MITIGATING LAND AND PLACE | FIFTH WARD

by

JOSHUA LAMARTINA

A REPORT

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Department of Landscape Architecture / Regional and Community Planning
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Approved by:

Major Professor
William P. Winslow III, FASLA, RLA

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Abstract

MDI Superfund is an abandoned 36 acre metal casting foundry site in the Fifth Ward Houston, TX. The site was recently remediated and cleared of nearly all industrial remnants including more than 16,000 cubic yards of lead contaminated soil. Completion of the remedial action allows the removal of fences that have been separating this tract of land and the community for nearly ten years. Proximity to downtown Houston makes this a desirable location for new development, which has threatened to displace the poor and elderly in recent years.

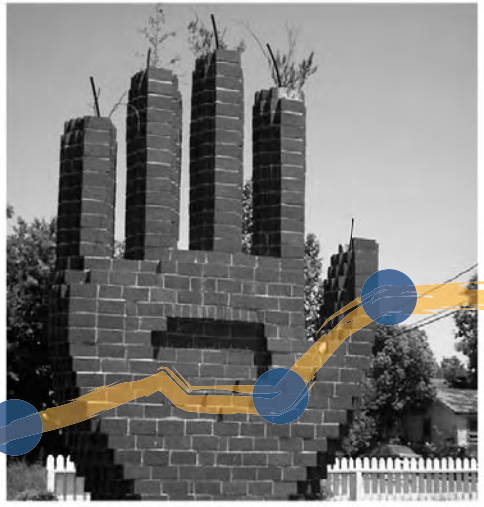
This project explores design alternatives that facilitate affordable housing without isolating it from new development. The integration of affordable housing with community needs is necessary to improve the dynamic in a mixed use, mixed income development.

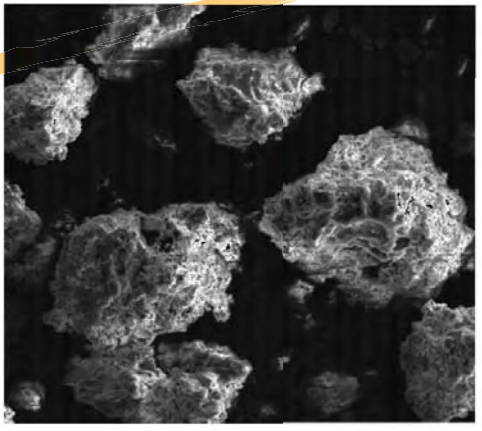
This research is intended to shape redevelopment of MDI Superfund, while providing community needs, minimizing gentrification, and improving quality of life of its inhabitants. The achievement of these goals relies upon the application of specific design principles that minimize conflict and increase success in similar communities.

Mitigating Land and Place | Fifth Ward

MDI Superfund: Houston, Texas

Joshua LaMartina





Abstract

MDI Superfund is an abandoned 36 acre metal casting foundry site in the Fifth Ward Houston, TX. The site was recently remediated and cleared of nearly all industrial remnants including more than 16,000 cubic yards of lead contaminated soil. Completion of the remedial action allows the removal of fences that have been separating this tract of land and the community for nearly ten years. Proximity to downtown Houston makes this a desirable location for new development, which has threatened to displace the poor and elderly in recent years.

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Introduction

Figure 1.1: Displays warning signs tagged onto the barrier that surrounded MDI Superfund during remedial efforts (Deprang)

1

Dilemma

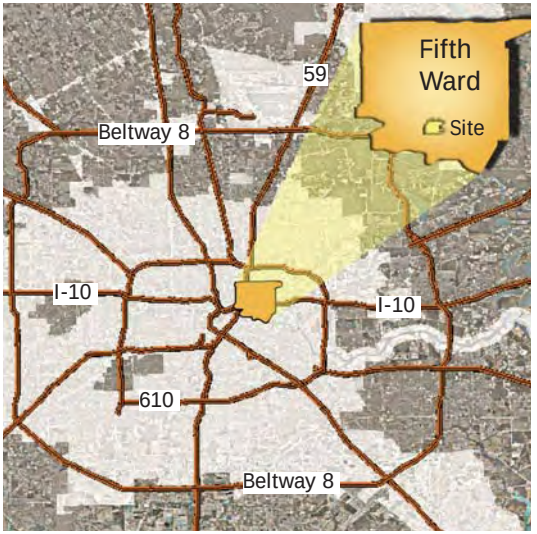
In the past, the Fifth Ward has been known for its crime but in recent history residents and community organizations have been working to remove this stigma. Only two miles from downtown Houston, the area is desirable for high end development which threatens to displace the poor and elderly.

With the recent remediation of MDI Superfund, development is inevitable and must respect the remedial design work to facilitate public health.

Thesis

Redevelopment of the MDI Superfund site can benefit the developer and the community without contributing to gentrification in the fifth ward, while facilitating public health.

MDI Superfund | Figure 1.2 (DPZ)



Houston Metropolitan Area Indicating Site Location
Figure 1.3 (LaMartina)

Introduction

The MDI Superfund site is a 36.4 acre parcel of land located about two miles northeast of downtown Houston, TX. The site lies within the Super Neighborhood of the Greater Fifth Ward (Figure 1.3). Figure 1.4 illustrates the site in plan as compared to other places including the Houston Astrodome and Clason Point Projects, which is outlined in chapter four. Formerly, a lead smelter site that had since shut down, this parcel is now a recently remediated brownfield site. The remedial efforts were funded and carried out by the developer with oversight of the Environmental Protection Agency (EPA).

Anticipated development is likely to be mostly residential with a commercial component. Proximity of the site to the

downtown makes this area desirable for high end development which could contribute to gentrification of the Fifth Ward. It is my intent to conduct research and analyze case studies that will shape design decisions. Research and design are shaped by two main goals of redevelopment that deal with two separate redevelopment issues. These goals include the mitigation of place and the mitigation of land.

Mitigation of place addresses the social issues that influence community redevelopment. In the past the Fifth Ward has been known for its high crime rate but in recent history residents and community organizations have been working to remove this stigma. In fact, the remediation of MDI Superfund has sparked a lot of interest in the community about environmental issues, public health, and city planning. Groups and organizations including; Mothers for Clean Air, The Sierra Club, the United Way, Bruce Elementary school and the Museum of Cultural Arts Houston (MOCAH) have been involved with programs in the community

Redevelopment trends in the area suggest that gentrification of the community is a cause for concern. The site's proximity to downtown Houston may attract high end development which threatens to displace the poor and elderly.

Mitigation of land addresses constraints on development caused by contamination and the environmental cleanup process. Since the site is a recently remediated brownfield, the physical parameters of the remedial design are major factors in redevelopment. Consideration of the remedial design is necessary to avoid liability and to facilitate public health. Products of an industrial site, like MDI Superfund, include physical constraints and unique programmatic opportunities.

MDI site | Houston, TX

Astrodome | Houston, TX

Clason Point Projects | South Bronx, NY

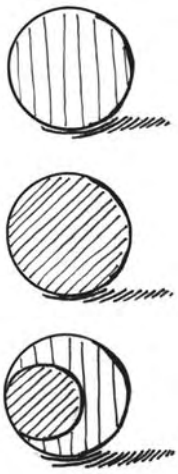
Scale comparison | Figure 1.4
(LaMartina adaptation)

The synthesis of mitigating place and mitigating land combine research and design criteria that will shape the redevelopment proposal. This addresses a variety of issues and opportunities without contradiction of the two goals. Figure 1.5 explains this process of synthesis regarding design goals for the project. In my approach to address the mitigation of land and the mitigation of place I have been focusing on three specific categories that make up my design philosophy. The over arching categories are; community, environment, and quality of living, all of which are encompassed by public health which is a primary concern (Figure 1.6). Below is a list of my personal design objectives that shaped the initial research that was undertaken. The process that I took in research and design is outlined in Appendix A.1.

Personal Objectives

- Learn about site remediation practices
- Learn about the process of Legal Landscape (see glossary)
- Accompany the remedial design work and build on it to improve public health
- Apply Phytoremediation practices if applicable
- Apply Defensible Space principles
- Design a site that illustrates the unique history
- Educate residents and visitors about the clean up of a contaminated site
- Design a more walkable community with mixed use development
- Improve quality of living and identity through development of sensitive site details
- Shape a community with people of mixed income
- Create a new green space to benefit the community

Design Goals | Figure 1.5
(LaMartina)

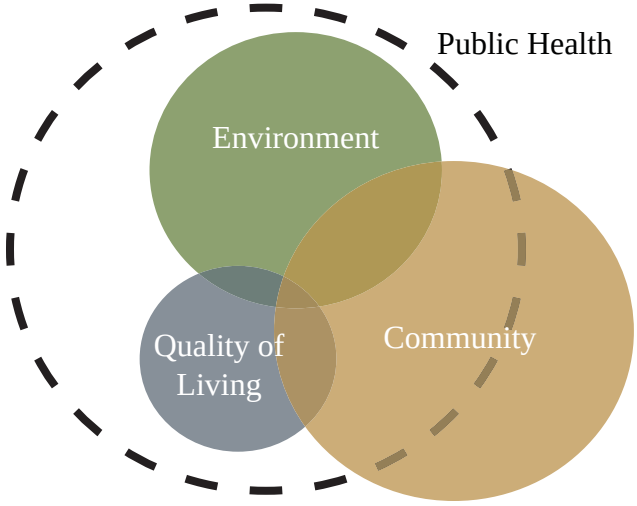


Mitigation of Place: Address mitigation of place and determine appropriate design criteria

Mitigation of Land: Address mitigation of land and determine appropriate design criteria

Synthesis: Apply mitigation of land criteria to meet mitigation of place criteria for design solution

Design Philosophy Figure 1.6
(LaMartina)



Social Background

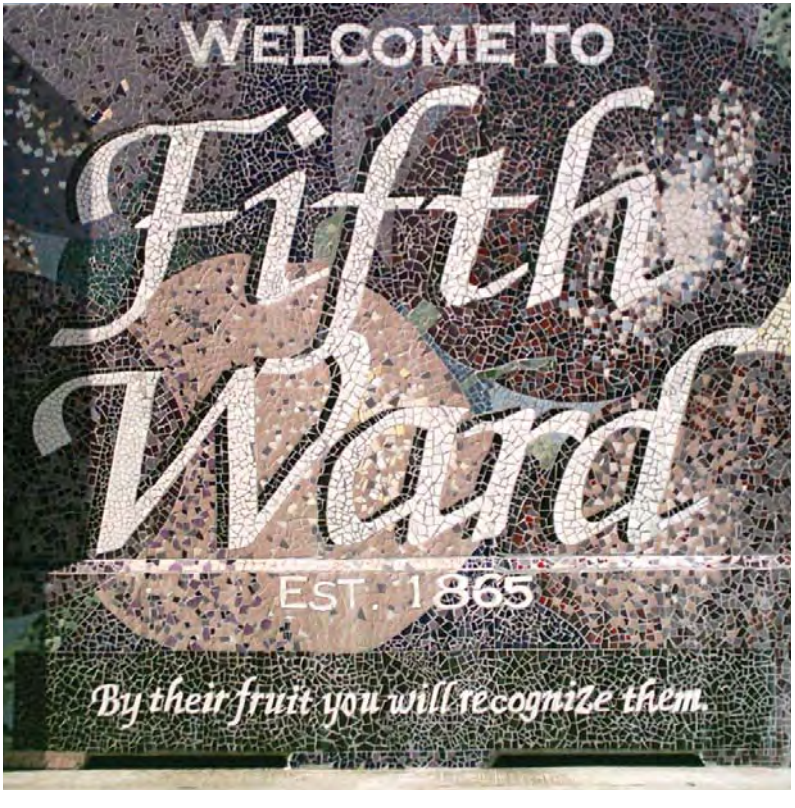


Figure 2.1: Depicts a colorful mural in the Fifth Ward that acknowledges famous and successful individuals who grew up in this community. (Houston Fire Station 19)

2

The Greater Fifth Ward is one of eighty eight Super Neighborhoods in Houston. The Fifth Ward is comprised of five square miles (3,192 sq ft) of property (www.houstontx.gov 2000). This region includes eleven public schools and one private school. The total population of the Fifth Ward consists of 22,211 citizens that reside in 7,591 households. Residents in the Fifth Ward are predominantly Black with 13,886 residents and Hispanic with 7,848 residents (Census 2000).

The Fifth Ward is a musically rich and culturally diverse community with a strong history. Figure 2.2 illustrates a public mural, recognizing notable figures that once a part of that history. Few lived in the Fifth Ward until after the civil war when it was settled by a number of freedmen (Figure 2.3). In 1866 this community became known as the Fifth Ward after an alderman was elected for Houston's City Council. The Fifth Ward was roughly half black and half white until the 1880s when the community became predominantly black. A major economic boost in the community resulted because of associated construction for the Southern Pacific Railroad. Economic growth was inhibited by the fire at Phoenix Lumber Mill in 1891 and a more significant fire in 1912. This fire destroyed 119 houses, 116 boxcars, nine oil tanks, thirteen industrial plants, and St. Patrick's church and school. In 1922, 500 French and Spanish blacks from Louisiana moved to the Fifth Ward, establishing the 'Frenchtown', a four square block neighborhood (fifthwardhouston.org, 2008).

The Kelley Court housing project and Finnegan Park opened after World War II. This was the second housing project and second community park for African Americans in Houston to date. In the 1960s integration laws were passed giving Blacks more opportunities, and subsequently increasing vacancy rates in the Fifth Ward. The Fifth Ward fell into a state of decline with unkept buildings and rundown properties. This contributed to a rise in crime and social conflict which gave the Fifth Ward it's reputation as "Texas' toughest, proudest, baddest ghetto" according to *Texas Monthly* (Kleiner 2008).

After the Fifth Ward Community Redevelopment Corporation was organized in 1989 residential and commercial growth began to increase once again (fifthwardhouston.org, 2008). This organization has been working to revitalize the Fifth Ward with new home construction, increased job training, and better access to technology and the arts (Kleiner 2008). Since then, other organizations and citizens have been focusing to revitalize, redevelop, and strengthen this historic and diverse neighborhood. Some other positive influences on the community have been The United Way, The Sierra Club, local government, and the local art community. Anna Babin, president of United Way of Greater Houston said "The Fifth Ward area of Houston is a wonderful example of what happens when people come together within a community to create a better life for themselves and their neighbors. Together we are doing something about it!" (unitedwayhouston.org 2008).

Fifth Ward Mural | Figure 2.2
(United Way Houston)

Timeline of Growth in the Fifth Ward | Figure 2.3 (LaMartina adaptation)

1865 — Settled by many freedmen after the Civil War.

1866 — Becomes the Fifth Ward.

1876 — Community is roughly 50% black and 50% white with two segregated schools.

1880s — Southern Pacific Railroad boosts Fifth Ward economy. Population is now predominantly black.

1912 — Fire that burned residential homes, industrial facilities, and St.. Patrick's church and school.

1922 — 'Frenchtown' is established.

1925 — There are approximately forty black owned businesses within the Fifth Ward.

1927 — Phillis Wheatley High School becomes one of the largest in the US with 2,600 students and sixty teachers

1940s — Kelley Court housing project and Finnegan Park open in the ward.

1960s — Integration laws pass during the civil rights movement and many residents move elsewhere. The Fifth Ward falls into decline.

1989 — The Fifth Ward Community Redevelopment Corporation was organized.

2000 — Fifth Ward Population reaches 22,211.

Notable Residents in time: Congress members; Barbara Johnson and Mickey Leland, Musicians; Arnett Cobb, Milton Larkin, and Illinois Jacquet, The Geto Boys, Joe Sample and the Crusaders, and George Foreman.

Remedial Action Summary

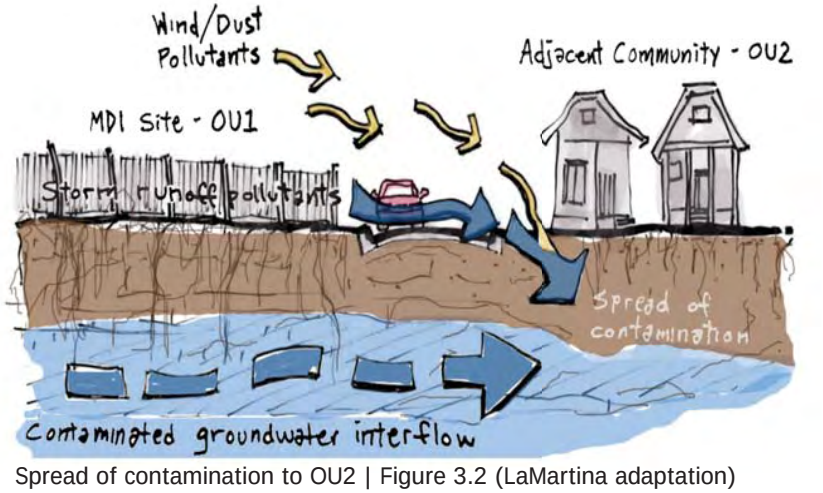
Figure 3.1: Installation of a permanent monitoring well on site using a hollow stem auger rig (Vega)

3

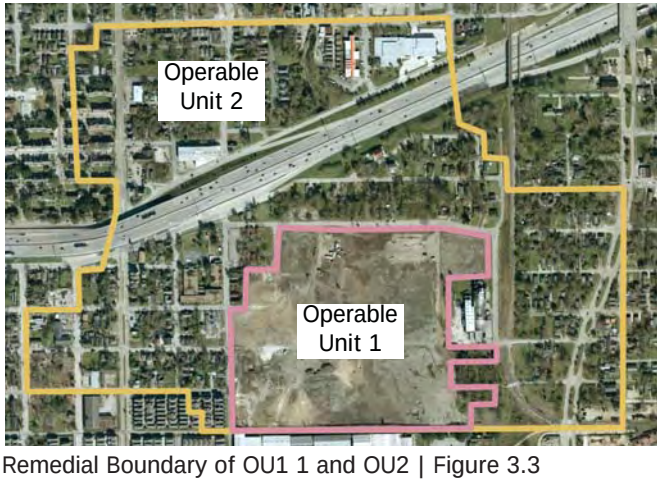
MDI Superfund is the product of more than sixty five years of industrial activities that led to its contamination. This timeline of events is illustrated in Figure 3.4. In 1926 Texas Electric Steel Casting Company (TESCO) began operations on-site as a metal casting facility. TESCO molded large wheels, tracks, and mining equipment. In the 1970s a second independently operating foundry was built on the eastern portion of the site. In the mid 1980s, TESCO rented out a parcel of land to Can-Am Resource Group. Can-Am carried out recycling operations of spent catalyst using an experimental process. Several years later Can-Am shut down, abandoning drums of spent catalyst. These abandoned drums and petrochemical catalyst sat for over ten years until the EPA conducted a removal action plan. Over 5,300 drums were removed at this time. In 1990, Many Diversified Interests (MDI) bought TESCO and began operations of San Jacinto refinery shortly after. Just two years later MDI went bankrupt which caused all refinery operations to cease. Most on-site facilities were then demolished as a salvage operation by the order of US bankruptcy court (ENTACT 2007).

Years of operation caused the contamination of lead to spread beyond the industrial site to the soil and groundwater in adjacent Fifth Ward neighborhoods (Figure 3.2). These affected neighborhoods are in Operable Unit 2 (OU2) and the MDI site is Operable Unit 1 (OU1). The boundaries of OU1 and OU2 are both illustrated in Figure 3.3. Considering public health, the remediation of OU2 was carried out before the remediation of OU1. This consisted of removing the top six inches of soil in residential areas and schools within OU2 (EPA 6 2008).

The remedial design for OU1 began in summer of 2004 and was completed in summer of 2008. This design included the excavation and removal of debris, excavation, treatment and removal of soil, monitoring, and institutional controls. Approximately 31,621 cubic yards of debris were removed from the site including; nonhazardous debris, foundry sand, slag, materials with asbestos (including a remaining building), and an underground storage tank. An estimated 21,00 cubic yards of soil contaminated with benzo(a)pyrene and other organics, light nonaqueous phase liquids, and total petroleum hydrocarbons was excavated and removed. Another 13,600



Spread of contamination to OU2 | Figure 3.2 (LaMartina adaptation)



Remedial Boundary of OU1 1 and OU2 | Figure 3.3 (LaMartina adaptation)



1926 — TESCObegan operations as a metal casting facility.

1970s — The second foundry was built.

1980s — A parcel on site was leased to Can-Am Resource Group in the mid 1980's. Can-Am carried out recycling operations but in 1988 Can-Am shut down.

1990 — MDI bought TESCO and opened San Jacinto refinery.


1992 — MDI filed bankruptcy and San Jacinto refinery operations ceased.

1995 — On site facilities were demolished .



1999 — A drum removal action plan was conducted.

2003 — EPA began to access the contamination of OU1, gathering information to choose an appropriate remedy. EPA began the final removal action for OU2.


2006 — Developer Frank Liu acquires the site. This is the first time that a private owner has ever funded the remediation of a Superfund site in the United States.

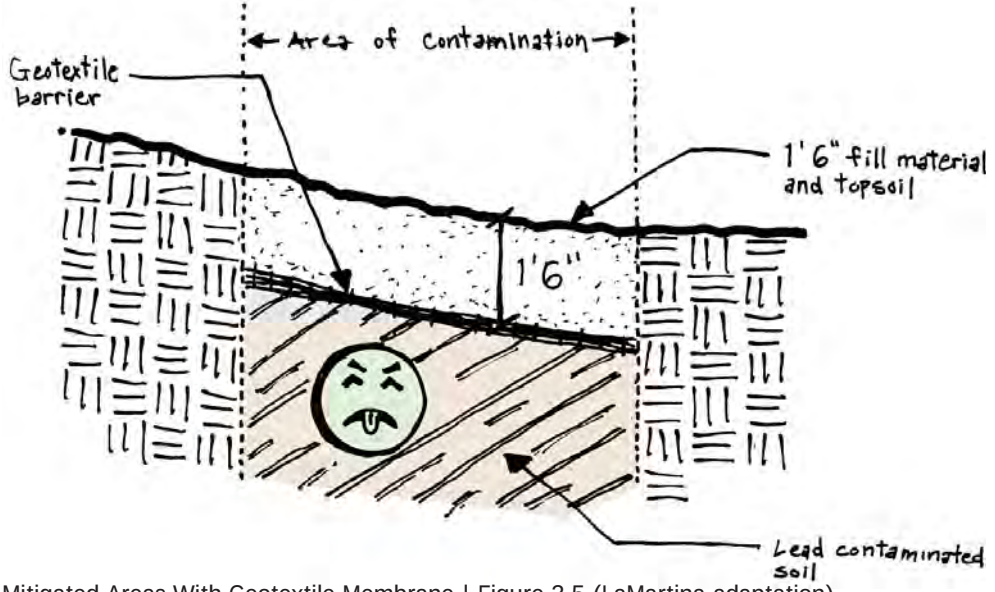
2008 — Remedial efforts are completed

cubic yards of lead contaminated soil was excavated and treated that did not meet the regulatory levels of the EPA. All soil with a lead content that was greater than 500 miligrams per kilogram was removed and stockpiled or treated. Soils were mitigated to a maximum depth of 1.5 feet which included 3,000 cubic yards of soil stockpiled from OU2. Remaining soil that still had a lead content, greater than 500 milligrams per kiliogram, was transported to an off site waste disposal facility (ENTACT 2007).

