"LEARNING FROM CHINA"- TRANSIT-ORIENTED AND LANDSCAPE INFRASTRUCTURE AS A CATALYST FOR A NEW SPATIAL STRUCTURING OF URBAN FORM…

Lessons From Beijing's Line 13 Elevated Subway Line and "Urban eco-filter" for the Third Ring Road of Beijing. Possible Applications to a Proposed Transit-oriented Infrastructural Development for the I-4 Metropolitan and Regional Corridor Strategy for Central Florida

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ABSTRACT: This paper will investigate two speculative urban design projects conducted during the China Summer Studies abroad program that give shape to a new urban spatial form that takes as its form the infrastructure of the transportation infrastructure and which can be a catalyst for a new form of regional development, while at the same time as being the common structuring device and link. Regional identity can coalesce around the identity of the transportation infrastructure or in the case of the Urban eco-filter, the landscape infrastructure, the link which provided cohesion and identity to regional fragmentation.

KEYWORDS: regional identity, integration and fragmentation, strategic regional corridor planning, multimodal transpiration hub, transportation infrastructure and network, mapping of new territory, design strategy

INTRODUCTION

This paper will describe the research through design investigation conducted by architecture and urbanism students from the University of South Florida's School of Architecture and Community Design (USF-SACD) during the ten-week long China Summer 2009 Studies Abroad. Run as a vertical design studio, urban design students had their project site located on and adjacent to Beijing's Line 13 elevated subway line located at the intersection of the Badaling Expressway. I will also discuss the research as design conducted by the Thesis student who I supervised. The thesis, entitled "An Urban Eco-filter for Beijing" proposed an urban green lung and filter for Beijing's Third Ring Road. I will discuss how the two speculative urban design projects address the questions of how the process of urbanization and urban transformation that Beijing is currently experiencing can generate a new kind of spatial form that is based on the concept of the metropolitan region. In Beijing, Line 13, the suburban above ground subway line implemented and opened in 2002 is a new infrastructure which transforms the structure of Beijing's urbanization development. While initial transportation networks and systems worked within the traditional urban structure of Beijing, notably subway lines 1 and 2, Line 13 prefigured suburbanization to the North West of the city. Line 13, in fact, acts as the linear connector which connects the polycentric nodes of development in Beijing's newly suburbanizing North West quarter which are characterized by different programs, territories and functions, sometimes disparate and different from the urban logic of Beijing. The second project, "An Urban Eco-filter", introduces a green lung to the city of Beijing". The proposal is a speculative urban design proposal for Beijing that attempts to remediate the process of urbanization and transformation with a landscape infrastructure at one scale which also becomes a connector to the landscape/ecological infrastructure at the metropolitan scale, and a connective tissue for disparate green networks and systems.

In conclusion, I will attempt to make links between the analysis and research through design embodied by these speculative urban design projects as a method of approaching a design strategy for a possible new urban spatial structuring strategy for transit-oriented urbanism along the proposed I-4 corridor in Central Florida, USA.

LINE 13 REDUX STUDIO

Beijing Urban Structure

Beijing's urban structure when initially planned and founded as Dadu in 1272, was based on traditional Chinese planning principles. The city was laid out on the symbolic north-south axis and fortified by a city wall with 11 gates or men that served as a physical barrier for capping urban sprawl, the land located beyond the wall remaining relatively non-urbanized until 1949. When Chairman Mao came to power and launched the People's Republic of China under the Communist regime, one of the first symbolic urban strategies was to pull down the old city wall. This was coupled with beginning the implementation of one of the initial subway lines, Line 2, which formed a loop following the base of the Ming Dynasty inner city wall. Planners and preservationists such as Liang Sicheng fought to preserve the historic city of Beijing by proposing an urban scheme that relocated the new administrative governmental complex outside the old city wall to the west. Sicheng also had a design to turn the top of the old city wall into an elevated green linear park, in addition to the proposal for a green belt on the perimeter of the city which is currently being implemented. Sicheng was unsuccessful at preserving the wall and implementing his scheme and was later persecuted and died in 1972 for his perceived opposition to the Mao regime in advocating for the preservation of the traditional Chinese city. Chinese planning strategies included the reconfiguring and retrofitting of the capital of Beijing as a Socialist city were borrowed and implemented by Soviet planners during this period. The concentric ring road system, which emanates from the symbolic center of power of the Forbidden City, now the center of the government, is based on the Moscow example. The concentric ring road system circulates around the symbolic center of the Socialist City. The first ring road circles the Forbidden City and currently Beijing is now on its Sixth Ring Road. Major road arteries such as Chang'an Street running east west to the south of the Forbidden City and to the north of Tiananmen Square which was reconfigured under Mao have transformed the urban structure of the capital.

