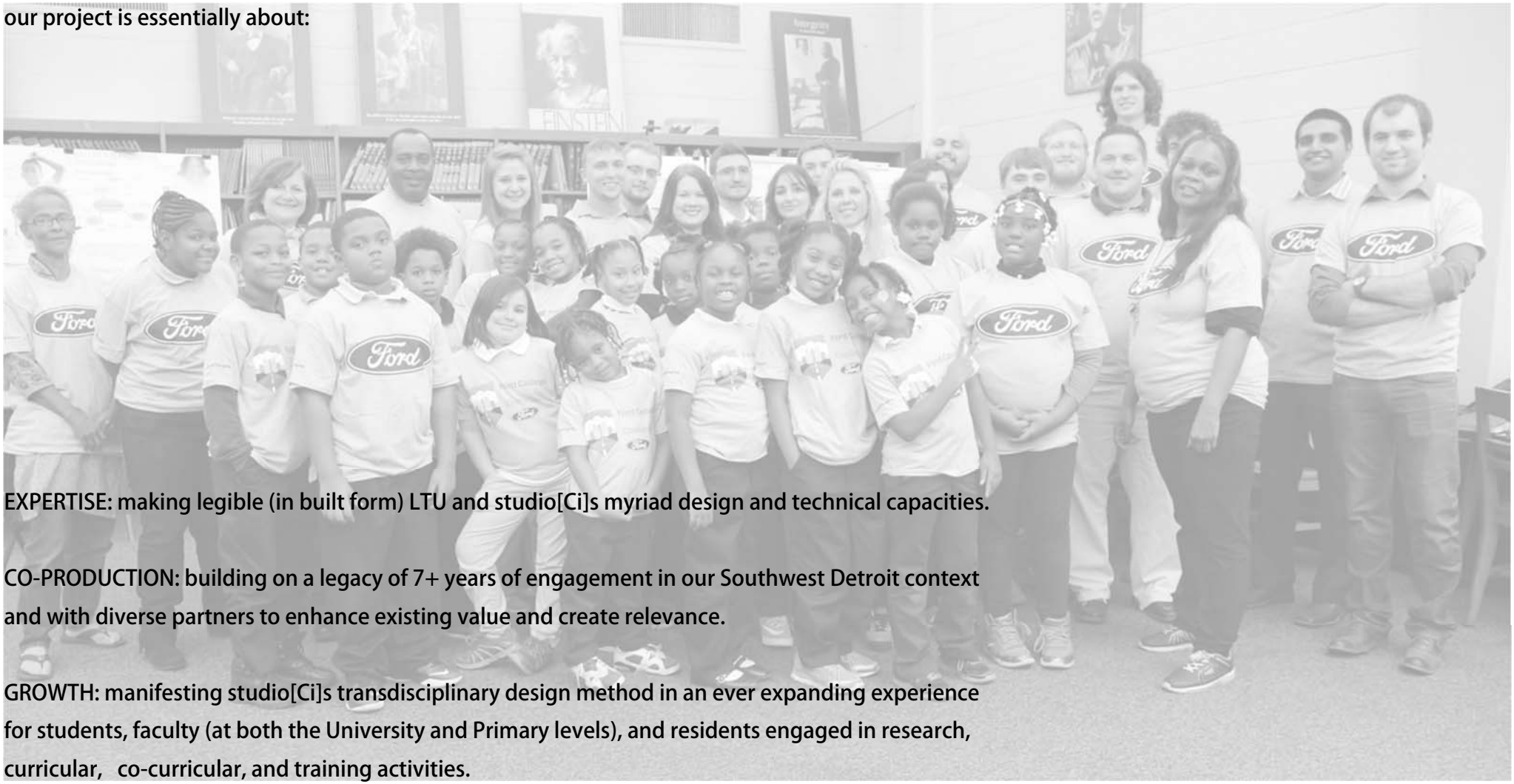
[sw]LAB NZE Prototype

studio[Ci]

[sw]LAB NZE Prototype

our project is essentially about:



EXPERTISE: making legible (in built form) LTU and studio[Ci]s myriad design and technical capacities.

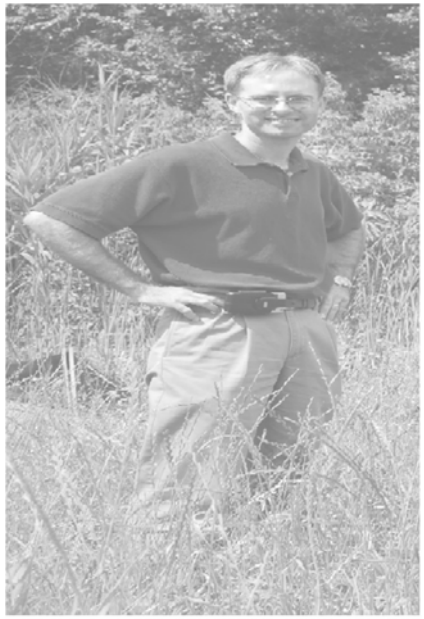
CO-PRODUCTION: building on a legacy of 7+ years of engagement in our Southwest Detroit context and with diverse partners to enhance existing value and create relevance.

GROWTH: manifesting studio[Ci]s transdisciplinary design method in an ever expanding experience for students, faculty (at both the University and Primary levels), and residents engaged in research, curricular, co-curricular, and training activities.

studio[Ci]

[sw]LAB NZE Prototype

Associate Professor Constance Bodurow
[CoAD]
PI and Design Director



Professor Donald Carpenter
[CoE]
Co-PI and Water Management

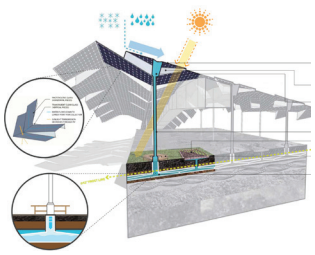
Professor Robert Fletcher [CoE]
[CoE]
Co-PI and Energy/Power

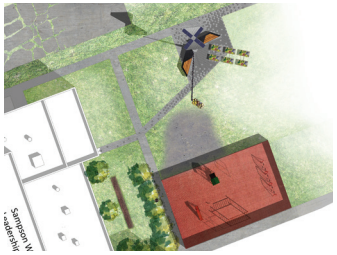
College Professor Charles O Geen
[CoAD]
Construction Management

studio[Ci]

Lawrence Technological University

[sw]LAB:NZE





WHO?

A team of over three dozen Lawrence Technological University (LTU) students and architecture and engineering professors has partnered with the Detroit Public Schools (DPS) to design and build a Net Zero Energy (NZE) structure at the Sampson Webber Leadership Academy (SWLA). In addition to educational partner DPS, the sw[LAB] NZE team has collaborated with the Mayor's Office, Department of Neighborhoods District 6, community partners It Starts at Home and Detroit Future City, and the residents, parents, and businesses of the Tireman neighborhood. The professors leading the project are Associate Professor of Architecture and studio[Ci] Director Constance C. Bodurow, AIA, AICP, CUD; Engineering Professor Donald Carpenter, PhD, PE, LEED AP; Associate Professor of Engineering Robert Fletcher, PhD; and College Professor of Architecture Charles O'Geen. Primary funding was provided by a $25,000 Ford College Community Challenge (Ford C3) grant with additional support from Michigan State University EDA REI, the Coleman Foundation, and LTU.

WHAT?

studio[Ci]'s vision for the sw[LAB] NZE project is to design and build a NZE structure to be part of an outdoor classroom at SWLA that is a replicable prototype for other DPS schools. The project features an energy farm, learning gardens, and photovoltaic energy and rainwater collection systems. It will generate renewable energy, conserve and manage water, and reinforce sustainability lessons that engage children and community members through active learning. The team has worked with DPS/SWLA to create curriculum and infrastructure in support of STE[A]M education and the DPS|Go Green Challenge and DPS|Garden Collaborative programs, including: lesson plans; hands-on assignments for in- and outdoor activities; and a NZE team room. As a permanent addition to SWLA's facilities and curriculum, the project will catalyze neighborhood stabilization and restoration. The collective long-term vision and phased implementation for the site, school, and neighborhood includes:

- Solar and geothermal energy farms with public information dash boards
- Stormwater management through green streets, rain gardens, and bioswales
- Year-round learning and community gardens
- A cooperative ownership and management approach creating a new, equitable economic model, revenue, and a generative use model for Detroit's vacancy
- A partnership institute/community and events center in the adjacent Biddle School that reinforces SWLA as the "hub" of the neighborhood for STE[A]M education, NZE research/technology transfer, recreational amenities, youth sports, learning for all ages, and training and jobs skills development
- A new entity comprised of DPS, LTU, and neighborhood stakeholders for the development, manufacture, installation, and maintenance of NZE infrastructure.

WHEN?

The culmination of over seven years of studio[Ci]'s commitment to design and planning with the southwest Detroit community, this collaboration with the DPS and SWLA's principal, lead teachers, and students began in fall 2013. A broader community engagement process began in fall 2014, turnkey bids were solicited in spring 2015, and construction began in summer 2015. The project is slated for completion by the start of the 2016 school year, when monitoring of performance metrics and enhanced lesson plans and training activities will occur.

WHERE?

SWLA, a pre K–8 Detroit Public School, 4700 Tireman Avenue, Detroit MI 48204, and the surrounding Tireman neighborhood on Detroit's "Old Westside."

"studio[Ci]'s transdisciplinary approach, incorporating hands-on involvement, education, and training, allows students, teachers, and residents to engage in and be empowered by this Net Zero Energy project." –Constance C. Bodurow

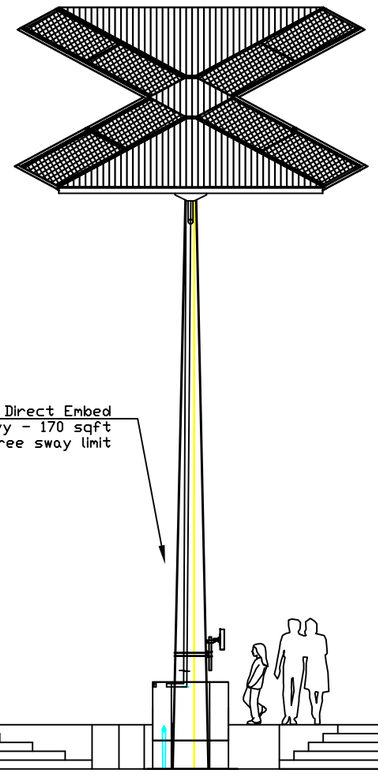
WHY?

The team arrived at SWLA through geo-spatial analysis of vacancy in Detroit, which perpetuates entrenched social, economic, and environmental inequity. When the team walked through the door, they found passion – in the students, teachers, parents, and residents – for this historic, challenged, but still intact Detroit neighborhood with a strong institutional presence – and they became passionate! The team's goal was to innovate and hybridize NZE technologies; create and test a "net new" prototype structure; and work at the boundaries of their disciplines, thereby advancing them. The team asked: *What if students learned about NZE in elementary school? What if residents were trained to generate their own energy? What if vacancy could be generative – of energy, wealth, educational opportunities? What would this mean for the stabilization of this neighborhood, the city, their future?*

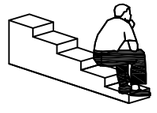
studio[Ci]

Lawrence Technological University
College of Architecture and Design
www.ltu.edu

Constance Bodurow
P: 248.204.2883
E: info@studio-ci.net
W: sciltufordc3.wordpress.com



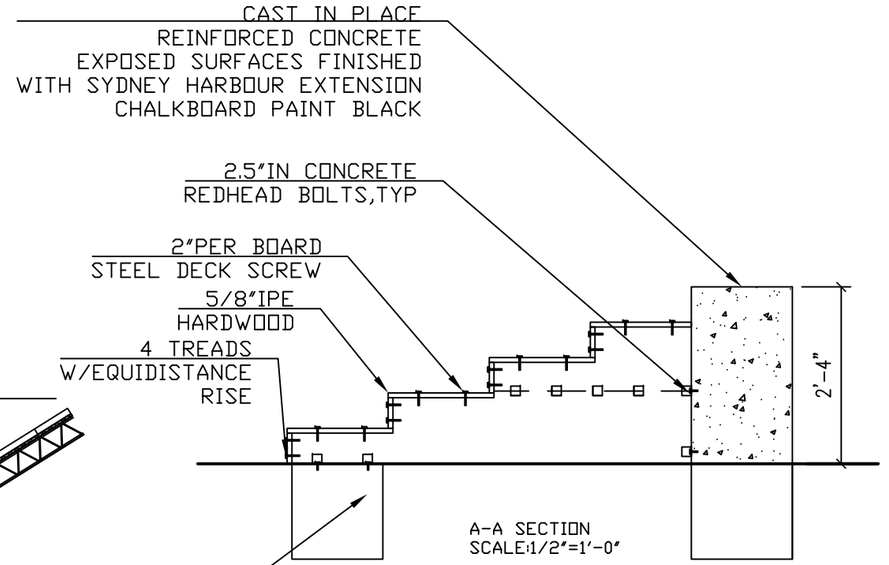
1 North Elevation
A.02 scale: 1/8"=1'-0"



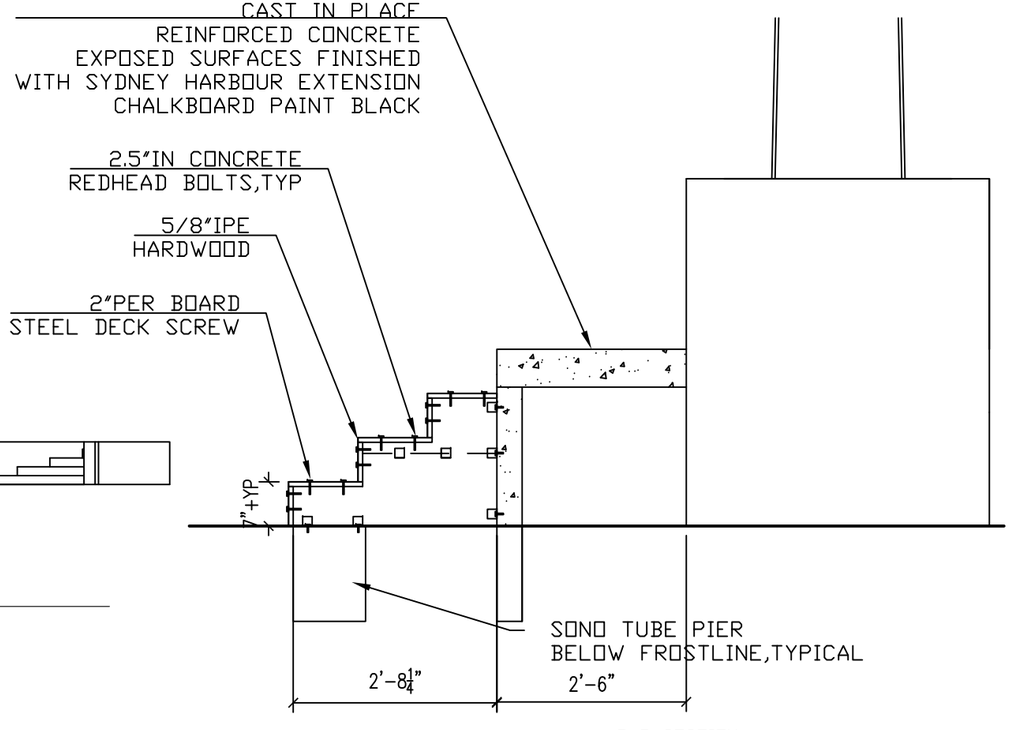
Human Use performance metric: A class of 30 school children/residents and several Instructors/Trainers can be accommodated on the stairs/steps.
Each child occupies an average of 18 s.f.

3
A.02 scale: 1/4"=1'-0"

2 East Elevation
A.02 scale: 1/8"=1'-0"



A-A SECTION
SCALE:1/2"=1'-0"



B-B SECTION
SCALE:1/2"=1'-0"

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THEORY PRACTICE
Possible is everything

s[Ci] studio[Ci]

CLIENT
DPS
SAMPSON WEBBER
LEADERSHIP ACADEMY
FORD C3

PROJECT
sw[LAB] NZE Prototype
PROJECT NO.
001

ISSUE 01
2.18.15

DRAWN BY
AC,CB,DB,RP,HT

ELEVATIONS AND DETAILS

A.02

-Sampson Webber Leadership Academy
(Pre-K to 8 DPS)
-Detroit Public Schools: Office of Communications, Office of Energy and Sustainability, Go Green Challenge, and Garden Collaborative
-The Tireman Neighborhood of Detroit
-Mayor's Office Department of Neighborhoods, District 6
-Detroit Future City
-Detroit Farm and Garden
-IBEW Local 58
-Ford

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(Pre-K to 8 DPS)
- City of Detroit
- Reed Kroloff
-Ford

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-Ford

-SDDC
-Ford

SDDC

INTENSITY

CAPACITY

TIME 2008 2010 2012 2013 2014 2015

VDCmp
https://www.facebook.com/groups/1148482918626272/

Ford c3 #1
http://studio-ci.net/disseminationawards/

ADS1+2
https://tuswiab.wordpress.com/

HOLCIM

Ford c3#2
https://twitter.com/studioCILTU

ID5
https://scilt.uford3.wordpress.com/

Ford c3#2

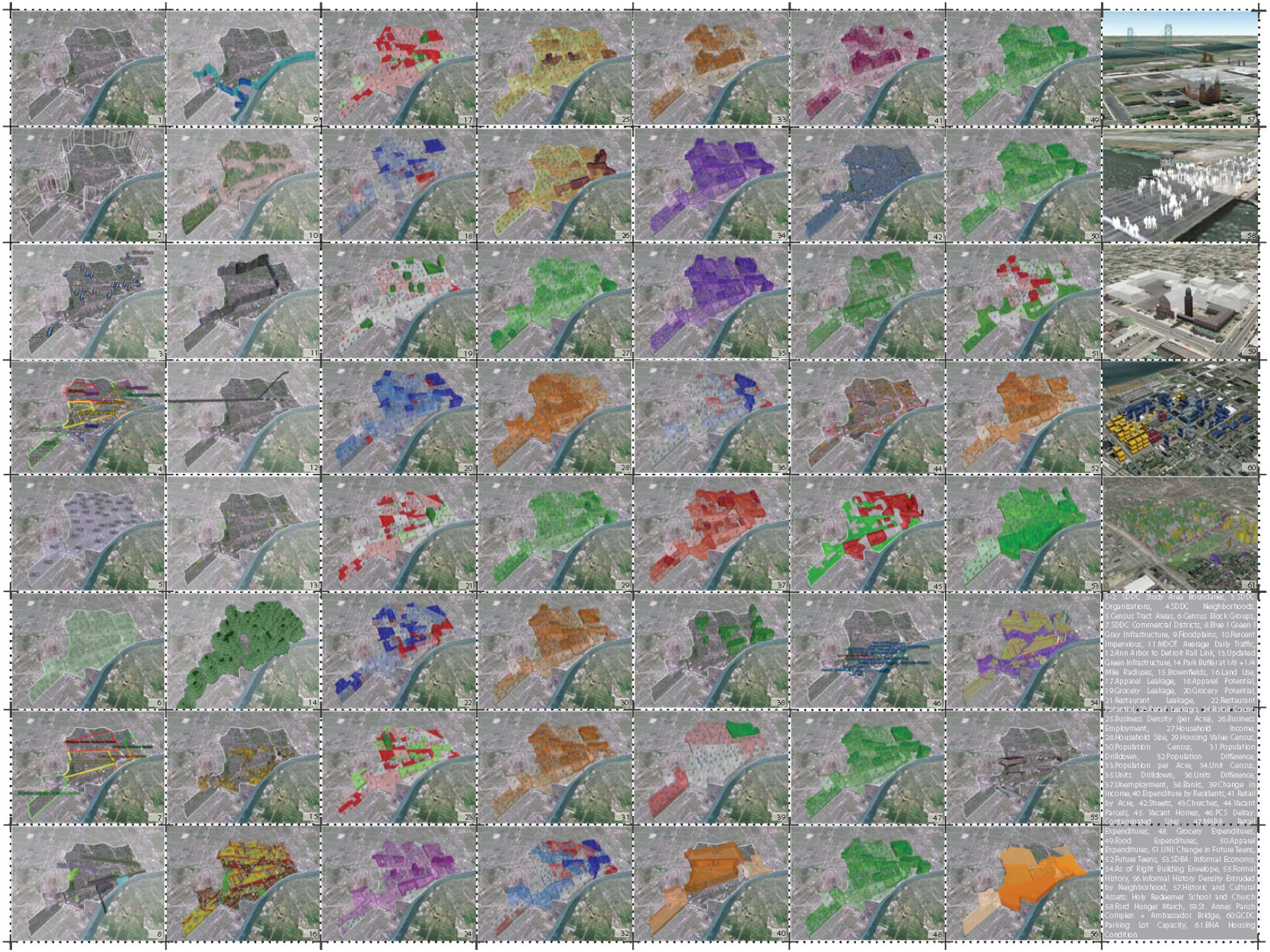
Value Densification

A focus on investment and development in neighborhoods and districts where inhabitation, infrastructure, cultural and employment assets [and value] are in evidence.

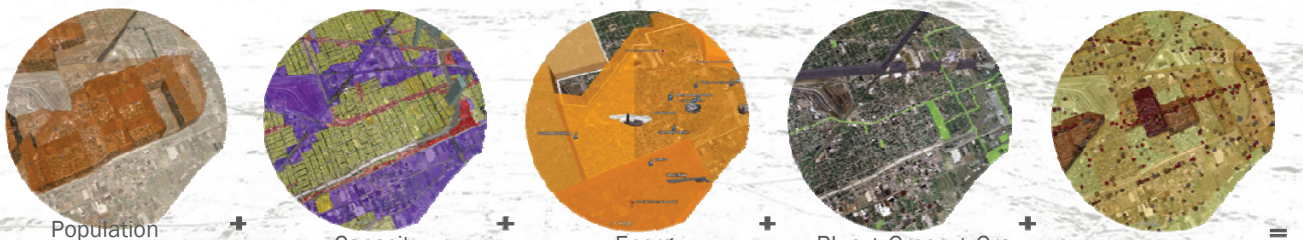
+ D IND DEV: Industrial Spatial Logic
and the Transformation of the City,
by Constance C. Bodurow
presented/published 20-22 October 2006,
ACSA Central Regional Conference,
University of Wisconsin-Milwaukee
School of Architecture + Planning

Value Densification : recommended Pilot Community Projects (green circles from left to right): Southwest Detroit, North End, Glengarry Marentette–Windsor, figure excerpted from +D IND DEV: Industrial Spatial Logic and the Transformation of the City, by Constance C. Bodurow, 2006, all rights reserved.

METHODOLOGY : MAPPING + ANALYSIS +DESIGN



1.SDBA Study Area Boundary, 2.SDBA Organizations, 4.SDDC Neighborhoods, 5.Census Tract Areas, 6.Census Block Groups, 7.SDDC Commercial Districts, 8.Blue / Green / Gray Infrastructure, 9.Floodplains, 10.Percent Impervious, 11.MDOT Average Daily Traffic, 12.Ann Arbor to Detroit Rail Link, 13.Updated Green Infrastructure, 14.Park Buffer at 1/8 +1/4 Mile Radiuses, 15.Brownfields, 16.Land Use, 17.Apparel Leakage, 18.Apparel Potential, 19.Grocery Leakage, 20.Grocery Potential, 21.Restaurant Leakage, 22.Restaurant Potential, 23.Retail Leakage, 24.Retail Gap, 25.Business Density (per Acre), 26.Business Employment, 27.Household Income, 28.Household Size, 29.Housing Value Census, 30.Population Census, 31.Population Drilldown, 32.Population Difference, 33.Population per Acre, 34.Unit Census, 35.Units Drilldown, 36.Units Difference, 37.Unemployment, 38.Banks, 39.Change in Income, 40.Expenditure by Residents, 41.Retail by Acre, 42.Streets, 43.Churches, 44.Vacant Parcels, 45.Vacant Homes, 46.PCS Delray, 47.Contaminated Sites, 47.MAPA, 47.Retail Expenditures, 48. Grocery Expenditures, 49.Food Expenditures, 50.Apparel Expenditures, 51.UNI: Change in Future Teens, 52.Future Teens, 53.SDBA: Informal Economy, 54.As of Right Building Envelope, 55.Formal History, 56.Informal History Density Extruded by Neighborhood, 57.Historic and Cultural Assets: Holy Redeemer School and Church, 58.Ford Hunger March, 59.St. Annes Parish Complex + Ambassador Bridge, 60.GCDC Parking Lot Capacity, 61.BHA Housing Condition



Convergence of Intensity
How to use GeoDesign tools to shape a city:

[Ci] Methodology

Determine the "Geography of Convergence" to develop formal design recommendations: The resultant analysis layering '(illustrated above)' shows the new "geography of convergence" within a ¼ mile walking radius of social, economic and environmental asset density in the Southwest Detroit neighborhood. Informed by a digital model of existing built and proposed development for the study area, we then identified all vacant parcels in the study area that were realistic for future development.