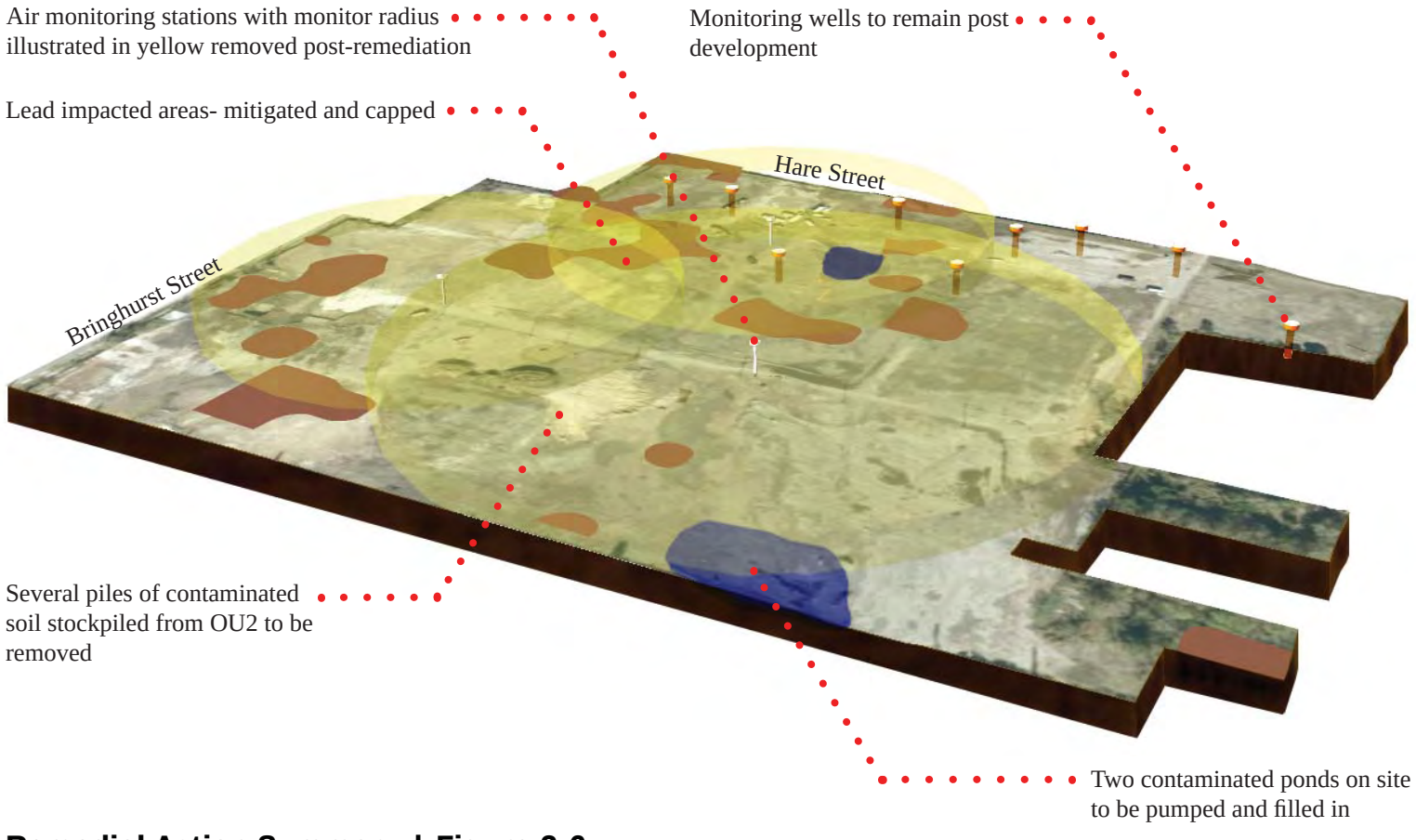
Monitored natural attenuation was initialized to improve and monitor ground water quality. This included the removal of source pollution points and long term monitoring of the groundwater plume. Monitoring wells on site must be maintained post development for up to thirty years to manage and monitor groundwater contamination. Air monitoring stations were used during the remedial process to avoid the migration of lead particles. However, there is no need to monitor the air on site now that remediation is complete (ENTACT 2007).

After all source removals of contamination were complete the site was re-graded to reflect the Remedial Action Interim Grading Plan. This plan promotes controlled surface water flow that minimizes further contamination through water erosion. Final grading also called for two ponds on site to be pumped of contaminated water and filled in with clean fill material. The Interim Grading plan is a major factor that shapes final design grading on site. Final grading will not compromise the 1.5 foot cover requirements of any lead impacted areas noted on the Site Inventory diagram (Figure 6.17). These lead impacted areas are portions of the site where soil depths greater than 1.5 feet do not meet regulatory levels of contamination. Within these lead impacted areas there is a geotextile membrane that prevents the transport of lead contaminated soils into soils that meet public health standards (Figure 3.5). This geotextile barrier is located 1.5 feet below the surface of the finished interim grading plan (ENTACT 2007).

A synthesis of the major elements on site that influenced the remedial action are illustrated in Figure 3.6. Monitoring stations on site were used to monitor the spread of contaminants through groundwater and the air. Air monitoring stations no longer remain on-site but, monitoring wells remain post-remediation. These ten monitoring wells must be taken into consideration to fit into the proposed redevelopment so they are accessible.



Mitigated Areas With Geotextile Membrane | Figure 3.5 (LaMartina adaptation)



Remedial Action Summary | Figure 3.6
(LaMartina adaptation)

Key

- Mitigated areas with geotextile membrane
- Air monitoring area
- Contaminated pond
- Monitoring well

Mitigating Place

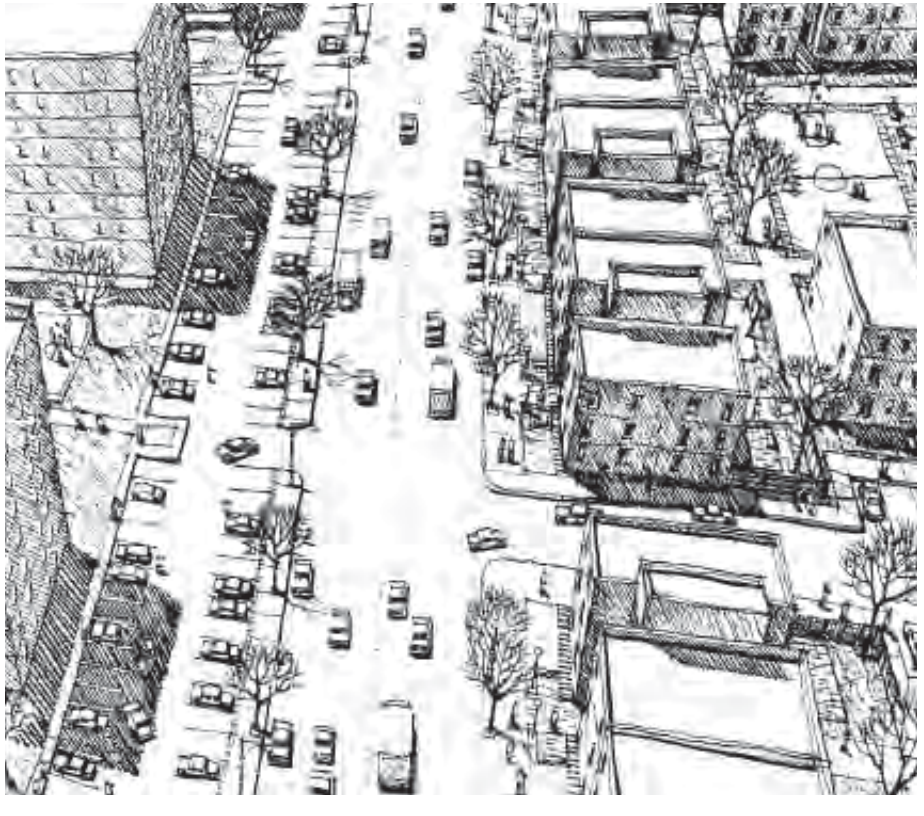


Figure 4.1: An Oscar Newman sketch that depicts alternative ways to develop a four block development. The project on the right side of the street creates a better pedestrian atmosphere with low-rise buildings facing the public street. (Newman)

4

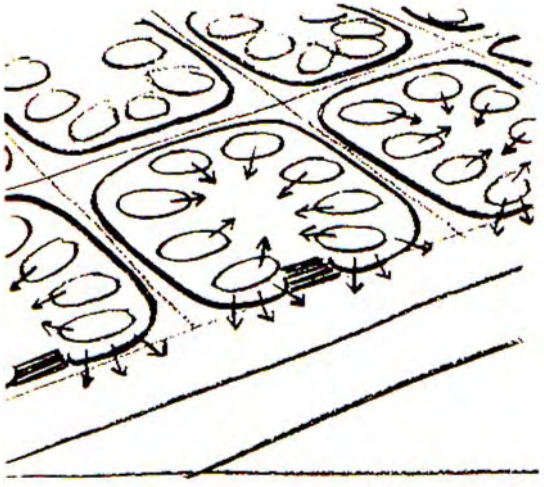
Mitigation of place addresses the social issues that influence redevelopment of a community. This chapter reviews some of the principles and criteria that were considered in an effort to achieve mitigation of place. The redevelopment strategy for MDI Superfund is shaped by an understanding of Defensible Space, affordable housing, and mixed income. An understanding of this subject matter is important for the redevelopment of MDI Superfund because of the low income demographic that surrounds it.

Defensible Space

Oscar Newman (1935-2004) was an architect and city planner who is internationally renowned for his research, writings, and architectural work in the fields of community planning, assisted housing, crime prevention, and racial integration (www.defensiblespace.com 2009). Through Newman's research and experience, he established the principles of Defensible Space, using them in practice and promoting them in literary works. The relevancy of his research led HUD toward the adoption of Defensible Space principles for all its new projects. Newman said, "Defensible Space is a model for residential environments which inhibits crime by creating the physical expression of a social fabric that defends itself" (Newman 1973). The most noteworthy benefits of Defensible Space are minimized crime and an improved quality of living.

Reducing the occurrence and intensity of crime can be achieved by thinking of physical design in terms of the criminal. Newman believed that most criminals behave with some rationality, committing crime in areas that are more likely to offer high rewards, and with less likelihood of being caught (Cisneros 1995). Therefore, crime is less likely to occur if spaces are designed to convey feelings that are undesirable for criminals. Feelings evoked from outsiders should be that they are intruding on someone else's space, that they are likely to be observed, and that a quick escape would be difficult. Physical design can deter crime by creating housing clusters with individual territorial definition. Figure 4.2 represents the conceptual form of territorial definition and how it can be reinforced with surveillance opportunities (arrows). The reduction of crime will eventually lead toward an improved quality of living for residents.

Quality of living is affected by physical design and quality of materials. The physical design of outdoor spaces should be clearly defined for the use of specific units sharing those spaces. Communities with spaces, defined in this way, have a more extensive spatial hierarchy and a smaller, subdivided 'public' domain. Subdivision of spaces in this sense can be more proactive,



Territorial Definition | Figure 4.2 (Newman)

especially in lower income communities. Sidewalks and walkways should be designed to account for a varying degree of pedestrian traffic and visibility. Whether it is site furniture or building facades, the quality of these materials must be considered. The use of 'nicer looking' site furnishings that do not look like typical projects fixtures improve community perceptions, feelings of proprietorship, and minimize vandalism (Newman 1996).

Affordable Housing

Most physical design considerations for affordable housing are comparable to any residential development. However, if overlooked the outcome can be more drastic, leading toward increases in crime, vacancy, and social conflict. The most noteworthy considerations that affect the success of affordable housing are landscape details, parking, open spaces, and building dynamic.

Pedestrian paths and walkways are crucial to the function of a residential development. These paths should be shaped by all possible uses including service, children play, bicycles, and convenient circulation. Walkways must follow the most convenient routes to facilitate needs of the residents and the average pedestrian. Many times in the design and construction of public housing developments, the landscape becomes a secondary consideration because of budget or misguided priorities. Various elements of landscape details should be taken more seriously in projects that deal with affordable housing because these elements are pivotal toward success of a development (HUD 2008). It is important to consider a diverse variety of plantings around residences and public spaces. Hardy, native species with minimal maintenance are most suitable to ensure longevity of plant material. These plantings should differentiate from one another depending on their function. Raised planting areas will deter interference of the public. Edges between planting areas and hardscapes provide an opportunity for public seating spaces which will promote interaction between residents which in turn facilitates passive surveillance. Trees and shrubs can also soften the impact of roads and parking areas.

Parking areas often become over-dominant in public housing developments. Modest parking lot areas behind buildings and street spaces avoid a landscape dominant of garages, driveways, and pavement (HUD 2008). Strategic location of parking areas is essential to avoid fragmentation of open spaces and eyesores.

Designation between public and private open spaces should be apparent to residents, providing a mix of both for circulation and recreation. Every unit should have access to some sort of private open space. These private spaces can be shared between a cluster of households which helps to create a more diverse community. Balconies and porches are valuable, extending people's living spaces into the landscape (Newman 1973). Play areas are "critical to the successful functioning of any family housing project" (HUD 2008). It is especially important for designers to understand how these play areas will be used by different age groups ranging from toddlers to teenagers. Play areas will be more effective and safe if they are sited to make parental vigilance more convenient.

Building dynamic refers to the placement and appearance of dwelling units. The placement of buildings should be undertaken consistently with the appropriate setbacks. If possible, avoid building setbacks that differ greatly from adjacent properties. Affordable housing developments will often contain structures with barren facades that lack variety. The development will be more successful if proposed buildings exhibit greater visual complexity. Individual units should differ from one another to enhance proprietorship however, details and overall forms should mimic the vernacular of the area. If this is achieved then it will not be apparent as to whether an individual unit is low income or middle income. Design for affordable housing and Defensible Space principles are exemplified in the following case studies including: Clason Point Projects, Five Oaks, and Townhomes on Capitol Hill.

Clason Point Projects
(Newman 1996)

Location
Soundview, South Bronx, New York City

Client
New York Housing Authority

Designer
Architect, Oscar Newman

Project Type
400 unit public housing project that consists of 46 buildings, mostly row houses

Density
25 units per acre- dense for row house standards

Problem
- In a high crime area.
- Intergenerational and interracial conflict.
- Presence of gangs and drug dealers
- Site characterizes the public housing stigma.
- Residents feel unsafe.
- 30 percent vacancy rate in 1969.

Goals
- Increase proprietary feelings of the residents.
- Limit pedestrian routes and intensify remaining walks. The location of these improvements is displayed in Figure 4.5.
- Improve image of buildings and give distinction from one to another.
- Reduce intergenerational conflict.

Design
Redefinition of grounds (Figure 4.3 and 4.4)
- Six ft fencing and low concrete curbing was used to subdivide public grounds into semi-private and semi-public areas.
- Planter seating and lighting was used in main walk areas to increase usage and visibility.
- Small play nodes and seating areas were used as opposed to large open spaces.
- Quality fixtures were installed instead of vandal-resistant products.

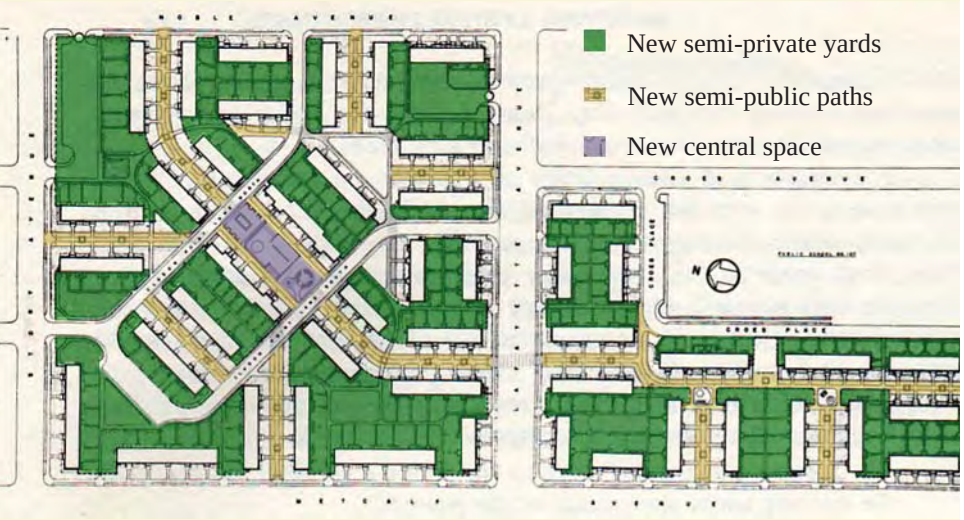
Resurfacing buildings
- Concrete walls were covered with stucco and finished to look like other brick row houses in the community.
- Tenants were allowed to pick their own color of brick from samples.

The central space (Figure 4.8)
- This space was subdivided into three areas of different character for different age groups.
- Front and rear yards were better defined to improve a feeling of ownership.

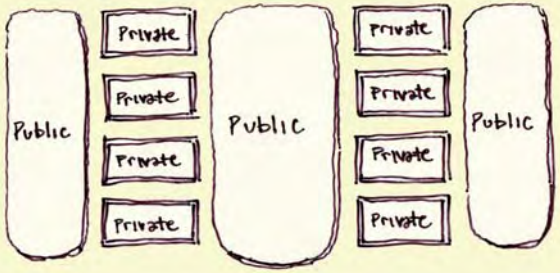
Lessons Learned
- Subdivided public spaces (Figure 4.6 & 4.7) gave residents a better sense of ownership and pride, causing them to invest in shrubs and garden furniture.
- Tenants took better care of their “spaces” allowing the maintenance crew to eventually cut back.
- Crime rates dropped.
- The property went from 30 percent vacant to having full occupancy with a wait list.
- The more small play spaces and gathering spaces the better to minimize intergenerational and interracial conflict.
- Crime rates dropped.
- Smaller semi private spaces were more effective than larger ones.

Pre-development: public space goes up to the entries of dwelling units (Figure 4.3) (Newman)

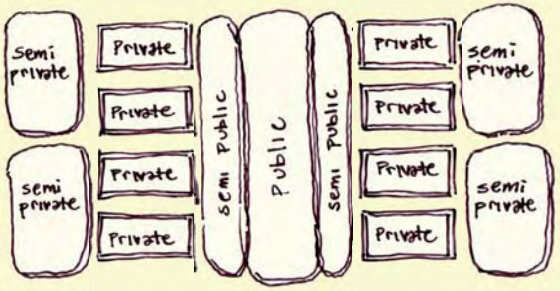
Post development: layering of semi-public and public spaces (Figure 4.4) (Newman)



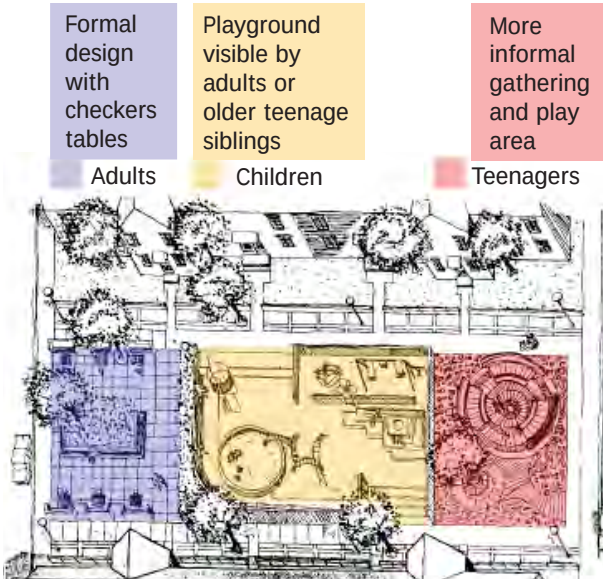
Redevelopment Plan | Figure 4.5 (LaMartina adaptation)



Spatial relationships before | Figure 4.6 (LaMartina adaptation)



Spatial relationships after | Figure 4.7 (LaMartina adaptation)



The Central Space | Figure 4.8
(LaMartina adaptation)

Principles to be applied toward MDI Superfund redevelopment

- Subdivide spaces into public, private, semi-public and semi-private.
- Allocate small meeting areas and play nodes in proximity to all living areas.
- Differentiate living units with building materials.
- Limit pedestrian routes and increase visibility of pedestrian corridors
- Define front and rear yards to improve resident's pride
- Provide a variety of open spaces for diverse social classes, including age and income.
- Provide aesthetic site details that give resident's a sense of pride.

Five Oaks
(Newman 1996)

Location
Dayton, Ohio

Client
City of Dayton

Designer
Architect, Oscar Newman

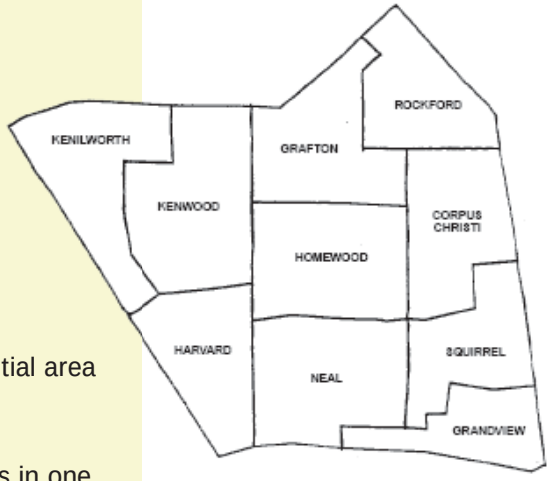
Project Type
One-half square mile residential area 'Defensible Space' retrofit

Density
Approximately 5000 residents in one and two family homes/ apartments

Problem
- Crime in this area was increasing
- Change in trends, less homeowners than renters
- Traffic problems

Goals
- Limit access and egress
- Diminish exit routes for criminals
- Divide into several mini-neighborhoods as defined by residents (Figure 4.9).
- Facilitate access but discourage through traffic

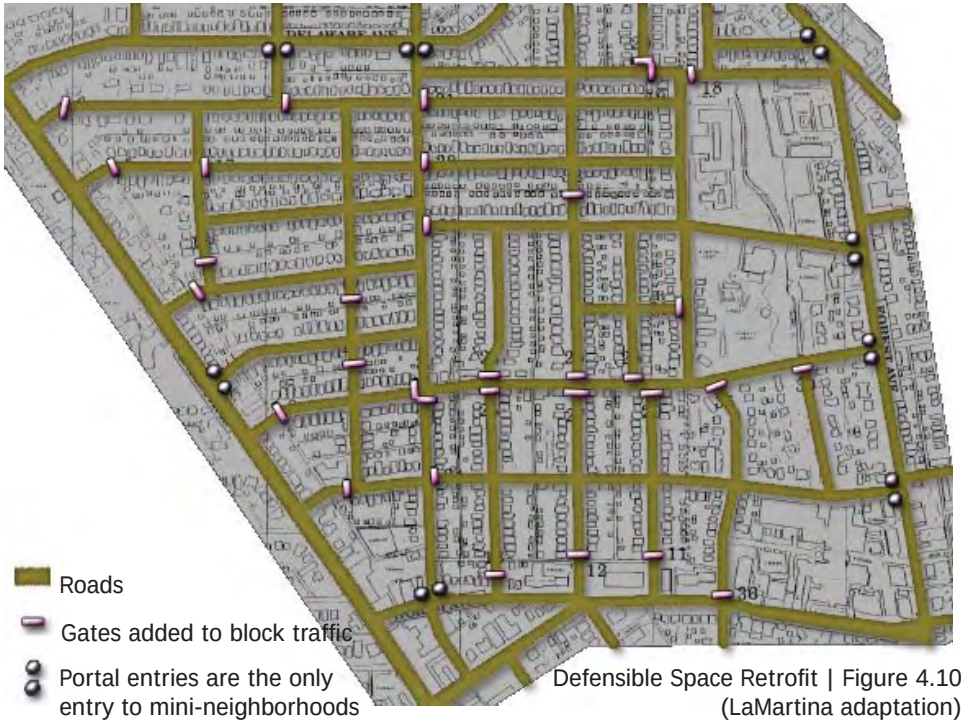
Lessons Learned
- Limited vehicular access reduced crime.
- Portal entries improve the pedestrian experience and increase residential proprietorship (Figure 4.10).
- Mini-neighborhoods increase resident's pride and reduce crime by promoting watchfulness.



10 Mini neighborhoods | Figure 4.9 (LaMartina adaptation)

Principles to be applied toward MDI Superfund redevelopment

- Limit egress and through traffic.
- Organize the development into mini neighborhoods with differing identities
- Use site details like portals to improve the pedestrian experience



Defensible Space Retrofit | Figure 4.10 (LaMartina adaptation)

Mixed Income

Neighborhoods containing a mixture of income groups creates new advantages and opportunities for the otherwise low-income residents. Mixed income housing is the mixing of income groups as a fundamental part of operation, because of community need, community desire, and adjacent housing market conditions (Brophy 1997). HUD's HOPE VI Federal program works to replace projects housing with a mixed income of residents (Schwartz 1997). An example of a HOPE VI project that integrated a mix of income is New Columbia in downtown Portland Oregon (Figure 4.11). When neighborhoods are concentrated with a low income demographic, social problems are often heightened, contributing to joblessness, drug abuse, and welfare dependency.

These social problems are inversely affected by anticipated benefits that can be achieved through the implementation of mixed income. The reduction in crime is one benefit that will occur because higher income residents demand stricter, better enforced rules for the community. Some argue that the exposure of low income children to the routine of working families, may make them more likely to adopt values and behavior necessary for future employment (Schwartz 1997). Children will also perform better in school because of their new influences. Nonworking low income residents will be less disconnected from the workforce, because of adherence to social norms and emulation of their higher income neighbors. Social trends like this can eventually lead toward upward mobility (Brophy 1997). Low income households immersed in a mix of incomes will also benefit from better resources and amenities. Low income residents will benefit from better schools, more amenities, more stores and services, access to jobs, and enhanced safety.

