CONVERGENCE OF INTENSITY [Ci] OR HOW TO PURPOSELY SHRINK A CITY

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Since completing the AIA RFP grant in 2008, we have continued our value densification design research with the community and expanded our urban design initiatives to envision a more equitable and sustainable city. We have focused our continued applied design research both practically and theoretically, asking, "What form would the post industrial city take if shrinkage were purposeful?" What if shrinking cities such as Detroit or New Orleans abandoned the restrictive nostalgia of their expansive (and unsustainable) urban geographies and embraced the forces of intensity (or the intent to become intensive)? What if shrinkage came to be viewed as the ethical, valued, sustainable approach in contrast to the explosive, unchecked, ecosystem-shattering growth of the cities of the BRIC nations? What if communities proactively identified and designed for the "coming together" of population, energy, capacity, investment, blue, green and gray infrastructure and existing built form into a spatial convergence? The research team defines this purposeful phenomenon of "resizing" the city based upon broadly defined density metrics as intensive convergence or a convergence of intensity [Ci].

Attempts to describe the current and envision the future condition and form of the shrinking city lie along a wide spectrum--from the pessimistic (city as an "unlimited vacuum") visions of Landscape Urbanism to the optimistic (city as a place for "unlimited capacity") projections of Hyper-Urbanism. Detroit, Michigan, is a proud yet wounded city whose patriarchal structures have failed. The city portrays the most exaggerated (and often cited) example of the phenomenon of contemporary urban "shrinkage" and also provides the basis for investigation and intervention. Detroit does have sustainable ground in its original urban form and settlement patterns, concentrations of population, and growing political will to "shrink", though in recent initiatives these criteria alone have proved unsuccessful as a basis for purposeful shrinkage. Ci may provide a theoretical and practical way forward to a future, sustainable state.

The research team asserts that in response to the well documented phenomenon of "shrinkage" of the post industrial city, that a new urban eco-system is required, one which takes advantage of the complex combinations of social, economic and environmental forces while increasing flexibility and reducing susceptibility to their mercurial nature. During the summer of 2009, our research team engaged in an intensive, community based urban design project in Detroit. This work adds new theory to the discourse of re-sizing the shrinking city, and illustrates an application of Ci through a collaborative design process between the community and the academy.

The essay provides an update on the other applications of our value densification interface, a brief background on our expanded theoretical approach, and a description of further work, which constitutes an initial application of the Ci theory via formal urban design recommendations. Detroit serves as the context for the first application of Ci, but the research team believes that the design methodology is replicable and widely applicable to empower the purposeful shrinkage of cities across the globe.

Convergence of Intensity [Ci] or How to Purposely Shrink a City

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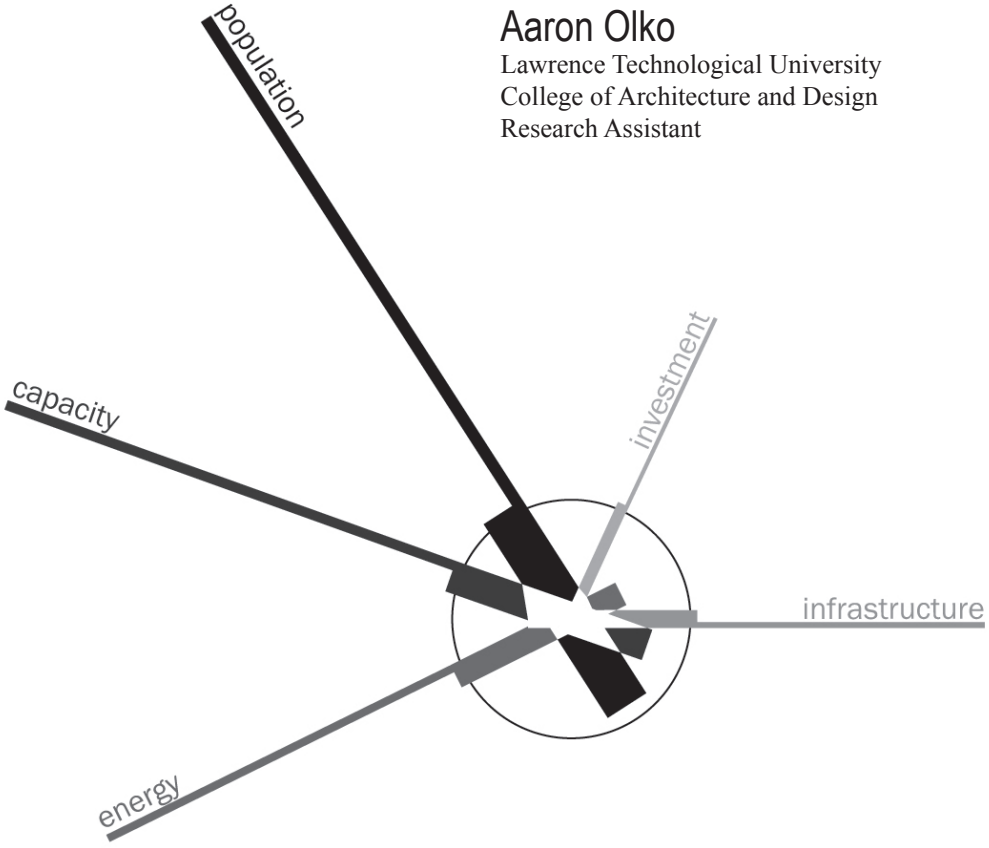


Introduction

The research team's previous applied design research, funded by the AIA RFP program, defined value densification as "a focus on investment and development in neighborhoods and districts where inhabitation, infrastructure, cultural and employment assets (and value) are in evidence" (Bodurow, 2006-2009). A resultant project in collaboration with two regional Detroit communities – the Value Densification Community Mapping Project (VDCmp) – was developed to explore how aspects of the post-industrial city can be understood, communicated and leveraged in service of equity and sustainability and to use technology to reveal data about the city in order to convince community, political and economic leadership to embrace densification. The project focused on the creation of a unique multivariable digital interface that incorporates and merges components of several 4D visualization softwares to model physical and social density and value in three dimensions. The digital interface is currently in use, empowering the community through asset identification, analysis and application to assist in envisioning its environmental, social and economic future.

