

A Strategic Urban Process: Developing a Tool for Complex Decision-Making

Summary

Master of Urban Design students at Carnegie Mellon University have examined a large defunct industrial site in Pittsburgh's Hazelwood neighborhood to investigate possibilities for its redevelopment. A consortium of local non-profit foundations wishing to see the site developed in accordance with their core missions owns the land. A plethora of potential users of the site include two universities, a hospital and spin-off companies from Carnegie Mellon's highly successful Robotics Department. Added to the mix is the desire for the development to be environmentally sustainable and to invigorate the surrounding Hazelwood community, a working class neighborhood comprised of ethnically Hungarian and African-American families, who have come upon hard times since the demise of Pittsburgh's steel industry. The situation is further complicated by proposals for two massive transportation options: one, the continuation of a highway that would essentially bisect the site, and the other, a new public rapid transportation system that would connect the site with the main campuses of the institutions considering expansion to the Hazelwood site.

Typically, urban designers would hold meetings with the various stakeholders to arrive at a master plan for the site. In this case, it quickly became clear that the situation at hand was far more complicated, as the stakeholders were numerous and no real programmatic decisions have yet been made. In other words, the possibilities for site utilization remain wide open. Rather than provide a single master plan, the student group has created a system that maps the hundreds of various potential decisions, to understand their causality, and to identify the various spatial implications of each decision. Using the logic of operational systems research, they have affixed surface area values to each possible outcome, allowing decision makers to make more informed choices with regards to site capacity.

Context

Pittsburgh, like many post-industrial cities, has seen better times, but could now be described as on an upswing. In its heyday as the center of the US steel industry, Pittsburgh was a magnet for those seeking better lives, coming from across the country and the world. At one time it boasted more millionaires than any other American city, a fact attested to by the myriad names attached to philanthropic foundations and civic buildings that still dot the landscape.

When the steel industry collapsed, so to did Pittsburgh. At its height in 1950, the population was almost 700,000. By 1990, the population hovered around 350,000, a reduction by half, with the greatest losses among young adults forced to look elsewhere for work opportunities. Five decades of declining population has lead to large-scale abandonment of previously productive property, and the erosion of the tax base necessary to upgrade an infrastructure at least half a century old.

Nevertheless, these economic and demographic challenges presented certain opportunities. Today there are no steel mills in Pittsburgh spewing smoke. The economy has slowly shifted from heavy industry to services, medicine, higher education, tourism, banking, corporate headquarters and high technology. At present, the top two private employers in the city are

the University of Pittsburgh Medical Center and the University of Pittsburgh. The three rivers that have been the city's lifeline are cleaner than they have been in over 130 years.

Following these transformations, present-day Pittsburgh, with clean air, a diversified economy, a low cost of living, and a rich infrastructure for education and culture, has been consistently ranked as one of America's most livable cities, attracting young educated professionals in search of a quality of life. An article in the 14 September 2006 of the *Economist* described the city this way:

Pittsburgh will not experience an explosion of population and investment, like the booming cities of America's south-west. But it is part of a pleasant and affordable region with an improving mix of industries and enviable demographics -- which is as much as many parts of the country can hope for. And besides shaping young minds, Pittsburgh is also doing its best to reshape old land, by cleaning up former mining and industrial sites for uses that suit the modern economy.

The Hazelwood site is among the largest of these efforts to reshape old land. A former industrial site with all the requisite difficulties, including environmental contamination, the 178-acre property was sold to Almono, LP in September 2002. Almono (named by taking the first syllable of each of Pittsburgh's three rivers: Allegheny, Monongahela, and Ohio) is a limited partnership comprised of four regional foundations that have retained a fifth managing partner to develop the site.

The Almono project site in Hazelwood is a 178-acre piece of derelict land near Pittsburgh's southeastern city limits. This former Hazelwood LTV Coke Works site is situated on the northern flatlands of the Monongahela River, 4 miles from downtown Pittsburgh. The site is a long, narrow strip of derelict riverfront land, geographically bound by the Monongahela River to the west and a steep hillside to the east. It extends from the Hot Metal Bridge at the northern tip to Berwick Street / Longworth Street at the southern end. Two active rail lines run through the site, one running along the riverfront and the other running along Second Avenue below the hillside.