Geography of Convergence

Our methodology and digital interface support formal urban design recommendations. During the summer of 2009, we initiated an application of the Ci theory in Southwest Detroit.

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HOLCIM

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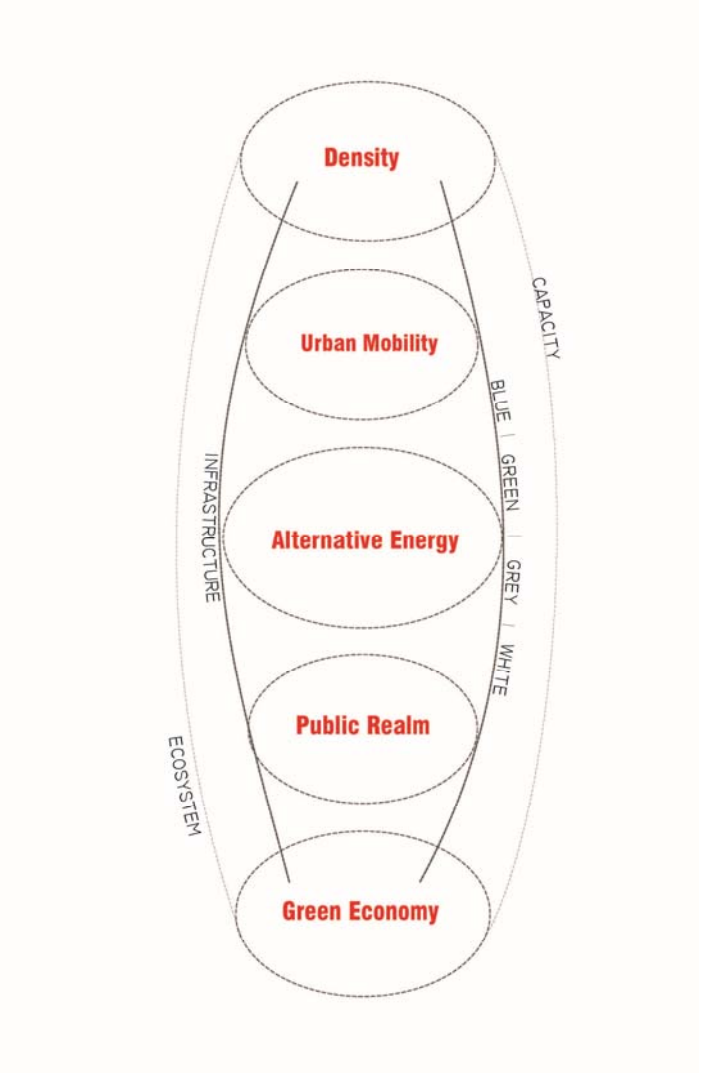
https://twitter.com/studioCILTU

ID5
https://scilt.uford3.wordpress.com/

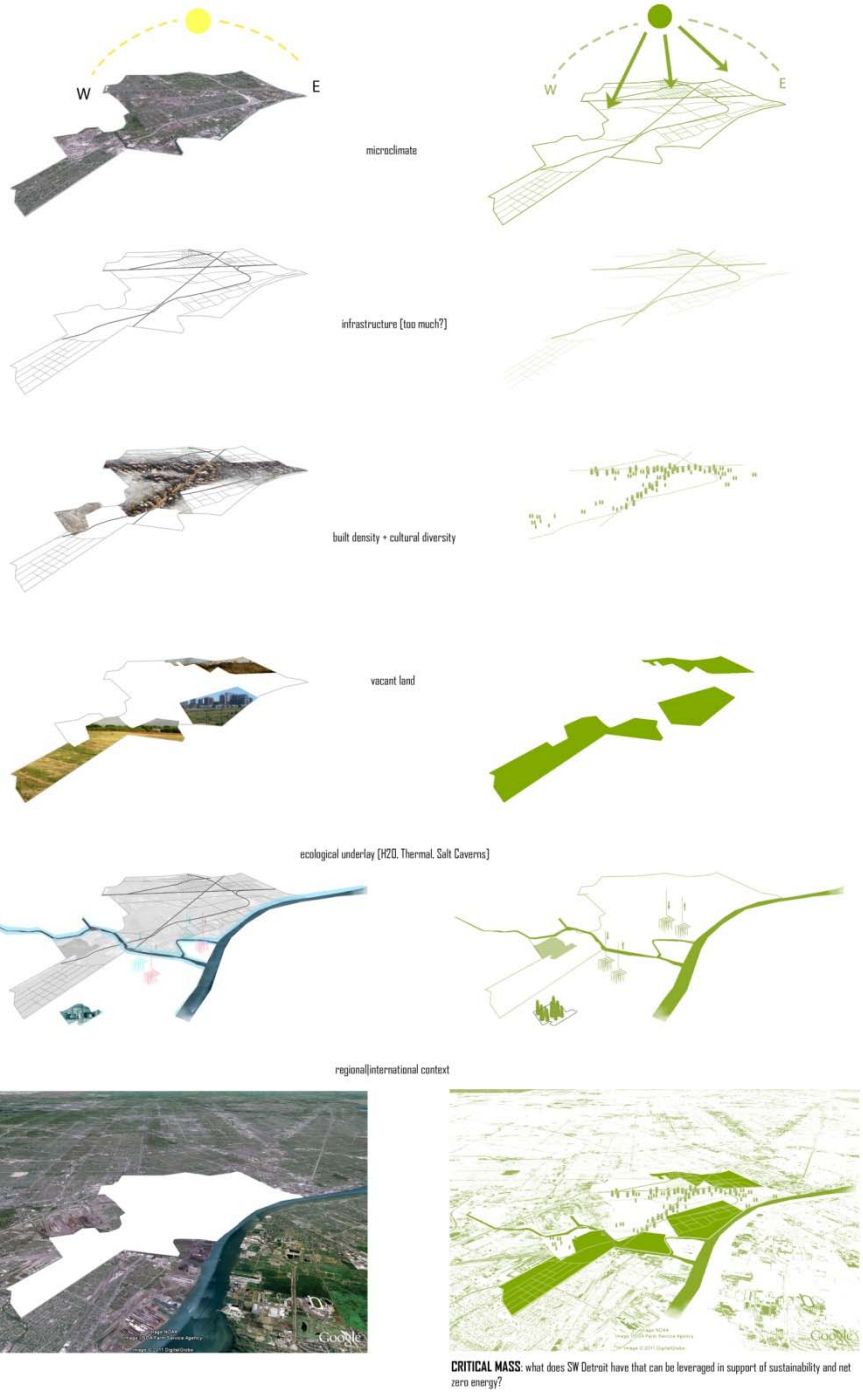
Ford c3#2

URBAN EVOLUTION: CREATING A NET ZERO ENERGY COMMUNITY
SOUTHWEST DETROIT: OUR REGION'S FIRST NET ZERO ENERGY COMMUNITY



Critical Mass

What does SW Detroit have that can be leveraged in support of sustainability and net zero energy?



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Systemic Overlay

Blue I Green I Gray I White Infrastructure

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Table3. Systemic Overlay Data Layers - blue green gray+ white infrastructure (studio[Ci], 2011)

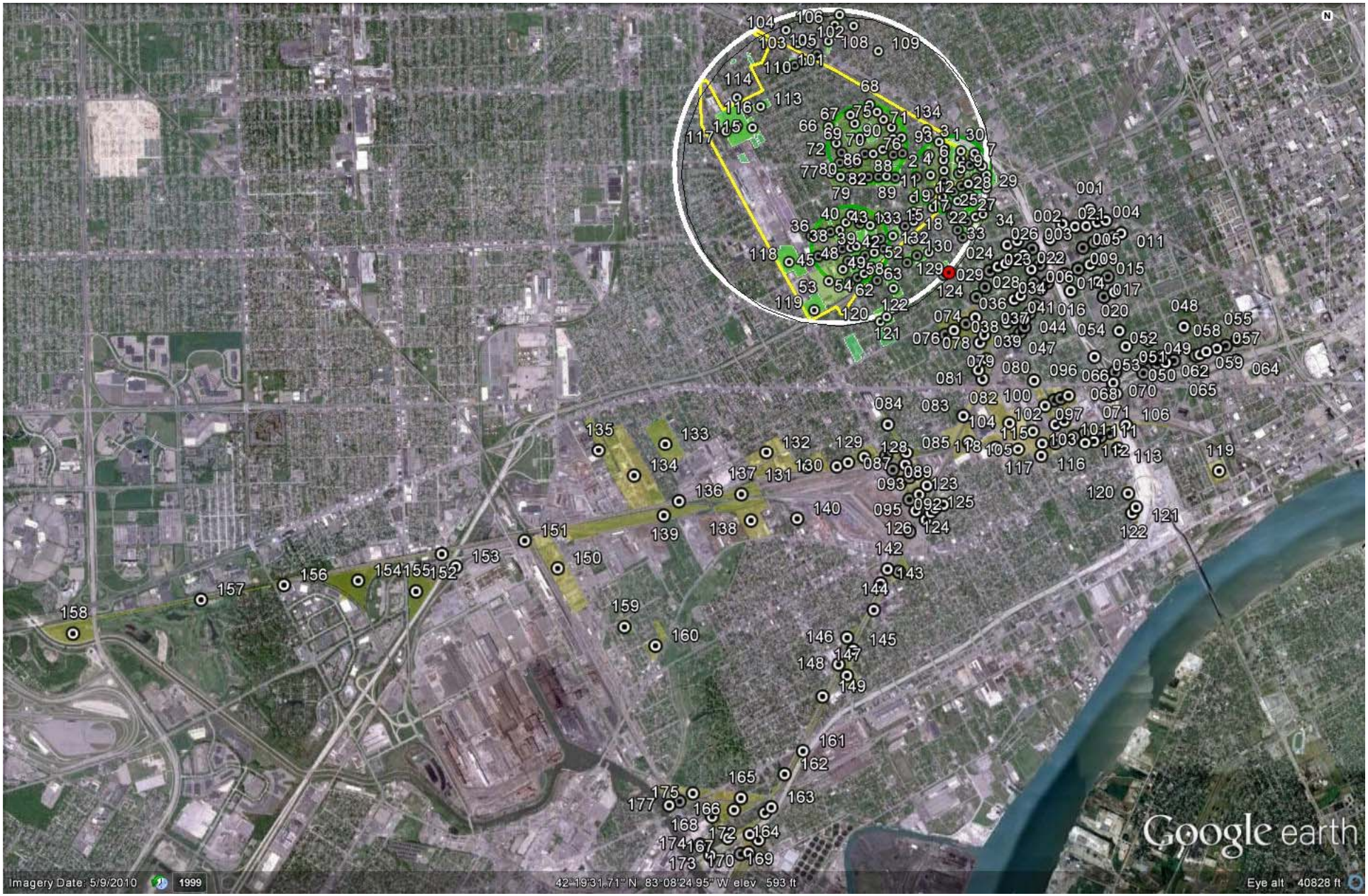
LAYERS:

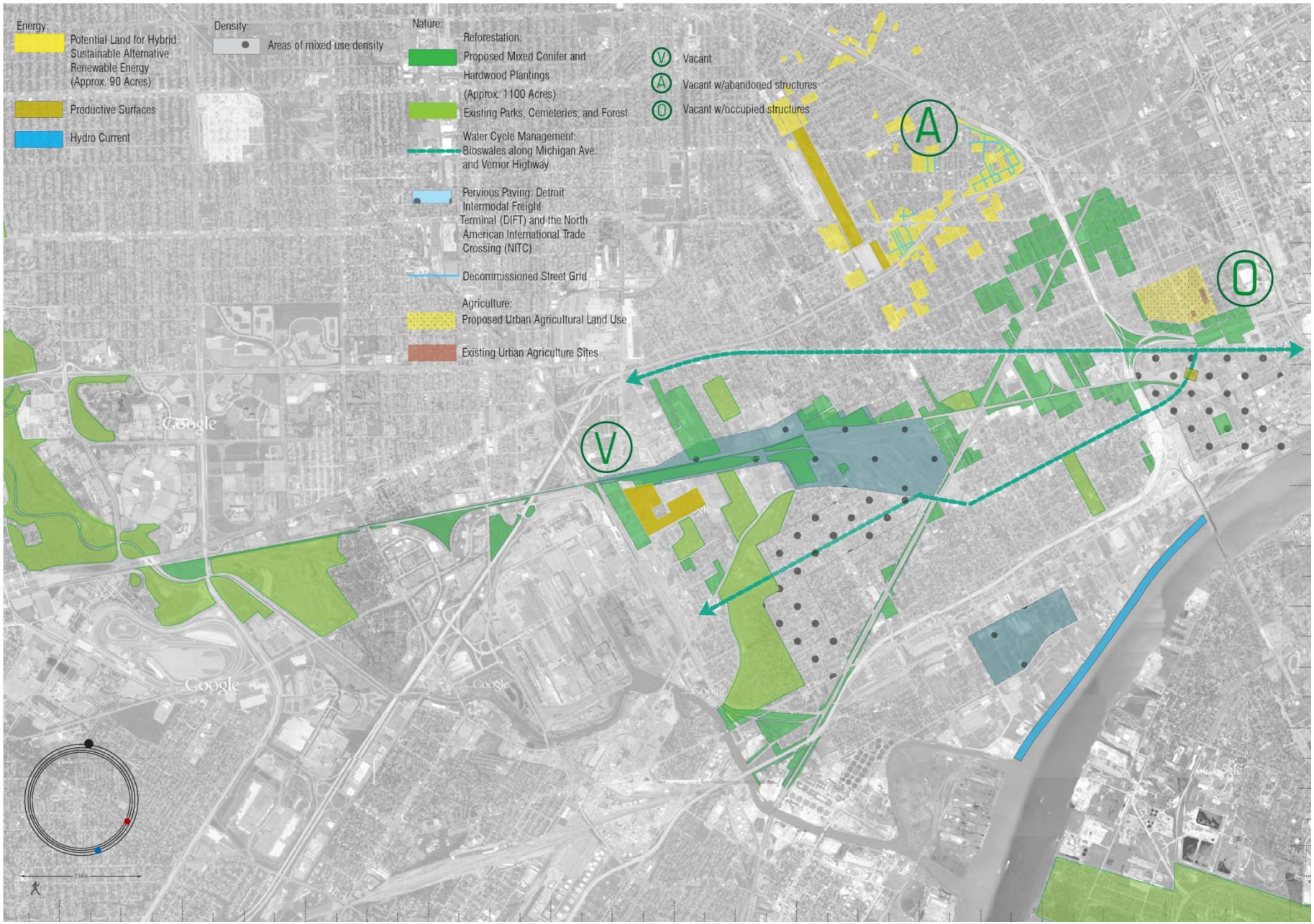
Blue Infrastructure
Bioswales/Infiltration Trenches
River and Ravines
Water Taxi
Water Freight Systems
Decommissioned Grid/Pervious Surfaces
Vacant Land

Green Infrastructure
Energy Buffers
Park Systems
Greenways
Green Roofs
Reforestation
Vacant Land

White Infrastructure
Solar Array Fields “Energy Farms”
Geothermal Energy Well Fields
Salt Caverns (storage)
Existing Electrical Grid
Hydro-Current System
Telecommunications (Wireless and Public)
Vacant Land

Gray Infrastructure
EV Car Charging Stations
Bus Rapid Transit System
Detroit to Ann Arbor Commuter Rail System
Canadian Pacific (CP) Passenger Rail System
Highway Systems
Bike Share Facilities
Railway Networks
Major Transportation Infrastructure Projects (NITC, DIFT, Ambassador Bridge)
Vacant Land


Google earth
Imagery Date: 5/9/2010
1999
42°19'31.71" N 83°08'24.95" W elev 593 ft
Eye alt 40828 ft



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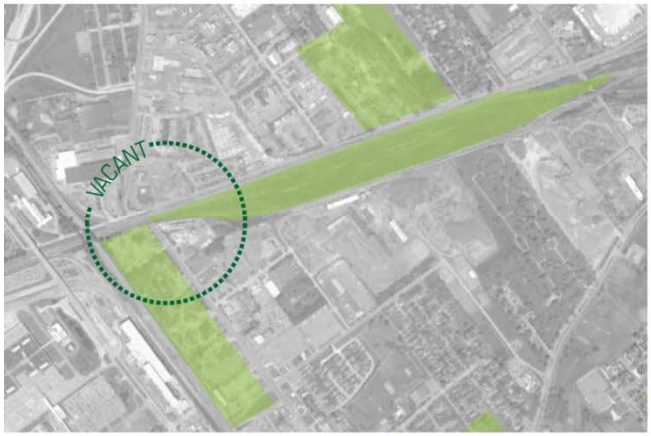
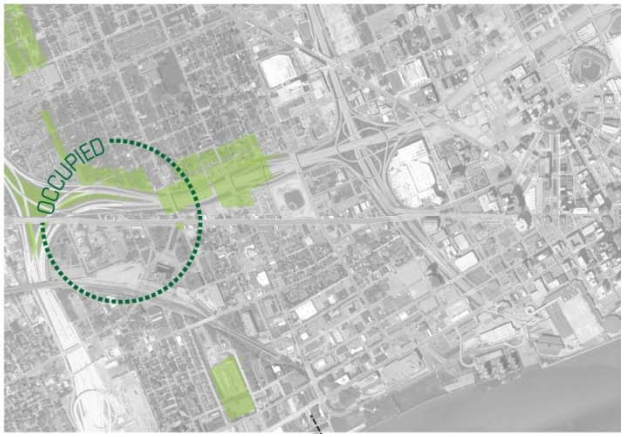
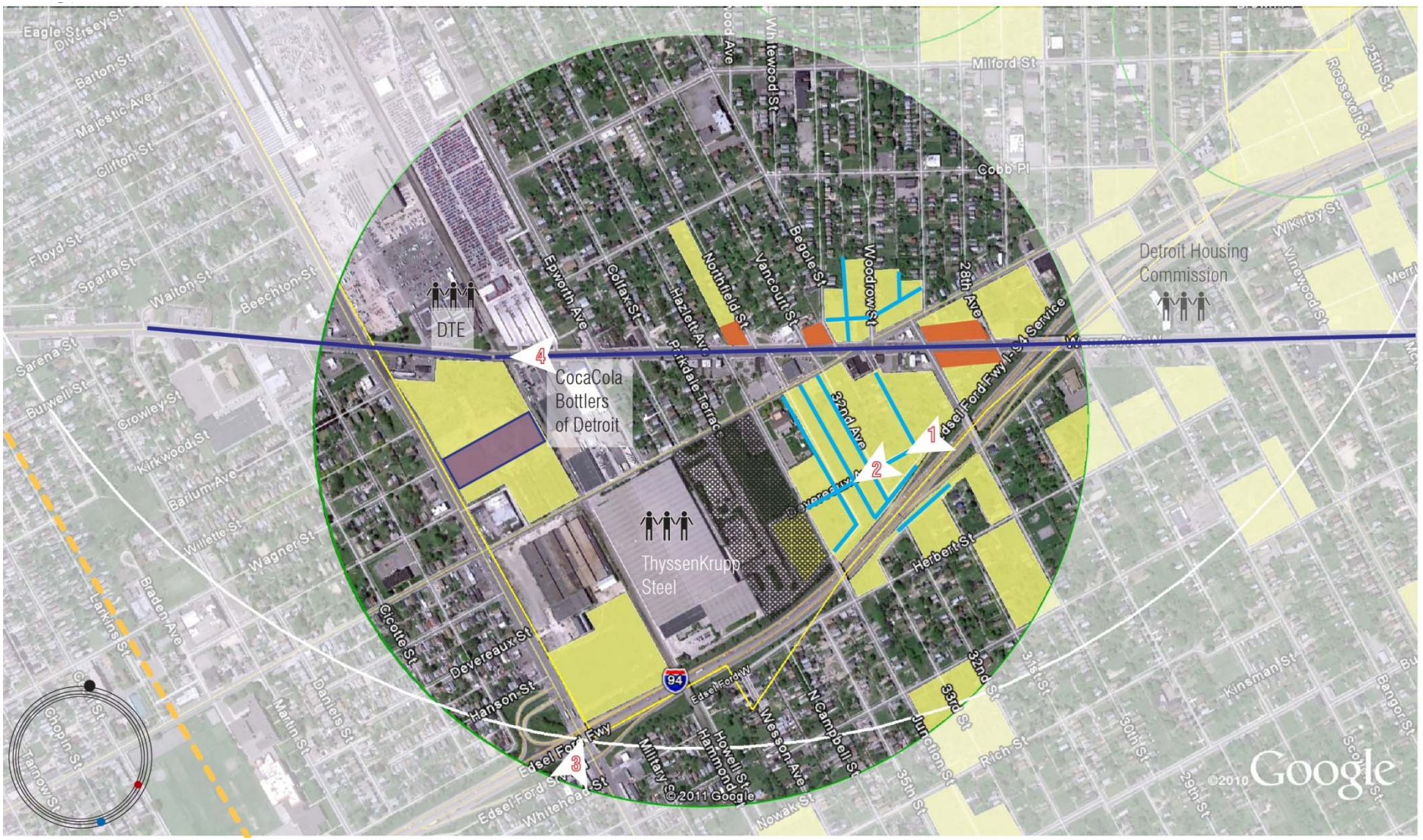
DESIGN INTERVENTIONS: NATURE, ENERGY, DENSITY






