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# TOWN HALL MEETING Information Packet

“Contamination Facts” on  
substance found in the  
Taku Gardens vicinity.



## **PRESS RELEASE:**

FOR GENERAL RELEASE  
CONTAMINATION FOUND

August 30, 2005  
Release #05-08-08-52

FORT WAINWRIGHT, Alaska – All construction on the Taku Garden housing expansion project here has ceased as of noon today in response to a recent confirmation of PCB-contaminated (polychlorinated biphenyls) soil. "Safety is our first concern," said COL Donna Boltz, the U.S. Army Garrison, Alaska, commander. "We want to ensure the well-being of our community – to include those who were working there – and at same time, restrict movement around and through the construction site until we can fully assess the extent of the contamination.

"We are working closely with the Alaska Department of Environmental Conservation, and the Environmental Protection Agency to develop a robust plan for collecting and testing soil samples to determine the extent of contamination." Officials do not yet know how the site became contaminated. A 1958 aerial photo show several communication-type facilities in the area that indicate the possibility of several pad-mounted transformers in this area as potential sources. The facilities were demolished in the late 1950s, and no additional industrial use was made at the site.

During construction in late June, workers reported a solvent-like odor emitting from the soil to post Directorate of Public Works. Soil samples were collected and tested by North Wind Environmental Services (NWES) for analysis. Laboratory results, received in late July, confirmed the presence of solvents and also revealed the possibility of PCBs. Since PCBs are typically odorless, these soil samples were not specifically tested for the presence of PCBs. Instead, the focus of the initial soil sample tests was to confirm the presence of potential solvents.

Additional soil samples were collected and tested; and results received this month confirmed the presence of PCBs. U.S. Army environmental officials immediately notified the ADEC and the EPA. More samples were collected from



areas surrounding the contaminated site in an effort to gauge the extent of contamination. As a result, the tests indicated the contaminated area was larger than originally estimated by environmental officials which prompted Boltz to contain the whole construction site until the extent of contamination is determined.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The United States stopped manufacturing PCBs in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made prior to 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

Prolonged exposure to PCBs can create health problems, and people most often come in contact with PCBs primarily through eating contaminated food and breathing contaminated air. Post environmental officials will perform ambient air monitoring to determine if PCB-contaminated soils are being transported by the wind. PCBs are unlikely to migrate to groundwater based on their affinity to bind with soil particles; however, the post will also conduct groundwater tests to determine if groundwater has been contaminated as well.

## **PCBs discovered at Taku Gardens expansion project**

**Date:** Aug. 31, 2005, 10:55 a.m.

<b>Fort Richardson Contact:</b> Bob Hall	<b>Phone:</b> 384-2546
<b>Fort Wainwright Contact:</b> Linda Douglass	<b>Phone:</b> 353-6701
<b>U.S. Army, Alaska Contact:</b> MAJ Kirk Gohlke	<b>Phone:</b> 384-1542
<b>DCO for Clinical Services:</b> LTC Eric Olins	<b>Phone:</b> 353-5221



## **BACKGROUND:**

PCB-contaminated (polychlorinated biphenyls) soils were discovered during the excavation of a foundation for a new housing unit, part of the expansion of Taku Garden housing area at Fort Wainwright. Work is ongoing to determine the extent of contamination but PCB concentrations up to 115,000 parts per million (ppm) have been detected from this initial excavation site.

Soil at this site was dug up in late June as the initial step in constructing the foundation of a new family housing unit. During excavation, the construction contractor noticed a solvent-like odor coming from the soils. Soil samples were collected at the direction of Fort Wainwright Directorate of Public Works to characterize these soils for disposal purposes. Initial laboratory results confirmed the presence of solvents and also revealed the possibility of PCB contamination. Since PCBs are typically odorless, soil samples were not specifically tested for the presence of PCBs. Instead, the focus of the tests was to confirm the presence of solvent contamination.

Additional soil samples were collected and tested at various spots adjacent to the original excavation site, and the excavated area was cordoned off. Excavated soils were covered pending laboratory analysis. Laboratory results of these samples indicated elevated levels of PCBs and additional follow-up sampling and analysis was performed to better estimate the extent of contamination.

Both the Alaska Department of Environmental Conservation (ADEC) and the U.S. Environmental Protection Agency (EPA) have been notified, and have been participating in the development of sampling and response plans.

The initial plan was to remove excavated contaminated soil from the construction site and conduct additional sampling and analysis to determine the extent of contamination. However, since the level of contamination is much higher and more extensive than original predictions, the U.S. Army Garrison commander, COL Donna Boltz, placed the entire construction site off limits to all, with the exception of the environmental specialists investigating the site. During this investigation, the area will be fenced off and signs will be posted to restrict access.

North Wind Environmental Services most recently collected additional samples for PCB specific analysis on 24 August; with result expected in the next few days. Soil sampling is ongoing.



Here is information on the medical effects of polychlorinated biphenyls (PCBs) from the toxicology website Agency for Toxic Substances and Disease Registry (ATSDR) at the CDC: <http://www.atsdr.cdc.gov/tfacts17.html>. (*Bifenilos Policlorados (BPCs)*)

**This fact sheet answers the most frequently asked health questions about polychlorinated biphenyls (PCBs). For more information, you may call the ATSDR Information Center at 1-888-422-8737. This fact sheet is one in a series of summaries about hazardous substances and their health effects. This information is important because this substance may harm you. The effects of exposure to any hazardous substance depend on the dose, the duration, how you are exposed, personal traits and habits, and whether other chemicals are present.**

**HIGHLIGHTS:** Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

### **What are polychlorinated biphenyls (PCBs)?**

Polychlorinated biphenyls are mixtures of up to 209 individual chlorinated compounds (known as congeners). There are no known natural sources of PCBs. PCBs are either oily liquids or solids that are colorless to light yellow. Some PCBs can exist as a vapor in air. PCBs have no known smell or taste. Many commercial PCB mixtures are known in the U.S. by the trade name Aroclor.

PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

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### **What happens to polychlorinated biphenyls (PCBs) when they enter the environment?**

- PCBs entered the air, water, and soil during their manufacture, use, and disposal; from accidental spills and leaks during their transport; and from leaks or fires in products containing PCBs.
- PCBs can still be released to the environment from hazardous waste sites; illegal or improper disposal of industrial wastes and consumer products; leaks from old electrical transformers containing PCBs; and burning of some wastes in incinerators.
- PCBs do not readily break down in the environment and thus may remain there for very long periods



of time. PCBs can travel long distances in the air and be deposited in areas far away from where they were released. In water, a small amount of PCBs may remain dissolved, but most stick to organic particles and bottom sediments. PCBs also bind strongly to soil.

- PCBs are taken up by small organisms and fish in water. They are also taken up by other animals that eat these aquatic animals as food. PCBs accumulate in fish and marine mammals, reaching levels that may be many thousands of times higher than in water.
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### **How might I be exposed to polychlorinated biphenyls (PCBs)?**

- Using old fluorescent lighting fixtures and electrical devices and appliances, such as television sets and refrigerators, that were made 30 or more years ago. These items may leak small amounts of PCBs into the air when they get hot during operation, and could be a source of skin exposure.
  - Eating contaminated food. The main dietary sources of PCBs are fish (especially sportfish caught in contaminated lakes or rivers), meat, and dairy products.
  - Breathing air near hazardous waste sites and drinking contaminated well water.
  - In the workplace during repair and maintenance of PCB transformers; accidents, fires or spills involving transformers, fluorescent lights, and other old electrical devices; and disposal of PCB materials.
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### **How can polychlorinated biphenyls (PCBs) affect my health?**

The most commonly observed health effects in people exposed to large amounts of PCBs are skin conditions such as acne and rashes. Studies in exposed workers have shown changes in blood and urine that may indicate liver damage. PCB exposures in the general population are not likely to result in skin and liver effects. Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

### **How likely are polychlorinated biphenyls (PCBs) to cause cancer?**

Few studies of workers indicate that PCBs were associated with certain kinds of cancer in humans, such as cancer of the liver and biliary tract. Rats that ate food containing high levels of PCBs for two years developed liver cancer. The Department of Health and Human Services (DHHS) has concluded that PCBs may reasonably be anticipated to be carcinogens. The EPA and the International Agency for Research on

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Cancer (IARC) have determined that PCBs are probably carcinogenic to humans.

### **How do polychlorinated biphenyls (PCBs) affect children?**

Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported. In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

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### **How can families reduce the risk of exposure to polychlorinated biphenyls (PCBs)?**

- You and your children may be exposed to PCBs by eating fish or wildlife caught from contaminated locations. Certain states, Native American tribes, and U.S. territories have issued advisories to warn people about PCB-contaminated fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.
  - Children should be told not play with old appliances, electrical equipment, or transformers, since they may contain PCBs.
  - Children should be discouraged from playing in the dirt near hazardous waste sites and in areas where there was a transformer fire. Children should also be discouraged from eating dirt and putting dirty hands, toys or other objects in their mouths, and should wash hands frequently.
  - If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.
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### **Is there a medical test to show whether I've been exposed to polychlorinated biphenyls (PCBs)?**

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

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## Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

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### References:

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological Profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

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### Where can I get more information?

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.

### For more information, contact:

Agency for Toxic Substances and Disease Registry  
Division of Toxicology  
1600 Clifton Road NE, Mailstop F-32  
Atlanta, GA 30333  
Phone: 1-888-42-ATSDR (1-888-422-8737)  
FAX: (770)-488-4178  
Email: [ATSDRIC@cdc.gov](mailto:ATSDRIC@cdc.gov)

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February 2001

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## RELATED RESOURCES

[ToxFAQ™](#)  35k

[ToxFAQ™ en Español](#)  32k

[Public Health Statement](#)  125k

[Public Health Statement en Español](#)  321k

[Toxicological Profile](#)  13.6MB

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## ToxFAQs™

### for

## Polychlorinated Biphenyls (PCBs)

*(Bifenilos Policlorados (BPCs))*

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**HIGHLIGHTS:** Polychlorinated biphenyls (PCBs) are a mixture of individual chemicals which are no longer produced in the United States, but are still found in the environment. Health effects that have been associated with exposure to PCBs include acne-like skin conditions in adults and neurobehavioral and immunological changes in children. PCBs are known to cause cancer in animals. PCBs have been found in at least 500 of the 1,598 National Priorities List sites identified by the Environmental Protection Agency (EPA).

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PCBs have been used as coolants and lubricants in transformers, capacitors, and other electrical equipment because they don't burn easily and are good insulators. The manufacture of PCBs was stopped in the U.S. in 1977 because of evidence they build up in the environment and can cause harmful health effects. Products made before 1977 that may contain PCBs include old fluorescent lighting fixtures and electrical devices containing PCB capacitors, and old microscope and hydraulic oils.

