Tacoma - Pierce County
Health Department
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Closed Landfill Report

December 2010

Originally published April 1993
Revised September 2002, March 2006, December 2010

Disclaimer:

This report describes an inventory and reflects limited environmental data collection by the Tacoma-Pierce County Health Department (Health Department). It is not intended to serve as a detailed environmental site assessment, and should not be used as such.

The Health Department encourages property owners, prospective buyers, or other interested parties to rely upon detailed site assessments performed by qualified professionals. Although this report is complete to the best of our ability and available information, the absence of a site from this inventory is not conclusive evidence that it was never a dumpsite or landfill.

Work on this December, 2010 revision was supported by a *Coordinated Prevention Grant* from the Washington State Department of Ecology, under contract G-0900111.

Prepared by:

TACOMA-PIERCE COUNTY HEALTH DEPARTMENT

ENVIRONMENTAL HEALTH DIVISION
WASTE MANAGEMENT PROGRAM

CLOSED LANDFILL STUDY
PIERCE COUNTY, WASHINGTON
December 2010

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EXECUTIVE SUMMARY

This December, 2010 *revision* includes updated environmental monitoring data when available, describes some sites not included in previous editions, and includes aerial photographs.

Purpose of Report: Following numerous requests for information about closed dumpsites and landfills in Pierce County the Tacoma-Pierce County Health Department (Health Department) began to develop an inventory of these sites. Initial work on the study began in January, 1990 and was completed in January, 1993. Updates were completed in September, 2002 and March, 2006.

The objectives of the study were to establish an inventory, identify public health risks associated with closed dumpsites and landfills, and (where possible) determine the need for further site investigation. Thirty-two (32) closed dumpsites and landfills are described and evaluated; more than 60 additional less-significant or less-documented dumping sites are also described.

Scope of Problem: During the past 30 years the handling and disposal of solid waste has become increasingly complex. Modern landfills are now constructed with engineered liners, leachate collection systems, and elaborate gas control systems designed to minimize the public health and environmental impacts of buried refuse.

By contrast, almost all of the old disposal sites in this report were operated under the standard practices for the time, including burning or disposal into gravel pits, wetlands, ravines, or hillsides. As a result, many of these older landfills have contaminated groundwater and/or caused methane gas migration onto neighboring properties. Counties and municipalities are commonly burdened with expensive remedial measures for contaminated landfills and dumpsites. Even absent contamination issues, development or re-use of these sites can be complicated by the presence of solid wastes.

Public Health Concerns: Closed dumpsites pose potential health and safety factors. Health factors include groundwater contamination (formed by rainwater percolating through the garbage and producing leachate), and the potential breeding and harborage of disease vectors (such as mosquitoes, flies, and rodents). Also, there is the potential for hazardous or toxic wastes in old dumpsites since current standards regarding hazardous waste were not in effect when most of these sites were in operation.

The first potential safety factor is the production, migration, and accumulation of methane gas. Methane gas is not toxic but when it is allowed to accumulate in confined spaces it can be flammable and explosive.[1] The second is the potential for injuries when a site is not properly fenced or properly covered, thereby exposing the public to refuse, sharp objects, or other physical hazards.

[1] See Appendix A

1.0 INTRODUCTION

The object of solid waste management in the past was simply to collect and dispose of waste as quickly, efficiently, and inexpensively as possible. A common result was garbage disposal in rural hillside dumps and gravel pits just outside individual communities. Most early dumps consisted of a dumping floor and an open face. The garbage was rarely covered and often burned. Occasionally, a tractor was brought in to push the garbage over the face and create additional dumping area. Such dumps became breeding grounds for large numbers of rodents. Historical records indicate that it was not uncommon for Health Department staff to report kills of over 1000 rodents at a single site during annual rodent exterminations.

Odor and rodent complaints eventually led to solid waste disposal laws and regulations preventing open disposal and burning. Trench-type disposal sites were then employed. Waste was placed in a trench and routinely covered with soil until the trench was filled. By contrast, modern landfills employ the area method, or sanitary landfilling. With this system, refuse is compacted and covered with soil or other approved materials on a daily basis thereby reducing litter, rodent, and odor problems.

This report includes 24 municipal dumpsites and landfills and 8 private disposal sites. Most of the 32 sites were closed before the enactment in 1985 of modern solid waste regulations (Chapter 173-304 WAC, also known as *Minimum Functional Standards* or *MFS*).

