

**PROPOSED REMEDIAL ACTION PLAN
MEETING INVITATION AND FACT SHEET
November 2006**

**Rockland Psychiatric Center Former Laundry
Facility
Town of Orangetown, Rockland County NY
Site No. 3-44-011**

Meeting Date and Location:

November 21, 2006, 7:00 pm
Town of Orangetown, Town
Hall
26 Orangeburg Rd.
Orangeburg, NY 10962

Public Comment Period:

November 8, 2006 through
December 7, 2006

Send Written Comments to:

John J. Rashak
NYSDEC-DER
21 South Putt Corners Road
New Paltz, NY 12561-1620

Document Repositories:

Orangeburg Library
20 South Greenbush Rd.
Orangeburg, NY 10962-2204
Mon.-Thurs.: 10AM-9PM
Fri.-Sat.: 10AM-5PM
Sun.: 1-5PM.
(845) 359-2244

Clerk's Office

Town of Orangetown, Town
Hall
26 Orangeburg Rd.
Orangeburg, NY 10962
Hours: by appointment
(845) 359-5100

NYSDEC Region 3

21 South Putt Corners Rd.
New Paltz, NY 12561-1620
Mon.-Fri.: 8:30AM-4:45PM
(845)256-3154

The community is invited to attend a public meeting on **November 21, 2006 at 7:00 pm** in the **Town of Orangetown's Town Hall** to discuss the proposed remedy for the Rockland Psychiatric Center Former Laundry Facility (RPC) site. This meeting is sponsored by the New York State Department of Environmental Conservation (NYSDEC) and the New York State Department of Health (NYSDOH). During the meeting, the NYSDEC will accept comments on the proposed remedy. The NYSDEC will also accept written comments on the remedy through December 7, 2006. After considering both verbal and written comments on the proposed remedy, the NYSDEC will issue a Record of Decision (ROD).

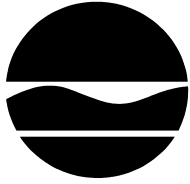
SITE DESCRIPTION

The site consists of 20.15 acres, portions of which are currently owned by the Rockland Psychiatric Center (RPC) and the Town of Orangetown. The site is located in a suburban section of Rockland County adjacent to the eastern end of Lake Tappan, a reservoir used for drinking water (see Figures 1 and 2).

SITE HISTORY

The RPC was built during 1927-1931. It evolved to become a nearly self-sufficient institution having its own power plant, water supply, sewage treatment facility, laundry service, vegetable farm and furniture manufacturing facility. Additionally, several areas of the RPC were used for the disposal of internally-generated wastes. The RPC is still operational today; however, its patient population has been significantly reduced and some of its former operations (e.g., the laundry service, the sewage treatment facility and the use of coal for power generation) have been discontinued.

REMEDIAL INVESTIGATION and FEASIBILITY STUDY



Contacts for Additional Information

For Site Remediation

Concerns:

John J. Rashak
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21 South Putt Corners Road
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(845)256-3179

For Health Related

Concerns:

Carl Obermeyer
NYSDOH
50 North Street- Suite 2
Monticello, NY 12701-1711
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About Citizen Participation

Michael J. Knipfing
NYSDEC Region 3
21 South Putt Corners Road
New Paltz, NY 12561-1620
(845)256-3154

In March 1998, a fish kill and the discovery of fish with lesions were documented on the RPC property. Although the fish kill may not have been the result of groundwater contamination, the NYSDEC ordered the initiation of a surface and subsurface investigation to evaluate potential environmental impacts associated with the historical operations at the RPC. An Interim Remedial Measure (IRM), consisting of an upgrade to a groundwater recovery (dewatering) sump located adjacent to the sewage treatment plant, was performed by a consultant to the New York State Office of Mental Health in 2001. The IRM redirected the sump discharge into the Orangetown sanitary sewer system for treatment under permit conditions.

The field investigation associated with the subsequent Remedial Investigation and Feasibility Study (RI/FS) was conducted during the March 2005- April 2006 period. A summary of this investigation, which found volatile organic compounds primarily in the groundwater, can be found in the June 2006 "Remedial Investigation/Feasibility Study Report" for the RPC site. This and other relevant documents, including the PRAP, are available to the public at the document repositories listed in this Fact Sheet.

The results from the environmental sampling conducted during the RI confirmed that the IRM was sufficient to control the extent of groundwater contamination. Based on the RI results, in comparison to relevant NYSDEC Standards, Criteria, and Guidance values (SCGs) and potential public health and environmental exposure routes, the NYSDEC has determined that the continued operation of the groundwater extraction system; an environmental easement; a site management plan; and a long-term groundwater monitoring program constitute the elements of the proposed remedy for this site. No further action would be required.

