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ENGLISH TRANSLATION OF CLARK STEVENS' WILDLIFE CROSSING IN AGOURA HILLS INTERVIEW

Could you tell us a bit more on the specific context/area/highway on which the crossing will be built?

the site is in western los angeles county, where the santa monica mountains, a coastal "transverse range" running east to west (like the amalfi coast) is separated from critical habitats to the north by lanes of the 101 freeway and a 2-lane parallel access road. the specific crossing from the santa monica mountains in the south to the simi hills in the north, is between the cities of Calabasas and Agoura Hills

Why is it important to build it, what is its significance for the area and its inhabitants (humans/not humans)?

the 101 (Ventura) freeway created an ecological barrier between the santa monica mountains and larger habitat areas to the north for decades. this has isolated many of the diverse species of our mediterranean ecosystem to the extent that several are exhibiting dangerously high levels of genetic isolation, that in the extreme can lead to infertility and local extinction. in the case of the mountain lions, a recent peer-reviewed study determined that there is a 90% chance of local extinction of mountain lions (pumas) within the next 50 years. however, with even one new breeding individual from outside the santa monicas about every 2 years, this decline can be stopped. for mountain lions, the landscape-scale wildlife overpass is the only reliable solution, and will also be used by other species- including sensitive bird and reptile species- that can not make it across one of the widest and busiest freeways in the world.

while the wildlife passage habitat (8 total acres of which about an acre is supported by bridge) is not designed to connect human users (they already know how to cross freeways), it is significant for the people of los angeles that they still have the opportunity to steward a companion species of big cat. no other city of this size outside of mumbai, with its leopards, can make such a choice. while there are critical ecological reasons to maintain apex predators in the food chain, for the thousands of local supporters of the project, the spiritual reason are perhaps as important.

Who will be the "users"?

everything from lizards to lions, butterflies to birds, will be able to use the crossing- and that would otherwise never see the other side in their lifetime. but again, genetic material will be a user of this landscape crossing, creating a critical passage that will allow for adaptation of species over time as ecological and climate conditions change.

Design

What are the main challenges in designing this typology of bridge?

one practical challenge comes from the geometry and topography of the crossing site. from a wildlife access perspective, it is our best remaining option, and yet narrows to only 1600 feet of potential crossing area with publicly owned land on either side. it is our last best place for an habitat linkage of this scale.

but the site is located where the freeway scraped off the “nose” of a mountain slope, leaving significant differences in elevation from one side to the other. therefore, the south approach slope must climb nearly 80 vertical feet to gain the clearance required over the freeway, in a very short horizontal distance because we do not want to impact the existing creek and legacy Valley Oaks on the south side of Agoura Road. to create a useable slope, with continuous line of sight for crossing wildlife requires a very specific placement of the main span, and the shallowest possible structural depth at the south abutment of the freeway. we essentially are putting back the “nose” of the mountain. in addition, we need the approach topography and vegetation to crop the light and sound of the freeway as much as possible. to do this, we are excavating the area where the fill from the highway work was placed, creating a restored riparian woodland area with narrow valleys climbing to the level of the overpass. we are trying to get the wildlife onto the bridge portion of the passage, without them ever realizing they are over a freeway

the other primary challenge will be aesthetic- this is not so much a bridge, as a habitat replacement project. it is tempting to think of this as a bridge, when it is really architecturally solid terrain through which vehicles must pass. ecologically speaking it is functionally the most important terrain for miles in either direction. as such, we think (at least some of the team) that it should be treated not so much as a decorated bridge- however well designed and typologically considered- but rather as a continuous flowing surface, a topography, even from the perspective of the vehicles. again, we are restoring the face of the mountain, and linking landscapes.

of course, we need to work within the standards of CalTrans (our state department of highways), and avoid designs that would slow construction and traffic on one of the world's busiest freeways. so while we are just beginning the final design phase, and our design team will grow and study more options, our initial approach that you see in the latest model and design works from cylindrical and warping, parabolic, geometries to create sound walls that flow as a landscape and deflect and diffuse sound. (see attached sketches and model images). there is no fragmentation of retaining walls, abutments, piers, spans, railings, with attendant decoration- but a continuous linked form- appropriate for a project whose entire purpose is to eliminate fragmentation and create linkage

right now, the net result reminds me of the mouth of a manta ray....

