

CSUMB: MILITARY BASE CONVERSION AS AN OPPORTUNITY FOR SUSTAINABLE DESIGN

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ABSTRACT

The conversion of military bases around the country creates an imperative to infuse social, economic, and environmental vitality back into the affected region. Fort Ord in Monterey County, a recent casualty of base closures, is being turned into an opportunity for adaptive reuse as it undergoes the transformation from an army base to a magnet campus for the California State University (CSU) system. The CSU Monterey Bay (CSUMB) campus visionaries included sustainability as a priority in the base conversion. To achieve this goal, the university hired a team of sustainable design consultants. This paper reports on the outcomes of the preliminary design and planning phases.

1. CLIMATE AND CONTEXT

The disposition of property at the former Ford Ord military base is approximately 28,000 acres of Coastal Dune, Maritime Chaparral, and Oak Woodland. The CSUMB campus allotment covers 1300 acres (Fig. 1) and includes representative samples of each of these biomes.

The climate is coastal temperate, rarely exceeding 21°C (70°F) in the summer or dropping below 6.1°C (43°F) during winter. The region is characteristically overcast especially during summer mornings. Winds are mild (3.6 m/s (8 m.p.h.) average wind speed) with occasional gusts. Annual precipitation is approximately 1000 mm (40 in.) most of which occurs in the winter and spring.

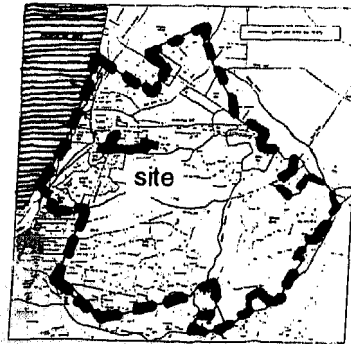


Fig. 1 Fort Ord Land Area and CSUMB Property

The Monterey region is a series of contrasts as it encompasses the agricultural basin of the Salinas River Valley as well as the coastal communities of Carmel and Pacific Grove to the south and Marina to the north. Industries in the region include retail, fisheries, farming, and tourism. The demographics of the tri-county region (Santa Cruz, San Benito, and Monterey counties) which will be served by the campus, is currently 60% White, 29% Hispanic, 4% Black, and 7% Other.

The campus aspires to be a model for education in the 21st century through its teaching methods and programs. The principal academic areas represented at CSUMB are the Sciences (marine, atmospheric, and environmental), Arts (performing, visual, and creative), Languages, Business, and Education. The university seeks to develop academic programs that respond to the distinct and diverse human populations and geography of the region.