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[ToxFAQs™ en Español](#)

[Public Health Statements](#)

[Toxicological Profiles](#)

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[MHMIs](#)

[Interaction Profiles](#)

[Priority List of Hazardous Substances](#)

[Division of Toxicology](#)

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## What happens to polychlorinated biphenyls (PCBs) when they enter the environment?

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Most of the studies of health effects of PCBs in the general population examined children of mothers who were exposed to PCBs.

Animals that ate food containing large amounts of PCBs for short periods of time had mild liver damage and some died. Animals that ate smaller amounts of PCBs in food over several weeks or months developed various kinds of health effects, including anemia; acne-like skin conditions; and liver, stomach, and thyroid gland injuries. Other effects of PCBs in animals include changes in the immune system, behavioral alterations, and impaired reproduction. PCBs are not known to cause birth defects.

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Women who were exposed to relatively high levels of PCBs in the workplace or ate large amounts of fish contaminated with PCBs had babies that weighed slightly less than babies from women who did not have these exposures. Babies born to women who ate PCB-contaminated fish also showed abnormal responses in tests of infant behavior. Some of these behaviors, such as problems with motor skills and a decrease in short-term memory, lasted for several years. Other studies suggest that the immune system was affected in children born to and nursed by mothers exposed to increased levels of PCBs. There are no reports of structural birth defects caused by exposure to PCBs or of health effects of PCBs in older children. The most likely way infants will be exposed to PCBs is from breast milk. Transplacental transfers of PCBs were also reported. In most cases, the benefits of breast-feeding outweigh any risks from exposure to PCBs in mother's milk.

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fish and fish-eating wildlife. You can reduce your family's exposure to PCBs by obeying these advisories.

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ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>

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- If you are exposed to PCBs in the workplace it is possible to carry them home on your clothes, body, or tools. If this is the case, you should shower and change clothing before leaving work, and your work clothes should be kept separate from other clothes and laundered separately.

#### Is there a medical test to show whether I've been exposed to PCBs?

Tests exist to measure levels of PCBs in your blood, body fat, and breast milk, but these are not routinely conducted. Most people normally have low levels of PCBs in their body because nearly everyone has been environmentally exposed to PCBs. The tests can show if your PCB levels are elevated, which would indicate past exposure to above-normal levels of PCBs, but cannot determine when or how long you were exposed or whether you will develop health effects.

#### Has the federal government made recommendations to protect human health?

The EPA has set a limit of 0.0005 milligrams of PCBs per liter of drinking water (0.0005 mg/L). Discharges, spills or accidental releases of 1 pound or more of PCBs into the environment must be reported to the EPA. The Food and Drug Administration (FDA) requires that infant foods, eggs, milk and other dairy products, fish and shellfish, poultry and red meat contain no more than 0.2-3 parts of PCBs per million parts (0.2-3 ppm) of food. Many states have established fish and wildlife consumption advisories for PCBs.

#### References

Agency for Toxic Substances and Disease Registry (ATSDR). 2000. Toxicological profile for polychlorinated biphenyls (PCBs). Atlanta, GA: U.S. Department of Health and Human Services, Public Health Service.

**Where can I get more information?** For more information, contact the Agency for Toxic Substances and Disease Registry, Division of Toxicology, 1600 Clifton Road NE, Mailstop F-32, Atlanta, GA 30333. Phone: 1-888-422-8737, FAX: 770-488-4178. ToxFAQs™ Internet address is <http://www.atsdr.cdc.gov/toxfaq.html>. ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances. You can also contact your community or state health or environmental quality department if you have any more questions or concerns.





## U.S. Environmental Protection Agency

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# Polychlorinated Biphenyls (PCBs) and You

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#### What are PCBs?

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#### What are PCBs?

Polychlorinated biphenyls (PCBs) are synthetic chemical compounds consisting of chlorine, carbon and hydrogen. PCBs belong to a family of organic compounds known as chlorinated hydrocarbons. PCBs may be clear to yellow oily liquids or waxy solids.

Due to public concern over the harmful effects of PCBs on the environment, the primary United States manufacturer voluntarily stopped making them in 1977. The 1976 Toxic Substances Control Act (TSCA Public Law 94-469) prohibited any further manufacture of PCBs in the U.S. Even though PCBs are no longer manufactured in the U.S., small amounts of PCBs continue to be formed in production processes when chlorine, carbon and elevated temperatures or catalysts are present together.

#### Where are PCBs found?

PCBs were produced in the United States between 1929 and 1977. PCBs were primarily used in industrial applications as an electrical insulator, but were also used in small amounts in other commercial products. They were popular because they were inexpensive, did not conduct electricity, tolerate high temperatures, and last a very long time without degrading. The majority of the PCBs were used insulating liquids in electrical equipment including transformers and capacitors. They were marketed under several trade names, including Aroclor, Askarel, Pyroclor, Sanotherm, Kennechlor, Hyvol, Chlorextol, and Pyranol. Some other commercial applications of the product were for heat transfer, hydraulic fluids, dye carriers in carbonless copy paper, adhesives, and as a plasticizer in paints. They were also used in electronic devices such as older fluorescent lights, refrigerators and television sets.

#### Why are PCBs harmful?

Once PCBs are released into the environment through improper disposal or leakage from PCB transformers and capacitors, they take several decades to slowly degrade. When they are ingested by people and animals, PCBs are stored in the fatty tissue and then are slowly released into the blood stream. Even at low exposure levels, the concentration of PCBs in fatty tissue can accumulate to a high level. This is the process termed bioaccumulation. PCB accumulations in the fatty tissue of organisms low in a food chain are magnified when consumed by the animals in the higher level of the chain. This process is termed biomagnification.