The most difficult problem in achieving a mixed income community is attracting and retaining middle and upper class residents (An American Challenge 2000). Marketing to higher income residents is enhanced by selling the most expensive houses first. In some developments, prospective buyers of the highest priced homes are offered a land write-down subsidy. This establishes the higher income standards and rules from the beginning of the process so that future, low income residents are exposed to these trends. The following case study explains other issues and considerations that affected mixed income design at the Townhomes on Capitol Hill in Washington DC.

New Columbia
Figure 4.11
This HOPE VI development integrates a number unit types and income levels into the existing community of downtown Portland. The image shows residents enjoying one of the community's amenities (Mithun).

Townhomes on Capitol Hill

(DC Housing Authority 2009)
(Growth Management Institute 2005)

Location

Southwest Washington D.C.

Client

District of Columbia Housing Authority and Ellen Wilson Community Development Corp.

Designer

Architect, Weinstein and Associates

Project Type

153 mixed income units including low income and market rate. An aerial of the redevelopment is displayed in Figure 4.12.

Density

29 units per acre

Problem

• A 1930s redevelopment removed the existing street pattern to provide more internal open space. This isolated the residents from the existing community. • By 1960 poor maintenance and management left this area as a blighted slum.
• Five low rise buildings were demolished for the new highway that fragmented the urban fabric of this district.
• The District of Columbia Housing Authority moved all residents out and sealed the buildings because of problems.
• This abandoned housing development led to an increase in crime and decrease in property value

Goals

• Reduce crime
• Improve connection to the community
• Planning should accommodate laws that support the historic district.

Program

153 mixed income homes:
• 19 units, market rate homes for sale
• 34 units for families whose household income was below 25% of Area Median Income (AMI)
• 33 units for those between 25% and 50% of AMI
• 67 units for those between 50% and 115% of AMI

Design

• Similar architectural styles and materials used for all unit types.
• Architectural features used to differentiate individual homes
• Historic details incorporated into housing and master plan.
• Brick sidewalks and front gardens used to create pedestrian friendly atmosphere.
• Different units were evenly distributed throughout the development.

Townhomes on Capitol Hill: The site plan was influenced by L'Enfant's 18th century plan for Washington D.C. | Figure 4.12 (google earth)

Planter Box Detail | Figure 4.13
(Growth Management Institute)

Streetscape | Figure 4.14
(Growth Management Institute)

Lessons Learned

• Assigned parking stalls would have worked more effectively than open parking lots to reduce conflict.
• Adjacent retail corridor along 8th street improved with addition of residents
• Pedestrian streetscape details have increased the feeling of security (illustrated in Figures 4.13 and 4.14).
• The mixed income dynamic brought stability to the neighborhood by linking social classes.

Principles to be applied toward MDI Superfund redevelopment

• Evenly distribute different unit types across the development
• Use similar materials and architectural styles for all unit types
• Incorporate historic details
• Create pedestrian friendly streets and walkways with site details
• Implore specific parking stalls for each resident, encourage street parking

Summary of Mitigating Place | Design Principles for MDI Superfund

The following is a chapter summary that outlines design principles to be applied toward the MDI Superfund redevelopment. Principles are derived from ideas expressed in Defensible Space, affordable housing, mixed income, and case study sections.

Circulation

- Visual barriers at an entrance should be avoided
- Traffic calming with minimal straight major road inhibits crime
- Private streets can inhibit crime
- Limit egress and through traffic
- Consider all possible uses of walkways
- Limit pedestrian routes and increase visibility of pedestrian corridors
- Create pedestrian friendly streets and walkways with site details

Landscape Details

- Provide barriers to inhibit easy access through back yards
- Provide adequate lighting and site furniture to activate walkways
- Do not fence off the development to discourage gang control
- Maintenance and cleaning is important to avoid resident withdrawal and vacancy
- The use of aesthetic site furnishings that do not look like typical projects fixtures improve community perceptions and feelings of proprietorship, and minimize vandalism.
- Use site details like portals to improve the pedestrian experience
- Use a variety of hardy, native plant species with minimal maintenance
- Use raised planting areas to deter interference of the public
- Terraces and stoops allow tenants to see and be seen
- Incorporate historic details

Building Dynamic

- Avoid setting the building too far from the street
- Turn residences out to public streets
- Walk-up dwelling units are safer than buildings with limited entries and interior/enclosed hallways
- Low-rise buildings with four stories or less dramatically reduce crime
- Provide visual difference between building facades
- Avoid building setback distances that greatly differ from neighboring properties
- Individual units should differ from one another while mimicking the vernacular forms of the area
- Low and middle income units should not greatly differ in appearance
- Evenly distribute different unit types and income levels across the development
- Use similar materials and architectural styles for all unit types
- Dwelling units should have good views of all outdoor spaces
- Sell higher priced units first

Public Spaces

• Pathways, gates, and landscaping in courtyards are important- eliminate visual barriers
• Establish proprietary spaces further away from dwellings, like community garden spaces
• Organize the development into mini neighborhoods with differing identities
• Allocate small meeting areas and play nodes in proximity to all living areas.
• Locate play areas so easily viewed by parents
• Subdivide spaces into public, private, semi-public and semi-private.
• Provide a variety of open spaces for diverse social classes, including age and income.

Private Spaces

• Enable residents with a sense of ownership/privacy
• Paths and low curbs in front of dwellings promote a sense of proprietorship
• Define front and rear yards to improve resident's pride

Parking and Service

• Avoid a landscape dominant of garages, driveways, and pavement
• Consider specific parking stalls for each resident and encourage street parking
• Consider individual garbage cans for each unit.

Mitigating Land

Figure 5.1: Depicts one of the Fifth Ward Project Grow panels. The Museum of Cultural Arts, Houston (MOCAH) organized a series of workshops for children in the Fifth Ward to learn about the MDI site and express their minds through artistic expression. This panel and others were tacked onto the fence surrounding MDI Superfund (MOCAH).

5

Mitigation of land addresses constraints on development caused by contamination and the cleanup process. This chapter reviews some of the principles and criteria that were considered in an effort to achieve mitigation of land. The redevelopment strategy for MDI Superfund is shaped by an understanding of industrial reclamation, capped brownfields, and the effects of lead on the public. An understanding of this information is important for the redevelopment of MDI Superfund because the site is a brownfield that has been remediated.

Industrial Reclamation

In order to make educated decisions concerning the redevelopment of MDI Superfund it is necessary to understand the challenges and opportunities of brownfield redevelopments and industrial reclamation projects. Brownfields are abandoned and underutilized properties that have become contaminated as a result of industrial activities (Russ 2000). It is estimated that there are 25,000 to 400,000 sites in the United States that may be considered brownfields. It was not until the 1970s and 1980s when federal legislation was passed to enforce and regulate the cleanup of industrial sites that had become contaminated.

Today, brownfields offer unique opportunities to community leaders, architects, and planners. These abandoned properties can be used as a planning tool, to rebuild declining communities and deter from urban sprawl with infill development. Brownfield redevelopments offer more than physical benefits concerning infill development. Brownfield redevelopments provide opportunities to spark community interaction through shared history and education.

The redevelopment of brownfields is carried out to achieve the industrial reclamation of communities. The term industrial reclamation is used to describe the redevelopment and remediation of land previously vacant and useless because of contamination or adverse conditions that were remnants of past industrial uses (Kirkwood 2001). Through industrial reclamation a contamination goes through a process that transforms liability into identity. When a contaminated site is reclaimed, it is not necessary to hide or forget about past uses and problems, but to embrace the history of these sites with an extensive industrial past. Through reclamation, however, the perception of the site's history is changed so that it can enrich, educate, and facilitate interaction. Opportunities for art and landscape details incorporated into brownfields combine man-made relics with artistic expression and history. Industrial reclamation artists like Sussan Leibowitz Steinman use salvaged household items and local industrial materials to reinforce the links between local daily life and environmental issues (Strelow 2004). Steinman achieves this reuse of salvaged materials as an art form in the Urban Apple Orchards project (1994-1995) in San Francisco, California (Figure 5.2). These kinds of details

Urban Apple Orchards |Figure 5.2 (Strelow)

reinforce principles that outline the mitigation of place by giving members of a community a greater sense of pride for their surrounding.

Capped Brownfields

The plan of remediation for many sites of various types of contamination requires the installation of a cap. The proposed cap varies in material and can be constructed of clay, concrete or an impermeable geotextile membrane. Clay caps are one of the oldest procedures while, geotextile membranes are the modern alternative. Capped brownfields are designed to seal the surface of the site, preventing water infiltration and isolating contamination from people and the environment.

In the case of MDI Superfund, impervious geotextile caps are used in specific locations where subsurface soils do not meet regulatory levels. Impervious geotextile caps restrict the depth of soil and the allowable root growth area. Because of the physical restrictions present on a capped site, they are often limited to grass cover or the cover of pavement (Russ 2000). In many projects, impermeable caps are designed as parking lots or storage areas to minimize a limited vegetative cover on site. The use of trees, shrubs, and any plant material with a significant root system risk penetrating and damaging the cap, so application of this plant material must be carefully considered. These types of plant material may require the introduction of planters, graded terraces, or berms to avoid damage to the cap (Russ 2000). The following case study on Joplin, Missouri studies that process of remediation for a lead contaminated site.

Effects of Lead | Public Health

It is important to understand how lead poisoning can affect people. This reinforces the need of the redevelopment plan to respect the remedial design, so there is no compromise to public health. The following explains how a person can become exposed to lead and how it can affect adults and children. Note that children are more susceptible to lead exposure than adults.

Types of exposure

- Ingestion of lead contaminated water, soil, or materials.
- Inhalation of lead containing particles of soil or dust.
- Ingestion of foods that contain lead from soil or water exposure (www.epa.gov).

Lead poisoning in adults can cause:

- poor muscle coordination
- nerve damage
- increased blood pressure
- hearing and vision impairment
- infertility in men
- retarded fetal development

Lead poisoning in children can cause:

- brain damage
- behavioral problems
- anemia
- liver and kidney damage
- hearing loss
- hyperactivity
- developmental delays

Joplin, Missouri
(Pierzynski 2004)

Location
Jasper County, Missouri

Client
City of Joplin residents in proximity to smelter site

Remedial Designer
EPA Region 7

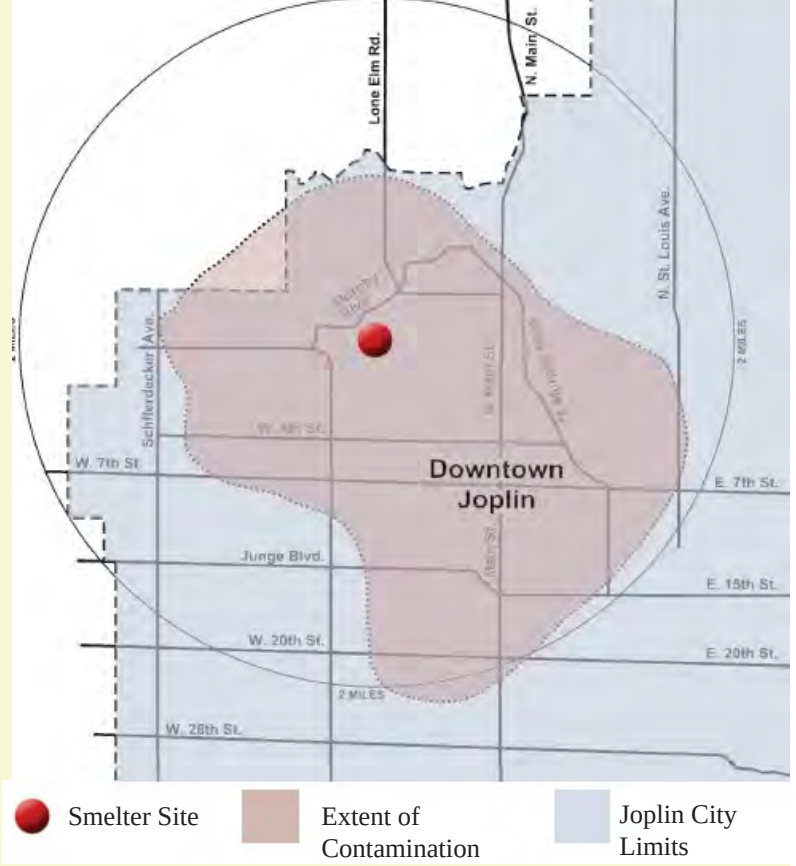
Project Type
Remedial cleanup of soils in residential yards that are contaminated with Lead, Cadmium, and Zinc.

Problem
Joplin is located in the Tri-State Mining Region which includes southwestern Missouri, southeastern Kansas, and northeastern Oklahoma. The Tri-State Mining Region is illustrated in Figure 5.3. Lead and Zinc were mined and smelted in this region from the mid 1800s until the 1970s, when all operations ceased. Figure 5.4 illustrates the conditions on site before the commencement of any remedial efforts. Smelter sites have large smokestacks that spread metal-enriched dust across surrounding areas. In this case, the soil contamination of heavy metals spread to residential areas within a two mile radius of the site. Lead exposure can affect adults and children causing abdominal cramping, anemia, decreased reaction time, weakness in extremities, and possible damage to the male reproductive system. Young children are most susceptible to chronic toxicity, which has been associated with increased development of hyperactivity, attention deficit disorder, and reduced IQ. Fourteen percent of the children in Jasper County surveyed for blood lead content were beyond 10 ug dL -10 which exceeds federal health standards.

Tri-State Mining Region | Figure 5.3
(LaMartina adaptation)

Remedial Action Goals
- Reduce human contact with lead.
- To have more than 90% of the children with blood Lead concentrations below 10 ug dL -1.
- Educate the public about the health effects of lead to minimize the exposure to children.
- Remove and replace soils with lead concentrations greater than 800 ppm.
- Remove and replace garden soils exceeding 500 ppm lead and 75 ppm cadmium.

Joplin Site | Figure 5.4
(EPA Region 7)



Joplin Area of Contamination | Figure 5.5
(LaMartina adaptation)

Site Cleanup

Cleanup for these residential areas started in 1996 and was completed in 2001. Approximately 2,500 residences were cleaned up of contaminated soil. This area of contamination is shown above in Figure 5.5. Cleanup of the smelter site was initiated in 2007 and will not be complete for at least 10 years.

Health Education Program

The EPA, MDOH (Missouri Department of Health), and (ATSDR) the Agency for Toxic Substances and Disease Registry used institutional controls to help minimize human exposure to lead throughout the remediation and after it's complete.

Reducing Child Exposure

- Children should not eat or drink in areas of known contamination.
- Children should not play in bare soil areas with known contamination
- Wash toys periodically and encourage children not to put toys in their mouths.
- Vacuum and dust inside the home to remove dust that may have lead in it.

Gardening

It's best to not garden in contaminated areas but these precautions minimize exposure of Cadmium and Lead. Cadmium is especially known to be taken up into crops and vegetables.

- Consider a raised garden bed, bring in soil that you know is not contaminated.
- Thoroughly wash all vegetables and peel root vegetables.
- Limit exposure to young children to contaminated garden soil
- Avoid transporting contaminated soil into the home on shoes, clothing, and pets.

Principles to be applied toward MDI Superfund redevelopment

- Design considerations should minimize risks to children
- Public health education should be considered
- Raised garden beds are an affective design tool to minimize health risks

Phytoremediation

Phytoremediation is the use of plants to absorb contaminants into plant tissues, to metabolize or biochemically convert the contaminant, or to diminish the concentration of contaminants in another way. This process varies depending on the plant material and the types of contaminants (Russ, 88). The two types of phytoremediation that can be used to mitigate lead contaminated soil are phytostabilization (Figure 5.6) and phytoextraction (Figure 5.7).

Figure 5.6 (LaMartina adaptation)

Phytostabilization

• Immobilizes the contaminant in soil through absorption and accumulation by root structure.
• Plant root system prevents contaminant migration through erosion, leaching, and soil dispersion.

Figure 5.7 (LaMartina adaptation)

Phytoextraction

• The contaminant is drawn into shoots and leaves of plant material through transpiration process.
• Harvest of plants is necessary to avoid reentry of contaminant back into system.

Primary Contaminant

Lead

Application for MDI Superfund

Phytostabilization- most appropriate

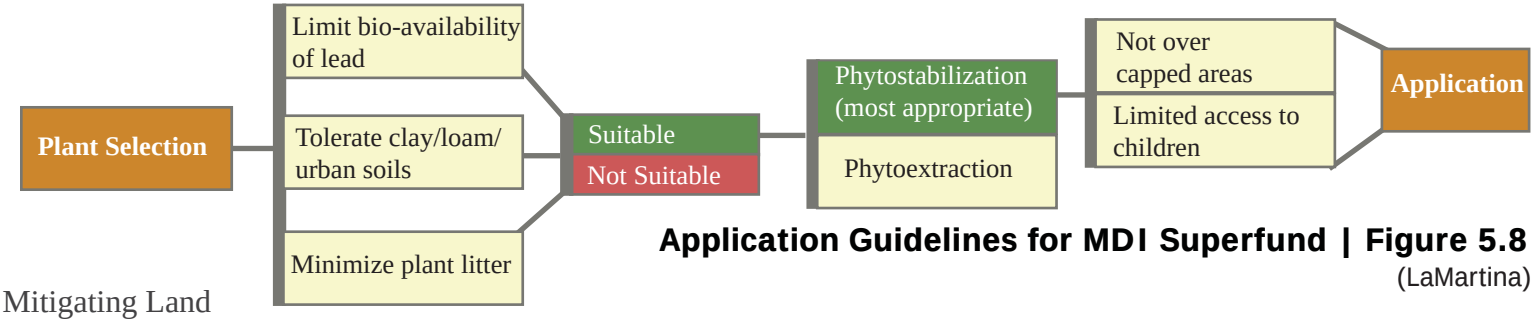
Phytoextraction- less desirable

Phytostabilization

A good polishing step where contaminant concentrations are below regulatory levels as in MDI Superfund.

Application Guidelines

Figure 5.8 illustrates the process of application for phytoremediation for the MDI site. Decisions are outlined for plant selection, site conditions and considerations, and method of phytoremediation. Note that phytostabilization is most appropriate. Because phytostabilization is the most appropriate method of phytoremediation, the specific application of a site in southeast, Kansas proves its relevancy.



Application Guidelines for MDI Superfund | Figure 5.8
(LaMartina)

Phytostabilization of Abandoned Zinc-Lead Smelter

(Pierzynski 2002)

Location

Southeast KS, near Dearing in Tri-State Mining Region

Remedial Designer

Gary Pierzynski

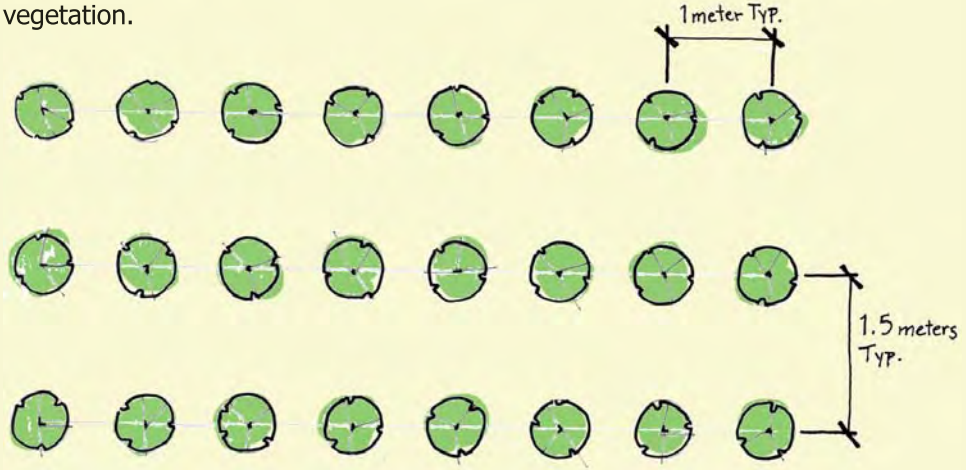
Project Type

Experiment conducted from 1994-1997 to investigate the suitability of deep-planted hybrid poplars for phytostabilization of a heavy metal contaminated site.

Problem

Like the Joplin site, this is also an abandoned lead/zinc smelter in the Tri-State Mining Region. Since its abandonment in 1919 the site was littered with debris including rubble, various types of waste rock, and smelter slag. Some areas on the site contain thick layers of slag that support no vegetation.

Hybrid Poplars | Figure 5.10
(photobucket)



Application | Figure 5.9
(LaMartina adaptation)

Plant Materials

Four hybrid poplars were selected for this experiment.

- Populus spp. 'Ecolotree'
- Populus deltoides x nigra 'North Liberty'
- Populus deltoides x nigra 'Iowa'
- Populus deltoides x nigra 'Imperial Carolina'

Application Figure 5.9

- Hybrids were planted in trenches as 120 cm whips (Figure 5.10).
- Trenches were 15 cm wide by 1 m deep
- Each plot consisted of 24 trees planted in three rows of eight trees
- Trees were one m apart within rows -Rows were 1.5 m apart
- Half of the plots were planted with manure and half without manure

Conclusions

- Manured treatments supported higher rates of photosynthesis, transpiration, and survival, although manured treatments would not be necessary in a humid climate.
- Imperial Carolina followed by Ecolotree functioned best and had a unique suitability for remediation of the site.

Principles to be applied toward MDI Superfund redevelopment

- Consider the use of poplars for phytostabilization.
- Use a barrier or low fence to limit the access of children to phytostabilization areas.

Summary of Mitigating Land | Design Principles for MDI Superfund

The following is a chapter summary that outlines design principles to be applied toward the MDI Superfund redevelopment. Principles are derived from ideas expressed in industrial reclamation, capped brownfields, phytoremediation, and case study sections.

Design Implementation

• Consider the use of poplars for phytostabilization.
• Use a barrier or low fence to limit the access of children to phytostabilization areas.
• Use art and landscape details to combine man-made relics with artistic expression
• Embrace history of the site
• Educate the public about brownfield cleanup and history
• Minimize vegetative cover over capped areas by covering with pavement if possible
• Do not compromise integrity of geotextile membrane with root structure of plant material
• Use planters, graded terraces, and berms to avoid damaging the geotextile membrane

Public Health

• Design considerations should minimize risks to children
• Public health education should be considered
• Raised garden beds are an affective design tool to minimize health risks of residents

Inventory and Analysis

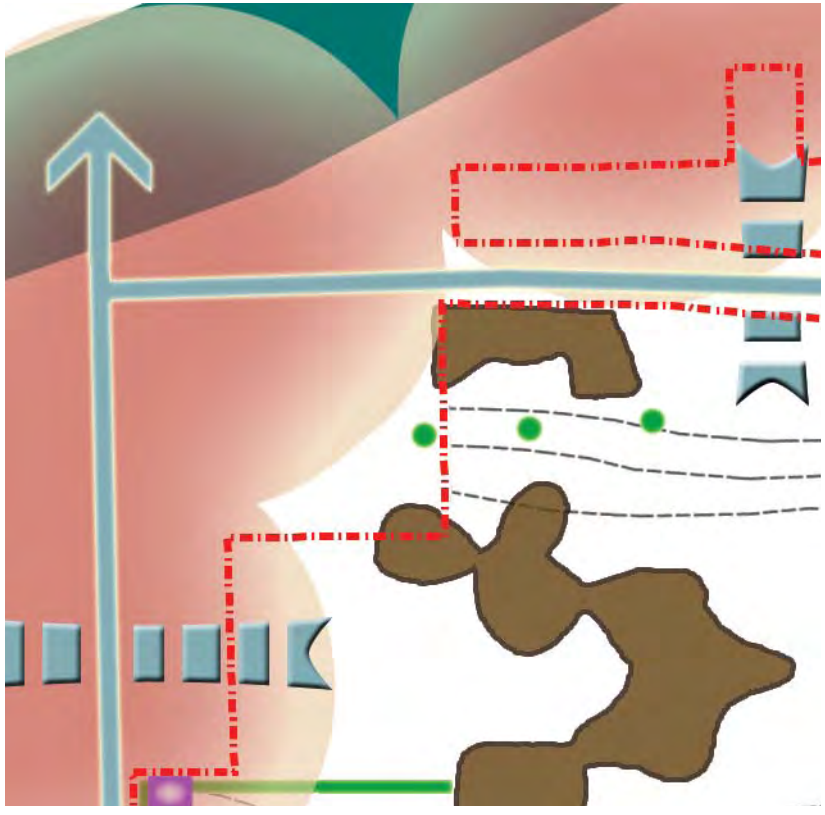


Figure 6.1: Depicts a portion of the comprehensive analysis map for the MDI Superfund site. The map shapes design decisions and is elaborated upon in the following chapter (LaMartina).

