Green Infrastructure as an Economic Development Tool: Linear Park Development in Springfield, Illinois

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I. Executive Summary

With high-speed rail coming down the line, Springfield, Illinois has the opportunity to create a world-class amenity in the form of a linear park stretching the length of the city as the 3rd Street corridor is decommissioned. This is a pivotal point in the development of Downtown Springfield as the city refocuses its efforts to create a more walkable, livable downtown. By creating a linear park and focusing on building specific people-attracting amenities in the Downtown portion of the corridor, the City can leverage the park as a means of attracting additional people to Downtown Springfield which in turn will further the economic development goals of the City.

Using a series of site suitability analyses, I intend to identify 1) the best locations to place different preferred and suitable amenities in the corridor in order to attract users and 2) which pedestrian corridors are should potentially receive focused efforts concerning streetscape improvements. I will base my analysis on the popularity of the following specific, existing parks and amenities in Springfield: public seating, public drinking fountains, playscapes, and wayfinding markers. Data was collected from the local government planning agency, the Springfield-Sangamon County Regional Planning Commission, and from the United States Census Bureau.

Through the course of this analysis, multiple areas along the corridor were found suitable based on requirements deemed appropriate for the amenity in question. Similarly, it is likely that certain streetscape improvements will need to be made to specific pedestrian corridors in order to increase traffic to and from the linear park. Further research is necessary to deem which and to what degree specific building facades and streetscapes need to be improved.
II. Introduction

Economic Development in Post-War America

Economic development is a critical topic to communities across the country, but is of particular importance to cities located in the post-industrial region known as the Rust Belt stretching from New England to the Great Plains. Losses in manufacturing jobs have affected local economies to varying degrees leaving municipalities with few options to reimagine their economic position (Crandall, 1993). Indeed, in post-War America, local and the national economies have shifted away from manufacturing to information and service-based economies. Additionally, since the end of World War II, rail freight has given way to trucking as the primary mode of shipping transportation, leaving cities with neglected or abandoned rail lines that inhibit many types of development since these sites are routinely designated as brownfield sites (EPA, 2013).

For smaller cities, the challenge to rebuild the local economy is even greater. Quality of life factors have become increasingly integral to the success of a city’s ability to retain or attract businesses and talented employees. Cities in regions with temperate climates tend to have no issues attracting businesses and people. Likewise, cities with vibrant cultural and entertainment scenes also have less of a problem becoming equally vibrant commercial centers. More modestly-sized communities in the Atlantic Coast or the Midwest, however, are unable to offer similar sorts of local natural amenities or cultural attractions and entertainment. Fortunately, there are a number of opportunities of which Rust Belt cities can take advantage.

Green Infrastructure

With the loss of manufacturing jobs and freight traffic, increasing amounts of rail-related brownfield sites are available for redevelopment. One of the most effective ways many communities can take advantage of this opportunity is to introduce green infrastructure to these sites. Examples of this strategy can be seen across the country and the globe.

Beginning in the late 1980s, Paris, France began building the Promenade Plantée along a nearly three-mile long obsolete railway (Mairie de Paris, 2012). Finished in 1993, the Promenade Plantée has become a main attraction in the 12th Arrondissement and an asset to an already wildly popular city. In the 2000s, New York City began constructing the now very popular High Line, a one-mile long linear park located on an elevated rail line which winds its way through the lower west side of Manhattan (New York Architecture, 2009). Indianapolis, Indiana unveiled its own street-level linear park known as the Canal. This linear park is a rehabilitated three-mile stretch through the city that runs adjacent to a canal system from the 1800s. Indianapolis used this rehabilitation as a means to increase pedestrian and non-auto traffic around the city (White River State Park, 2012). Indianapolis also introduced The Cultural Trail officially in 2013, which is a network of bicycle and pedestrian lanes designed to move people around Downtown Indianapolis without relying on vehicles to do so.
Other major cities have begun conversations and construction on their own iterations of green infrastructure. Chicago began the process of constructing their own nearly three-mile linear park along a decommissioned stretch of the old Bloomingdale track on the west side of the city (City of Chicago, 2011). Formerly known as the Bloomingdale Line, this linear park project was rebranded in mid-2013 as “the 606” as it will incorporate street level bicycle lanes and pocket parks as it makes its way through the west side of Chicago. In 2012, the mayor of London, England commissioned a competition to design a linear park through its own municipal limits; the winning design is one which takes advantage of an unused underground tunnel system previously used by mail carriers (Landscape Institute, 2012).