As Jean-Francois Doulet proposes in his paper, "Beijing 2008: Transportation Networks, Trying to Catch up with the City", there is a direct connection between the implementation of transportation network planning in Beijing and the shift from the city of Beijing under the Maoist system to post Maoism and reform in the 1990ies. The urban structure in the 1980ies was still functioning under the danwei or work unit which was modeled after the imported urban unit from the Soviet Union micro-rayon urban concept. There was not a large need for the development of transportation networks under the danwei model as people's workplaces, residences and services were located in the same location and they did not need to commute. There was also little regional migration as the population was controlled by the danwei system. The Beijing mega-block is a scaled-up model of the traditional courtyard and hutong urban fabric typology. The block was fortified on the outside and had on its inside, the danwei/work units or governmental services and buildings on its inside. With the reform period in the 1990ies, and the thawing of Maoism, there was an increase in urban mobility which signified a population increase. Doulet continues to make the point that while transportation planning for the city had, up until that point been based on the notion of a centralized city; it shifted to planning for a decentralized city. During the 1990ies, transportation networks were planned for the centralized urban model of Beijing which began first with planning bicycle networks, bus networks which then became networks that prioritized the car.

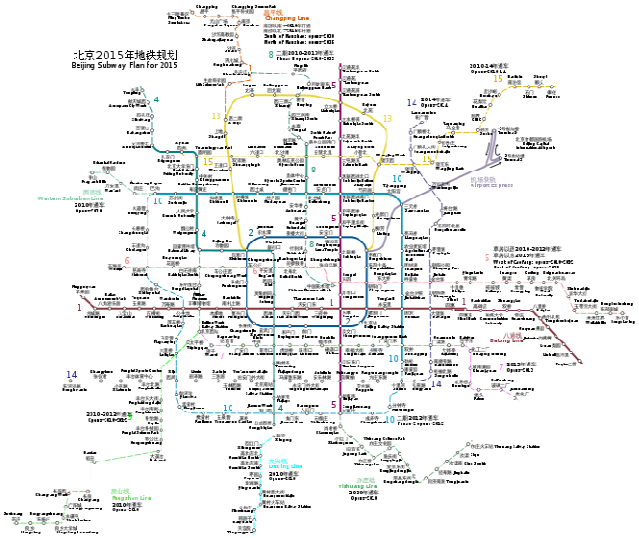

Figure 1_Beijing subway system

History of Beijing Subway system

The elevated subway Line 13 was completed in 2002 and its structure delineates a different territory and configuration than the two subway lines completed in Beijing before it, Lines 1 and 2 both completed in the 1980ies. Line 1 cuts east west across the city center, running beneath the East-West major artery of Chang'an Street through Tiananmen square, linking Beijing's governmental and commercial centers, including the Central Business District (CBD) located to the east of the old city wall. Line 2 makes a loop following the base of the historic Ming inner city wall of Beijing. Line 2 still has stops at 11 of the city wall gates which are called 'men". These two subway lines were initially infrastructures built for the military when Beijing, the first city in China to begin developing a subway system in 1965, built them with the intention of effectively moving troupes into the city with the impending threat of Soviet Union invasion. Three other lines were completed for the Olympics; Line 5 which runs north south; Line 10 which follows the Third Ring Road; and Line 8 which has three stops on the Olympic Green and Line 4 just opened in September 2009. 9 more subway lines are currently under construction –with the global economic crisis, China has focused inwards on the construction on its infrastructure. A 4 trillion yuan stimulus package is currently planned, and by 2015 the Beijing subway line will have doubled the length to 561km.