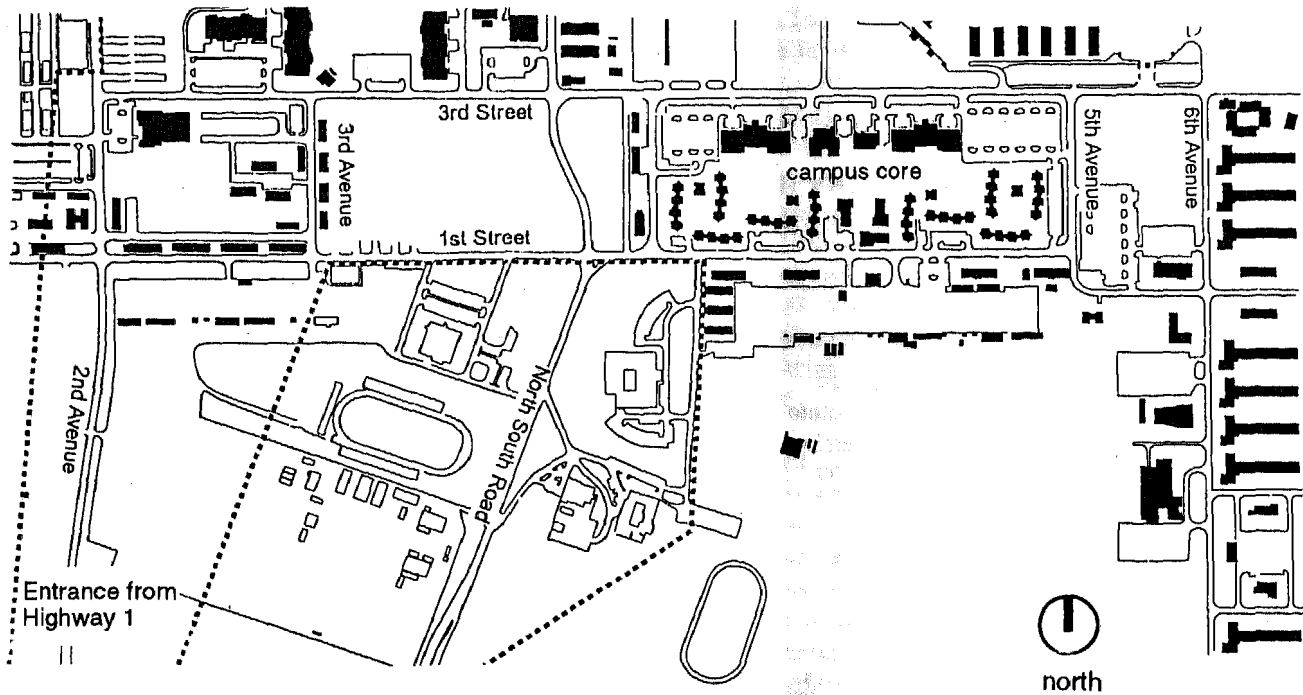


Fig. 2 CSUMB Phase One Renovation Campus Core

2. PHASE ONE RENOVATION

The first phase renovation is intended to provide for 1000 F.T.E. (full time equivalent) students who will arrive on the campus in Fall 1995. The short time frame, approximately one and one-half years from design through occupancy, posed numerous challenges for the design teams and consultants.

Facilities planning together with user groups and the design teams identified the "campus core" (Fig. 2) and selected a series of structures to be renovated for Phase One. Buildings in the Phase One renovation included adaptive reuse into instructional space, faculty and administrative offices, computer and language labs, an information resource center, student and community services, science laboratories, a small theater, gymnasium, cafeteria, dormitory, and library.

Of twenty-two structures to be renovated in Phase One, eleven buildings were constructed from one of four prototypical "patterns" used throughout the base. Due to the repetitive nature of the structures, our first proposal was to focus our study on two basic building types; the "duplex" and "six-module" buildings. In this way, we could optimize our services to the client by making recommendations which may be applicable to other structures of the same type. Although the buildings

appeared similar in the as-built drawings, further on site investigation revealed surprising differences in construction materials, structural and mechanical systems, and building configuration. A fundamental principle of sustainable design is to be cautious of "one-size-fits-all" solutions and to seek the particular design solution of the surrounding context.

We also sought to develop proposals for a "showcase" building where the client might be persuaded to concentrate funding. Our motivation was to illustrate those aspects that might be incorporated into other building designs given adequate time and financial resources. The reoccurring "six-module" (Fig. 3) building designated to become the campus library was selected as the demonstration building for the application of sustainable design principles.

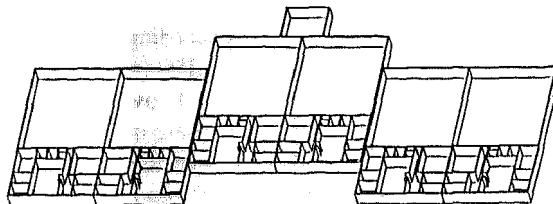


Fig. 3 Typical "Six-Module" Building

3. DESIGN PROCESS

After a competitive review process, the university hired several firms to perform master planning for the campus as well as construction management, landscape and architectural design services for the first phase renovation. Consultants were hired to assist in the areas of accessibility compliance and sustainability (also called “environmental responsibility”). As sustainability consultants, our group sought to review all aspects of design development *as it was occurring* in order to recommend modifications and additions to the project throughout the design and construction processes. In reality, the fast-tracked nature of the project and the administrative communication funnel reduced the interaction possible between ourselves as consultants and the other design professionals. Most consulting work benefits from being engaged throughout the design process and this is especially true for sustainable design. There is a significant need to participate with all members of the design team to develop comprehensive solutions that span more than a single discipline.