High-Speed Rail Development and Springfield, Illinois

It is clear that major cities have successfully implemented green infrastructure on large-scale bases in order to enhance pedestrian experiences and increase their quality of life for residents and visitors. Of course, even the smallest of these examples is a city nearly four times the size of the city that is the focus of this analysis, Springfield, Illinois. This report aims to show that world-class amenity development in the form of a linear park is well within the reach of smaller, more modest communities. Indeed, the following suitability analyses aim to show that this sort of development is entirely feasible if done with an appropriate amount of forethought.

The federal government and State of Illinois have identified a corridor which runs North-South the length of the state as an ideal candidate for high-speed rail development. Springfield, Illinois, the state capitol, lies directly in the path of this corridor. With two major rail corridors in city limits, local officials and transportation engineers have identified the 3rd Street corridor as that which will be decommissioned, while its’ neighbor to the west, 10th Street, will be expanded and retrofitted with high-speed rail lines. This provides Springfield with an amazing opportunity to redevelop the 3rd Street corridor as its own three-mile long linear park.

3rd Street also happens to fall within the city-defined area of Downtown. Currently, multi-agency efforts are at play to increase residential density (see right chart) as well as reinvigorate Downtown Springfield as a cultural and entertainment destination, adding to its existing character as a large, dense center of employment for the region. Current initiatives include a City program to increase public art, Downtown Springfield Incorporated (DSI) increases their annual offerings of festivals and programs on a regular basis, and the Springfield-Sangamon County Regional Planning Commission (SSCRPC) also regularly works with the Springfield Convention and Visitors Bureau to increase tourism traffic to the local Downtown historic sites related to Abraham Lincoln.
Springfield itself has felt the effect of the loss of manufacturing jobs and the corresponding stagnating growth of its local population, even with its strategic location at the junction of two major interstates 55 and 72. Above is a chart showing population growth from 1950 to 2010 per the United States Census Bureau. The local growth rate is significantly below the national average: 4.3% as compared to 9.7%, nationally [US Census Bureau, 2010].

Springfield is also the state capitol of Illinois, but lacks the more robust development seen in other capitol cities. It is time for Springfield to reclaim the vibrant, bustling, and enviable status of its past.

Reference Maps

Following this section is a series of reference maps which place Springfield within its geographic context, displays existing amenities in Downtown Springfield, and display residential and worker densities in Downtown Springfield.
Green Infrastructure as an Economic Development Tool: Linear Park Amenity Development in Springfield, Illinois

Geographic Context, Illinois and Sangamon County

050100 Miles

Springfield
St. Louis
Chicago

Downtown Study Area
Sangamon County
Other Illinois County
Springfield
Park
3rd Street Corridor
Rail
Infrastructure

Current Amenities in Downtown Springfield

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III. Problem Statement

The decommissioning of the 3rd Street corridor provides an opportunity to develop a truly quality amenity in Springfield. In order to increase the likelihood that amenities within the linear park are used extensively by the community, the city needs to consider where those amenities should be located. Similarly, if the goal here is for green infrastructure to aid economic development efforts in Downtown Springfield, major pedestrian corridors need to be inspected to ensure that streetscapes are amenable to increased pedestrian activity. In order to fully take advantage of the opportunity being afforded by high-speed rail development, the city would benefit from careful consideration of its park design, including the location of specific kinds of amenities.

