

Associate Vice President and Senior Laboratory Planner
Cannon Design

Animal Enrichment Influence on Facility Planning and Design

There has been growing interest within the lab animal industry, as well as the governing bodies and agencies that provide oversight and guidance to both public and private research organizations regarding the value and importance of “enrichment” for a variety of species, especially nonhuman primates (NHP’s) and canines. The current trends have extended beyond the basic use of toys, foraging boards and nesting materials to a holistic building design approach. This approach incorporates programmatic elements for playrooms, natural light and views to the outside environment. It also includes open

group housing and animal runs that support a healthy social environment that mimics the animal’s natural, social, and physical environment.

In the United States, the *Guide for the Care and Use of Laboratory Animals* as well as the USDA—ARS *Facility Design Standards 242.1* offer minimal prescriptive guidance on facility design requirements or suggestions that would create opportunities for improved species enrichment. Research organizations have had to turn to other sources such as the EU’s *Appendix A: Guidelines for Accommodation and Care*

of Animals (Article 5 of the Convention) or internally developed guidelines which outline facility features that champion enrichment housing solutions. It is alternative guidelines that have driven design solutions to open pens with greater areas and volume per animal as well as emphasize the value and importance of daylight and views to the natural environment as critical to the physical and psychological well-being of the animal.

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CANINE HOLDING ROOMS—LONGITUDINAL SECTIONAL

The importance of facility designs that incorporate animal enrichment has become evident during recent tours of academic institutions and through personal involvement in the planning and design of a drug safety assessment facility. Increasingly, facility design is influenced by the species used and research activities and functions that support the scientific mission. However, the use of less dense, open social pens with increased area and room volume to allow for free climbing and animal movement, as well as the incorporation of natural light into the animal holding rooms, is a constant.

When embarking on a facility design, planners should examine a number of physical and operational factors when migrating from a traditional vivarium design that utilizes one-over-one or two-over-two caging paradigms to an open penning arrangement. The characteristics of each species and the impacts to animal handling and husbandry practices must be considered when deciding how to design an open, healthy and enriching environment. The facility design concepts should account for the animals' locomotion patterns. Designs should allow for ropes, bars, platforms and perches to permit a variety of physical activities as well as the incorporation of nesting and isolation boxes for refuge, solitude

and safe haven. Operational protocols need to be developed in conjunction with the facility design to address issues such as how to isolate and control an aggressive animal within an open pen design. A focus on positive reinforcement and clicker training to aid the animal care staff with effectively moving and isolating animals during either cleaning activities or research procedures needs to be investigated. When animals are allowed to run freely, materials for walls and floors surfaces need to be fully evaluated because of the heavy wear and tear caused by the direct contact of animals and the cleaning process. Because of the direct contact, final finishes need to be evaluated to ensure that the materials are not detrimental to the health of the animals.

Key Design Drivers

The experience of designing a safety assessment facility for a confidential corporate client offers important insights into key factors that drive the process. The first was the corporate mandate to design an animal facility that would incorporate open social pen environments for the housing of both canines and nonhuman primates. The corporate push to integrate the requirements of both the EU *Appendix A* and internal guidelines set a foundation for the design team as well as the animal care and

research staff to develop an animal facility that would place enrichment and the social interaction of the animals at the forefront of the design effort. This foundation set the tone for the early forums and collaborative design charrettes where the design team, along with the animal care