Immediately north of the site is the Oakland I-376 exit/entrance ramp, the refurbished Hot Metal Bridge connecting directly to the mixed-use Southside Works neighborhood across the river, and the heavily trafficked Bates Street leading directly into Pittsburgh's second largest business district, Oakland. The Pittsburgh Technology Center (PTC) neighbors the site to the north, and is home to several high-tech industrial and research facilities including two

buildings operated by Carnegie Mellon and the University of Pittsburgh. The downtown business district is four miles away.

Although the southern tip of the LTV site extends into the Hazelwood residential area, it is largely disconnected from the surrounding neighborhoods of Hazelwood, Greenfield and Glen Hazel. The community-scale blocks that once extended from the community across the site all the way to the riverfront have long been demolished. The site is now bordered by active rail lines, steep hillsides, and industrial perimeter fencing. Restored connections from the site to the existing neighborhood may be possible in the future, especially from the Riverside sub-neighborhood running along the southern edge of the site. However, these new access points must contend with existing dead-end street infrastructure and active rail lines.

The site is still zoned for General Industrial use, but rezoning is likely to accompany the redevelopment process. The General Industrial designation allows for basic low-density industrial development and support facilities as well as limited non-competing commercial activity. Adaptive reuse of any remaining industrial buildings is also permitted. Pending approval, this designation would also permit the site to house facilities for communications, transit, waste management, and correctional purposes. Neighborhood residents would like to see the site rezoned to prevent nuisance industries from developing on the site. The negative health effects of air and noise pollution from industries are also key concerns.

Any zoning changes must be approved by the city and will require appropriate levels of environmental remediation to restrict exposure to lingering industrial contamination. The limited remediation already complete does not currently meet the standards set by the Environmental Protection Agency for a full range of office, retail, and residential activity. Housing development standards are the most stringent. However, since contamination was not evenly distributed across the site, certain areas may be permissible for residential use pending future investigation and testing.

Currently, the site remains undeveloped. Most of the above ground infrastructure has been demolished. The remaining infrastructure includes a small warehouse and shed, the shell of former powerhouse, one dirt road, remnants of service lines from CSX (active railroad lines on 2nd Avenue side), a floating wharf, ice breakers, and 3 loading docks. Although the docks are in decent condition, the rest of the infrastructure appears to be in fair to poor condition. Carnegie Mellon has already partially renovated the former locomotive roundhouse in the middle of the site and is currently using the facility to house elements of their Field Robotics Center.

Redevelopment Proposals

Although several redevelopment plans have been put forward since the site was cleared in 1998, no plan to date has been developed to a realistic level. What follows is a summary of the major redevelopment proposals and planning reports completed to date.

In 1998, the Department of City Planning issued "The Riverfront Development Plan", which presented a coordinated citywide land use vision for Pittsburgh's major waterways. The document proposed land use designations and design principles intended to guide riverfront redevelopment in a regionally coordinated and optimized manner conducive to overall city regeneration. The City proposed maintaining industrial designations along riverfront properties near the city's municipal edges, included the former LTV Corp. sites in Hazelwood, South Oakland, and the South Side. Within this designation, the city recommended developing new, non-nuisance industrial parks catering to high-tech research and office activities. The plan also called for publicly accessible riverfront trails and

strategically located shared open space to be integrated into these larger industrial complexes.