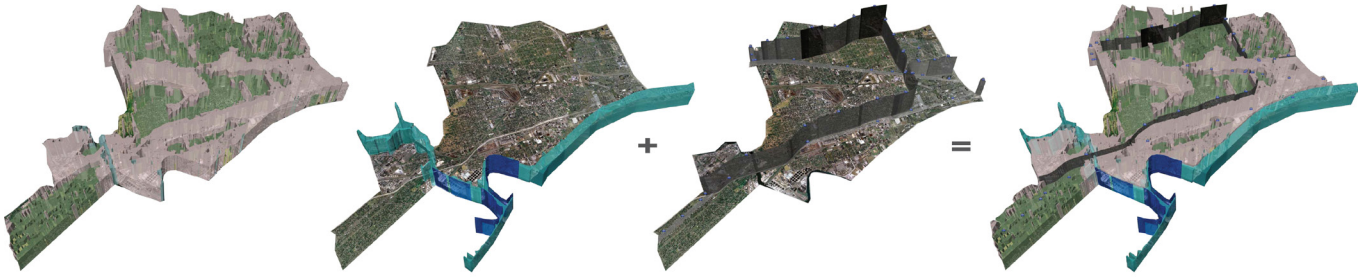


Figure 1: Environmental Impact Analysis Layering.

The context of the research team's design research is Detroit, Michigan. Specifically, we have worked in Southwest Detroit, a 12,450 acre, 19.45 square mile neighborhood located on the Detroit River, the international border with Canada and at the junction of major highway and rail infrastructure. Southwest Detroit is characterized by new immigration and population growth, a cogent cultural heritage, large employment centers, rich "blue, green and gray" infrastructure and cultural and historic sites. Southwest Detroit enjoys a vibrant commercial base and is served by highly skilled advocacy and longstanding, effective community-based development organizations, 25 of which recently organized under the umbrella organization of the Southwest Detroit Development Collaborative (SDDC).

Since summer 2007, the research team has collaborated with the SDDC to produce a multivariable 4D digital interface with 135+ data layers which "mapped" diverse attributes of human, organizational, physical and economic metrics. We are currently focusing on utilizing the resultant digital interface to conduct analysis in support of future Urban Design studies. By using data layers to construct what we call "analysis layerings", we prompted the community to identify additional layerings, and ultimately relevant and useful design work in support of community driven planning, design and development initiatives. The Environmental Impact Layering (Figure 1) illustrates the percent impervious (gray) and permeable (green) surface in the study area with the Detroit River and Rouge River floodplains (blue) coupled with State Roads and Average Daily Traffic (ADT). The community will utilize this layering to evaluate the non-point source pollution and other environmental impacts of the proposed Detroit River International Crossing (DRIC), proposed new parks, green alleys, other pervious surfaces and increased housing and mixed use development density. The research team plans to make the evaluation dynamic, so that future development information will be linked to impacts on surface waters (pollution) and to existing infrastructure such as road and sewer (capacity). This work has assisted in identifying unintended conflicts amongst various public and private development projects, and supporting specific initiatives as diverse as the placement of green infrastructure projects to marketing commercial corridors (Bodurow, et al, 2009).

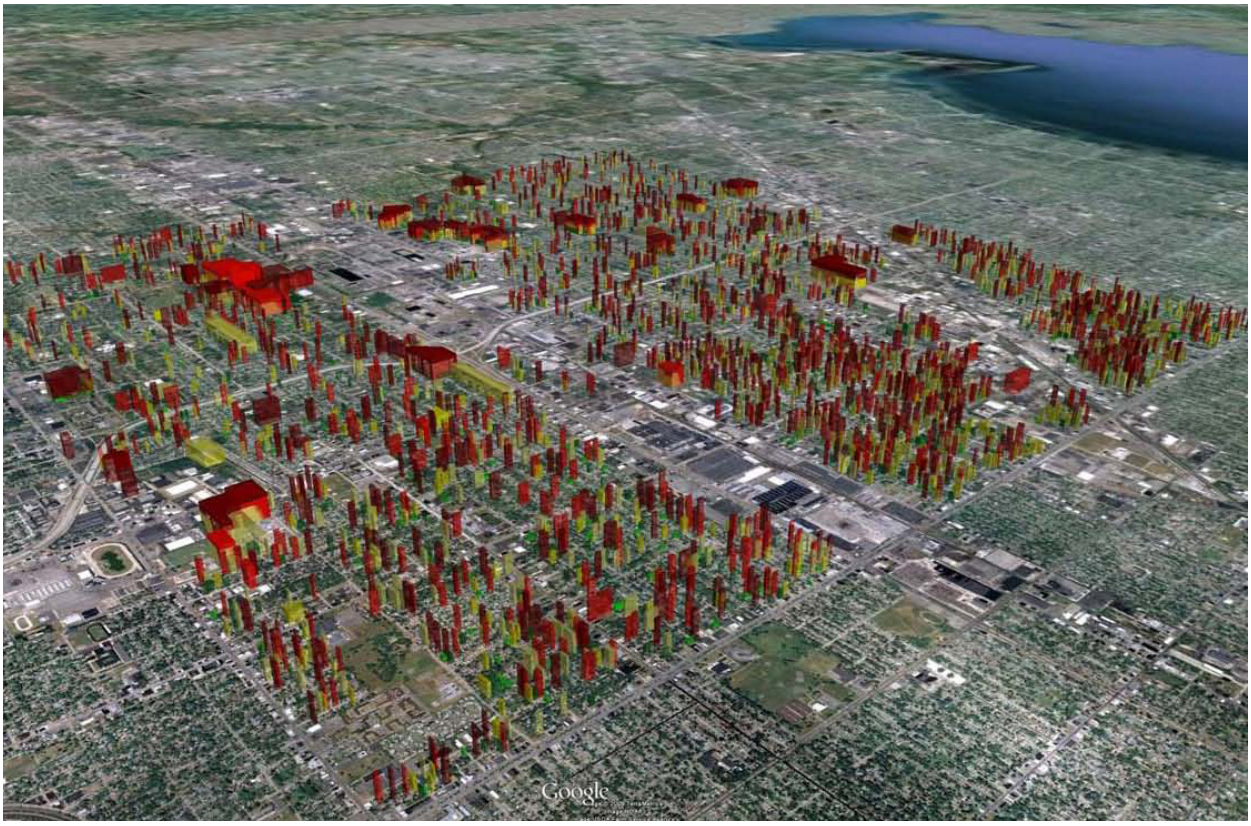


Figure 2: Parcel Level foreclosure data for the City of Warren and the City of Centerline.