What are the basic technical requirements for the project? (dimensions, structure, landscape design etc)

the structural elements of the crossing form consist of two primary crossings over Agoura Road and the 101 Freeway.

the smaller road crossing is near the base of the south approach landscape, and is required by the city engineers who manage the road to be 54' wide and 18' tall at the center. the length of this span will allow about 200' of landscape surface to pass over the road.

the highway crossing is designed to be as wide as it is long to create an inviting broad passage to accommodate multiple species. there is a line of support at the center median strip, so the main crossing consists of two spans about 90 to 100 feet in length, with the width tapering from 200' at each abutment to about 170' at the center.

the south approach landscape spreads from that 200 feet of width at the 101 South abutment as a large fill slope in a broad, conical surface to allow for gentle slopes from the SE and SW. the span over Agoura Road also allows for a more gentle gradient on that conic surface perpendicular to the south abutment to the edge of the small creek below. the base of the approach "cone" varies to accommodate the root structures of the valley oaks, and as a result creates small valleys within the surface that will be vegetated as natural draws in a coastal sage-scrub and oak woodland landscape. the slopes vary from small areas of almost 2:1 (the maximum for structural fill) to about 6:1. again, about 1/3 to 1/ of this earthen fill will be the same earth that was originally taken away in the 1970's and that filled the creek valley on the NW side of the project area.

this southern approach surface will cover about 3 acres, about 1 acre total supported by structures. we have learned a lot about green roof construction, so the bridge will be able to support appropriate habitat, even trees, with deeper soils and heavier vegetation located in the vicinity of the vertical supports at the abutments and freeway median.

How does the fauna reacts to this kind of structures? Does it become a funnel for predators?

we studied various forms of crossings in the early stages of conceptual design. the landscape scale overpass accommodates the greatest number of species. but we also created an initial phase that simulated a creek channel leading from the habitat on the south, under the freeway at the liberty road under crossing, and cleaned out a 5' tall, 300' long tunnel entrance as part of the project (already complete). it was soon found and used by a single lion, named P-64 by researchers, who used the crossing over a dozen times before he died from injuries suffered in the 2018 Woolsey wildfire.

because of fear of predators, deer will not use tunnels, and birds will not fly through them. deer and other ungulates have been shown to successfully use the same overpasses used by their predators.

however, we will continue to exploit every possible crossing location and type between these two habitat patches- this is all about increasing the probability of the greatest number of species making the greatest number of safe crossing possible

We agree that there should be a crossing like these for any street in the world set in nature, be it secondary or a highway. But how costly is it?

it would be FAR less costly if crossing had been designed into the original freeway. in fact, accommodating habitat linkages are becoming standard requirements in freeway construction in the US. however, this is an old freeway, built before many thought of or cared about habitat fragmentation. now, we have to build over an operational freeway, move major power lines and other utilities (which is a significant portion of the total cost), and re-form 8 acres of landscape. most of that expense could have been avoided.

another reason we “went big”, is strategic. a previous design for a tunnel at this location went unfunded, and frankly unnoticed for several

Are there any smaller-scale solutions that can be employed?

yes, and these are being used, improved, and monitored for effectiveness in many other crossing locations within the region. that being said, the most genetically at-risk species, our mountain lions, are naturally funneled to this Liberty Canyon location, and at this location, the landscaped overcrossing proved to be the most effective for the most species, and (surprisingly) more cost effective than a large tunnel that would have required temporarily cutting a section of the freeway and re-covering it weeks later. that would have been a true “Carmaggedon”

How did you come up with the final shape? What was the concept?

much of it comes from placing the toe of the slope at the maximum extent and distance from the crossing, then creating a surface (a digital mesh, initially) from toe to abutment, and moving the abutment to the location that optimized the slopes for the gentlest average gradient possible. see digital studies attached. i already discussed the concept for the continuous “sound wall” surface above.

What were your main references for the project?

the original landform and topography of the mountain face that was once at this location. of course, the technical requirements and evaluation of effectiveness come from wildlife experts, particularly those working in Road Ecology. In fact, the National

Park Service convened a group of wildlife crossing ecologists from across the country to evaluate a number of sites and approaches before we began, and selected Liberty Canyon as the best available first site.