

Convergence of Intensity: How to Use GeoDesign Tools to Shape a City

Constance Bodurow of Lawrence Technological University, Studio [Ci] presents "Convergence of Intensity: How to Use GeoDesign Tools to Shape a City" at the 2011 GeoDesign Summit.

<http://video.esri.com/watch/178/convergence-of-intensity-how-to-use-geodesign-tools-to-shape-a-city>

Video Transcription

00:01 Our next speaker is going to be Constance Bodurow from the Lawrence Technological University, studio[Ci].

00:15 Good morning.

00:16 Constance Bodurow from...I'm the director of studio[Ci], which is a design lab within the College of...

00:21 ...Architecture and Design at Lawrence Technological University.

00:26 We're a multidisciplinary team of architects, urban designers, civil and environmental engineers...

00:32 ...and we utilize a variety of digital technologies to visualize three-dimensional urban density.

00:38 We try to vividly illustrate the built, natural, social, and cultural environments of the city...

00:43 ...and its neighborhoods by working collaboratively with communities.

00:46 We create land use, urban design, and architectural proposals to recommend future dense sustainable urban form.

00:59 We're urbanists, and we're interested in the future of urban form.

01:03 We believe that cities should be the most desirable place for human beings to live.

01:10 We believe that density is sustainable and should be broadly defined and visualized utilizing diverse metrics.

01:18 We also believe that there's a new urban geography and ecosystem that's required and that ecosystem...

01:25 ...would leverage the assets and complex combination of forces that actually shape the city.

01:32 We also think that geodesign tools have a role in this, particularly those that include...

01:36 ...value and asset-based community-driven approaches to identify resources...

01:43 ...minimize liabilities, and support the creation of this new urban geography and ecosystem.

01:49 So our work bridges the disciplines of design and geography.

01:54 We believe that the best and most relevant approach to design incorporates and balances both the qualitative...

02:00 ...and the quantitative through an iterative process...

02:04 ...and that the powerful tools of GIS and other parametric softwares are well suited to finding that balance.

02:12 We work primarily in Detroit, Michigan, and that is a city that's received a lot of attention...

02:18 ...from the media and also the design professions.

02:21 Specifically, we've worked in southwest Detroit, which is a vibrant, 20-square-mile neighborhood...

02:26 ...located on the Detroit River.

02:28 It's growing and thriving and pretty much defying the generally negative depiction of the city of Detroit.

02:37 So we feel that Detroit is a place of worth, and through our work we seek to vividly illustrate the...

02:43 ...built, natural, social, and cultural environments of Detroit and its neighborhoods...

02:47 ...and produce design outcomes using innovative geodesign approaches.

02:51 We've developed an interface, and some of the output of that interface is on the slide you're looking at.

02:57 This graphic is now affectionately known in our lab as the stamps graphic, illustrating...

03:03 ...some of the 115 layers that we've mapped regarding the neighborhood.

03:07 So our interface combines the capabilities of Esri ArcGIS, Google Earth, SketchUp...

03:14 ...and other softwares to model physical and social density and value in three dimensions...

03:19 ...and that's the key is we model in three dimensions.

03:22 So we use these familiar tools, but we believe - you'll let us know - that we're generating unique...

03:27 ...compelling, and vivid outcomes that help us model urban design principles and guide our design...

03:32 ...and density recommendations.

03:35 So, using our data and it's a criteria-driven geodesign approach, the community has maximized...

03:41 ...its opportunities and minimized liabilities.

03:45 We think the fundamental question designing the city in this century is where and how will we...

03:50 ...sustainably develop or densify and support residential populations and infrastructure, services, and investment.

03:58 Answers to these questions are often dominated by a capricious political market and social forces.

04:05 So, again, we feel a consistent description and application of metrics or criteria is essential.

04:11 Our response to that question is CI - convergence of intensity - which is a value-based approach utilizing geodesign tools.

04:20 CI proposes specific criteria for the form of the city, arguing that...