As PCBs bioaccumulate in organisms and biomagnify in the food chain, they create

health hazards at all levels. The short term health hazards associated with PCB exposure for people include irritation to the eyes, nose and throat. High, acute exposures can damage the liver and in some extreme cases it can cause death. Chronic (long term) health effects are often not immediately apparent and may last for months or years. Certain PCBs are probable carcinogens for people. There is some evidence that they cause skin cancer in people and have been shown to cause liver cancer in animals. Some long term effects include liver damage, reproductive problems, a severe acne like rash (chloracne), and damage to the nervous system resulting in numbness, weakness and tingling in the arms and legs.

#### **How Might I be Exposed?**

Exposures to PCBs may come from many areas including:

- workplace practices
- hazardous waste sites where improper disposal of PCBs has occurred
- leakage from PCB transformers and capacitors
- drinking contaminated water
- eating contaminated food, especially seafood
- skin contact with contaminated soil
- breathing contaminated air
- fluorescent light ballasts

The best way to know whether or not you are exposed to PCBs at work is through routine evaluation or a blood test that is available to detect recent large exposures. Evaluation can include personal or work area sampling and analysis. The evaluation only indicates one's exposure to PCBs and does not predict potential health effects.

A route of both industrial and nonindustrial potential exposure is fluorescent light ballasts (bulbs). Before EPA banned the manufacture of PCBs in 1977, PCBs were commonly used in the manufacture of fluorescent light ballasts. If the ballasts fail, the capacitor, which contains the PCB may break open releasing the PCBs to contaminate the surrounding tar-like material. It is virtually impossible to determine whether a small capacitor inside a light ballast is leaking since you cannot see the capacitor. The importance is whether or not the ballast itself is leaking. The black potting compound around the capacitor may be PCB-contaminated.

#### **What to do if you believe you have an exposure problem?**

If you believe you are having work related health problems and any other health problems related to PCB exposure, seek help from a physician who is trained to recognize occupational diseases. Take this information with you.

#### **How to reduce exposure?**

PCBs chemicals can be eaten, inhaled, or absorbed via skin. PCBs are probable cancer-causing agents; therefore, all contact should be reduced to the lowest possible level. Many scientists believe there is no safe level of exposure to PCBs. To keep from getting exposed, the following steps should be taken:

- In areas where PCBs are handled, processed, or stored, do not eat, smoke, or drink.
- After working in the area, wash hands thoroughly before eating or smoking.
- Wear full body protective clothing when working with the chemical.
- If a possible skin contact occurs, emergency shower facilities should be used.

### **What are the Federal Regulations for PCBs?**

The Environmental Protection Agency (EPA) has set a maximum containment level for PCBs of 0.0005 milligram per liter of drinking water (0.0005mg/L). Accidental releases of PCBs into the environment of one pound or more are required to be reported to the EPA. The Food and Drug Administration (FDA) requires that milk, eggs, other dairy products, poultry fat, fish, shellfish, and infant foods contain not more than 0.2-3 parts of PCBs per million parts (0.2-3 p.m.) of food.

### **Where to obtain more information?**

If there are more concerns or questions, please contact your community, state health, or environmental quality department or,

The Agency for Toxic Substances and Disease Registry (ATSDR)

Division of Toxicology

1600 Clifton Road NE, Mailstop E-29

Atlanta, Georgia 30333

Phone: 1-800-447-1544

Website address: <http://www.atsdr.cdc.gov/tfacts17.html> 

ATSDR can tell you where to find occupational and environmental health clinics. Their specialists can recognize, evaluate, and treat illnesses resulting from exposure to hazardous substances.

### **For further information, please call your Regional PCB coordinator:**

EPA Region 1 (Maine, Vermont, New Hampshire, Massachusetts, Connecticut, Rhode Island)

Boston, MA: Kim Tisa (617) 918-1527

EPA Region 2 (New York, New Jersey, Puerto Rico, Virgin Islands)

New York, NY: Dave Greenlaw (732) 906-6817

EPA Region 3 (Pennsylvania, West Virginia, Virginia, Maryland, Delaware, D.C.)

Philadelphia, PA: Ed Cohen (215) 814-2147

EPA Region 4 (Tennessee, Kentucky, North Carolina, South Carolina, Georgia, Alabama, Mississippi, Florida)

Atlanta, GA: Stuart Perry (404) 562-8980

EPA Region 5 (Illinois, Wisconsin, Indiana, Michigan, Minnesota, Ohio)

Chicago, IL: Tony Martig (312) 353-2291

EPA Region 6 (New Mexico, Texas, Oklahoma, Arkansas, Louisiana)

Dallas, TX: Lou Roberts (214) 665-7579

EPA Region 7 (Nebraska, Kansas, Missouri, Iowa)

Kansas City, KS: Dave Phillippi (913) 551-7395

EPA Region 8 (Montana, Wyoming, North Dakota, South Dakota, Utah, Colorado)

Denver, CO: Dan Bench (303) 312-6027

EPA Region 9 (California, Nevada, Arizona, Hawaii, American Samoa, Guam)

San Francisco, CA: Max Weintraub (415) 744-1129

EPA Region 10 (Washington, Oregon, Idaho, Alaska)

Seattle, WA: Dan Duncan (206) 553-6693

*Unit: Solid Waste & Toxics Unit*

Daniel Duncan

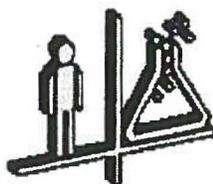
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## What's the Story? — PCBs

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Posted: Wednesday, January 1, 2003

### What Are PCBs?

Polychlorinated biphenyls, or PCBs, are a family of more than 200 chemical compounds ("congeners"), each of which consists of two benzene rings and from 1 to 10 chlorine atoms. They range from light, oily fluids to heavier, greasy or waxy substances. PCBs were discovered over 100 years ago, but their production and commercial use began in 1929. An estimated 1.1 billion pounds of PCBs were produced in the United States between 1929 and 1977.