6

The purpose of this chapter is to catalogue and analyze the factors that affect mitigating place and mitigating land. These factors help determine issues that contribute to the dilemma, both on and off-site. The factors also determine issues and opportunities that will shape the redevelopment. The inventory and analysis is divided into several categories. These categories include site context, demographics, crime, community needs, site factors, and comprehensive analysis. The categories contribute to the decisions that make up program development and conceptual design.

Site Context

Residents living in this part of the Fifth Ward value the location for ease of highway access (adjacent to I-10 and just east of US 59). They also value the location for the close proximity to downtown Houston, which is about two miles southeast of the site. Figure 6.2 illustrates the connections and contextual opportunities to the MDI Superfund site location. The MDI site is in close proximity to community assets as well as industrial eyesores that will ultimately shape program development and conceptual design.

Several community assets are near the MDI site including two elementary schools, a day care center, a senior citizen's center, the Fifth Ward library, the neighborhood education center, the Fifth Ward Multi Services Center, Gregg Street Park, and public transit opportunities. These community assets help to determine the specific programming, explained in chapter seven, that will benefit the existing and proposed community.

The Fifth Ward Multi Services Center is a valuable resource that residents in the area can take advantage of, however it is separated from the site by highway I-10, which makes pedestrian access difficult. Aside from the residential properties, adjacent to the north and west of the site, the strongest community connection opportunity is Bruce Elementary School, located just west of MDI Superfund. A strong pedestrian connection between the proposed redevelopment and the school should facilitate safety and convenience of children going to school.

Any artistic or educational component proposed in the redevelopment should connect to the school and reach out to the community. Gregg Street Park is located just two blocks west of the MDI Site which can be easily connected to a proposed pedestrian corridor or network of greenspaces. Several bus stops surround the MDI site but none of them are directly adjacent. It will be necessary to identify a central area in the proposed redevelopment that includes a more convenient bus stop for residents.

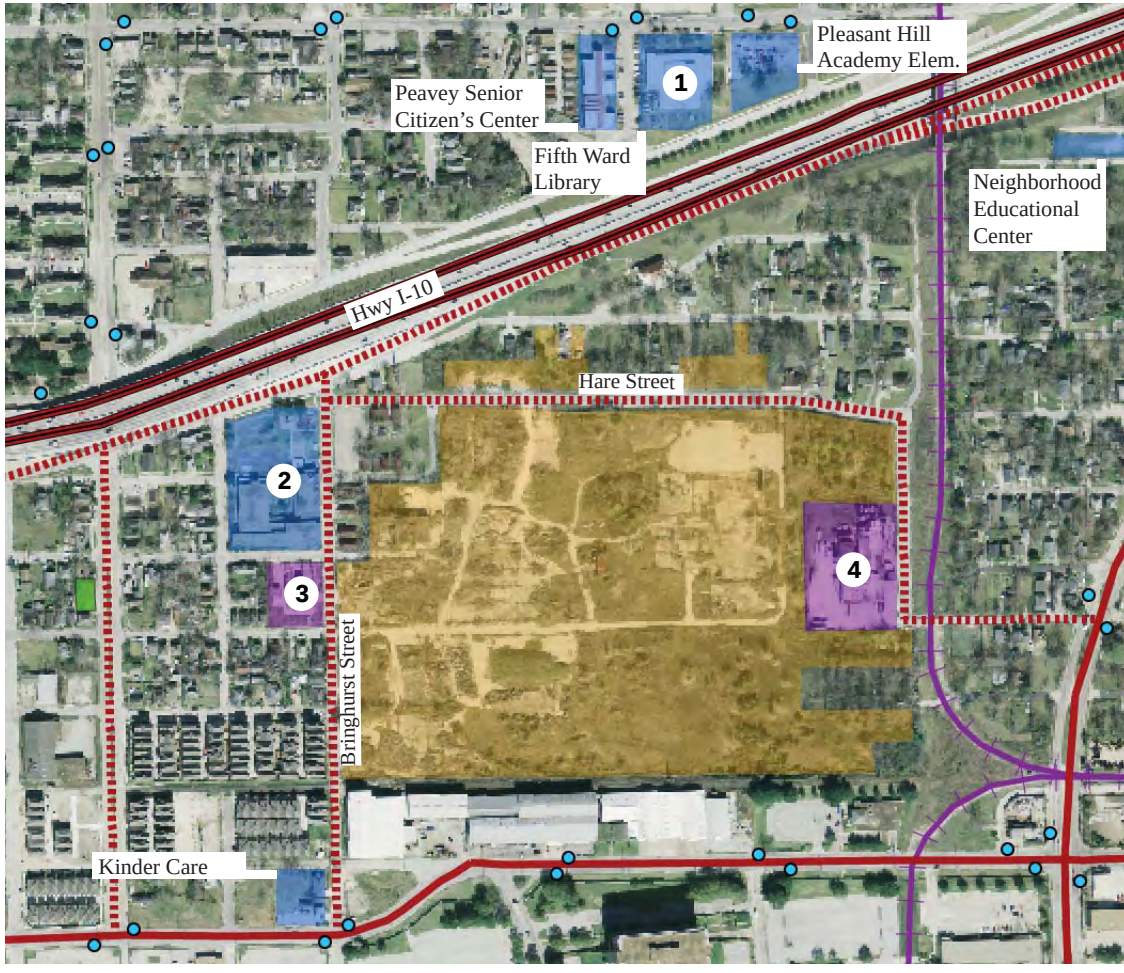
Fifth Ward Multi Services Center

Bruce Elementary School

Power Distribution Plant

Vinegar Plant

Adjacency Inventory | Figure 6.2 (LaMartina adaptation)



KEY:

Highway

Primary roads

Secondary roads

MDI site

Gregg Street Park

Institutional

Industrial

Railroad tracks

Bus stop

Scale: 1 inch = 600 feet

Highway I-10

Scattered residential and vacant lots line north of site

Bruce Elementary School

Power distribution plant

Compact row-housing development and other residential uses to west of site

TDI Group Inc. industrial facility

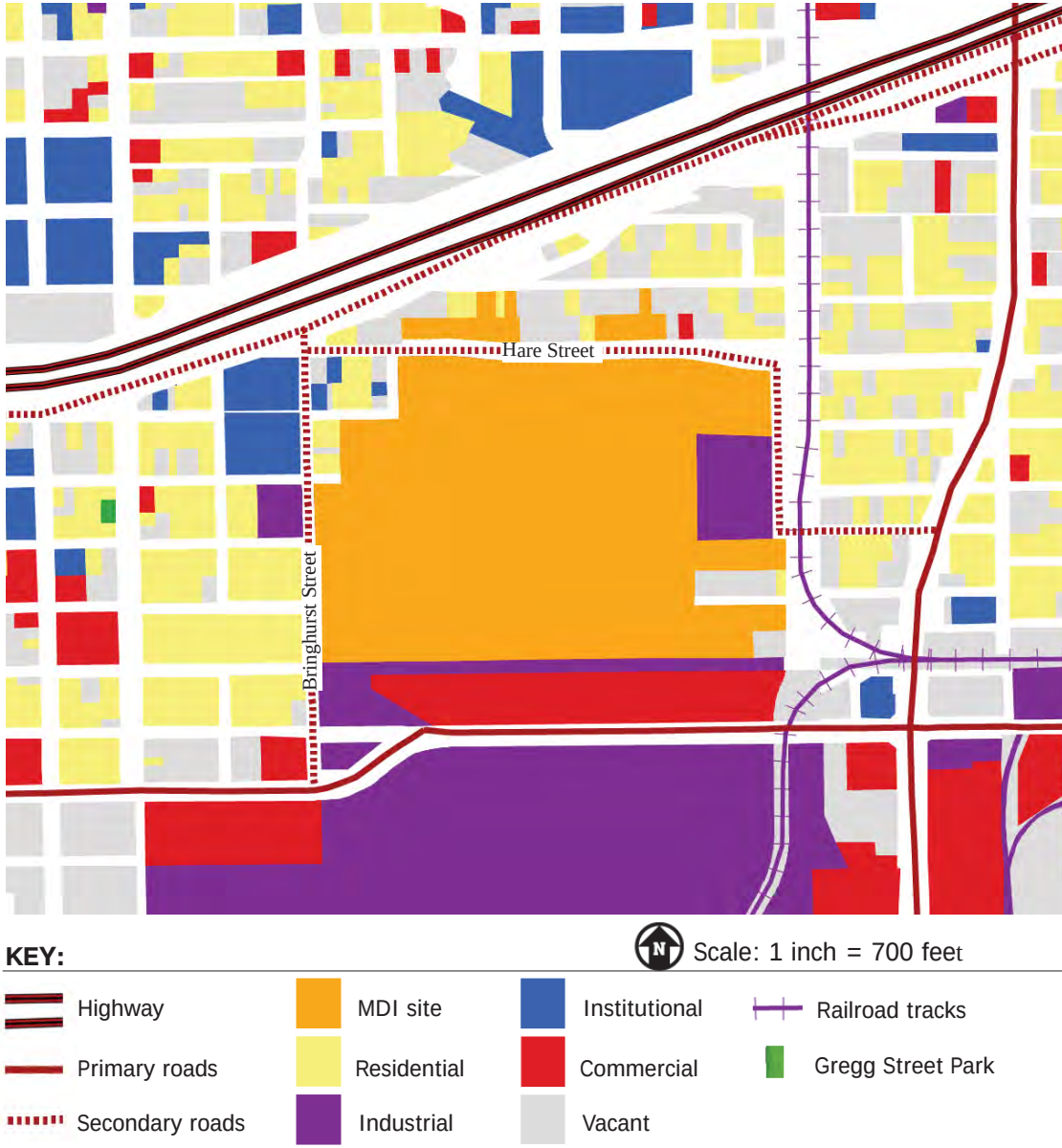
Rear of commercial buildings facing south of site

National Vinegar Company

Existing Context | Figure 6.3
(LaMartina)

Being in an industrial area, the MDI site is located near some properties that are considered less than desirable or even eyesores. The least aesthetic structures adjacent to the site are the power distribution plant, the vinegar plant, and the commercial and industrial properties to the south of the site (Figure 6.3). The power distribution plant is located west of the MDI site and south of Bruce Elementary School near several existing residences. Besides the few institutional, commercial, and industrial uses, the site is primarily surrounded by residential areas. All contextual land use types and their relationships are illustrated in Figure 6.4. Scattered vacant parcels amidst residential properties to the north and east of the site are to be considered as they will affect the proposed redevelopment. Although, it is assumed that these properties will become redeveloped residences after the proposed redevelopment of the MDI site.

Contextual Land Use | Figure 6.4 (LaMartina adaptation)



Population

Figure 6.5 illustrates population density as it relates to the MDI site. There are fewer people living directly adjacent to the site than in less industrial, more populated areas. Populations are greater north of I-10 in the Fifth Ward and South of Buffalo Bayou in the Second Ward. However, approximately 3,950 residents live within one half mile of the site according to Census 2000 data.

Age

Figure 6.6 illustrates the variance in age for residents living near the MDI site. Areas surrounding the site have a majority population of children from age five to seventeen. Specific programming for the redevelopment accommodates for this demographic. Considering this age group is important for site development as a crime deterrent, keeping children busy means keeping them out of trouble.

Race

Figure 6.7 illustrates the demographics of residents living near the MDI Superfund site. The residents living near the MDI site are predominantly Black followed by Hispanics.

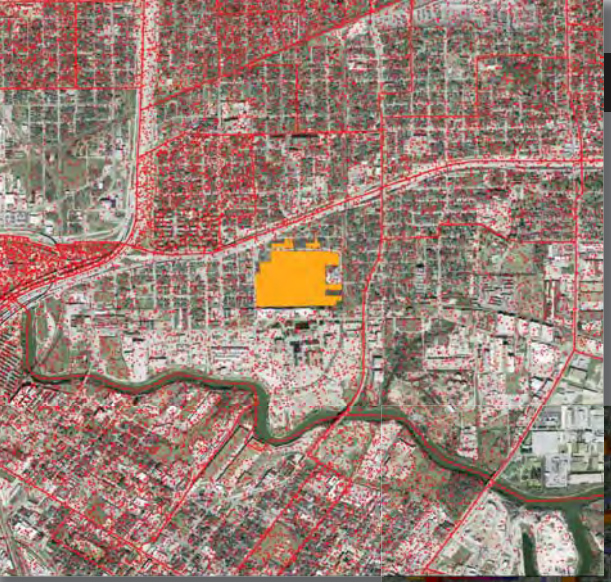
Demographics

Figures 6.5, 6.6, and 6.7

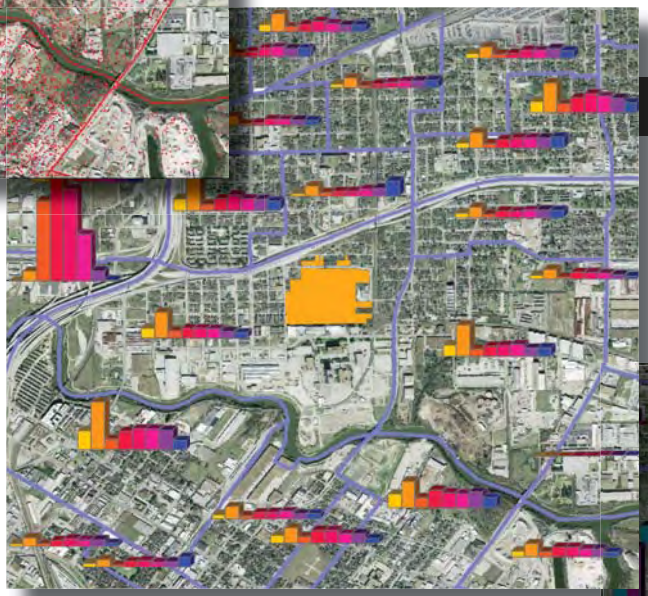
Scale: 1 inch = 4000 feet (LaMartina)

Population Density | Figure 6.5

1 dot = 1 person

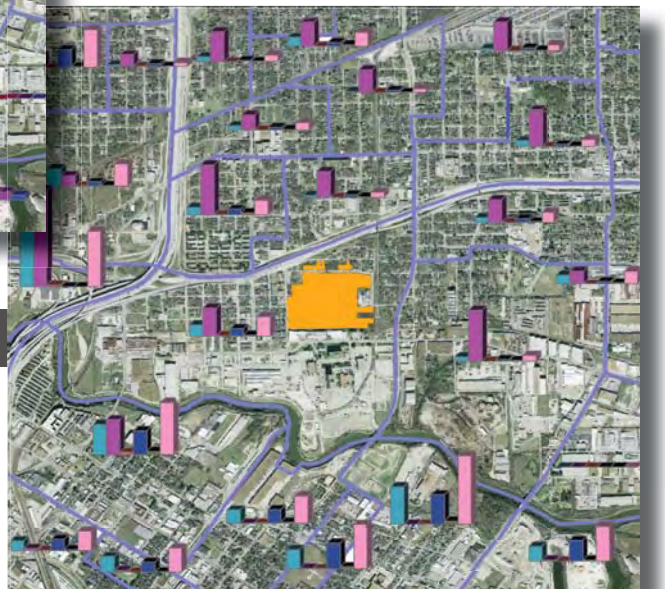


Age Demographics | Figure 6.6



- <5
- 5-17
- 18-21
- 22-29
- 30-39
- 40-49
- 50-64
- 65+

Race Demographics | Figure 6.7

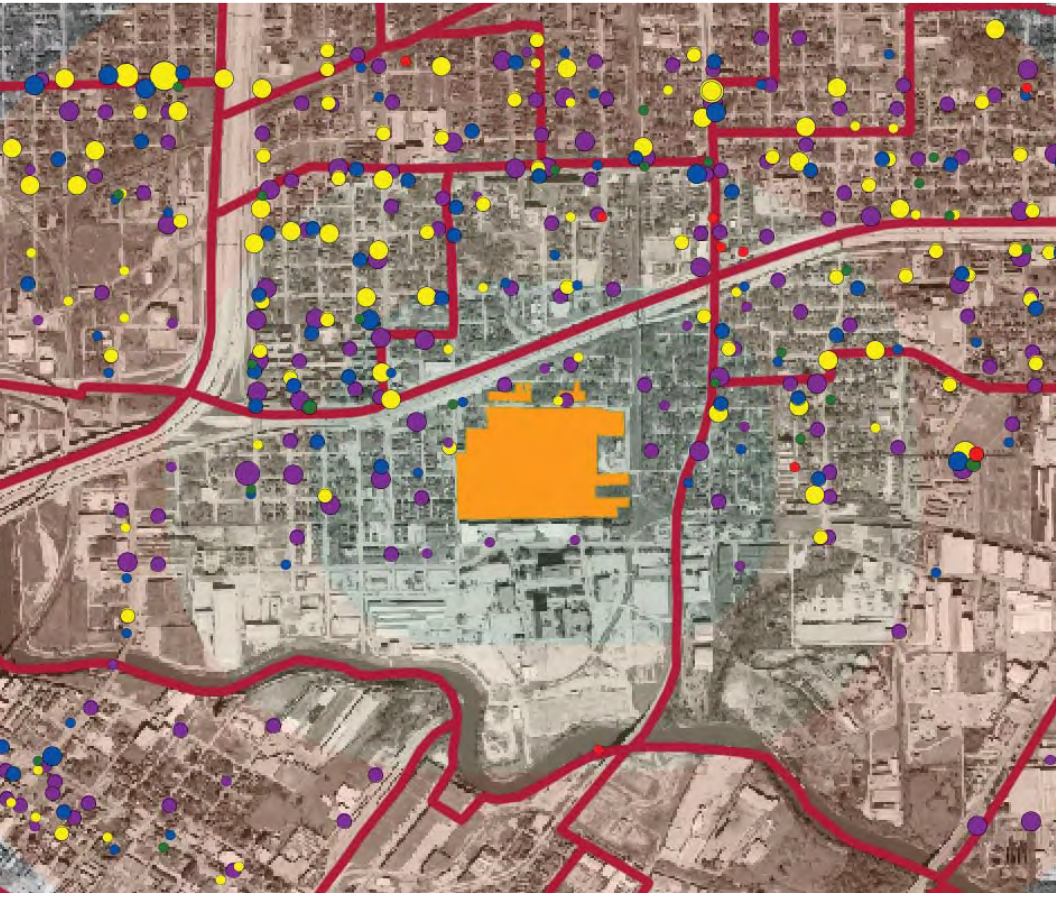


- White
- Black
- Asian
- Other
- Multiple Race
- Hispanic

Crime

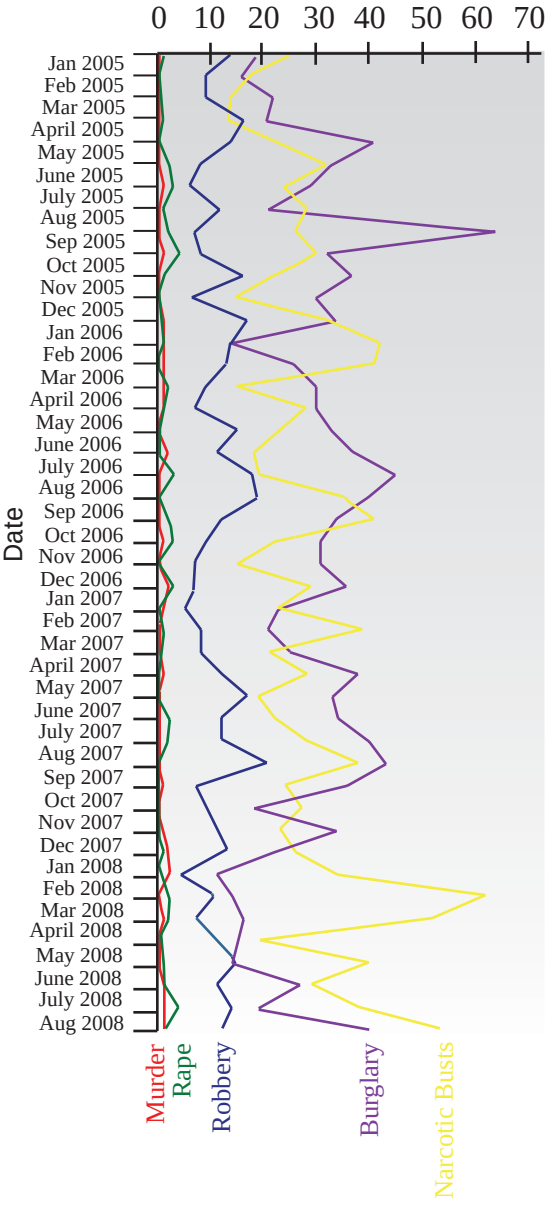
Crime locations noted in Figure 6.8 were committed between January of 2005 and August of 2008. The color variation of the aerial is determined by proximity to the site. The green area is one quarter mile or less from the site, the yellow area is one half mile or less from the site and the red area is one mile or less from the site. Proximity of crime to the MDI site was analyzed in these 1/4 mile, 1/2 mile, and one mile increments to in order to understand which

Crime Inventory | Figure 6.8 (LaMartina adaptation)



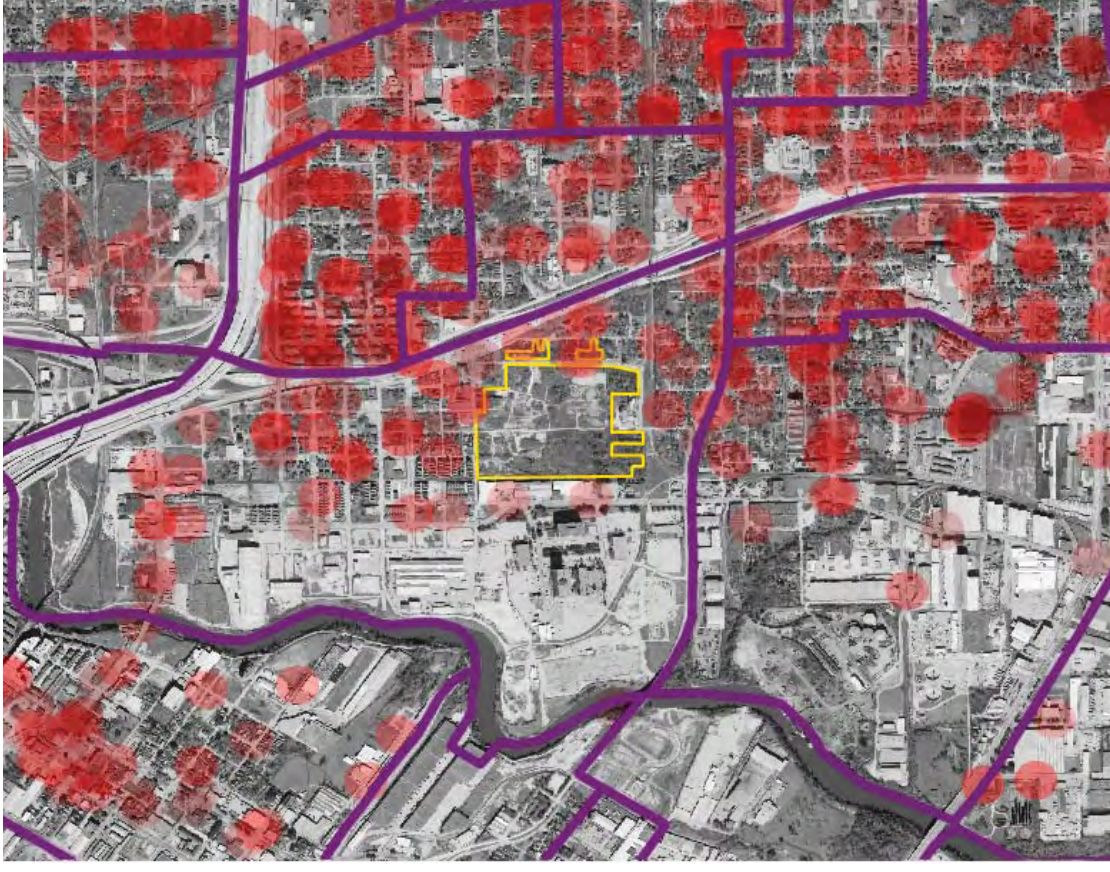
Scale: 1 inch = 2000 feet

Number of Incidents | Figure 6.9
(LaMartina adaptation)



areas are most vulnerable to crime. The number of incidents reported in Figure 6.9 corresponds with the size and color of the dots illustrated in Figure 6.8. The large dots represent locations in the Fifth Ward where crimes were repeatedly committed.

Crime vulnerability adjacent to the site was determined by creating an overlay of information from the crime inventory. The number of incidents and severity of the crime were both taken into consideration to analyze areas that are more prone to crime. Figure 6.10 shows that the northern part of the site is the most vulnerable to crime followed by the western edge. Defensible Space design principles will be implemented to minimize the risk of crime and adverse affects on the proposed redevelopment.



