Brownfield Redevelopment Study of Beardsley Park Neighborhood

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Overview

Past developments located in the Beardsley Park neighborhood of Champaign have warranted the need for this Brownfield Study. A total of three sites have perceived contamination with the ability to leach out to other nearby property within the area. These past developments along with present activities in the area have had the potential to deposit petroleum and its by-products, polychlorinated biphenyls (PCBs), coal and a host of other unknown contaminants. Exposure to these contaminants can result in health risks, can depress property value, and can limit the range of future development in the area. The perceived contaminants are in very close proximity to residential and commercial establishments, and pose a direct threat to the health of the residents and visitors to the community.

This study addresses the appropriate cleanup and sources of funding for the remediation of the sites, and the development benefits that can result from the cleanup. Available financing tools to facilitate proper remediation of the site are presented. PSI Environmental Service conducted a Contamination Assessment of the area for the City of Champaign including soil core sample data, groundwater data, and contaminant results (see Appendix).

This assessment serves the as primary data being examined in this study from which cleanup estimates and policy recommendations are made. This study was not comprehensive but limited to public land away from the heart of expected contaminated private sites. Therefore, this study cannot produce exact costs or specific cleanup technologies. Instead, this study estimates the nature, magnitude, and extent of contamination using a low, moderate, and high potential cleanup cost based on different types of contaminant.

This study will serve as the first step in decision-making of brownfield redevelopment by examining the means of remediation and recommending a cleanup process that will produce the greatest flexibility in land use once decontaminated. At best, this study will provide the City of Champaign with the most feasible remediation procedures. The overall objective is to establish the safest, most cost-efficient method for the sites in question, and to secure the area for the Beardsley Park neighborhood residents and businesses.

Introduction

The term brownfield refers to known contaminated lands or lands with perceived contamination. These sites are normally industrial and commercial developments that are prevented from attaining their highest and best use as a result of the perceived or actual contamination (Simons 1998, ix). Far too often, they are left undeveloped due to the risk and costs associated with their decontamination. The lack of clean up results in vacant lots, abandoned buildings, and non-conforming uses. Abandonment or underutilization can be a fenced off eyesore, depress adjacent land value and cater to criminal activity and illegal dumping. Worst of all brownfields have the potential of causing detrimental health conditions to the inhabitants of the area. Most often, these sites are located in low-income communities and contribute to their declining economic status. Once these brownfield sites are remediated and developed, the area has a chance to turn around aesthetically, as well as economically.

Background

The Beardsley Park neighborhood, located in North Champaign, has been plagued with land use conflicts, non-conforming uses, flooding, underutilized properties, and crime. Many of these factors are due to the prior developments in the area. It is a strong possibility that past uses in the Beardsley Park Neighborhood deposited a number of pollutants that remain in the soil and have possibly leached into the groundwater, and onto surrounding property.

Areas 1, 2, and 3 (see Figure 1 -- all figures are found in the Appendix) were previously owned by Phillips Petroleum, Standard Oil, and BC Beach & Co., respectively. Each of these establishments occupied the area for more than 30 years. Over that 30-year time span, leaking tanks, spills, and contaminant penetrations through the soil were possible and expected by the city. Even under the most careful of circumstances, such instances occur. The first two sites, Areas 1 and 2, operated as storage facilities for petroleum and its bi-products (i.e. bulk oil, underground storage tanks, etc.).

Area 3, BC Beach & Co., operated as the old city powerhouse from the early 1900's to 1963 providing supplementary electrical energy generation for the city. The site was used to store coal and is located along the Pennsylvania Central Railroad.

Present Conditions

Area 1, the former Phillips Petroleum facility, is currently owned by Illinois Power and functions as an Electrical Substation (see Figure 3) with a fenced off area to the south. This development proposes a

new hazard to the area because transformers from the substation leak polychlorinated biphenyls (PCB's), a neurotoxic and possibly carcinogenic contaminant, into the ground. Petroleum products coupled with PCB's pose a definite health threat to this area.

This substation also contributes to the area's decline by preventing the continuity of the residential neighborhood and hindering the use of the neighboring park (see Figure 5). For these reasons, it should have been placed in another area environmentally buffered from residential neighborhoods. It is an eyesore placed in this residential community without any type of buffering. Only a wire fence separates this area from the adjoining neighborhood (see Figure 7). The height of the transformers decreases visibility to the park facing Eureka; as a result, it can screen criminal activity from view.

The fenced off area to the south is a vacant concrete paved lot believed to be fenced off and unused due to past contamination. This contributes to the underutilized or abandoned appearance of the area. This site could become a constructive and attractive addition to the community. Both properties are currently zoned as I-1 Light Industrial.

Area 2, the former Standard Oil site, is also currently a vacant lot. It is also zoned as I-1 Light Industrial. The city directory lists this property as owned by William Klein Co. Chemical Allied Products. Their building faces Market Street and occupies the southernmost portion of the lot. This leaves the northern portion of lot that faces Eureka Street vacant and fenced off adding to the underutilized property found in this area.

Area 3, the former BC Beach & Co., is presently comprised of clustered development. The area is fenced off from thru-traffic making it difficult to see the type of development within (see Figure 4). The area is zoned industrial, however, developments are a mix of residential, industrial and vacant lots. Most of the residential seems to be dilapidated. The city directory did not list a current owner of this property.

Possible Contamination

Certain activities have a tendency to produce an associated group of contaminants. The former petroleum sites in Areas 1 and 2, are notorious for depositing compounds referred to as "BTEX". BTEX is the acronym used to describe the compounds of **b**enzene, **t**oluene, **e**thylbenzene, and

xylene, which were analyzed in the PSI assessment for the City (see Appendix). Keep in mind that these results were taken from the City easement not the actual site. Therefore, it is highly probable the levels of contamination at ground zero of Areas 1 and 2 will be considerably greater than those found in the easement.

The old roundhouse and railyards probably contained coal and coal gasification by-products. Typical contaminants produced from coal gasification include polyaromatic hydrocarbons, sulfur compounds, cyanide, aluminum, iron, lead, nickel, and chromium. Typical contaminants produced from railyards include Petroleum hydrocarbons, volatile organic compounds, benzene, toluene, ethylbenzene, xylene, solvents, fuels, oil and grease, lead, and PCBs. Until this area is tested for contamination, it is very uncertain what contaminants, if any, will be found and to what degree.

Test Results

A Contamination Assessment was conducted by PSI in October 1995 on public land in the Beardsley Park Neighborhood on the NW Corner of Market Street and Eureka Street. Soil borings and groundwater monitoring wells were installed to conduct soil and groundwater sampling, as well as laboratory analysis. A total of four soil borings were placed in the city easement around the Collegiate Cap & Gown Parking Lot (as shown in PSI Site Plan in Appendix.). They were labeled as follows: B-1, B-2, and B-4 and converted to monitoring wells: MW-1, MW-2, and MW-4, respectively. Monitoring wells indicate the presence of groundwater. However, soil boring B-3 did not produce any groundwater to be analyzed. Groundwater samples were analyzed for petroleum and lead compounds to determine if the bulk oil storage on adjacent private properties had contaminated this area.

B-4 was the only sample to contain organic vapor content. PSI used a Photoionization detector to report results. All of soil borings listed a reading that was below the detection limit of 50 parts per million. After conversion of B-4 to MW-4, benzene compounds were found to be present in concentrations beyond the Illinois Environmental Protection Agency's (IEPA) cleanup objectives. The actual reading of 7.2 micrograms per liter was 2.2 micrograms per liter over the standard. Again, all other monitoring wells were below the detection limit (see PSI Table in Appendix).

M-2 and MW-4 (see PSI Table in Appendix) results were both above the IEPA Cleanup Objectives for Total Lead. MW-4 concentrations were found to exceed the objectives for benzo(a)pyrene and benzo(b)fluoroanthene, as well. MW-1 was considerably lower which infers that groundwater might be flowing from the northeast of each of the petroleum sites through the site to areas to the southwest--see possible leachate zone in Figure 2. Thus, concluding that Area 1 is leaching to MW-4 and Area 2 is leaching to MW-2.