Research Questions

This analysis focuses on two primary research questions related to linear park amenity development:

- What are the ideal sites for placing public seating, public drinking fountains, playscapes, and wayfinding marker amenities in such a way as to increase the likelihood of their use?
- Which pedestrian corridors should receive focused efforts on streetscape improvements?

V. Methodology

Project Preparation

During the course of an internship over the summer of 2013 with the Springfield-Sangamon County Regional Planning Commission, it was brought to my attention that with the decommissioning of the 3rd Street corridor, only the development of a bicycle lane was currently being proposed by the City as a means of connecting spatially disparate recreational trails in Sangamon County. Having done previous research on green infrastructure, I saw this as a prime opportunity for the city to coordinate an effort to revitalize this corridor as a recreational and transportation asset for the city in addition to bolstering ongoing efforts to revitalize Downtown Springfield.

Recently, the Springfield Parks District opened a new park called Southwind Park located on the southern edge of the city. This greenspace has become wildly popular with local residents as it includes not only ample recreational space, but also interactive experiences for all ages such as sensory gardens, musical playscapes, a fishing pond, and a splash park. Given the success of this park within the local context, there is every
hope that a similarly equipped linear park would serve an equally important purpose for the community.

In order to conduct these analyses, necessary data would include local shapefiles, demographic data, and manually create shapefiles which reflect amenities known by personal familiarity with the area in addition to Google Maps and Google Earth.

It was also crucial to decide which amenities would be the subject of this proposal. Specific linear park amenities were chosen based on local preferences based on the popularity of the new Southwind Park. Due to a dense amount of office and legislative workers in Downtown, public seating including benches and tables are considered. As this linear park will connect multiple regional recreational trails, public drinking fountains are also explored as an amenity. With nearby attractions for children including the Illinois State Museum, the forthcoming Springfield Children’s Museum, as well as a number of public schools, playscapes are also contemplated. Finally, due to the large amount of tourist destinations located in Downtown Springfield, wayfinding markers are also taken into account as a critical amenity in the proposed linear park development.

Data Collection

In order to conduct this analysis, GIS shapefiles were needed from the SSCRPC in addition to census data available through the American Factfinder tool on the Census website. Data from the SSCRPC was formally requested via a letter written to the executive director, Norm Sims, as the SSCRPC does not maintain a publically available GIS data portal. Census data was downloaded to reflect varying demographic information for Springfield and Sangamon County from the Census tool American Factfinder.

Data

The following data was collected from the SSCRPC: parcels, streets, sidewalks, recreational trails, bicycle infrastructure, and building footprints. Census shapefile downloads included: national hydrology (for the Great Lakes), Illinois shapefile, Illinois counties shapefile, and Illinois municipalities’ shapefile. Additionally, specific census data pertaining to total population, population by age, and housing vacancy status was downloaded from the American Factfinder.

Analysis steps

1. Data downloaded
   a. Data cleaned
   b. Data clipped to Springfield and Downtown Springfield
   c. Data projected into appropriate geographic reference for Central Illinois
2. Reference maps created
   a. Geographic context map
      i. Added data
      ii. Symbolized point, line, and shapefiles
   b. Existing amenities in Downtown Springfield map
      i. Added data
      ii. Symbolized point, line, and shapefiles
   c. Residential and worker density map
      i. Added data
      ii. Symbolized point, line, and shapefiles
      1. Specifically created dot density map for residents and workers
      2. Added pie chart for additional visual reference of difference between worker and residential densities

3. Suitability analyses maps created
   a. Public seating
      i. Appropriate reference data added to map
      ii. Appropriate data processed in order to locate suitable areas of the 3rd Street corridor for specific amenity development
      iii. Symbolized point, line, and shapefiles
   b. Public drinking fountains
      i. Appropriate reference data added to map
      ii. Appropriate data processed in order to locate suitable areas of the 3rd Street corridor for specific amenity development
      iii. Symbolized point, line, and shapefiles
   c. Playscapes
      i. Appropriate reference data added to map
      ii. Appropriate data processed in order to locate suitable areas of the 3rd Street corridor for specific amenity development
      iii. Symbolized point, line, and shapefiles
   d. Wayfinding markers
      i. Appropriate reference data added to map
      ii. Appropriate data processed in order to locate suitable areas of the 3rd Street corridor for specific amenity development
      iii. Symbolized point, line, and shapefiles