THE PROPOSED REMEDY

The proposed remedy is as follows:

1. Maintenance of the existing groundwater extraction system, which redirects the sump discharge to a publicly owned treatment works (POTW).
2. Imposition of an institutional control in the form of an environmental easement, which would require: (a) limiting the use and development of the property to restricted residential use, which would also permit commercial or industrial uses; (b) restricting the use of groundwater and surface water as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; and (c) the property owners completing and submitting to the Department a periodic certification of institutional and engineering controls.
3. Development of a site management plan which would include the following institutional and engineering controls: (a) continued evaluation of the potential for vapor intrusion for any buildings developed or where a change in use is contemplated for existing buildings on the site, including provision for mitigation of any impacts identified; (b) monitoring of VOCs (volatile organic compounds) in groundwater and (if necessary) soil vapor; (c) identification of any use restrictions on the site; and (d) provisions for the continued proper operation and maintenance of the components of the remedy.
4. A long-term groundwater monitoring program would be instituted, which would allow the effectiveness of

the groundwater extraction system to be monitored.

CITIZEN PARTICIPATION

The NYSDEC, in conjunction with the NYSDOH, is committed to establishing effective two-way communication with the public. The public is encouraged to make use of the Document Repositories listed on the first page of this Fact Sheet to review the PRAP and other site related documents, and to provide comments on the PRAP, either during the November 21, 2006 public meeting, or during the public comment period from November 8, 2006 through December 7, 2006.

Written comments (postmarked on or before December 7, 2006) should be sent to:

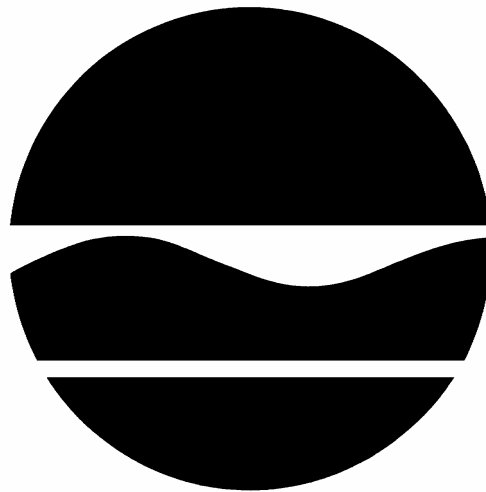
**John J. Rashak, Environmental Engineer I
NYSDEC-DER
21 South Putt Corners Road
New Paltz, NY 12561-1620**

After considering comments on the PRAP, the NYSDEC will select the remedy for the site and issue the Record of Decision (ROD). The ROD will contain a "Responsiveness Summary", which will address the questions and concerns raised during the comment period. A copy of the ROD will be placed in the Document Repositories and a "Notice of ROD Availability" will be mailed to the site's contact list. If you know of anyone who would like to be put on the mailing list, please have them contact one of the State representatives listed in this fact sheet.

PLEASE NOTE: In the event of severe weather conditions on November 21, 2006, the meeting will be rescheduled to November 28, 2006.

PROPOSED REMEDIAL ACTION PLAN
Rockland Psychiatric Center Former
Laundry Facility
Town of Orangetown, Rockland County, New York
Site No. 344011

October 2006



Prepared by:

Division of Environmental Remediation
New York State Department of Environmental Conservation

PROPOSED REMEDIAL ACTION PLAN

**Rockland Psychiatric Center
Town of Orangetown, Rockland County, New York
Site No. 344011
October 2006**

SECTION 1: SUMMARY AND PURPOSE OF THE PROPOSED PLAN

The New York State Department of Environmental Conservation (the Department), in consultation with the New York State Department of Health (NYSDOH), is proposing a remedy for the Rockland Psychiatric Center Former Laundry Facility site. As more fully described in Sections 3 and 5 of this document, operation of the former laundry facility at the site resulted in the disposal of hazardous wastes, primarily seven VOCs (volatile organic compounds): tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (1,1-DCE), cis-1,2-DCE, trans-1,2-DCE, 1,1,1-trichloroethane (TCA) and vinyl chloride (VC). These wastes (a.k.a. contaminants of concern) contaminated the groundwater and surface water at the site, and resulted in:

- a significant threat to human health associated with potential exposure to groundwater.
- a significant environmental threat associated with the potential impacts of contaminants in groundwater to surface water.

During the course of the investigation certain actions, known as interim remedial measures (IRMs), were undertaken at the Rockland Psychiatric Center Former Laundry Facility in response to the threats identified above. An IRM is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the remedial investigation/feasibility study (RI/FS). The IRM undertaken at this site included an upgraded groundwater extraction system, which redirected the sump discharge from a nearby stream to a publicly owned treatment works (POTW).

Based on the implementation of the above IRM, the findings of the investigation of this site indicate that the site no longer poses a significant threat to human health or the environment, therefore No Further Action with continued operation of the groundwater extraction system pursuant to a site management plan is proposed as the remedy for this site.

The proposed remedy, discussed in detail in Section 8, is intended to attain the remediation goals identified for this site in Section 6. The remedy must conform to officially promulgated standards and criteria that are directly applicable, or that are relevant and appropriate. The selection of a remedy must also take into consideration guidance, as appropriate. Standards, criteria and guidance are hereafter called SCGs.

This Proposed Remedial Action Plan (PRAP) identifies the preferred remedy, summarizes the other alternatives considered, and discusses the reasons for this preference. The Department will select a final

remedy for the site only after careful consideration of all comments received during the public comment period.