### What Are the Benefits of PCBs?

Because of their remarkable insulating capacity and their flame-retardant nature, PCBs gained widespread use as coolants and lubricants in transformers and other electrical equipment. They replaced combustible mineral-oil insulating fluids and thereby reduced the risk of fires in office buildings, hospitals, factories, and schools. The use of PCBs also allowed for smaller capacitors, thus lowering equipment costs. Some city codes went so far as to require installation of PCB-containing electrical equipment in applications where fire-resistance was critical; insurance companies in many locations also required PCB-containing equipment.

Additionally, for several decades PCBs were routinely used in the manufacture of a wide variety of common products, such as plastics, adhesives, paints and varnishes, carbonless copying paper, newsprint, fluorescent light ballasts, and caulking compounds.

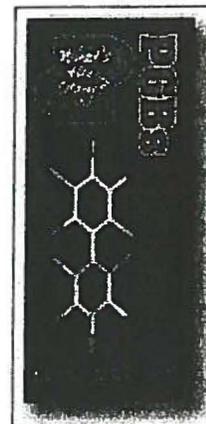
### What Are the Charges Leveled Against PCBs?

In the mid-1960s PCBs were detected in soil and wildlife, and concern arose over their possible adverse effects on health and the environment. Research confirmed that some PCB congeners degrade very slowly in the environment and can build up in the food chain, notably in fish and fish-eating birds.

In 1968 a widespread human-poisoning episode in Japan was at first attributed to the consumption of rice-bran oil contaminated with PCBs. In this incident and in a similar incident that occurred in 1978-79 in Taiwan, consumption of PCB-contaminated rice-bran oil resulted in chloracne (a severe form of acne), fatigue, nausea, and liver disorders. There was a preliminary report that liver cancer among Japanese males was significantly increased; however, the uneven geographic distribution of liver cancers between the two areas of western Japan involved in the incident (with a significant increase in liver cancers observed in only one of the areas) suggests that factors other than just the rice-oil poisoning were involved. Nevertheless, the Japan and Taiwan incidents increased the already growing concern over the safety of PCBs.

In 1975 Dr. Renate Kimbrough of the Centers for Disease Control published the results of a study in which rats were fed high doses of PCBs. This study indicated that the highly chlorinated PCBs increased the incidence of liver tumors in the rats. The study also raised further concerns about the potential long-term health effects of PCBs in humans. In 1971-72, many of the so-called "open" uses of

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PCBs in plastics and other common products were discontinued. Sales of PCBs were voluntarily restricted by the manufacturer to "closed" uses in electrical equipment. The manufacturer voluntarily ceased production completely in 1977, and the EPA banned the manufacture of PCBs in 1979.

In recent years some researchers have suggested that chemicals such as PCBs and other persistent synthetic chemicals present in the environment can find their way into our bodies and mimic the body's natural hormones, such as estrogen. Basing their conclusions largely on studies of wildlife, these researchers have further suggested that this "endocrine (hormone) disruption" can lead to infertility, to certain types of cancer, and to other hormone-related disorders.

#### **What Are the Facts?**

The toxicity observed in the Japanese and Taiwanese rice-bran oil victims was not observed in workers exposed to high doses of PCBs over long periods of time — even though the levels of PCB in the blood of the workers exceeded the levels in the blood of the rice-bran oil victims. The effects in the rice-bran oil victims are now believed to have been due to the presence in the rice-bran oil of polychlorinated dibenzofurans ("furans") — substances similar to dioxins — and polychlorinated quaterphenyls (PCQs) — toxic substances generated from the heat-related breakdown of PCBs. These thermal-degradation products are far more toxic than PCBs themselves. Analysis of the contaminated rice-bran oil in Japan and Taiwan revealed that the PCB heat-transfer fluid that had contaminated the rice-bran oil was partially heat-degraded due to mechanical problems in the heat exchanger and so contained high levels of furans and PCQs.

Acute health effects of PCBs have been found in animals only at extremely high doses. Those high doses have been shown to cause tumors in animals with long-term exposure. Several regulatory and advisory agencies, including the U.S. Environmental Protection Agency (EPA), have therefore determined that there is sufficient evidence to consider PCBs both animal carcinogens and potential human carcinogens.

Recent studies, however, have produced evidence that the cancer-causing potency of PCBs in animals had generally been overestimated and that some PCBs are much less potent than others. The EPA now takes this into account when it conducts the risk assessments it uses to make remedial decisions.

In addition, studies of workers exposed by inhalation and skin contact to high doses of PCBs over long periods of time have not revealed an increased risk of cancer. The only effects in the workers attributable to PCBs are skin and eye irritation.

