

# Habitat Trails: A Low Impact Habitat for Humanity Neighborhood Development

JEFFREY E. HUBER

University of Arkansas

AARON GABRIEL

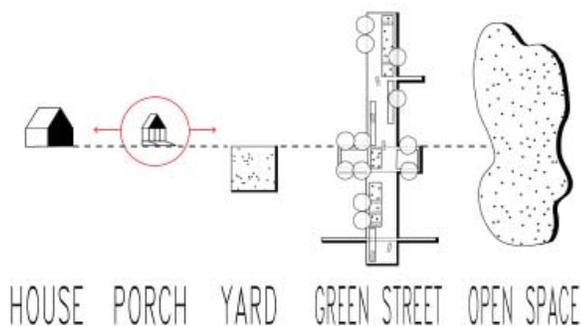
University of Arkansas

STEPHEN LUONI

University of Arkansas

How might we protect and enhance critical ecological services while improving social capital within developing urban areas?

According to a 2000 census, Benton County, Arkansas was ranked the third fastest growing county in the U.S. As in many regions, rapid growth coupled with a lack of alternative development models has prevented the integration of natural systems within the built environment. *Habitat Trails* provides the city of Rogers with a new development model designed to accommodate Habitat for Humanity standards. The neighborhood design consists of 17 dwelling units at an average of 1,100 square feet and a construction budget of \$55 a square foot, offering high-value, affordable residential solutions to a historically underserved population and the surrounding community. The challenge was to create place from the housing provider's modest single-family home specifications on a donated, formally agrarian five-acre greenfield site, while introducing a biological stormwater treatment system that integrates ecological services in a neighborhood infrastructure.



Habitat for Humanity and other non-profit affordable housing providers—including their design and consultant networks—may be the primary vector to mainstream Low Impact Development.

## LOW IMPACT DEVELOPMENT (LID)

What is it and why?

LID is an ecologically-based development model, emphasizing regenerative site design. Regenerative design employs technologies for restoring water quality impacted by urban stormwater runoff, and for protecting critical ecological services in urban areas. Urban stormwater runoff is not only the costliest management service provided by road infrastructure, but is also the single greatest cause of nonpoint source pollution in watersheds. The first hour of urban stormwater runoff has a pollution index far greater than that of raw sewage. Moreover, research shows that due to stormwater runoff, impervious surface coverage of just 30%



of a watershed leads to irreversible environmental degradation. Best management practices in ecological engineering alone will not change nonpoint source pollution problems, since environmental planning and urban planning—each with their own metrics and optimization tendencies—are currently practiced as separate fields. *Habitat Trails* offers an integrated development model that embeds ecological metrics into urban planning templates, land-use policy, and infrastructural design.

### THE REGENERATIVE DEVELOPMENT TRANSECT

Leveraging Urban and Ecological Services

Conventional residential development models separate infrastructural planning from individual property development. On the contrary, neighborhood planning for *Habitat Trails* integrates LID site design with environmentally passive strategies in architectural design. This approach comprises a residential Regenerative Development Transect (see previous page) that leverages urban and ecological services latent in the house, porch, yard, street, and open space.

### PLANNING APPROACH

Parks, not Pipes

Several factors concerning affordability and client maintenance participation limited the types of sustainability strategies employable at *Habitat Trails* to those that were passive or infrastructural.

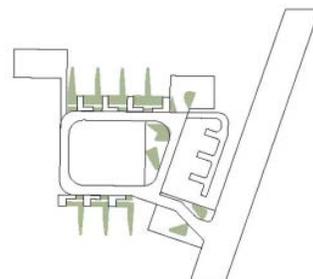
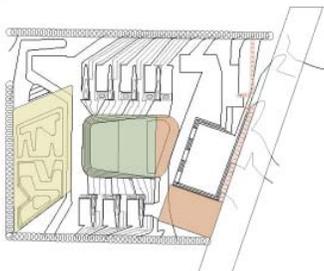
Municipal protocols required that the site have only one curb cut, and uncooperative neighbors prevented connectivity to adjacent properties. An entry court provides a “handshake” to the neighborhood, and unlike siting practices in nearby developments that turn their backs to the street, *Habitat Trails* addresses the street by providing shared open space that can be used by both *Habi-*

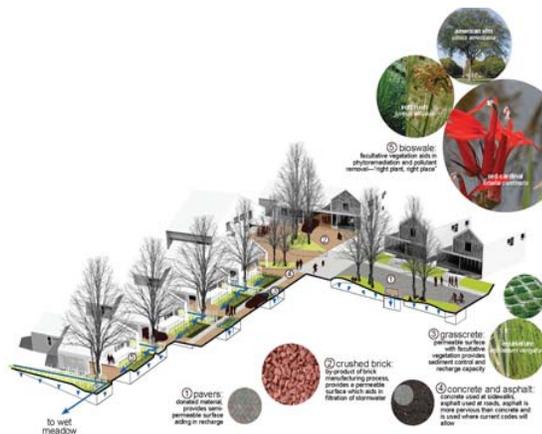
*tat Trails* residents and those of the surrounding subdivisions.

