

Site Review And Update

BRICK TOWNSHIP LANDFILL

BRICK TOWNSHIP, OCEAN COUNTY, NEW JERSEY

CERCLIS NO. NJD980505176

SEPTEMBER 26, 1995

**U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service
Agency for Toxic Substances and Disease Registry
Division of Health Assessment and Consultation
Atlanta, Georgia**

Site Review and Update: A Note of Explanation

The purpose of the Site Review and Update is to discuss the current status of a hazardous waste site and to identify future ATSDR activities planned for the site. The SRU is generally reserved to update activities for those sites for which public health assessments have been previously prepared (it is not intended to be an addendum to a public health assessment). The SRU, in conjunction with the ATSDR Site Ranking Scheme, will be used to determine relative priorities for future ATSDR public health actions.

SITE REVIEW AND UPDATE

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Prepared By:

**The New Jersey Department of Health
Environmental Health Service
Under A Cooperative Agreement With
The Agency For Toxic Substances And Disease Registry**

SUMMARY OF BACKGROUND AND HISTORY

Brick Township Landfill is located on Sally Ike Road (Route 549), in Brick Township, Ocean County, New Jersey (Figure 1). The site consists of 42 acres of land adjacent to residential areas (Figure 2). Residential areas are located to the northeast, southeast and southwest of the site. Approximately 3000 people live within one mile of the landfill.

The site started operations in 1949 and operated until 1979, first as McCormick's Dump, then as French's Landfill, and finally as the Brick Township Landfill. In 1973 Brick Township purchased the landfill which was used for the disposal of municipal solid wastes, bulk liquid wastes, commercial and construction wastes, and sewage and septic wastes. A large borrow pit was created in the northern part of the site to provide soil for daily and weekly cover. This pit can contain standing water during wet conditions.⁽¹⁾

The Public Utilities Commission (PUC) disposed of 100,000 gallons of septage per day at the landfill, under a contractual agreement, into three septage pit areas. Brick Township was allowed to reduce the amount of septage to 70,000 gal/day, in 1974. In May 1979, the Township ceased all disposal operations and a two-foot layer of soil was placed over the solid wastes and septage wastes.

The New Jersey Department of Environmental Protection (NJDEP) conducted site inspections in April and May 1978, and then issued a Notice of Prosecution on May 10, 1978 for three violations: 1) Failure to control windblown litter; 2) Failure to maintain the grade and thickness of cover material; and 3) Failure to obtain NJDEP approval prior to the excavation, disruption, or removal of deposited material.

The Kirkwood-Cohansey aquifer is approximately 80 feet below the site and contains a confining layer in the Kirkwood formation. This is expected to be an effective barrier to any downward migration of contaminated water into the deeper aquifers. In October 1974, four monitoring wells were installed at the perimeter of the landfill under the direction of the NJDEP.

The Brick Township Board of Education installed four monitoring wells east of the landfill at McCormick Tract, in November 1980, to determine if the site was feasible for the construction of an elementary school. Monitoring wells at the site of the proposed school contained a maximum of 3.4 ppm of 1,1-dichloroethane, 2.4 ppm of 1,2-dichloroethane, 0.02 ppm of carbon tetrachloride, 2.4 ppm of bromoform, and 0.119 ppm of benzene.

In December 1980, additional samples were collected from on- and off-site monitoring wells, potable wells, residue from the three on-site septage pits, and surface waters, for the Township and the NJDEP. A variety of Volatile Organic Compounds (VOC's) and metals were found in the septage pit and in groundwater samples. Surface waters contained several volatile organic chemicals whose concentrations were below their respective drinking water health comparison values. Residential wells were contaminated by VOC's (chloroform, trichloroethylene) above their respective drinking water health comparison values.