Line 13 according to as Doulet, was an infrastructural system that was put in to catalyze projected regional urban growth and suburbanization of the north of Beijing when planning for a decentralized city began in the 1990ies with increased population and urban mobility. First called "the city rail", Line 13 is 42 km long, running for the most part above ground with some sections elevated several meters above the street level and in fact only goes underground for 2 km where it connects with the line 2 loop at Donghimen station. It is a loop that serves the northern suburbs and its implementation forced the government into partnership with "other players such as banks, developers to catalyze real-estate spectatorship and urban growth".1 Line 13 has been a catalyst for a change of land use and urban transformation that has created a spatial restructuring at the regional scale and has been a connector for the in-between-spaces between poly-nucleated developments. It has been an agent for the transformation of land use, where agricultural lands are transformed into urban construction and informal settlements and villages transform into urban residential enclaves.

[1] Jean-Francois Doulet, "Beijing 2008, Transportation Networks: Trying to Catch up with the City, Paris Institute of Political Studies".

Figure 2_Field trip along Line 13; **Figure 3**_Mapping of Line 13-Source Sourceimages: Moving Cities

Urban researchers, Moving Cities2-Bert deMuynck and Monica Carrico- continue to map and research Line 13, describing its linear infrastructure and system as a connector between polynucleated forms of regional development. Line 13 is the linear system that provides the structure or the linear link between these polycentric nodes and disparate pieces that are seemingly disparate territories including forests, golf courses, explosive middle-class residential development, former dog parks (supposedly where the SARS epidemic was supposed to have started). Students began to understand and map this new regional territory delineated by Line 13 by cutting sections through it. Additionally, they garnered an understanding of the relationship of the site's node at Line 13 and its relationship to the larger infrastructural network of Beijing's subway system. This was through empirical observations and analysis collected by riding the length of Line 13 and documenting it, as well as disembarking at several stations and walking in between them, thus understanding the different forms and nodes of urban development both generated and catalyzed by the elevated subway line and infrastructure, Castell's so-called "urban constellations".

The program for the studio project was to develop a transit oriented-development, in addition to conceptualizing the existing elevated Line 13 infrastructure and adjacent rail bed as a connector (both horizontal and vertical) for the four semi-autonomous regions currently fragmented by Line 13 and the Badaling Expressway. Student's schemes investigated creating legal vertical connections to the existing infrastructural connector from the Longzhe station to the urban migrant village. Additionally, students proposed landscape and topographical strategies which began to remediate an existing polluted river system located to the west of the site through the proposed reconstruction of a healthy wetland. These landscape and topographical systems would also integrated into the layout of the scheme, stitching the lot and block structure, in addition to providing a topographical infrastructure that would connect the development to the elevated subway above.

[2] Moving Cities- http://movingcities.org/

Description of initial workshop and studio

Moving Cities began the studio with a two-day workshop[3] that included an introduction to Line 13 and a fieldtrip of the line and its site. Moving Cities' urban research of Line 13 has been ongoing, beginning with the Line 13 Super linearity studio run with Prof. Adrian Blackwell and University of Toronto students during the Summer of 2008. As described in the project blog by Moving Cities[4] "since its construction in 1996 (finished in 2001), the Badaling Expressway has acted as an important attractor for urban development in the North-Western part of Beijing. Around the Longze subway station where the expressway meets the subway line, four distinct and programmatically autonomous areas can be discerned; a semi-legal and self-built migrant village, an area called 'Car City', a low-rise residential area and a high-rise upscale residential areas. Moving Cities further describes Line 13 as being a generator for a form of peri-urbanism to the north of Beijing" which is that of a polycentric model as opposed to the one based off of the Beijing city grid, mega block and concentric ring road urban structure". Students conducted initial site analysis at both a macro and micro scale, conducting multiple readings of the site which included documentation through the mapping of: existing programs, existing systems and the observations of formal and informal uses. Students worked in groups of two, and came up with proposals to strengthen the area, in addition to projecting new programs onto the existing area. Students focused on developing a master plan for their chosen site, in addition to zooming into different scales of understanding. The studio consisted of analysis of place, programmatic intentions, and the main scale of the interventions and ultimate master plan proposal.