Other Applications

Since completing the AIA RFP in 2008, our research team has continued to advance our value densification research both as "applied research" with new and existing community partners in regional Detroit and also in a more theoretical manner within the academy. We applied our methodology and framework to a second Regional Detroit community--the City of Warren, Michigan. In February 2009, the VDCmp research team was invited to participate in RSVP #13: After the Crisis, sponsored by the Netherlands Architecture Institute (NAI), ArCHis, Abitare and state, regional and local governments to discuss responses to the recent regional real estate crisis (Volume, 2009).

The event also included faculty from the Lawrence Technological University College of Architecture and Design, Southeast Michigan political leaders, and local stakeholders. The purpose of this international discussion was to identify tools that may be used to form a unified approach to address highly concentrated foreclosures and associated economic impact in an urban setting. The City of Warren was investigated as a case study and surrogate for numerous communities in Southeast Michigan experiencing economic hardship due to foreclosures. An inventory of the current conditions and effects of the real estate crises was developed using the value densification framework. The tool was initially used to identify foreclosure density at the macro scale, using data from Macomb County Planning and GIS staff, defined as the number of filed Sherriff's deeds within the past three years (2006–2008) within each census block (Figure 2).

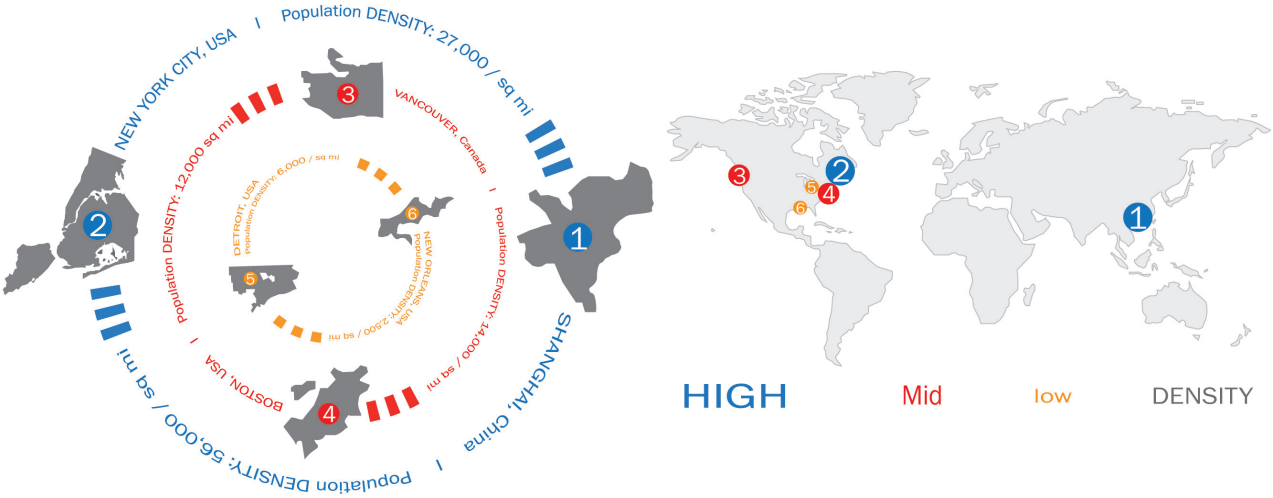


Figure 3: A spectrum of urban Density: population densities of:
LD [low density]: Regional Detroit, MI, USA and New Orleans, LA, USA
MD [mid Density]: Boston, MA, USA and Vancouver, CA
HD [High Density]: Shanghai, China and New York City, NY, USA

Following the macro-scale analysis, the community leaders identified the potential of siting community centers, parks, green infrastructure, or other community assets within large contiguous areas of foreclosed parcels. The parcel level data is able to assist the community leaders in determining the feasibility of such sitings. In addition, this analysis identifies priority areas for other available grant funds such as from the Michigan State Housing Development Authority (MSHDA) or National Stabilization Program (NSP) for revitalization or demolition of existing structures. Coupled with the Southwest Detroit Value Densification Community Mapping Project, the Warren-Macomb Densification project displays the ability of the developed GIS-based Google Earth framework to assist in decision-making and design. As discussed, community leaders are able to make real-time decisions with the tool and identify areas of density for siting infrastructure, housing and other amenities. These are the initial implementations of a broader vision for the tool, which may be proved relevant for use in other post-industrial cities.

In the Fall 2009 semester, the research team conducted a master level seminar entitled DENSITY=GREEN: sustainable urbanism, density and spatial analysis. Participants researched, analyzed and visualized in 2D, 3D and/or 4D, parallel metrics that portray both the impacts and benefits of increased density in six cities representing the spectrum of urban density (Figure 3). This seminar also began to explore and expand upon the established methodologies for "carrying capacity" (McHarg, 1969; Meadows et al 1972) to define a "tipping point" to human habitation in the urban context--a level at which the new ecosystem created through built and population densities begins to negatively impact the natural environment and ecological capacity of an urbanized region. To further our "tipping point" research, we have applied for grant funding to support the creation of both formal and policy recommendations to encourage informed decision making and urban and architectural design around balancing the long term benefits and impacts of urban density. We hope to examine discreet sets of parallel or comparative metrics, including social, environmental, and economic to model the potentially positive and/or negative impacts of increased density, focusing on mixed use development, in three urbanized regions.

Distribution of Findings

Our value densification research has received extensive academic and professional interest and dissemination. The research supported by the AIA RFP was published in the prestigious journal Transactions in GIS (Bodurow, et al, 2009). We were invited to present our work at multiple academic and professional conferences in 2009, including the national and international conferences of the AIA, APA, ACSA, UAA, EUAA and ESRI. Recently, the results of the current evolution of our methodology – Ci – described in this essay, was included in the November 2009 International Symbolic Cities exhibition in Shanghai, China, cosponsored by Shanghai University of Engineering Science (SUES) and Lawrence Technological University. Our Ci work has also been accepted for dissemination at the ACSA 2010 Annual meeting to be held in New Orleans and invited for presentation at the 2010 Sustainable Architecture and Urban Development conference to be held in Amman, Jordan.