The halt of PCB production in the United States and other countries, the elimination of "open" uses, the continued reductions of use in electrical equipment, and efforts to clean up contaminated sites have significantly reduced general-population exposure to PCBs in fish and other foods since the 1970s. PCB levels in human blood are also decreasing. Studies of people who ate PCB-contaminated fish have shown that while the quantity of fish consumed was correlated with PCB blood levels, there were no significant health differences between people who ate a lot of fish and those who ate little. A recent report has suggested an increased risk of neurodevelopmental problems — such as lowered IQ — in infants and children exposed prenatally to PCBs through the expectant mothers' consumption of contaminated fish. Other studies have found no relationship between maternal PCB exposure and either infant birth weight or head circumference, however. Additionally, the concentrations of PCBs in the blood of the mothers who ate contaminated fish were only slightly greater than the concentrations found in the blood of mothers who did not report eating fish; and both groups were within the range of PCB blood concentrations for North America. Some studies have also been criticized for failing to consider the potential effects of other environmental contaminants commonly found in the fish eaten by the study subjects.

There is insufficient evidence to conclude that environmental PCBs



pose significant health problems through "endocrine disruption" or estrogenic effects. Numerous researchers have characterized as both unproved and implausible claims that environmental estrogen exposure causes breast cancer or male reproductive problems.

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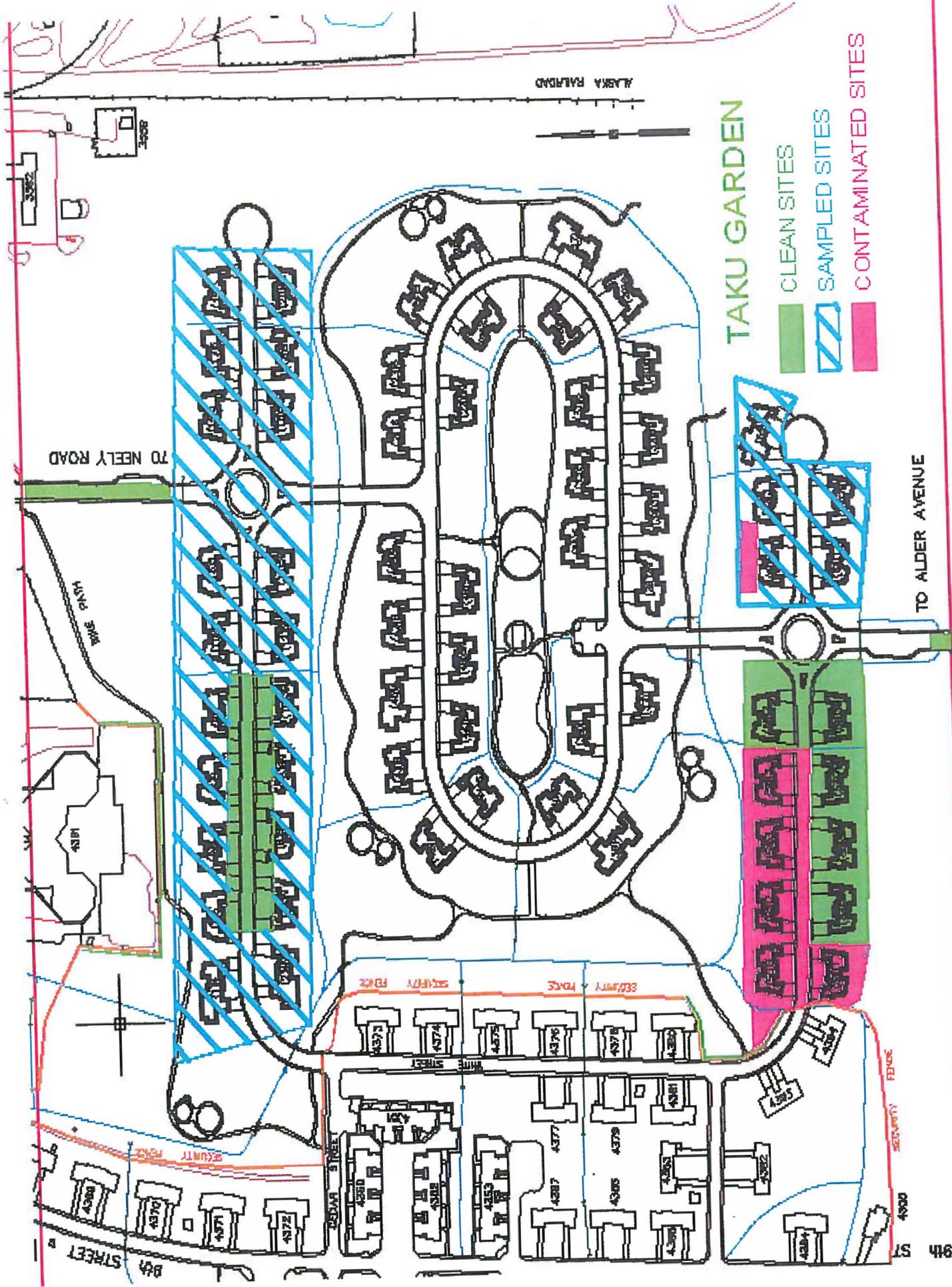
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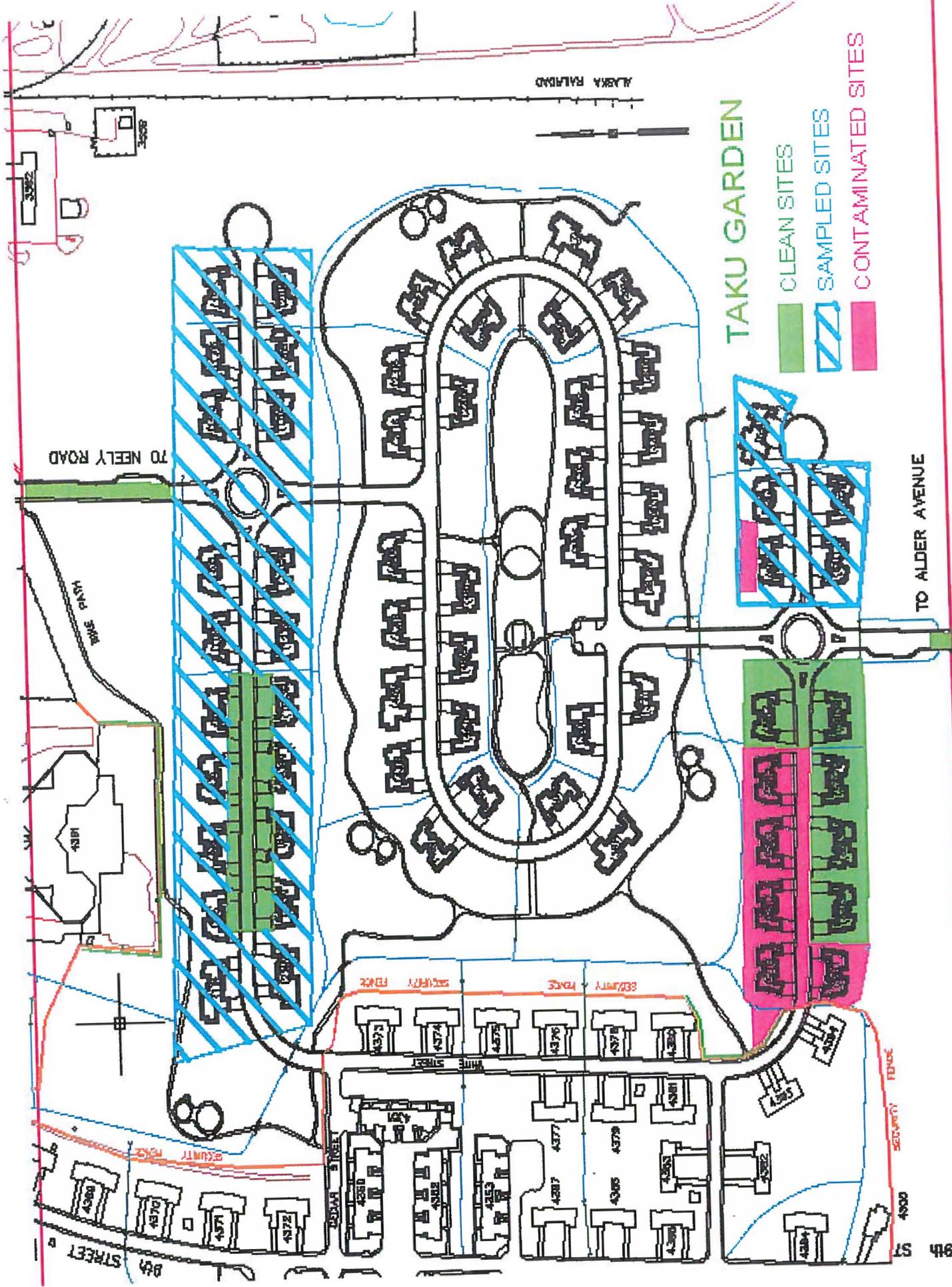