The site was located on the northwestern side of Line 13, bounded to the south by line 13 and to the east by the Badaling Expressway.

Some generators for design schemes were pulled from analysis and observations that focused on aspects of the informal urban migrant village; its organization and structure. The studio speculated on its presence and continued longevity, informal settlement and various infrastructural issues such as a lack of municipal services including garbage collection-garbage often taking over public spaces. The spine of Market Street, an informal covered market with tarp forming a north-south running spine throughout the settlement with housing adjacencies whose public circulation occurred above the market also served as design generators when considering that their design proposal on the other side of line 13 could be an upscale version of the urban migrant village.

The informal settlement is boarded to its west by agricultural land that is further bounded by Line 13 which begins at this juncture to curve and begin its southern descent on the Western portion of its line. These agricultural fields have graveyards next to them, perpetuating a speculation whether this has prevented its development, or if the farmers have land rights which prevent its development similar to the Village in the City urban phenomena in Shenzhen. To the north of the site lies Car City, on the site, and adjacent to the line, a combination of warehouses and home to illegal car racing. Most striking is the current illegal and informal crossing from the Longzhe subway

Figure 4_Aerial of site along Line 13; **Figure 5**_Field Trip along Line 13 (Source images: Moving Cities) **Figure 6**_Masterplan model by Stephanie Herring and Brennen Huller, USF SACD.

[3] Moving Cities- Line 13 Redux http://movingcities.org/projects/line13-redux/
[4] IBID.

station to the migrant village which currently occurs along the railway line viaduct running alongside Line 13 and spanning across the Badaling expressway. Both the railway bank and Line 13 are infrastructures are what link the disparate parts of the site together, including the informal settlement. Inhabitants of the urban migrant village walk along this track of the train that passes by twice per day and scale down the rail embankment on a path that has been worn. For the government to put in a formal crossing would mean acknowledgement of the informal and illegal settlement.

Both schemes propose making a formal pedestrian crossing from the Longzhe subway station which is both horizontal and vertical. proposes developing a formal connection over the Badaling expressway in a landscape infrastructure and focusing the site to the north of Line 13. Scales of landscape include remediation of the existing sewer to the west of the site and Car City

Their proposals involved the integration of numerous scales and systems of infrastructure and landscape, further articulating a formal connection in a functioning landscape system. The existing sewer to the west of the site was proposed for ecological remediation. When mapping and zooming out it began far north as viewed along the Badaling expressway, beyond the Sixth Ring road and dedicated Green Belt. It was perceived that this might be an ecological infrastructure that would restitch the leapfrog suburbs currently occurring to the north of car city and provide a dedicated bike infrastructure that might happen alongside the infrastructure.

The first team integrated a market into the station infrastructural connector, as well as a topographical infrastructure. The infrastructure becomes a civic structure and multi-modal hub whose vertical circulation connects a plaza to the rail level and thus the landscape connector to the subway station. It was speculated that the integration of a light rail that begins/terminates sat the node would perpetuate or act as a catalyst for a forma connection to the subway by the city.

The scheme also proposes a light rail system which would run to the north, connecting the site to the leap frog suburbia to the north of Car City. Both schemes have two main nodes of intervention at proposed transit systems felt that this node with this formal connection would incite development.

Both schemes propose an upscale version of the migrant village with similar configurations, increased density, while increasing the market spine. An ecological infrastructure with a dedicated bike infrastructure is also introduced.