Our collaborative community work in Southwest Detroit continues to be funded by Local Initiatives Support Corporation (LISC) and will move into a next phase in 2010. LISC, a national funding consortium, is particularly interested in replicability at the neighborhood, city and regional scales. Our next phase of work will focus on three scope areas: 1) Technical Assistance, emphasizing use of the interface by Community Development Organizations (CDO); 2) Accessibility, including the creation of a training manual and updating, mapping and modeling of data layers at the neighborhood and citywide levels; and 3) Applicability, including analysis layerings, additional urban design projects and sustainability-modeling of benefits and impacts.

Background to Further Work: a Theoretical Approach

Before describing the application and evolution of our methodology and the further work in which we have engaged since completion of the AIA RFP grant, we wish to offer an expanded theoretical basis for our approach. Urbanists are interested in the future of urban form. Fundamentally, cities should be the most desirable location for human habitation: beautiful, equitable and sustainable. The city, and more to the point, the shrinking city, is an antithesis of this desirable urban condition, but no less a complex and ever changing entity. Attempts to describe the current and envision the future condition and form of the shrinking city lie along a wide spectrum. Most adopt a 20th century, capitalist notion of growth and regeneration: promoting growth as "good", inevitable, and accommodated and assimilated through technology. That growth will provide something--form, program, policy--to fill in the gaps of the post industrial city. Rollin Stanley defined this at the 2005 UC Berkeley Conference on shrinking cities as "the dogma of growth" (Allweil, 2007).

Cities are not static artifacts--they exist in a state of constant change, and along a spectrum of urban density, growth, and contraction. In 2009, we began to investigate a "spectrum of urban design" (see Figure 3), collecting data on a series of low-, medium- and high-density cities and their associated regions. For purposes of contrast, we highlight the extremes of current urban theory--the low density Landscape Urbanism approach and the Hyper-Density approach.

Unlimited Vacuum?

Proponents of landscape urbanism are pessimists in their approach to the shrinking city. Examining "the context of global capital, post-Fordist models of production, and informal labor relations," Landscape urbanism asserts that "urbanization continues to decrease the density of North American settlements" (Waldheim 2006). This approach is also supported by economists, who have defined the emerging post-industrial trans-national economy as "spatially dispersed, yet globally integrated" (Sassen, 1991).

Unlimited Capacity?

Proponents of hyper-density are optimists in their approach to the shrinking city. They promote the city as a place of unlimited development or "capacity", calling for "a new . . . city that continues to serve all demands while incorporating all desire. A city that increases our capacities within the current mass, as well as in the currently underused spaces" (Maas, 2006). Unlike Landscape Urbanism, the hyper-density approach relates to mid- and high-density cities, particularly those with explosive economic and population growth such as the major cities of the BRIC (Brazil, Russia, India, and China) nations.

Limited Intersections (the New Geography)

The research team proposes an alternative theoretical approach which is neither optimistic nor pessimistic, but ethical. Convergence of Intensity (Ci) is a value-based approach which meditates between the two ends of the density spectrum. Ci proposes specific criteria for the "resizing" of the post-industrial/shrinking city, arguing that balanced, sustainable, dense and urbane development is still possible.

Expanding on the value densification methodology and interface, the research team has proposed Ci to further investigate the implications for urban form, contending that shrinkage should be purposeful. Shrinking cities such as Detroit and New Orleans should abandon the restrictive nostalgia of their expansive (and unsustainable) urban geographies and embrace the forces of intensity. In this way, the negative stigmatism of shrinkage might come to be viewed as a valued and sustainable approach in contrast to the explosive, unchecked, ecosystem-shattering growth being experienced in the cities of the BRIC nations. These cities should proactively identify and design for the "coming together" of population, energy, capacity, investment, blue, green and gray infrastructure and existing built form into a spatial convergence. The research team defines this purposeful phenomenon of "resizing" the city based upon broadly defined density metrics as a convergence of densities (intensity) intensive convergence or a convergence of intensity (Ci).

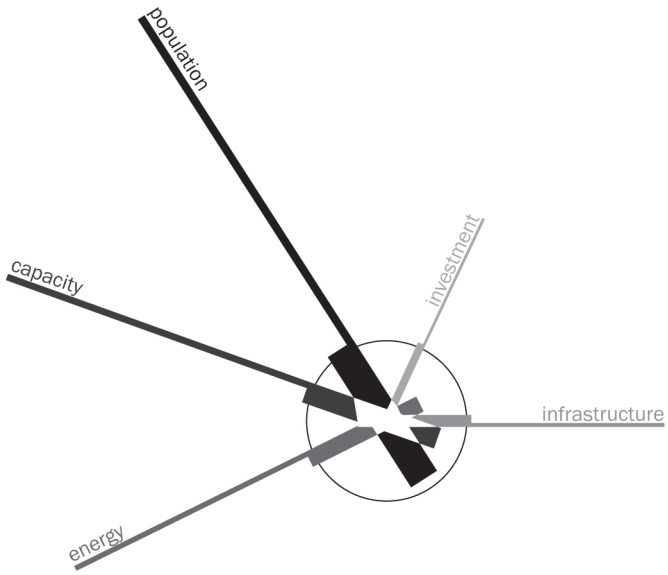


Figure 4: The new geography: Convergence of Intensity (Ci) – this diagram illustrates the primary metrics (criteria) implying a "coming together" of densities (intensities) into a spatial convergence.

The fundamental question in "resizing" the shrinking city is, "Where and how will we sustainably redevelop (densify) and support resident populations with infrastructure, services and investment?" Since answers to this essential question have been dominated by capricious political, market, and/or social forces, the consistent description and application of metrics (criteria) are essential. Detroit provides the basis for investigation and intervention--with its stubborn defiance of normally reliable market forces. Detroit has high (sustainable) ground in its original urban form and settlement patterns, concentrations of population, and growing political will to "shrink". Detroit might have grown (densified) within its "high" ground--within the Grand Boulevard--the city limits until 1927 when it sprawled, through annexation, to its present 140 square mile unsustainable form.