4. Final maps created
   a. Proposed amenity location development map
      i. Appropriate reference data added to map
      ii. Results of individual suitability analyses added to map
      iii. Symbolized point, line, and shapefiles
   b. Proposed pedestrian corridor analysis map
      i. Appropriate reference data added to map
      ii. Proposed amenity development data intersected to show where, if at all, all four suitability analyses results coincide
iii. Walkable buffer created around intersected file to highlight where possible streetscape improvements might be made to make the area more amenable to pedestrian traffic associated with the linear park development

iv. Symbolized point, line, and shapefiles

VI. Findings

The primary results of this analysis area attached in a series of maps following this section.
Green Infrastructure as an Economic Development Tool: Linear Park Amenity Development in Springfield, Illinois

Miles

Suitable Seating Area

3rd Street Corridor

Employment Center

Building Footprint

Sidewalk Intersection Buffer

Existing Amenity Buffer

Worker Density Buffer

Potential Amenity Suitability Analysis: Public Seating

Sources: Springfield-Sangamon County Regional Planning Commission, U.S. Census Bureau. NAD 1983 State Plane Illinois West FIPS 1202 (Feet).

*: Notable place of employment based on local knowledge.
Green Infrastructure as an Economic Development Tool: Linear Park Amenity Development in Springfield, Illinois

Amenity Suitability Analysis: Public Drinking Fountains

00.10.2 Miles

*: Notable place of employment based on local knowledge.

14
Green Infrastructure as an Economic Development Tool: Linear Park Amenity Development in Springfield, Illinois

Amenity Suitability Analysis: Playscapes

Green Infrastructure as an Economic Development Tool: Linear Park Amenity Development in Springfield, Illinois


Amenity Suitability Analysis: Wayfinding Markers
Green Infrastructure as an Economic Development Tool: Linear Park Amenity Development in Springfield, Illinois


Proposed Development Areas By Amenity

- Public Seating
- Drinking Fountains
- Playscapes
- Wayfinding Markers
- Suitable Playscape Area
- Suitable Fountain Area
- Suitable Marker Area
- 3rd Street Corridor
- Rail Line
- Street
- Building Footprint
- Suitable Seating Area

0.10.2 Miles
Green Infrastructure as an Economic Development Tool: Linear Park Amenity Development in Springfield, Illinois

Pedestrian Corridor Analysis for Streetscape Improvements

Suitable Areas Intersect 3rd Street Corridor and Rail Line
Suitable Areas In Green
Pedestrian Corridor Analysis


VII. Analysis

Public Seating

The map illustrating suitable sites for public seating along the 3rd Street corridor displays the following factors, equally weighted:
- Distance from worker density
- Distance from existing amenities
- Distance from the intersections of the sidewalk and corridor

Public Drinking Fountains

The map displaying public drinking fountains shows the following inputs, equally weighted:
- Distance from worker density
- Distance from intersections of the sidewalk and corridor
- Distance from existing amenities

Playscapes

The suitability analysis for playscapes included the following factors, equally weighted:
- Distance from children-attracting amenities
- Distance from intersections of the sidewalk and corridor
- Distance from major traffic intersections with the corridor

Wayfinding Markers

Wayfinding markers were examined using a suitability analysis considering the following, equally-weighted factors:
- Distance from tourist-attracting amenities
- Distance from intersections of the sidewalk and corridor
- Distance from major traffic intersections with the corridor

Pedestrian Corridor Analysis

Finally, another analysis was conducted in order to determine which pedestrian corridors are spatially most significant in terms of streetscape evaluation and improvements. This resulted in a 1/8th mile buffer surrounding an area where all four amenities would be considered suitable.