The overall objective of this assessment was to determine the effect the petroleum sites had on Cap & Gown's accessory parking lot. However, the data does not fully confirm the extent of pollution in the lot because soil and groundwater were only tested in the city's easement. Until Cap & Gown gives permission for testing on the site, this can not be determined. On the other hand, since these tests were conducted away from the actual ground zero point of pollution, it proves these contaminants have leached to the city easement. It is expected that the results will be much greater when lots at the center of Area 1 and 2 are tested.

Land Owner Feedback

Illinois Power has no intentions of selling, changing the use, or conducting tests on the Electrical Sub-station in the near future. In fact, on several occasions, they expressed their position of keeping the substation as is. They refused to meet, and phone conversions were very limited.

In a meeting on October 24, 2000, Cap & Gown's Champaign Plant Manager, Pete Slamkowski stated that they would be willing to work with the city to relocate their accessory parking lot (see Figure 6). One of the main reasons for cooperation is that Cap & Gown is concerned for the safety of their workers crossing Market Street to and from the parking lot area. Market Street is so congested with traffic that pedestrian safety is a definite concern.

The City and Cap & Gown should be able to work out an equally beneficial solution to cleaning up this area. If the parking lot can be swapped for city-owned or purchased property, Champaign will be able to carry out tests and proceed with remediation on the property. Cap & Gown seems willing to negotiate with the City, as long as they don't bear the costs of remediating the site, purchasing a new site, or paying construction costs for a new site to be turned into a parking lot. However, it has not

been confirmed whether the area to the south of Cap & Gown, currently owned by B & B Trucking, can be secured by the City for the swap.

In response to swapping land, Cap & Gown's Champaign Plant Manager, Pete Slamkowski, stated that "they would need to get an estimate for constructing a new parking lot before making a comment" (Slamkowski, 2000). When asked would he consider swapping for a tax break, he said, "that might be an option he would seriously *consider*".

Some possible solutions that Cap & Gown might consider include:

- A land swap of Cap & Gown accessory parking lot for land south of their main building.
- City remediating contamination at accessory parking lot during Cap & Gown's off-season, then returning the site to a parking lot in peak business months.
- Tax breaks on new parking site after land swap to alleviate costs of paving new site.

Barriers to moving the Parking Lot include:

- Neither the City, nor Cap & Gown own the land south of the Cap & Gown main building.
- If the land swap occurs, Cap & Gown will incur costs of paving the new area.
- Remediating parking lot might take more time than Cap & Gown's seasonal parking need would allow.
- B & B Trucking might not be willing to sell land to the south of Cap & Gown.

Owner feedback was unattainable from Area 3 because there was no listing of an owner in the City Directory for this property.

Extent of Contamination

The actual extent of contamination of Areas 1 and 2 are unknown at this point. Until further testing of the entire area is conducted, only rough guesstimations based on the typology, soil, and flow patterns of groundwater are possible. Until tests can be conducted on the actual core contaminated areas, a definite concentration or exact number of contaminants can not be determined with any reasonable certainty. However, it is highly probable that tests made at the suspected ground zero of the sites where the petroleum was stored and used would be considerably higher than results found from the City easement.

Area 3 has not been tested for contamination. However, information on the historic use of the site is similar to other sites that Illinois Power (IP) has previously cleaned up. The background from those cases should give a good indication of the likelihood of contamination for this site.

A September 23, 1986, News Gazette Article read "Old coal-gas plants may be contaminated." This report was based on findings of waste products known to cause cancer at a Taylorville coal-gasification plant. Tests conducted on the site showed pollution covering a vast area that would result in extensive cleanup costs. The Taylorville waste brought concern to other utility companies that may encounter the same situation because cancer-causing "compounds were found that are hard to break down and therefore persist in the environment" (Pringle 1986, pA-1).

A November 7, 1997 News Gazette article reported that Illinois Power performed a cleanup on the old coal gasification plant in the 300 block of North Fifth Street. "Workers excavated coal tar, cinders, and soil from the area around the old gas holder and tar wells then filled the area with broken concrete and limestone and covered with clean soil. After IP blended the excavated material with coal and lime, they tested the result for compliance with regulatory standards for nonhazardous waste, then shipped it to IP's Baldwin Power Station where it was burned in the plant's boilers" (Bloomer 1997, pA-3).

Soil Study

Soils in the Beardsley Park area are classified as Drummer Flannagan. The Drummer series soils are typically dark-colored, "poorly-drained", and developed in 40 to 60 inches of silty material (Alexander 1974, 45). By poorly drained, it means that the soils are wet for long periods and are light gray and irregularly marked with spots of different colors (Alexander 1974, 129).

Flow of Water

Based on the results from the PSI study, the groundwater flow for the area adjacent to Beardsley Park is from northeast to southwest, meaning the water would flow into the Boneyard Creek. The lowest point in the area for the creek is now the new retention basin east of Illinois Central Gulf Railroad (see Figure 1.) Leachates would contribute to the Boneyard's poor water quality. "The Beardsley Park area watershed includes approximately 1.0 square mile of area and 1.69 miles of channel length" (Perkins 1998, 30).

Boneyard Creek is notorious for flooding problems. "Causes of flooding documented by previous studies and reports include: 1) rapid runoff rate due to the urbanized character of the entire watershed, 2) several locations where multiple large storm sewer outlets converge, 3) limited channel capacity, 4) channel restrictions due to building encroachment, bridge and culvert restrictions, and general encroachment with the floodplain and floodway" (Perkins 1998, p32).

Levels of Cleanup

Local governments must be cognizant of the cost-to-use trade-off relationship between the desired level of cleanup and the site's future use. The key to obtaining a successful brownfield redevelopment program is to determine, as early as possible, the future use of the site to achieve the most cost effective and health appropriate result. To ascertain the level of cleanup needed, "risk assessments" are the first step. Risk assessments can take a number of forms from a least costly basic assessment to a higher priced detailed assessment.

There are three options for contamination assessments listed below. It is the decision of the City which option to choose. However, when costs of remediating a site can run into millions of dollars, it is best to conduct more data collection and analyses as in Option 3. The least costly assessment (Option 1) is geared towards sites that have less serious contamination. Listed below are the processes that each assessment undergoes to document the risks of the site.

Option 1: Tier 1 Assessment

- Compare concentrations of toxic substances at a site with risk based screening levels
- Based on conservative assumptions using historical records, visual inspections, and initial site assessments

Option 2: Tier 2 Assessment

- Uses site specific target levels applying actual points of exposure, rates of contaminant travel, and other factors at a particular site.

Option 3: Tier 3 Assessment

Uses more sophisticated analyses including:

- Detailed site assessments.

- Probabilistic exposure evaluations.
- Sophisticated fate and transport models.

(Tier assessments taken from Kirshenberg 1997, p4-2)

In 1997, Illinois' Pollution Control Board changed how Illinois assessed the cleanup of contaminated soil and ground water by adopting a risk-based system for determining cleanup objectives. This system of regulation, called "the Tiered Approach to Corrective Action Objectives (TACO), eliminates uncertainty over how cleanups should be conducted in the future" (Reott, et al, 1998).

Cleanup Options

When remediating contaminated sites, cleanup strategies can take many different forms. Each is specifically designed to meet a certain purpose, and vary in cost, procedures, and availability. The least costly procedures leave a substantial amount of contaminated soil on the site, but the land use that will be allowed on the site is appropriate for that level of cleanup. Because we do not know the actual level and type of contamination at the 3 sites in Beardsley Park, a method had to be devised to cover all the possible outcomes of a comprehensive tier assessment at ground zero for all contaminant travel paths. An analytic model that looks at 4 alternatives of cleanup, the cost, and reuse potential of each accomplishes this.

Least Cost Options

Alternative 1: No Cleanup - Leave area as is.

- No costs are incurred.
- All contamination remains on properties.

Alternative 2: Encapsulation - Completely cover hazardous area.

- Low to moderate cost.
- Moderate risk.
- Risk factor prevents loan acceptance.
- Groundwater may still be affected.
- May require deed restrictions regarding land use.

Alternative 3: Remove Hot spots - After systematic site testing, material well above state-mandated limits can be removed off site; other material can be treated on site.
- Great for minimizing costs (i.e. less transportation and disposal costs for removal).
- A well-designed plan must be in place.