Off-site subsurface soils taken adjacent to the site were reported to be contaminated with compounds above their soil comparison values. The soils contained acetone at 1000 ppm, 1000 ppm of ethylbenzene, 210 ppm of 1,1,1-trichloroethane, 1000 ppm of toluene, 2 ppm of vinyl chloride, 5100 ppm of 1,2-dichlorobenzene, 280 ppm of 1,4-dichlorobenzene, 49 ppm of bis(2-ethylhexyl)phthalate, 0.45 ppm of PCB, and 2 ppm of DDT.^(1,2)

The NJDEP conducted another site inspection, in March 1981, and found about 150 55-gallon drums, three empty 10,000 gallon storage tanks, and three open pits used for septage disposal. Residential potable wells were sampled by the NJDEP in May 1981, and trace amounts of chloroform, bromoform, 1,1-dichloroethane, and 1,1,1-trichloroethane were found. Analysis of the septage pits in December 1981 found high levels of pesticides, VOC's, and metals.

In December 1982, additional off-site groundwater monitoring was conducted, the on-site drums were removed, and structures on-site were demolished in order to comply with the August 1982 Administrative Consent Order (ACO). Also in December 1982, the site was placed on the United States Environmental Protection Agency's (USEPA's) National Priorities List (NPL).

In December 1985, an ACO was signed to perform a Remedial Investigation/ Feasibility Study (RI/FS), which was released in June 1992. On-site soil samples contained a maximum of arsenic at 1.1 ppm, cadmium at 2.7 ppm, chromium at 5.3 ppm, and lead at 6.7 ppm. The groundwater contained a maximum of chromium at 582 ppb, lead at 76.7 ppb, mercury at 5.8 ppb, selenium at 6.2 ppb, nickel at 296 ppb, 1,3-dichlorobenzene at 16 ppb, vinyl chloride at 23 ppb, methylene chloride at 17 ppb, 1,2 dichloroethylene at 36 ppb, benzene at 14 ppb, chlorobenzene at 125 ppb, 1,4-dichlorobenzene at 28 ppb, endrine ketone at 0.08 ppb, and 4,4 DDT at 0.115 ppb. Analysis of landfill gas indicates that no methane or non-methane gases are migrating off-site to residential areas ⁽²⁾.

The NJDEP completed a Decision Document for the Brick Township Landfill Site in November, 1992.⁽³⁾ The selected remedy consists of: 1) Placement of an impermeable cap on the landfill; 2) Control surface water; 3) Provide a landfill gas collection/venting system; 4) Implement air and ground water quality monitoring programs; 5) Fencing the site; and 6) Provide deed restrictions.

The Brick Township Landfill Health Assessment (HA) was released on June 20, 1990.⁽⁴⁾ The health assessment stated that the groundwater is contaminated and the contaminant plume is migrating southeast from the site. The health assessment also identified off-site surface soil as being potentially contaminated. Thus, the HA cited potential human exposure pathways could occur through inhalation of gaseous pollutants or airborne respirable particles, ingestion of contaminated water and surface soil, and skin contact. The contaminants of concern identified in monitoring well water were naphthalene, anthracene, phthalates, dichloroethanes, dichloroethenes, chlorobenzene, ethylbenzene, toluene, benzene, cadmium, lead, mercury, trichloroethane, and tetrachloroethylene. These chemicals were also identified in the soil samples on-site.

Community concerns were focused primarily on groundwater quality. Their specific concerns were: 1) Lack of site security which allowed access to children and dirt-biking; 2) Assurance that storage tanks have been removed from the site; 3) Potential for contamination of the Lanes Mill School wells; and 4) Possible surface water runoff from the landfill entering the Lanes Mill School Property. Public health concerns were focused on the danger to children and dirt-bikers who trespass.

The health assessment for this site concluded: 1) The site is of potential health concern because of the risk to human health resulting from possible exposure via inhalation, ingestion, and/or skin contact; 2) The site is not secure to prevent trespassing; 3) The borrow pit is a danger because it fills with water; 3) Private wells are still in use for drinking and other domestic purposes, thus, exposure to contaminants may occur; 4) More information on the population living near the site is needed; and 5) Additional information is needed to characterize the groundwater contaminant plume and on-site and off-site soil; and 6) The population exposed to on-site and off-site contaminants at a level of public health concern has not yet been identified.