Urban Morphology

The studio studied Beijing's mega-block typologies and several precedents of design strategies were applied. The mega-blocks of Beijing's danwei units were studied, in addition to more contemporary precedents such as the SOHO models which investigate the three dimensional Asian city.

Conclusions to Line 13 Redux Studio

Students concluded with a presentation to jurors from Turenscape, BASE (Beijing Architecture Studio Enterprise), OMA and CAUPD (Chinese Academy of Urban Planning and Design).

URBAN ECO-FILTER AND URBAN LUNG

Thesis student Carlos Gil who was conducting design research under my supervision began with the Line 13 workshop, and then began researching through design, "An Urban Eco-Filter- Introducing New Lungs to the City of Beijing" proposed over the Third Ring Road of Beijng. Gil researched Beijing's multiple scales of urban landscape. He zoomed in by looking at the node in the Central Business District (CBD) area, located to the east of the old city wall at the Guomao subway line stop.

His thesis investigated the integration of an urban filter for the city of Beijing. He studied Beijing's urban structure, and conducted a series of mappings, including: a timeline of Beijing's ecological footprint, and a regional mapping of Beijing's water infrastructure and regional water management system. His scheme proposes a green infrastructure which serves as a green corridor occupying the air rights above the Third Ring Road. As an ecological infrastructure, the scheme attempts to remediate Beijing's current environmental degradation through a green urban proposition. Gil identified several environmental issues which are currently impacting Beijing, including: groundwater depletion; absence of an ecological footprint and impending water shortage. Historically, Beijing's siting was not rational, sited in the plains and not near natural water bodies yet man-made ornamental ones. The current population of 17 million in Beijing's area of jurisdiction cannot be supported by its current water supply. NPR journalist and others have gone as far as to state that in fifty years time, the capital will need to be relocated due to water wars. Chairman Mao's water diversion scheme to re-divert a tributary of the Yangtze River currently running south to run north in order to supply the city of Beijing with water is currently being reincarnated. Construction and implementation is expected to be completed within two years time.

The Urban Eco-filter is structured as an ecological infrastructure, which is a reconnective tissue to the disparate and fragmented ecological systems of the city, in addition to creating a green network connecting the proposed greenbelt, initially proposed by Liang Sicheng at the Sixth Ring road of the city. It is at once for the city of Beijing a water collector and also an aqueduct for the city, replacing the "People's channels" currently located along "Peoples road" or the Third Ring road, the water of which is currently ecologically degraded. The aqueduct replaces this infrastructure and which cleans and purifies the water.