Next, because of the known petroleum compounds and groundwater contamination (see PSI Tables in Appendix) found in the city easement results, an examination of some technologies specifically geared to these issues must be considered. These practices are more costly than the aforementioned practices because of the equipment used and/or the greater amount of contaminant removed from the area on a permanent basis.

More Costly Options

Alternative 1: Excavation - Haul contaminated soil and demolition debris to a special landfill.
- Hauling costs are considerable.
- All contaminated soil is removed from the site.

Alternative 2: Soil Washing/ Steam Stripping - Applying steam to remove volatile and semivolatile organic compounds. It requires flushing of injecting water into contaminated areas.
- Works best on petroleum contamination.
- Low to moderate cost.
- Equipment availability is a factor

Alternative 3: Air Stripping - Passes air through the groundwater to improve the transfer between the air and water in its gaseous and liquid states.
- Used specifically for groundwater remediation for petroleum products.
- High costs of designing specific solution for contaminated property. Design and assessment must be done case by case.

Alternative 4: Pump and treat - Fluids are pumped into a containment area collecting contaminants in soil and groundwater.
- Very costly.

- Uncertain length of treatment.
- Frequent monitoring required.

Site use options

Brownfield redevelopment has the potential to resurrect a neighborhood by allowing higher economic land uses in place of the old, vacant, or underutilized sites. Because of its vacant and underutilized property Beardsley Park has suffered from lack of investment for over 30 years. Brownfield cleanup could be extremely beneficial to the neighborhood. Let's look at four options for the remediated site and some of the possible advantages and disadvantages that might result. All options, with the exception of #1, require the properties to be rezoned before development. Area 1, Area 2, and Cap & Gown's accessory parking lot are capable of being rezoned to office, commercial or residential with proper cleanup. Area 3's proximity to the railroad tracks is best suited to its current industrial zoning or rezoning as park land and open buffer space, as shown in the City of Champaign's Beardsley Park Neighborhood Plan 2000. Whatever the final land configuration, the area's mixed uses should be resolved in order to function as its zoning classification intends.

Option 1: No change (After remediation of sites, turn them back over to current owner to maintain its current use).

- Area would not benefit aesthetically or economically, only environmentally.
- Property values would remain the same.
- Very little remediation would be needed, therefore least costly option.
- Impervious surfaces of current uses (i.e. substation, parking lot, etc.) continue flooding problems.
- Traffic from Cap & Gown parking lot continues to cause concern for pedestrian safety.
- Conflicting uses continue.

Option 2: Turn remediated areas into residential in-fill housing

- Maintains neighborhood continuity.
- Stimulates neighborhood revitalization.
- Reduces the amounts of conflicting uses in the area.
- Increase property values.
- Residential areas would need considerable remediation.

Option 3: Turn remediated areas into commercial establishments

- Area 1 could become a neighborhood recreation center as an extension of Beardsley Park.
- Area 1 or 2 could be rezoned to attract small business to the area, thus stimulating economic growth and tax revenues.
  - Jobs would be created in the area.
  - Might take away from residential character of the neighborhood.
  - Traffic would increase around the park and in residential areas bringing about safety issues.

Option 4: Turn remediated areas into open space

- Maintains park-like settings landscaped with trees, benches, paths, and ponds.
- Reduction in impervious surfaces would reduce flooding problems dramatically.
- Green space could serve as detention areas, (wet or dry), for floodwaters.
- Area would function as zones of social interaction.
- Contribute to area visibility, therefore reducing crime.
- Definite aesthetic improvement.

Costs of Cleanup Costs of cleanup are very difficult to determine because of the lack of knowledge about the extent of contamination at this point. However, listed below are some ballpark figures of the process:

- Phase I Environmental Site Assessment ranges from $1500 to $2500 or higher.
- Phase II Environmental Site Assessment ranges from $5000 to $25000 and higher.
- Phase III Environmental Site Assessment varies tremendously from a few thousand dollars to millions of dollars. This is dependent upon the type of remediation, extent of contamination, and soil and groundwater at site and size of the area.

Sources of Funding 'The Comprehensive Environmental Response, Compensation, and Liability Act, 42 U.S.C.A. § 9601 et seq. (1980) called CERCLA was established by the EPA to remediate contamination from past waste disposal practices that now endanger, or threaten to endanger, public health or the environment. The primary functions of CERCLA is (1) to impose strict liability on parties responsible for the release of hazardous substances (§ 107), (2) by creating a "Superfund" to finance actions to

clean up such releases (§ 111), and (3) by imposing the cleanup costs upon the parties who generated and handled hazardous substances" (Plater et al 1998, Reference materials p52).

There are a few instances where the Superfund Program has shortcomings. For one, the process is very lengthy with an average of 10+ years between EPA's initial discovery of a potential site's existence and the completion of cleanup (Plater et al 1998, p849). The process can become very litigious, which might destroy the city's relations with the businesses involved. Steps to the process, in Diagram 1 (see page 14), illustrate the time that elapses between each step in the Superfund process. Many times the shortage of EPA personnel allows them to turn over certain aspects to the local government to speed the process along.

State Brownfield Programs are another avenue for receiving remediation assistance. Unfortunately the Illinois Site Remediation Program does not provide financial Assistance. It merely serves liability assurance by providing a No Further Remediation (NFR) Letter that becomes a permanent part of the deed to alert future buyers or sellers that the property represents no threat to human health or the environment.

In the State Brownfield Program, the city "could seek agency review and evaluation of work plans, environmental site assessment reports, response action plans, risk assessment reports, contaminant fate and transport modeling, response action completion reports, and health and safety plans from the IEPA. In addition, "the agency can also assist with establishment of remediation objective levels, sample collection and analysis, community relations, and coordination and communication with other State employees or program participant (Kirsheberg, 1997, pA-22). "

IEPA interaction costs are a $5000 initial prepayment fee, or the City could opt to pay half of the cost for the procedures, whichever is less. Also, a fee assessment equal to the amount of the procedural fee up to a maximum of $2,500 before the issuance of the NFR Letter. The IEPA contact for this program is Rick Lucas of the Division of Land Pollution Control at (217) 782-6761.