DTE
4
CocaCola
Bottlers
of Detroit
ThyssenKrupp
Steel
1
2
3
Detroit Housing
Commission
Milford St
Cobb Pl
Eagle St
Baiton St
Majestic Ave
Clifton St
Floyd St
Sparta St
Walton St
Beechton St
Sarena St
Burwell St
Crowley St
Kirkwood St
Barium Ave
Willette St
Wagner St
Braden Ave
Larkins St
Chopin St
Tarrow St
Epworth Ave
Golfax St
Northfield St
Hazlett Ave
Parkdale Terrace
Vancourt St
Begole St
Woodrow St
28th Ave
32nd Ave
Whitewood St
Roosevelt St
25th St
W Kirby St
Vinewood St
Edsel Ford Fwy I-94 Service
Herbert St
Circolite St
Devereaux St
Hanson St
Edsel Ford Fwy
Edsel Ford W
Whitehead St
Military St
Howell St
Hammond St
Weston Ave
N Campbell St
Junction St
Rich St
Nowak St
35th St
33rd St
32nd St
31st St
30th St
29th St
Kinsman St
Bangor St
Martin St
Daniels St
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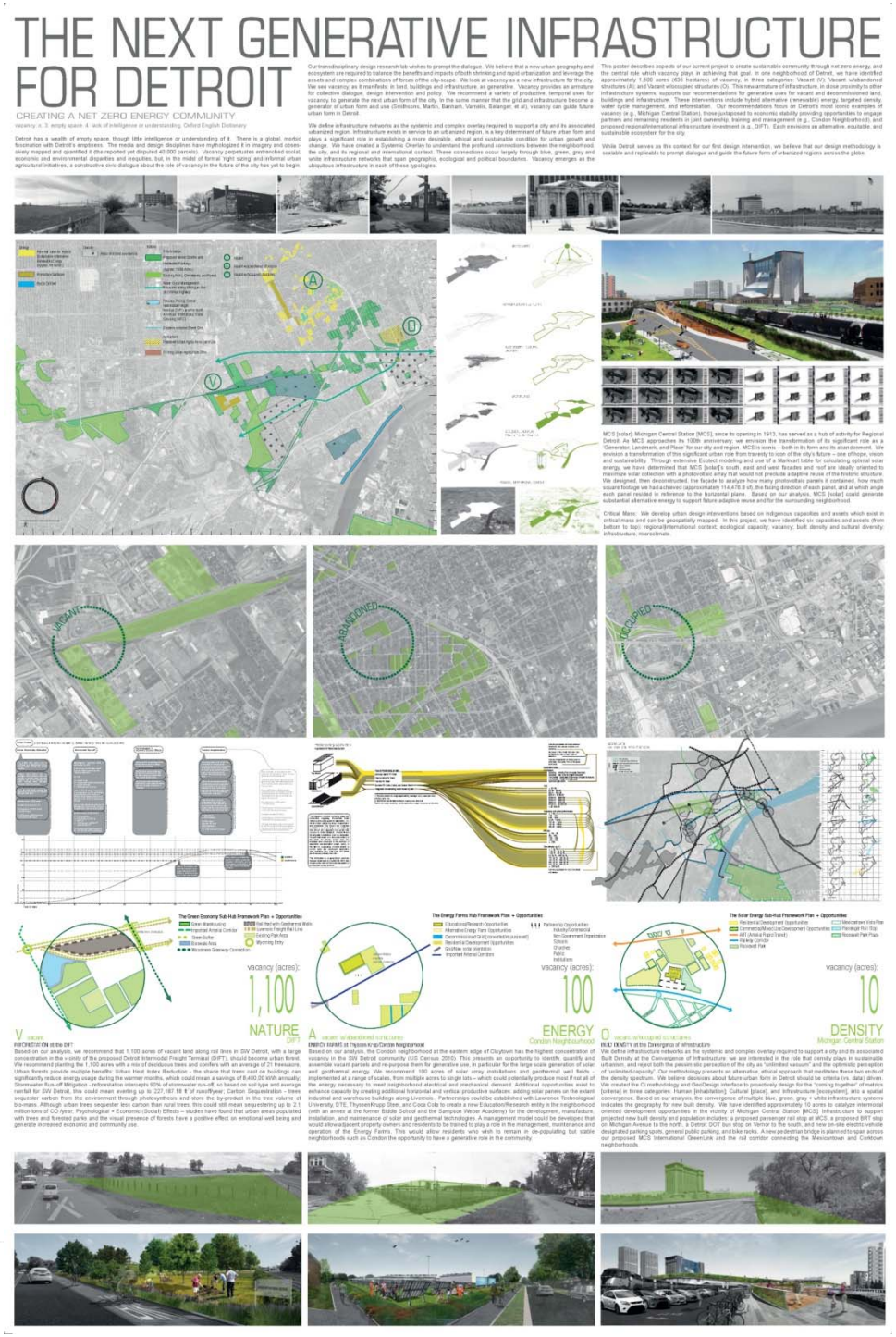
ENERGY: 100 Acres
A: ENERGY FARMS at the Tireman /Condon Neighbourhood

Detroit's Next Generative Infrastructure:

vacancy: n. 3: empty space. 4: lack of intelligence or understanding. Oxford English Dictionary

Detroit has a wealth of empty space, though little intelligence or understanding of it. There is a global, morbid fascination with Detroit's emptiness. The media and design disciplines have mythologized it in imagery and obsessively mapped and quantified it (the reported yet disputed 40,000 parcels). Vacancy perpetuates entrenched social, economic and environmental disparities and inequities, but, in the midst of formal 'right sizing' and informal urban agricultural initiatives, a constructive civic dialogue about the role of vacancy in the future of the city has yet to begin.



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SDDC

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HOLCIM

Ford c3#2
https://twitter.com/studioCILTU

ID5
https://scilt.uford3.wordpress.com/

Ford c3#2

TRANSDISCIPLINARY URBANISM [TU] STUDIO: SPRING + FALL 2013

ARC 5824 Advanced Design Studio 2 (ADS 2)

Transdisciplinary Urbanism [TU]: networked infrastructures, research and practice
Instructor: Constance C. Bodurow, Assoc. AIA, AICP, Assistant Professor, Program Coordinator, Master of Urban Design, Director, studio[Ci] , 2013-2014 Coleman Fellow
Spring 2013
partially supported by the Coleman Foundation

This spring, nine daring CoAD graduate students are expanding the boundaries of the architectural discipline by adopting the studio[Ci] transdisciplinary research and practice method in order to effectively address the complexity of forces and dynamics affecting the built and natural environment, and the pressing need for sustainable interventions at all scales. Under the guidance of Prof. Constance Bodurow and with the generous assistance of Professor Donald Carpenter, CoE, Director of the Great Lakes Stormwater Management Institute at Lawrence Technological University, and widely published Low Impact Development [LID] expert, our studio design project and program will create a "hybridized architecture" – [green] infrastructure networks and systems - for A.B. Ford Park, a 33 acre riverfront park in the Jefferson Chalmers district, within the Detroit River watershed and the Great Lakes bioregion. Our client group includes the Director of General Services and the Chief Landscape Architect of the City of Detroit and neighborhood NGOs and residents.

Illustrated here is our progress as of Midterm Review. Three teams conducted extensive research and then created an ANALYSIS FRAMEWORK comprised of:

CONDITIONS
CRITERIA
CAPACITIES

Teams then identified primary and supportive opportunitites to drive their unique Conceptual + Schematic Design Alternatives. Teams addressed [at minimum] the Recreation Center on site, incorporation of playing fields, and green infrastructure [LID BMPs]. The three alternatives included:

THE INLET
LE RETOUR HABITAT
[VISUALIZING] BLUEWAYS

Disciplinary Thievery:

"...it would offer the renewed potential for architecture to again recuperate a systemic thinking – one whose systems extend extrinsically, outward – and for architecture to position a contingent open-endedness that invites new typological species for architecture, new roles for architects, and ultimately, an entrepreneurial spirit about location of its very discipline."

Mason White

We welcome input - drop in to our T-219 studio and give us your feedback or visit our website: http://tustudio.wix.com/abfordparkdetroit!

ARC 5814 Advanced Design Studio 1 (ADS 1)

Transdisciplinary Urbanism [TU]: networked infrastructures, research and practice
partially supported by the Coleman Foundation
Instructor: Constance C. Bodurow, Assoc. AIA, AICP, Associate Professor, Director, studio[Ci], and 2013-2014 Coleman Fellow
Graduate Teaching Assistant: Lauren Hetzel, M.Arch Candidate
fall 2013

[sw]LAB:Generate!

This fall, a small but mighty band of CoAD graduate students and senior Civil Engineering students are expanding the boundaries of the architectural discipline by adopting the studio[Ci] transdisciplinary research and practice method. We intend to explore how to effectively address the complexity of forces and dynamics affecting the built and natural environment, and the pressing need for sustainable interventions at all scales. Under the guidance of Prof. Constance Bodurow and with the generous assistance of Professor Donald Carpenter, CoE, Director of the Great Lakes Stormwater Management Institute at Lawrence Technological University and widely published Low Impact Development [LID] expert, and Professor Robert W. Fletcher, CoE, Director, LTU Alternative Energy Engineering Program, our studio design project and program will create a HYBRIDIZED ECOSYSTEM AND ARCHITECTURE – [green] infrastructure networks and structures – for an "Energy Farm". Our vision is to engage the community and leverage assets of a strong institutional presence, vacancy, and [corporate] partners in order to generate three things: net zero energy, wealth and educational opportunities. We will link the schools and neighborhood, and create a new partnership institution for the Sampson Webber Leadership Academy and Biddle School in the DPS Northwestern District, Tireman/Condon Neighborhood of Detroit. Our client group includes the school Principal, lower and upper division Teachers, Students, Parents and Neighborhood Residents.

We are currently conducting extensive research and creating an ANALYSIS FRAMEWORK comprised of:
CONDITIONS
CRITERIA
CAPACITIES

Participants then identified primary and supportive opportunitites to drive their unique CONCEPTUAL + SCHEMATIC DESIGN ALTERNATIVES: NETWORKS + STRUCTURES. Ultimately, participants designed HYBRIDIZED ECOSYSTEMS+ARCHITECTURES of both natural and built form which create the Partnership Institute, support LID/HAE infrastructure and serve diverse user groups.

We welcome your input - drop into our T-219 studio and give us your feedback or visit our website and blog: http://tuswlab.wordpress.com/

PLANET: Environmental quality and resource efficiency

The Transdisciplinary [TU] Studio Team (from left to right): Gania Kandalaft, M.Arch candidate, Chris Bragg, Brian Uhr and Christina Milne, BCE Candidates, Associate Professor Constance Bodurow, Dustin Altschul, M.Arch/nm.U.D. Canidate, Cheung Yang, M.Arch Candidate, and Ben Vidian, BS.Arch/BCE Candidate, fall 2013.

In fall 2013, CoAD graduate students and senior Civil Engineering students are expanding the boundaries of the architectural discipline by adopting the studio[Ci] transdisciplinary research and practice method. We intend to explore how to effectively address the complexity of forces and dynamics affecting the built and natural environment, and the pressing need for sustainable interventions at all scales. Under the guidance of Professor Constance Bodurow and with the generous assistance of Professor Donald Carpenter, CoE, Director of the Great Lakes Stormwater Management Institute at Lawrence Technological University and widely published Low Impact Development [LID] expert, and Professor Robert W. Fletcher, CoE, Director, LTU Alternative Energy Engineering Program, our studio design project and program will create a HYBRIDIZED ECOSYSTEM AND ARCHITECTURE – [green] infrastructure networks and structures – for an “Energy Farm”. Our vision is to engage the community and leverage assets of a strong institutional presence, vacancy, and corporate/NGO partners in order to generate three things: net zero energy, wealth and educational opportunities. We will link the schools and neighborhood, and create a new partnership institution for the Sampson Webber Leadership Academy and Biddle School in the DPS Northwestern District, Tireman/Condon Neighborhood of Detroit. Our client group includes the school Principal, lower and upper division Teachers, Students, Parents and Neighborhood Residents.

-Sampson Webber Leadership Academy
(Pre-K to 8 DPS)
-Detroit Public Schools: Office of Communications, Office of Energy and Sustainability, Go Green Challenge, and Garden Collaborative
-The Tireman Neighborhood of Detroit
-Mayor's Office Department of Neighborhoods, District 6
-Detroit Future City
-Detroit Farm and Garden
-IBEW Local 58
-Ford

-Sampson Webber Leadership Academy
(Pre-K to 8 DPS)
-Detroit Public Schools: Office of Communications, Office of Energy and Sustainability, Go Green Challenge, and Garden Collaborative
-The Tireman Neighborhood of Detroit
-Mayor's Office Department of Neighborhoods, District 6
-Detroit Future City
-Detroit Farm and Garden
-Ford

- Sampson Webber Leadership Academy
(Pre-K to 8 DPS)
- City of Detroit
- Reed Kroloff
-Ford

- Sampson Webber Leadership Academy
(Pre-K to 8 DPS)
- City of Detroit
-Ford

-SDDC
-Ford

SDDC

INTENSITY

CAPACITY

TIME 2008 2010 2012 2013 2014 2015

VDCmp
https://www.facebook.com/groups/1148482918626272/

Ford c3 #1
http://studio-ci.net/disseminationawards/

ADS1+2
https://tuswiab.wordpress.com/

HOLCIM

Ford c3#2
https://twitter.com/studioCILTU

ID5
https://scilt.uford3.wordpress.com/

Ford c3#2

swLAB: Energy Farm/Outdoor Classroom

[Project title]

HA14-HEMJV

[Project ID]

HOLCIM AWARDS (MAIN CATEGORY)

GENERAL PROJECT DATA

Project Group 2	Landscape, urban design, transportation infrastructure and public utilities
Competition region	North America
City	Detroit
Country	United States
Client	Sampson Webber Leadership Academy
Intervention	New construction and conversion
Status of planning	Final design stage
Status of permission	Application in preparation
Planned start	Sep '14
Project background	Research project
Latitude	42°21'16.49"N
Longitude	83° 7'5.55"W
Elevation	187
Other competition	no

MAIN AUTHOR AND CONTACT DETAILS

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Chris, Dr. Fletcher, Lauren, Dr. Carpenter, Pr.Houston, Gania, Chenchun, Dir.Bodurow, Dustin, Haibin

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7. Mr. Houston Anthony
Academic · 1960 · male · Detroit Public Schools · Sampson Leadership Academy · 4700 Tireman · 48204 · Detroit · United States · Tel 313-596-4750 · anthony.houston02@detroitk12.org ·

"...it's 'rough' in this area, but it doesn't mean kids don't want to learn and parents don't care."
-Mrs. LaShon Clay Henderson, 3rd grade math + science teacher

This is my school

This is my class

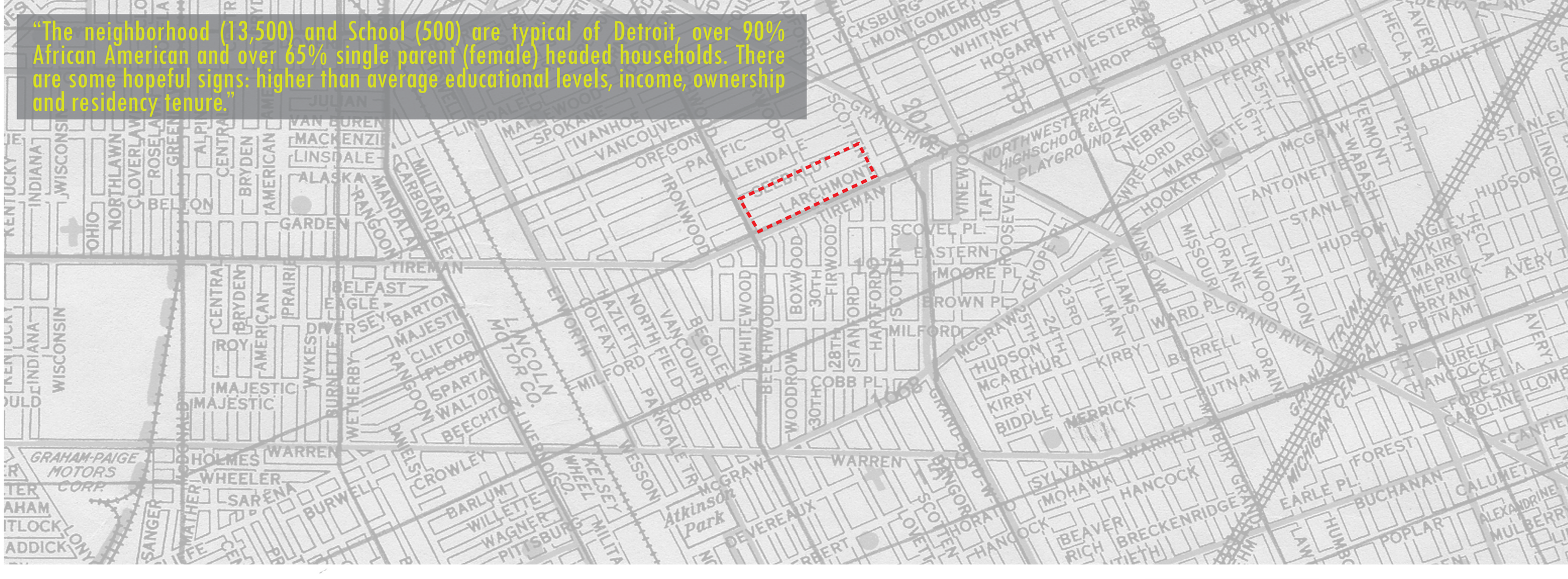
This is my neighborhood

"Our vision is to partner, engage the community, and leverage assets of a strong institutional presence, vacancy, and NGO/public/corporate partners in order to generate three things: energy, wealth and educational opportunities."

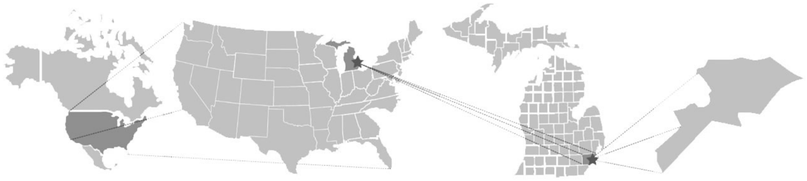
This is my future

[sw]LAB stands for both Sampson Webber Leadership Academy at Biddle and solar/water LAB!

We came to this place through dispassionate geospatial analysis. When we walked through the door of the school, we found passion: in the teachers and students, the parents, and for an historic, challenged but still intact Detroit neighborhood. We asked, what if students learned about Net Zero Energy (NZE) in elementary school? What if residents were empowered to generate their own energy? What would it mean for this neighborhood, our city, their future? A story began emerge:



"The neighborhood (13,500) and School (500) are typical of Detroit, over 90% African American and over 65% single parent (female) headed households. There are some hopeful signs: higher than average educational levels, income, ownership and residency tenure."



The Neighborhood and its citizenry enjoy a proud but un-celebrated history. The neighborhood has its origins in the Joseph Tireman family farm, Greenfield Township (1882) which was subdivided for development in the 1920s. More significantly, Tireman Street was historic boundary between Springwells and Greenfield Townships and served as the "Jim Crow Line" from 1920-1950, essentially dividing black and white Detroit. In 1944, the Orsel McGhee family attempted to purchase 5037 Seebaldt Avenue, just across from the school. This spurred the historic McGhee v. Sipes case, supported by the NAACP and successfully taken to the Supreme Court by Thurgood Marshall, then a young attorney. This home is now a State of Michigan Historic Site. By 1927, the still running Tireman #47 Bus became the second bus route in Detroit, carrying passengers between Downtown and Dearborn. The two schools were built in the 1960s, one named for James B. Webber, nephew of J.L. Hudson and one of the founders of the Hudson Webber Foundation which has long supported school programs (http://www.hudson-webber.org/), and the other for a prominent Doctor, Andrew Porter Biddle. Sampson-Webber absorbed Biddle Elementary in 2005. The neighborhood also has a rich musical tradition, embodied in the Blue Bird Inn at 5021 Tireman, a black owned establishment which was, until closing in the 1990s, was the live music venue for modern jazz in Detroit, featuring live performances by renowned musicians such as Charlie Parker and Miles Davis.

Residents told us "this was a really a serious neighborhood - people did not leave — and homes went from generation to generation. All housing was highly in demand. The two apartment buildings across from the school were always full — you could not get an apartment! Kids were disciplined. There were no drugs in the neighborhood. If there were, they were gone quickly (police were called in). There was vibrant retail in the Tireman commercial strip: barber shop, ice cream shop, pool hall, a bakery. Vic's was a full service grocery store under the same family ownership for a long time."

1882 — Joseph Tireman's Farm

1920 — Jim Crow Line
Havlena Family Living at 5037 Seebaldt Avenue

1927 — #47 Tireman Bus Route

1944 — First African American Family North of Tireman

1950 — Detroit's population reaches it's height of 1.8 million
Over 300 family-owned businesses were located on Tireman

1948 — McGhee V. Sipes; Thurgood Marshall

1953 — The Blue Bird Inn

1963 — Andrew Porter Biddle Elementary School
Named for Detroit Medical Doctor and Spainish-American War Surgeon

James B. Webber Junior High School
Named For J.L. Hudson's Nephew and Hudson's Vice

2005 — Sampson-Webber absorbs Biddle Elementary

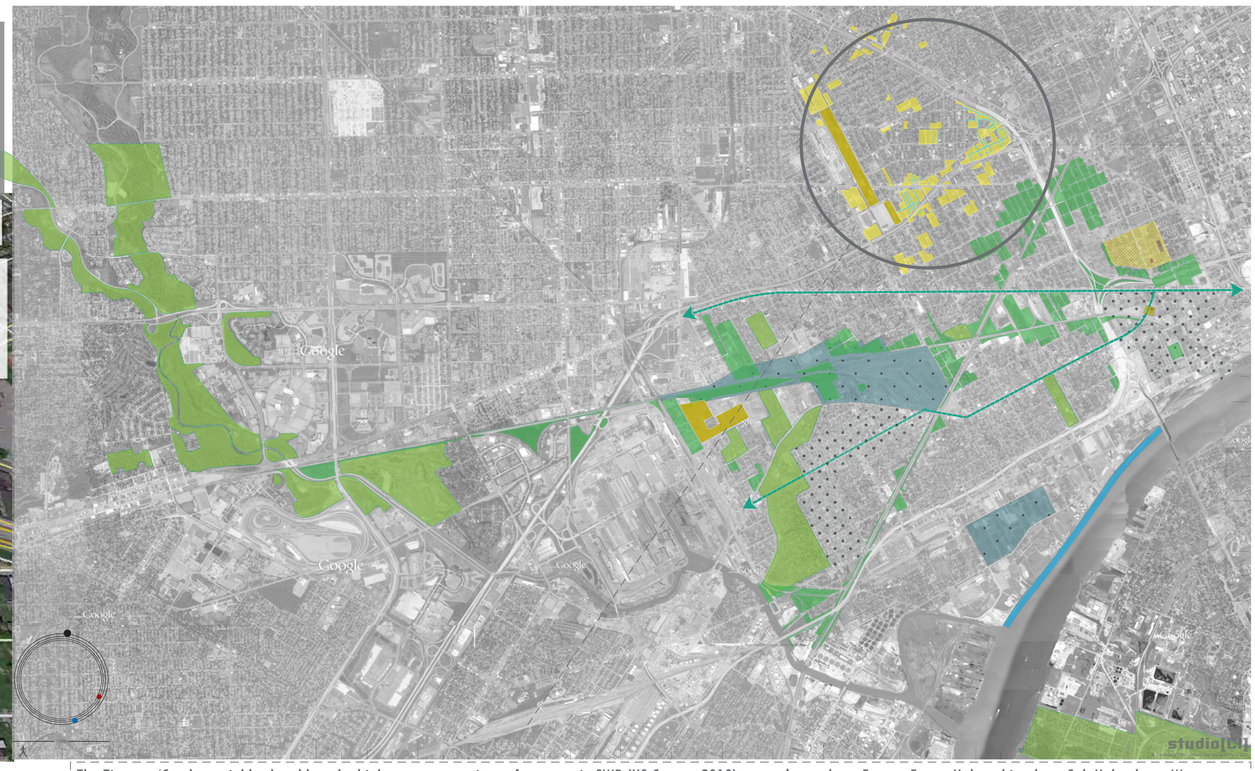
2006 — Sampson-Webber Leadership Academy

Present

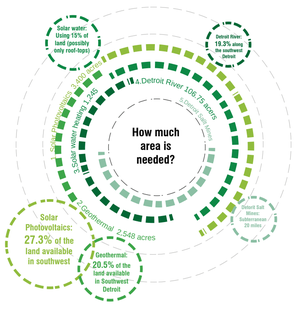
[sw]LAB:Generate!