The Department has issued this PRAP as a component of the Citizen Participation Plan developed pursuant to the New York State Environmental Conservation Law and Title 6 of the Official Compilation of Codes, Rules and Regulations of the State of New York (6 NYCRR) Part 375. This document is a summary of the information that can be found in greater detail in the June 2006 “Remedial Investigation/Feasibility Study Report” (RI/FS), and other relevant documents. The public is encouraged to review the project documents, which are available at the following repositories:

Orangeburg Library
20 South Greenbush Rd.
Orangeburg, NY 10962-2204
Mon.-Thurs.: 10AM-9PM
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New Paltz, NY 12561
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(845) 256-3179
John Rashak, Project Manager

The Department seeks input from the community on all PRAPs. A public comment period has been set from November 8 to December 7, 2006 to provide an opportunity for public participation in the remedy selection process. A public meeting is scheduled for November 21, 2006 at the Town of Orangetown’s Town Hall beginning at 7:00 PM.

At the meeting, the results of the RI/FS will be presented along with a summary of the proposed remedy. After the presentation, a question-and-answer period will be held, during which verbal or written comments may be submitted on the PRAP. Written comments may also be sent to Mr. John Rashak at the above address through December 7, 2006.

The Department may modify the proposed remedy or select another, based on new information or public comments. Therefore, the public is encouraged to review and comment on all of the alternatives identified here.

Comments will be summarized and addressed in the responsiveness summary section of the Record of Decision (ROD). The ROD is the Department's final selection of the remedy for this site.

SECTION 2: SITE LOCATION AND DESCRIPTION

The site is located in a suburban section of Rockland County (see Figure 1). The site consists of 20.15 acres of the 600-acre Rockland Psychiatric Center (RPC), which was built during 1927-1931. The site includes land sold to the Town of Orangetown. As the RPC evolved, it became a nearly self-sufficient institution having its own power plant, water supply, sewage treatment facility, laundry service, vegetable farm and furniture manufacturing facility. The RPC is still operational today; however, its patient population has been significantly reduced and some of its former operations (e.g., the laundry service, the sewage treatment facility and coal-fired power generation) have been discontinued. The site lies immediately west of the former laundry facility and is adjacent to the eastern end of Lake Tappan, a reservoir used for drinking water.

The site's uppermost geologic unit is a glacial outwash consisting of a dark reddish brown, fine to medium sand with varying amounts of silt. The outwash has occasional beds of gravel or cobbles and thicknesses ranging from approximately 15 to 30 feet, with increasing thickness from east to west. The thickness of the outwash generally decreases with higher elevations. The glacial outwash represents the shallow overburden aquifer at the site.

Underlying the outwash is a glacial till characterized by intervals of dark reddish brown sandy silt, gravel, and cobbles. The till varies in thickness from approximately 10 to 20 feet, with generally decreasing thickness at higher elevations. The glacial till represents the deep overburden aquifer at the site.

The underlying bedrock is reddish Arkose sandstone interbedded with siltstone and mudstone, and can be found at 25-50 feet below ground surface (bgs). The interface between till and bedrock is often difficult to determine because of the presence of large angular cobbles.

The surface water and overburden groundwater flow directions are primarily west towards the Lake Tappan reservoir, while the bedrock flow direction is south-southeast. Groundwater elevation in the overburden varies from 0.4 feet bgs near Lake Tappan to 15.5 feet bgs near the laundry facility.

The site and the surrounding area are serviced by a municipal water supply that has not been impacted by the site.

SECTION 3: SITE HISTORY

3.1: Operational/Disposal History

The source of contamination appears to be the laundry service which was housed in Building 47 (a.k.a. the Laundry Building). A dry-cleaning service was operated as a component of the laundry service until the late 1960s or early 1970s, while the conventional laundry service operated into the late 1980s. Liquids from the laundry service were reportedly discharged to the floor drains connected to the on-site sewage treatment plant. These drains were rerouted to the sanitary sewer system when the sewage treatment plant was closed in the mid-1970s. The tetrachloroethene (PCE) used in the dry-cleaning service was reportedly discharged to the site's soils, surface waters, and sewer systems, creating a groundwater plume of contamination in the

process. In addition, some of the PCE discharged to the sewer systems from Building 47 may have been released to the environment via evaporation from the old aeration beds and holding tanks of the treatment plant.

RPC operated its own sewage treatment plant for over 40 years. Liquid wastes were discharged to aeration beds located northwest of the plant until the mid 1970s, when the facility was connected to the Town of Orangetown publicly-owned treatment works (POTW).

3.2: Remedial History

A 15-foot-deep groundwater recovery (de-watering) sump was installed on the south side of the RPC sewage treatment plant after its closure in the mid 1970s. This sump consisted of three plastic and one metal 55-gallon drum sections stacked and installed to a depth of 15 feet bgs, along with a manually activated, submersible pump. The sump discharge was directed into a nearby stream that emptied into Lake Tappan, a potable water supply source for northern New Jersey.

In March 1998, a fish kill and the discovery of fish with lesions were documented on the RPC property. Although the fish kill may not have been the result of groundwater contamination, the NYSDEC ordered the initiation of a surface and subsurface investigation to evaluate potential environmental impacts associated with the historic operations at the RPC. An Interim Remedial Measure (IRM), consisting of an upgrade to the sump, was performed by a consultant to the New York State Office of Mental Health (NYSOMH) in 2001 (see Figure 4). The IRM redirected the sump discharge into the Orangetown sanitary sewer system (with the permission of the Orangetown Sewer Department, which issued Industrial Waste Water Discharge Permit No. 05-06 to the RPC).