In spite of the limits placed on communication and integration described herein, opportunities for sustainable design were identified and planning recommendations were made relative to the first phase renovation.

4. SUSTAINABILITY ISSUES

Four areas were identified as providing greatest opportunity for sustainable design: (1) responding and connecting to the larger socio-economic and ecological context, (2) making tradeoffs between disciplines to reduce overall operating energy consumption, (3) increasing opportunities for daylighting, and (4) minimizing negative impacts on human health and the environment through “green” building materials selection. Initial recommendations to the client included an outline of work on all of the above. In reality, there was some initial involvement with the design teams and preliminary recommendations were made regarding the latter three areas which focused on the building scale. The task of identifying green building materials was taken further than the other proposed study areas. An abbreviated sustainable product guide was prepared for the client with general background information on selection criteria for products as well as sources.

Most of the consulting work was undertaken with the understanding that sufficient time may not be available for inclusion of all recommendations made during Phase One. However, it was recognized that any opportunities for sustainable design identified during Phase One may also be applicable in a future stage of design and construction. This

was considered especially relevant since the campus renovation will likely go on well into the next century.

4.1 The Broader Context of Sustainable Design

Those of us who have wrestled with its daunting scope are well aware that sustainability is comprised of more than energy conservation and passive solar design. Sustainability acknowledges that “quality of life” depends on diversity, equity, and holism for all species-- an interrelatedness that is found in nature and complex human-derived systems (such as cities). Therefore, a design solution will only be sustainable if it responds to the fullest range of scales, from macroscopic to microscopic, seeking iteration and feedback. In this scenario, the output of one resource stream becomes the input to another, thus minimizing unnecessary waste and maintaining a regenerative flow of information and resources. See Fig. 4 for the focus scales of CSUMB.

In the case of CSUMB, our analysis suggested that connections to the physical setting and watershed ecology had not been made as strongly as suggested by the context. The academic programs were modeled after a hierarchy of considerations based on limited aspects of local geography and demographics, emphasizing the immediate region’s unique marine environment and coastal populations. There were several undeveloped opportunities that, if recognized, could have created a stronger link to the regional context and benefited the long term health of the region.

One undeveloped opportunity is the tie between agricultural production in the region and university programs. According to *the Annual Crop Reports for the Tri-Counties*, Monterey County alone is the largest vegetable producing county in the nation. Global concerns over soil nutrient depletion for human food production suggest that possible teaching and research areas should emphasize sustainable agriculture which can be studied and field tested in the Salinas River Valley.

Another is creating the awareness downstream of the environmental impacts of agriculture, industry, and development along the upper Salinas River Valley. Although the university has slated an environmental science program, it is unclear how connected this program will be to the unique regional ecology.

Finally, changing demographics in the region suggests an examination of the role of multi-culturalism and the particular educational interests of expanding ethnicity. A 329% increase in the Hispanic population is anticipated for California between 1990 and 2030, the year when the campus expects to reach its full, build-out enrollment.