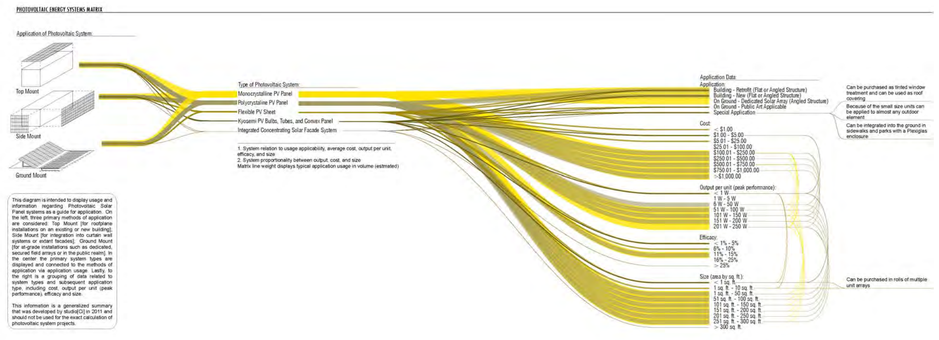
CONTEXT HISTORY

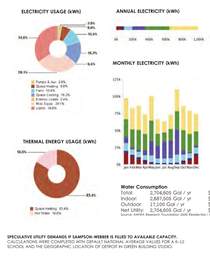
"Vacancy is a new infrastructure for the city. We see vacancy as it manifests in land, buildings and infrastructure, as generative and recommend productive, temporal uses for vacancy, providing an armature for collective dialogue, design intervention and policy." Constance C. Bodurow, Director, studio[Ci]

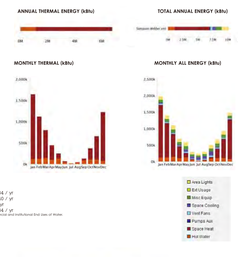


The Tireman/Condon neighborhood has the highest concentrations of vacancy in SWD (US Census 2010), so we located our Energy Farms Hub and its three Sub Hubs there. We saw an opportunity to identify, quantify and assemble vacant parcels and re-purpose them for generative use, primarily for the large scale production of solar and geothermal energy. We call these repurposed areas of SWD Energy Farms, utilizing vacant land and adjacent decommissioned street grid for the generation of alternative energy and water management

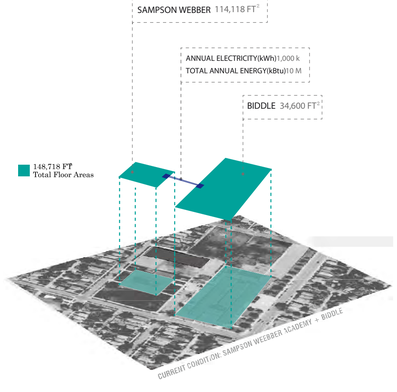


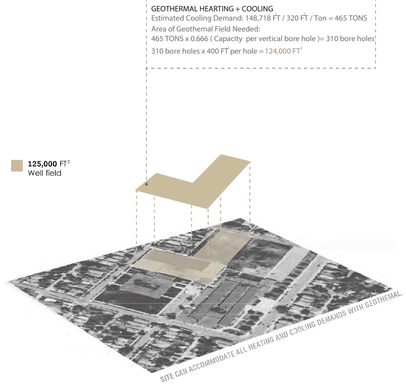


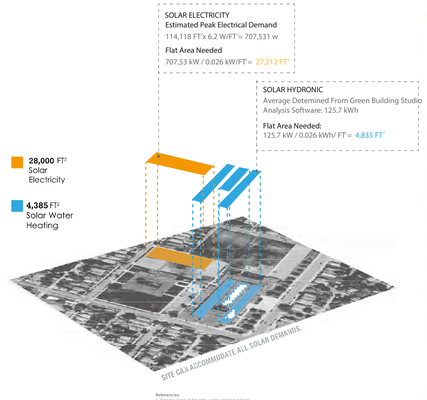




In 2010, studio[Ci], a transdisciplinary design research lab @ LTU CoAD was awarded one of five Ford C3 grants in North America, modestly claiming we could make Southwest Detroit (SWD) Michigan's first NZE community, and spent the next two years working with the Southwest Detroit community proving it could be done! In 2013, we took the EF/OC concept into final design through the Transdisciplinary Urbanism TU] Studio @ LTU. A faculty team of Architects, Urbanists and Engineers guided both graduate Architecture students and senior Civil Engineering students. Our process is collaborative, criteria-driven, integrative, transdisciplinary, and transparent, engaging diverse stakeholders. We established a partnership with the school Principal and gained input from Administrators, Teachers, Staff, Parents, and Neighborhood Residents. Building on the Ford C3 work, we conducted further extensive research for an Analysis Framework comprised of: Conditions - Criteria – Capacities to provide baseline contextual information on the neighborhood and school and craft a comprehensive program for the EF/OC. We then identified primary and supportive opportunities to drive unique Schematic Design Alternatives. Finally, we generated Hybridized Architectures+Ecosystems.







MAXIMIZED SOLAR ENERGY AVAILABLE AREAS
Building Roofs: 148,718 FT x 0.66 = 98,153 FT

SITE
Gross Area: 546,852.2 FT
Recreation Ratio: 54,685.24 FT
Shadow Area: 9,903.6 FT
Available: 482,263.4 FT²
Total Available: 580,416 FT

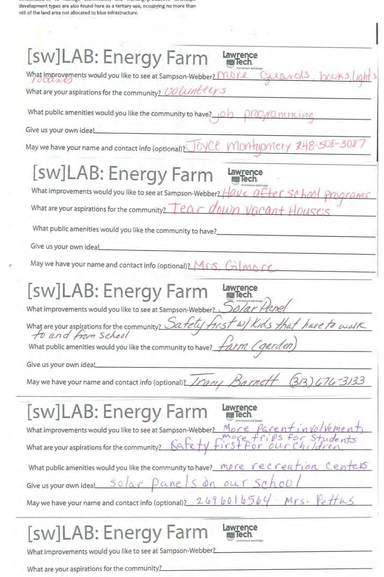
AVERAGE HOURLY AVAILABLE SOLAR PRODUCTION
580,416 FT X 0.026 kWh/ FT = 15,090 kWh

PERCENTAGE CONSUMED BY DEMAND
Total Daily Demand
Electric: 27,212 FT²
Hydronic: 4,835 FT²
Total: 32,047 FT²

PRECENTAGE:
580,416 FT / 32,047 FT = 18.11%

Site can produce 81.89% more solar energy than is needed

INNOVATION ECOLOGICAL areas are landscapes of innovation, where ecological development types predominate. Here forests, meadows, and other landscapes develop gradually over time and cost very little (or nothing!) to "construct" and maintain. Flowering meadows gradually give way to forests, and the changing landscape supports a variety of plant and animal life, including lives like pheasants. These landscapes can develop on their own, or can be guided to different types of desirable landscapes, which may be especially suitable for a particular species, or more appropriate for stormwater management, or a quick-growing forest that shades out tall grasses and prevents them from growing, improving visibility and eliminating need for mowing. A portion of these areas is devoted to blue infrastructure, to manage stormwater, and working=productive. landscape development types are also found here as a tertiary use, occupying no more than rest of the land area not allocated to blue infrastructure.



[sw]LAB:Generate!
RESEARCH/ PROCESS

ENERGY FARM | OUTDOOR CLASSROOM | LEARNING GARDEN

[sw]LAB:Generate studio[Ci] Lawrence Tech

> "Make it a relevant place for learning and keep it kid-friendly. Make it fun and exciting! We need sustainable, viable, and securable design proposals."
> Anthony Houston, Principal, Sampson Webber Leadership Academy

legend

- raingarden
- bioswale
- pervious pavers
- pervious concrete | outdoor classroom
- recycled rubber | playscape
- walkable pv panels
- school garden

stormwater management

water runoff
[im]pervious cover
soil type
minimal disturbance
infiltration

Minimize environment impact while using stormwater runoff as a resource for the immediate over-taxed sewer system.

Decrease impervious materials so water can infiltrate through the ground more.

techniques | structural
bioretention cells
planter boxes
vegetated swales
detention basins
infiltration practices
native landscaping
permeable pavements
vegetated roofs
green streets
cisterns
water harvesting

outdoor classrooms

designated gathering space
multiple activities
location near garden

Materials **sustainable, maintainable,** and **securable**: use of porous concrete.

Location near garden and buildings for **easy access**. **Connection** will enhance lesson plans between **classroom** and **garden.**

Multiple activities set up for student independent **hands-on interaction.**

play space

materiality
cost efficiency
safety

Enhance the current playscape. 180'x140' minimum area for a multi-use field play area. Increase **interaction** among all grade levels.

Minimal **maintenance** of materials, of which are **not costly** and are **recyclable**, like porous recycled rubber. Cost should be kept low for replacement purposes, caused by damage or theft.

Multiple stations for different age groups that **encourage** all students to try different **activities.**

garden

plant variety
maintainable/sustainable materials
location near outdoor/indoor classrooms

Continuity between **indoor** activities and **outdoor** initiatives. Science teachers, for example, **integrate** the garden with lesson plans. Students get the **physical interaction** of planting flowers and vegetables and taking care of the plants, and learn how energy is created and consumed.

decommissioned street

permeable material
bioswale
dashboard / pv display
raingarden

energy farm

research
education
collaboration

Re-use the existing, but now abandoned, school as a facility for a research and partnership institute. Research of the energy farm on-site can be displayed on a digital signage community dashboard, highlighting the efforts of the initiatives and community.

Potential partnerships: Lawrence Technological University, Henry Ford Health System, Detroit Medical Center, DTE Energy, Detroit Public School system, ReGen Detroit, Recharge

community impact

The energy farm does not only impact the school children's education, but the community's as well.

The community-at-large will have the opportunity to participate in learning about and maintaining the energy farm. Residents have an investment in the project with the potential of a training program around the energy farm helping to solve issues, for example, within the neighborhood.

geo-thermal heating

ground sourced heat pumps
-vertical loop
-horizontal loop
-slinky loop*
*install below Michigan frost line: 42'

vertical loop:
-used with limited surface land
-bores small diameter holes from 100 to 400 feet deep

horizontal loop:
-adequate land surface
-length: length from 300-400 ft

slinky coils:
-3 meters deep and 1 meter wide trenches
-100-150 ft long trenches
-looped coils every spaced

photovoltaic panels

grid interactive pv systems

1.32 m² = 1 panel

panel angle

batteries/inverters

energy production

The Biddle School and property vacancy allows for great opportunity to create an energy farm that will benefit not only the school, but the surrounding community as well.

Multiple aspects of a viable energy farm can be used directly on the school buildings, such as vegetated roof and solar panels on the roof, green walls and proper stormwater runoff management from the rooftops.

The property can include geo-thermal fields underground, solar panels on the open field, and integrate low impact development practices. The combination of these ways will increase energy production for the school with a potential to give back to the local grid.

SEEBALDT
FIRWOOD
BEECHWOOD
TIREMAN

PARTNERSHIP INSTITUTE
RESEARCH ANNEX
BIDDLE
SCHOOL

SAMPSON WEBBER
LEADERSHIP ACADEMY

PHASE II
PHASE I
PHASE III

PHASING PLAN
I: energy farm | outdoor classroom | learning garden
II: partnership institute addition/renovation
III: green-street

One of the many design interventions which emerged from the Ford C3 project in SWD is our concept of an Energy Farm/Outdoor Classroom/Learning Garden (EF/OC/LG) at the Sampson Webber Leadership Academy, a pre K-8 Detroit Public School (DPS) and the adjacent vacant Biddle Elementary School. To implement the concept, we propose three (3) phases. The EF/OC/LG and decommissioned Firwood Street comprises phase I of the [sw]LAB project in partnership with SWLA. In phase II, Tireman and Beechwood Streets would be converted to Green Streets through a regional infrastructure funding source. In phase III, LTU, DTE, and corporations in the vicinity create a new Partnership Institute – an educational/research entity through the restoration of the former Biddle School in conjunction with the EF/OC/LG for the development, manufacturing, installation, and maintenance of hybrid alternative energy (HAE) and low-impact development (LID).

Lusus Naturae: “whim of nature”
Oxford English Dictionary

PV absorbs and reflects the IR light spectrum

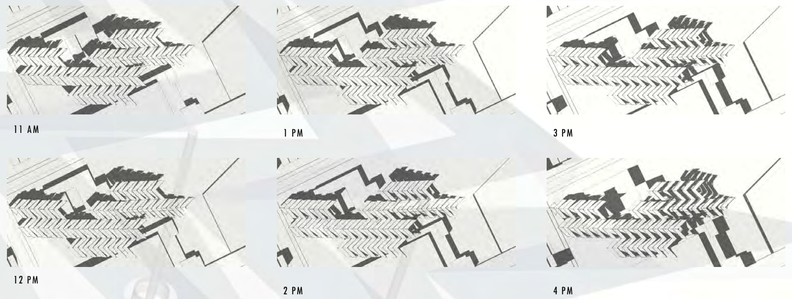
PANEL excess heat = reflected in summer, retained in winter

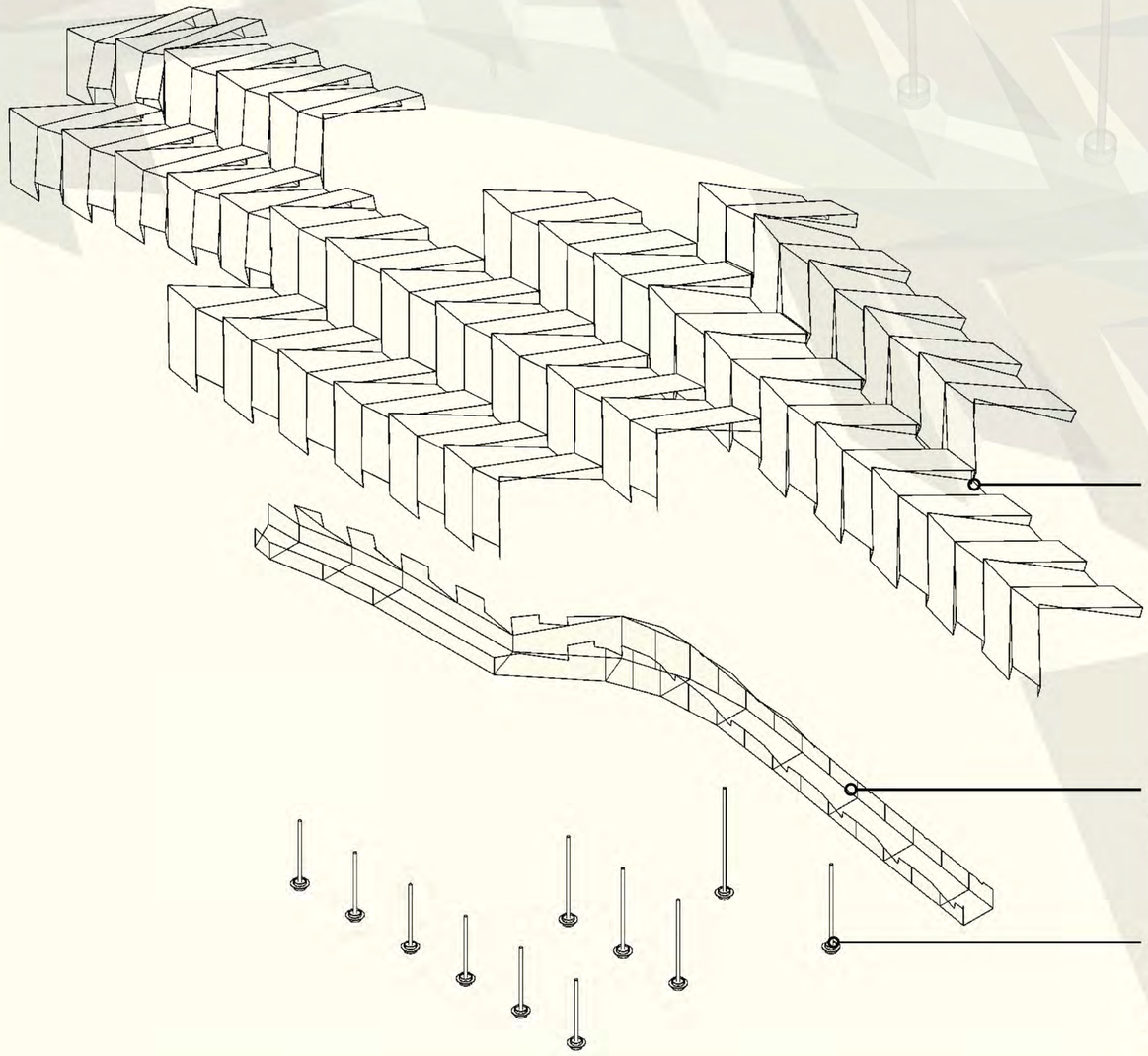
50FC LOW LIGHT LEVELS CHINESE EVERGREEN CAST IRON

250FC MEDIUM LIGHT LEVELS BEGONIAS CISSUS SPECIES DUMB CANE

WITH THE INTERSECTION STRUCTURE COVERING A LARGE PORTION OF THE LAND IN BETWEEN THE SCHOOLS AND THE GARDEN STARTING UNDERNEATH THE STRUCTURE, SUNLIGHT NEEDS TO SHINE THROUGH THE STRUCTURE ROOFTOP ENOUGH TO FACILITATE PLANT GROWTH.

THE GRAPHIC SHOWS THE AMOUNT OF LIGHT PARTICULAR PLANTS REQUIRE FOR GROWTH AND THE BENEFITS OF USING PHOTOVOLTAIC GLASS.





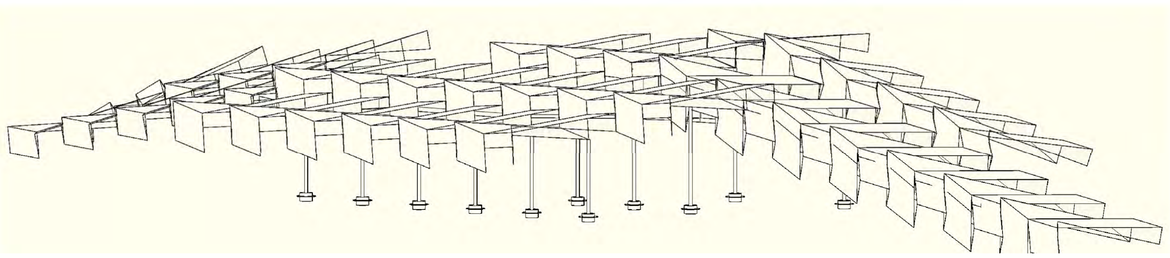
ROOFTOP
COLLECTION OF MODULES ROTATED
@ 10° AND 15°

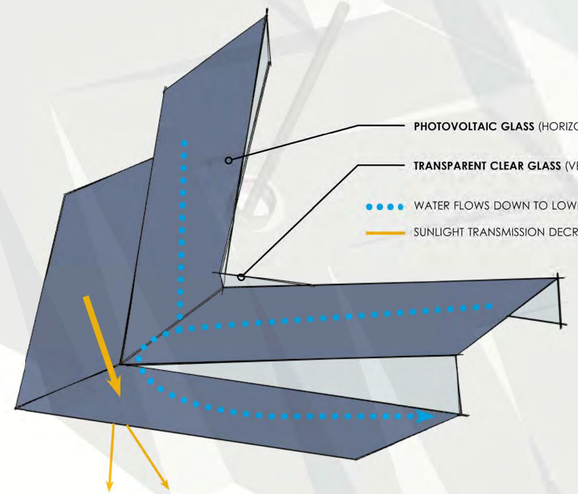
SOLAR ENERGY PRODUCTION
@ HORIZONTAL PV GLASS PANELS

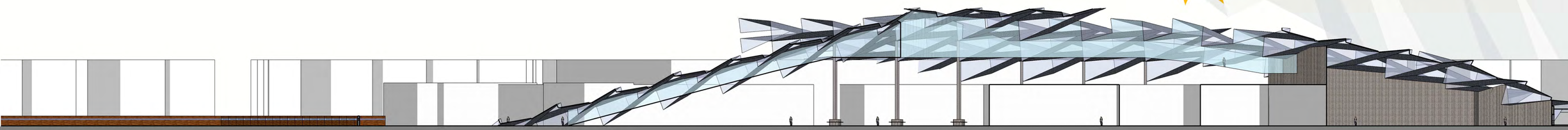
RAINWATER COLLECTION @ SLOPED PANELS

CATWALK
CONNECTS PI ADDITION
TO ENERGY FARM

SUPPORT
RAINWATER COLLECTION @ COLUMN
GEOTHERMAL HEATING @ COLUMN
CISTERN/SEATING/PLANTER @ BASE

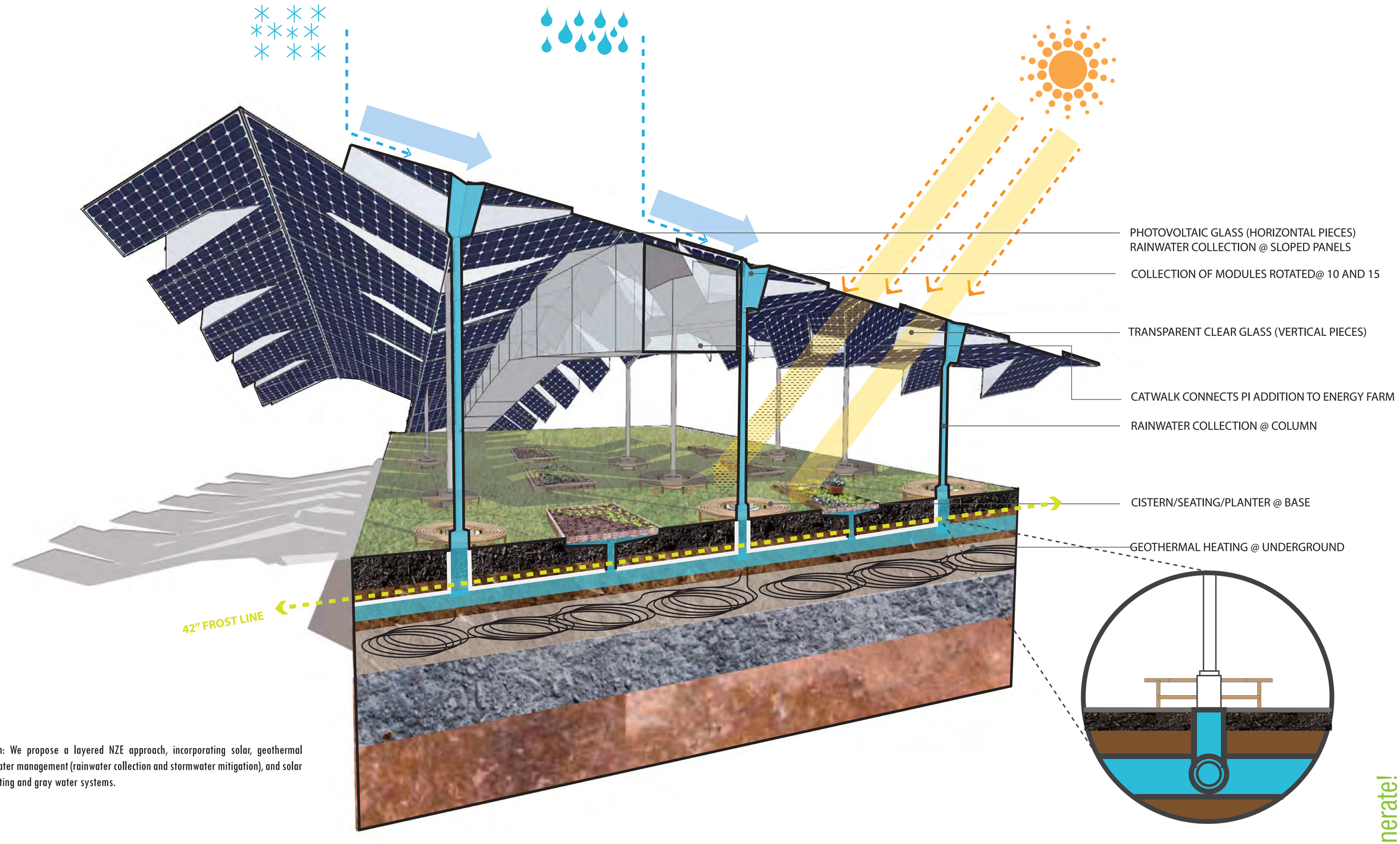






[sw]LAB:Generate!
PHASE I | LUSUS NATURAE

"...interdependencies of landscape, infrastructure, urban fabric and architecture."
Holcim Foundation



LN Section: We propose a layered NZE approach, incorporating solar, geothermal energy; water management (rainwater collection and stormwater mitigation), and solar water heating and gray water systems.