To capture construction savings and to minimize ecological disturbance the neighborhood is developed in accord with the site’s existing hydrological drainage, catchment, and recharge patterns. Stormwater runoff generated by new development will be retained and treated through a contiguous network of bioswale corridors, infiltration trenches, stormwater gardens, sediment filter strips, “green streets” and a constructed wet meadow. This treatment landscape substitutes an ecologically-based stormwater management system for the expensive curb-gutter-pipe solution in conventional civil infrastructure. Ratification of a property owners association ensures maintenance of neighborhood amenities and LID solutions. Affordability is enhanced through capital and life-cycle costs savings in infrastructure design—unlike conventional civil engineered solutions, LID technologies become more resilient to failure and require less maintenance as they reach successional maturity.

### GREEN STREETS

*Habitat Trails’* streets are designed as landscapes to calm vehicular traffic and provide stormwater management functions. “Skinny streets” surfaced with pervious grasspave parking strips and granulated stone in auto parking courts minimize costly, impervious pavement while dampening motorist speeds and provide an alternative to the cul-de-sac. This reduces street costs from \$450 to \$250 per linear foot while enhancing pedestrian facilities. Ecological stormwater management solutions enhance water quality beyond the minimum detention requirements, dissipate peak flows to prevent flooding, provide erosion and sediment control, and are not prone to the systemic failures common in civil infrastructure. The collateral ben-

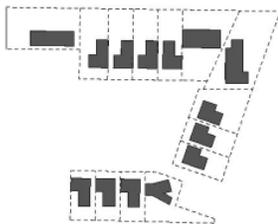




efits include enhanced pedestrian-oriented environments, safety, additional passive recreation, and provision of wildlife habitat. Contrary to civil pipe-and-pond solutions, the street becomes a net producer of ecological and social services.

### HOUSE TYPOLOGIES AND NEIGHBORHOOD INTEGRATION

*Habitat Trails* employs an extended living transect, consisting of public (street) and private (home) ecotones with the porch as a hinge component. Fourth-year architecture students participated in the design of the housing fabric and were held accountable for the integration of site LID technologies and passive architectural solutions that addressed Habitat for Humanity's modest budget and volunteer labor force constraints. House forms and construction typologies were set by the client, so the challenge was to construct place within a single-family detached affordable development model. Bioswale corridors replace the individual green lawn, providing infrastructural stormwater services while also visually linking porch and street. Porches establish an urban fabric linked to various neighborhood landscapes based on spatial types, solar orientation, and auto storage configurations. As outdoor rooms, porches



extend the home's modest internal living space and function as elevated breezeways to promote convective and cross-ventilation through home interiors. These neighborhood ecotones serve as context-producing systems and cost-effective strategies for achieving quality within affordable parameters.

### LID IMPLEMENTATION

#### Municipal Codes and Policy

The project received 30 zoning variances from the city of Rogers, and LID solutions like the ones proposed in *Habitat Trails* are illegal in most other U.S. cities. To overcome the obstacles of single-use zoning requirements and the obduracy of existing infrastructure and emergency services models, the project team established an immediate collaboration with the fire department, street department, and public utilities—organizations that essentially govern land development. Rather than view city departments as downstream regulators, designers established collaborative relationships with government agencies to leverage their embedded technical knowledge allowing *Habitat Trails* to become Arkansas' first "green" neighborhood.

### COLLABORATION AND EARLY ADOPTERS

Beyond the local interest generated for the project, *Habitat Trails* is affecting land development policy in the region. Fayetteville, a similarly sized



city to the south of Rogers, has pledged financial and political support for affordable, LID neighborhood development and is currently working with the University of Arkansas Community Design Center and its design partners. The Northwest Arkansas Regional Planning Commission has adopted *Habitat Trails* as a model for all new residential developments and the project has been generously awarded among the national design and planning communities.

Still, although LID capital and operating costs are less expensive, more land area is required, which is not compatible with most for-profit development models. The project is a collaboration among the university research community, for-profit and non-profit design organizations, city public works, the local corporate community, and a housing provider representing prospective homeowners. Since non-profit housing providers returns on investment are based on combined social, environmental, and economic benefits, they are the most likely candidates for adopting LID.