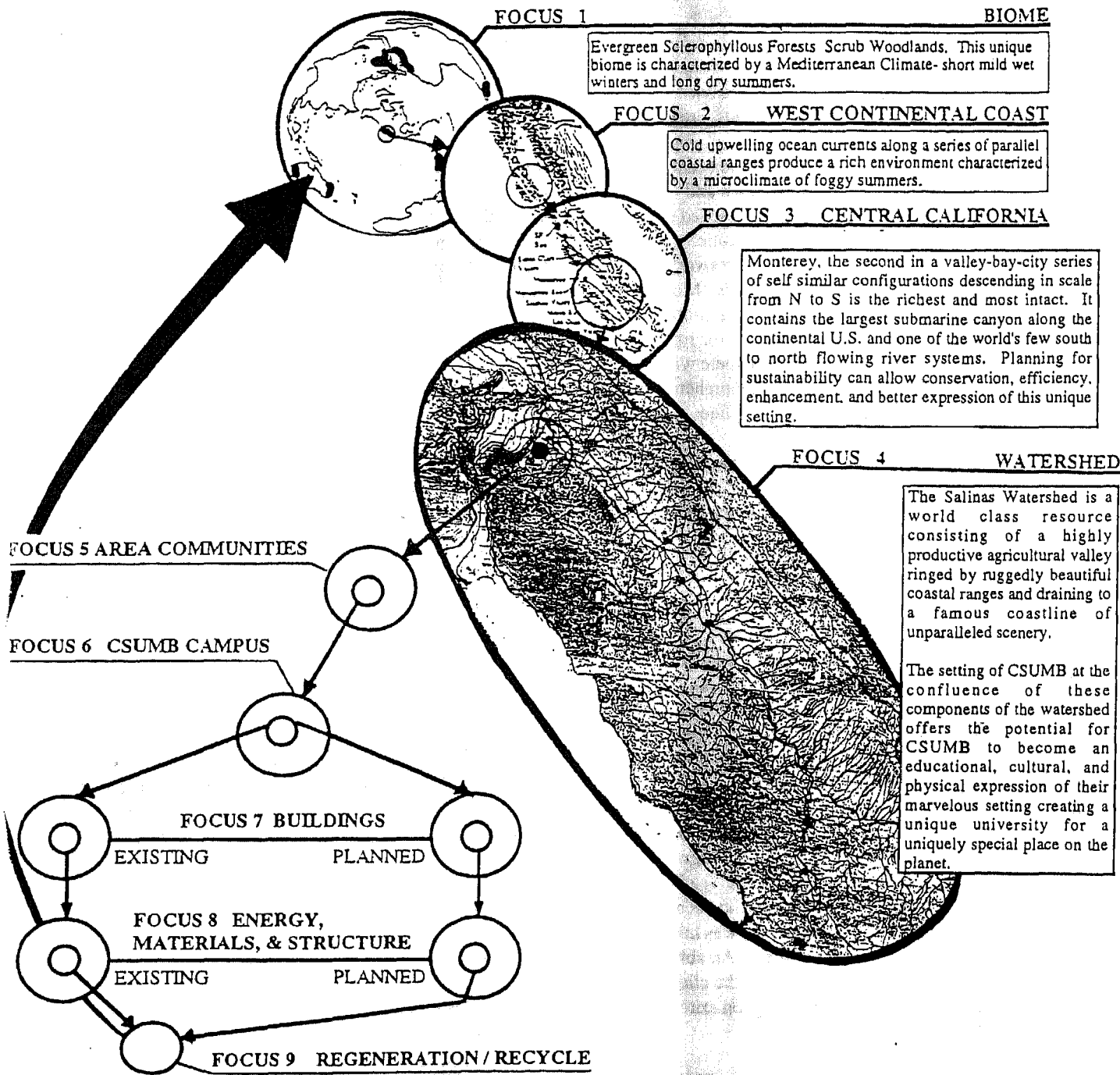


Fig. 4 Fractal Scan of the CSUMB Context

4.2 Comprehensive Building Analysis

In traditional architectural practice dealing with large or complex buildings, the architect gathers the expertise of engineers and other specialists and integrates the work of these consultants. If the architect is aware of the opportunities that exist for group problem solving, he or she may encourage interaction between disciplines during the design phase. The architect may facilitate the search for innovative solutions by bringing the various disciplines together and allowing for interactive creative and holistic problem solving.

Early in the CSUMB project, the sustainability consultants recognized the need for such interaction between disciplines and recommended areas that engineering sub-disciplines should consider for potential energy and cost savings such as tradeoffs between electric lighting and cooling loads. The cooperation that would optimize communication, issue identification, and problem solving between design professionals was not pursued by the university most likely due to schedule time constraints and the lack of familiarity with such a process.

Understanding sustainability is half the battle. Compared to other consultants who frequently provide advice at the level of details, our approach was to be generalists and limited architectural specialists at the same time. This seemed novel by conventional standards and beyond the scope of work one would expect from a sub-specialty. Sustainability consultants can in fact provide a unique skill in their ability to *integrate* information across disciplines, lead group problem solving, and identify areas that require further detailed study. In the case of CSUMB, daylighting was one such area.

4.3 Daylighting

The use of natural light in buildings as an amenity as well as an energy saving device has long been recognized. More recently, research is focusing on the productivity gains of providing natural light to office and manufacturing environments. At CSUMB, the architects sought opportunities for daylight, beginning with the library building, on both of these accounts but ruled out the possibility due to a very restricted budget.