04:24 ...balanced, sustainable, dense, and urbane development is possible.

04:29 Our methodology to empower cities is to proactively identify and design for a coming together of population...

04:34 ...energy, capacity, investment, and infrastructure, which we define broadly as blue, green, gray...

04:41 ...and white infrastructure, as well as taking into account the existing built form of the city.

04:48 So this spatial convergence which is diagrammed at the top right, we think it can help define the...

04:56 ...purposeful phenomenon of revitalizing the city based on these broadly designed metrics.

05:02 And again there's a little screen capture of the interface at the bottom.

05:07 I wanted to demo the interface, but given the limited time, I'm actually going to use some videos to describe our methodology.

05:15 We have a three-step methodology.

05:17 First, we identify and map these broadly defined density metrics in three categories.

05:23 We use primarily publicly accessible data from a variety of sources - the U.S. Census and others...

05:29 ...to create data layers with our interface.

05:33 And again, we create three-dimensional extrusions because we believe that the...

05:38 ...community can more easily see and interpret the implications of these concentrations of...

05:43 ...density using three dimensions.

05:46 As I've said, we've mapped over 100 layers to date, which include thousands of datasets...

05:51 ...and I'm just going to demonstrate a couple of videos here to give you just a taste of some of

the things.

05:59 The first video shows population density by census tract in Wayne County with the concentrations...

06:05 ...in southwest Detroit.

06:07 This is a change of age of teenagers in the neighborhood.

06:13 Next we're going into a cultural or place category.

06:16 This is a SketchUp model of Holy Redeemer Church and school...

06:20 ...which is a very important cultural resource in the neighborhood.

06:25 The third infrastructure category, you're looking at park buffers, the walking radii from...

06:31 ...established City of Detroit parks in the neighborhood.

06:35 Here you see established existing and proposed blue/green/gray and white infrastructure.

06:42 Billions of dollars are being invested in this neighborhood.

06:45 And then you also see a small parking capacity graphic here in the Corktown neighborhood.

06:50 So that's just a variety of the things that we're mapping in terms of data.

06:56 Our second step we call analysis layerings, or mashups, utilizing the data layers to inform policy, planning, and design.

07:06 Our methodology and interface allow for data layers to be overlaid and used simultaneously.

07:11 So you can easily see that convergence of density of the resources and assets.

07:18 These help us have a collective dialog with the community and informs decision making...

07:23 ...design recommendations, and implementation.

07:27 So, I'll play a couple of videos again of two different analysis layerings that we've created.

07:35 The first is a transit analysis layering to argue for a commuter rail stop.

07:39 This is a right-of-way to the Ann Arbor to Detroit rail link that does not currently have a stop...

07:43 ...in the most densely populated neighborhood of the city.

07:46 Here's the population density.

07:47 Here's the layer that shows vacant parcels by ownership where you could site a stop in the neighborhood...

07:53 ...and there's the combination of the three.

07:55 So the community's using this right now to make an argument to actually site a transit stop...

08:00 ...in this most populous neighborhood of Detroit.

08:05 The second video is a, more of a water quality - oops, pardon, I hit the wrong one. Let's see.

08:18 Hold on. Move on. They all look alike.

08:30 Help! Need my [unintelligible]. Man, I was on a roll.

08:45 There's always got to be something, right? Okay, I think that one's it.

08:49 And then CTRL+L, is that right, Nick? Hope this is it. Okay, so this should be...Yes. Great.

08:57 These are the floodplains of the Detroit and Rouge Rivers.

09:01 And then you'll see the percent impervious surface in gray and the present pervious service...

09:07 ...in the neighborhood in green.

09:09 And then we have average daily traffic on the major state roads.

09:12 So the community's using this analysis layering to evaluate non-point source pollution and other...

09:17 ...environmental impacts and then we hope eventually, as we get into real-time analysis, we can start to look at...

09:23 ...different density recommendations.

09:27 So our third step is design using our geodesign tools, and I'm going to give you one example of how...

09:34 ...we've used the interface for design.