It was recommended that: 1) The landfill should be secured on all boundaries to restrict entry and warning signs should be erected; 2) The borrow pit should be filled in immediately to prevent accidents; 3) Private wells still in use near the site should be periodically sampled; 4) Sensitive populations living adjacent to the site should be identified and informed of preventive measures to minimize possible exposure to landfill contaminants; 5) Additional testing should be done in the Phase II RI/FS to characterize on- and off-site contamination and the direction and extent of the leachate plume; and 6) ATSDR/NJDOH will reevaluate this site if data become available suggesting that human exposure to significant levels of hazardous substances is currently occurring or has previously occurred.

CURRENT SITE CONDITIONS

On August 4, 1994, a site visit was conducted by Howard Reuben of the NJDOH, the NJDEP Project Officer, and a representative from the Ocean County Health Department. The site consisted of an inactive landfill and a borrow pit. It was overgrown with vegetation. There were no buildings or other structures on the site. All residences in the area use municipal water and sewage lines. A public high school approximately 0.25 miles away from the edge of the site is connected to the municipal water supply.

No signs were evident indicating the presence of a Superfund site. The gates to the entrance of the landfill were partially closed so that trespassers could gain access. The site was only partially fenced. Several houses backed onto the edge of the landfill without any fencing or other protective barriers between the landfill and the houses.

There were many signs of trespassing including broken bottles, building and other debris, tires, fresh All Terrain Vehicle (ATV) tracks, and a skateboarding platform. The only physical

hazard existing on-site were the steep banks of the landfill cells and the borrow pit. Bike riders and hikers could be injured if they fell down an embankment.

There were no changes in site conditions subsequent to the health assessment except for some minor erosion occurring on the sides of the borrow pit and cell caps. The local health officer did not have information regarding the residents that were on well water in the past. The Township provides city-supplied water to all of the residents near the site.

Conclusions of the 1990 health assessment remain valid under present site conditions. New data indicate that: 1) Private wells are no longer in use for drinking or other domestic purposes; 2) There are no known exposed populations currently except for on-site trespassers.

The recommendations in the 1990 health assessment that are no longer valid are: 1) Private wells still in use near the site should be periodically sampled; 2) Sensitive populations adjacent to the site should be identified and educated about the site hazards; and 3) Additional testing should be done in the Phase II RI/FS to characterize on-site and off-site contamination and the direction and extent of the leachate plume, 4) Off-site surface soil sampling data is needed to determine if exposures exist for nearby residents.

Additional environmental sampling was conducted in 1992 by the NJDEP for the Final RI/FS, subsequent to the 1990 health assessment. On-site surface soil samples contained arsenic at 1.12 mg/kg and cadmium at 2.7 mg/kg, which was above their health comparison values. The groundwater contained benzene at 7.5 µg/l, cadmium at 22 µg/l, 1,2-dichloroethane at 95 µg/l, 1,1-dichloroethylene at 39 µg/l, heptachlor at 67 µg/l, heptachlor epoxide at 6 µg/l, lead at 16 µg/l, methylene chloride at 30 µg/l, and trichloroethylene at 5 µg/l, which was above their health comparison values. No methane or non-methane gases were found to be migrating off-site.

CURRENT ISSUES

Community health concerns were identified in the health assessment. These focused on the following general areas:

- 1) Lack of site security which allowed access to children and dirt-biking. This concern remains valid as the site remains accessible to trespassers.
- 2) Assurance that storage tanks have been removed from the site. This concern has been satisfied with implementation of on-site removal activities.
- 3) Potential for contamination of the Lanes Mill (High) School wells. According to the Brick Township Board of Education, the high school has utilized municipal water supplies since opening in 1980. The High school well is used for irrigation purposes only, with no potential for contact by students or faculty.