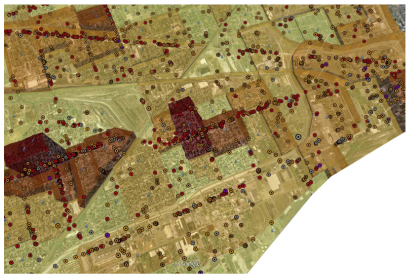
In response, the research team asserts that a new urban ecosystem is required, one that leverages the assets and the complex combinations of social, economic and environmental forces of the shrinking city, while increasing flexibility and reducing susceptibility to their mercurial nature. Ci identifies and purposely weights an expanded set of criteria for shrinkage--including population, energy, investment, blue, green and gray infrastructure and capacity (Figure 5).

The convergence of these five criteria forms an intersection and identifies the new geography for design intervention. Ci takes value densification to the next level--modeling the specific opportunities and employing urban design rationale to make formal recommendations based on these criteria to guide the future of urban form. Ci will lead to decisions about priorities around concentration of investment and development. This strategy implies a very different urban form than the post-industrial/shrinking city has taken in the twentieth century, but perhaps a more sustainable state. A primary intent of this approach is to empower communities to take advantage of the shrinking cities phenomenon. Detroit is then not simply susceptible to continuing degenerative forces associated with it. Additionally, the Ci approach may prompt a new way of interpreting, illustrating and leveraging distinctly urban assets and, in doing so, positively influence future urban form.

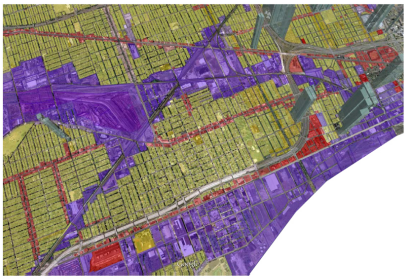
Population - shrinking cities such as Detroit are often characterized by significant population loss. However, both cities have neighborhoods that are characterized by stable, even growing populations. Concentrations of inhabitation serve as a foundation criterion.

Energy - here defined specifically related to built form and density – both existing and potential. In particular, we refer to the "as of right" zoning build out envelopes – the density that market forces would generate in a growing city. Given the economic context of shrinking cities, often these conventional approaches to development are ignored in favor of densities that attract public and foundation sector subsidy.

Investment - in Detroit, there exists a highly subsidized development economy. Detroit is literally "upside down" with market forces, with every project built over the last decade having received some sort of development subsidy – tax abatement, public or foundation investment. LISC has invested millions in Detroit (LISC, 2009), and the federal government billions (HUD, 2009). Concentrations of unconventional investment become the fifth criterion.



Blue, Green + Gray [Infrastructure] - shrinking cities are rich with physical and technological infrastructure that supported manufacturing and movement of goods and services and the associated human settlement. This infrastructure defines the natural and built ecosystem of the city. We employ an expansive interpretation of infrastructure as "blue, green and gray": green infrastructure describes both natural flora and fauna and their related habitats and also man-made landscape and greenway networks and the increasing emphasis and presence of criteria-rated buildings and neighborhoods. Blue infrastructure describes the watersheds, floodplains, wetlands, hydrology, etc. Gray infrastructure is entirely man-made, including highways, roads, rails, digital technology, etc. along with the environmental impacts generated by such.



Capacity - defined as "embodied energy" both in terms of civic ethic and built form. This is energy transformed into intent. Shrinking cities have layers of organizational energy – largely in the non-governmental [NGO] sector. Citizens, failed by both the public and private sectors, have increasingly turned to self reliance as a means of stabilization and regeneration. Shrinking cities generally have a legacy of both built and narrative heritage. Such energy assets are both formal – those designated by some governmental authority; and informal – those deemed significant by the citizens of the community [we make no value judgment about the primacy of either typology]. Concentrations of these diverse resources become the third criterion.

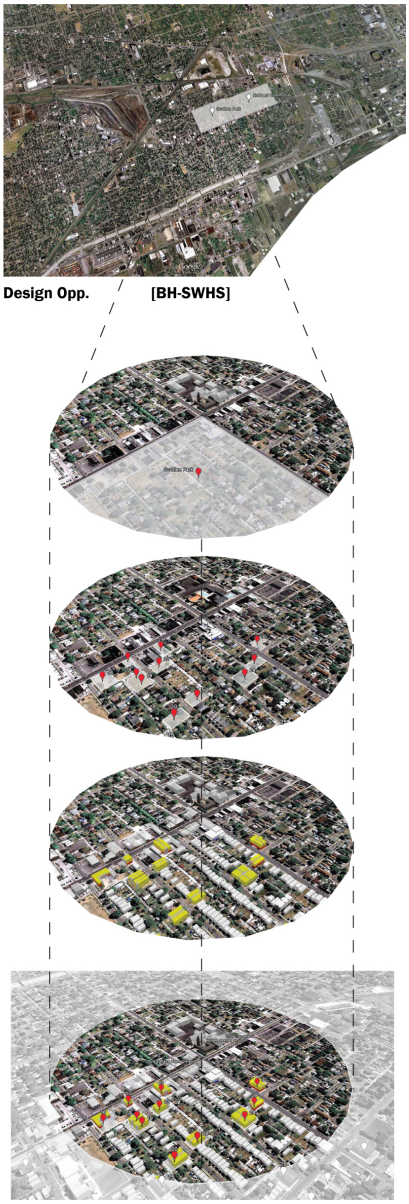


Figure 5: Ci applied: Analysis Layering + Urban Design Rationale.

Further Work : Formal [Urban Design] Recommendations

During the summer of 2009, the research team initiated an application of the Ci theory via formal urban design recommendations in Detroit. We applied the Ci theory and practice approach to resizing the shrinking city through a collaborative design process between the community and the academy. We engaged the community to identify potential Urban Design interventions and Development Opportunities. Table 2 describes the more than 23 initiatives that are being contemplated and implemented by SDDC members. We then conducted a Ci analysis to identify the intersection of various density metrics from the 135+ data layers in our digital interface. The research team selected specific metrics in each of the five Ci categories, illustrated with 3D extrusions at the scale of the parcel or census block group, to vividly portray density, including:

population (density by block group);
energy (geographic locations of SDDC organizations and formal and informal cultural assets);
investment (business and employment density by block group).
infrastructure (geographic locations of neighborhood parks and greenways and proposed Rail Link); and
capacity ("as of right" zoning envelopes by parcel).