Interestingly, despite the relatively small size of Downtown Springfield, the locations of suitable sites for the proposed linear park amenities varies along this stretch of 3rd Street. With only one site containing overlap from all four amenities, this analysis shows that even in a small spatial area, there can be quite a bit of variance among the four chosen amenities.
VIII. Conclusions

The results of these analyses show that multiple areas along the Downtown stretch of the 3rd Street corridor are suitable for various amenity developments according to the criteria assigned. Indeed, if the correct amenities were to be developed along this area using a well-designed series of suitability analyses, capturing and replicating the success of Springfield’s own Southwind Park should be within the grasp of the designers responsible for this proposed linear park.

Overall, many areas in the Downtown study area of Springfield fall well within the requirements defined for each amenity outlined in this analysis. If the goal of using green infrastructure as an economic development tool is to increase the number of people visiting Downtown via this proposed linear park, amenities must be placed where they are likely to be used. As all four amenity suitability analyses overlap at a certain point along the corridor, the defined area from the Pedestrian Corridor analysis may serve as a potential major entry point into the linear park itself. As such, it may behoove the City to research current conditions, and invest or incentivize streetscape improvements.

Over the course of this analysis, it became clear that this series of suitability analyses does not provide a definitive, final proposal for linear park amenities. Instead, it reinforces the importance of researching and planning where amenities should be placed using GIS or other reliable sources.

Further Research

Given that various sources of data were unavailable for this analysis, further research would be necessary in order to further clarify where specific types of amenities should be located. Specifically the following data would be incredibly useful:
- Average daily numbers of tourists to Downtown Springfield;
- Zoning data from the City, and;
- Case study examples from municipalities using suitability analyses for amenity placement

All of this information could have an effect on the outcome of these analyses. The Springfield Convention Visitors Bureau and City of Springfield are potential partners in the effort to expand the scope of this analysis. Overtures have been made to both agencies in hopes of obtaining this data within the next three to four months as this report is a precursor to a larger Professional Report. Ideally, these analyses will be reimagined or expanded upon in order to incorporate the data listed above and enhance the final recommendations of this report.
IX. Appendix
1. Detailed Methodology

1. Data and shapefile pre-processing
   a. Obtained data [SSCRPC, US TIGER/Line]
      i. Projected all files into NAD 1983 StatePlane Illinois West FIPS 1202 [Feet]
   b. Queried major roads [based on personal knowledge] from Street_Network shapefile and exported as Major_Roads shapefile
   c. Identified Census tracts intersecting Downtown area and exported to a new file
      i. Clean and edit data tables (parcel vacancies, total population, gender by age) and join to selected Census tracts
      ii. Clipped Census_Tracts to all tracts [10] which intersected defined [by City] Downtown area and named Census_Tracts_Downtown
   d. Selected Sangamon County from county shapefile and exported as Sangamon County
   e. Clipped places shapefile from Sangamon County shapefile and exported as Sangamon Municipalities
   f. Selected Springfield from Sangamon Municipalities shapefile and exported as Springfield
   g. Clipped Building_Footprints, Street_Network, and Land_Use_By_Parcel to Census_Tracts_Downtown shapefile [put "_Clipped" for each as new shapefile name]
      i. Selected Union Pacific RR from Rail_Network and exported as "3rd_St Corridor"
   i. Selected known employment centers from Building_Footprints_Clipped, and symbolize as a hollow outline to focus on office buildings
      i. Added "floors," "Approx_Tot_Sqft," "Approx_Workers" fields to Building_Footprint shapefile attribute table
      ii. Based on fieldwork and Google Maps visual analysis, populated "floors" field with the approximate number of floors per building zoned as "office"
      iii. Using Calculate Geometry for the Approx_Tot_Sqft field, multiplied SHAPE_AREA by Floors
      iv. Used Calculate Geometry for the Approx_Workers field, multiplied Approx_Tot_Sqft by .85 [efficiently designed office buildings typically consist of 85% usable space], then divided by 100 [the real estate industry standard for approximate square footage per American office worker]
   j. Created new point shapefile for major auto-traffic intersections along 3rd Street Corridor named "Major_Intersections"