- 4) Possible surface water runoff from the landfill entering the Lanes Mill School Property. This concern is not substantiated by physical conditions at the site.

No additional potential or completed human exposure pathways have been identified since the release of the health assessment.

The Ocean County Health Officer stated that there are no new community or public health concerns. The ATSDR/NJDOH consider the lack of site security to be a potential public health concern. There are no newly identified concerns.

The Ocean County Health Department has a ordinance requiring sampling of all residential wells prior to issuance of a certificate of occupancy. However, new homes in Brick Township are required to be connected to municipal water supplies which became available in 1977. Therefore, the only documented completed human exposure pathway existed in the past and were those residents who drank water from contaminated private wells. This exposure is evaluated in the Public Health Implications section.

PUBLIC HEALTH IMPLICATIONS

This section contains a discussion of the potential health effects in persons exposed to contaminants at the Brick Township Landfill site in order to address specific community health concerns. Health effects evaluations are accomplished by estimating the amount (or dose) of those contaminants that a person might come in contact with on a daily basis. This estimated exposure dose is then compared to established health guidelines. People who are exposed for some crucial length of time to contaminants of concern at levels above established guidelines are more likely to have associated illnesses or disease. In evaluating the toxicological significance of potential exposure of contaminated well water, the following assumptions were made: 1) Adults drink 2 l of water/day and children drink 1 l of water/day; 2) An adult weighs 70 kg and a child weighs 35 kg; and 3) The Landfill started operations in 1949, and exposure ceased in 1977. The exposure duration is considered to be 28 years for adults and ten years for children.

Health guidelines are developed for contaminants commonly found at hazardous waste sites. Examples of health guidelines are the ATSDR's Minimum Risk Level (MRL) and the USEPA's Reference Dose (RfD). When exposure (or dose) is below the MRL or RfD; then, non-cancer, adverse health effects are unlikely to occur. MRLs are developed for each duration of exposure, such as acute (less than 14 days), intermediate (15 to 364 days), and chronic (365 days and greater). The ATSDR presents these MRLs in Toxicological Profiles. These chemical-specific profiles provide information on health effects, environmental transport, human exposure, and regulatory status.

The toxicological effects of contaminants detected in environmental media are considered singly. The cumulative or synergistic effects of mixtures of contaminants may serve to enhance

their public health significance. Additionally, individual or mixtures of contaminants may have the ability to produce greater adverse health effects in children as compared to adults. This situation depends upon the specific chemical being ingested or inhaled, its pharmacokinetics in children and adults, and its toxicity in children and adults.

There were QA/QC problems with previous analytical data. Therefore, the data used for analyses were taken from private wells that were sampled between 1978 and 1985. Samples containing contaminants at their maximum detected concentrations, their exposure doses, and their health effects are listed in Table 1. The data was not separated by residence.

Chloroform

To evaluate the public health significance past exposure to contaminated groundwater in private wells, exposure doses for chloroform and subsequent lifetime excess cancer risk (LECR) estimates were calculated. The maximum concentration of chloroform in private wells were reported by the NJDEP was 9 ug/l. The human exposure pathway is assumed to be the ingestion of chloroform in potable water. The ATSDR has established a minimal risk level for chronic oral exposure (duration > 1 year) of 0.01 mg/kg/day which is equivalent to the USEPA chronic oral reference dose. At the media concentrations cited above, the estimated exposure doses for an adult or child for the exposure pathway cited were below the chronic oral MRL for chloroform. These exposure doses are below the no observed adverse effect level cited in the ATSDR Toxicological Profile for Chloroform.⁽⁵⁾ At such concentrations, non-carcinogenic health effects among children or adults are not generally expected. For both adults and children, there would be an insignificant or no ($< 10 E^{-6}$) increased cancer risk based upon calculated exposure doses.