The IRM also maximized the effectiveness of the sump in capturing the contaminated groundwater by reconstructing the sump with a 15-foot, 24-inch-diameter high-density polyethylene pipe section with cut slots. Further details are provided in Section 5.2. Two water samples are collected on a quarterly basis from the sump discharge line and one sample from the sluiceway, prior to discharge to the POTW.

SECTION 4: ENFORCEMENT STATUS

Potentially Responsible Parties (PRPs) are those who may be legally liable for contamination at a site. This may include past or present owners and operators, waste generators, and haulers.

The Department and the New York State Office of Mental Health (NYSOMH) entered into a Consent Order on September 8, 2004. The Order obligates the NYSOMH to implement a full remedial program.

SECTION 5: SITE CONTAMINATION

A remedial investigation/feasibility study (RI/FS) has been conducted to evaluate the alternatives for addressing the significant threats to human health and the environment.

5.1: Summary of the Remedial Investigation

The purpose of the RI was to define the nature and extent of any contamination resulting from previous activities at the site. The RI was conducted between March 2005 and April 2006. The field activities and findings of the investigation are described in the RI/FS.

5.1.1: Standards, Criteria, and Guidance (SCGs)

To determine whether the soil, groundwater, surface water, sediments, and air contain contamination at levels of concern, data from the investigation were compared to the following SCGs:

- Groundwater, drinking water, and surface water SCGs are based on the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
- Soil SCGs are based on the Department's Soil Cleanup Objectives
- Sediment SCGs are based on the Department's "Technical Guidance for Screening Contaminated Sediments".
- Concentrations of VOCs in indoor air were evaluated using the air guidelines provided in the NYSDOH guidance document titled "Guidance for Evaluating Soil Vapor Intrusion in the State of New York" (dated February 2005).

Based on the RI results, in comparison to the SCGs and potential public health and environmental exposure routes, certain media and areas of the site require remediation. These are summarized in Section 5.1.2. More complete information can be found in the RI/FS.

5.1.2: Nature and Extent of Contamination

This section describes the findings of the investigation for all environmental media that were investigated.

As described in the RI/FS, many soil, groundwater, sediment, soil gas and air samples were collected to characterize the nature and extent of contamination. As summarized in Table 1, the main categories of contaminants that exceed their SCGs are volatile organic compounds (VOCs). For comparison purposes, SCGs are provided for each medium.

Chemical concentrations are reported in parts per billion (ppb) for water and parts per million (ppm) for soil and sediment. Air and soil gas samples are reported in micrograms per cubic meter ($\mu\text{g}/\text{m}^3$).

Table 1 summarizes the degree of contamination for the contaminants of concern in the soil, groundwater, sediment, soil gas and air samples and compares the data with the SCGs for the site. The following summarizes the findings of the investigation of the environmental media.

Surface Soil

The twenty surface soil samples were collected in a single round of sampling during the RI down to a minimum depth of two inches, and no site-related VOCs were detected. However, one surface soil sample, collected at 0-1 foot bgs at location GP-6 (about 115 feet west of the Laundry Building; see Figure 3) during June 1998, contained 0.0028 ppm of PCE, 0.0032 ppm of TCE and 0.0112 ppm of trans-1,2-DCE. These values are below the SCGs of 1.4 ppm, 0.7 ppm and 0.3 ppm, respectively. In addition, none of these chlorinated VOCs were present in RI surface soil sample RPC-SUR-3, which was collected during 2006 within 25 feet (northeast) of GP-6.

In summary, no SCGs were exceeded for the contaminants of concern in on-site surface soil samples analyzed during the RI/FS. Therefore, no remedial alternatives need to be evaluated for surface soil.

Subsurface Soil

Seventeen subsurface soil samples were collected in a single round of sampling during the RI at depths ranging from 2-28 feet bgs (i.e., below ground surface). These samples represent a 2-4 foot interval within the soil boring that had the highest potential for containing contamination, based upon the highest photoionization detector (i.e., PID, a.k.a. VOCs detector) reading for that soil profile. No site-related subsurface soil contamination of concern was identified during the RI/FS, since the seven contaminants of concern were not detected. Therefore, no remedial alternatives need to be evaluated for subsurface soil.

Groundwater

Forty eight groundwater samples were collected in two rounds of sampling during the RI. PCE was detected in samples collected from eight of the groundwater monitoring wells. However, only five wells (i.e., MW1-S, MW1-D, MW3-D, MWSB8-S and BR-1; see Figure 3) contained PCE at concentrations in excess of the groundwater standard of 5 ppb. All five of these wells are in the immediate vicinity of or downgradient from the upgraded sump.