Low Crime — High Crime

Crime Vulnerability | Figure 6.10
(LaMartina adaptation)

Scale: 1 inch = 2000 feet

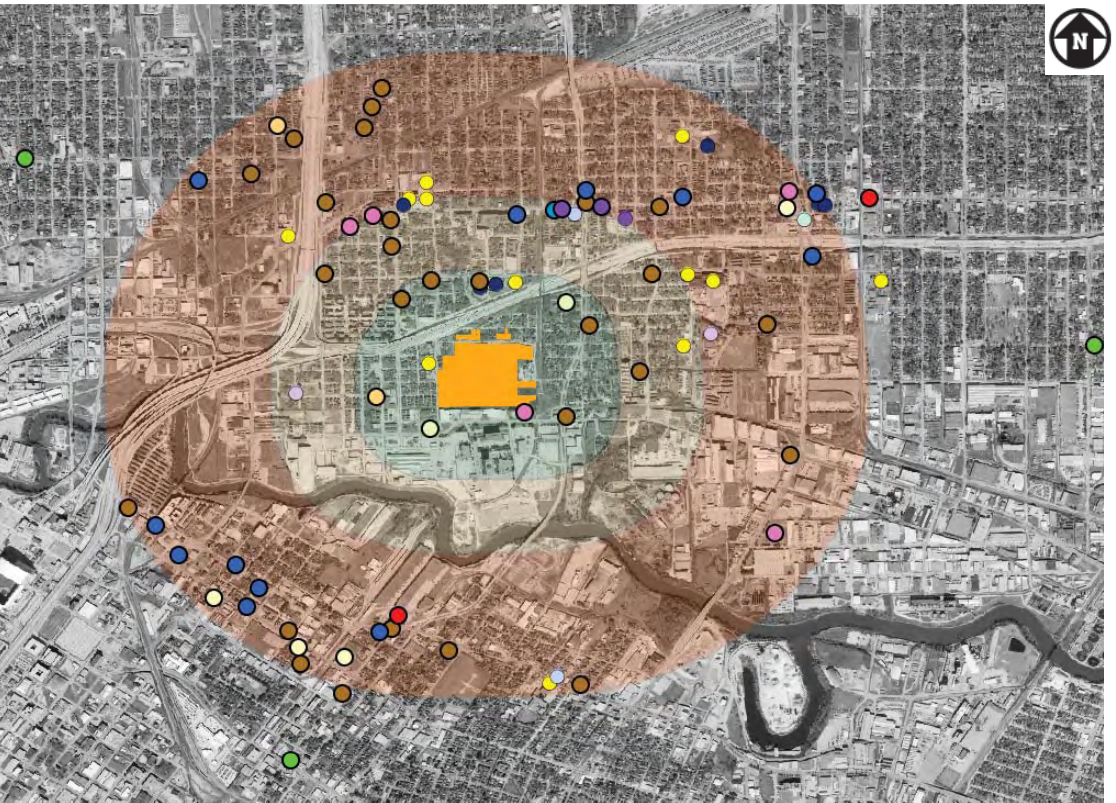
Community Needs

Community needs are important to all programmatic considerations of the proposed redevelopment. The priority of these community needs is determined by physical proximity (Figure 6.11) and community opinion which is understood from the Fifth Ward Community Survey. An inventory of businesses that provide retail and services within one mile was conducted to gain an understanding of community needs on and around the MDI site. Figure 6.11 shows that there are not many retail establishments or services available within one quarter mile radius of the site besides a few small grocery stores, a bank, a bar, a senior citizens center, and two day care centers. There are very few restaurants and commercial businesses near the MDI site. The addition of more commercial opportunities is desirable in promoting a convenient and walkable community. Other desirable business types for the proposed redevelopment include a laundromat, barbershop, and a pharmacy. These desired business types will become more desirable after the MDI site and surrounding areas are developed to include more residence areas.

Site Proximity to Retail and Services

Figure 6.11 (LaMartina)

Scale: 1 inch = 3500 feet



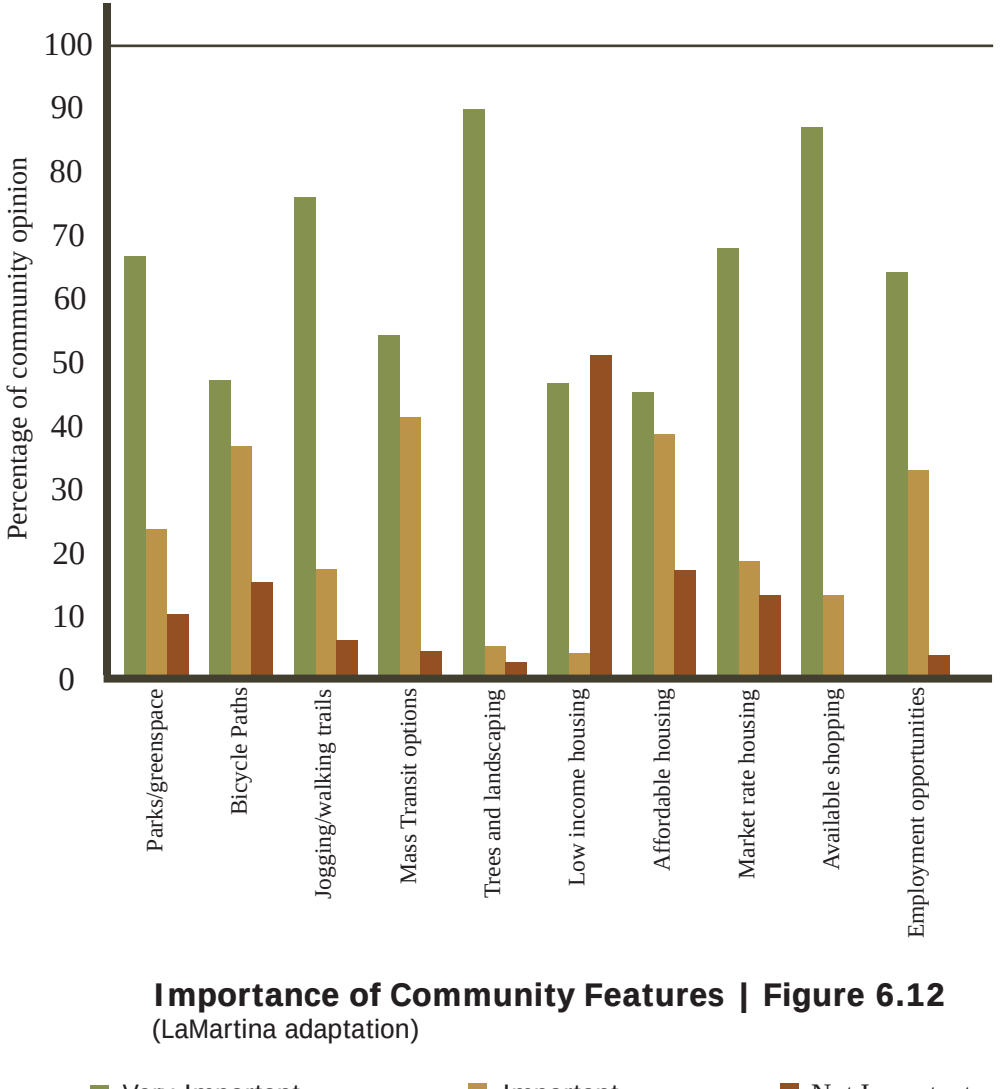
Key

- Laundromat
- Barber Shop
- Commercial Goods
- Day Care
- Pharmacy
- Hotel
- Bank
- Bar
- Restaurant
- Grocery Store
- Senior Citizens Center
- Community Center
- Hospital
- Houston Police Department
- Library
- School
- Metro Transit Center

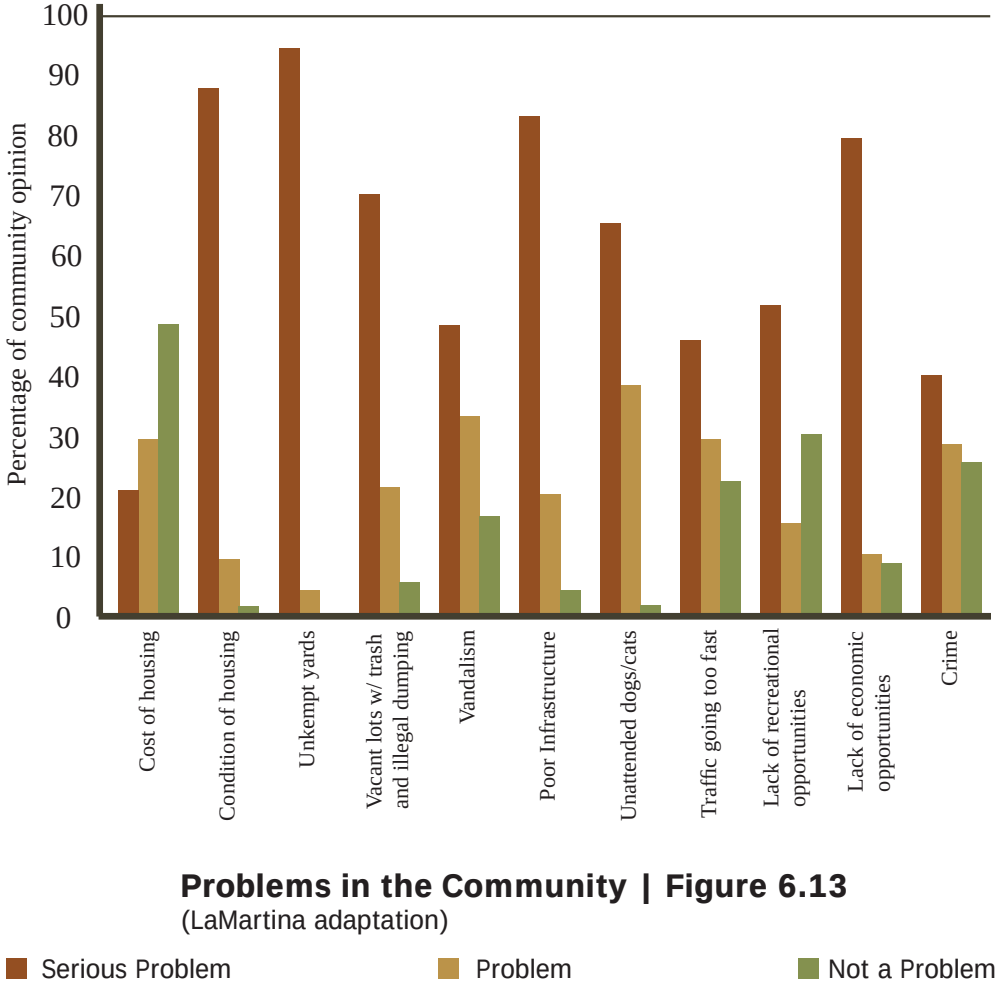
Fifth Ward Community Survey

The following data is based on the Southern Fifth Ward Community Survey compiled by the Sierra Club. The survey was taken between July and September of 2006. The purpose of the survey was to gain community input about the redevelopment and revitalization of the MDI Superfund site. This information is based on 109 surveys that were completed and returned to the Sierra Club. I compiled information, that I found most pertinent to the redevelopment, into the following graphs and charts. See Appendices A.2-A.5 for other graphics that correspond with the Fifth Ward Community Survey, beyond what is outlined in this chapter.

The importance of community features (Figure 6.12) is illustrated according to the percentage of opinions expressed by Fifth Ward residents who were surveyed. Recreational opportunities and landscaping are important to Fifth Ward residents with an emphasis on public spaces that cater to walking and biking. Most residents think mass transit options, affordable housing, market rate housing, available shopping, and employment opportunities are important features to be considered in the proposed redevelopment.



Importance of Community Features | Figure 6.12
(LaMartina adaptation)



Problems in the Community | Figure 6.13
(LaMartina adaptation)

Figure 6.13 shows the largest perceived problems in the Fifth Ward according to the opinions of residents surveyed. Some of the most serious problems perceived by residents are the condition of housing, unkempt yards, and vacant lots with trash. Defensible Space, affordable housing, and mixed income design principles will be implemented in the proposed redevelopment in an effort to address these social issues. Vandalism, traffic going too fast, and crime will also be addressed through the use of these design principles. Lack of recreational and economic opportunities will be addressed in the programming of spaces for the proposed redevelopment.

The Fifth Ward Multi Services Center is located north of the site across from highway I-10, however, residents in the southern portion of the Fifth Ward desire some sort of community center within the proposed redevelopment. This need has most likely manifested itself because of the highway separation between southern Fifth Ward and the multi services center. It is desirable to create a small community center within the proposed redevelopment to serve residents in this area. Figure 6.14 illustrates the elements the community would like to see in a new community center. The proposed community center should accommodate a number of uses expressed in Figure 6.14 and are elaborated upon in chapter seven.

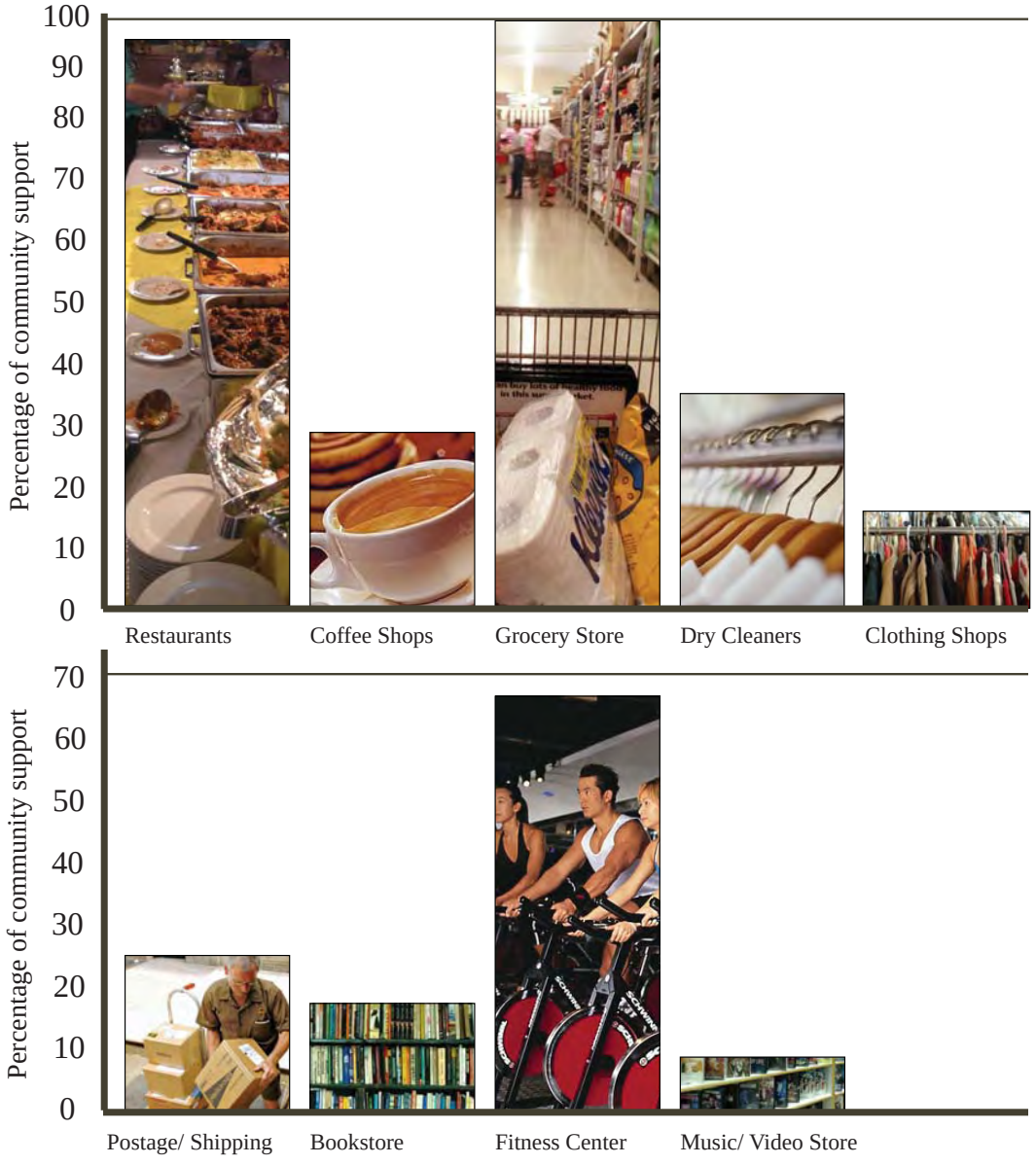
Community Center Program | Figure 6.14 (LaMartina adaptation)

Community Improvements | Figure 6.15
(LaMartina adaptation)

Figure 6.15 illustrates the community's opinion on what they perceive as the most needed improvements in the Fifth Ward community. The need for affordable housing and new economic development is continually stressed in data from the survey. These community needs will be implemented into the program of the proposed redevelopment.

There is a physical lack of commercial development surrounding the proposed redevelopment, which is apparent in the survey (Figure 6.16). Although there are several small grocery stores located near the site, one hundred percent of residents surveyed desire a better one.

Commercial Development | Figure 6.16 (LaMartina adaptation)

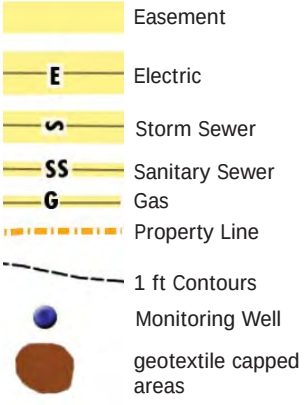


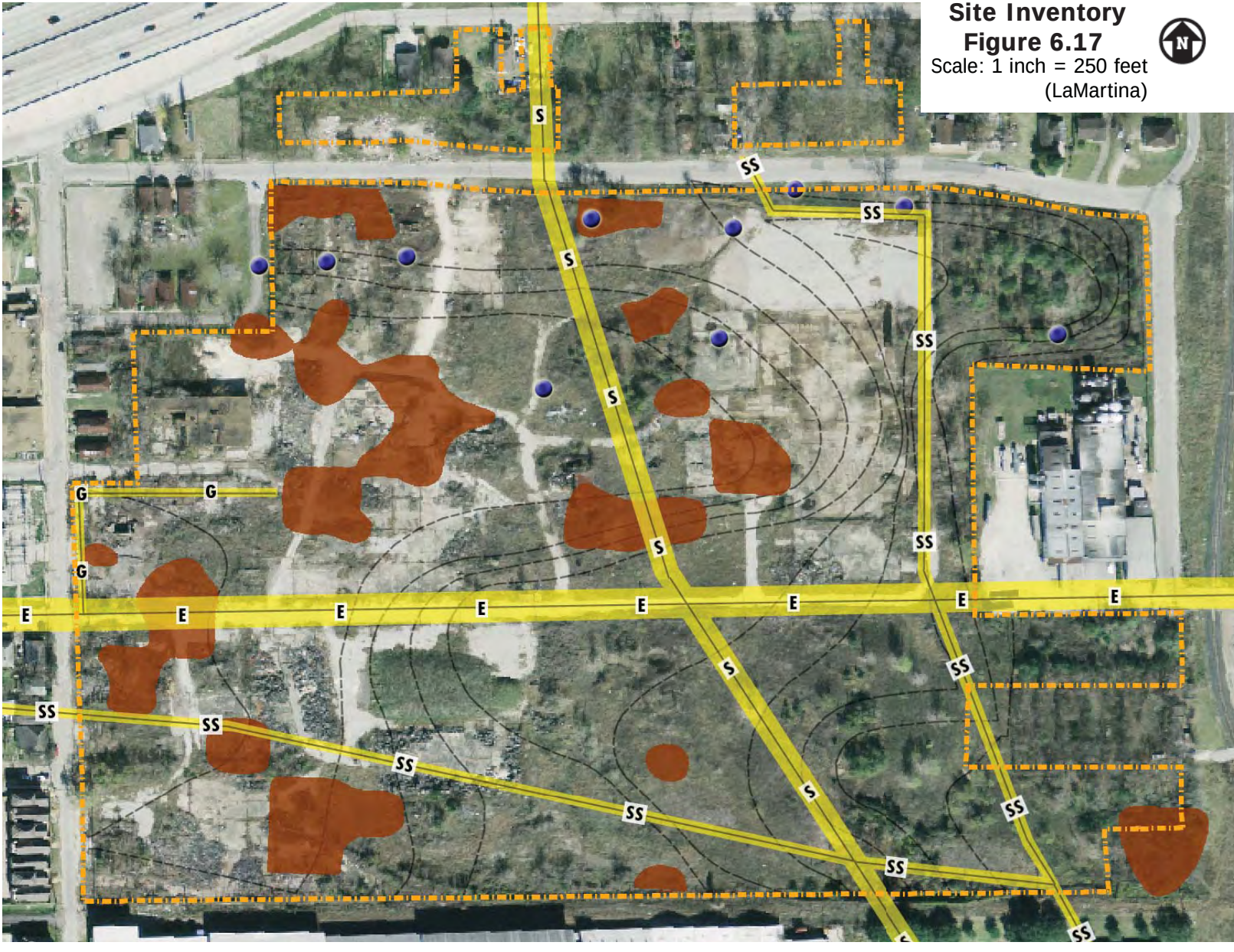
Site Factors

Beyond the contextual issues and opportunities that shape the proposed redevelopment of the MDI site, there are a number of on-site influences that create opportunities and physical design constraints. A number of these physical constraints exist because of the remedial action that was completed in 2008. Site factors summarized in the remedial action summary (chapter three) are a driving factor in the site inventory (Figure 6.17). The most pertinent influences are monitoring wells, the interim grading plan, geotextile capped areas, and utility easements.

Ten monitoring wells in the northern portion of the site will remain on the site, up to thirty years, for monitored natural attenuation (MNA). MNA ensures monitoring of the groundwater plume and its level of contamination at these stations. These MNA stations must remain accessible post-redevelopment. The interim grading plan is cause for the topography, which remains post-remediation. This existing grade is at an elevation 1.5 feet above the geotextile membranes in the areas displayed in Figure 6.17. Mitigating land principles are necessary to consider in the proposed redevelopment. Another factor that constricts the design of the proposed redevelopment is the utility easements, another product of an industrial site. The easements include: electric lines, storm sewers, sanitary sewers, and gas lines. These easements diminish developable areas on-site but can be used as an opportunity for public spaces.