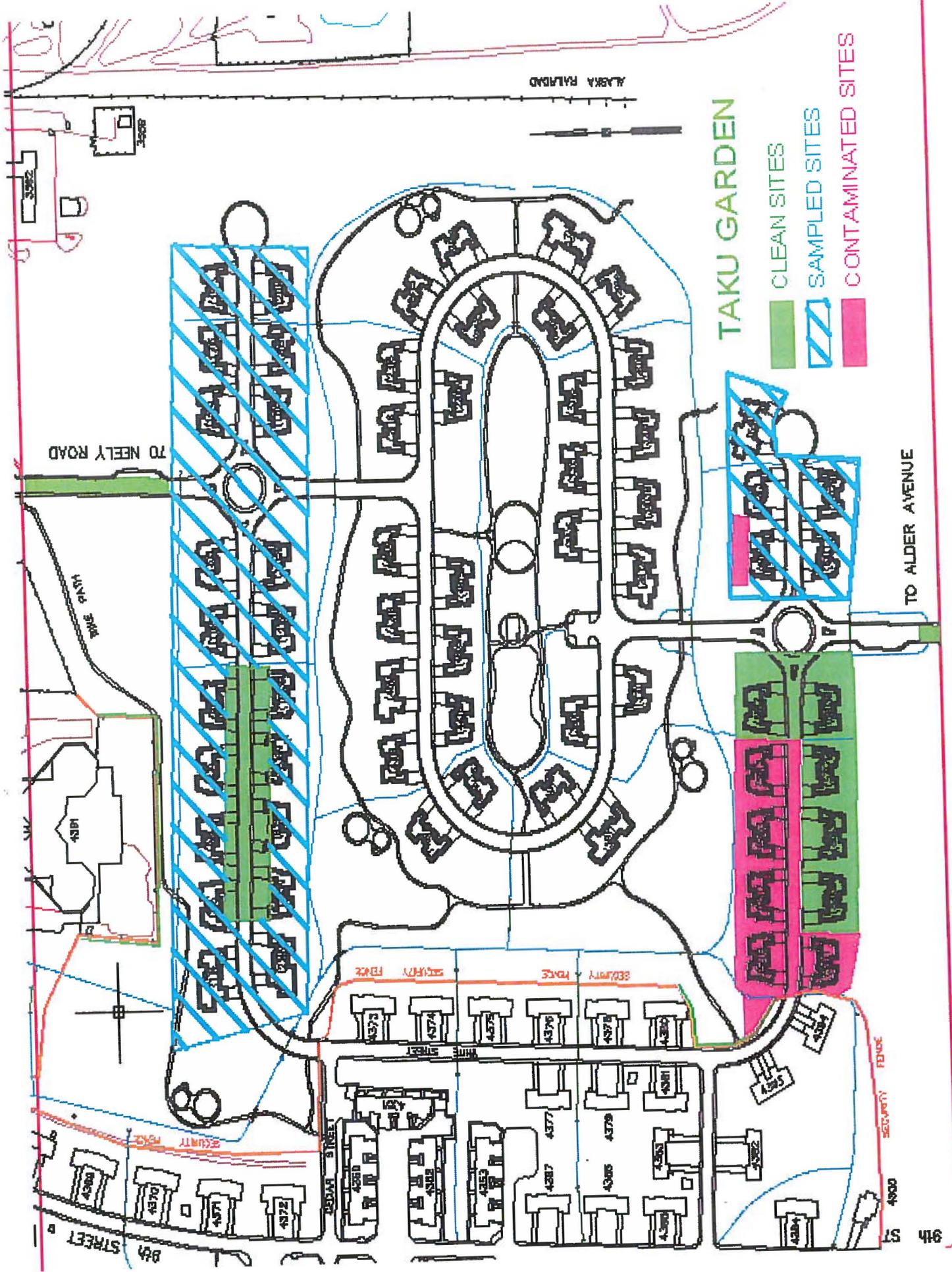












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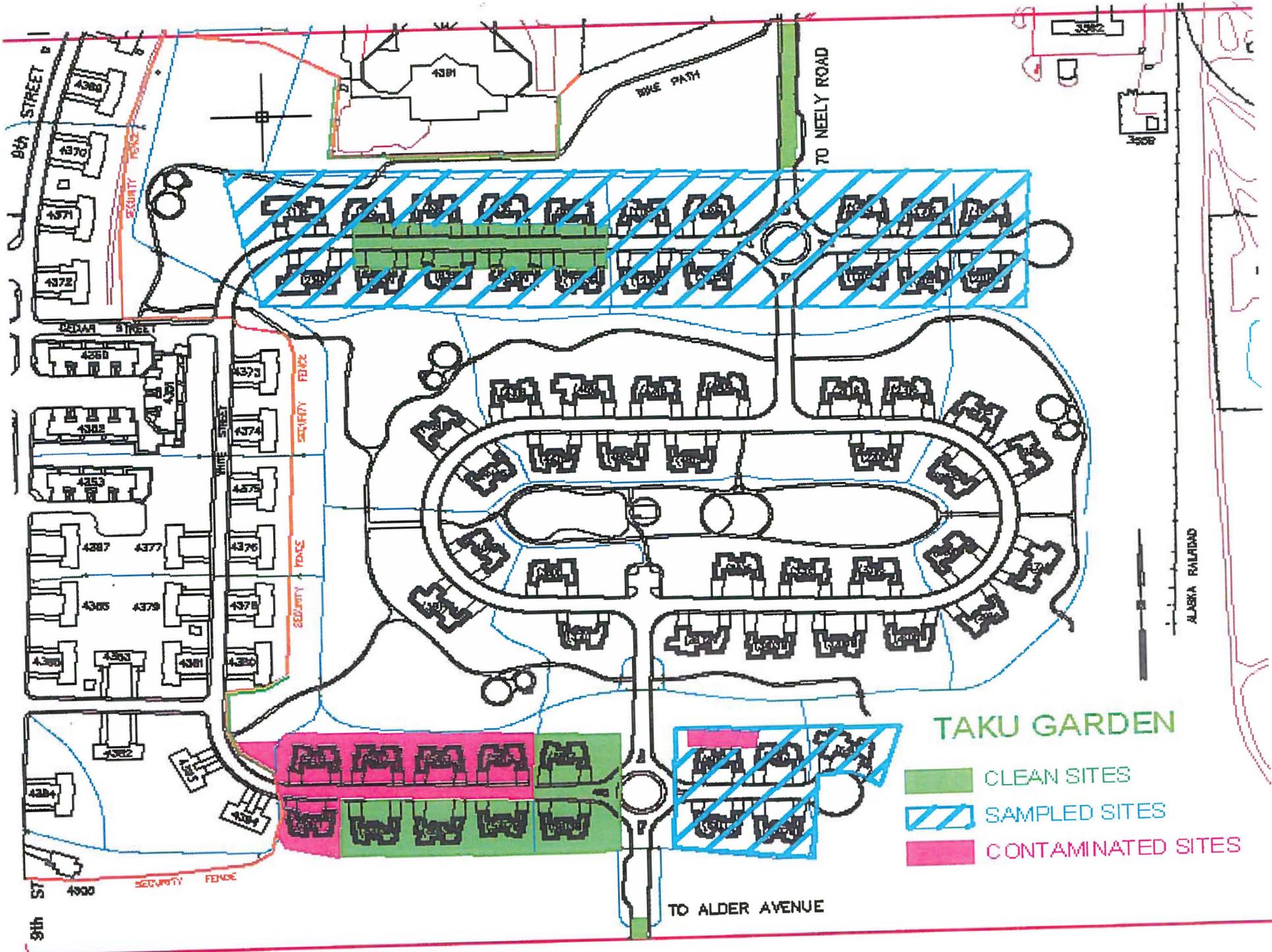
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