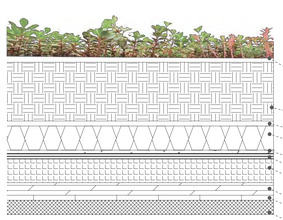
"The schools used to be more connected to the community. Residents and parents want to contribute to, and benefit from, this project."
Ms. Wilkes, SWLA Librarian, parent, and Tireman Neighborhood Resident

RAIN GARDEN

BIOSWALE

PERVIOUS PAVING

The resulting EF/OC project is both aesthetic and performative and represents networks/structures which envision future infrastructure and landscape as the armature for multifarious urban and regional capacities; embody an intersection of both the traditional and non-traditional (informal) roles of infrastructure; and address virtual (programming, data, media, etc.) and physical/environmental functions.

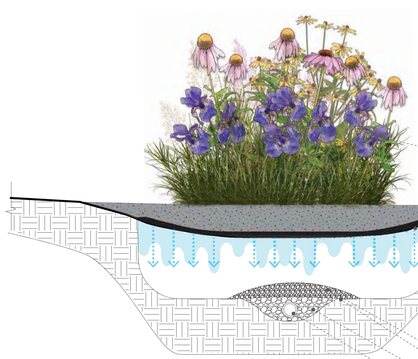


EXTENSIVE GREEN ROOF

- VARIETY OF SEDUM
- LITETOP EXTENSIVE MEDIA (4")
- SYSTEMFILTER
- GARDENDRAIN GR30
- MOISTURE RETENTION MAT
- HYDRODRAIN AL
- DOW STYROFOAM INSULATION
- ROOT STOP
- HYDROFLEX 30
- 6125EV-FR

vegetated roofs

extensive vs intensive	a living roof consisting of thin layers of vegetation.
soil	intensive: –1 foot of soil minimum –accommodates trees, shrubs, gardens –80–250 lbs/sf –allows public access –high maintenance –complex drainage system
vegetation	extensive: 1–5 inches deep –vegetative ground cover and grass –12–50 lbs/sf –restricts regular access –minimal maintenance –simple drainage system
load	
access	
maintenance	
drainage	

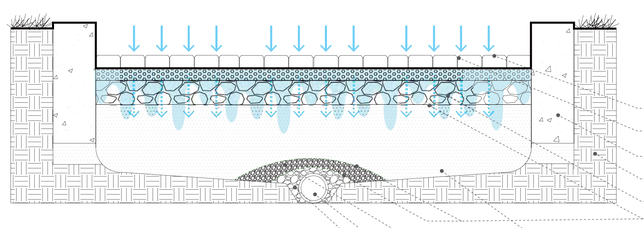


BIORETENTION CELL

- DROUGHT AND INUNDATION TOLERANT NATIVE PLANTS:
  BLUE FLAG IRIS
  PURPLE CONE FLOWER
  BLACK EYED SUSAN
  NODDING ONION
- 6" PONDING DEPTH REQUIRED TO DRAIN IN 48 HOURS OR LESS
- 3" SHREDDED HARDWOOD MULCH
- INSITU HYDRAULIC GROUP D SOIL
- 30" AMENDED PLANTING MIXTURE (BY VOLUME):
  40% SAND
  35% COMPOST
  25% NATIVE TOPSOIL
- 6" PEA GRAVEL FILTER BED .25-.5" DIA
- PERMEABLE FILTER FABRIC EXTENDING 3' ON EITHER SIDE
- 8" GRAVEL FILTER BED 1.5" DIA MDOT CLASS I
- 10" PERFORATED UNDERDRAIN OUTLET PIPE

rain gardens

water capture	allow water runoff to infiltrate through its pervious surface and to clean the water from pollutants.
water filter	
soil mix	basic principles include: –mix soils, do not just use one –use native plants –till or rip to improve infiltration –5:1 impervious to rain garden ratio –locate at least 10 feet from building foundation –locate in pathway of water runoff –be aware of maintenance needs
location	
size	
native plants	



PERMEABLE PARKING LOT CROSS-SECTION

- UNILOCK TURFSTONE INTERLOCKING CONCRETE PAVERS
- DRAINAGE VOIDS PACKED WITH FINE AGGREGATE
- 12"H X 5"W CONCRETE RESTRAINT PLACED 8" BELOW GRADE
- SUBGRADE UNDISTURBED, UNCOMPACTED INSITU HYDROLOGIC GROUP D SOIL
- 1.5" 2NS BEDDING LAYER
- PERMEABLE FILTER FABRIC
- 14" LAYER OF MDOT CLASS II GRANULAR SUBBASE
- 6" PEA GRAVEL FILTER BED .25-.5" DIA MDOT CLASS I
- 12" PERFORATED DRAINAGE PIPE TO UNDERGROUND DETENTION
- 8" GRAVEL FILTER BED 1.5" DIA MDOT CLASS I

green streets

pervious pavement	help protect and improve the efficiency of the neighborhood's grey infrastructure
curb extensions	
stormwater management	increase urban green space, improve air quality, replenish groundwater
bio-retention	

[sw]LAB:Generate!

PHASE I | ENERGY FARM : LID

-Sampson Webber Leadership Academy
(Pre-K to 8 DPS)
-Detroit Public Schools: Office of Communications, Office of Energy and Sustainability, Go Green Challenge, and Garden Collaborative
-The Tireman Neighborhood of Detroit
-Mayor's Office Department of Neighborhoods, District 6
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- City of Detroit
- Reed Kroloff
-Ford

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(Pre-K to 8 DPS)
- City of Detroit
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INTENSITY

CAPACITY

TIME 2008 2010 2012 2013 2014 2015

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http://studio-ci.net/disseminationawards/

ADS1+2
https://tuswiab.wordpress.com/

HOLCIM

Ford c3#2
https://twitter.com/studioCILTU

ID5
https://scilt.uford3.wordpress.com/

Ford c3#2

2014 Ford College Community Challenge

"Building Sustainable Communities"

This program is designed to empower student-led projects at higher education organizations to catalyze community-building projects that address pressing local needs around the theme “Building Sustainable Communities.”

Participants are urged to think broadly and explore a variety of potential topics including infrastructure and workforce needs, education pipeline issues, design issues, new approaches to student volunteerism, etc.

Important Dates

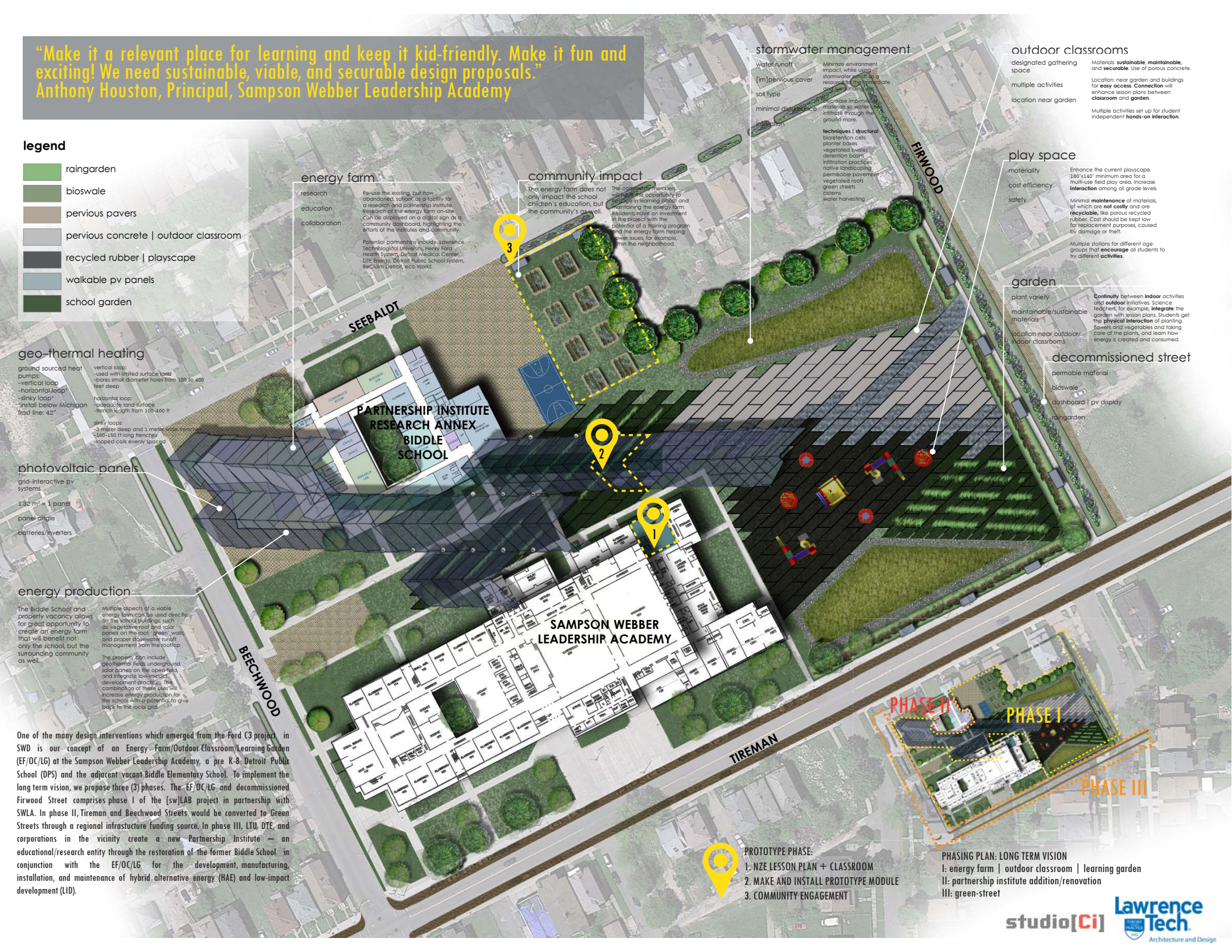
• Proposals due:	May 2, 2014
• Top 20 selected and posted to Ford Blue Oval Scholars website:	May 27, 2014
• Winners selected:	Mid-June, 2014
• Projects implemented:	June 2014 – Spring 2015

Profile Information

Please fill in the information for the project leads (maximum 50 characters each).
It is recommended to test this document and save it to ensure it is compatible with your PDF writer.

College/University	Student Organization
Lawrence Technological University	studio[Ci] @ LTU CoAD
Project Lead: Faculty Member Name*	Project Lead: Student Name*
Constance Bodurow	Gania Kandalaft
Department	Student Major
Architecture	Architecture
Contact Phone	Contact Phone
248.204.2883	248.204.2883
Contact Email	Contact Email
cbodurow@ltu.edu	gkandalaf@ltu.edu
Main Grant Contact Name**	Main Grant Contact Phone
Howard Davis	248.204.2316
Main Grant Contact Email	Project Name
hdavis@ltu.edu	[sw]LAB NZE Prototype

* **The Project Leads will be notified if the proposal advances to the Top 20.**
** **The Main Grant Contact should be the fiduciary at the college or university.**


"Make it a relevant place for learning and keep it kid-friendly. Make it fun and exciting! We need sustainable, viable, and securable design proposals."
Anthony Houston, Principal, Sampson Webber Leadership Academy
legend
raingarden
bioswale
pervious pavers
pervious concrete | outdoor classroom
recycled rubber | playscape
walkable pv panels
school garden
energy farm
research
education
collaboration
Re-use the existing, but now abandoned, school, as a facility for a research and partnership institute. Research of the energy farm on-site can be displayed on a digital sign as a community dashboard, highlighting the efforts of the institutes and community.
Potential partnerships include: Lawrence Technological University, Henry Ford Health System, Detroit Medical Center, DTE Energy, Detroit Public School system, ReClaim Detroit, eco Works.
community impact
The energy farm does not only impact the school children's education, but the community's as well.
The community members will have the opportunity to engage in learning about and maintaining the energy farm. Residents have an investment in the project with the potential of a training program and the energy farm helping lower issues, for example, within the neighborhood.
stormwater management
water runoff
[im]pervious cover
soil type
minimal disturbance
irrigation
Minimize environment impact, while using stormwater runoff as a resource to the immediate and surrounding site.
Decrease impervious materials so water can infiltrate through the ground more.
techniques | structural
bioretention cells
planter boxes
vegetated swales
detention basins
infiltration practices
native landscaping
permeable pavement
vegetated roofs
green streets
cisterns
water harvesting
outdoor classrooms
designated gathering space
multiple activities
location near garden
Materials: sustainable, maintainable, and securable. Use of porous concrete.
Location: near garden and buildings for easy access. Connection will enhance lesson plans between classroom and garden.
Multiple activities set up for student independent hands-on interaction.
play space
materiality
cost efficiency
safety
Enhance the current playscape. 180'x140' minimum area for a multi-use field play area. Increase interaction among all grade levels.
Minimal maintenance of materials, of which are not costly and are recyclable, like porous recycled rubber. Cost should be kept low for replacement purposes, caused by damage or theft.
Multiple stations for different age groups that encourage all students to try different activities.
garden
plant variety
maintainable/sustainable materials
location near outdoor/ indoor classrooms
Continuity between indoor activities and outdoor initiatives. Science teachers, for example, integrate the garden with lesson plans. Students get the physical interaction of planting flowers and vegetables and taking care of the plants, and learn how energy is created and consumed.
decommissioned street
permable material
bioswale
dashboard | pv display
raingarden
geo-thermal heating
ground sourced heat pumps:
-vertical loop
-horizontal loop*
-slinky loop*
*install below Michigan 'frost line: 42"
vertical loop:
-used with limited surface land
-bores small diameter holes from 100 to 400 feet deep
horizontal loop:
-adequate land surface
-trench length from 100-400 ft
slinky loops:
-3 meter deep and 1 meter wide trenches
-100-150 ft long trenches
-looped coils evenly spaced
photovoltaic panels
grid-interactive pv systems
1.32 m² = 1 panel
panel angle
batteries/inverters
energy production
The Biddle School and property vacancy allows for great opportunity to create an energy farm that will benefit not only the school, but the surrounding community as well.
Multiple aspects of a viable energy farm can be used directly on the school buildings, such as: vegetative roof and solar panels on the roof, 'green' walls and proper stormwater runoff management from the rooftop.
The property can include geothermal fields underground, solar panels on the open field, and integrate low-impact development practices. The combination of these uses will increase energy production for the school with a potential to give back to the local grid.
SEEBALDT
FIRWOOD
BEECHWOOD
TIREMAN
PARTNERSHIP INSTITUTE
RESEARCH ANNEX
BIDDLE
SCHOOL
SAMPSON WEBBER
LEADERSHIP ACADEMY
1
2
3
PHASE II
PHASE I
PHASE III
One of the many design interventions which emerged from the Ford C3 project in SWD is our concept of an Energy Farm/Outdoor Classroom/Learning Garden (EF/OC/LG) at the Sampson Webber Leadership Academy, a pre K-8 Detroit Public School (DPS) and the adjacent vacant Biddle Elementary School. To implement the long term vision, we propose three (3) phases. The EF/OC/LG and decommissioned Firwood Street comprises phase I of the [sw]LAB project in partnership with SWLA. In phase II, Tireman and Beechwood Streets would be converted to Green Streets through a regional infrastructure funding source. In phase III, LTU, DTE, and corporations in the vicinity create a new Partnership Institute – an educational/research entity through the restoration of the former Biddle School in conjunction with the EF/OC/LG for the development, manufacturing, installation, and maintenance of hybrid alternative energy (HAE) and low-impact development (LID).
PROTOTYPE PHASE:
1. NZE LESSON PLAN + CLASSROOM
2. MAKE AND INSTALL PROTOTYPE MODULE
3. COMMUNITY ENGAGEMENT
PHASING PLAN: LONG TERM VISION
I: energy farm | outdoor classroom | learning garden
II: partnership institute addition/renovation
III: green-street
studio[Ci]
Lawrence Tech
Architecture and Design

	Schedule, in Month occurs	Total Months	1 AUG '14	2 SEP '14	3 OCT '14	4 NOV '14	5 DEC '14	6 JAN '15	7 FEB '15	8 MAR '15	9 APR '15	10 MAY '15
Task 1: NZE Prototype Module												
Establish Working Group w/SWLA and DPS	Aug	1										
Launch and conduct fall 2014 [TU] Studio w/Faculty Team	Aug-Dec	5										
Final Design + Specifications	Dec-Jan	2										
Permitting	Jan-Feb	2										
Material Procurement	Jan	1										
Construction Scheduling	Dec	1										
Ground Breaking	Mar	1										
Construction	Mar-Apr	2										
Site Preparation/Excavation	Mar	0.5										
Erection	Apr	1.5										
Demonstration and Monitoring	May	1										
Task 2: Community Partner Engagement												
Working Group Meetings at SWLA (Monthly)	Aug-May	10										
Community Engagement Meetings (1 every 2 months)	Aug,Oct,Dec,Feb,Apr	5										
Lesson Plan Implementation w/SWLA (Indoor + Outdoor Classrooms)	Mar-May	3										
Launch; Ground Breaking; and Celebratory Public Events	Aug,Mar,May	3										
Task 3: Student Engagement												
Interview and hire CoAD/CoE students	Aug	1										
Student leadership roles	Aug-May	10										
Task 4: Project Management												
studio[Ci] project team meetings	Aug-May	10										
Publicity + Communications: blog; media; updated web presence	Aug-May	10										
PI Management + Review	Aug-May	10										

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-Ford

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HOLCIM

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https://twitter.com/studioCILTU

ID5
https://scilt.uford3.wordpress.com/

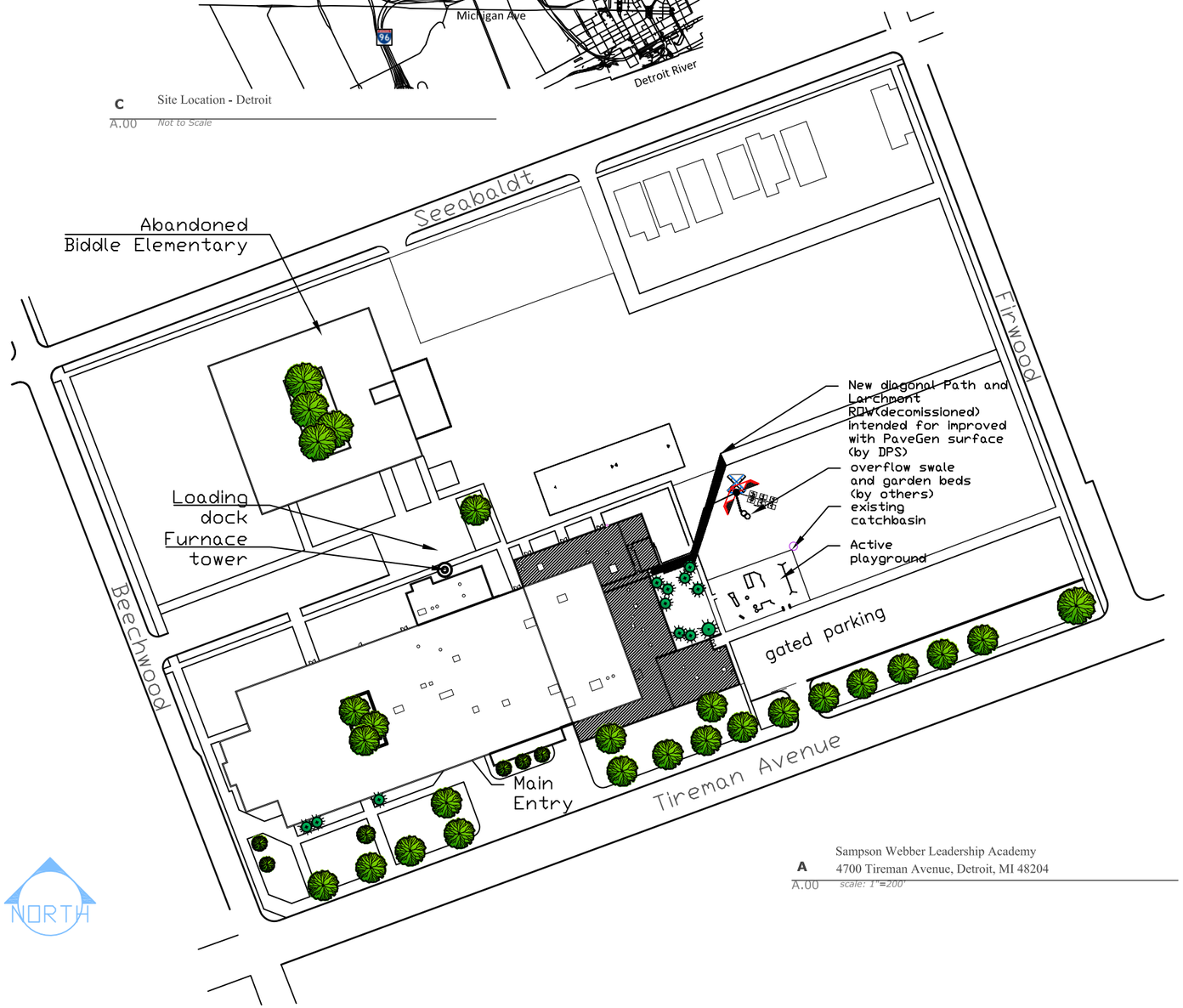
Ford c3#2

[sw]LAB NZE Prototype

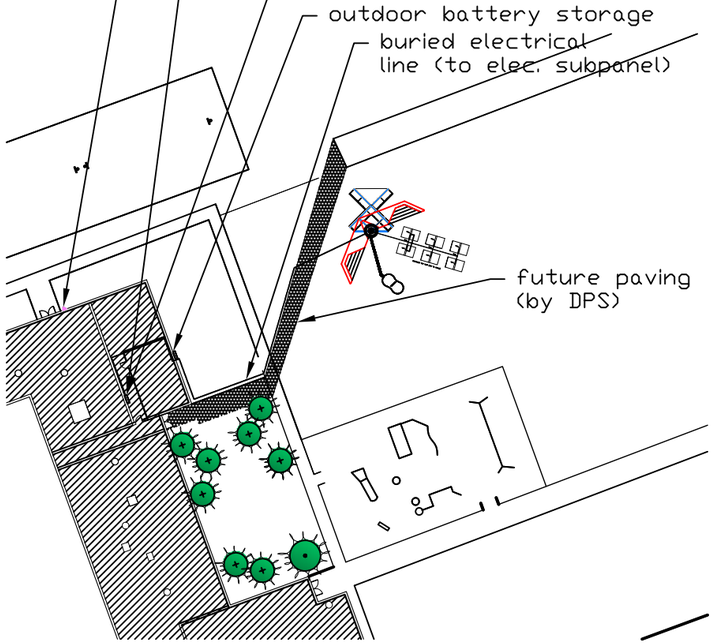
ID5 Fall 2015 Bodurow Carpenter

C Site Location - Detroit
A.00 *Not to Scale*

Table of contents



A Sampson Webber Leadership Academy
4700 Tireman Avenue, Detroit, MI 48204
A.00 *scale: 1"=200'*



B NZE Prototype Plan Location
A.00 *scale: 1/64"=1'-0"*

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THEORY AND PRACTICE
Possible is everything