In 2000, Hazelwood Initiatives Inc. and City of Pittsburgh jointly commissioned a document titled "Master Development Planning in Hazelwood and Junction Hollow". The international planning firm Saratoga Associates completed the report in 2001 based, in part, on community input from the Hazelwood, Greenfield, and Oakland neighborhoods. The community preferred a mixed-use redevelopment vision tailored to strengthen the existing neighborhoods. The community also hoped to improve the area's connectivity to Oakland, increase community access to the riverfront, and expand opportunities for the live/work lifestyle. Community members and planners alike felt the proposed Mon/Fayette Expressway slated to run through the neighborhood would have a dramatic impact on the viability and typology of redevelopment schemes. Building on these preferences, the Saratoga professionals recommended redeveloping the site to include two new marinas, an office park, and two mixed-use development areas. The report also recommended extending existing neighborhood blocks into the site and along the riverfront, and argued that new development should be used to bolster the extant Second Avenue business district.

The Pennsylvania Turnpike Commission has an on-going plan to develop the Mon/Fayette Expressway through the Hazelwood neighborhood and along the western portion of the former LTV site. The four-lane expressway would consume significant amounts of otherwise developable land and undermine the current neighborhood regeneration effort. In 2002, a coalition of local stakeholders prepared a document entitled "The citizens' plan: An alternative to the Pennsylvania Turnpike Commission's plan to complete the Mon-Fayette toll road". The report was motivated by concerns that the proposed construction methods and routing path would decimate the city's already struggling business district and would irretrievably isolate the neighborhood from its riverfront. The coalition argued that the project's planners had not exhausted the development options and was intended to present a more community-friendly alternative. Although the report is far-reaching in its geographical scope, its authors did make some specific recommendations regarding the former LTV site. They proposed building a new commuter-traffic urban boulevard through the LTV to relieve congestion from the Second Avenue community retail area. Other site issues were not addressed. On the whole, the Mon/Fayette project has been the subject of much political debate and, as of 2007, has been put on hold pending funding acquisition.

In 2003, the new site owner Almono LP retained the Pittsburgh-based Urban Design Associates (UDA) planning firm to develop a mixed-use master plan for their newly acquired site. In a three-phased process, UDA professionals explored redevelopment scenarios with and without Mon/Fayette Expressway. The report concluded that the rail lines, the proposed Tollway, and the existing contamination levels reduced the 178-acre site to only 81 acres of developable land area. The redevelopment vision emphasized extending the existing street grid across the site to accommodate mixed-use development for residential, commercial, and recreational uses. The riverfront vision included trail and bench amenities, some restaurants, a small marina, and some sports facilities.

In 2004, the LTV Coke Works project received an economic development grant from the Pennsylvania Governor's office. The grant, funded by the Redevelopment Assistance Capital Program (RACP), contributes \$6 million for the construction of 700,000 square feet of office building research and development space and 1,000 new residential units. An additional \$5 million was given to the Junction Hollow Research and Development Center Phase II projects to develop an incubation technology center.

In 2005, the Dept. of City Planning commissioned Loysen + Kreuthmeier Architects to complete the "Hazelwood Second Avenue Design Strategy". The Loysen authors were asked to focus their attention on the existing Hazelwood Second Avenue business area. From this

vantage point, Loysen recommend that Almono redevelopment schemes locate future commercial uses along the Second Avenue corridor in order to reinforce rather than compete with the existing business district. The authors also called for new neighborhood connections to the Almono site across the rail lines and from the Riverside sub-neighborhood.

Carnegie Mellon is currently using a portion of the Almono site as an extension of its Oakland-based Field Robotics Center. The Robotics Institute partially renovated the former railroad roundhouse and is currently using the building and grounds to test new robot designs. The Center is also using its autonomous robot technology to replant the site and would like to use robot technologies to help clean soil contamination. The University hopes to develop a brand new robotics research center on the Almono site and hopes to use its robots to aid in the physical construction and landscaping process. Almono's Heinz Endowments has expressed its interest in the project and may provide funds to develop a planning proposal for the project.

The Pittsburgh Technology Center (PTC), which borders the Almono site to the north, is beginning a multi-year expansion initiative. Given the PTC's close proximity and similar industrial zoning, the PTC's shifting land-use patterns and market pressures will influence the Hazelwood site's redevelopment potential. Since the last PTC building was completed in 2002, the demand for research facilities in Oakland has continued to grow. The expansion will add up to one million sq. ft. of new high-tech office space and supporting retail services. The city will finance infrastructure improvements and is recruiting private developers to manage building construction.