The resultant analysis layering illustrates the new geography of convergence within ¼ mile of social, economic and environmental asset density in the Southwest Detroit neighborhood.Specifically, the convergence occurs in the Bagley Housing/Southwest Housing Solutions (BH/SWHS) neighborhood preservation plan (NPP) area of Southwest Detroit. The community client selected one of BH/SWHS projects as a "beta test", since that organization, through MSHDA subsidies, had built and were in the process of building, housing in this area.

In support of our work with BH/SWHS, we conducted an urban design study, including site visits and existing conditions documentation of the Scotten Park and Hubbard Communities study areas bounded by W. Vernor to the South, Toledo to the North, Junction to the West and 25th Street to the East (Figure 6). We first built a digital model of existing built and proposed development for the study area, then identified all vacant parcels in the study area that were realistic for future development (Figure 7).

AdHOC Committee Member	Design Development Opportunities
GCDC	Temple Street: Model Streetscape Improvements - Alley and Sidewalks - Potentail Urban Agriculture
	Infill Opportunities: Model Potential South Corktown Mixed-Use Infill Opportunities
	Tiger Stadium: Model Potential Development Opportunities
	Roosevelt Park + Michigan Central Station: Model Michigan Central Station and Roosevelt Park / Hotel Development Opportunity
UNI	Park Development Opportunities: Mark Twain Playlot, Bridgeview Park, Weiss Park [Redeveloped by City/UNI], Pheonix Playground, Hams Playlot, Smith Park, Mil Reg Park, Williams / Ash 'Wedge' Park, Wingle Park [by City], Bienicity Park [by City], Dingerman Park
	Vacant Lots: Potential Parks [Woodmere]
	Woodmere Community Plan Development Opportunities
	Springdale Community Development Opportunities
SWHS/BH	Neighborhood Preservation Plan [Area #1]: MSHDA-approved Plan, Inexsistence since 2003. Rehabilitation, Infill, Infrastructure.
	Projects: Hubbard Communities, Scotten Park [both housing; 80+ units], Clark Park: Lighting, Paths, Restrooms,
	Existing Residential Rehabilitation - Link housing to increase Income and Residents, etc.
	Neighborhood Preservation Plan [Area #2]: Proposed Plan Currently being Written with MSHDA. Similar Vacant Infill, Connect to Green
	Fewer Vacant Lots: Focus on Rehab - Need to "See" Effects of Improvements on Existing Housing.
	Vacancy Potentail Infill
PCS	Greenway Connector: Delray Park to Forman Park [Rouge River].
	Delray Memorial Park: Redevelopment - Baseball, Soccer Field and Additional playgrounds.
	New DRIC Replacement Housing
	Proposed Urban Forest Surrounding DRIC Site
	Fort Wayne Redevelopment / Stabalization Plan
SDEV	Business Redevelopment: Possible Logistics, Relocating of Displaced Delray Businesses, Alternate Energy Generation [windpower, solar, etc.]
SDBA	Vernor Corridor [East + West]: Facade Improvement, Retail Infill, Retail Attraction, Greenway Development and Connection, Business Attraction / Retention
MABA	Priority District #1+2: Kronk Development Plan, Housing Plan and Development, Historic Overlay District, Preservation of Boys and Girls Club, Clean and Green Zone, Firehouse Museum, Senate Theater Redevelopment

Table 2: Community Intent: Urban Design Interventions/Development Opportunities in Southwest Detroit.

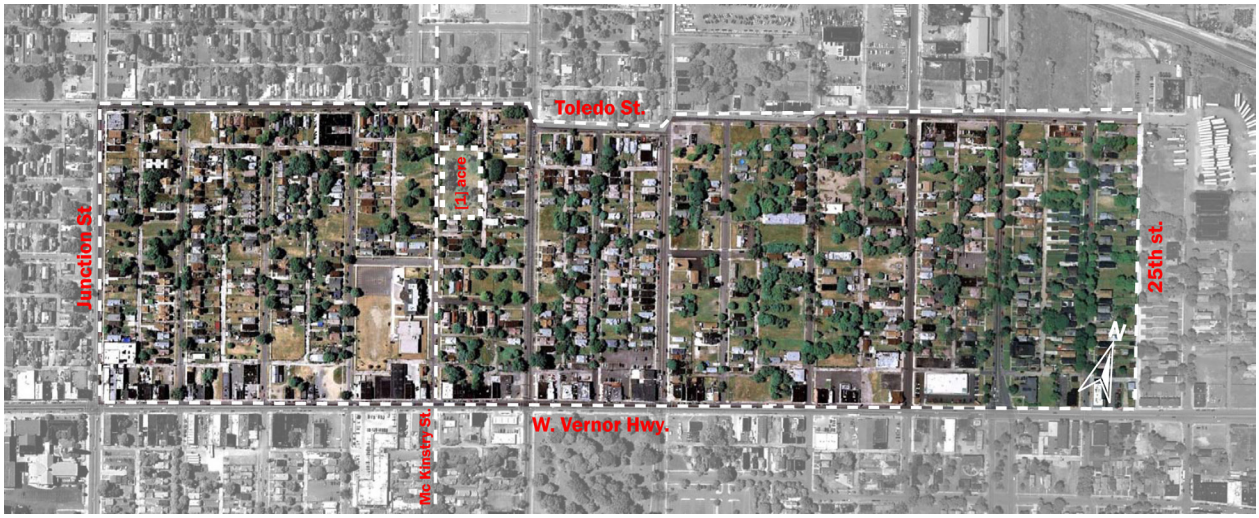


Figure 6: BH/SWHS Study Area.

Figure 7: Ci Opportunities: Scotten Park vacant parcels (left) and development parcels identified by the research team (right).