Of the 32 sites, 24 were identified as needing further investigation, whether in the form of surface water and groundwater sampling, periodic methane gas monitoring, or routine inspections to monitor for ongoing illegal dumping. No immediate health concerns were detected at any of the sites. Although located in Lewis County, the Elbe dumpsite is also included in this report because it served predominantly Pierce County residents. All of the sites evaluated are listed in Table 1 (p.5).

In addition to these 32 sites, this report also contains summary descriptions of 62 additional sites in Pierce County. For these additional sites (typically illegal fill or dump sites) less-complete information is typically available. Each listing includes the location and (to the extent possible) dates of operation, type of wastes, volume of wastes, and a summary of available information.

As of the date of this revision there are two active municipal waste landfills (the LRI Landfill and the City of Tacoma Landfill) and one active inert waste (e.g., concrete, asphalt) landfill in Pierce County. Three additional inert waste landfills have valid solid waste handling permits but have been inactive (have not received waste) for several years.

The sites listed in this report were identified via historical solid waste records from the Health Department, Pierce County Public Works, and other miscellaneous sources. This inventory represents most of the known dumpsites and landfills closed after 1950 (no records were found of sites closed prior to 1950). The discussion for each site covers five categories:

Past and Present Use,
Waste Disposal Practices,
Suspected Problems,
Field Results; and,
Recommendations

A map is provided for each site, and the most recent monitoring event and/or inspection by the Health Department is noted. Sites described in this report were evaluated through:

1) Soil gas surveys for the presence of methane (most sites, where practical)[2];
2) Documentation of nearby water sources;
3) Identification and location of nearby homes and structures;
4) Physical description of the sites, including types and amounts of vegetation;
5) Assessment of the final cover system;
6) A walking survey to note the presence of leachate, illegal dumping, and other nuisance or hazardous issues; and
7) GPS survey of the approximate boundary of the landfill site.

The terms *dump*, *dumpsite*, *disposal site*, and *landfill* may be used interchangeably throughout this document. In general, *dump* and *dumpsite* are used for the historical open-pit and hillside disposal sites where the sanitary practice of routinely covering the refuse with soil was not employed.

[2] Methane monitoring was performed using a combustible gas meter calibrated specifically for methane. A 36" steel barhole punch was used to penetrate the ground surface. In addition to the soil gas survey, water meter vaults and electrical conduits were sampled, where possible, for methane.

Table 1. List of Closed Dumpsites and Landfills in Pierce County

1. Anderson Island
2. Ashford/National
3. Buck Creek
4. Buckley
5. Camp Murray
6. Carbonado
7. Cascade Demolition
8. City Fill (35th St. [Tacoma] Landfill
9. Coski
10. Dupont
11. Eatonville
12. Elbe
13. Fort Lewis
14. Fox Island
15. Grice
16. Hidden Valley
17. Key Center
18. LaGrande
19. Lime Waste
20. McChord Demolition
21. McMillin Reservoir
22. McNeil Island
23. Orting
24. Purdy
25. Puyallup / Sumner
26. Rhine Demolition
27. Roy
28. Ruston
29. South Prairie
30. Spanaway
31. Starvation Valley
32. Tacoma Tideflats

2.8 CITY FILL (35TH ST. LANDFILL)

The City Fill is located near 35th Street on the east side of Pacific Avenue in Sec 9, T 20N, and R 3E. The site was approximately 5 acres and was in operation from about 1960 to 1992.

2.8.1 PAST AND PRESENT USE

Most of this dumpsite was owned by the City of Tacoma (City). A large natural gulch that extends parallel to Pacific Avenue south of South 38th Street northward toward Interstate 5 is the area that was filled. Most of the filling consisted of inert wastes and street sweepings, which consisted of sand, leaves, tree needles, and other organic wastes that had been swept from along roadsides. The site was used by the City's Street Maintenance and Sewer Utility Divisions, as well as the Dickson Company (who performed several City projects, and also owned property at the site).

In 1992, the City regraded the site in order to provide slope stability. The site was also hydroseeded to control erosion. The site is no longer being used as a City dumpsite. Currently, some of the perimeter of the site consists of residential uses and small businesses.