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02.18.15

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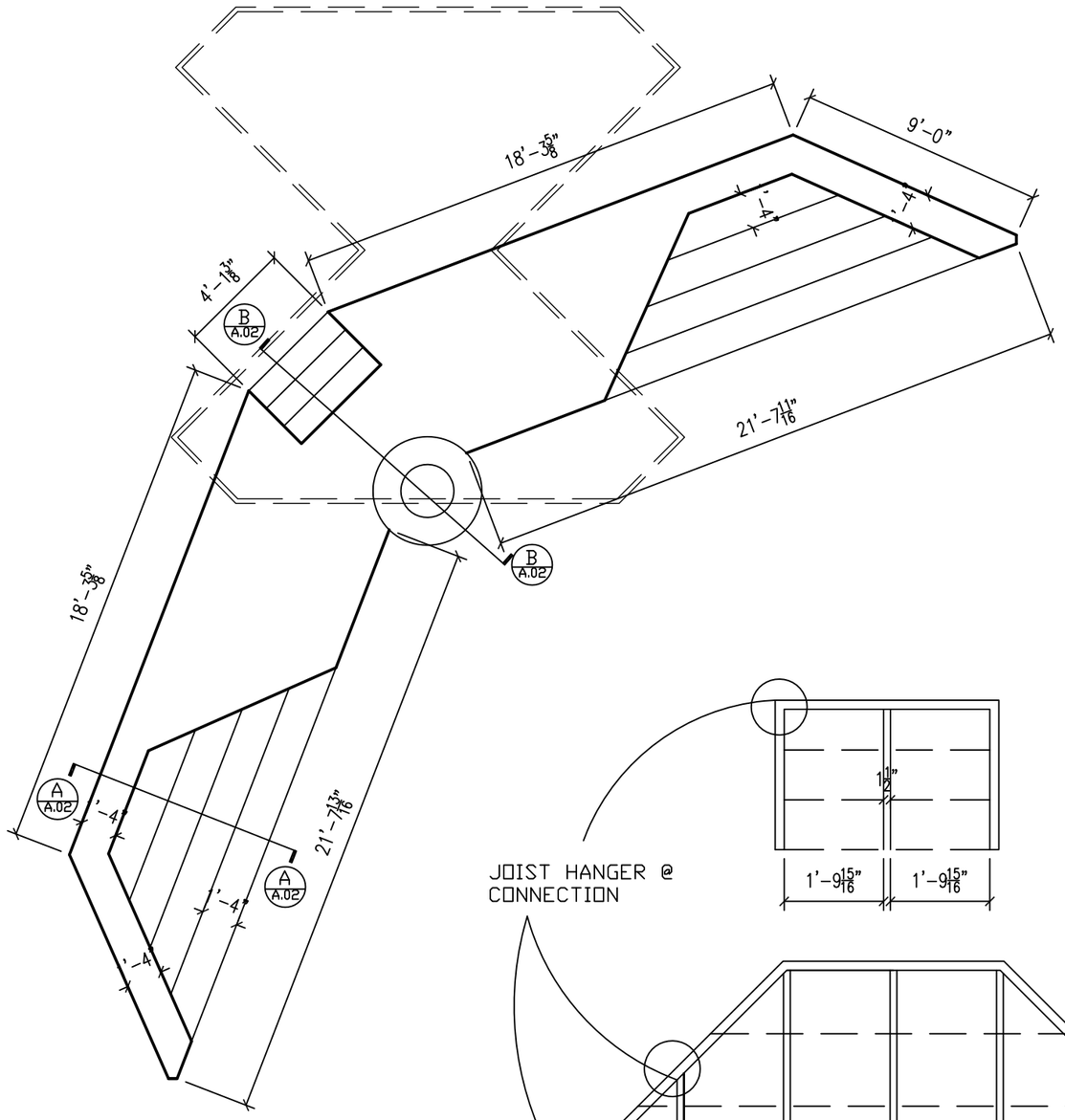
SITE PLAN +CONTEXT

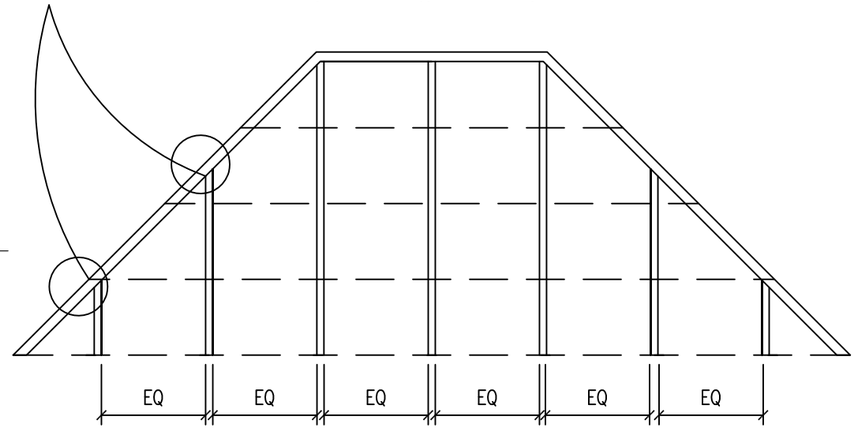
A.00



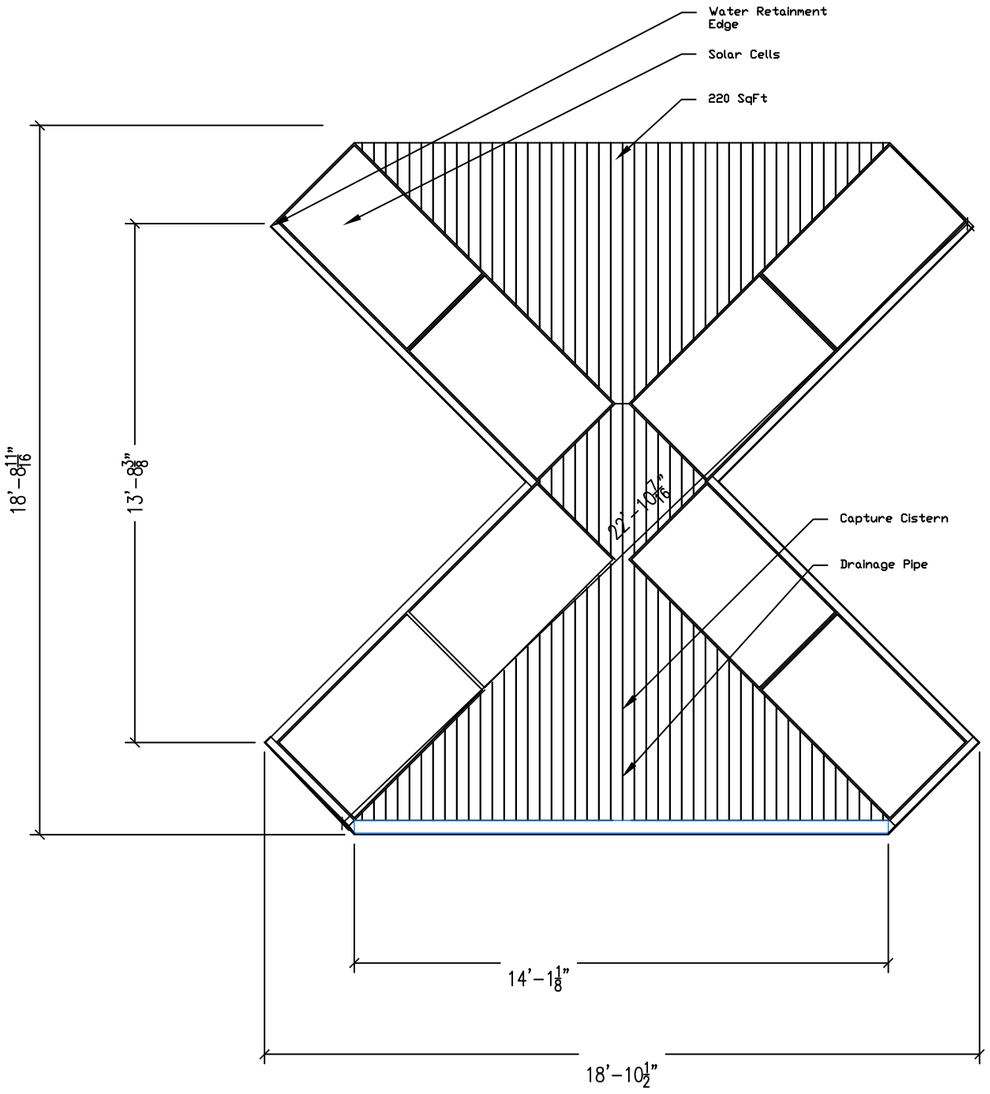
1 Plan of seating area with stairs and steps

A.01 scale: 3/16"=1'-0"

JOIST HANGER @ CONNECTION



FRAMING - Wolmanized Risers



2 Hidden Line Plan of upper array

A.01 scale: 1/4"=1'-0"

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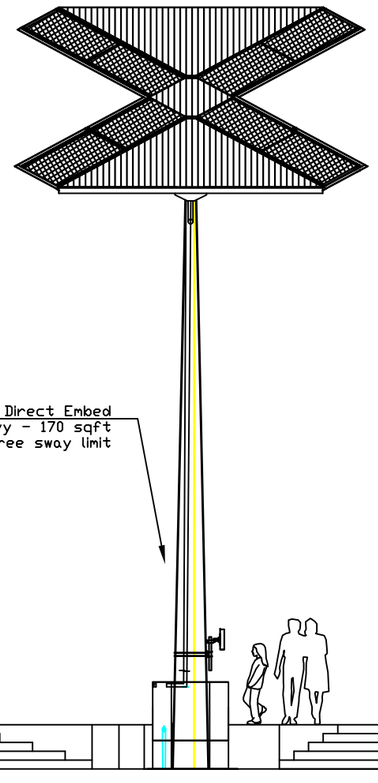
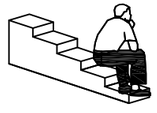
PLANS
ARRAY+OUTDOOR CLASSROOM

A.01



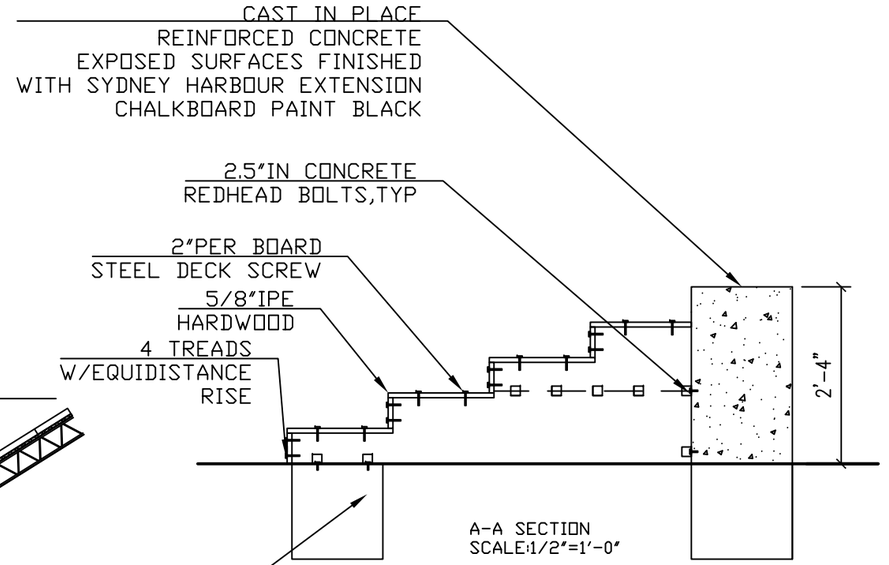
1 North Elevation
A.02 scale: 1/8"=1'-0"



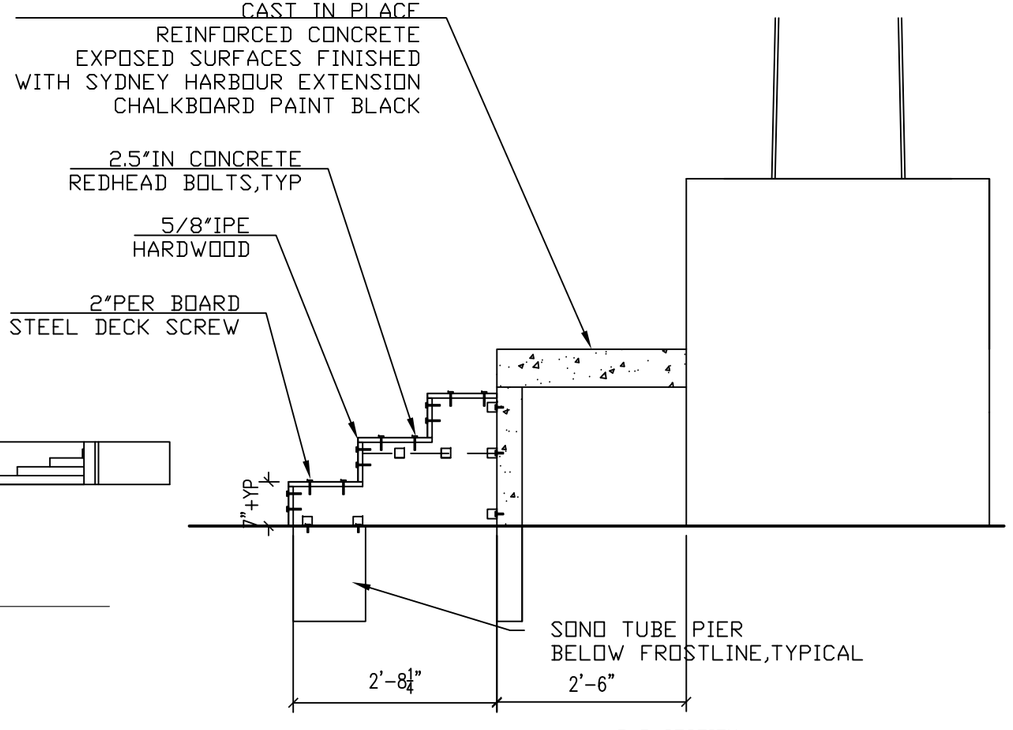
Human Use performance metric: A class of 30 school children/residents and several Instructors/Trainers can be accommodated on the stairs/steps.
Each child occupies an average of 18 s.f.

3
A.02 scale: 1/4"=1'-0"

2 East Elevation
A.02 scale: 1/8"=1'-0"



A-A SECTION
SCALE:1/2"=1'-0"



B-B SECTION
SCALE:1/2"=1'-0"

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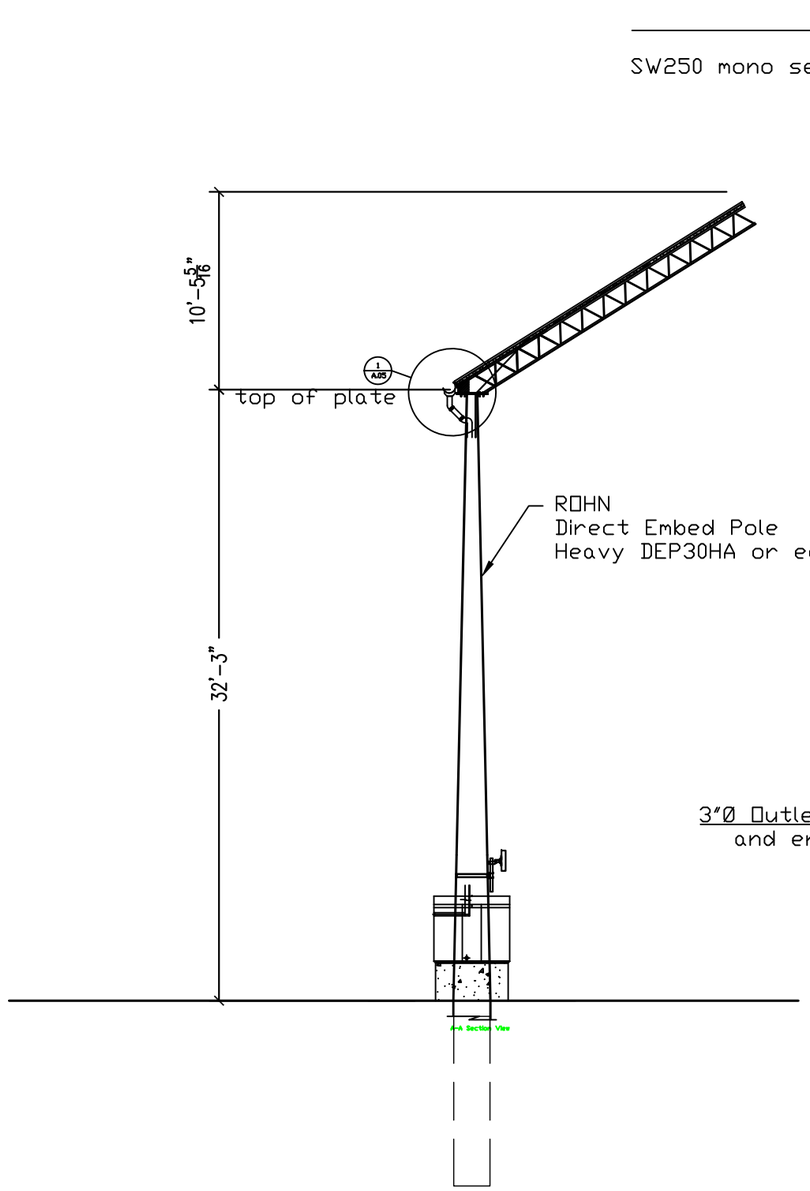
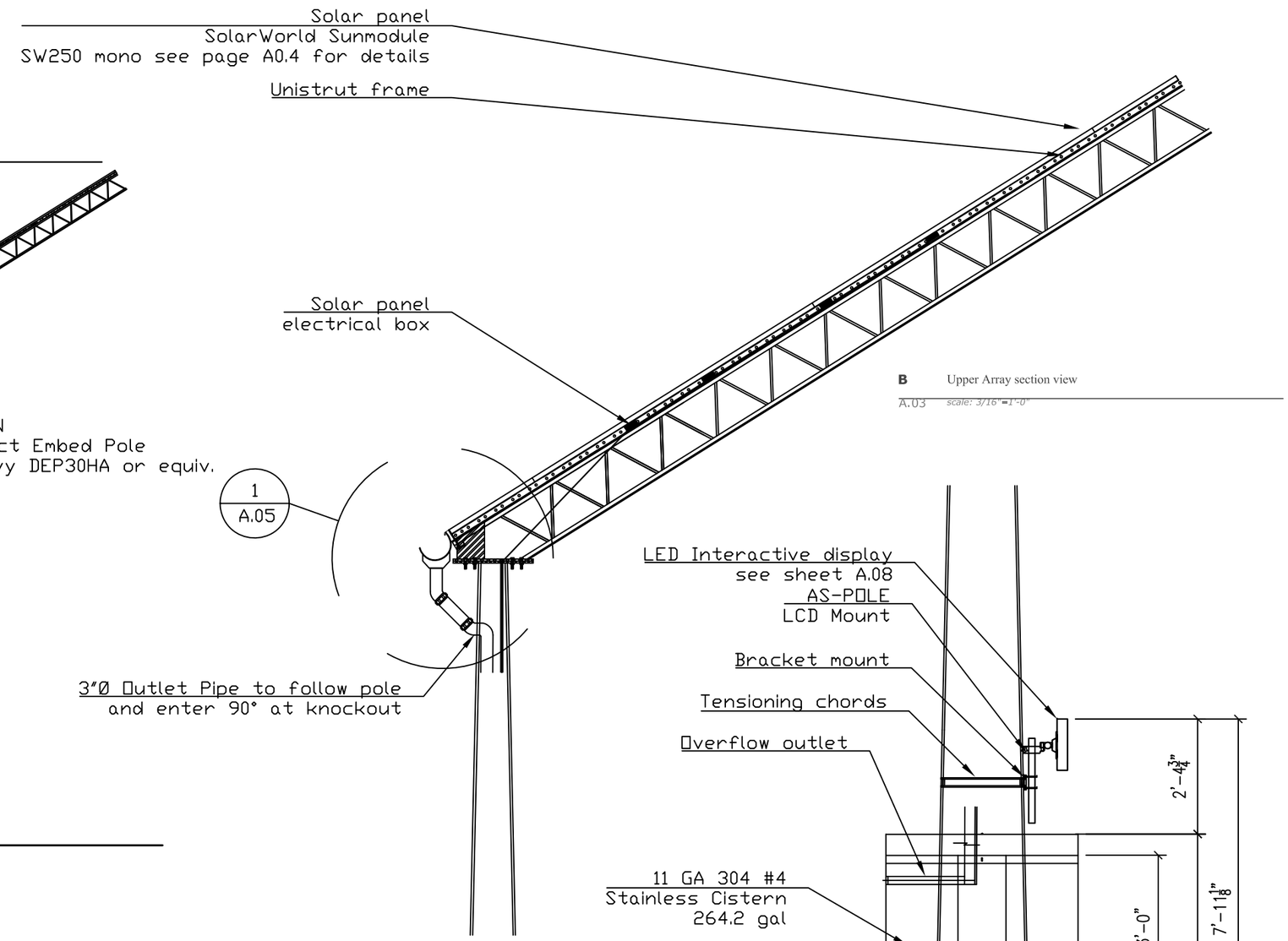
ELEVATIONS AND DETAILS

A.02



A Prototype section view

A.03 *scale: 3/16"=1'-0"*



B Upper Array section view

A.03 *scale: 3/16"=1'-0"*

C Prototype foundation section view

A.03 *scale: 3/16"=1'-0"*

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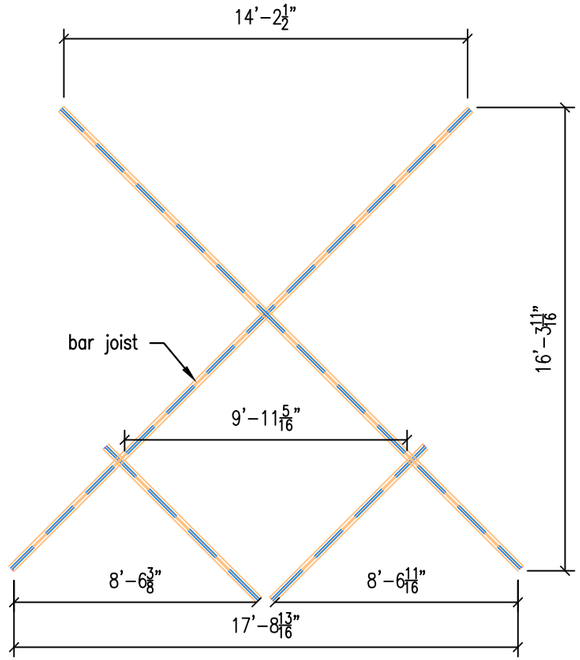
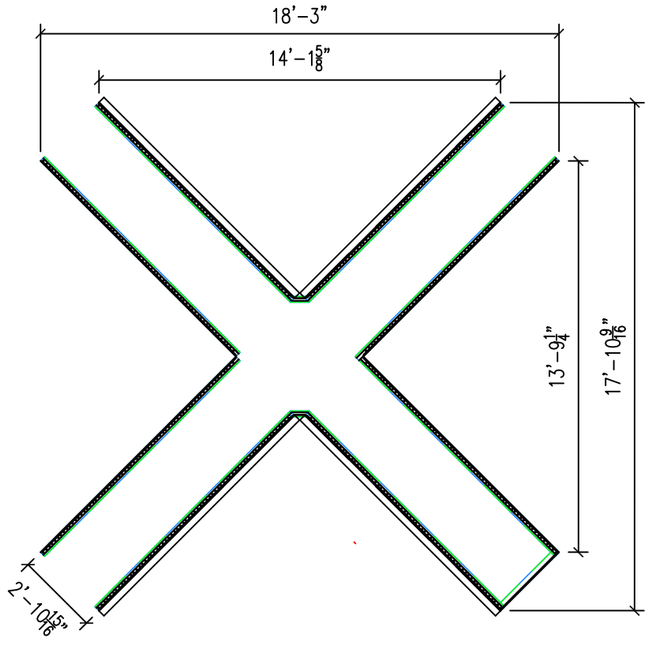
SECTIONS