2. Created contextual/descriptive maps
   a. Sangamon County/Illinois map
      i. Added state, counties, and places shapefiles
      ii. Highlighted Sangamon County
      iii. Symbolized point, line, and polygon shapefiles
      iv. Added Sangamon County, Sangamon Municipalities, Major_Roads_Sangamon, Rail_Network
v. Drew box to highlight Downtown Springfield
vi. Symbolized point, line, and polygon shapefiles
c. Downtown area map
   i. Added Springfield and clipped “_Clipped” shapefiles
   ii. Created new point shapefile which highlights amenities in and around Downtown including: accommodations, arts, civic building, hospitals, libraries, recreational places, religious centers, restaurants/bars, retail, schools, tourist attractions, and youth centers; renamed as “Point_of_Interest”
d. Maps for “person” density
   i. Symbolized office worker density based on Approx_Workers field of Building_Footprint shapefile [1 dot per 25 workers], duplicated file and saved as “Worker_Density”
   ii. Symbolized residential density (totpop field) of “Census_Tracts_Downtown” density as 1 dot per 25 residents, duplicated file and saved as Residential_Density

3. Created suitability analysis maps
   a. Public seating, including benches and picnic tables
      i. Added _Clipped shapefiles, Worker_Density, and Residential_Density
      ii. Buffered .25 mile distance from points of Point_of_Interest shapefile
      iii. Intersected 3rd_St_Corridor with Sidewalk_Network
         a. Buffered 250 foot distance
      iv. Buffered .125 mile distance from Worker_Density
      v. Intersected input files and exported as “Suitable Public Seating”
   b. Drinking fountains
      i. Added _Clipped shapefiles, Residential_Density, Recreational Trails, and Points_of_Interest shapefiles
      ii. Buffered .125 mile distance from Worker_Density
      iii. Buffered 1.5 mile distance from Recreational_Trails
      iv. Buffered .25 mile distance from Points_of_Interest
      v. Unioned buffered shapefiles and exported as “Suitable_Areas_DF”
   c. Play structures
      i. Added _Springfield shapefiles, Gender_By_Age, Points_of_Interest
      ii. Selected children-attracting amenities [schools, library, YMCA, museums] from Points_of_Interest and exported as Schools
         a. Buffered .125 mile distance from Schools
      iii. Buffered .1 miles from Major_Intersections
      iv. Unioned buffered shapefiles and exported as “Suitable_Areas_Play”
   d. Wayfinding Markers
      i. Added “_Clipped” shapefiles, Points_of_Interest, Sidewalk_Network, 3rd_St_Corridor_Intersection shapefile and Major_Intersections_Buffer [created in Public Seating and Play Structures suitability analysis maps]
      ii. Selected tourist attractions type of amenity from Point_of_Interests and exported as Tourism
         a. Buffered .25 miles from Tourism
3. Unioned buffered and intersected shapefiles and exported as "Suitable_Areas_WM"

4. Created final maps
   a. Proposed locations of amenities throughout the length of linear park in Downtown area
      i. Added shapefiles for each amenity created during suitability analysis maps, also added "_Clipped" and Point_of_Interest shapefiles
   b. Proposed pedestrian corridor analysis
      i. Intersected amenity suitability results, named "suitable_areas_intersect"
      ii. Buffered .125 mile around "suitable_areas_intersect," named "suitable_areas_intersect_buffer"
      iii. Intersected "suitable_areas_intersect_buffer" with Street_Network_Clipped, renamed "Pedestrian Corridor Analysis"

2. References

Citations


Data Sources

Springfield-Sangamon County Regional Planning Commission [received during summer internship; not available online]: street shapefile, parcel shapefile, zoning/land use shapefile, bicycle network shapefile, parks shapefile [computer files]. [2011] Springfield, IL: SSCRPC.