Figure 6.17 Key





Site Inventory
Figure 6.17
Scale: 1 inch = 250 feet
(LaMartina)

Comprehensive Analysis

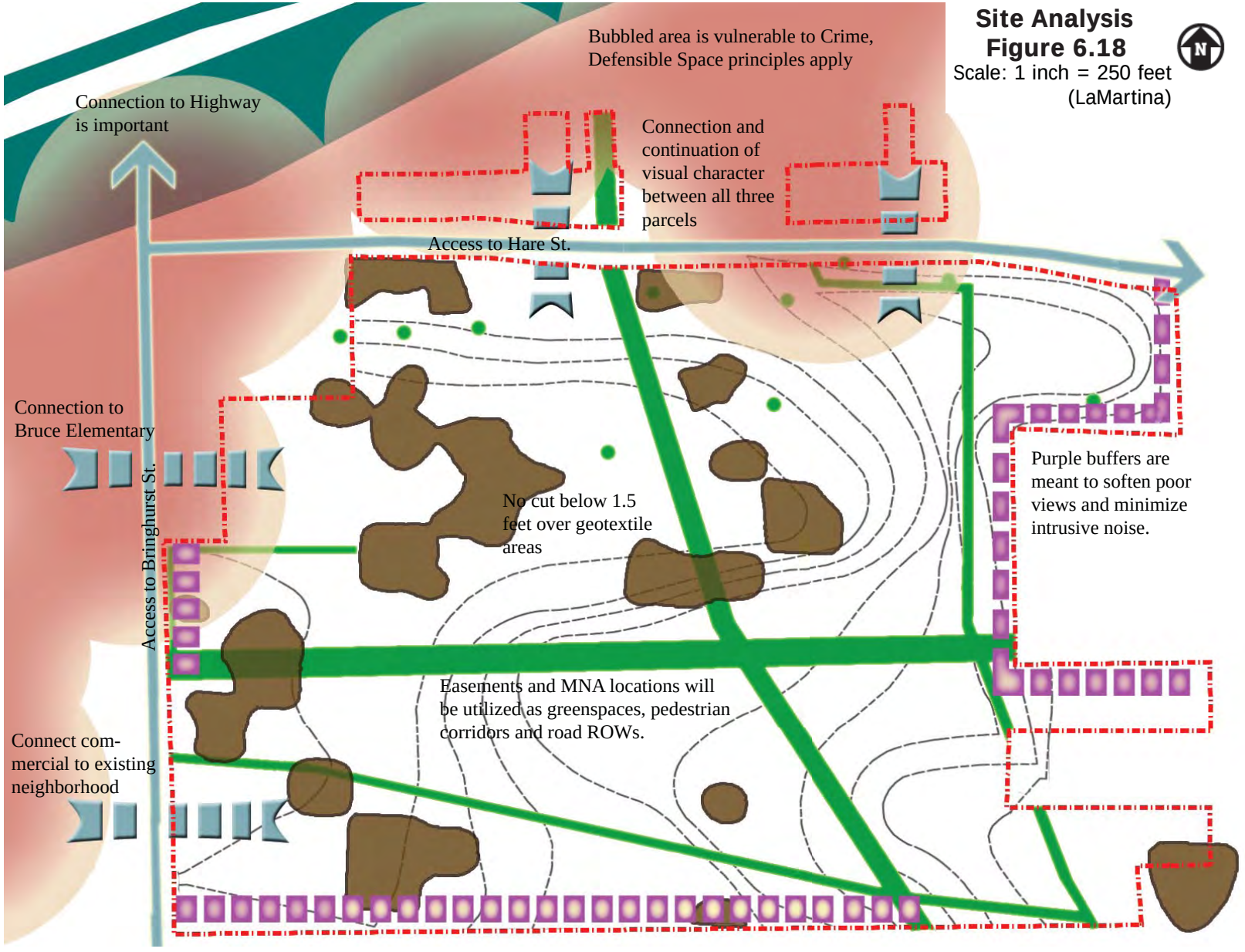
Figure 6.18 is the synthesis of information gained from the other pieces of inventory and analysis including site context, demographics, crime, community needs, and site factors. The physical factors affecting the proposed redevelopment provide opportunities to improve the social dynamic which will contribute to the mitigation of place. Access to the proposed redevelopment is important, especially in the siting of commercial properties. Commercial properties must be accessible by way of highway I-10, through Bringhurst and Hare Street connections.

Commercial properties should also be located near the outer edges of the proposed redevelopment to provide services and resources for the existing community. Consistency and continuation of visual character between land parcels, split by Hare Street, will help facilitate connection. The need for access to MNA stations will be combined with the need for trails and public space which is the fusion of mitigating place and mitigating land. This will allocate open space, creates site identity, and can facilitate brownfield education. Because the MNA stations located on-site are primarily in the north, another educational opportunity, that interacts with more of the proposed redevelopment, is desirable. Easements and MNA stations are suitable for greenspaces, pedestrian corridors, and road ROWs.

Perhaps the most delicate factor on-site is the areas with geotextile caps. The proposed redevelopment plan must respect these areas not cutting below 1.5 feet. Plant material must be selected carefully and detailed accordingly so the geotextile membrane's structure is not compromised.

Because the MDI site is located in an area with a presence of crime, and an industrial influence, design decisions will be made that reflect this. Areas characterized with more crime vulnerability will take advantage of mitigating place design principles Desirable buffers are illustrated in purple (Figure 6.18) and will require greater thought as to how buildings should be sited in the proposed redevelopment. Light industrial and commercial properties can help transition from the outer edges of the site to residential in some circumstances. These properties will also provide needed employment opportunities. Inventory that cannot be graphically displayed in Figure 6.18 goes into the decision making process for program development in chapter seven.

Figure 6.17 Key


Site Analysis
Figure 6.18
Scale: 1 inch = 250 feet
(LaMartina)
Bubbled area is vulnerable to Crime, Defensible Space principles apply
Connection to Highway is important
Connection and continuation of visual character between all three parcels
Access to Hare St.
Connection to Bruce Elementary
Access to Bringhurst St.
No cut below 1.5 feet over geotextile areas
Purple buffers are meant to soften poor views and minimize intrusive noise.
Easements and MNA locations will be utilized as greenspaces, pedestrian corridors and road ROWs.
Connect commercial to existing neighborhood

Shaping the Program

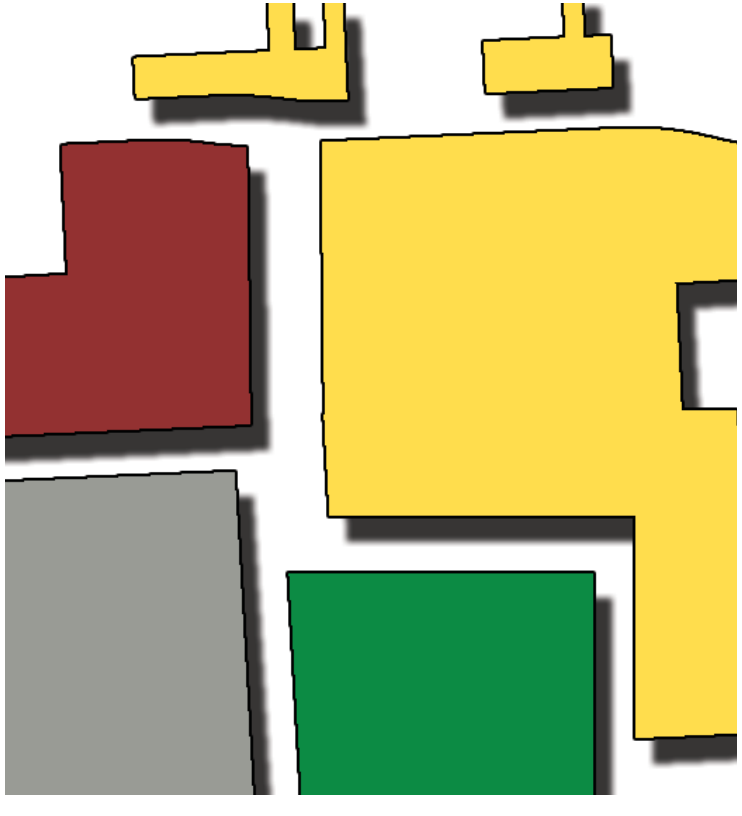


Figure 7.1: Enlarged diagram which expresses the percentage of program uses for the proposed redevelopment (LaMartina)

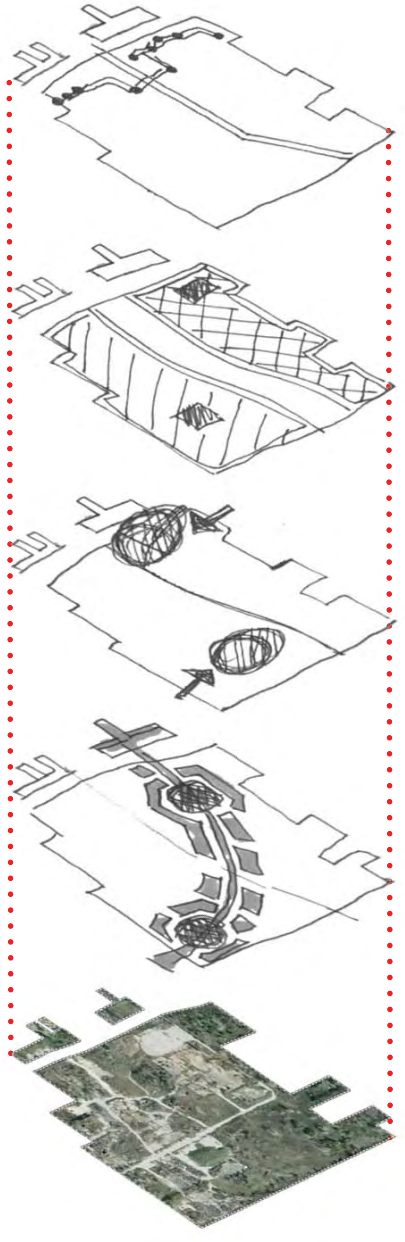
7

The synthesis of data derived from inventory and analysis influenced program elements and conceptual design. This data affected the decision making process for concept development, program suitability, program development, and program elements.

Concept Development

There are three possible types of residential development that could occur on the site. These residential scenarios include market rate housing, affordable housing, and mixed income housing. Inventory and analysis was conducted to achieve the mitigation of land and place. Preliminary concept development was used to explore the pros and cons of all three residential scenarios. Four concept ideas were derived from these preliminary thoughts and are the basis for the proposed redevelopment. The four concept ideas (Figure 7.2) include: pedestrian corridor, dispersed business cores, mini-neighborhoods, and brownfield education.

The pedestrian corridor concept creates a network of pedestrian spaces along major roads and through greenspaces that connect larger public spaces. Dispersed business cores aim to provide multiple commercial hubs that serve the surrounding community. These hubs each fit into a separate mini-neighborhood defined by character and circulation. The mini-neighborhoods



Concept Development
Figure 7.2
(LaMartina)

share a public greenspace running north and south along the storm sewer easement. The last concept idea is brownfield education, which creates an interconnective trail system. This trail system links MNA stations, providing access while creating recreational amenities.

Program Suitability

The synthesis of these concept ideas helped to develop a program for the proposed redevelopment. Market rate housing is more desirable for the developer while the community desires both market rate housing and affordable housing. Because of these factors, mixed income housing is the most realistic and logical design scenario for the MDI Superfund redevelopment.

Mixed income housing appeases the developer and the community while minimizing the affects of gentrification in the Fifth Ward. Program suitability of a mixed income development differs from that of traditional planning, which separates uses, unit types, and income levels, as shown in Figure 7.3. The proposed program and redevelopment plan strives to integrate uses and income levels, without isolating them from the surrounding community. The goal is to minimize social conflict and facilitate access for those living in the southern portion of the Fifth Ward. Highway access and visibility are necessary for the success of proposed commercial properties. However, the integration of commercial hubs within residential neighborhoods will encourage watchfulness and encourage daily use. Although adjacency of affordable housing to the existing community is necessary, a pattern of mixed distribution between social classes is desirable to create a diverse neighborhood instead of a segregated one.

Market Rate Housing Suitability

Commercial Use Suitability

Affordable Housing Suitability

Traditional Program Suitability | Figure 7.3 (LaMartina)

Program suitability of the proposed redevelopment will not separate uses, unit types, and income levels as traditional program suitability would suggest.

Program Development

Program Goals | Figure 7.4 (LaMartina)

The program for this project includes a variety of development types and is broken down to accommodate the existing community as well as a wealthier demographic that is likely to be drawn into this area (Figure 7.4).

36.4 acre site including approximately:

50%-60% Mixed Income Residential
- -25% <50% AMI
- -25% 50%-99% AMI
- -25% 100% AMI
- -25% >100% AMI

15%-20% Circulation/Parking/Open Space

15%-20% Commercial; Retail/Office/Light Industrial

10%-15% Public Parks

Program Elements

The overall program of the proposed redevelopment is based on design principles expressed in Mitigating Place (chapter 4) and Mitigating Land (chapter 5) as well as the synthesis of all inventory and analysis, including the Fifth Ward Survey results.

Residential including:
- Affordable and market rate housing
- Single Family Homes
- Condominiums / Townhomes
- Multiplexes
- Apartments
- Senior Housing

Commercial including:
- Grocery Store
- Corner Store
- Restaurants
- Laundromat
- Dry Cleaners
- Postage and shipping
- Bookstore
- Barber Shop
- Pharmacy
- Coffee Shop
- Clothing Shops
- Miscellaneous commercial shopping
- Employment opportunities
- Children's activities for large 5-17 year old demographic
-Economic venue

Community Recreation including:
- Parks / greenspace
- Biking / walking trails
- Community Center:
    - Fitness center
    - Public meeting rooms
    - Public kitchen/banquet room
    - Bus stop
    - Outdoor swimming pool
- Connection to Bruce Elementary
- Neighborhood connection to bus routes
- Playgrounds

Program Goals:
- Integrate mitigation of land and place
- Calm traffic
- Minimize crime risks and improve the quality of living with Defensible Space principles
- Create employment opportunities
- Promote education about the brownfield site
- Provide some kind of community center
- Integrate a mixed income community
- Cluster affordable housing units to allow shared semi-private open space that promote proprietorship
- Provide an economic venue for the community

Mitigating Land and Place

Figure 8.1: Depicts sign detail that is implemented along the proposed educational trail system. These signs promote learning for residents, visitors, and school children from Bruce Elementary School (LaMartina).

8

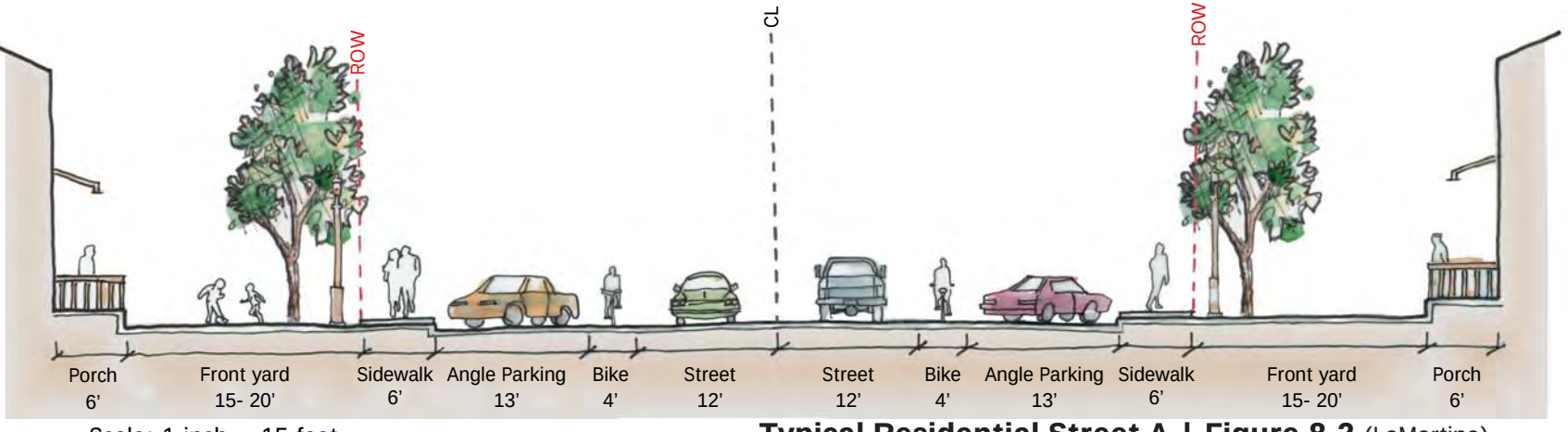
The proposed redevelopment plan for MDI Superfund is derived from research and site studies described previously. All decisions were derived from design principles that encourage the mitigation of land and place and supported by conclusions made in chapters six and seven. The concept ideas derived from conceptual design were combined with two main goals that address the project dilemma. These concept ideas and design goals create six overarching goals that are implemented into the redevelopment plan (Figure 8.3). These overarching goals are to:

- Implement mini-neighborhoods
- Implement a pedestrian corridor
- Encourage brownfield education
- Dispersal of Business Cores
- Maintain public health
- Minimize Gentrification

The mini-neighborhoods concept is derived from Defensible Space principles and is influenced by projects that Oscar Newman designed. The proposed redevelopment is divided into two mini-neighborhoods that share a public greenspace running north and south along the storm sewer easement. These mini-neighborhoods are not connected with streets to minimize the through traffic of undesirable drivers. The purpose is to inhibit crime and promote individual mini-neighborhood pride. The public greenspace creates a pedestrian corridor (the Phyto Trail) that abuts the back yards of residents residing in both mini-neighborhoods.

This pedestrian corridor is also a component of brownfield education. Brownfield education on-site consists of the MNA trail and the Phyto trail, both of which are described in greater detail later in this chapter. The pedestrian corridor is the spine of the community, connected by a network of walkable spaces, along streets and through smaller green spaces. A variety of pedestrian spaces are created along public streets to accommodate different units with varying use, size, and income level. Typical street ROWs are made up of driving lanes, bike lanes, street parking, and pedestrian walkways. Street parking is used rather then parking lots in most cases in the proposed redevelopment. This maximizes open space while minimizing social conflict between residents. Street-side parking offers parallel stalls as well as angled stalls.

Building setbacks for residential streets differ depending on unit type and location (Figures 8.2 and 8.4). Varying



Scale: 1 inch = 15 feet

Typical Residential Street A | Figure 8.2 (LaMartina)

Development Plan

Figure 8.3

Scale: 1 inch = 250 feet (LaMartina)

Key:

- Commercial A
- Light Industrial B
- Community Center C
- Playground
- MNA Station
- Phytostabilization Area
- Capped Area

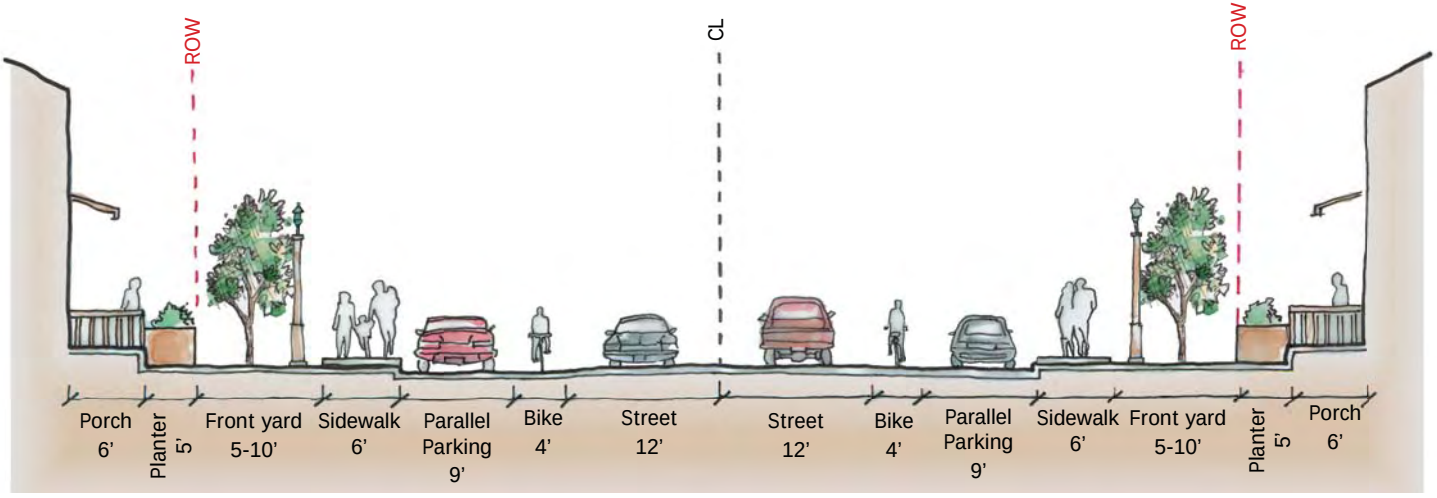
Note: The proposed redevelopment contains an average of nearly eleven units per acre.

setbacks correspond with the location of geotextile capped areas to maximize their paved cover. Paved cover over capped areas is more desirable then vegetative cover because plant material can become limited with it's root zone.

Within each mini-neighborhood is an individual commercial hub. Each hub is located near the outer edge of the redevelopment site to maximize access and serve the community. The dashed line circles in Figure 8.5 represent one quarter mile radius and signifies a walkable distance. This illustrates how these commercial hubs were sited in order to benefit the surrounding community. A proposed community center is located adjacent to commercial hub B and the pedestrian corridor. This placement ensures that it is easily accessible by residents within the proposed redevelopment. Program elements for both commercial hubs and the community center are based on the needs determined from conclusions made in chapter six.

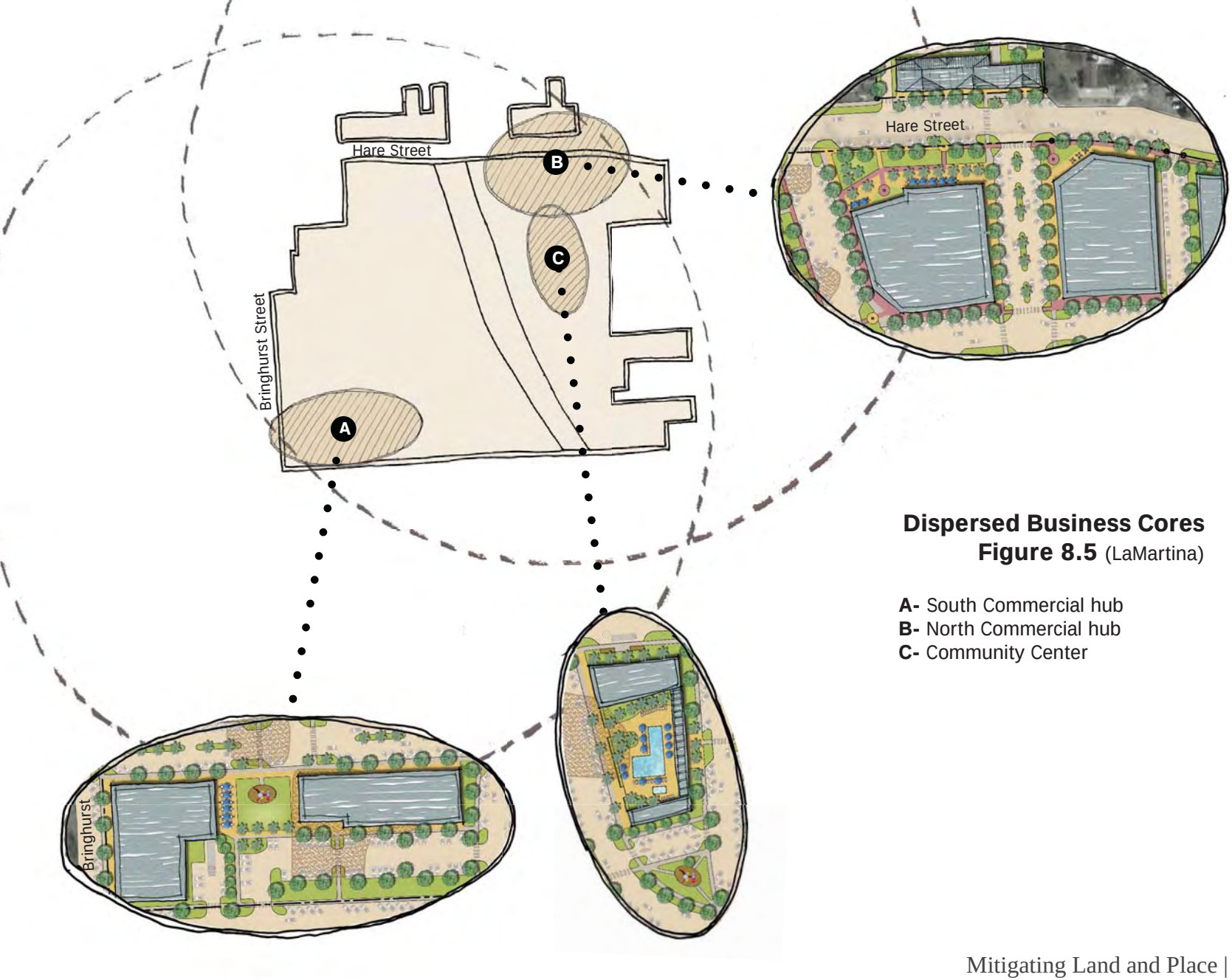
Commercial hub A is located in the southwest corner of the redevelopment site. This allows access by Bringhurst Street to the west, supporting the western mini-neighborhood and off-site residents. Commercial hub B is located in the northwest of the site and is accessible by way of Hare Street. This benefits the residents of the eastern mini-neighborhood as well as the surrounding community to the north and the east. Both commercial hubs should include a mixture of retail, restaurants, and commercial shopping. One of the commercial hubs should include a grocery store while the other one provides a corner store, at minimum, to serve nearby residents. The large five to seventeen year old demographic should also be considered in the specific programming of these commercial hubs. Both commercial hubs should also contain: a laundromat, dry cleaners, postage/ shipping store, bookstore, barber shop, pharmacy, and a coffee shop. Business diversity should present employment opportunities that will benefit the surrounding community.