Trichloroethylene

To evaluate the public health significance past exposure to contaminated groundwater in private wells, exposure doses for trichloroethylene and subsequent lifetime excess cancer risk (LECR) estimates were calculated. The maximum concentrations of trichloroethylene in private wells were reported by the NJDEP was 8 ug/l. The human exposure pathway is assumed to be the ingestion of trichloroethylene in potable water. There is currently no chronic oral MRL or RfD for chronic oral exposure to trichloroethylene. The ATSDR has established a minimal risk level for intermediate oral exposure (duration > 14 days, and < 1 year) of 0.7 mg/kg/day. At the media concentrations cited above, the estimated exposure dose for a adult or child for the exposure pathway cited were below the intermediate oral MRL for chloroform. These exposure doses are below the no observed adverse effect level cited in the ATSDR Toxicological Profile for Trichloroethylene.⁽⁶⁾ At such concentrations, non-carcinogenic health effects among children or adults are not generally expected. For both adults and children, there would be no apparent ($< 10 E^{-5}$) increased cancer risk based upon calculated exposure doses.

CONCLUSIONS

The Brick Township Landfill site is evaluated by the NJDOH and the ATSDR to presently present no apparent public health hazard for the groundwater pathway as residents have municipal water supplies available. All new wells in the environs of the site are sampled by the Ocean County Health Department prior to use thus ensuring their suitability for potable use. There are currently no completed or potential human exposure pathways associated with the Brick Township Landfill site.

The site is evaluated to have constituted no apparent public health hazard in the past as a result of the ingestion of contaminated groundwater because maximum exposure doses of chloroform and trichloroethylene detected in residential wells were not at levels where non-carcinogenic adverse health effects were likely. Based upon calculated exposure doses, it is unlikely that those residents exposed to chloroform or trichloroethylene in the past by drinking contaminated private well water will experience significant additional carcinogenic risk.

The conclusions made in the 1990 health assessment regarding the site being of potential health concern were valid. The recommendations to periodically sample residential wells and conduct additional testing should be done to characterize off-site soil contamination in residential areas are no longer valid based on current site observations. Additional recommendations that are no longer valid are: 1) Private wells still in use near the site should be periodically sampled; 2) Sensitive populations adjacent to the site should be identified and educated about the site hazards; and 3) Additional testing should be done in the Phase II RI/FS to characterize on-site and off-site groundwater contamination and the direction and extent of the leachate plume.

Recommendations which still should be addressed include: 1) The landfill should be secured on all boundaries to restrict entry and exposure to physical hazards, and warning signs should be erected; 2) The borrow pit should be filled in immediately to prevent accidents.

Specific community concerns were: 1) Lack of site security which allowed access to children and dirt-biking; 2) Assurance that storage tanks have been removed from the site; 3) Potential for contamination of the Lanes Mill School wells; and 4) Possible surface water runoff from the landfill entering the Lanes Mill School property. All community concerns have been addressed except for site security.

The remedial activities specified in the NJDEP Record of Decision, when implemented, are sufficient to address the remaining concerns of the ATSDR, the NJDOH, and the community regarding the site and are consistent with protection of the public health.

RECOMMENDATIONS

Cease/Reduce Exposure Recommendations

- 1) Post signs indicating the Brick Township Landfill is a USEPA hazardous waste site.
- 2) Secure the Brick Township Landfill to prevent trespassing and access to physical hazards.

Site Characterization Recommendations

- 1) Implement remedial plans specified in the Record of Decision for the Brick Township Landfill site.

Health Activities Recommendation Panel Determinations

The data and information developed in this SRU have been evaluated to determine whether HARP follow-up actions may be indicated. An evaluation by HARP is not indicated at this time.