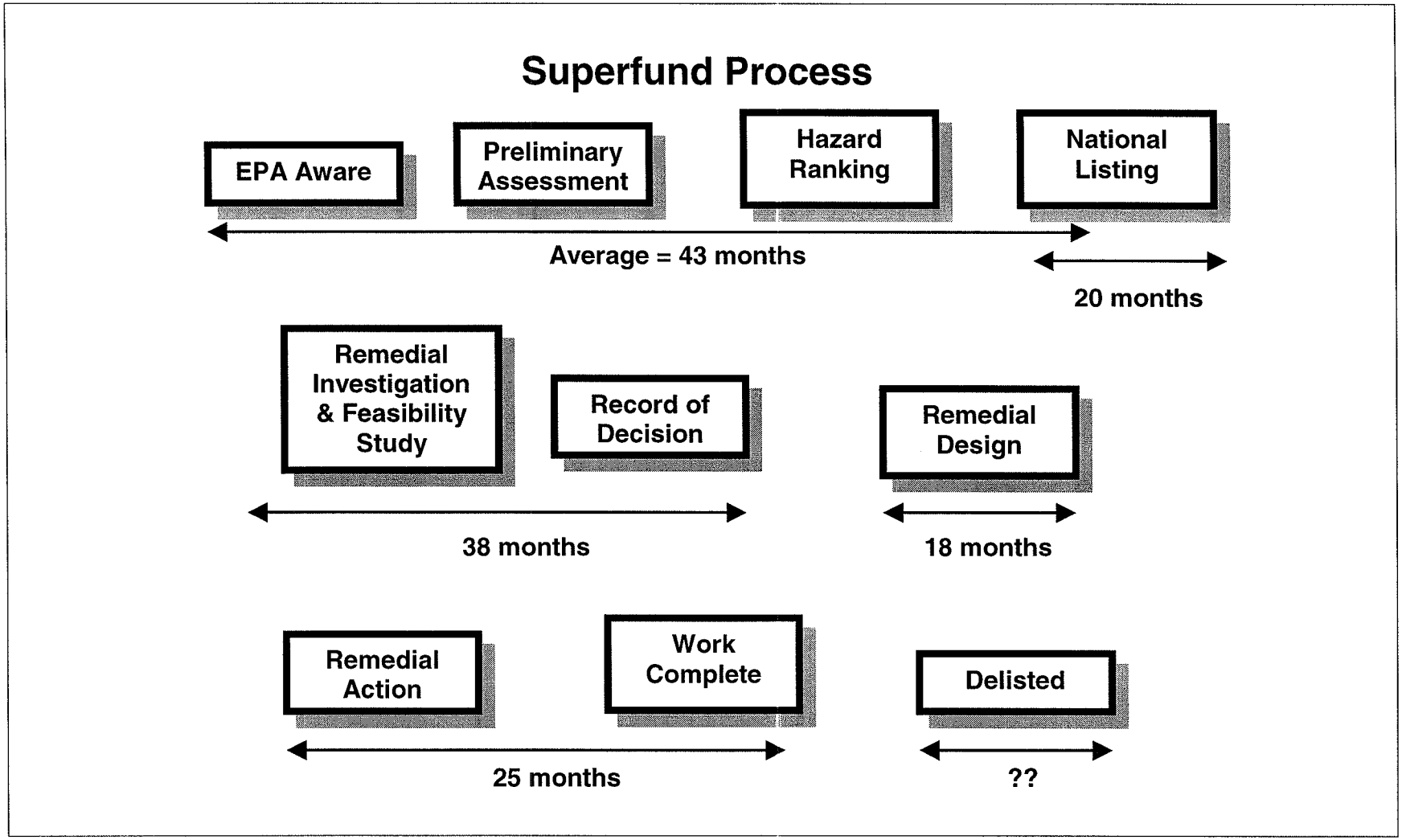


Diagram 1: Average time between Principal Steps in the Superfund Process.
Source: Plater, et al. Environmental Law and Policy: Nature, Law, and Society, 2nd Edition, 1998.

If this program is used to remediate any of the Beardsley Park sites it is important to keep in mind that a change in the land use of the remediated site could result in voidance of the NFR letter. Therefore if the site is remediated to the level of industrial usage, that is the only type of structure that can be placed on the site.

"Grant monies provided by other agencies, such as the HUD Community Development Block Grant Program (CDBG), and EDA Title I public works grants (for industrial parks and infrastructure), could be other sources of funds for activities such as site assessment and cleanup, with concurrence from those agencies and the local governments" (U. S. EPA 1997, p12).

Recommendations A few suggestions for the city to keep in mind when redeveloping brownfields are: 1) to contact IEPA before obtaining property, 2) keep the community involved in the process, 3) create and maintain a brownfield inventory, and 4) construct a detailed process for approaching the redevelopment of these sites. These strategies will become a valuable resource for the City in combating the brownfield issues.

The first step in brownfield remediation is for the City to contact the Illinois Environmental Protection Agency (IEPA) before any remediation work is conducted on contaminated sites. IEPA will provide the City with assistance and paperwork needed to carry out the processes of the remediation.

Community Participation is also a key element to be incorporated into the City's Brownfield Redevelopment Strategy. It is very important to keep the community aware of the developments taking place that will directly affect the residents and businesses of the area. This would be a time to gain feedback from the community about concerns for their neighborhoods.

The City should take steps towards creating and maintaining its own Brownfield Inventory. With an inventory system in place, the City would be able to pinpoint areas of redevelopment, coordinate developers with prime sites, and also create a turnover fund to redevelop new sites from the revenues produced from the remediated sites.

Lastly, the City should construct a detailed matrix for costing-outbrownfield redevelopment. The matrix should function as a model for planners to approach each contaminated sites because the cost of remediation will be a factor of both pollution characteristics and the ultimate reuse characteristics. The matrix should include a range of costs based on: type of pollutants found, level of pollutants, size of contaminated areas, soil conditions, extent of contamination, and size of contaminated area cross tabulated with desired future use of the site.

Diagram 2. Brownfield Remediation Cost Range Matrix

		Planning Area Development Characteristics				
		Residential	Commercial	Industrial	Open Space	Parking Lot
Pollution Characteristics	Type of pollutant					
	Level of pollutant					
	Size of contaminated area					
	Soil conditions					
	Extent of contamination					
	Size of contaminated area					

References

Alexander, J.D., et al 1974. Soil Survey: Champaign-Urbana Area, Illinois.

Bartsch, Charles and Elizabeth Collaton. 1997.Brownfields: Cleaning and Reusing Contaminated Properties. Northeast - Midwest Institute.

Bloomer, J. Phillip. 7 Nov. 1997. "IP Cleanup of Old Champaign Plant Underway." *The Champaign-Urbana News Gazette.*

——— 11 Sept. 1997. "IP to Clean Champaign Coal to Gas Plant." *The Champaign-Urbana News Gazette.*

City of Champaign. 1982. Destination Champaign 21st Century: Comprehensive Plan.

——— 1995. Beardsley Park Neighborhood Improvement Plan: An Element of the Neighborhood Wellness Action Plan.

Illinois Environmental Protection Agency. 1999. Brownfield Redevelopment Tax Incentives.

——— 1999. Brownfield Properties with Underground Storage Tanks: Frequently Asked Questions.

Kirshenberg, Seth. 1997. Brownfields Redevelopment: A Guidebook for Local Governments. Washington, D.C.: International City/County Management Association.

Kline, Greg. 27 July 1990. "Study Indicates Little Risk from Old Coal Gas Plant." *The Champaign-Urbana News Gazette.*

Mathison, Glen. 26 Nov 1990. "IP Readies for New Round of Soil, Water Testing at Local Coal Tar Site." *The Champaign-Urbana News Gazette.*

Perkins, Gary O. 1998 Masters Thesis. Inner-City Neighborhood Redevelopment master Plan: A Case Study of the Beardsley Park Area in Champaign, IL.

Plater, Zymunt, et al. 1998. Environmental Law and Policy: Nature, Law, and Society. 2nd edition. St. Paul, Minnesota: West Group.

Pringle, Kirby. 23 Sept. 1986. "Old Coal-Gas Plants May Be Contaminated." *The Champaign-Urbana News Gazette.*

——— 18 Mar. 1987. "IP Uncertain if Local Coal-Gas Plant Contaminated." *The Champaign-Urbana News Gazette.*

PSI Environmental Geotechnical Construction. 1995 Oct. A Contamination Assessment for City of Champaign for Beardsley Park Parcel.

Reott, Raymond and E. Lynn Grayson. 1998 June. "Risk-Based Corrective Action: Lessons for Brownfields from the Illinois Rulemaking. Air & Waste Management Association, Annual Meeting, San Diego, California.

Simons, Robert. 1998. Turning Brownfields into Greenbacks: Developing and Financing Environmentally Contaminated Urban Real Estate. Washington, D.C.: ULI - Urban Land Institute.

Slamkowski, Pete. 24 Oct. 2000. In-Person Interview with Collegiate Cap & Gown's Champaign Plant Manager.

U.S. EPA. 1997 Dec. Expediting Clean-Up and Redevelopment of Brownfields: Addressing the Major Barriers to Private Sector Involvement -- Real or Perceived. http://www.epa.gov/efinpage/brncle.htm.

——— 1996 Sept. An Integrated Approach for Brownfield Redevelopment: A Priority Setting Tool. Smart Growth Network. http://www.smartgro...ields_tool/brownfields_priority_set.html.