Numerous other neighborhood and regional studies have been completed. These studies provide information on the existing housing stock, the Hazelwood community's regeneration efforts, local and regional transportation studies, and various riverfront redevelopment visions.

Stakeholders

The Owners

Almono is a conglomerate of four high-profile regional philanthropic foundations including the Richard King Mellon Foundation, the Heinz Endowments, the McCune Foundation, and the Claude Worthington Benedum Foundation. As a fifth team member, the foundations have retained a site developer, Regional Industrial Development Corporation of Southwestern Pennsylvania (RIDC), to manage the property, make redevelopment decisions, and assume much of the development liability.

As a first step, Almono retained the Pittsburgh-based Urban Design Associates planning firm to develop a mixed-use master plan for the site in 2003. During this process, the foundations outlined their top redevelopment goals as follows:

1. Revitalize Hazelwood by weaving the new development into the existing residential and commercial areas of Hazelwood;
2. Create a Great Urban Pittsburgh Place...a new address celebrating the cultural and industrial history of the site, Hazelwood and Pittsburgh;
3. Be Sustainable, showcasing the best practices of industrial reuse while healing the site and being pedestrian/bike/transit friendly; and
4. Connect the Site to the Region by supporting public transportation into the Mon Valley, connecting to the institutions and resources of Oakland and Pittsburgh, as well as providing public access to the river for recreation and commerce.

Although the foundations are collaborating in the redevelopment process, the different organizations do have distinctive interests and financial strategies. Based on past funding patterns, the R. K. Mellon Foundation is especially committed to economic development and environmental conservation issues. While the Heinz Endowments share these two interests, their economic mission focuses more specifically on innovative development strategies and, in environmental terms, focuses more broadly on economically and socially integrated sustainability initiatives. The McCune Foundation also supports economic development and places particular emphases on related community building programs. The Benedum Foundation also emphasizes economic growth with a focus on local leadership and regional partnership.

The site's foundation ownership could prove to be a tremendous asset in the redevelopment process. Although RIDC and, to a lesser extent, the four foundations are effected by market pressures, their organizational interests and measures of success extend beyond the standard short-term matrices of typical profit-oriented developers. Instead of minimizing turnover time and maximizing profit, Almono can afford to prolong the redevelopment process and pursue the highest and best use for the site as measured by social, environmental, and economic concerns on both the local and regional level.

Given the site's relatively large acreage, slower and incremental building could help the existing community integrate with and adapt to their changing neighborhood context. Large-scale developments can run the risk of forming homogeneous, stand-alone islands with little community connectivity. Accelerated construction timetables prevent opportunities to learn from mistakes or morph to accommodate unexpected consequences. A slower redevelopment period enhances possibilities for the existing community to influence the development's final form and to take advantage of entrepreneurial opportunities created along the way. When exploring such strategies, the foundations could find new ways to achieve their larger social and economic visions in a cost-effective community building process.

The foundations' commitment to environmental protection suggests that more extensive remediation efforts could be completed. Although such efforts require time and money, they would accommodate higher uses on the site and could restore valuable natural assets along the riverfront. Restoration activities may also integrate the foundation's with other educational and economic interests if, for instance, local university researchers were to use the clean-up and construction project as a demonstration project showcasing robotics technologies. Or, remediation and rebuilding efforts could be integrated into workforce training programs that promote community development and leadership. By integrating such initiatives and technologies into actual urban patterns and structures, the new development would literally and figuratively reflect an experimental, cutting edge profile.

Other players and possibilities

All of these factors suggest a positive outcome. As the last great tract of land within the city boundaries, however, the site has become a sort of Holy Grail, in the sense that it is all things to all people. In an effort to do the right thing, the foundations, with the best of intentions but limited experience in developing real estate, are trying to do everything, and, as a result, nothing is moving forward in a linear fashion.