PUBLIC HEALTH ACTION PLAN

The Public Health Action Plan (PHAP) for the Brick Township Landfill site contains a description of the actions to be taken at or in the vicinity of the site. The purpose of the PHAP is to ensure that this health assessment not only identifies public health hazards, but provides a plan of action designed to mitigate and prevent adverse human health effects resulting from exposure to hazardous substances in the environment. Included, is a commitment on the part of ATSDR and NJDOH to follow-up on this plan to ensure that it is implemented. ATSDR will provide an annual follow-up to this PHAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this site review and update, and will be provided to persons who request it. The public health actions taken or to be implemented are as follows:

Actions Undertaken by ATSDR/NJDOH:

1. These data and information developed in the Site Review and Update have been evaluated by ATSDR/NJDOH to determine if public health concerns, regarding potential human exposure pathways associated with the Brick Township Landfill site.


Actions Planned

1. ATSDR will provide an annual follow up to this PHAP, outlining the actions completed and those in progress. This report will be placed in repositories that contain copies of this site review and update, and will be provided to persons who request it.

ATSDR will reevaluate and expand the Public Health Action Plan (PHAP) when needed. New environmental, toxicological, health outcome data, or the results of implementing the above proposed actions may determine the need for additional actions at this site.

CERTIFICATION

The Site Review and Update for the Brick Township Landfill site was prepared by the New Jersey Department of Health under a cooperative agreement with the Agency for Toxic Substances and Disease Registry (ATSDR). It is in accordance with approved methodology and procedures existing at the time the site review and update was initiated.



Technical Project Officer, SPS, SSAB, DHAC

The Division of Health Assessment and Consultation (DHAC), ATSDR, has reviewed this Site Review and Update and concurs with its findings.



Division Director, DHAC, ATSDR

DOCUMENTS REVIEWED

- 1) New Jersey Department of Environmental Protection. Brick Township Landfill Site Remedial Investigation/Feasibility Study: Final Feasibility Study Report. Brick Township, Ocean County, New Jersey. June, 1992.
- 2) New Jersey Department of Environmental Protection. Brick Township Landfill Site Remedial Investigation/Feasibility Study: Final Phase II Remedial Investigation Report. Brick Township, Ocean County, New Jersey. July, 1992.
- 3) New Jersey Department of Environmental Protection. Decision Document for Brick Township Landfill, Brick Township, Ocean County, New Jersey. November, 1992.
- 4) Agency for Toxic Substances and Disease Registry. Health Assessment for Brick Township Landfill, Brick Township, Ocean County, New Jersey, June 20, 1990.
- 5) Agency for Toxic Substances and Disease Registry, Toxicological Profile for Chloroform. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, April 1993.
- 6) Agency for Toxic Substances and Disease Registry, Toxicological Profile for Trichloroethylene. Atlanta, Georgia: Agency for Toxic Substances and Disease Registry, April 1993.