The community center (C) offers several services and amenities to residents including: a fitness center, public meeting rooms, a public kitchen/ banquet room, an outdoor swimming pool, and a community playground. The community center also provides a bus stop that serves residents within the



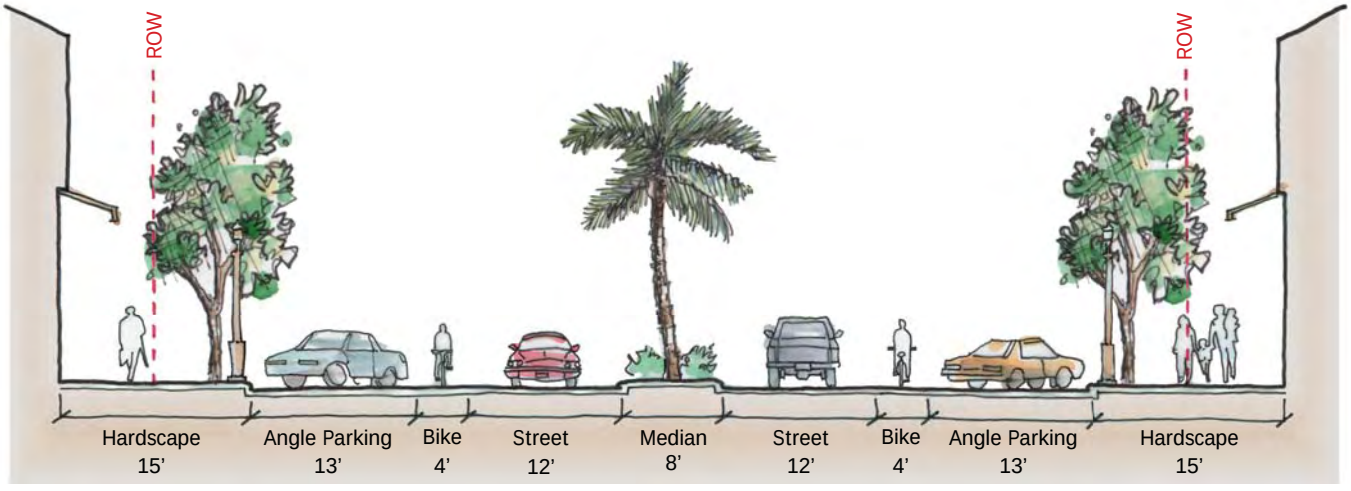
Scale: 1 inch = 15 feet

Typical Residential Street B | Figure 8.4 (LaMartina)



Dispersed Business Cores
Figure 8.5 (LaMartina)

A- South Commercial hub
B- North Commercial hub
C- Community Center



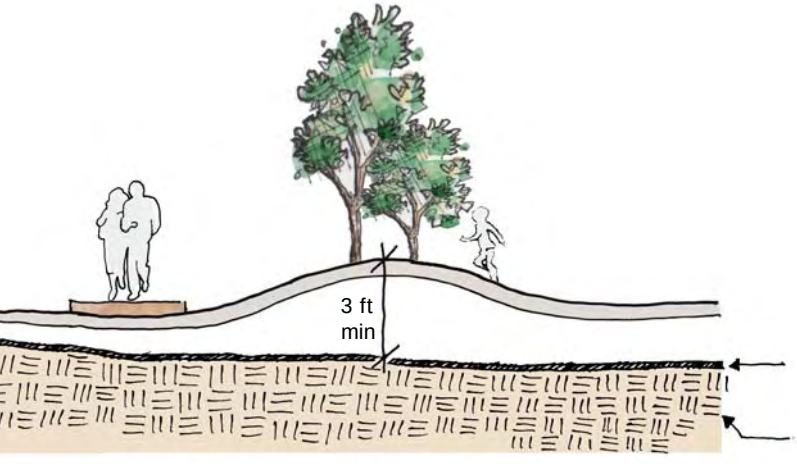
Scale: 1 inch = 15 feet

Typical Commercial Street | Figure 8.6 (LaMartina)

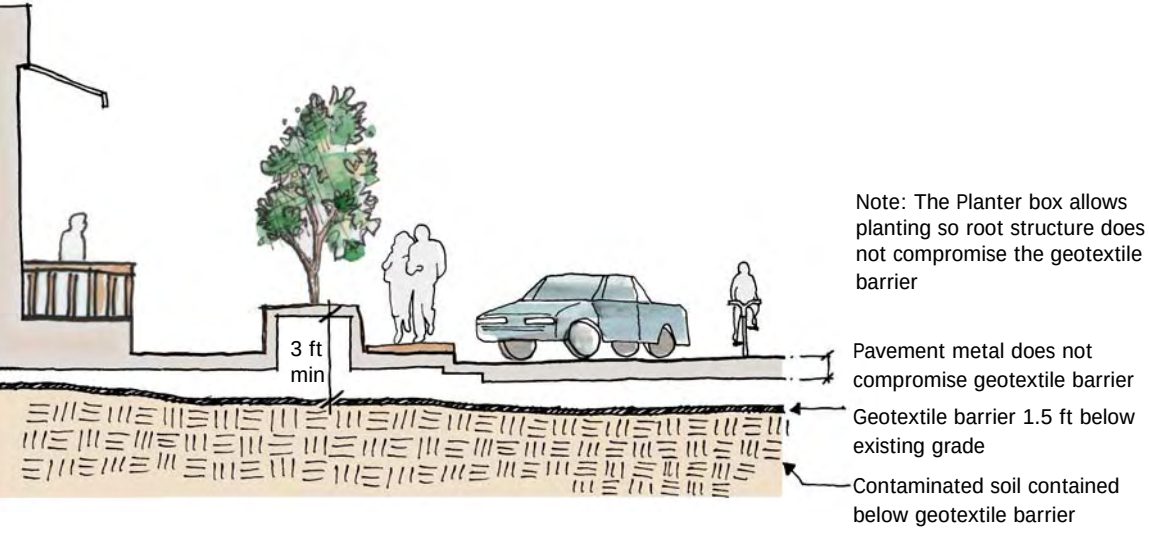
proposed redevelopment. Typical streets adjacent to commercial hubs and the community center differ from that of residential streets. Buildings are fronted with public walks lined with awnings and street trees. Major streets incorporate a planted median with palm trees and low shrubs that soften the street corridor (Figure 8.6).

Public health is a major concern of the proposed redevelopment. The proposed redevelopment site is remediated to regulatory levels that satisfy the EPA. However, other measures have been taken to ensure that public health is maintained and improved for residents. Figure 8.7 displays a typical detail of raised garden beds that are to be implemented for clusters of dwelling units. This lets residents garden in their own top soil

Typical Raised Garden Bed | Figure 8.7 (LaMartina)



Typical Berm Detail | Figure 8.8 (LaMartina)
Scale: 1 inch = 10 feet



Typical Planter Detail | Figure 8.9 (LaMartina)
Scale: 1 inch = 10 feet

brought in from off site. Garden bed height staggers from one foot to three foot which accommodates the usability of diverse residents, whether young or old. These raised garden beds are constructed from corrugated steel, making them more durable while mimicking the industrial look of the area. Durability is especially an important factor of affordable housing projects, which is appropriate.

Other design details for the proposed redevelopment that maintain public health are in response to the geotextile caps on-site. Specific details over these areas make the use of larger plant material possible, without compromising the integrity of the geotextile barrier. These typical planting details are specific to the location, for streetscapes and open areas. Both details ensure a three foot minimum dimension between proposed grade of plant material and the geotextile barrier. A typical berm detail (Figure 8.8) is proposed for open recreation areas where trees occur over the geotextile barrier. This creates visual interest for residents while providing a function. Areas with geotextile caps along proposed streets implement a raised brick planter box (Figure 8.9) that can be used as a seat wall. Both typical details are used to protect the public and obey the remedial design while providing residents with recreational amenities and shade.

In an attempt to minimize gentrification, maximum diversity should be exemplified in use, size, and income level for buildings and units within the proposed redevelopment. A wide variety of units is proposed, ranging from 400 square feet to more than 1400 square feet (Figure 8.10 and Table 8.1). Different sized units are available for a wide range of income levels to accommodate diverse dwelling types.

Different dwelling types range from small one bedroom apartments to larger multi bedroom townhomes. Residential structures range from one to three stories with varying density to promote individuality in building clusters. Individual buildings and units vary from one another while instilling the use of consistent materials that exemplify vernacular forms of the area.

Commercial and light industrial structures are proposed in areas adjacent to existing commercial and light industrial. This helps to transition from existing industrial to proposed residential. In most cases residential structures are turned to face the exterior of the proposed redevelopment, embracing the community instead of fencing it off. However, the fronts of residential structures are turned away from industrial properties, embracing one of the proposed streets on site. Proposed land use on-site is displayed in Table 8.2 and Figure 8.11, which also shows the dynamic of residential mixed income.

Unit Size | Figure 8.10 (LaMartina)

Unit Size | Table 8.1

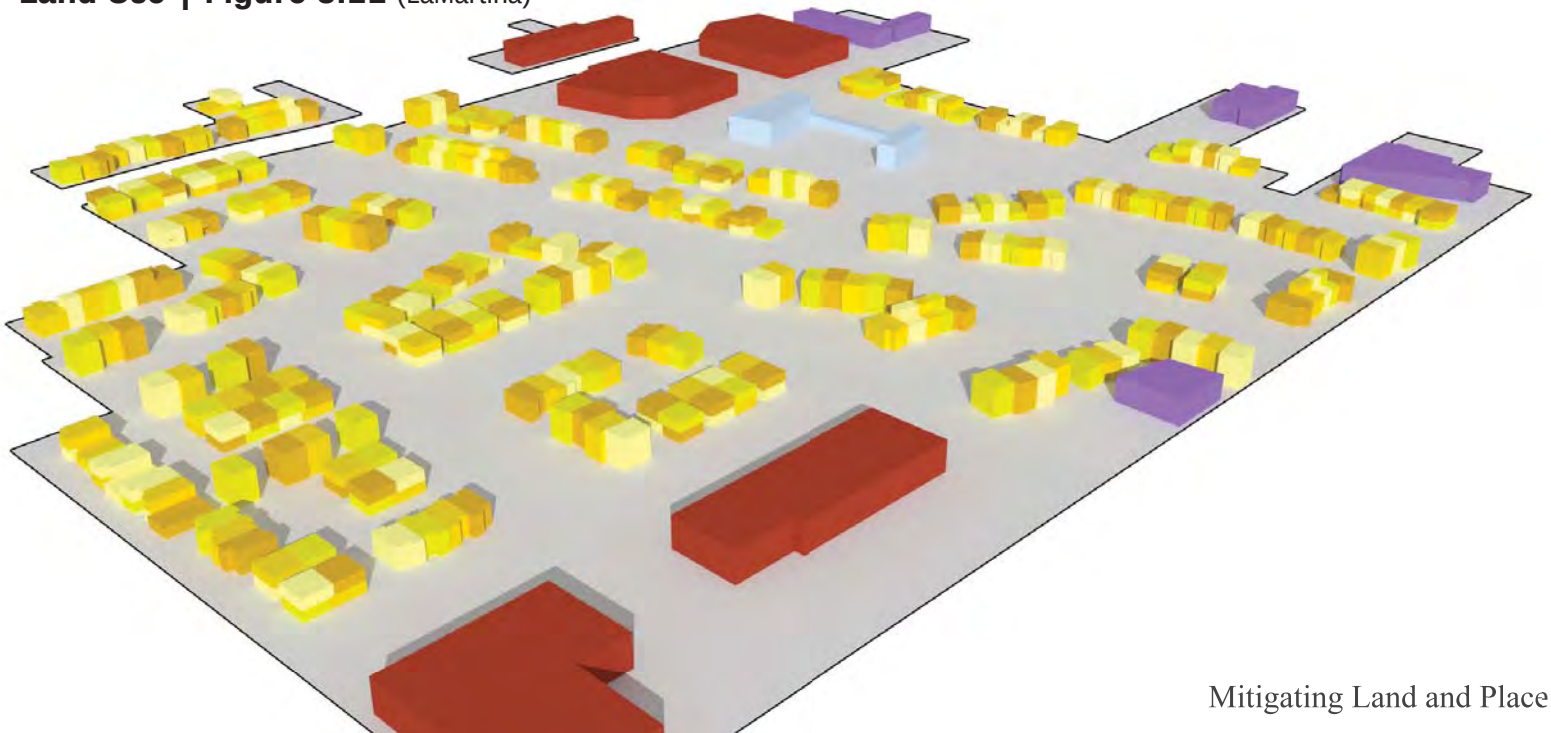
Size Range (square feet)	# of Units	Symbol
400-600	50 units	
600-800	104 units	
800-1000	80 units	
1000-1200	68 units	
1200-1400	44 units	
1400+	48 units	

Land Use	Table 8.2			
Housing Type	Average Median Income	% Mix	# of Units	Key
Affordable &	<50% AMI	25%	98	
Low Income	50-99% AMI	25%	99	
Market Rate &	100% AMI	25%	99	
Above	>100% AMI	25%	98	
Total			394	

Commercial		
Community Center		
Light Industrial		

Housing types are provided for residents with varying income levels that are expressed in terms of their annual median income. Annual median income (AMI) is based on the distribution and income level of families and individuals in the area. The proposed redevelopment allocates one quarter of the units to four income levels, providing affordable housing and market rate housing. These four income levels include: less than 50 percent of the AMI, 50-99 percent of the AMI, 100 percent of the AMI, and greater than 100 percent of the AMI. All income levels dispersed in a mix across the proposed redevelopment as displayed in Figure 8.11.

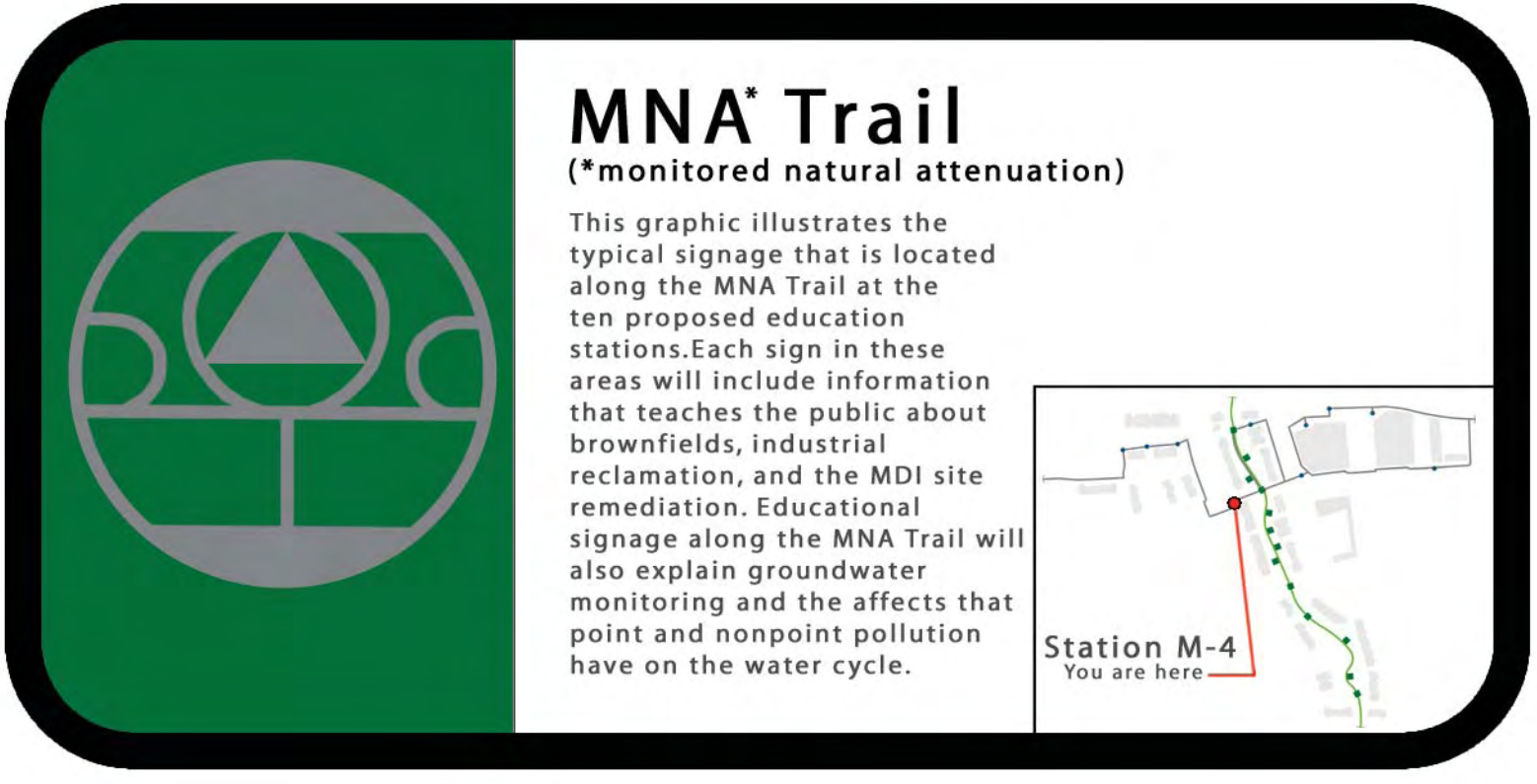
Land Use | Figure 8.11 (LaMartina)



Educational trails are implemented throughout the proposed redevelopment that provide public open space to residents. These trail systems connect a series of seating areas and gathering spaces containing educational signage. This signage teaches residents and visitors about brownfields and the MDI Superfund remediation. Specific benches and signage elements are specified for use along the educational trails (Figure 8.12). Benches along these areas are built from recycled fifty-five gallon drums that reflect the site's industrial past. The educational trail system includes two overlapping routes that are referred to as the MNA Trail and the Phyto Trail (Figure 8.13). This educational system aims to connect residents to their home by embracing the site's history. It is intended that these trails benefit the community through amenities while instilling a sense of place and proprietorship.

Bench and Signage Detail | Figure 8.12 (LaMartina)

Educational Trails | Figure 8.13
(LaMartina)



MNA Trail Sign Detail | Figure 8.14 (LaMartina)

Scale 1in = 6in

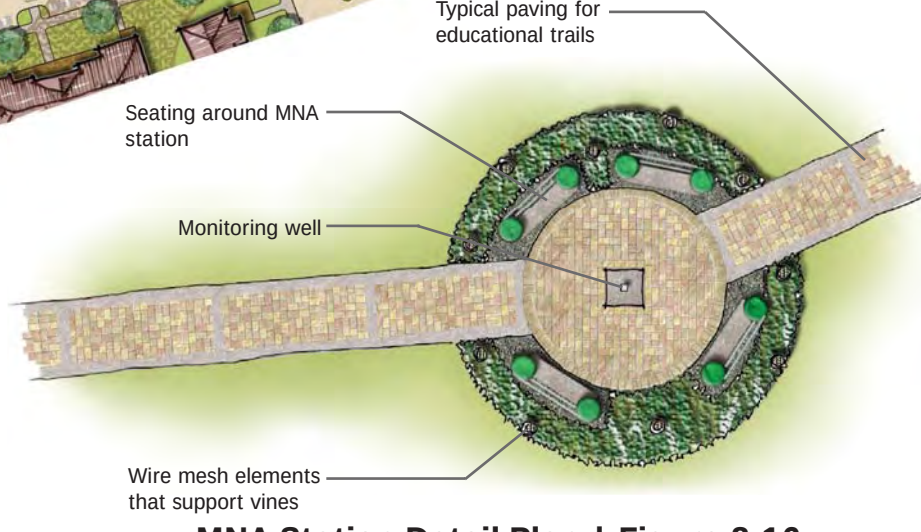
The MNA trail runs from east to west, connecting the proposed redevelopment to Bruce Elementary in the west and the existing community to the east and west of the site. The MNA Trail contains ten stations in residential and commercial areas located where monitoring well stations remain post-remediation. Each station along the MNA trail implements signage that educates the public (Figure 8.14).

MNA Trail | Figure 8.15

Scale 1in = 150ft

(LaMartina)

Figure 8.15 illustrates the connectivity between the existing community, the proposed development, and the MNA Trail. All ten stations are connected by six foot wide sidewalks highlighted by pave stones that differ from typical concrete sidewalks in the proposed redevelopment (Figure 8.16). A similar paving detail that differs in color is implemented along the Phyto Trail. Figure 8.16 also depicts the typical MNA station for areas that are more recreational (stations one through six). Benches illustrated in Figure 8.12 are sited around the MNA station which transforms the monitoring well into a focal point. The well remains accessible for ground water monitoring, but it becomes something that the



MNA Station Detail Plan | Figure 8.16

Scale 1in = 15ft

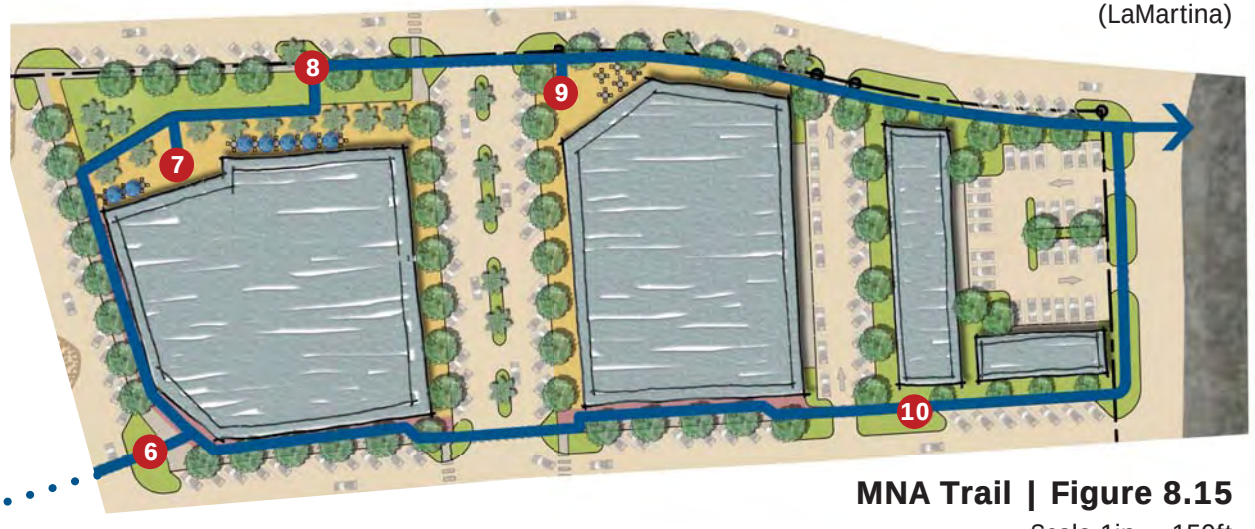
(LaMartina)

community can pride themselves in instead of just a remnant of the industrial past. Figure 8.17 illustrates the entry sequence of one of the first six MNA stations. Wire mesh structures of varying heights surround the monitoring well that make these stations visible from a distance and help to create a sense of enclosure without confining the space. It is important that the space is not too confined so as to promote watchfulness and discourage crime.

Stations seven through nine are located along the streetscapes that front commercial hub B. These stations are similar in nature as they are centered around monitoring wells with seating and signage. They differ in that they are more open to encourage the use of pedestrians along the store fronts.