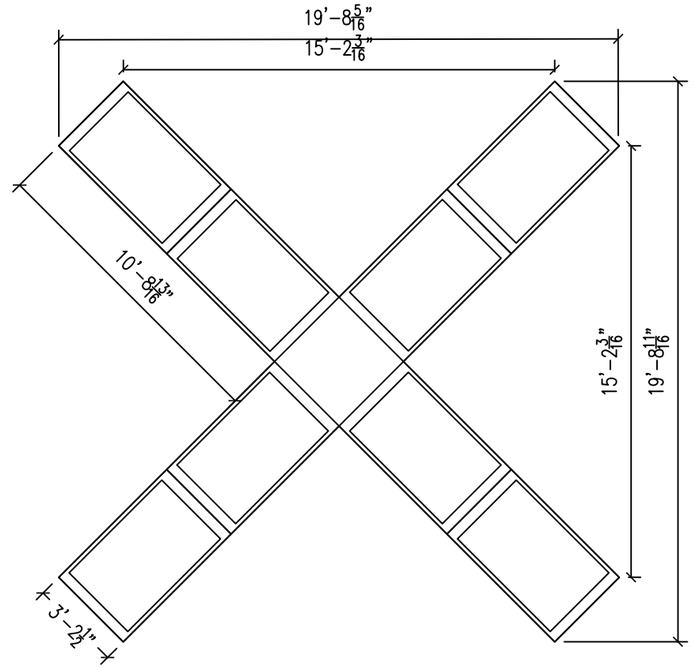
A.03



2 Plan of Structural Bar Joist (flattened)
A.04 scale: 3/16"=1'-0"

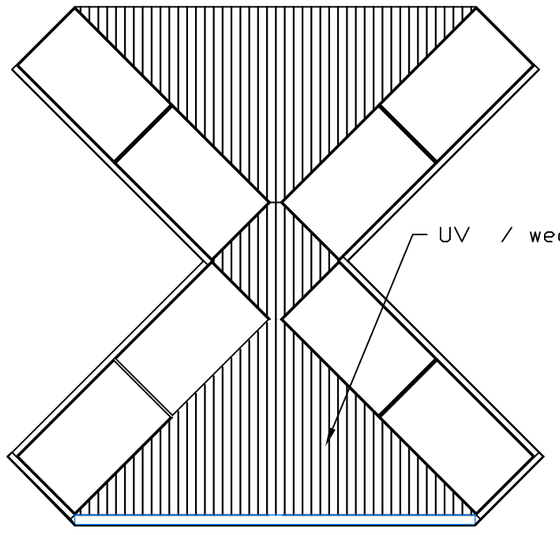


3 Plan of Unistrut channel (flattened)
A.04 scale: 3/16"=1'-0"



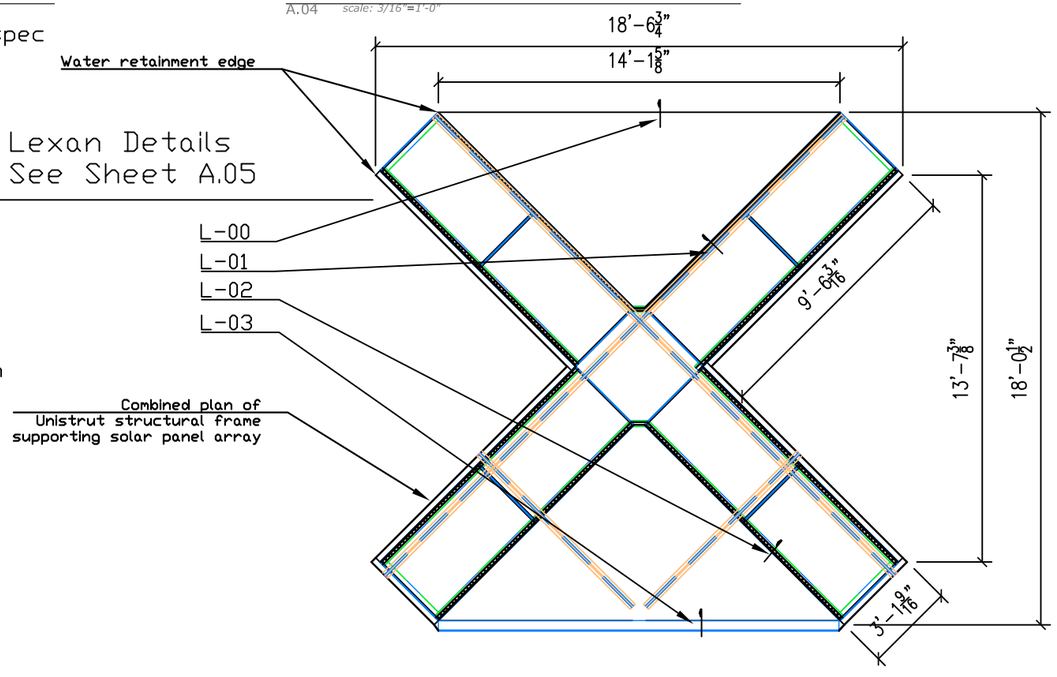
4 Solar panel array outline (flattened)
A.04 scale: 3/16"=1'-0"

Note: Lexan supports per PE spec



5 Lexan Pannel
A.04 scale: 3/16"=1'-0"

Lexan Details
See Sheet A.05



1 Compiled plan
A.04 scale: 3/16"=1'-0"

Details of unistrut connection to mast page 3&5

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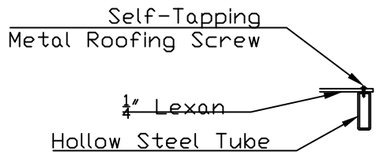
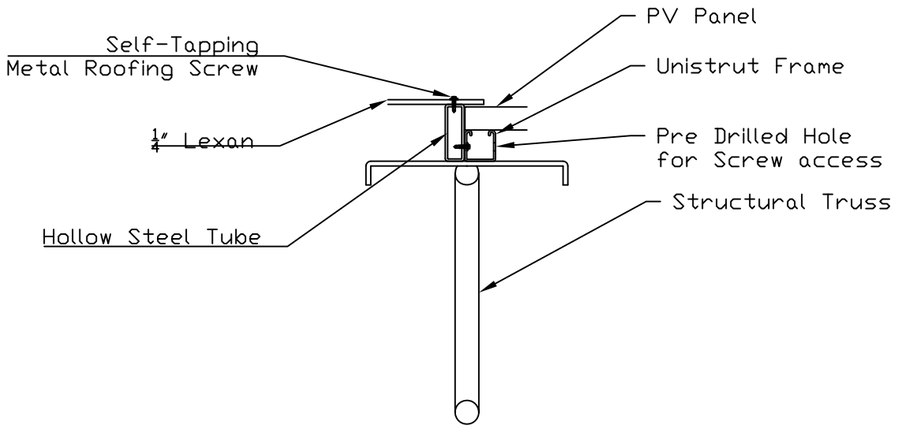
UNISTRUT DETAILS

A.04



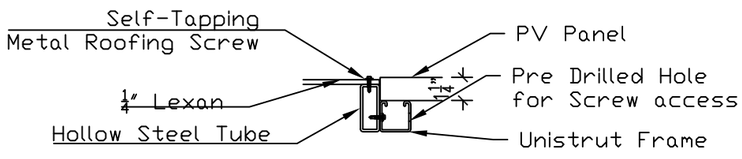
L-00 Lexan to Steel Detail [Top Section \\ Rear]

A.05 *1"=1'-0"*



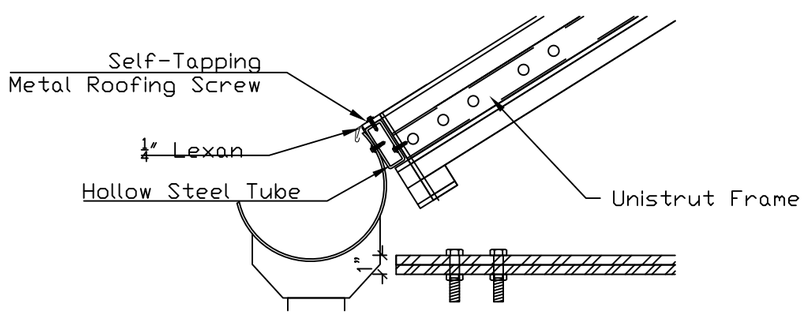
L-01 Lexan to Truss Detail [Top Section]

A.05 *1-1/2"=1'-0"*



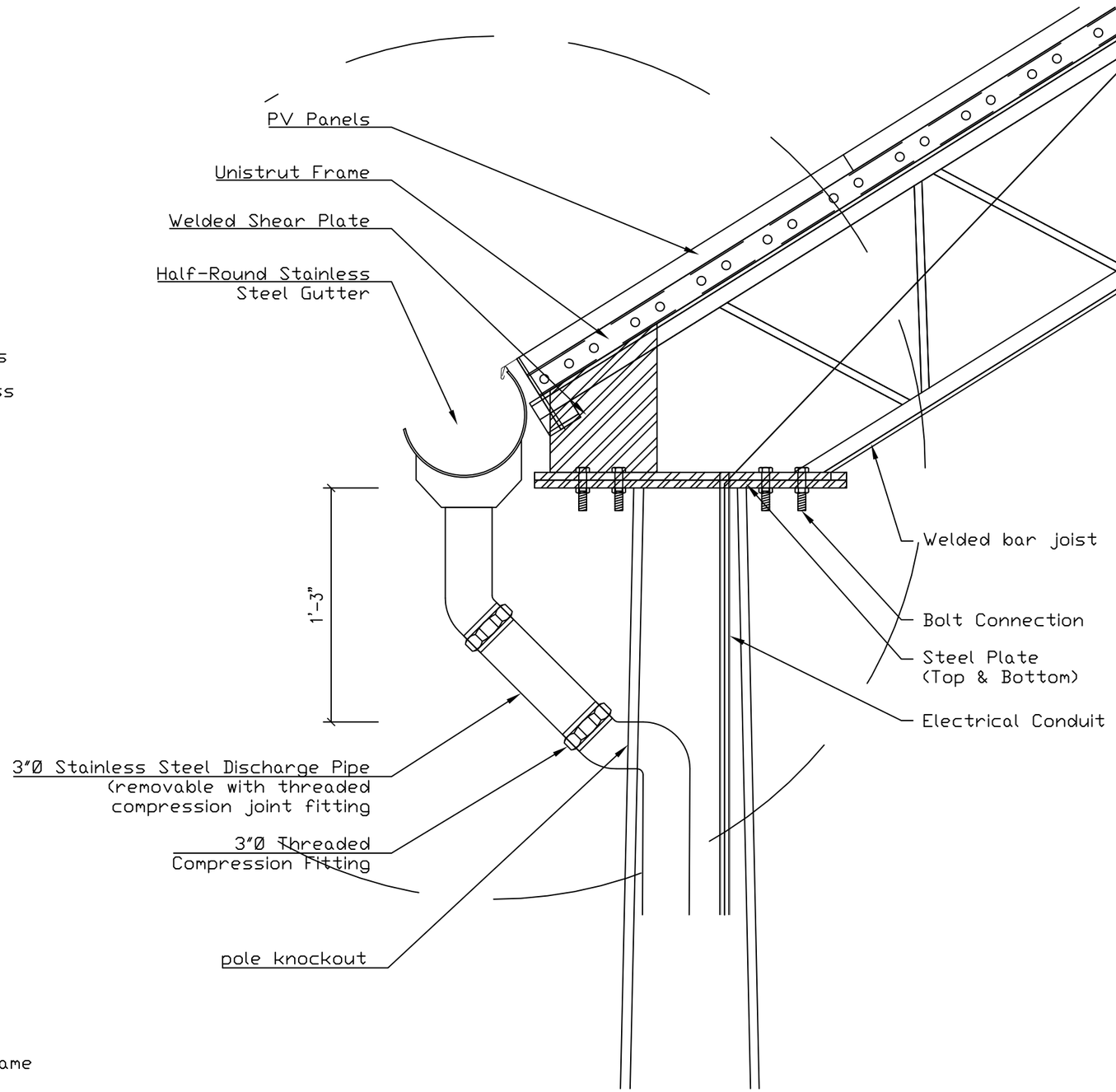
L-02 Lexan to Panel Detail [Bottom Section \\ Side]

A.05 *1-1/2"=1'-0"*



L-03 Lexan to Gutter Detail [Bottom Section]

A.05 *1-1/2"=1'-0"*



1 Top of Pole Section Detail

A.05 *1-1/2"=1'-0"*

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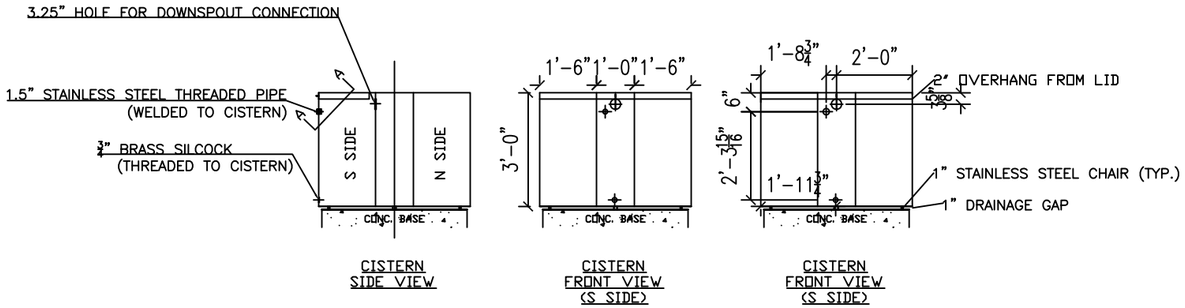
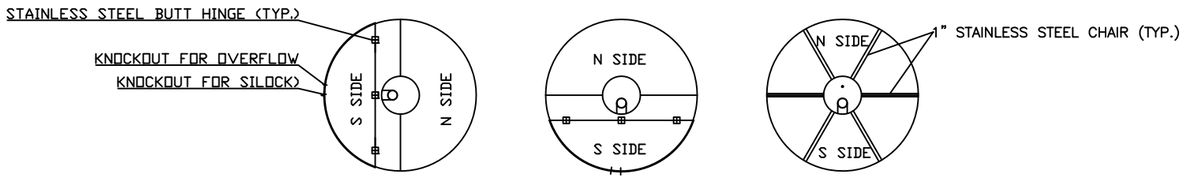
ASSEMBLY DETAILS
TOP OF POLE

A.05



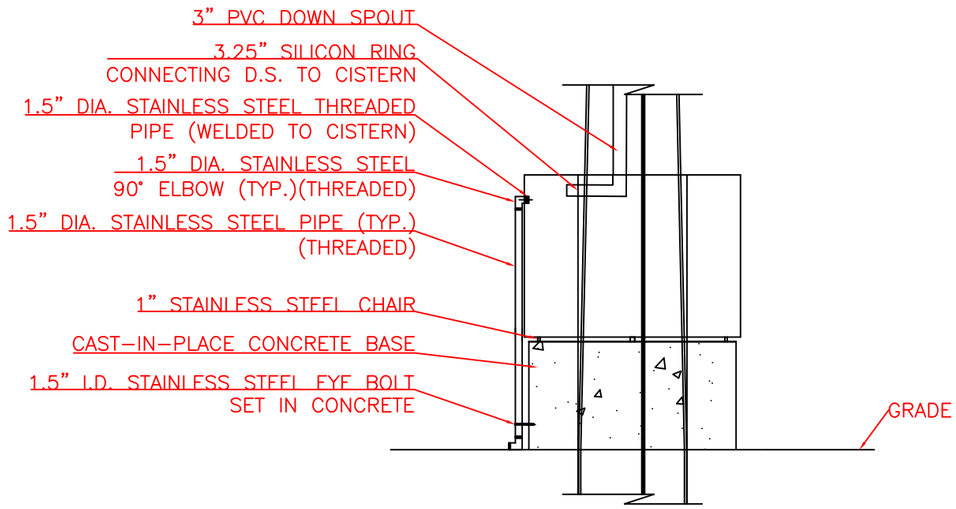
CISTERN SIDE VIEW | CISTERN FRONT VIEW (S SIDE) | CISTERN FRONT VIEW (S SIDE)



CISTERN TOP VIEW | CISTERN TOP VIEW | CISTERN TOP VIEW

3 Water cistern details

A.06 *scale: 1/4"=1'-0"*



CISTERN INLET & OUTLET CONNECTION DETAIL

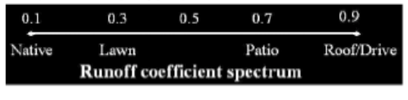
2 Cistern detail at ground level

A.06 *scale: 1/16"=1'-0"*

Monthly Averages, Detroit, Michigan, National Weather Service												
Link: http://www.crh.noaa.gov/dtx/cms.php?n=monthlynormals				Growing Season								
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Precipitation (in.)	1.96	2.02	2.28	2.9	3.38	3.52	3.37	3	3.27	2.52	2.79	2.46
Precipitation (ft.)	0.16	0.17	0.19	0.24	0.28	0.29	0.28	0.25	0.27	0.21	0.23	0.21
Area of collection surface (ft^2)	220											
Runoff from PV array (ft^3.)				53	62	65	62	55	60	46		
Runoff from PV array (gal.)				398	464	483	462	411	448	346		
Volume of Cistern (gal.)	264											
Overflow from Cistern (gal.)				134	200	219	198	147	184	82		
Average overflow per month (gal.)	166											

Rain Rarden Sizing (Darcy's Law)			
DA = Drainage area (ft^2.)	6000	3000	220
d = Depth of garden bed (ft.)	1.5	1.5	1.5
I = Infiltration rate (ft./day)	0.2	0.2	0.2
c = Runoff coefficient of surrounding area	0.35	0.35	0.35
p = Allowable ponding depth (ft.)	0.25	0.25	0.25
SA = Surface area of rain garden (ft^2.)	360	180	13.2

$$SA = \frac{0.04 * c * DA * d}{I * (d + p)}$$



INVESTIGATION OF RAIN GARDEN PLANTING MIXTURES

By Donald Carpenter, Ph.D. - Lawrence Technological University -- June 2005 Data

% WATER RETAINED BY WEIGHT	
100% compost	132%
80% compost; 20% sharp sand	76%
80% compost; 10% sharp sand; 10% top soil	69%
60% compost; 40% sharp sand	35%
35% compost; 35% sharp sand; 30% top soil	27%
100% sharp sand	16%

Rainwater Harvesting System Calculations

Average Amount of Rainfall During Growing Season
3 inch/month
~4 inch/month (75%)

Anticipated Amount of Rainfall for Harvesting
2.0 inch per 2.0 weeks
2.0 inch = 0.167 feet

Area of Collection Surface (ft^2)	Volume Harvested (ft^3)	1 ft^3 =	7.48	gal
210	35.1		262.3	

Volume Harvested (ft^3) = *Depth of Rainfall* (ft) * *Area of Collection Surface*

Volume of a Hollow Cylinder $(ft^3) = \pi * h * (r_1^2 - r_2^2)$

π	Height h, (ft)	O.D. r_1 (ft)	I.D. r_2 (ft)	Volume, (ft^3)	Volume, (gal)
3.14	3	2	0.5	35.3	264.2

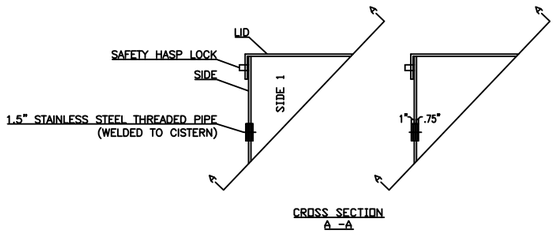
Surface Area of Outer Lateral $(ft^2) = 2 * \pi * r1 * h$
Surface Area (ft^2) 37.68

Surface Area of Inner Lateral $(ft^2) = 2 * \pi * r1 * h$
Surface Area (ft^2) 9.42

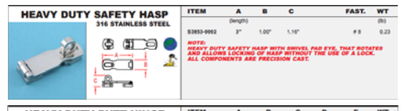
Surface of Top and Base $(ft^2) = \pi * (r_1^2 - r_2^2)$
Surface Area (ft^2) 11.78

1 Cistern Sizing Calcs. & cross section A-A

A.06 *scale: 3/16"=1'-0"*



CROSS SECTION A -A



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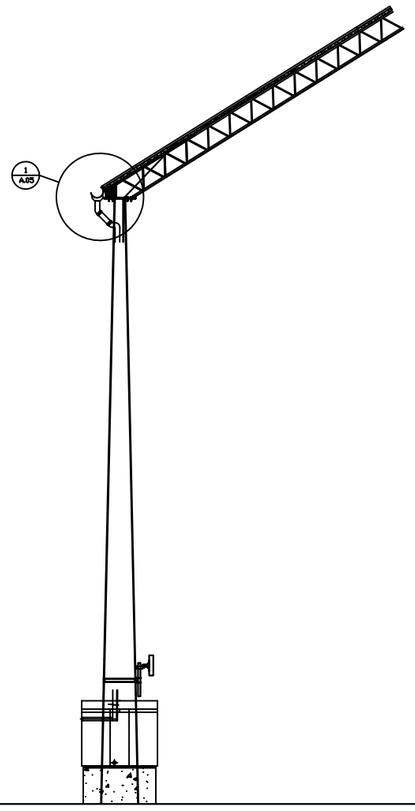
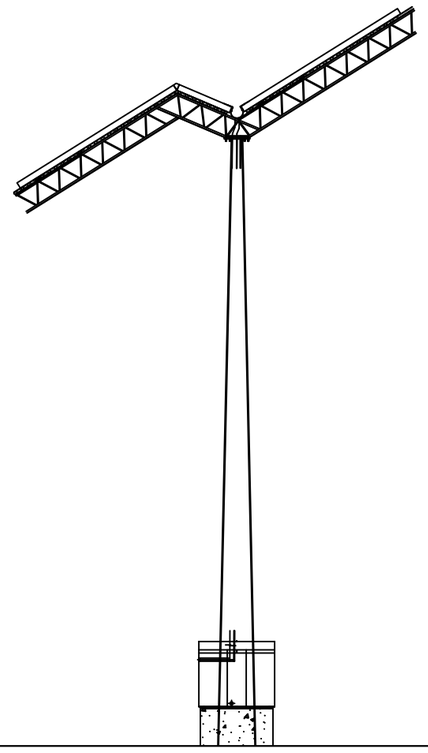
CISTERN DETAILS

A.06



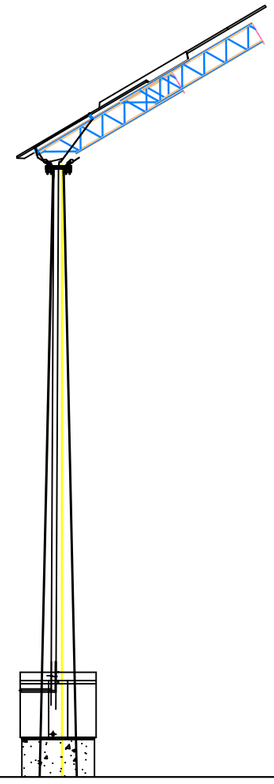
1 "The X" Alternative

A.07 scale: 1/16"=1'-0"



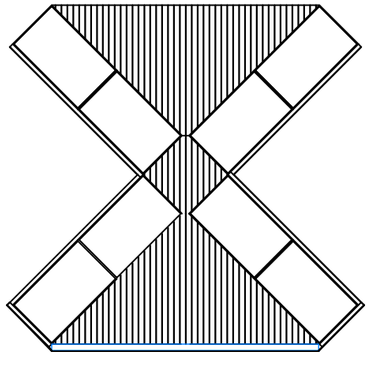
2 "The Bolt" Alternative

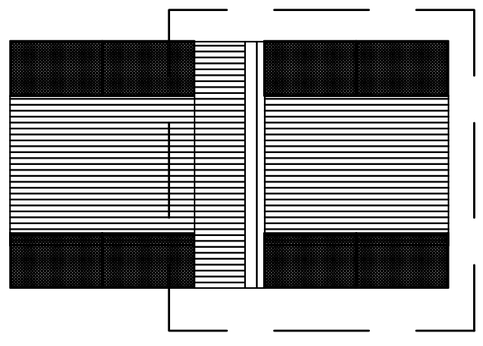
A.07 scale: 1/16"=1'-0"

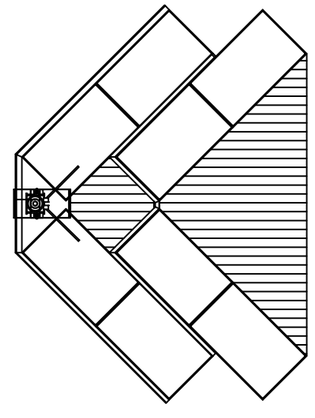


3 "The One Sided" Alternative

A.07 scale: 1/16"=1'-0"







NOTE: ALL THREE ALTERNATIVES MUST HAVE 170 S.F. MINIMUM CATCHMENT AREA.