Appendix

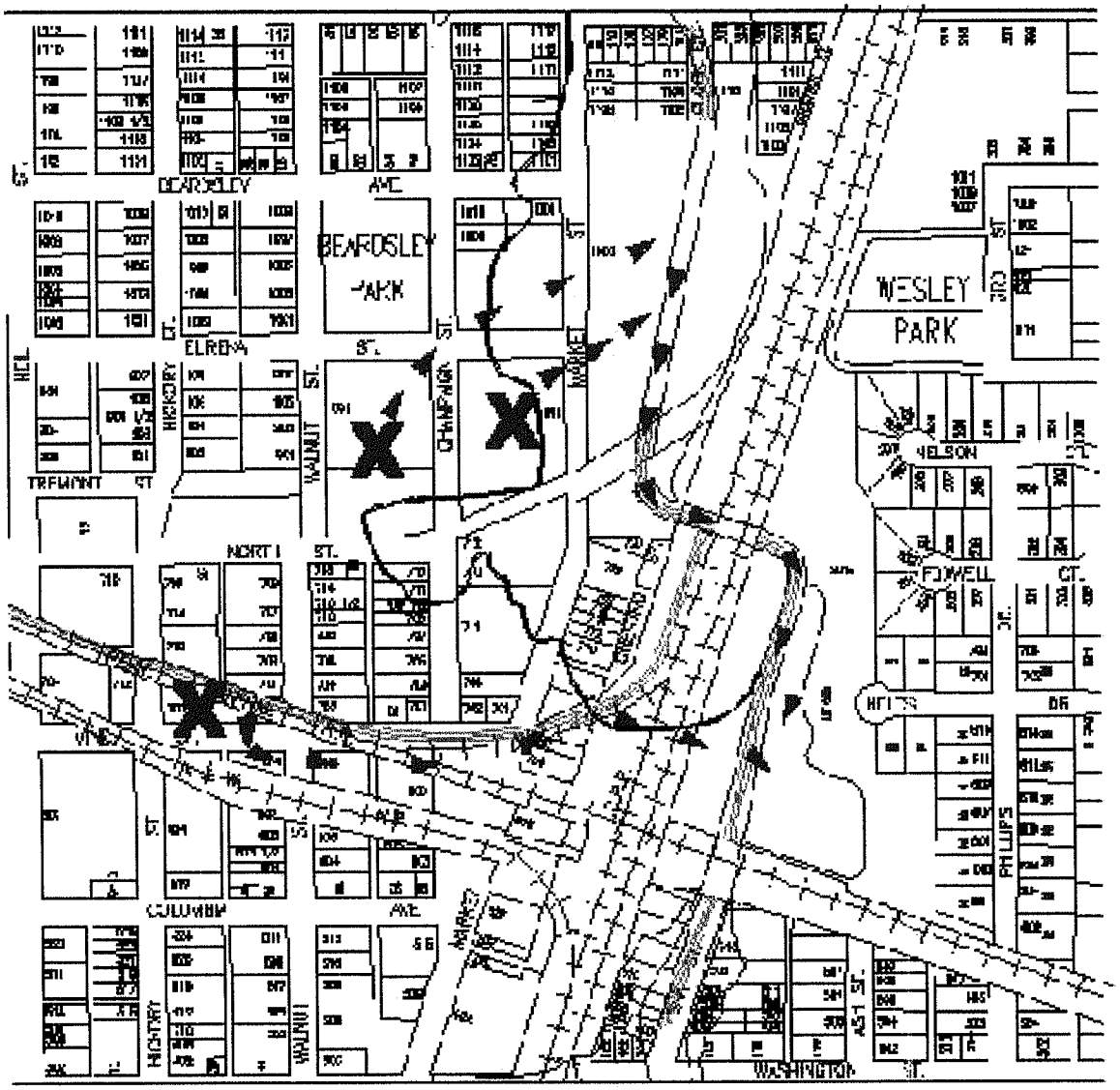


Figure 2. Flow of Contamination

Flow of Leachate

X Ground Zero Contamination

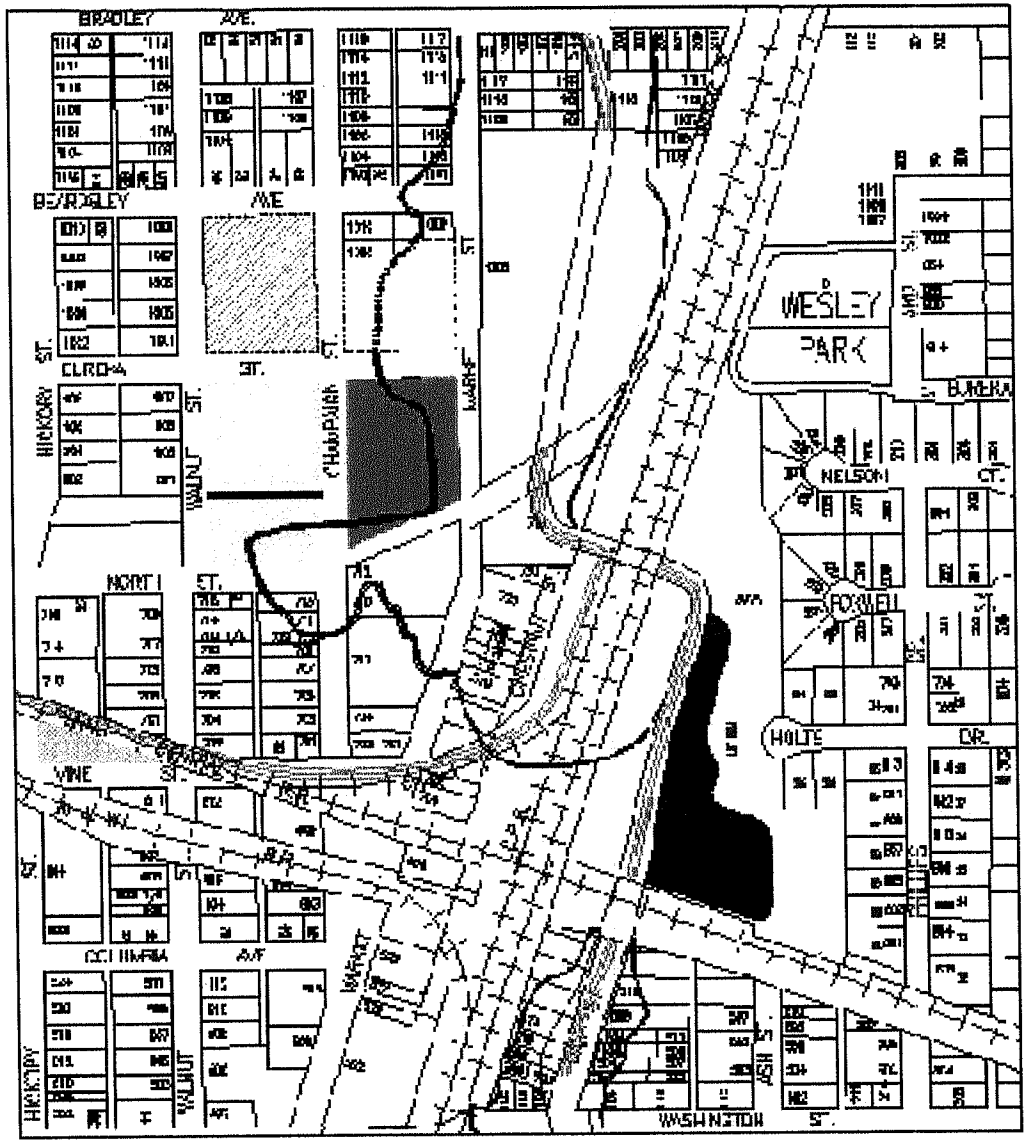


Figure 1. Beardsley Park Suspected Brownfield Zones.

- Area 1
- Area 2
- Area 3
- Beardsley Park
- Cap & Gown Parking Lot
- Oak Ash Detention Basin
- Boneyard Creek above ground
- Boneyard Creek under ground
- 100 Year Floodplain

Illinois Power Electrical Substation #1

Figure 3. Illinois Electrical Power Substation #1 located at 908 N.