During the RI/FS (2005-2006), the highest concentrations of PCE were detected in the well cluster near the sump (i.e., MW1-S, MW1-D and MWSB8-S), with reported concentrations ranging from 19 to 29 ppb. At MW-3D, 550 feet downgradient from the sump, PCE exceeded groundwater standards with a reported concentration of 16 to 17 ppb. Two associated breakdown products of PCE, TCE at 29-31 ppb and VC at 2.2-2.3 ppb, were also detected at this location in excess of groundwater standards. The concentrations of PCE at BR-1 ranged from 2.7-5.7 ppb. While Table 1 covers the March 2005-April 2006 data that were used to define the site, consideration of earlier data appear to indicate a generally decreasing trend in groundwater concentrations.

Concentrations of total VOCs (PCE, TCE and cis-1,2 DCE only) in the sump decreased from approximately 300 ppb to 100 ppb during the May 1999-September 2005 period. In addition, the concentration of PCE at well MW-1D decreased from 250 ppb to 28 ppb during the period from 1998-2005.

Concentrations of PCE, TCE, and cis-1,2 DCE in MW-3D increased from 8, non-detect, and 5 ppb, to 17, 31, and 36 ppb, respectively, between November 1998 and July 2005, indicating that the contaminants have migrated towards Lake Tappan. However, it appears that the sump upgrade performed in 2001 substantially captured the plume in the shallow overburden, meaning that this increase in PCE and TCE concentrations is

temporary; and represents the part of the plume that existed before the upgrade but was beyond the capture zone of the upgraded sump. Concentrations of these contaminants are expected to continue to decline via natural attenuation.

Comparison of the historical and most recent analytical data indicates that microbial dechlorination of the PCE into its daughter compounds is occurring. During November 1998, the concentration of PCE in MW-1D was 250 ppb and the concentrations of the breakdown products TCE, DCE, and VC were reported as non-detect. However, the sample collected from MW-1D during July 2005 contained 28 ppb of PCE, 2.4 ppb of TCE, 22 ppb of cis-1,2-DCE and 0.59 ppb of VC. The presence of methane in MW-1S, MW-1D and MW3-D may also be indicative of anaerobic degradation.

The groundwater contamination identified during the RI/FS is being addressed by the IRM.

Surface Water

Seven surface water samples were collected in a single round of sampling during the RI. 1.2 ppb of PCE was detected in a surface water sample at SW-5, which exceeds the surface water standard of 0.7 ppb. SW-5 is located at the storm sewer outfall southeast of the Sewer Pump House (see Figure 3). However, PCE was not detected at downgradient location SW-3, which is located at the southwest corner of the site, indicating that the PCE detected at SW-5 has not moved beyond the general vicinity of SW-5 or is being volatilized over a short distance.

Surface water contamination identified during the RI/FS is not significant.

Sediments

Fourteen sediment samples were collected during the RI. Half of the sediment samples were collected at 0-6 inches bgs, while the other half were collected at 6-18 inches bgs. PCE was detected in sample SED-6, which is located at the headwaters of the northern drainage channel (see Figure 3). Several petroleum-related compounds (which are not considered contaminants of concern because of their limited extent and low-level concentrations at the site) were also detected at SED-3, SED-4, and SED-6 (i.e., at the southwest and southern perimeters, in addition to the northern perimeter, of the site). However, neither the PCE nor the petroleum-related compound concentrations exceeded their SCGs (see Table 1 for the PCE results and the RI/FS for the petroleum-related compound results).

No site-related sediment contamination of concern was identified during the RI/FS. Therefore, no remedial alternatives need to be evaluated for sediment.

Soil Vapor/Sub-Slab Vapor/Air

Two on-site structures have been evaluated for soil vapor intrusion. A complete soil vapor intrusion evaluation consists of a sub-slab soil vapor sample, an indoor air sample and an outdoor air sample. Both structures underwent a complete soil vapor intrusion evaluation in March of 2005 and March of 2006. During each sampling event, two soil vapor samples were collected away from any building foundations.

Building 68 is a sewage pump house that is occupied occasionally by maintenance personnel. This building is located directly above the PCE groundwater plume and presents the most likely building to be impacted

by PCE and its breakdown products. The sample results from March 2005, when compared to NYSDOH's soil vapor/ indoor air guidance for tetrachloroethene (PCE), indicate that further monitoring is recommended due to elevated levels of PCE in the sub-slab soil vapor sample. Concentrations of BTEX compounds were also detected in sub-slab soil vapor and indoor air samples. The source of these detections is most likely the equipment that is stored in the pump house (forklift, compressors). An additional round of samples was collected in March 2006. These results also indicate that further monitoring is recommended when compared to NYSDOH's soil vapor/ indoor air guidance for PCE. BTEX compounds were also detected in the indoor air, sub-slab soil vapor and outdoor air samples. Due to the limited use of this building, no further action is required at this structure at this time.

Building 47 is the former laundry building and is currently used for storage. The March 2005 sample results indicate that benzene, dichlorofluoromethane and toluene are present in the outdoor air and may be contributing to detected levels of these compounds in the indoor air. Several other BTEX compounds were detected in the indoor air, but not in the sub-slab soil vapor or outdoor air around building 47 and may be attributable to a chemical locker located on the first floor that was not available for inspection at the time of sampling. These results suggest that there is no vapor intrusion related to PCE and its breakdown products. The second round of sampling that occurred at building 47 detected only two compounds in the indoor air (toluene and m/p-xylene), neither of which were detected in the sub-slab soil vapor sample. This suggests that there is no current vapor intrusion occurring at this building.