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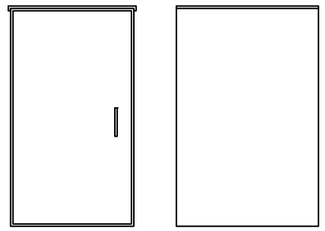
ALTERNATIVE UPPER ARRAY

A.07



DDB UNLIMITED IOD-46DXC

46" H x 25" W x 30" D (23 RU) Outdoor Enclosure

NEMA 3R (Vented)

Zinc Die Powder-coated Black EMKA Three Point Padlocking Handles

Material:.125" Alumiflex®

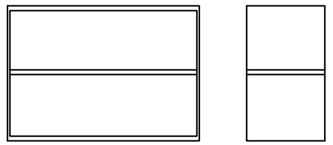
Finish: Painted cream

RF properties: Non-ferrous

lockable doors

5 Outdoor battery storage

A.08 *scale: 3/8"=1'-0"*



SBS VR-2T5W INDOOR

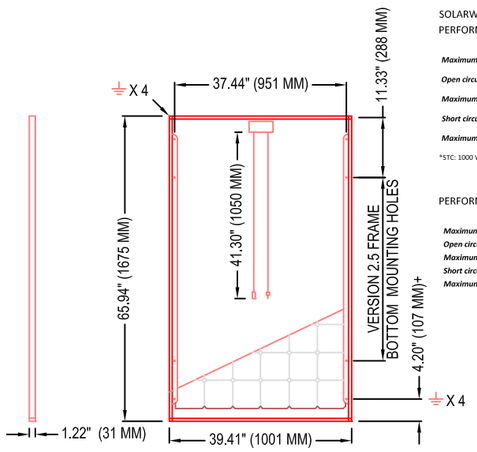
All welded construction with 7 GA frame and rails

Floor mounting brackets included

Adjustable rails with 3" lip

4 Indoor battery storage

A.08 *scale: 3/8"=1'-0"*



SOLARWORLD SUNMODULE PROTOECT SW275 MONO

PERFORMANCE UNDER STANDARD TEST CONDITIONS (STC)*

Maximum power	P_{max}	275 Wp
Open circuit voltage	V_{oc}	39.4 V
Maximum power point voltage	V_{mpp}	31.0 V
Short circuit current	I_{sc}	9.58 A
Maximum power point current	I_{mpp}	8.94 A

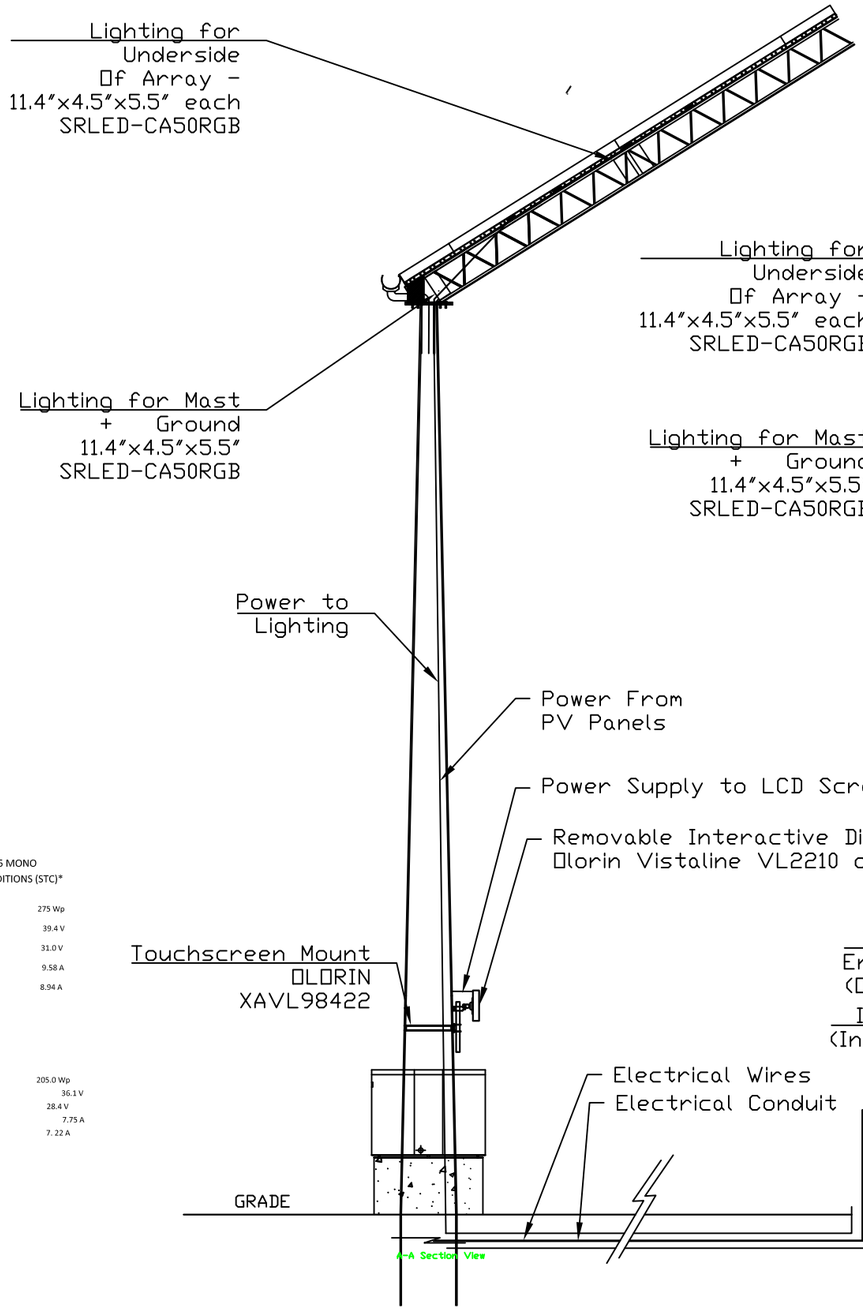
*STC: 1000 W/m², 25°C, AM 1.5.

PERFORMANCE AT 800 W/m², NOCT, AM 1.5

Maximum power	P_{max}	205.0 Wp
Open circuit voltage	V_{oc}	36.1 V
Maximum power point voltage	V_{mpp}	28.4 V
Short circuit current	I_{sc}	7.75 A
Maximum power point current	I_{mpp}	7. 22 A

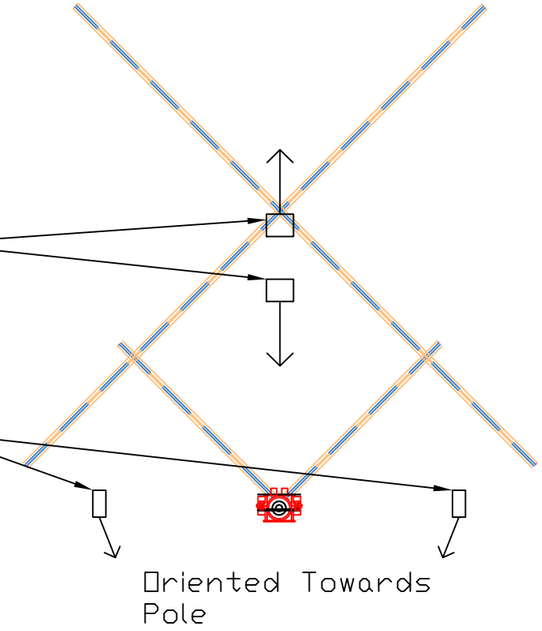
3 Solar Panel plan details

A.08 *scale: 3/8"=1'-0"*



1 Power Routing diagram

A.08 *Not to Scale*



2 Upper Array electrical plan

A.08 *scale: 3/16"=1'-0"*

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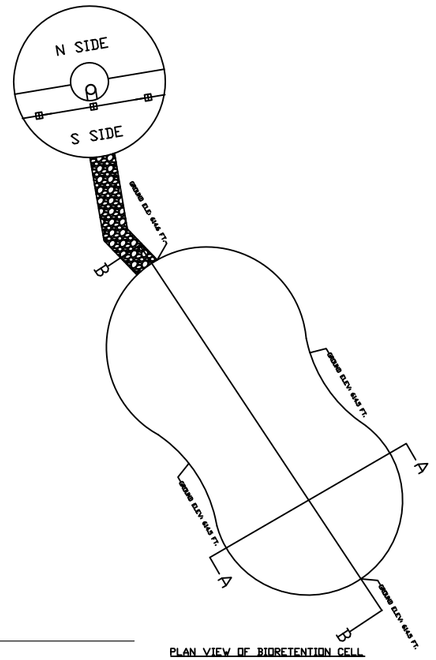
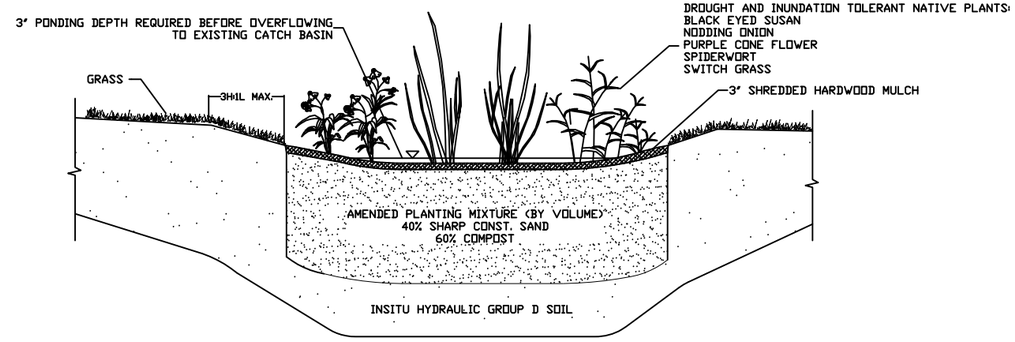
ELECTRICAL + BATTERY DETAILS

A.08



PLAN VIEW OF BIORETENTION CELL

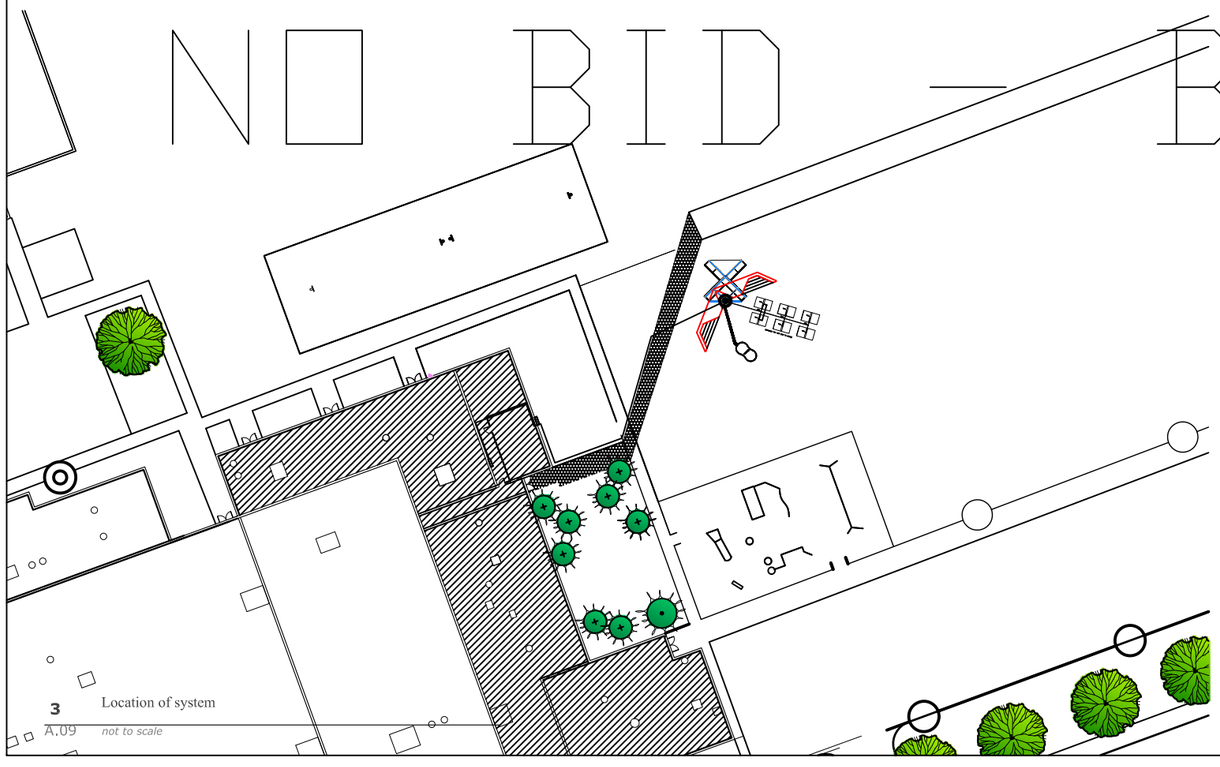
1 Bioretention Cell Plan View
A.09 *scale: 1/4"=1.0'*



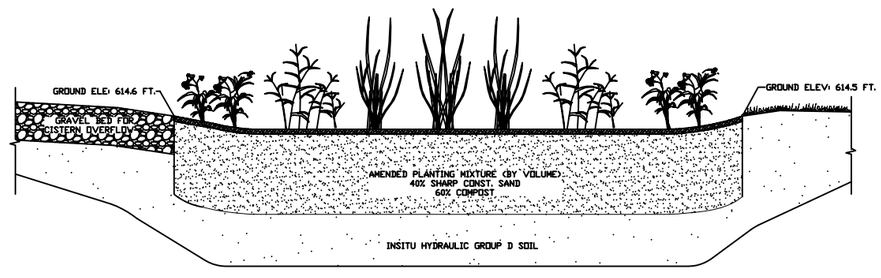
PROFILE VIEW OF BIORETENTION CELL
A–A

2 Bioretention Cell Profile View
A.09 *scale: 1/2"=1.0'*

NO BID — BY OTHERS



3 Location of system
A.09 *not to scale*



PROFILE VIEW OF BIORETENTION CELL
B–B

4 Bioretention Cell Profile View
A.09 *scale: 3/8"=1.0'*

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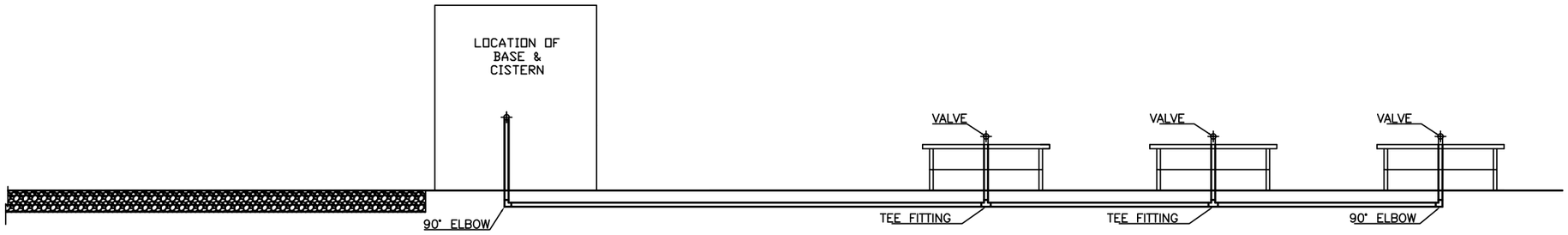
BIORETENTION CELL

A.09

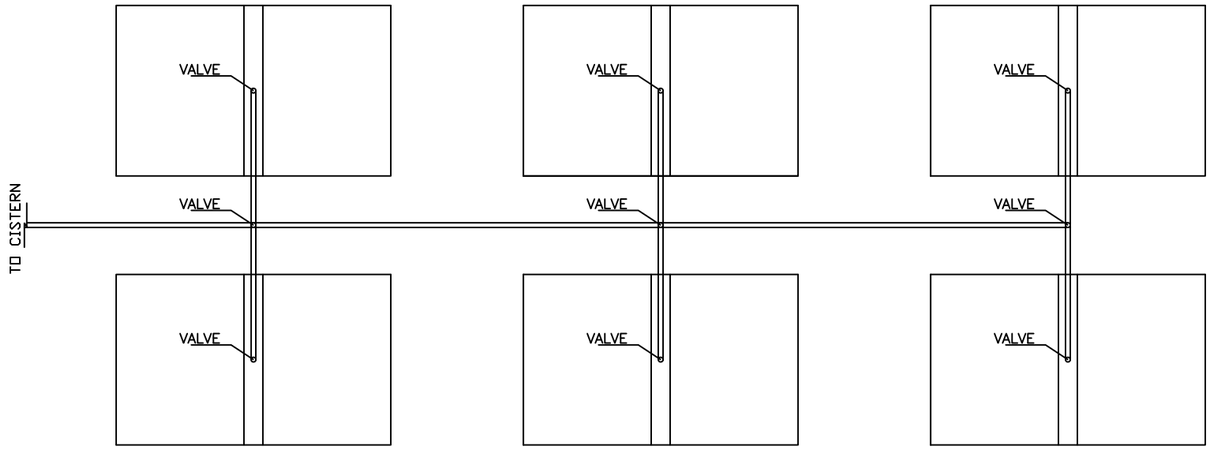


B DPS Garden Beds

A.10 *not to scale*

		Total Qty.	Cost $	Qty.	Unit Price $	Supplier	Model #
Total Length (ln. ft.)	=	77	21.52	8	2.69	HD	531194
Globe Valve (unit)	=	7	15.33	7	2.19	HD	T-601
Tee Fitting (unit)	=	3	5.82	3	1.94	HD	F001TEE-WH
90° Degree Elbow (unit)	=	7	10.15	7	1.45	HD	F00190E-WH

Total Cost $	52.82



D.P.S. GARDEN COLLABORATIVE BEDS (NOT TO SCALE)

NO BID — BY OTHERS

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DPS GARDEN BEDS

A.10

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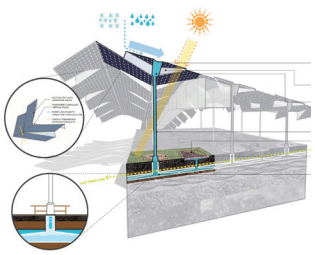

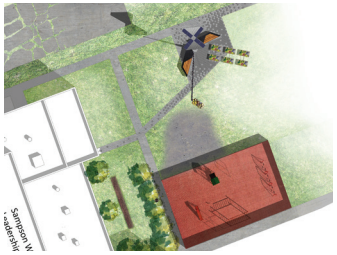

WHO?

A team of over three dozen Lawrence Technological University (LTU) students and architecture and engineering professors has partnered with the Detroit Public Schools (DPS) to design and build a Net Zero Energy (NZE) structure at the Sampson Webber Leadership Academy (SWLA). In addition to educational partner DPS, the sw[LAB] NZE team has collaborated with the Mayor's Office, Department of Neighborhoods District 6, community partners It Starts at Home and Detroit Future City, and the residents, parents, and businesses of the Tireman neighborhood. The professors leading the project are Associate Professor of Architecture and studio[Ci] Director Constance C. Bodurow, AIA, AICP, CUD; Engineering Professor Donald Carpenter, PhD, PE, LEED AP; Associate Professor of Engineering Robert Fletcher, PhD; and College Professor of Architecture Charles O'Geen. Primary funding was provided by a $25,000 Ford College Community Challenge (Ford C3) grant with additional support from Michigan State University EDA REI, the Coleman Foundation, and LTU.

WHAT?

studio[Ci]'s vision for the sw[LAB] NZE project is to design and build a NZE structure to be part of an outdoor classroom at SWLA that is a replicable prototype for other DPS schools. The project features an energy farm, learning gardens, and photovoltaic energy and rainwater collection systems. It will generate renewable energy, conserve and manage water, and reinforce sustainability lessons that engage children and community members through active learning. The team has worked with DPS/SWLA to create curriculum and infrastructure in support of STE[A]M education and the DPS|Go Green Challenge and DPS|Garden Collaborative programs, including: lesson plans; hands-on assignments for in- and outdoor activities; and a NZE team room. As a permanent addition to SWLA's facilities and curriculum, the project will catalyze neighborhood stabilization and restoration. The collective long-term vision and phased implementation for the site, school, and neighborhood includes:

- Solar and geothermal energy farms with public information dash boards
- Stormwater management through green streets, rain gardens, and bioswales
- Year-round learning and community gardens
- A cooperative ownership and management approach creating a new, equitable economic model, revenue, and a generative use model for Detroit's vacancy
- A partnership institute/community and events center in the adjacent Biddle School that reinforces SWLA as the "hub" of the neighborhood for STE[A]M education, NZE research/technology transfer, recreational amenities, youth sports, learning for all ages, and training and jobs skills development
- A new entity comprised of DPS, LTU, and neighborhood stakeholders for the development, manufacture, installation, and maintenance of NZE infrastructure.

WHEN?

The culmination of over seven years of studio[Ci]'s commitment to design and planning with the southwest Detroit community, this collaboration with the DPS and SWLA's principal, lead teachers, and students began in fall 2013. A broader community engagement process began in fall 2014, turnkey bids were solicited in spring 2015, and construction began in summer 2015. The project is slated for completion by the start of the 2016 school year, when monitoring of performance metrics and enhanced lesson plans and training activities will occur.

WHERE?

SWLA, a pre K–8 Detroit Public School, 4700 Tireman Avenue, Detroit MI 48204, and the surrounding Tireman neighborhood on Detroit's "Old Westside."

"studio[Ci]'s transdisciplinary approach, incorporating hands-on involvement, education, and training, allows students, teachers, and residents to engage in and be empowered by this Net Zero Energy project." –Constance C. Bodurow

WHY?

The team arrived at SWLA through geo-spatial analysis of vacancy in Detroit, which perpetuates entrenched social, economic, and environmental inequity. When the team walked through the door, they found passion – in the students, teachers, parents, and residents – for this historic, challenged, but still intact Detroit neighborhood with a strong institutional presence – and they became passionate! The team's goal was to innovate and hybridize NZE technologies; create and test a "net new" prototype structure; and work at the boundaries of their disciplines, thereby advancing them. The team asked: *What if students learned about NZE in elementary school? What if residents were trained to generate their own energy? What if vacancy could be generative – of energy, wealth, educational opportunities? What would this mean for the stabilization of this neighborhood, the city, their future?*

studio[Ci]

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Constance Bodurow
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E: info@studio-ci.net
W: sciltufordc3.wordpress.com

[sw]LAB NZE Prototype

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[sw]LAB NZE Prototype

our project is essentially about:

THANK YOU!
Q+A

EXPERTISE: making legible (in built form) LTU and studio[Ci]s myriad design and technical capacities.

CO-PRODUCTION: building on a legacy of 7+ years of engagement in our Southwest Detroit context and with diverse partners to enhance existing value and create relevance.

GROWTH: manifesting studio[Ci]s transdisciplinary design method in an ever expanding experience for students, faculty (at both the University and Primary levels), and residents engaged in research, curricular, co-curricular, and training activities.

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