When my students and I were asked to look at the problem, it quickly became clear to us that there were too many players who wanted to be involved. Carnegie Mellon University is eyeing the property for its future expansion, as is the University of Pittsburgh and the University of Pittsburgh Medical Center, the largest employer in the region. Carnegie Mellon's Robotics Department, already squatting on the land, is determined to make the site the premier robotics testing ground in the nation, dubbing their plans "Robo-City." The

surrounding communities, a collection of several ethnicities with various degrees of attachment to the neighborhood, see the site as a source of much-needed job growth and recreation.

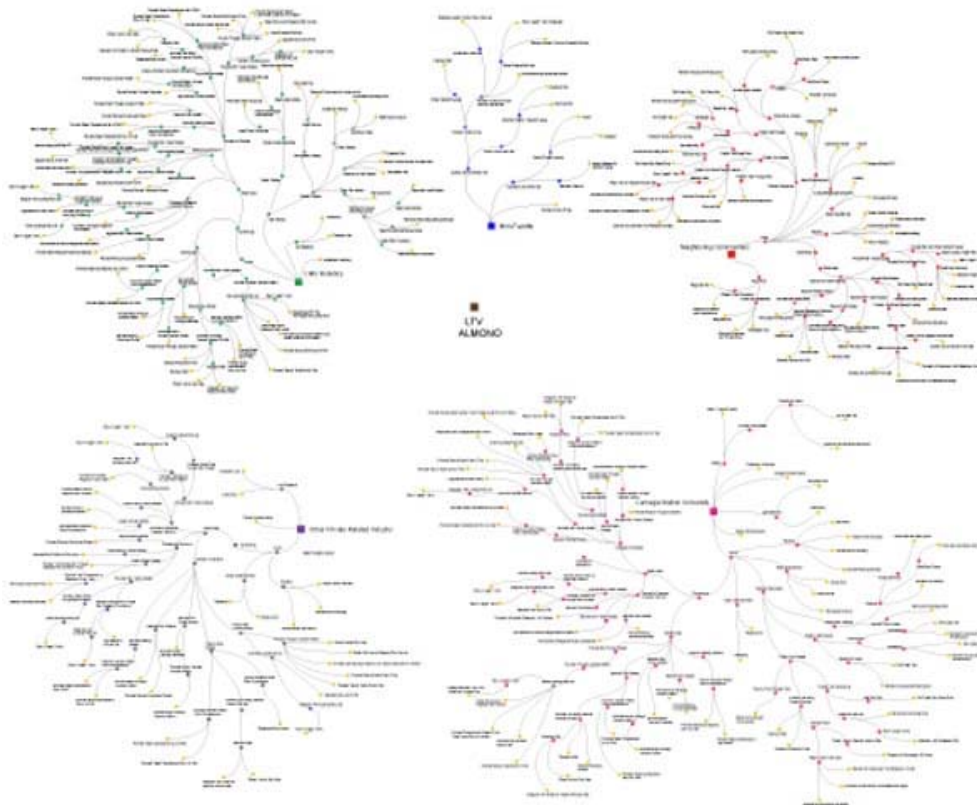
It also became clear that no real decisions had been taken. Despite (or perhaps, because of) the countless studies and proposals commissioned, there was no further progress of the planning and development of the site. In fact, one might argue that there is at this point an overabundance of plans, with little concrete planning. Master plans and urban design proposals by some of the biggest names in the country fell short, not due to a lack of talent, but due to a lack of decision-making.

In order to avoid putting our study on the top of a pile of similarly well-meaning but ultimately futile efforts, we choose to step back. Rather than provide the stakeholders with a single master plan for the site, we choose to design a tool for making decisions, ultimately the necessary precursor to the design effort.

The Tool

Full Decision Field

The students began by identifying all the possible players, including the foundations, the universities, a range of university institutes, and the various communities that border site. We then mapped each possible outcome that a given player might desire, and the various programmatic implications that would produce these desires. These decisions were categorized in the following manner: public policy decisions, user's policy decisions, user activities, general physical infrastructure, and transportation infrastructure. The result, an extensive constellation of possibilities surrounding each user, represented the complexity of the problem in a graphic form.