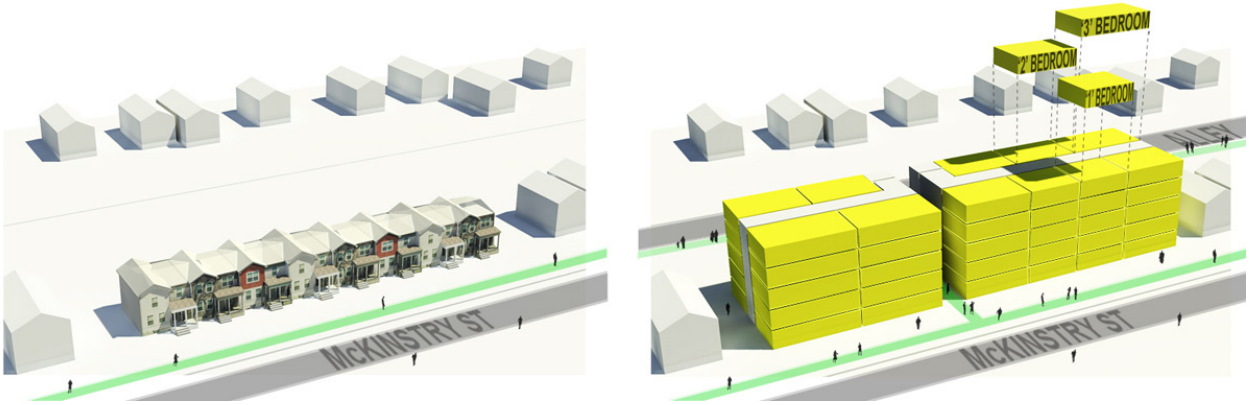


Figure 8: min and MAX Zoning: BH/SWHS Scotten Park [8 units/acre vs. 55 units/acre].

We developed and applied an urban design rationale, utilizing urban design principles to guide our density recommendations:

1. As of Right Zoning – the study area contains two zoning districts: R2 and B4. Each allows a maximum height of 35', with front and side setbacks from parcel lines based on existing built context.
2. Street Grid – three perimeter streets--W. Vernor, Junction, and Clark are four travel lanes each with widths that allow for more height and density--both formally and in terms of increased social density and pedestrian, motorized and non-motorized traffic. These perimeter streets also present the opportunity to continue the existing pattern of ground floor commercial. The Scotten Park study area has two sets of "one way pairs" with intermediate alleys. We targeted parcels on these "pairs" for increased residential density in keeping with the current pattern and character.
3. Circulation –proposed buildings are massed and sited to concentrate pedestrian traffic and entry along perimeter and residential street frontage and contain residential vehicular traffic and parking access via existing alleys.
4. Solar Orientation – the study area is ideally oriented with southern exposure. The proposed building massing reflects opportunities to maximize sunlight for residents and future green infrastructure.
5. Building Typology – two new typologies were recommended: Mixed Use (with Ground Floor Commercial) and Apartment Residential in support of the MAX zoning scenario. Note that these higher-density typologies are recommended for McKinstry, and represent an alternative to BH/SWHS's MSHDA application [e.g.: FIG 8 illustrates a proposed building yielding 55 units (15-3BR, 30-2BR, and 10-1BR) in comparison to 8-3BR townhouses on the same parcel]. For all typologies, 2 and 3 story buildings are assumed as "walk ups" and 4 or more story buildings include an elevator core.
6. Program – uses were driven by the community client and include residential and ground floor commercial (retail and services). Opportunities for ground floor commercial were identified on the three perimeter streets. Higher density residential typologies were focused on interior parcels.
7. Public Realm – initial opportunities for green courtyards between and alongside residential buildings were identified.

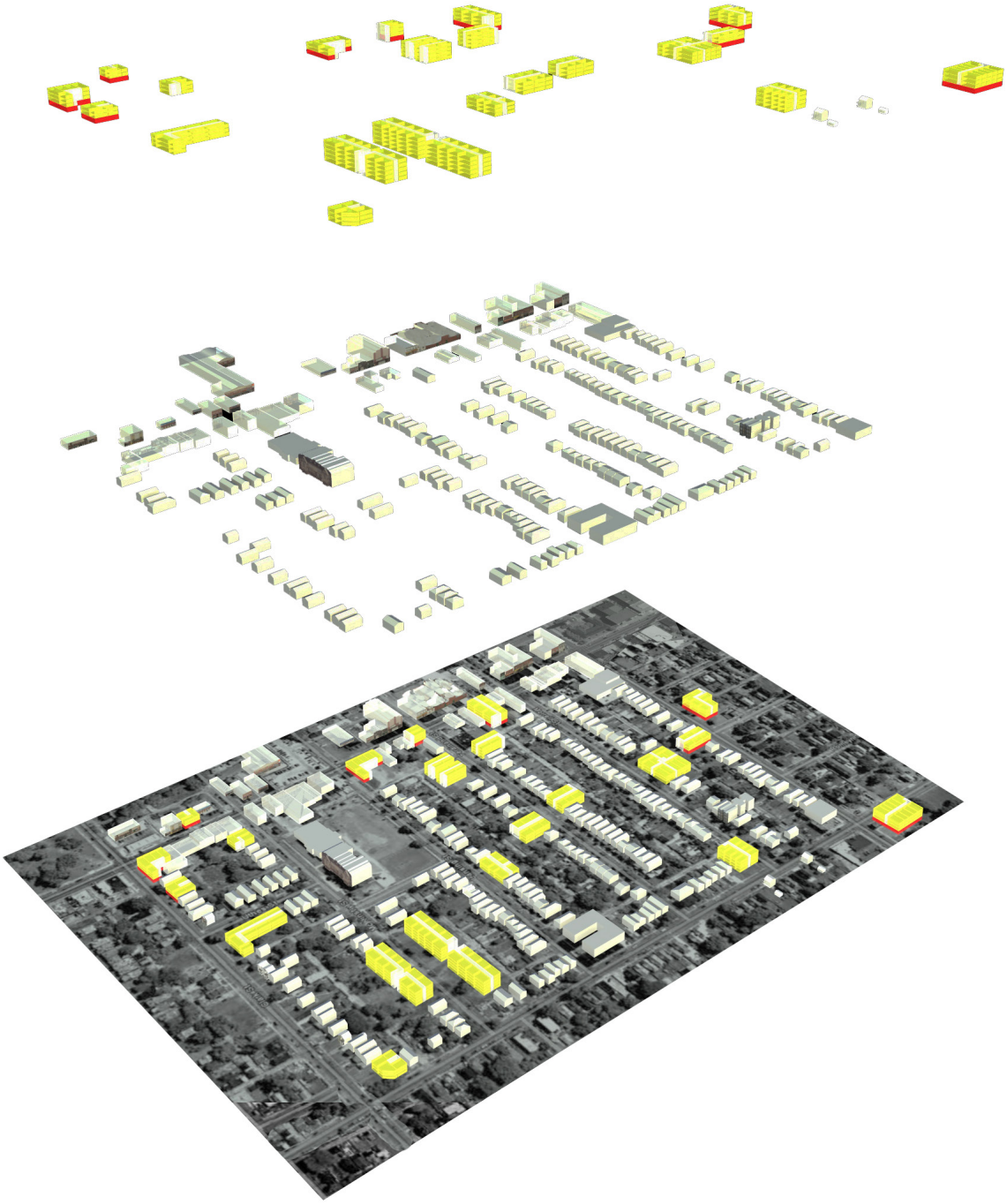


Figure 9: Urban Design Rationale for Scotten Park Scenario 2: Max Zoning.