09:36 Our first example of that is we basically mapped five categories in the convergence of intensity approach.

09:44 So here you see a rate across the top - energy, where we looked at informal cultural assets...

09:50 ...capacity, which was modeling the as of right; build-out envelope, population density by block group.

09:58 Investment, we're looking at business and employment density by block group in the neighborhood...

10:01 ...and infrastructure, where we looked at neighborhood parks greenways, and again that proposed rail link.

10:07 So that initial look at the convergence, we get then the new geography of the city, where we want to...

10:12 ...actually focus our recommendations to densify.

10:16 Another video, and a reminder here that our context, the majority of our work is in Detroit, Michigan.

10:26 This is a district-scale design application. We partnered the Southwest Detroit community...

10:31 ...and the community selected Scotten Park, which is a 53-acre area of the neighborhood, as a beta test.

10:36 They had received Michigan State Housing Development Authority subsidies to build housing in the district.

10:41 So we first conducted site visits and did existing conditions documentation.

10:45 We generated digital models of existing built and proposed fabric for the study area.

10:52 This image shows you their proposed MSHDA application, which is a very low-density...

10:56 ...townhouse proposal on the development parcels.

10:59 We then went about looking at how we could densify this particular neighborhood.

11:04 We identified all the vacant parcels that were buildable and realistic for development.

11:10 We came up with about 30; we then developed some urban design rationale, looking at the...

11:15 ...again, that zoning build-out envelope.

11:18 What are the height setbacks and those kinds of requirements.

11:22 We looked at solar orientation. The neighborhood is sort of ideally southern, located with southern exposure...

11:28 ...so we proposed our building massing to reflect that and maximize sunlight for...

11:32 ...the residents and green infrastructure.

11:35 Street grid, actually the perimeter streets already have very strong ground-level retail and commercial...

11:40 ...retail, so we emphasized that.

11:43 We came up with building topology and program, based on what the community wanted...

11:48 ...and we actually recommended two new building topologies with mixed use and apartment residential.

11:55 So, this particular proposal that you see here, we call it our max zoning proposal, it's about 55 units an acre...

12:02 ...it's six-and-a-half times more dense than the application they had actually made to the state.

12:08 Based on the subsidized development economy in Detroit, people don't really even know what they can build...

12:12 ...as of right until we illustrated this.

12:16 And then again I think this slide just really reinforces those top images on the left; again...

12:21 ...what they had proposed on the right, the higher-density proposal where we yielded 55 units an acre.

12:31 We are just beginning another application of the CI interface; we've been awarded a grant from the...

12:36 ...Ford Motor Company, they're very interested in building sustainable community.

12:40 And, we've modestly proposed that Southwest Detroit will be our region's first net-zero energy community...

12:47 ...and that we're going to use the interface to help do that.

12:51 We've recommended that there are five elements of sustainable community, energy hubs, green economy...

12:56 ...concentrations of targeted mixed-use density, and green infrastructure that supports enhanced...

13:01 ...pedestrian mobility, mass transit, and EV fleets.

13:05 So we're really just beginning this, and in order to support the project we're going to enhance...

13:10 ...the interface with modular plug-in for SketchUp.

13:12 I'm sure some of you are familiar with that; allows us to create parametrically controlled...

13:17 ...building forms for urban-scale study.

13:20 We're also analyzing and integrating the LEED ND criteria, so that we can assist...

13:26 ...the community in making decisions about sustainable assets and growth.

13:32 So we're encouraged by our results in our initial work in the geodesign process, and we're motivated as geodesign...

13:40 ...technology, such as real-time dynamic assessment, advanced/enhanced the digital interface and our design process.

13:47 Detroit serves as the context for our first application, but we modestly believe that the methodology is...

13:54 ...scalable and replicable, to empower sustainable design of other urbanized regions across the globe.

14:01 Our design team looks forward to opportunities to collaborate with additional communities...

14:05 ...and now with our new geodesign colleagues.

14:08 Thank you.