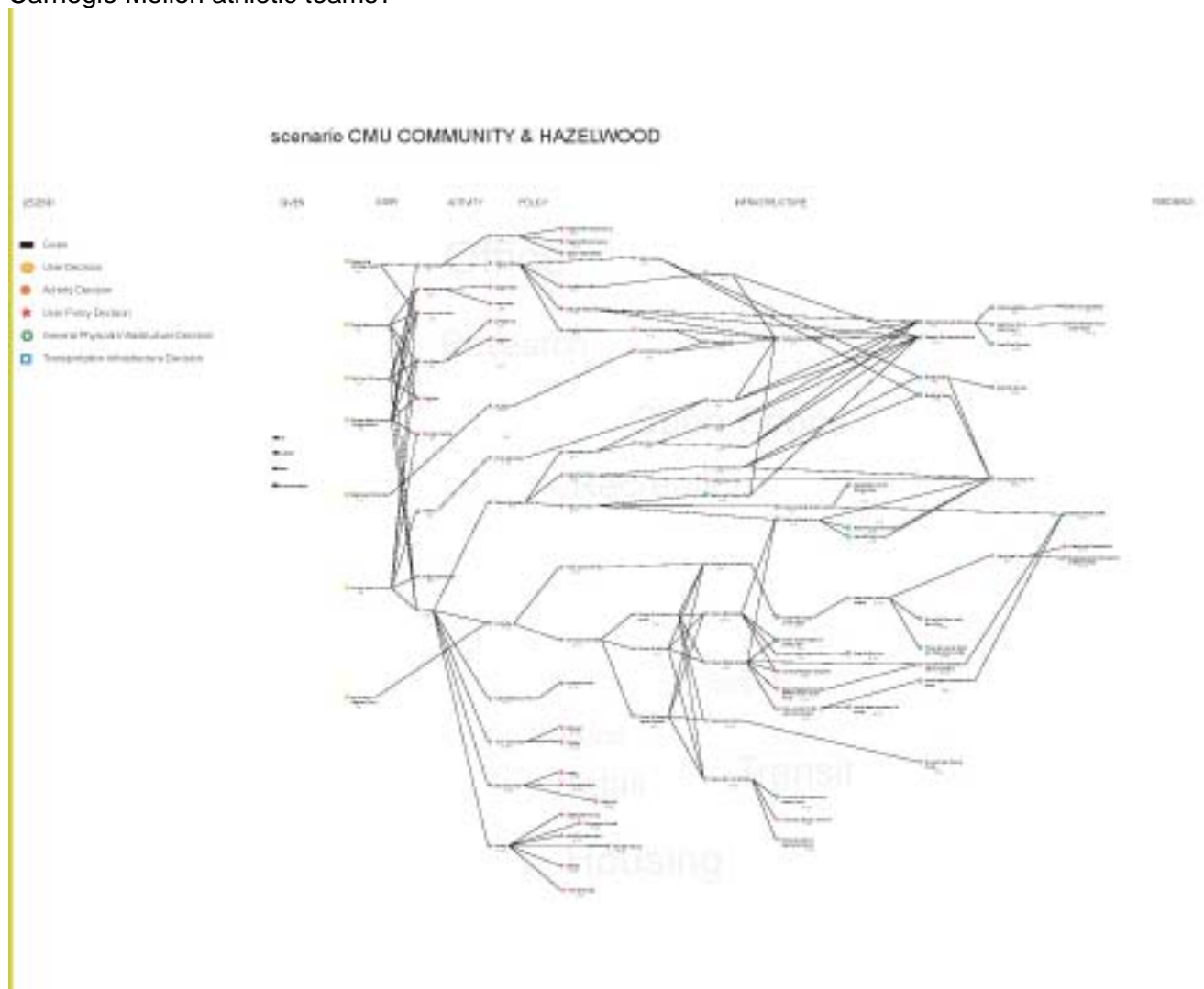
Consolidated Decision Field

While fascinating, this enormous drawing (approximately 4 meters tall by 6 meters long) was obviously too unwieldy. Upon further analysis, we realized that several decisions were repeated at many points in the constellation. For example, a long wall on the site – one of the few remaining vestiges of the site’s industrial past – could only be knocked down once. A refined decision tree mapping was thus created.