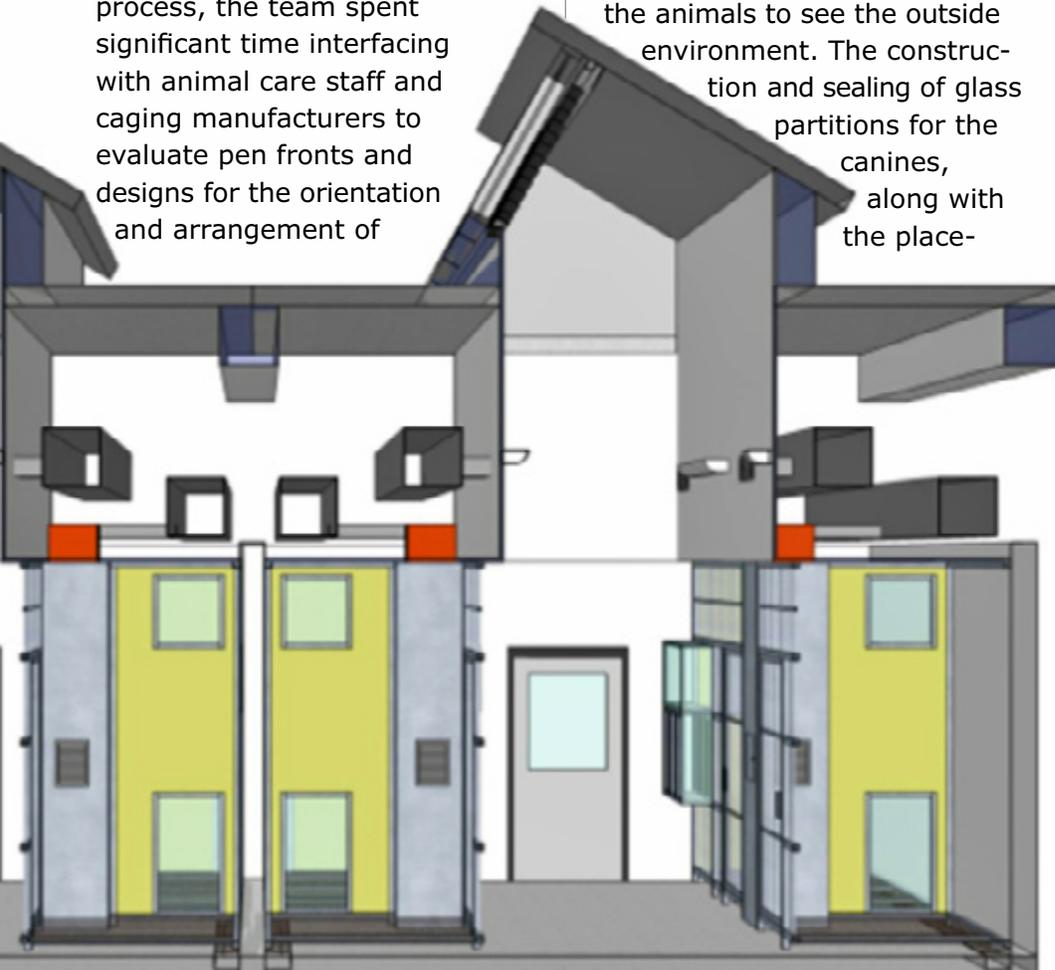


NHP HOLDING ROOMS—CROSS SECTIONAL VIEW

and research staff, focused on the macro level criteria for pen volume and area per animal in addition to the spatial adjacencies and plan configurations that would support safe and effective research and animal care protocols.

The second was the time and attention spent on evaluating

and developing construction details that would not adversely affect the built environment and the day-to-day research and animal care operations. During the later stages of the design process, the team spent significant time interfacing with animal care staff and caging manufacturers to evaluate pen fronts and designs for the orientation and arrangement of



the bar and mesh materials to ensure there were no pinch points or areas where NHPs could get fingers or limbs caught. Time was spent evaluating with the animal care staff the effective height of resting boards for canines, along with the appropriate mix of flat and raised flooring and the profile of the grating material to ensure that the canines would

not develop interdigital cysts. A great amount of attention was placed on the design of full glass walls in the canine holding areas and skylights in the NHP holding rooms to allow the animals to see the outside environment. The construction and sealing of glass partitions for the canines, along with the place-

ment of skylights in NHP holding rooms and coordination with the MEP distribution, consumed a significant portion of time to ensure the ability of staff to effectively clean and maintain the facility.

Conclusion

The trend to integrate animal enrichment within a holistic

building design approach that provides for a more natural social and physical environment for the animal is growing. There are a number of issues to evaluate and balance with regard to staff and animal safety as well as standard operational protocols within traditional facility designs that simply cage animals. It is critical that the animal facility management champion and drive the change to an open and enriching animal holding paradigm. Also, the full engagement of the animal care and research staff to review protocols, flows, plan configurations and pen and room design details is key to the successful integration of a holistic design approach for the animal holding environment.

Erik Terry has 17 years of experience focused on a variety of vivarium planning and design projects for a diverse base of clients including Higher Education, Government, Institutional, Pharmaceutical and Biotech companies. With a broad range of experiences with developing strategic/master planning initiatives as well as providing programming and planning services for vivarium design projects, Mr. Terry works with scientific users, designers and engineers to develop innovative solutions for the changing research environment.