In 2008 the City had a prospective buyer that wanted to develop the property with condominiums. The prospective buyer entered Ecology's Voluntary Cleanup Program (VCP) and hired Landau Associates in an effort to obtain a No Further Action (NFA) from Ecology. As part of this process six landfill gas monitoring probes were installed on the property. However, the sale of the property was not completed and, as of the writing of this report, the property continues to be owned by the City of Tacoma.

2.8.2 WASTE DISPOSAL PRACTICES

The City Fill was first used during the construction of Interstate 5 and nearby roads in the early 1960's. Most of the filling at that time consisted of waste concrete, asphalt, and other debris considered 'inert'. In the 1970's, a portion of the site that had been purchased by the Dickson Company was used for disposal of inert wastes. The Dickson Company was performing hauling activities for the City of Tacoma and other parties. The City instructed Dickson to discontinue dumping in 1987 when it was discovered that some of Dickson's debris had been disposed of on City-owned property. The fill site did not require a solid waste permit from the TPCHD because the wastes being disposed of were considered inert or clean and a significant portion of the site was filled before these types of wastes came under the regulatory purview of the TPCHD.

From 1985 to 1992, the City dumped wastes into the fill area that were generated from the City's Street Maintenance Division and Sewer Utility Division. The materials dumped at that time were street sweepings, which being more organic, lead to the production of methane gas. Also, oil from vehicles leads to the presence of metals and petroleum hydrocarbons in the street sweepings.

2.8.3 SUSPECTED PROBLEMS

Because of the organic nature of some of the wastes landfilled at the site, methane gas generation is occurring. Surface water contamination is a potential problem in the area, due to the unknown nature of some of the wastes dumped at the site.

2.8.4 FIELD RESULTS

In 1990 the TPCHD monitored for landfill gas at the 35th Street site. High concentrations of combustible gas were detected along the northern face of the ravine.

The City of Tacoma conducted an environmental site assessment in April 1991 (final report dated April 1992) for the Tacoma Public Works Department's Street Maintenance Division. Soil samples and surface water samples were collected and analyzed for a variety of chemical constituents. Elevated total petroleum hydrocarbons were detected in some soil samples. Elevated arsenic was also discovered in some soil samples (228 ppm). Arsenic and xylene were also detected in surface water samples. A methane monitoring investigation was also conducted in 1992 at an area south of the 35th Street site near a City Light substation. No combustible gas was detected.

In 1998, the City Fill site was placed on a periodic methane monitoring schedule due to previous high concentrations of methane gas having been detected. A methane survey was conducted on March 3, 1999 jointly by the City of Tacoma Solid Waste Management and the Health Department. Only trace levels of methane gas were detected. The site continued to be monitored periodically by the City of Tacoma or the Health Department. No combustible gas above 38% of the LEL (Lower Explosive Limit) were detected in the monitoring events from 1999-2006.

As noted previously, 6 landfill gas monitoring probes were installed on the property in 2008 as part of a remedial action. Joint monitoring of the probes was conducted by the Health Department and City of Tacoma on May 15, 2008. Another monitoring event was conducted on July 30, 2008. Two probes had elevated levels of combustible gas above 100% of the Lower Explosive Limit (LEL) for methane gas in the May monitoring event. The probes were then monitored quarterly by the Health Department starting in 2009. Probe number LAI05 had elevated levels of combustible gas above 100% of the LEL on a few occasions. After the monitoring event in June 2010 the valve was left open. Subsequent follow-up monitoring detected only a low level of gas present. The last methane monitoring event prior to the writing of this report was conducted by the Health Department on September 28, 2010. Results of the methane survey are shown in Table 5 and Figure 8.

Table 5. Methane monitoring results for the City Fill (35th St. Landfill) (September 28, 2010)

Gas Probe	Methane reading (% LEL)	Probe depth
LAI01	31%	25 feet
LAI02	56%	30 feet
LAI03	ND	30 feet
LAI04	ND	25 feet
LAI05	1%	27 feet
LAI06	ND	30 feet

ND = No Detection
LEL = Lower Explosive Limit

The bank and the toe of the slope were inspected for signs of leaching during the April 2001 site inspection. No visible signs of leaching were noted. A large puddle of water was noted at the toe of the slope. From 1999 to 2004 the City of Tacoma performed sampling of soil and surface water at the landfill site on an annual basis. Analysis of the samples showed no petroleum contamination present. A spring was noted north of the landfill during the last sampling event. The spring flows north into a storm drain. The spring was sampled on May 8, 2001. No contamination above state cleanup standards was detected. In July 2005 the Health Department, on behalf of Ecology's Toxics Cleanup Program, received a request to conduct an initial investigation of this site to determine possible contamination. After a review of the facility's files, it was determined that sampling at the site performed by city agencies was inadequate. An initial investigation, including further sampling was conducted in August 2005. The sampling results confirmed petroleum hydrocarbon, heavy metals, arsenic, and lead contamination at varying degrees.