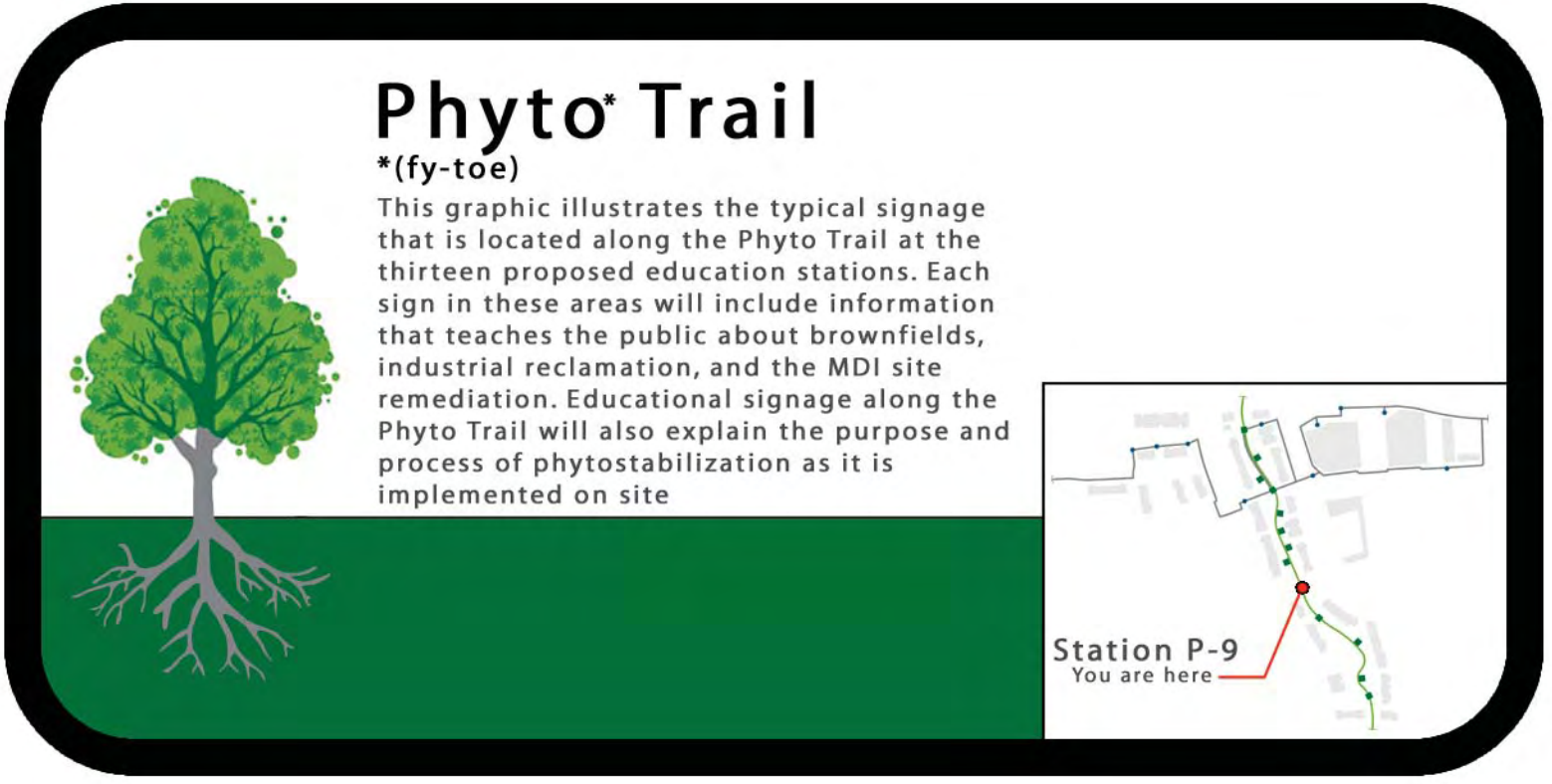
MNA Station Perspective | Figure 8.17

(LaMartina)



MNA Trail | Figure 8.15

Scale 1in = 150ft

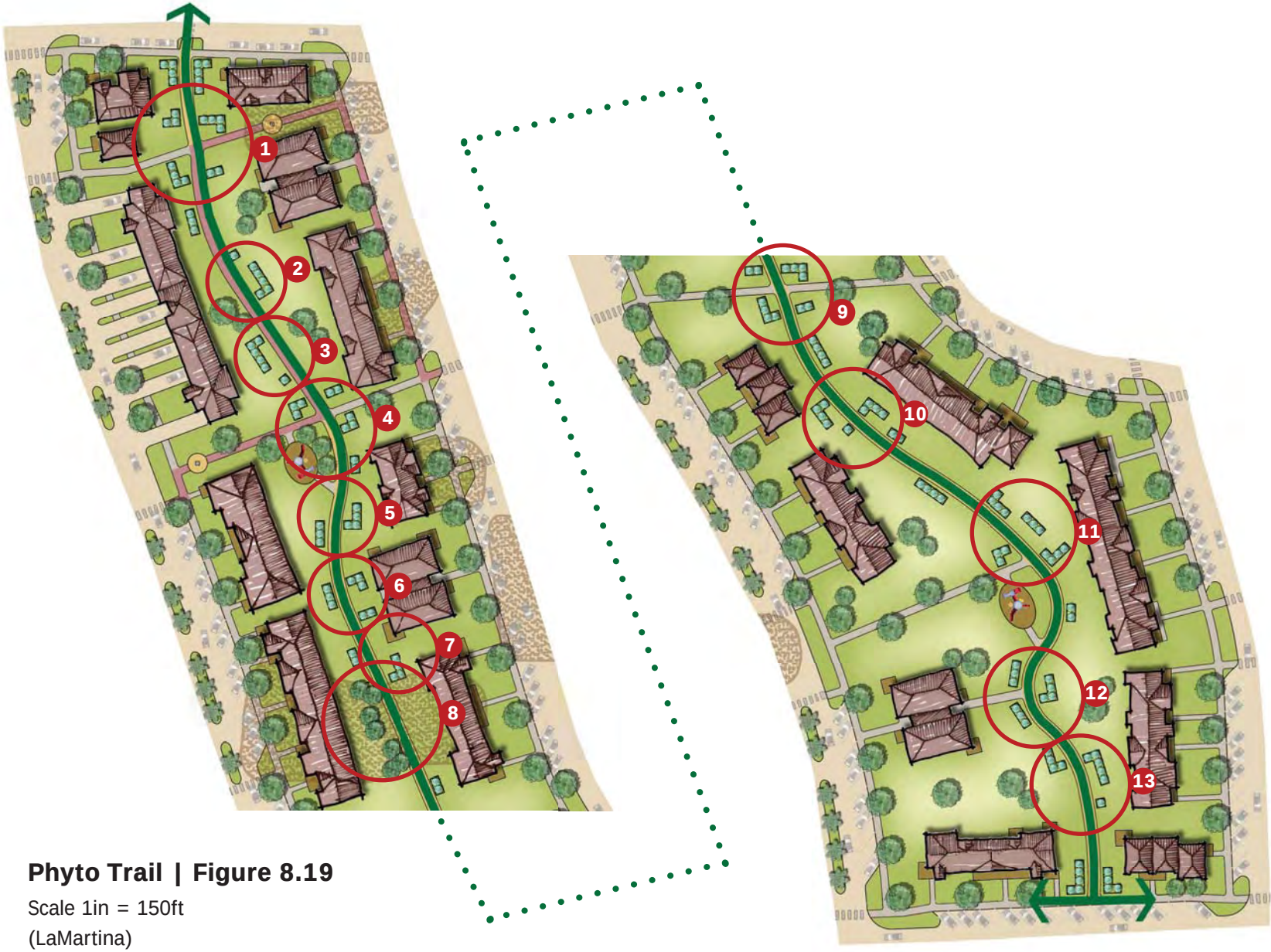


Phyto Trail Sign Detail | Figure 8.18 (LaMartina)

Scale 1in = 6in

The Phyto Trail runs from north to south, connecting the proposed redevelopment to the existing community and the proposed MNA Trail. The Phyto Trail contains thirteen stations along the public pedestrian corridor that follow the storm sewer easement (Figure 8.19). The stations along the Phyto Trail are shaped by a series of Phytostabilization areas that follow this pedestrian walkway. Although soils on-site meet regulatory levels, it is desirable to continue the remediation on site. The use of Phytostabilization is used to limit the bio-availability of lead. Phytostabilization areas are enclosed by three foot wrought iron fences that create an attractive barrier. These fenced areas are constructed in seven foot modules, based on the spacing of plant material. Each area is planted with Indian Mustard grasses and hybrid poplars for their tolerance to lead. Benches and signage are implemented at the thirteen stations along the Phyto Trail (Figure 8.18).

Each Phytostabilization station is a unique space created by the rhythmic spacing of modules. This promotes residents' sense of proprietorship for these spaces that appear near their homes. All stations are typically as



Phyto Trail | Figure 8.19

Scale 1in = 150ft

(LaMartina)

described except for station eight. Station eight is located above one of the geotextile caps which offers a unique educational opportunity. This station is shaped by raised planter boxes as in Figure 8.9 that correspond with the Phyto Trail seven foot modules. The signage at this station should explain how the geotextile capped areas affect the site and the development.

Figure 8.20 demonstrates how the Phyto trail interacts with proposed dwelling units. At ten foot wide, this walkway is comfortable for many types of passive recreation. Pedestrian lighting is placed along the walk to encourage night-time use, providing a sense of safety and security. Plantings and turf areas along the Phyto Trail are graded to slow the flow of stormwater. This promotes infiltration and minimizes runoff before water enters drain inlets. This graphic is shown in section to illustrate the root system of the hybrid poplars and Indian Mustard. These plants limit the bio-availability of lead, promoting a continued remediation on-site for years to come.

Phyto Trail Station 11
Figure 8.20
(LaMartina)

Conclusions

Figure 9.1: Depicts a portion of the MNA Trail and how it interacts with the commercial hub in the north of the site (LaMartina).

9

In conclusion, redevelopment of the MDI Superfund site can benefit the developer and the community without contributing to gentrification in the Fifth Ward while facilitating public health. In order for this to occur, it is important to achieve the mitigation of land and place. Mitigation of land and place are infused with a single gesture. This addresses social issues through the response to an environmental cleanup (Figures 9.2 and 9.3). Mitigation of land and place is shaped by design principles and goals that benefit the community, minimize gentrification, and facilitate public health.

The proposed redevelopment would benefit the community because of specific programming that caters to the southern portion of the Fifth Ward. This redevelopment strategy opens up to the community as opposed to turning in on itself. New opportunities for shopping, dining, employment, and recreation would make the community a better place, according to the Fifth Ward community survey.

Implementation of a mixed income development will help to minimize the risk of gentrification. This housing scenario is more likely to appease the developer and the community. This could provide a number of benefits to those of lower income.

The proposed redevelopment facilitates public health which is maintained and improved. In the case of MDI Superfund, public health is maintained by adhering to the remedial design and embracing the product. Public health is improved with the implementation of phytostabilization that continues to reduce the bio-availability of lead.

MNA Station 8 | Figure 9.2
(LaMartina)

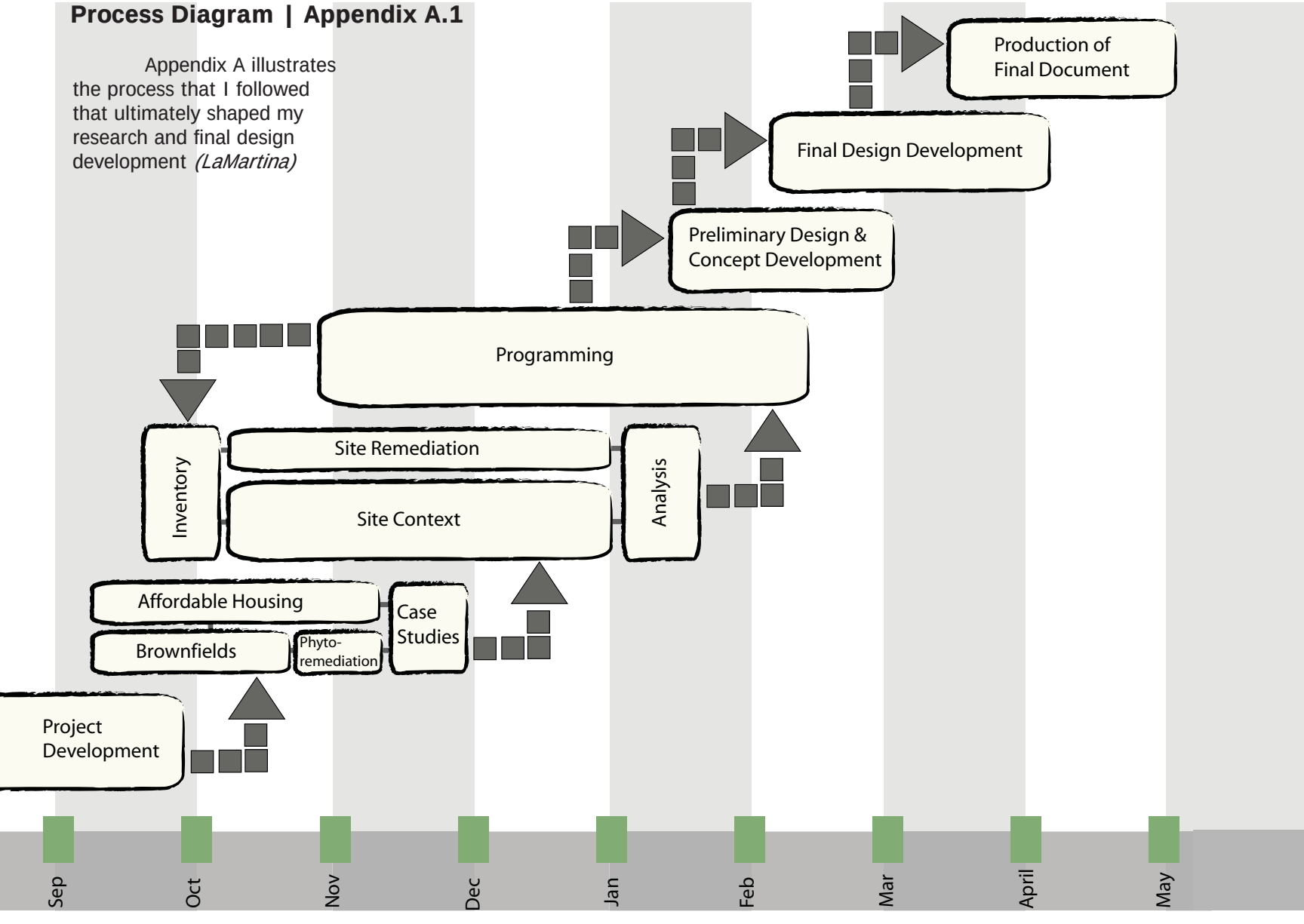
Commercial Hub B and the MNA Trail | Figure 9.3
(LaMartina)

Appendix

Appendix A.2: Community features (LaMartina adaptation)

Process Diagram | Appendix A.1

Appendix A illustrates the process that I followed that ultimately shaped my research and final design development *(LaMartina)*



Community Features | Appendix A.2

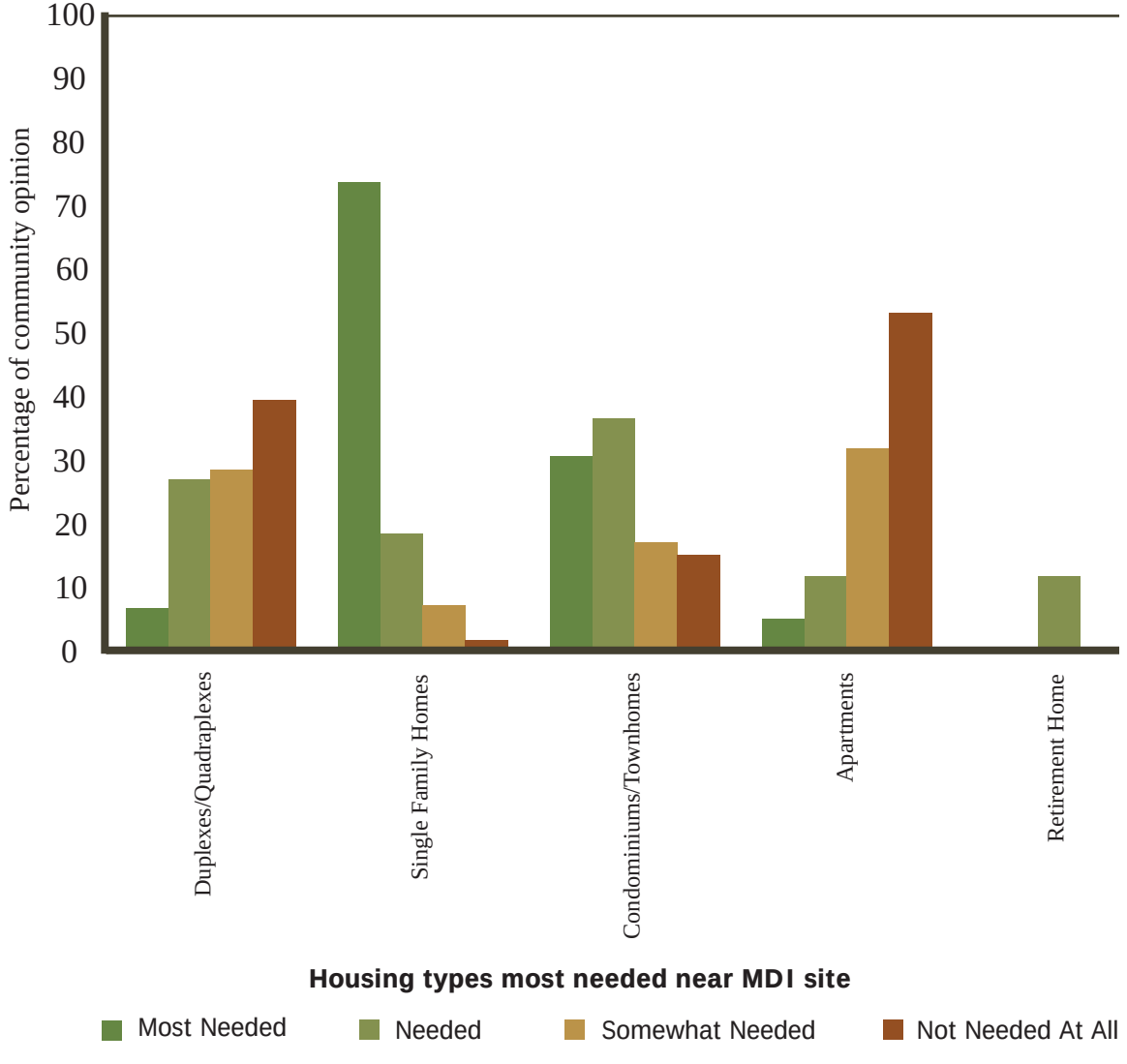
Appendix B shows the most important features that Fifth Ward residents would like to see incorporated into the community. This data was used to shape the program needs of the MDI Superfund redevelopment *(LaMartina adaptation)*

Crime Problems | Appendix A.3 (LaMartina)

Appendix C shows the percentages of perceived crime problems based on the opinions of Fifth Ward residents. Defensible Space design principles are important to alleviate these problems *(LaMartina adaptation).*

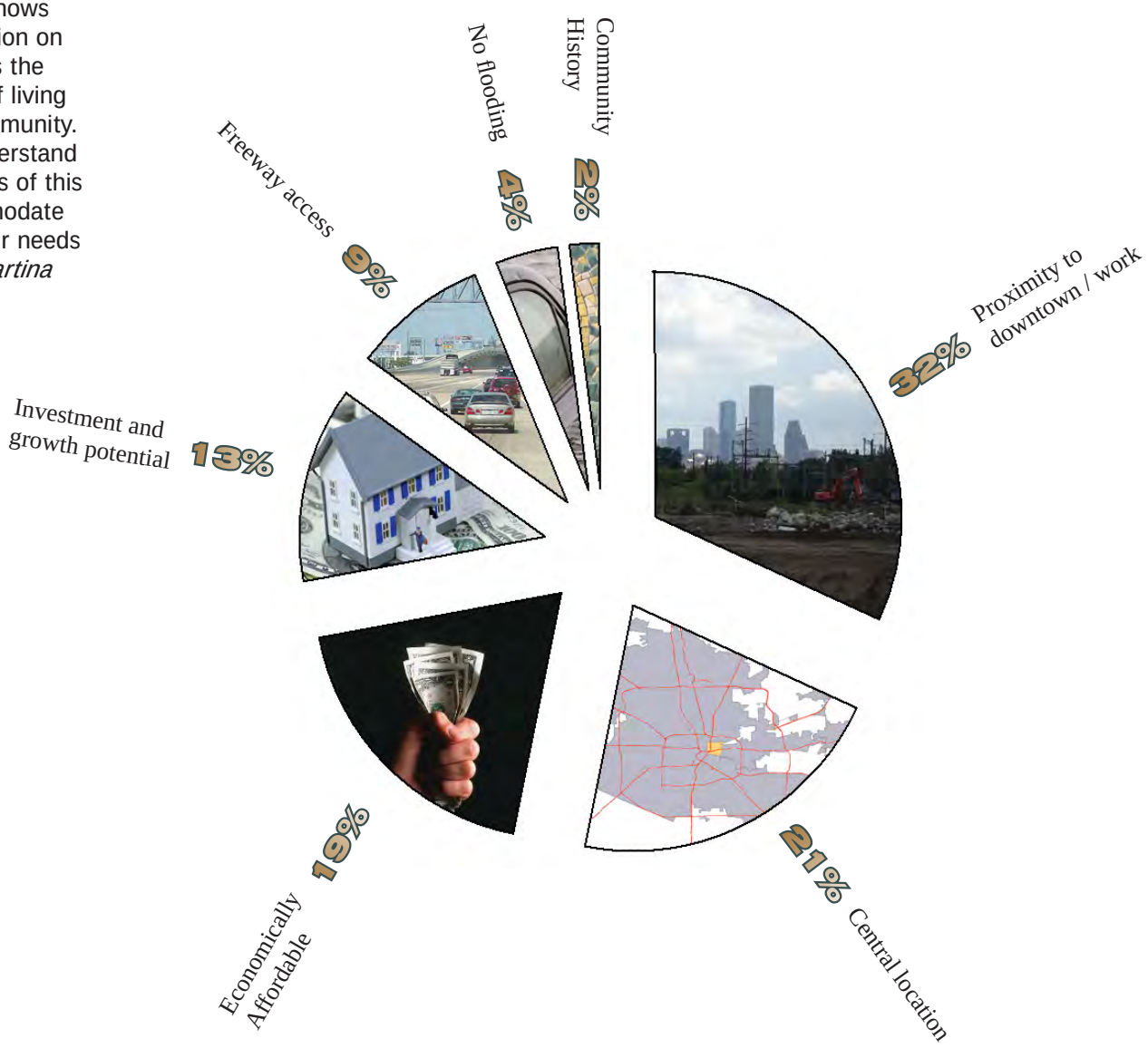
Housing Types Most Desired | Appendix A.4 (LaMartina)

Appendix D shows what housing types residents of the Fifth Ward think are most needed or least needed in the area proposed for redevelopment *(LaMartina adaptation).*



Advantages to Living in the Fifth Ward | Appendix A.5 (LaMartina)

Appendix E shows the community's opinion on what they perceive as the biggest advantages of living in the Fifth Ward community. It is important to understand what current residents of this area value to accommodate without inhibiting their needs through design *(LaMartina adaptation).*



Glossary

Accumulator: Heavy metal-tolerant plant species which concentrate and detoxify metals in parts of the plant that is above ground. See also Excluder (Pierzynski).

Affordable Housing: This consists of housing that costs no more than 30 percent of a household's monthly income. This includes monthly rent and utilities (US Department of Housing and Urban Development).

Brownfields: "abandoned and underutilized industrial properties that are known or suspected to be contaminated. Various researchers estimate that from 25,000 to 400,000 sites across the United States may be considered brownfields." (Russ).

Hazardous soils (for MDI site): Soils containing equal to or greater than 500 mg/kg total and 5 mg/L TCLP Lead (EPA).

Environmental Remediation: Cleanup efforts to improve environmental quality that meets EPA standards to alleviate risks to people, animals, and natural systems.

EPA: U.S. Environmental Protection Agency

Gentrification: "The process of renewal and rebuilding accompanying the influx of middle-class or affluent people into deteriorating areas that often displaces poorer residents." (Merriam-Webster).

Hyperaccumulators: Metal tolerant plant that accumulates an exceptionally high level of metal, to a specified concentration or to a specified multiple of the concentration found in other nearby plants (EPA).

Industrial Reclamation: This term is used to describe the redevelopment and remediation of land previously vacant and useless because of contamination or adverse conditions that were remnants of past industrial uses.

Infill: The development of a vacant area in an urban environment planned as an urban renewal technique.

Infiltration: The rate at which water is absorbed into the ground through a combination of soil and engineered porous materials.

Legal landscape: The combination of policy, legislation and regulations that protect public health and natural resources. Legal landscape can provide various opportunities and constraints that guide important aspects of site development.

Metal-tolerant plants: Plants that can grow in metal rich soils without accumulating the metals (EPA).

Operable Unit 1: The proposed project site, formerly a metal casting facility and currently the vacant MDI Superfund site (EPA).

Glossary

Operable Unit 2: This includes the residential yards and high access areas surrounding the MDI Superfund site. Contaminated soil was removed from OU2 and stockpiled at OU1 for treatment as one of the fist steps in the remedial process to reduce public health risks (EPA).

Phytoextraction: The uptake of contaminants by plant roots and translocation into the above-ground portion of the plants, where it is generally removed by harvesting the plants. This technology is most often applied to metal-contaminated soil or water (EPA).

Phytoremediation: The use of plants to absorb contaminants into plant tissues, to metabolize or biochemically convert the contaminant, or to diminish the concentration of contaminants in another way. This process varies depending on the plant material and the types of contaminants (Russ, 88).

Phytostabilization: The use of plants to immobilize contaminants in soil through absorption and accumulation by root structure.

Plume: A volume of contaminated groundwater in an aquifer that extends from a specific source of contamination (EPA).

Superfund: A United States federal government program that focuses on the cleanup and remediation of the nation's uncontrolled hazardous waste sites. Sites are cleaned up to EPA standards that protect the environment and the health of the general public (EPA).

TCEQ: Texas Commission of Environmental Quality. TCEQ is an environmental agency that strives to protect human and natural resources in Texas.

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