5.2: Interim Remedial Measures

An interim remedial measure (IRM) is conducted at a site when a source of contamination or exposure pathway can be effectively addressed before completion of the RI/FS.

An Interim Remedial Measure (IRM), consisting of an upgrade to a groundwater recovery (dewatering) sump located adjacent to the sewage treatment plant, was performed by a consultant to the New York State Office of Mental Health (NYSOMH) in 2001.

A 15-foot-deep groundwater de-watering sump had been installed on the east side of the RPC sewage treatment plant after its closure. The original sump consisted of three plastic and one metal 55-gallon drum sections stacked and installed to a depth of 15 feet bgs, along with a manually activated, submersible pump.

Prior to the fish kill incident, the sump discharge was directed into a nearby stream that emptied into Lake Tappan, a potable water supply source for northern New Jersey. Following that incident, the IRM redirected the sump discharge into four holding tanks that are also used for storage of sewage from the 600-acre RPC. The holding tanks discharge into a sluiceway that ultimately discharges into the Orangetown sanitary sewer system (with the permission of the Orangetown Sewer Department, which issued Industrial Waste Water Discharge Permit No. 05-06 to the RPC).

The IRM also maximized the effectiveness of the existing dewatering/sump system in capturing the contaminated groundwater by reconstructing the sump with a 15-foot, 24-inch-diameter high-density polyethylene pipe section with cut slots for screen. Pea gravel was backfilled around the pipe from 5 to 15

bgs. The remaining 5 feet was backfilled to grade using native soil. New ancillary piping, controllers, heaters and discharge lines were connected to the new pump system. The new system featured a control logic with in-sump liquid-level indicators and was hard-piped to each of the four existing holding tanks. Valves located at the inlet to each tank allow the plant operator to discharge to any of the holding tanks. The upgraded sump/dewatering /groundwater recovery system has a radius of influence range of 142- 227 feet.

5.3: Summary of Human Exposure Pathways:

This section describes the types of human exposures that may present added health risks to persons at or around the site. A more detailed discussion of the human exposure pathways can be found in Section 7.0 of the RI/FS report. An exposure pathway describes the means by which an individual may be exposed to contaminants originating from a site. An exposure pathway has five elements: [1] a contaminant source, [2] contaminant release and transport mechanisms, [3] a point of exposure, [4] a route of exposure, and [5] a receptor population.

The source of contamination is the location where contaminants were released to the environment (any waste disposal area or point of discharge). Contaminant release and transport mechanisms carry contaminants from the source to a point where people may be exposed. The exposure point is a location where actual or potential human contact with a contaminated medium may occur. The route of exposure is the manner in which a contaminant actually enters or contacts the body (e.g., ingestion, inhalation, or direct contact). The receptor population is the people who are, or may be, exposed to contaminants at a point of exposure.

An exposure pathway is complete when all five elements of an exposure pathway exist. An exposure pathway is considered a potential pathway when one or more of the elements currently does not exist, but could in the future.

Ingestion of contaminated groundwater at the site is a potential exposure pathway. However, the site is served with public water and therefore, exposure is not expected.

Inhalation of contaminated soil vapor via vapor intrusion is a potential exposure pathway in Buildings 68. Inhalation of indoor air in Building 47 is a potential exposure pathway. However, neither building is occupied on a regular basis (i.e., both buildings are occupied occasionally by maintenance personnel) and the results of indoor air sampling in both buildings indicate no impacts to indoor air from soil vapor intrusion above the NYSDOH guidelines. Therefore, exposure is expected to be minimal. In addition, the proposed remedy includes provisions for monitoring the potential for vapor intrusion and mitigation of structures, if necessary, in the buildings and any future structures constructed at the site.

5.4: Summary of Environmental Assessment

This section summarizes the assessment of existing and potential future environmental impacts presented by the site. Environmental impacts include existing and potential future exposure pathways to fish and wildlife receptors, as well as damage to natural resources such as aquifers and wetlands.

The Fish and Wildlife Impact Analysis (FWIA), which is included in Appendix G of the RI/FS, presents a detailed discussion of the existing and potential impacts from the site to fish and wildlife receptors, and the following environmental exposure pathways and ecological risks were identified:

- Surface soil, surface water and sediment.

Surface water and sediment data for the site were screened in the FWIA, while surface soil data was screened afterwards. The screening of surface water and soil data indicated no compounds of concern, and minimal impact to sediment.

SECTION 6: SUMMARY OF THE REMEDIATION GOALS

Goals for the remedial program have been established through the remedy selection process stated in 6 NYCRR Part 375. At a minimum, the remedy selected must eliminate or mitigate all significant threats to public health and/or the environment presented by the hazardous waste disposed at the site through the proper application of scientific and engineering principles.

Prior to the completion of the IRM described in Section 5.2, the remediation goals for this site were to eliminate or reduce to the extent practicable:

- exposures of persons at or around the site to VOCs in soil and groundwater,
- environmental exposures of flora or fauna to VOCs in soil, and
- the intrusion of VOCs from soil-vapor into the indoor air of Building 68.

The Department believes that the IRM has accomplished these remediation goals provided that it continues to be operated and maintained in a manner consistent with the design.