Area 3

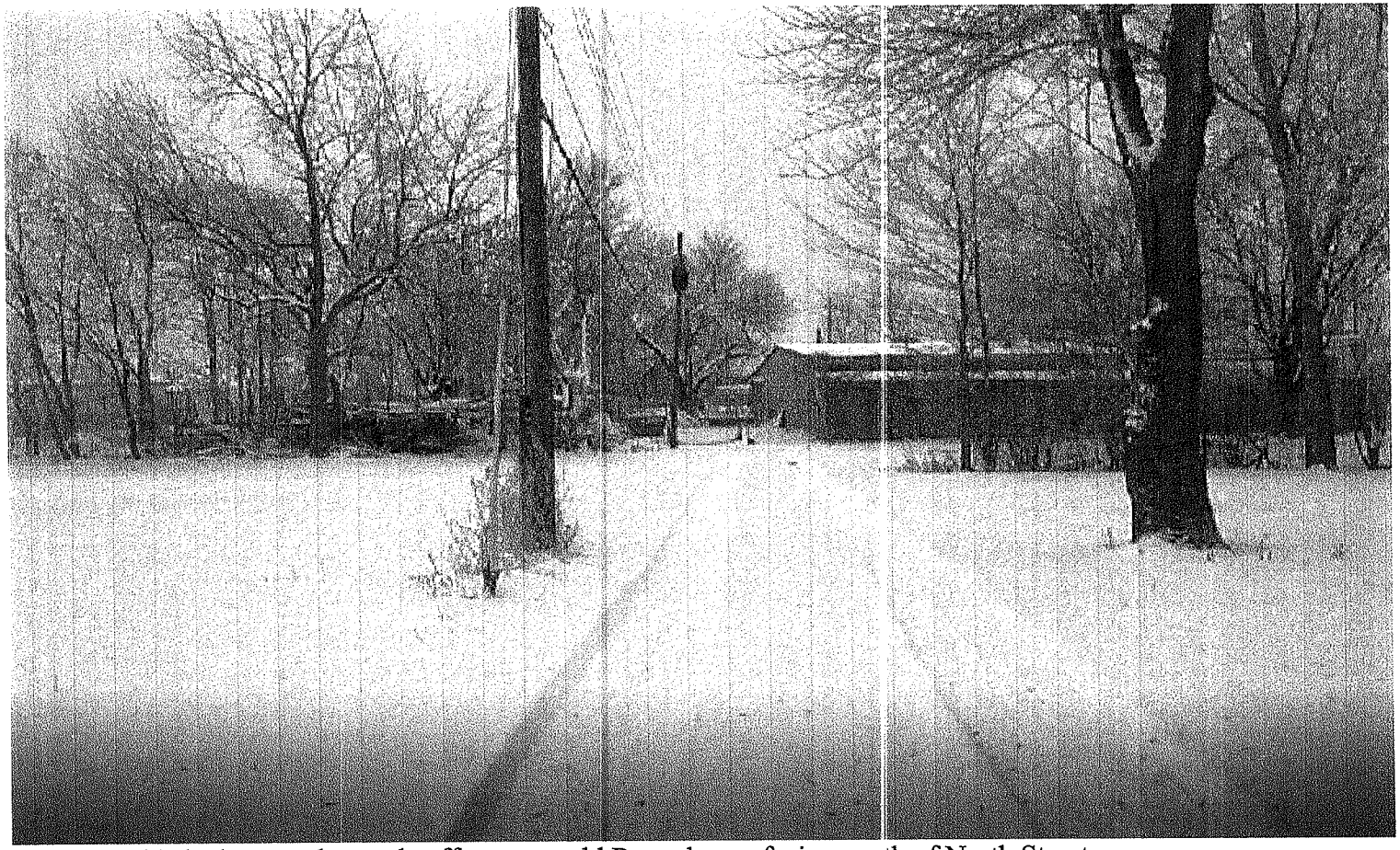


Figure 4. This is the gate that seals off street to old Powerhouse facing south of North Street.

Beardsley Park

Figure 5. Beardsley Park entrance corner of Champaign and Eureka adjacent to Cap & Gown Parking Lot.

Collegiate Cap & Gown Parking Lot

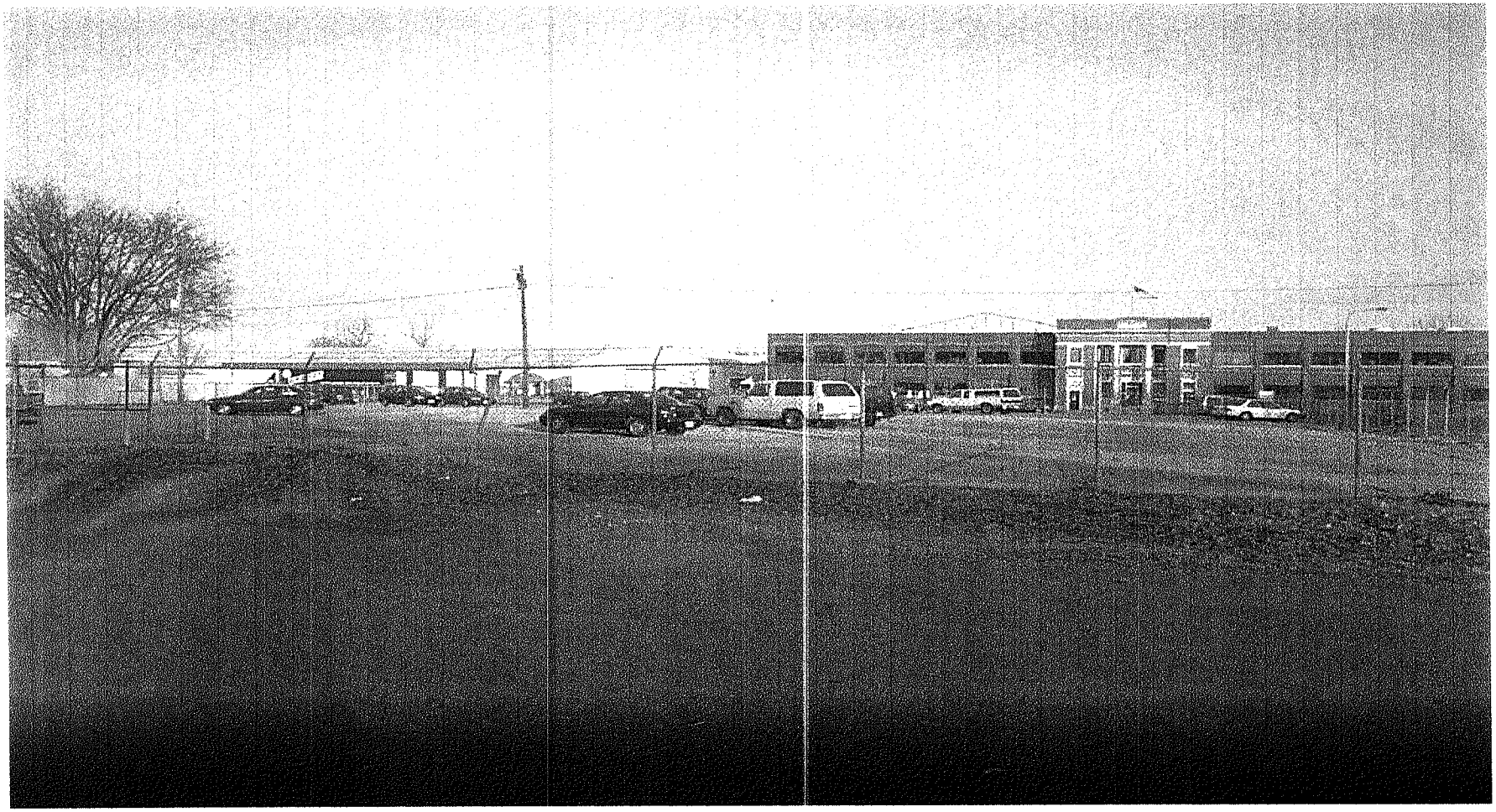


Figure 6. Cap & Gown Parking Lot and City Easement at corner of Champaign and Eureka.