Landau Associates prepared a report in August 2008 that included a remedial investigation, feasibility study, and cleanup action plan. Results in the report indicate that cPAHs (carcinogenic polycyclic aromatic hydrocarbons) and motor oil were detected above cleanup levels in some of the samples. Recommendations were made in the report and in October 2008 Ecology responded with a written opinion on the proposed cleanup of the site. No follow-up was performed by the prospective buyer and the sale ultimately was not completed.

2.8.5 RECOMMENDATIONS

Due to the close proximity of residential and business buildings to the landfill, the potential for methane migration into the buildings exists. Therefore, the Health Department recommends that quarterly methane monitoring of the gas probes continue to be conducted. Future methane monitoring frequency at the site may be altered based upon the results obtained.

The soil and water sampling activities recommended in the 1992 report that had been conducted by the City of Tacoma were ultimately not useful and were discontinued. Ecology, in accordance with the Health Department's Site Hazard Assessment Program will work with the property owner to resolve contamination issues at the site. In the future, Ecology may conduct a Site Hazard Assessment of the site. At that time, Ecology will assess whether action will be needed and, if necessary, establish a priority for the work.

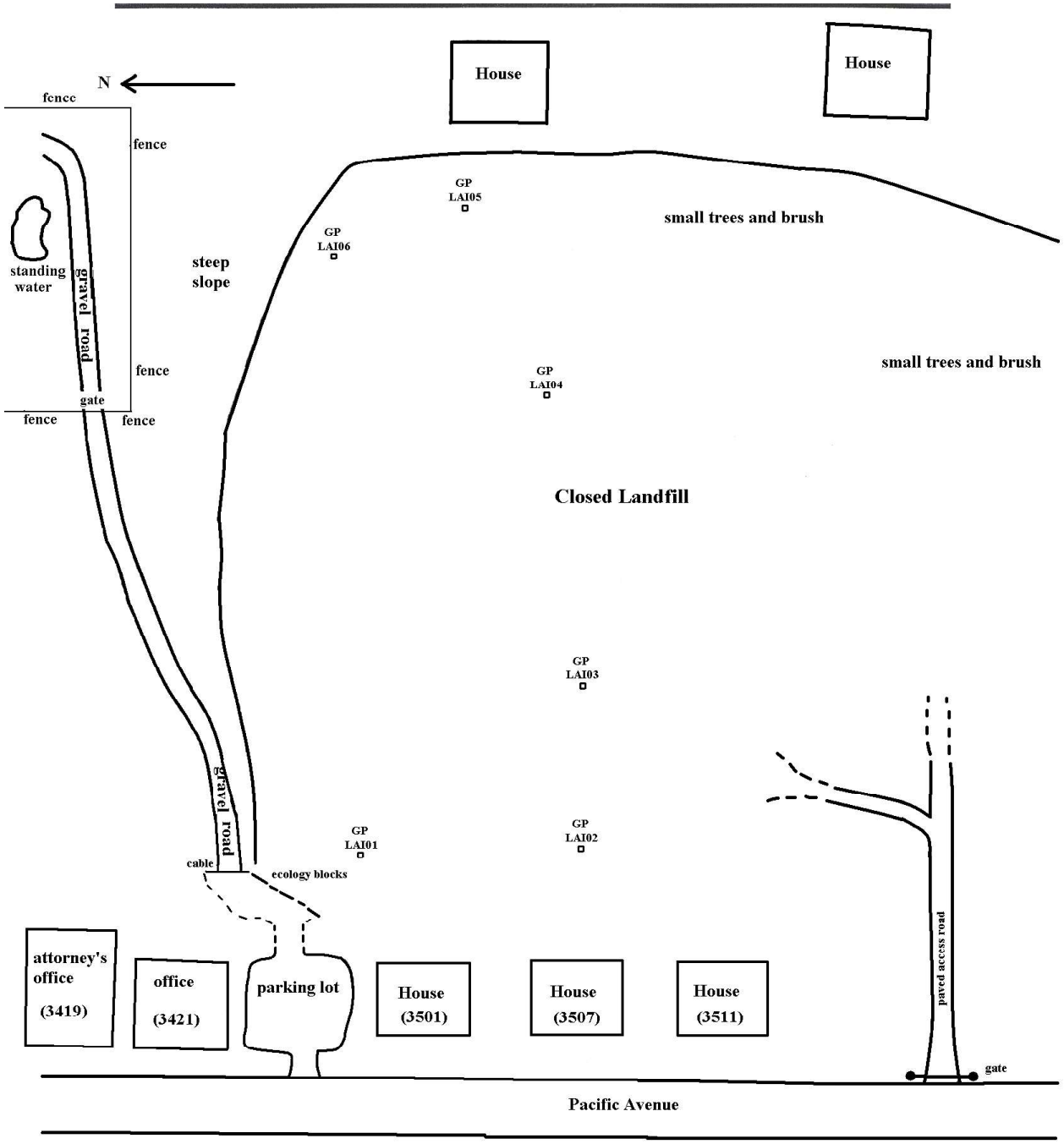
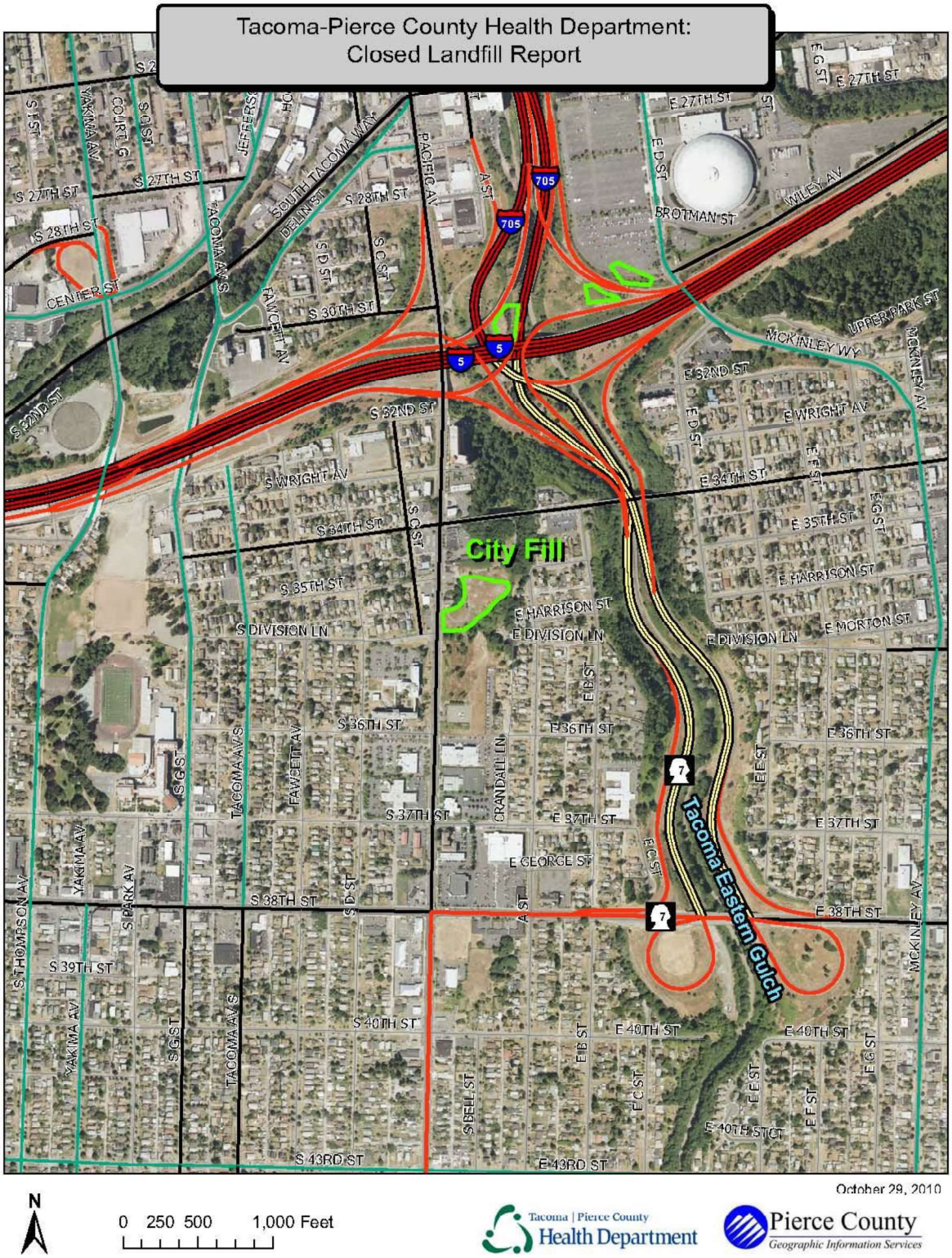