The main SCGs applicable to this project are as follows:

- Groundwater, drinking water, and surface water SCGs per the Department's "Ambient Water Quality Standards and Guidance Values" and Part 5 of the New York State Sanitary Code.
- Soil SCGs per the Department's Soil Cleanup Objectives.

-
- Concentrations of VOCs in air per the air guidelines provided in the NYSDOH guidance document titled “Guidance for Evaluating Soil Vapor Intrusion in the State of New York” (dated February 2005).

The following elements of the IRM already completed have achieved the remediation goals and satisfy SCGs for the site:

1. An upgraded groundwater extraction system, which allowed the sump discharge from holding tanks to go to a publicly owned treatment works (POTW), instead of a stream.
2. A well network to monitor groundwater flow and document the effectiveness of the extraction system and quality of groundwater relative to standards.

Based on the results of the investigations at the site, the IRM that has been performed, and the evaluation presented here, the Department is proposing No Further Action with continued operation of the an upgraded groundwater extraction system, a site management plan and an environmental easement as the preferred alternative for the site.

The basis for this proposal is the Department’s conclusion that No Further Action with continued operation of the upgraded groundwater extraction system would be protective of human health and the environment and would satisfy all SCGs as described above. Overall protectiveness is achieved through meeting the remediation goals listed above.

Therefore, the Department concludes that No Further Action is needed other than site management consisting of operation, maintenance, and monitoring of the existing system, and the institutional and engineering controls listed below:

1. Operation of the existing groundwater extraction system, which collects groundwater in a sump and sends the sump discharge to holding tanks at the site, and from there to the Orangetown POTW.
2. Imposition of an institutional control in the form of an environmental easement that would require: (a) limiting the use and development of the property to residential use, which would also permit commercial or industrial uses; (b) restricting the use of groundwater and surface water as a source of potable or process water, without necessary water quality treatment as determined by NYSDOH; (c) implementation of a site management plan; and (d) the property owners to complete and submit to the Department a periodic certification of institutional and engineering controls.
3. Development of a site management plan which would include the following: (a) continued evaluation of the potential for vapor intrusion for any buildings developed or where a change in use is contemplated for existing buildings on the site, including provision for mitigation of any impacts identified; (b) monitoring of VOCs (volatile organic compounds) in groundwater and (where necessary) soil vapor; (c) identification of any use restrictions on the site; and (d) the operation of

the components of the remedy until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

4. The property owners would provide a periodic certification of institutional and engineering controls, prepared and submitted by a professional engineer or such other expert acceptable to the Department, until the Department notifies the property owners in writing that this certification is no longer needed. This submittal would: (a) contain certification that the institutional controls and engineering controls put in place are still in place and are either unchanged from the previous certification or are compliant with Department-approved modifications; (b) allow the Department access to the site; and (c) state that nothing has occurred that would impair the ability of the control to protect public health or the environment, or constitute a violation or failure to comply with the site management plan unless otherwise approved by the Department.
5. The operation of the components of the remedy would continue until the remedial objectives have been achieved, or until the Department determines that continued operation is technically impracticable or not feasible.

TABLE 1
Nature and Extent of Contamination
March 2005 to April 2006

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)^a	SCG^b (ppm)^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	PCE	ND (0.0041)	1.4	0 of 20
	TCE	ND (0.0017)	0.7	0 of 20
	Cis-1,2-DCE	ND (0.0018)	NA	0 of 20
	Trans-1,2-DCE	ND (0.0036)	0.3	0 of 20
SUBSURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)^a	SCG^b (ppm)^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	PCE	ND (0.00066)	1.4	0 of 17
	TCE	ND (0.00033)	0.7	0 of 17
	Cis-1,2-DCE	ND (0.00029)	NA	0 of 17
	Trans-1,2-DCE	ND (0.00039)	0.3	0 of 17
SEDIMENTS	Contaminants of Concern	Concentration Range Detected (ppm)^a	SCG^b (ppm)^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	PCE	ND (0.00082) to 0.0038J	0.065 ^c	0 of 14
	TCE	ND (0.00035)	0.016 ^c	0 of 14
	Cis-1,2-DCE	ND (0.00036)	0.065 ^c	0 of 14

SURFACE SOIL	Contaminants of Concern	Concentration Range Detected (ppm)^a	SCG^b (ppm)^a	Frequency of Exceeding SCG
	Trans-1,2-DCE	ND (0.00076)	0.065 ^c	0 of 14
SURFACE WATER	Contaminants of Concern	Concentration Range Detected (ppb)^a	SCG^b (ppb)^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	PCE	ND (0.12) to 1.2	0.7	1 of 7
	TCE	ND (0.12)	5	0 of 7
	Cis-1,2-DCE	ND (0.09)	5	0 of 7
	Trans-1,2-DCE	ND (0.10)	5	0 of 7

GROUNDWATER	Contaminants of Concern	Concentration Range Detected (ppb)^a	SCG^b (ppb)^a	Frequency of Exceeding SCG
Volatile Organic Compounds (VOCs)	PCE	ND (0.12) to 29J	5	9 of 48
	TCE	ND (0.12) to 31	5	2 of 48
	Cis-1,2- DCE	ND (0.09) to 44	5	0 of 48
	Trans-1,2- DCE	ND (0.10) to 2.1	5	0 of 48
	1,1-DCE	ND (0.19) to 1.6	5	0 of 48
	TCA	ND (0.16) to 2.3J	5	0 of 48
	VC	ND (0.09) to 2.3	2	2 of 48

^a ppb = parts per billion, which is equivalent to micrograms per liter, µg/L, in water;
ppm = parts per million, which is equivalent to milligrams per kilogram, mg/kg, in soil;
µg/m³ = micrograms per cubic meter.