Parcel	Street	Typology	Stories	Residential Sq. Feet	Commercial Sq. Feet	Residential Units			
						1 Bedroom	2 Bedroom	3 Bedroom	Total
1	Vernor + Clark	Mixed Use (Ground Floor Commercial)	4	15,824 sf.	5,978 sf.	3	6	6	15
2	Clark	Mixed Use (Ground Floor Commercial)	3	12,864 sf.	4,288 sf.	2	4	2	8
3	Clark	Single Residencial	2	1,230 sf.	0	0	1	0	1
4	Clark	Apartment Residential	3	11,042 sf.	0	3	12	9	24
5	Clark	Duplex Residential	2	2,460 sf.	0	0	0	2	2
6	Clark	Single Residential	2	1,230 sf.	0	0	1	0	1
7	Clark + Toledo	Apartment Residential	3	13,080 sf.	0	3	6	3	12
8	McKinstry	Apartment Residential	5	26,040 sf.	0	0	10	10	20
9	McKinstry	Apartment Residential	5	41,230 sf.	0	10	20	5	35
10	McKinstry	Apartment Residential	3	10,368 sf.	0	0	3	6	9
11	Vernor	Mixed Use (Ground Floor Commercial)	3	5,390 sf.	2,695 sf.	4	2	0	6
12	McKinstry	Apartment Residential	5	24,820 sf.	0	10	25	10	45
13	McKinstry	Apartment Residential	5	10,812 sf.	0	5	20	15	40
14	Lansing	Duplex Residential	2	2,468 sf.	0	0	0	2	2
15	Lansing	Apartment Residential	3	20,601 sf.	0	6	6	6	18
16	Lansing + Vernor	Mixed Use (Ground Floor Commercial)	3	17,920 sf.	8,960 sf.	0	8	4	12
17	Vernor + Ferdinand	Mixed Use (Ground Floor Commercial)	4	8,004 sf.	2,668 sf.	0	0	6	6
18	Ferdinand	Apartment Residential	4	17,100 sf.	0	12	4	0	16
19	Ferdinand	Apartment Residential	4	17,100 sf.	0	12	4	0	16
20	Ferdinand	Apartment Residential	3	23,634 sf.	0	3	9	6	18
21	Ferdinand	Apartment Residential	3	20,202 sf.	0	6	9	3	18
22	Ferdinand	Apartment Residential	4	22,116 sf.	0	0	12	4	16
23	Vernor	Mixed Use (Ground Floor Commercial)	4	19,404 sf.	6,468 sf.	3	12	6	21
24	Morrell	Apartment Residential	3	18,000 sf.	0	0	18	15	33
25	Morrell + Toledo	Apartment Residential	4	30,544 sf.	0	20	12	0	32
26	Toledo	Single Residential	2	1,230 sf.	0	0	1	0	1
27	Toledo	Single Residential	2	1,230 sf.	0	0	1	0	1
28	Junction + Toledo	Mixed Use (Ground Floor Commercial)	4	43,416 sf.	14,472 sf.	3	15	12	30
29	Junction	Mixed Use (Ground Floor Commercial)	3	12,720 sf.	6,360 sf.	6	6	0	12
30	Junction	Mixed Use (Ground Floor Commercial)	4	30,387 sf.	10,129 sf.	0	9	9	18

Table 3: Intent to become intensive: BH/SWHS MAX Zoning scenario.

Further evidence of Detroit's highly subsidized development economy (MSHDA, etc.), our community client was not aware of the "as of right" zoning build out envelopes in the study area. We proposed to design and model the maximum density allowed under the current City of Detroit Zoning Ordinance. Figure 9 illustrates both the current direction of 8 units/acre (min zoning) and the MAX Zoning proposal generated by the research team, which is 55 units/acre--more than 6.5 times more dense, "as of right" than BH/SWHS's MSHDA application.

The BH/SWHS Scotten Park Scenario 2: MAX Zoning, as of right, yielded an additional 30 development parcels. We designed and modeled 30 new residential buildings with 482,458 sf. of proposed residential density distributed among 488 total units (111 one bedroom units; 236 two bedroom units; and 141 three bedroom units) and 62,108 s.f. of new commercial density in the study area. Refer to Table 3, which details parcel number, street location, typology, stories, residential and commercial square footage and residential units.

This proposed density, if built, would essentially double the BH/SWHS real estate portfolio within walking distance of the convergence of densities illustrated in the Analysis Layering (Figure 5).

Possible Applications

We have been encouraged by the results of the value densification research supported by the AIA RFP grant and the expanded theoretical and design approach it has enabled. Our collaborative process, the resultant digital tools, and formal recommendations to date have motivated us to reflect upon, evaluate and enhance the Ci theoretical approach and design methodology. We plan to engage in this reflection while simultaneously continuing the collaborative design process between the community and the academy in Detroit to model the identified urban design and development opportunities using the Ci methodology. The research team is also investigating the use of parametric software to convert our "analysis layerings" into logic scripts in order to animate the convergence of densities at an urban scale in a more compelling manner. We are researching "Swarm and Flock Urbansim" (Leach, 2009), and refining the interface to visualize, illustrate, analyze, and convey design direction (and associated benefits and impacts) for future urban form at parcel scale.

Detroit serves as the context for the first application of Ci, but our research team believes that the design methodology is replicable and widely applicable to empower the purposeful shrinkage of other urbanized regions along the spectrum of urban density in cities across the globe.

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