In this map, each unique decision is represented by a small box with a ‘tail’ for input on the left and multiple tails for ‘output’ on the right. In most cases the top of the box is the affirmative decision and the bottom is the negative (i.e., include a particular activity on the site, or don’t). In certain cases, multiple outputs are considered. Lines connect each decision to the subsequent choices to be made, once a decision is made. The map is read from left to right, beginning with ‘users’ and ‘given’ items all the way on the left.

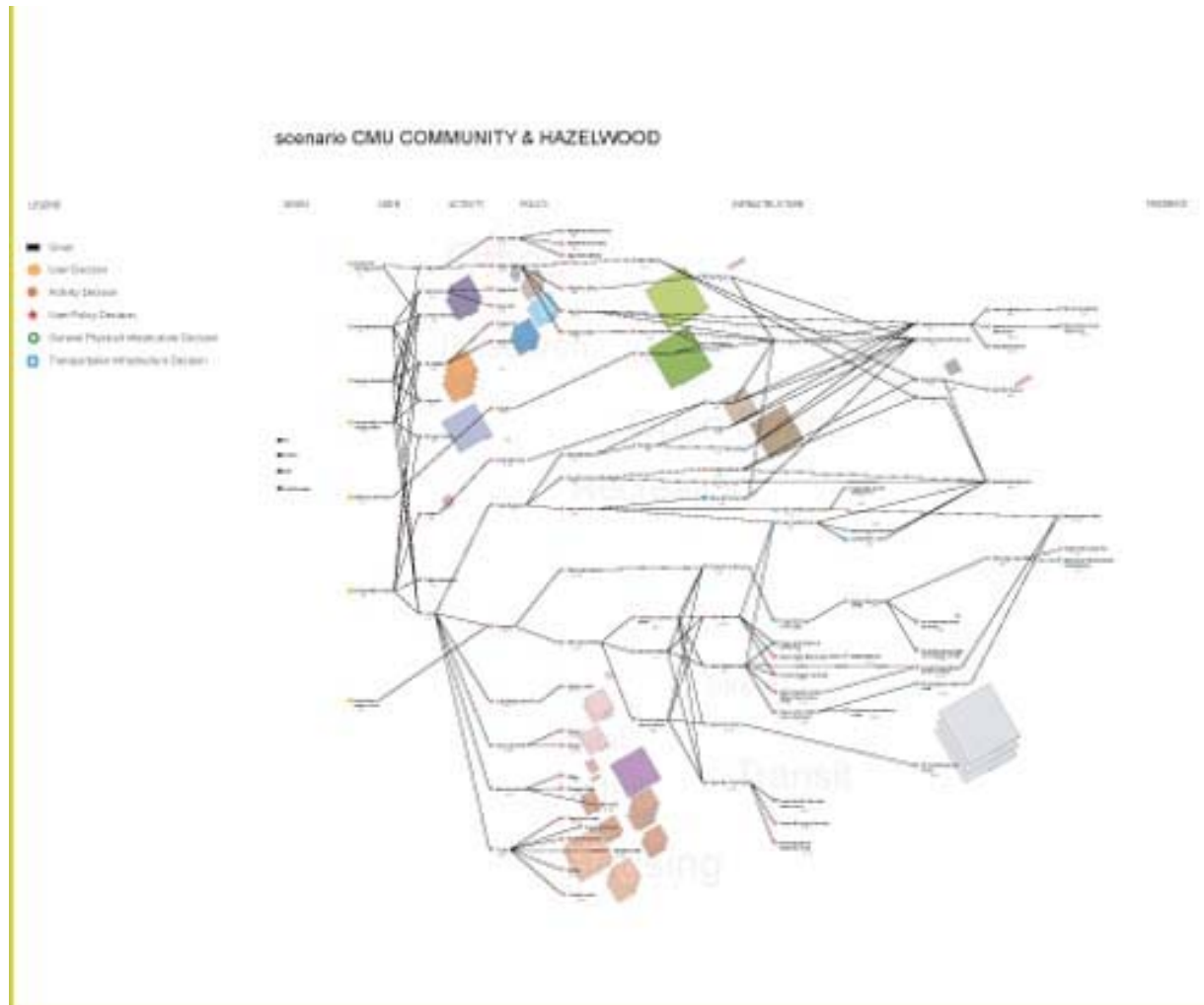
Selected Decision Scenario

From this consolidated decision tree, a series of scenarios can now be identified and tested. For example, if we were to take a scenario in which Carnegie Mellon would occupy the site in partnership with the local Hazelwood community, we can now trace the possible decisions and their resultant programmatic ramifications. For example, would a desire to provide recreational spaces allow for sports fields that could be shared between the community and Carnegie Mellon athletic teams?



Representative Scale Diagram

These programmatic ramifications are now associated with surface area. Each outcome is given a size, allowing the decision-makers to begin to comprehend the scale of their decisions. For example, how much recreational space is needed to activate collegial atmosphere? How much for the community? What is the necessary amount of space dedicated to university dormitories?



Adjacency Diagrams

At some point, decisions about adjacencies will need to be made. In our tool, we have identified elements that must be adjacent, those that cannot be adjacent, as well those that could be adjacent. For example, computer labs must be adjacent to classrooms, could be adjacent to an administration building, but cannot be adjacent to an outdoor testing site.

Kit of Parts

Perhaps the most controversial in our set of tools is the establishment of a template that describes in short hand the language of various architectural, landscape architecture, urban and infrastructural elements of the project. Typologies in each category are chosen and/or modified. These would include housing typologies, open space classifications, and street characteristics – including widths, tree types, setback and height limitations.



Descriptive Vignettes