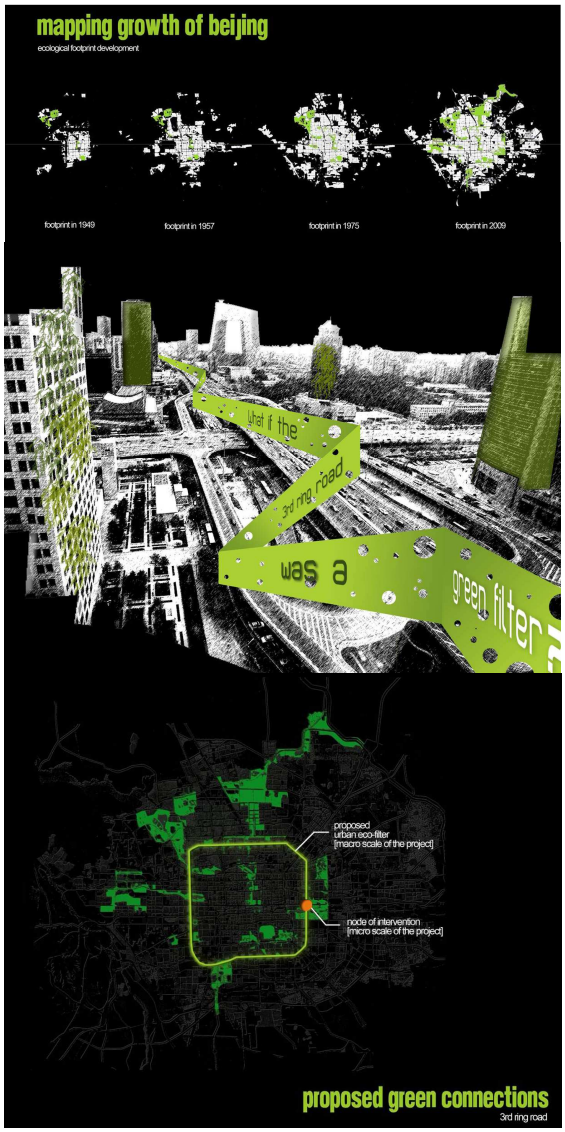

Figure 7_Mapping of Growth of Beijing, provided by Alx Camprubi, Turenscape; **Figure 8**_Urban Eco-filter urban proposal, Thesis Student Carlos Gil; **Figure 9**_Proposed Green Connections Diagram, Carlos Gil

The scheme also provides ecological remediation to the city and an infrastructure for new productive urban landscapes to occur, as well as a new dedicated bike infrastructure. A matrix provides design guidelines which shape the design and typologies occurring with an immediate adjacency to it address a loss of cropland and agriculture and food production. From 1980-2004, 44,000 square miles of agricultural land was lost due to new development. In the way which Line 13 is a linear system connecting nodes or "urban constellations" and reconfiguring the regional urban condition, so do the urban filter but the connector to these nodes is not linear in fact it is a green connective tissue that connects the existing green spaces and systems within the city which are currently fractured. This could perpetuate a green system throughout the city which could be interconnected at the regional scale to the proposed greenbelt; a proposal of Liang Sicheng's creating a regional urban identity which is shaped by a proposed urban landscape. Currently beyond the Sixth Ring Road there has been implemented forest and green in order to shield the city from the Mongolian sand storms that happen in the spring. The urban lung is proposed at the macro scale of the city and at the micro scale of the node of intervention. The proposed node is in the Central Business District at the Guomao stop. (CBD). Design guidelines include living wall systems which regulate the water back to the city, also developed typologies. A new city wall- Liang Sicheng's proposal for a green linear park ontop of the old city wall.

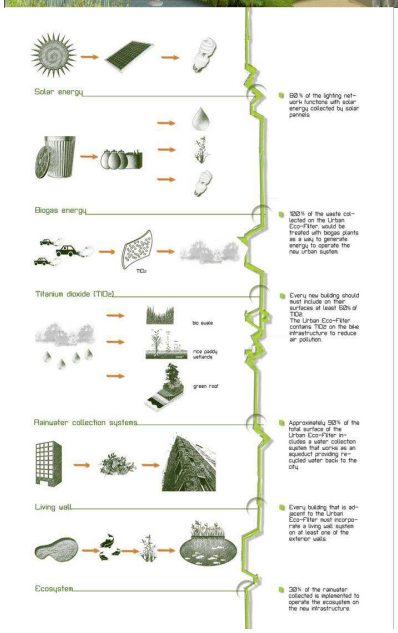

Figure 10_Proposed Aqueduct Diagram_Carlos Gil; **Figure 11**_Propsed Scheme_Carlos Gil; **Figure 12**_ Proposed Matrix_ Carlos Gil

OVERALL CONCLUSIONS-LEARNING FROM CHINA-CATALYSTS FOR THE NEW I4 CORRIDOR AND REGION

Framed as "Learning from China", the China Summer Studio provided students an opportunity to test out strategies through speculative urban design projects where urbanism is generated and catalyzed from an existing transit-oriented infrastructural system, a model which does not yet exist in Tampa or Florida. The studio speculated that this might then provide the urban design tools to be then applied to a proposed urban spatial model in Tampa at the scale of a regional and metropolitan transit-oriented infrastructural system. This, in turn, can act as a catalyst for a distinct new form of urbanization and development or nodal development along it which is connected by the corridor system. In both the Line 13 Redux studio and the Urban Eco-Filter proposal, infrastructure is what ties the at times fragmented development together at the regional scale. The landscape infrastructure integrated in both schemes also had an ecologically remediative impact on the urban form.