Illinois Power Electrical Substation #2

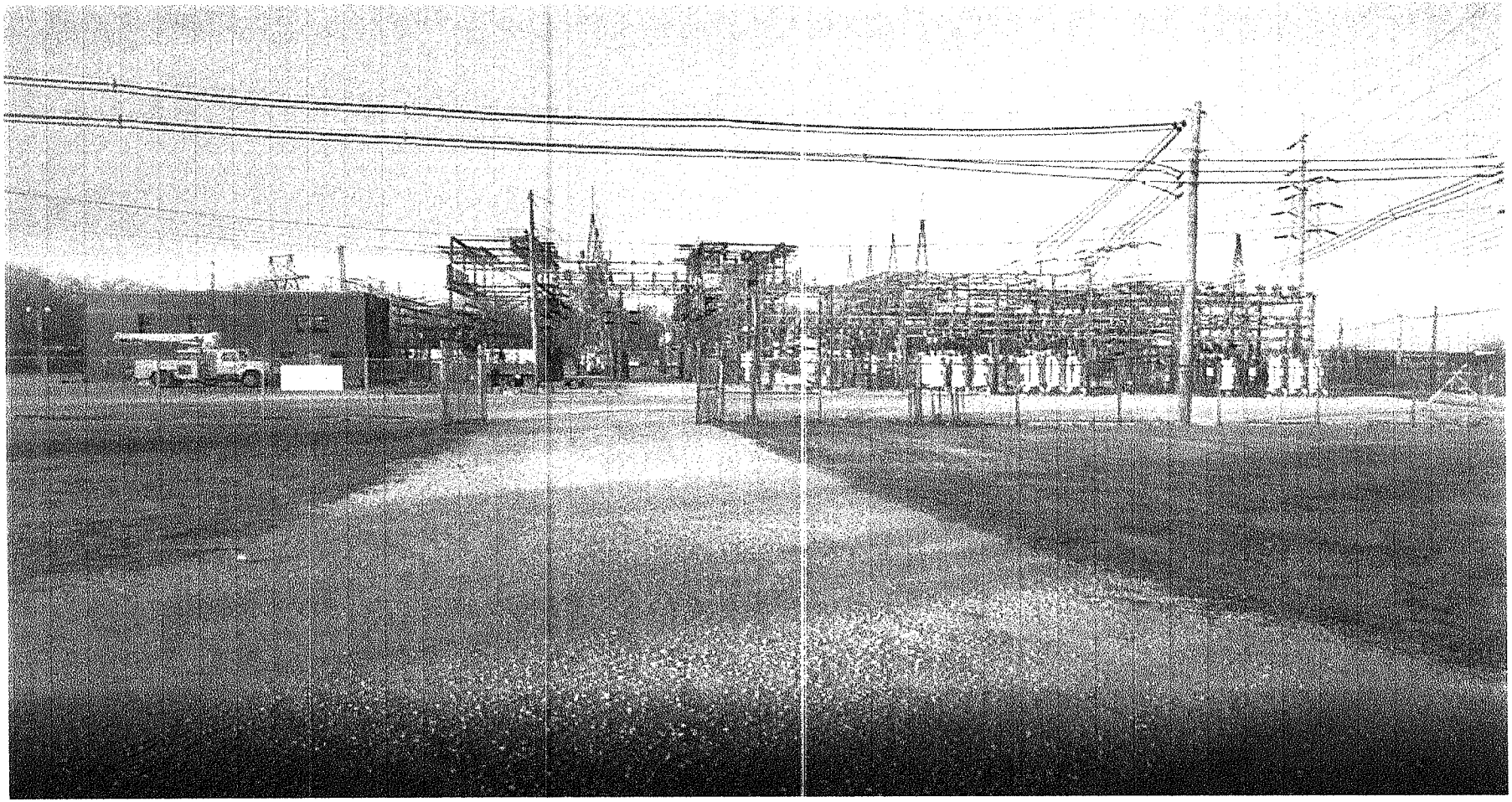


Figure 7. Illinois Power Electrical Substation #2 at Chestnut and Roper.

Vacant lot behind Electrical Substation 1.

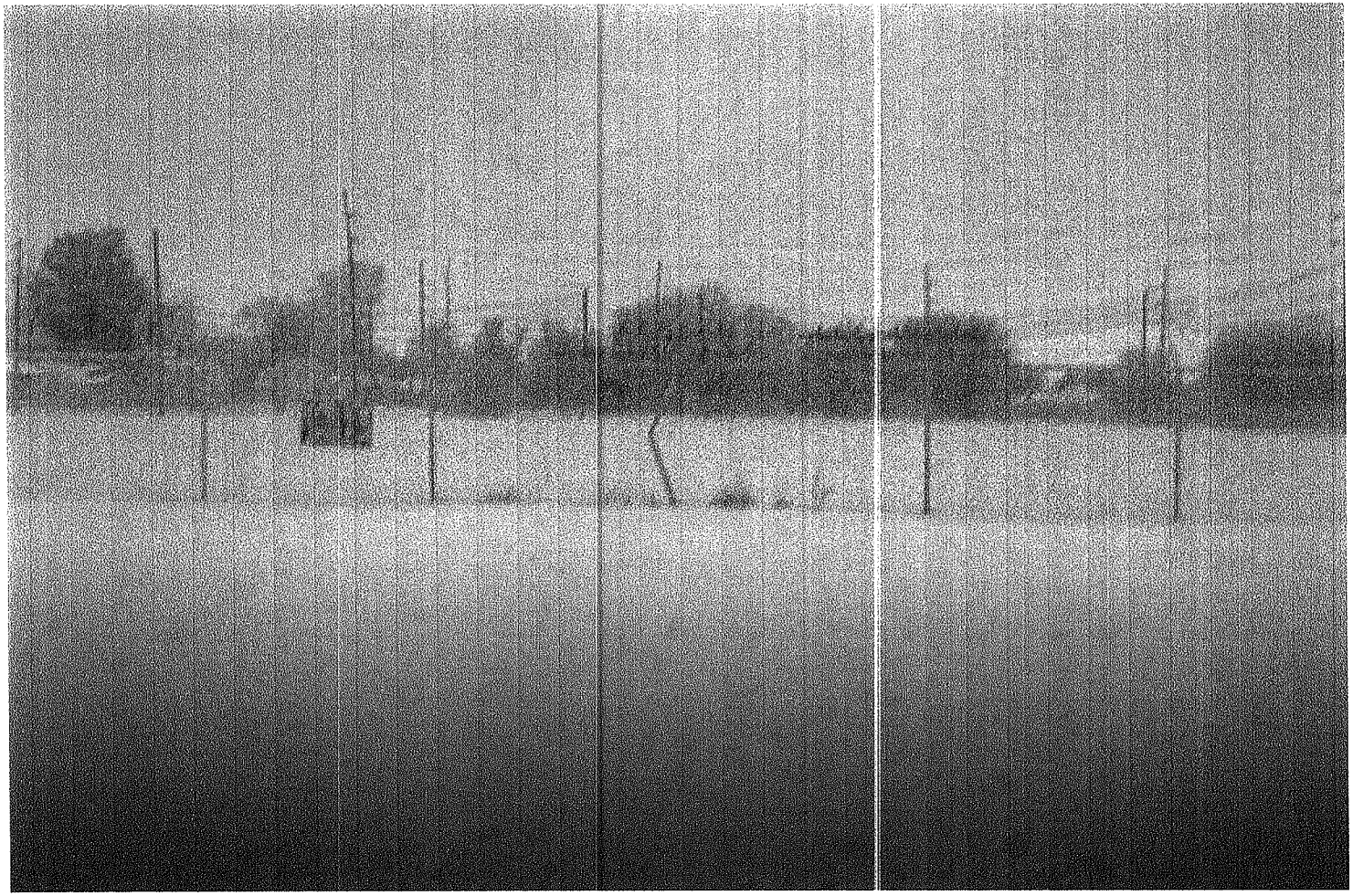
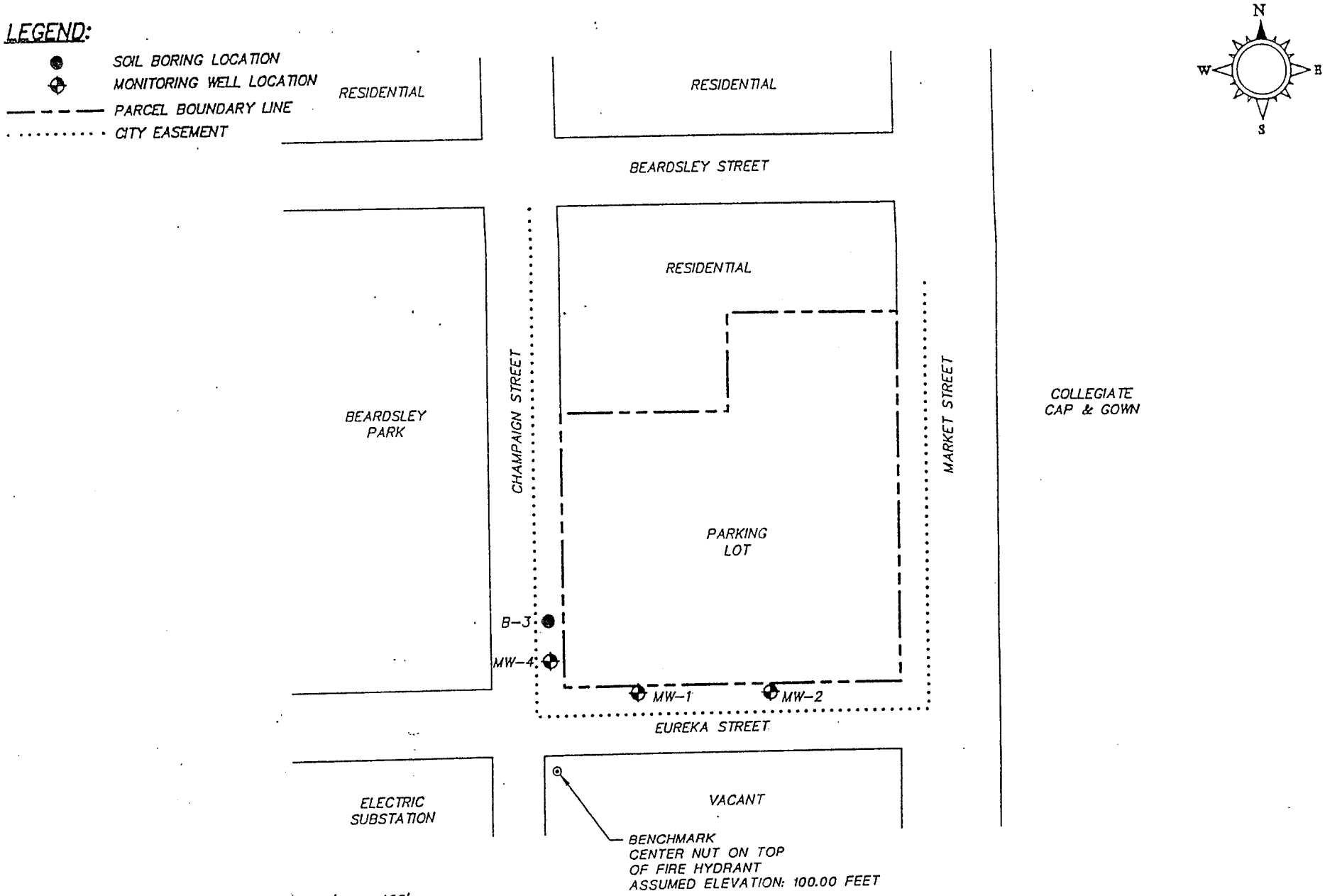