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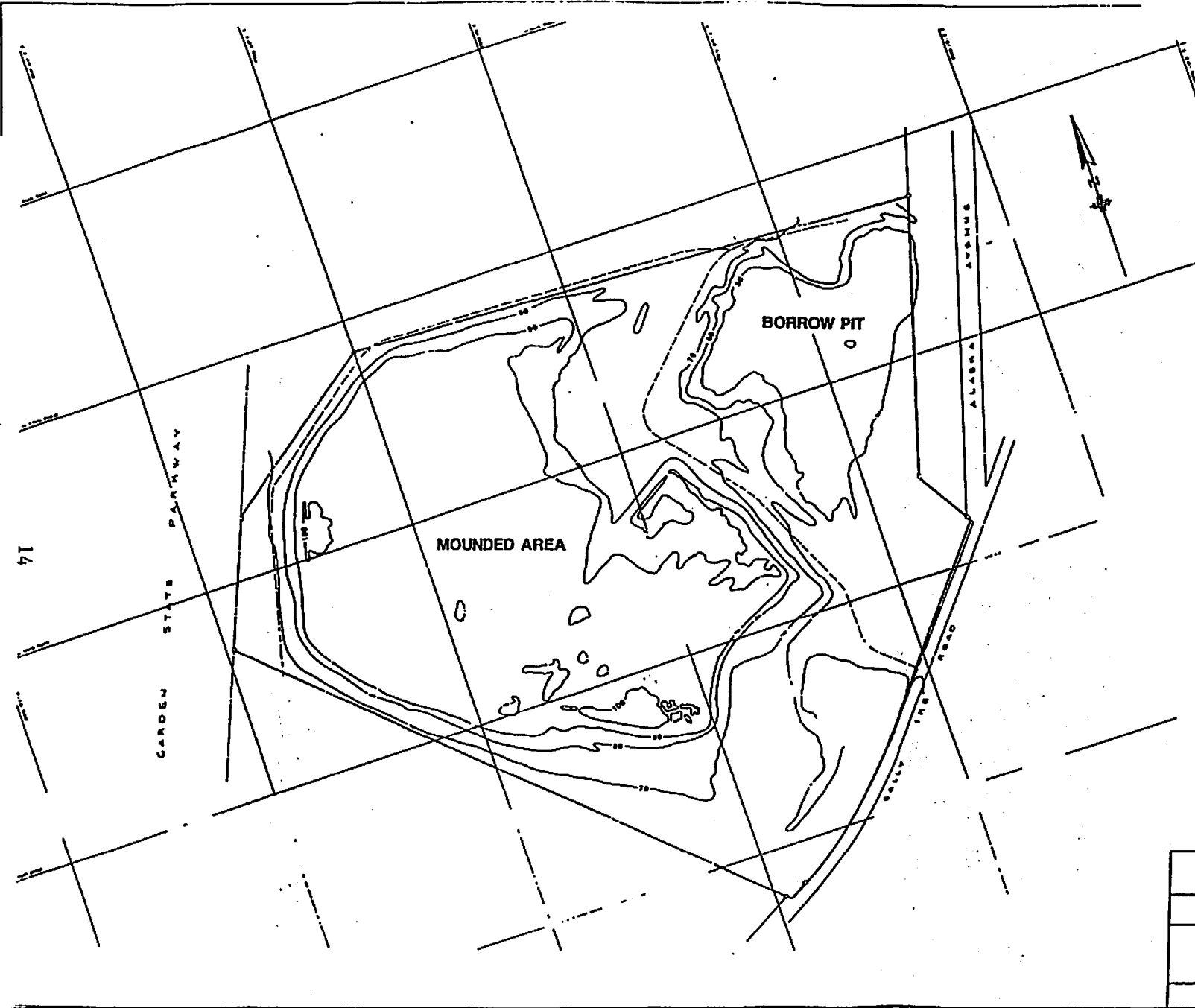
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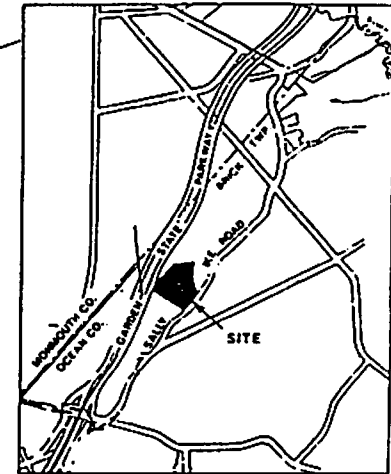
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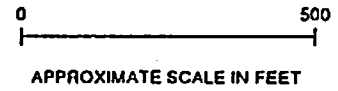
APPENDICES