There is currently much discussion in the metropolitan region of Tampa and central Florida regarding the creation of a transit-oriented infrastructural corridor along the existing I-4 corridor. The I-4 is the major east-west highway running across Central Florida which connects Tampa/St. Pete's (West) with Orlando (Central) and Daytona (East). The

project's stasis in implementation is largely due to the lack of effective communication and collaboration between the various regional governmental and planning agencies. An urban model conceptualizing this corridor would be helpful in providing a framework for understanding the urban and spatial quality of the new transit-oriented, interconnected corridor. Likewise, it might give an urban spatial form and a spine to a form of urbanism which currently suffers from poly-nucleated sprawl that is all car-based. The city of Tampa itself is currently on par with the City of Detroit in its lack of public transportation system in the city. Both suffer the "Shrinking City" phenomena, impacted by the federal highway system and urban renewal strategies which cut through once vibrant city fabric in the 1960ies. How the implementation of a regional transformational, infrastructure might generate a new form of urbanism and be a catalyst for a new form of urban spatial development which is transit-oriented in nature, and which creates new territory? How might this provide a new regional planning identity for an area that currently suffers from urban fragmentation? How might the creation of a new territory be generated which organizes itself along this new transit-oriented infrastructure? What will the new spatial form be? These urban issues are particularly relevant in the ongoing discussion of urban design post the age of oil. Tampa and Florida were areas particularly impacted by the rising cost of oil in 2008. For example, several of the area's senior citizen population was forced to move back North when the cost of oil and gas skyrocketed during the fall of 2008. The area is particularly vulnerable to post-oil crisis, again due to its generation by car-oriented development and poly-nucleated sprawl. Students have much to learn from China, including its urbanism, formal and informal and its infrastructural implementation, and subsequent catalytic development. There are many parallels between both the USA and China in terms of both countries turning inwards to invest in its own infrastructure as an economic stimulus in light of the global economic meltdown. Albeit the scales differ by a large order of magnitude when one compares the billions of dollars china is investing in its infrastructure. China is also able to implement infrastructure at a much quicker pace as it does not have to undergo the same public approvals process that the US does in terms of implementation of public works projects including infrastructure which slow down its process significantly.

While Obama is inciting green economy this can signify new regional economies which can have a regional identity and the region can be a new spatial model. The I-4 corridor has been the site of significant growth and is currently being planned as the "Green Technology Corridor", a plan which focuses on the green economy economic development potential as part of the Obama economic stimulus plan. The corridor would house green tech and conceptually focus on green industry, sustainable building technology and mass sustainable transportation infrastructure. Also in the region, planning is currently underway for the new University of South Florida polytechnic, the new master plan of which is being designed by Spanish architect Caltrava. Much has been discussed regarding the new regional identity and the importance for ascribing importance to this new regional identity located along the I4 corridor. Infrastructure linking these polycentric nodes can become key in becoming the identifier or the linear structure that provided this line to the system. Also important for implementation is the collaboration between disparate entities. modernization process. Notable is that the mayor of Tampa is proposing a 1 cent sales tax on the 2010 ballot for which to built a light rail transit system and mass transit. This will be transformative for the entire community. Already plans are underway for the conversion of the current rail lines into commuter rails on part of this corridor. The analysis by both schemes serves to give shape to a new urban spatial form that takes as its form the infrastructure of the transportation infrastructure and which can be a catalyst for a new form of development, while at the same time as being the common structuring device and link. Regional identity can coalesce around the identity of the transportation infrastructure or in the case of the Urban eco-filter, the landscape infrastructure, the link which provided cohesion and identity to regional fragmentation.

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