Figure 8. The adjoining lot to the Substation facing north on North Street.



psi Environmental Geotechnical Construction
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PROJECT NAME: CITY OF CHAMPAIGN BEARDSLEY PARK PARCEL
NW CORNER OF MARKET ST. & EUREKA ST. CHAMPAIGN, IL

TITLE: SITE PLAN

PROJECT MANAGER	DATE	DRAWING NO.
P. WAITE	DEC. 1995	F-1
DRAWN BY: A. CRAIG	PROJECT NO. 002-5H020	

On-Site Photoionization Detector (PID) Readings - Beardsley Park Parcel

Approx Depth bls, feet	PID Readings, ppm			
	B-1	B-2	B-3	B-4
2.0	BDL	BDL	BDL	50
4.0	BDL	BDL	BDL	NS
6.0	BDL	BDL	BDL	90
8.0	BDL	BDL	BDL	30
10.0	BDL	BDL	BDL	140
12.0	BDL	BDL	BDL	40
14.0	BDL	BDL	BDL	60

Notes:
PID readings were collected using an HNU model PI-101 Photoionization Detector with a manufacturer's reported detection limit of 1 ppm.
bls: Below Land Surface
BDL: Below Detection Limit
NS: No Sample

Summary of Groundwater Quality Data - PNAs and Total Lead - Beardsley Park Parcel

Analytical Compound	Groundwater Samples Concentrations in µg/L			IEPA Cleanup Objectives, µg/L
	MW-1	MW-2	MW-4	
Acenaphthene	< 3.5410	< 3.5410	< 3.5410	420
Acenaphthylene	< 1.7360	< 1.7360	< 1.7360	-
Anthracene	< 0.1200	< 0.1200	< 0.1200	2100
Benzo(a)anthracene	< 0.0940	< 0.0940	< 0.0940	0.13
Benzo(a)pyrene	< 0.5880	< 0.5880	< 0.5880	0.20
Benzo(b)fluoranthene	< 0.1700	< 0.1700	< 0.1700	0.18
Benzo(k)fluoranthene	< 0.1030	< 0.1030	< 0.1030	0.17
Benzo(ghi)perylene	< 0.2004	< 0.2004	< 0.2004	-
Chrysene	< 0.0900	< 0.0900	< 0.0900	01.5
Dibenzo(ah)anthracene	< 0.2325	< 0.2325	< 0.2325	0.30
Fluoranthene	< 0.2280	< 0.2280	< 0.2280	280
Fluorene	< 0.3980	< 0.3980	< 0.3980	280
Indeno(1,2,3-cd)pyrene	< 0.1830	< 0.1830	< 0.1830	0.43
Naphthalene	< 1.1890	< 1.1890	< 0.1890	25
Phenanthrene	< 0.1050	< 0.1050	< 0.1050	-
Pyrene	< 0.2720	0.26 J	< 0.2720	210
Total Carcinogenic PNAs (a)	< 0.5880	< 0.5880	< 0.5880	-
Total Non-Carcinogenic PNAs (b)	< 1.7360	< 1.7360	< 1.7360	210
Total Lead, mg/L	0.004	0.1710	0.047	0.0075 (c)

Notes: "-" indicates no IEPA cleanup objective for these compounds

(a) Total Carcinogenic PNAs are the total of benzo(a)anthracene, benzo(a)pyrene, benzo(b)fluoranthene, benzo(k)fluoranthene, chrysene, dibenzo(a,h)anthracene, and indeno(1,2,3-c,d)pyrene.

(b) Total Non-Carcinogenic PNAs are the total of acenaphthylene, benzo(ghi)perylene, and phenanthrene.

(c) This is the Class I groundwater standard for total lead.

Groundwater Elevations - Beardsley Park Parcel

Monitoring Well Number	Manhole Rim Elevation	Top of Casing Elevation	November 9, 1995		December 6, 1995	
			Depth to Groundwater	Groundwater Elevation	Depth to Groundwater	Groundwater Elevation
MW-1	96.48	96.16	5.96	90.20	6.21	89.95
MW-2	97.13	96.86	4.62	92.24	4.98	91.88
MW-4	97.83	97.56	6.92	90.64	7.30	90.26

Notes:

1. All measurements are reported in feet
2. Elevations are referenced from an arbitrary benchmark elevation of 100 feet. The benchmark is the center nut of the fire hydrant across Eureka Street.
3. Depth to Groundwater is measured in feet below top of casing.

Summary of Groundwater Quality Data - BTEX - Beardsley Park Parcel

Analytical Compound	Groundwater Samples Concentrations in µg/L			IEPA Class I Groundwater Standards, µg/L
	MW-1	MW-2	MW-4	
Benzene	0.5 J	1.7	7.2	5.0
Toluene	0.69 J	< 1.0	1.5	1000
Ethylbenzene	< 1.0	< 1.0	1.0	700
Xylenes	0.92	0.54 J	1.8	10,000
Total BTEX	2.11	2.24	11.5	11,705

Notes: J = Estimated value, below detection limit.
Class I Groundwater Standards for BTEX are the same as the LUST Cleanup Objectives.