Figure 8. City Fill (35th St. Landfill)



The map features are approximate and are intended only to provide an indication of said feature. Additional areas that have not been mapped may be present. This is not a survey. Orthophotos and other data may not align. The County assumes no liability for variations ascertained by actual survey. ALL DATA IS EXPRESSLY PROVIDED 'AS IS' AND 'WITH ALL FAULTS'. The County makes no warranty of fitness for a particular purpose.

4.0 SITES LISTED BY AREA

Range 1W

T 20N Longbranch Open Dump
T 21N Key Center Dump

Range 1E

T 19N Anderson Island Dump
Fort Lewis Landfill
Dupont Dump
T 20N McNeil Island Landfill
T 22N Purdy Landfill

Range 2E

T 17N Roy Dump
Wood, Ken
T 19N Lakes Drywall Dump
McChord Demolition Landfill
T 20N Fox Island Dump
Northwest Aggregates
Mountain View Funeral Home
Todd Nursery Disposal Site
Chambers Vista
T 21N Ruston Dump
Miller, Edward

Range 3E

T 17N Rogich, Gary
T 19N Cascade Demolition Landfill
Prebilsky
Rogich, Gary
Spanaway Dump
T 20N Occidental Chemical - Site VI (Dauphin Site) & Site II (Petarcik Site)
Tacoma Tideflats Landfill
Windstar Landfill
Tacoma Spur Projects (Site I, II, III)
City Fill (35th Street Landfill)
Masella, Fred/Mileski, Walter
Leingang, George
Reese and Salscheider Fill
Canyon Sand & Gravel
Lidford Dump
Milender, Dennis
Tacoma Place
Rhine Demolition Landfill
Brett, Vern
T21N Lime Waste Fill
O'Connor Demolition Fill
Grice Landfill
Occidental Chemical - Site I
Oline, Don (Site #1) - Occidental Site IV
General Chemical
Occidental Chemical - Site III (Don Oline or General Metals Landfill)
Oline, Don (Site #2)
Coski Dump

Range 4E

T 16N Pack Forest - University of Washington
LaGrande Dump
Eatonville Dump
T 18N Ferguson-Mathias Road
T 19N American Topsoils
McMillin Reservoir
Fox's Drywall
Starvation Valley Landfill
Hidden Valley Landfill
T 20N Jerry Apple Dumpsite/Apple Dumpsites ("Apple site")
Jerry Apple Dumpsite/Apple Dumpsites ("Olson site")
B&L Woodwaste
Jerry Apple Dumpsite/Apple Dumpsites (Milton Park site)
Oline, Brad
US Gypsum (Site 2)
Hopper, William
Jackson, Charles Fill Site
Jordan Brothers
Johnson, Robert/Oline, Brad fill site
Roseberry
Jerry Apple Dumpsite/Apple Dumpsites ("Swanson Site")
Barry Excavating Landfill
Corliss Wood Waste Fill
US Gypsum (Site 1)
Puyallup/Sumner Landfill

Range 5E

T 15N Elbe Dump
T 17N Puget Sound Power and Light
Kapowsin Lake Log Sort Dump
Camp One Dump
T 18N Old Soldiers Home Dump
Orting Dump
T 19N South Prairie Dump
T 20N AA Asphalting
Kiblinger
Stowe Construction
Boster, Robert E.
Puget Power (Canal Lining)
Bachmann, Michael
Alderton Sportsmen's Club

Range 6E

T 15N Ashford/National Dump
Tahoma Woods Dump
T 18N Carbonado Dump
T 19N Shear, Ronald
Champion International Corporation
T 20N Buckley Dump