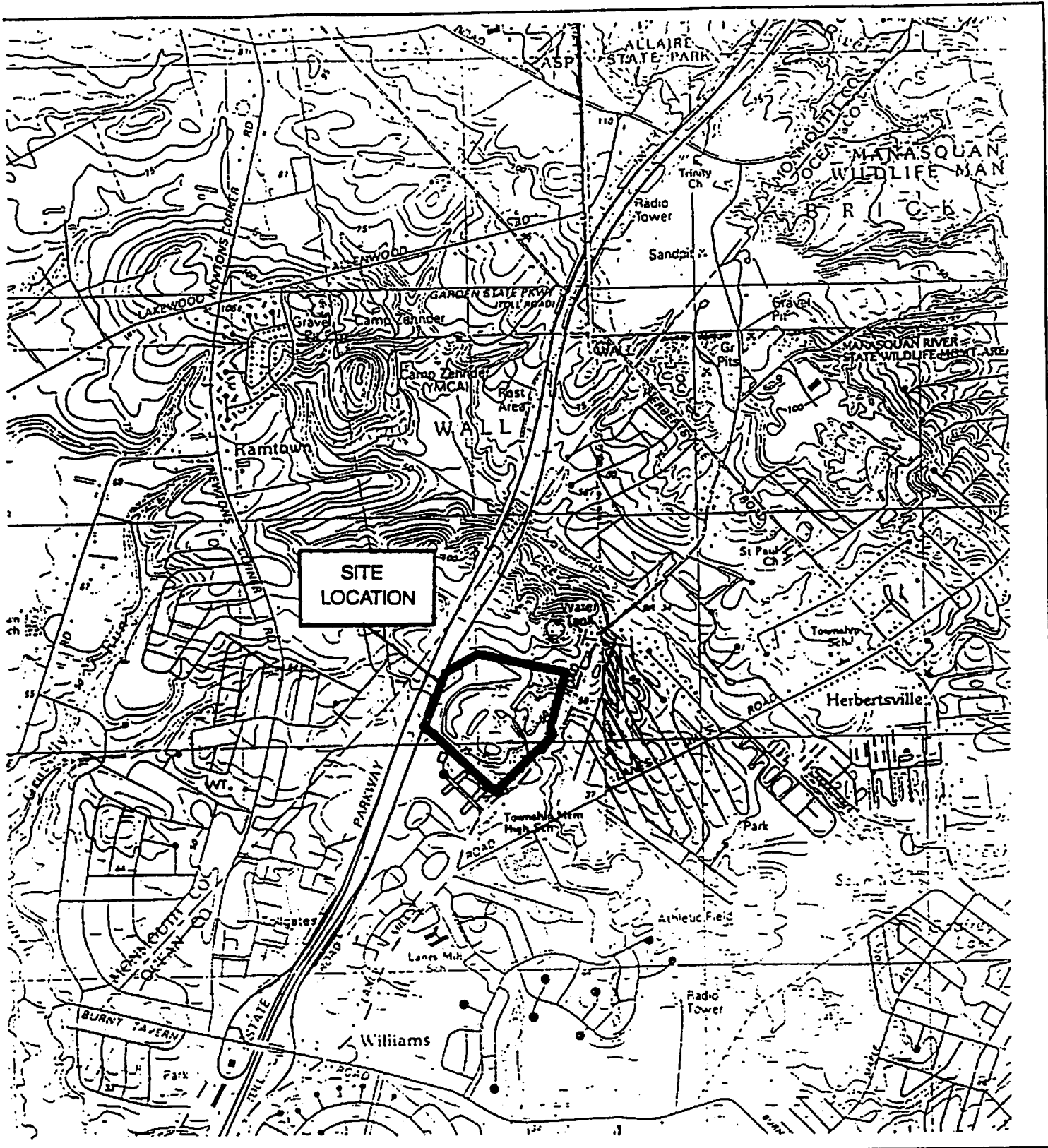
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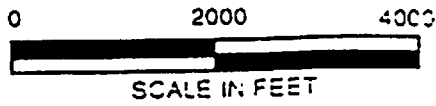
KEY MAP



NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ENERGY
BRICK TOWNSHIP LANDFILL SITE
FIGURE 1
SITE LAYOUT MAP
EBASCO SERVICES INCORPORATED



SOURCE: U.S.G S. 7.5 MINUTE TOPOGRAPHIC MAPS POINT PLEASANT, ASBURY PARK, FARMINGDALE, & LAKEWOOD NEW JERSEY QUADRANGLES



NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION AND ENERGY

BRICK TOWNSHIP LANDFILL SITE

FIGURE 2
SITE LOCATION MAP

EBASCO SERVICES INCORPORATED