The resulting axonometric views give users a quick impression of what their development might look like, based on the choices they have made along the way. By leading stakeholders through these phases, they quickly become more aware of the implications of their decisions and are provided with visual tools that provide them with a greater understanding of their decisions at a variety of scales.



Conclusion

This work represents the efforts of two students and their advisor for the course of a semester. We are currently working with a computer programmer to assist us in automating the process, and hope to test it out this year. Already it has been of benefit: the Remaking Cities Institute, a Carnegie Mellon think-tank that is facilitating the investigation into the site's development has incorporated our work into their larger study and brought it before the foundations. Also, our explorations of redevelopment scenarios and analysis decision-making frameworks will serve as the basis for the Fall 2007 semester Urban Laboratory, an urban design studio for all fifth year Architecture students, in which they engage with consultants and stakeholders to explore and develop site-specific redevelopment plans.

It should be clear by now that we see this as a tool with uses beyond the scope of the original problem for which it was designed. Or put another way, notwithstanding the particularities of Pittsburgh and its history, the conditions of the Almono site are not unique. Increasingly on large-scale urban development projects, a plurality of voices demand to be heard. These voices represent legitimate desires of communities, organizations, and businesses, but do not necessarily have the training to visualize the spatial ramifications of their decisions. A set of tools like the ones we have developed might be of great use in the early stages of planning so that policy goals can be articulated with a clear understanding of their physical impact.

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* This paper was written with a great deal of assistance from Luis Rico Gutierrez, Associate Dean of Carnegie Mellon University College of Fine Arts and Director of the Remaking Cities Institute (RCI), and Elise Gatti and Kim Kinder, RCI research assistants who provided much of the information on the context as well as the stakeholders. The work shown during the lecture was produced by Jacob Day and Linda Huang both candidates for a Master in Urban Design at Carnegie Mellon, and my students during the spring term of 2007.