Range 10E

T 18N Buck Creek Dump

5.0 GLOSSARY
LIST OF ACRONYMS

ASARCO	American Smelting And Refining Company
CH_4	Methane (See Appendix)
DNR	Department of Natural Resources
EPA	Environmental Protection Agency
H_2S	Hydrogen Sulfide
LEL	Lower Explosive Limit
LRI	Land Recovery, Inc.
MFS	Minimum Functional Standards
NPS	National Park Service
PAH	Polynuclear Aromatic Hydrocarbons
PPM	Parts Per Million
PSCAA	Puget Sound Clean Air Agency, *formerly Puget Sound Air Pollution Control Agency (PSAPCA)*
PVC	Polyvinyl Chloride
RCW	Revised Code of Washington
TPCHD	Tacoma-Pierce County Health Department
UEL	Upper Explosive Limit
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
WNG	Washington Natural Gas

6.0 GLOSSARY
DEFINITIONS OF TERMS

CH_4 Methane Gas A colorless, odorless, and tasteless gas that is a by-product of anaerobic decomposition and a component of landfill gas. Typically, methane constitutes almost 50% of landfill decomposition gas (carbon dioxide constitutes another almost 50% - see below). For more information on methane gas see the appendix.

CO_2 Carbon Dioxide A colorless, odorless, noncombustible gas that constitutes almost 50% of landfill decomposition gas. Carbon Dioxide is heavier than air and will move toward the bottom of a landfill.

H_2S Hydrogen Sulfide A colorless gas with a strong odor of rotten eggs. Hydrogen Sulfide is found as a component of landfill gas at some landfills.

LEL Lower Explosive Limit Stated as a percentage, 100% LEL equals 5% methane (CH_4) gas by volume. Methane gas is explosive from 5% to 15% CH_4 gas.

MFS Minimum Functional Standards for Solid Waste Handling Chapter 173-304 WAC (also called the MFS) became policy in 1988. The MFS set minimum functional performance standards for the proper handling of solid wastes. At the time of the writing of this report, the MFS was being revised into Chapter 173-350 WAC.

PPM Parts Per Million Example: 500 ppm methane gas = 500/1,000,000 or .05% methane

PVC Polyvinyl Chloride A white water-insoluble thermoplastic resin with many uses including the making of landfill liners.

UEL Upper Explosive Limit The Upper Explosive Limit for CH_4 gas is 15%. Methane gas is explosive from 5% to 15% CH_4 gas.

7.0 APPENDIX - METHANE GAS

Methane gas is produced by the anaerobic digestion of organic waste materials in a landfill environment. Methane itself is a colorless, odorless, and non-toxic gas. It is known to be lighter than air and rise from a landfill. Methane gas will take the path of least resistance to the surface of the landfill or when migrating through soils off-site.

Methane gas is not a direct threat to public health, but can be a significant safety hazard. Methane can be a simple asphyxiant due to the displacement of oxygen. Methane gas is explosive at concentrations of 5-15% gas by volume in air.

The production and quantity of methane produced by an individual site depends on many factors. These factors include the volumes and types of waste present within a fill, as well as the level of moisture within the waste. When present, the movement or migration of methane gas is driven by pressure. A landfill itself commonly acts as a pressure cooker. As more gas is generated, it creates additional internal pressure which causes the methane to move towards areas of less pressure, generally up through the surface or out the sides through soil. The rate and amount of methane migration from a landfill can also be heavily influenced by the barometric pressure. A lower barometric pressure increases the rate of methane being emitted from the landfill.

Table 24 includes the various units used by instruments to measure methane gas concentrations and the conversions between the units.

Table 24. Conversion Factors for Methane gas.

% CH_4	ppm	% LEL
0.01%	100	0.2%
0.05%	500	1.0%
0.10%	1,000	2.0%
0.50%	5,000	10.0%
1.00%	10,000	20.0%
1.25%	12,500	25.0%
2.00%	20,000	40.0%
2.50%	25,000	50.0%
5.00%	50,000	100.0%

$\%CH_4$ = % methane by volume in air (flammable range 5-15%)
ppm = parts per million

%LEL = Lower Explosive Limit (5% volume in air = 100% LEL)
Ratio of LEL: CH_4 is equal to 20:1 (20% LEL = 1% CH_4)