Most of the architects sought to provide natural light through the use of skylights in the predominantly one storey buildings. Our objective was to assist their design intuition with accurate daylighting study models that showed before and after images of the proposed library building. We conjectured that if the client could see the oppressive nature

of a virtually windowless space that they would certainly find the means of creating one building with quality daylight. In the spirit of a providing a comprehensive building analysis, we also performed CALPAS simulations to show the benefits of daylighting from a thermal standpoint. Moreover, we suggested involving the design assistance team of the local utility in evaluating the project for incentive programs that could provide rebate savings which in turn could be applied to amenities such as skylights.

The final outcome of this analysis was that insufficient budget and time made it impossible to incorporate skylights during Phase One. However, the recommendation was to identify locations for future skylights so that improvements made during the first phase of construction would not be remodeled in subsequent phases.

4.4 Green Building Materials Selection

The one area of greater influence was in identification of green building materials for CSUMB. This task was seemingly straightforward as the abundance increases of information available to the general public on sustainable building materials. In fact, it is difficult to uncover the degree of environmentally-friendliness of most products on the market. A few services such as the Harris Directory, have limited their scope for this reason and provide a reliable and thoroughly researched listing. Green building products come and go daily and their is little consistency in advertising the merits of one product over another for comparison. Also, there is little certification of green building materials with a few exceptions such as sustainable yield timber.

With this in mind, CSUMB was provided with a brief outline for each material identified telling of its relative merits and the primary environmental issues concerning the material. In addition, a list of suppliers or distributors followed the summary description. All information, formatted according to the Construction Specifications Institute (C.S.I.) Masterformat, was indexed as to the source. The categories that qualified a material to be in the guide were: locally manufactured, (post-consumer) recycled content, recyclability, low toxicity, durability, low outgassing, recoverability and reuse. Few products meet all of the above criteria and clearly the best product meet as many environmental criteria as possible.

Finally, our goal was to work with the construction specifier to ensure integration of green building materials, proper installation, documentation and follow through. Moreover, we expressed the need to have input to operations and

maintenance procedures which also impact the longer term serviceability and effectiveness of the products. These services were not requested by the client in time for inclusion in Phase One.

5. OTHER RECOMMENDATIONS

In addition to the four sustainability issue areas recommended for our initial consulting, our original proposal to CSUMB included assistance with master planning, especially in the area of sustainable infrastructure. Since water and waste treatment are certainly to be of serious concern to the development of the campus, our team was especially interested in presenting alternative methods of biological wastewater and solid waste resource recovery. The sustainability consultants are currently engaged in a similar proposal for Cal Poly, San Luis Obispo. Other renewable and alternative technologies related to infrastructure include electric vehicles, water reclamation and conservation, photovoltaics and solar water heating, and wind energy.

With respect to the visual character of the campus, it is commonly understood that the campus suffers from a lack of physical identity and center, especially while many of the buildings remain unoccupied. Our team made recommendations for using landscape elements and environmental art that would especially engage the first class of students and faculty to create a sense of place. Vehicular and pedestrian paths could also be used to strengthen the loosely formed campus and to make the connections to remote points such as the distant married student housing.

6. CONCLUSIONS

In spite of living in a global society with few restrictions on trade and travel, the viability of a region ultimately depends on how well communities invest in the social, economic, and biological needs of species and habitat (human, plant, and animal). In the words of environmentalist David Brower, what is needed is "CPR: Conservation, Preservation, and Restoration for the planet" which must be performed first and foremost at the local level thereby satisfying needs of all members of the immediate community. Our consulting team sought to bring the broader spectrum of sustainability issues to the table going far beyond building issues.

Although the CSUMB project has not reaped the rewards of first phase sustainability consulting, we believe that the

university is committed to positive environmental change. The Phase One renovation has placed severe demands on all persons involved with the project but the university's intentions towards observing environmental responsibility have been made evident. Since sustainability consulting is a relatively new field, consultants will likely bring one strength and must resist the tendency to limit their focus to that single area. The ability to think broadly as well as provide a degree of professional environmental design expertise are central to creating sustainable environments.

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