^b SCG = standards, criteria, and guidance values.

^c Site-specific sediment criteria were calculated using an average Total Organic Carbon (TOC) value of 8,157 mg/kg.

J = Value is estimated because it has a higher level of quantitative uncertainty either because one or two of four surrogate recoveries in each sample were below control limits but were above 10% recovery, or the relative percent difference between a sample and its field duplicate was greater than the allowable 20%. Even though the value is labeled as “estimated”, the value is considered usable. Detailed information on the data quality is provided in the Data Validation Reports (a.k.a. the Data Usability Summary Reports),

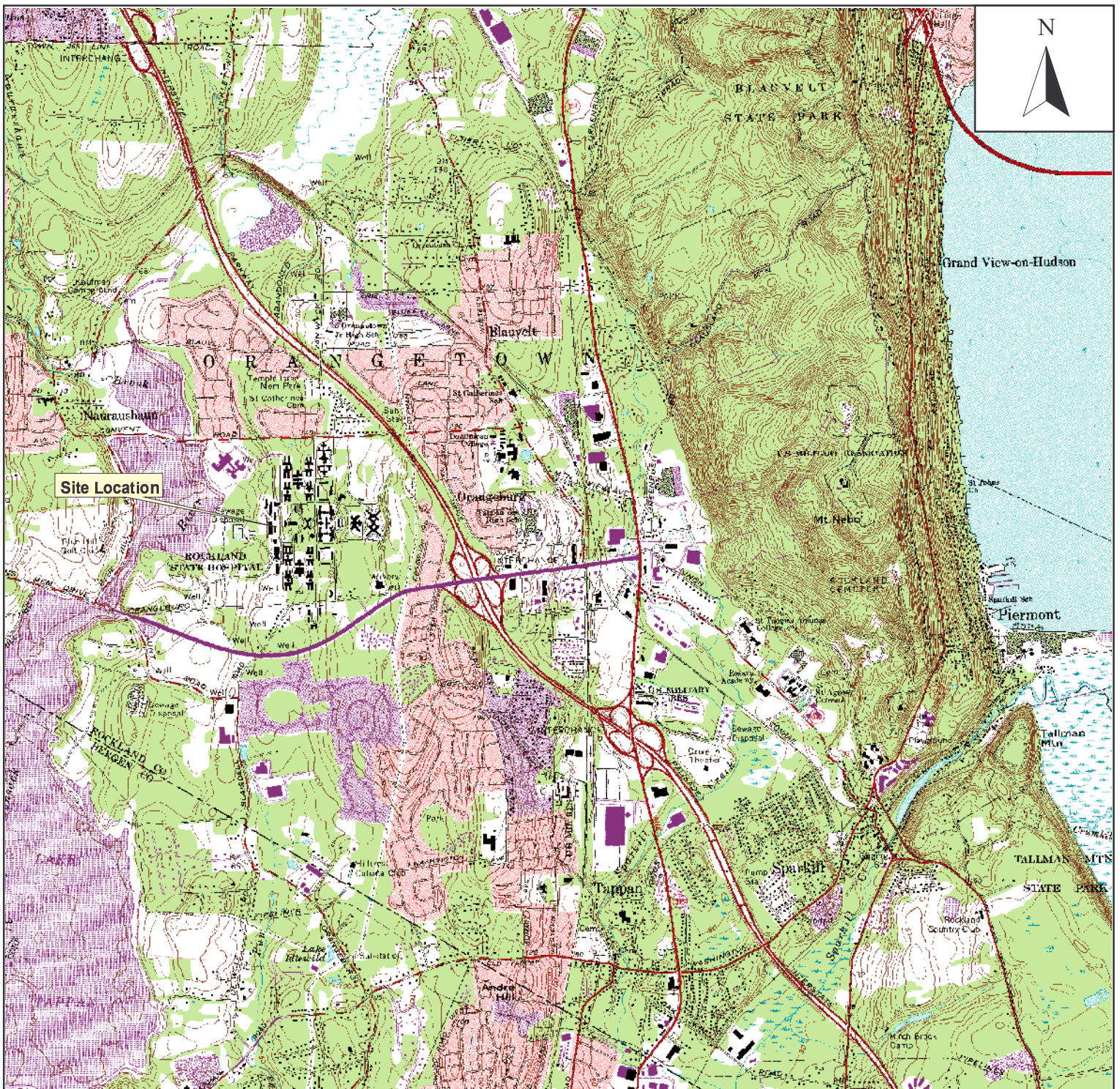
which can be found on the CD provided in Appendix F of the RI/FS.

NA = SCG is not available for this contaminant of concern.

ND = contaminant was not detected. The detection limit is contained in the parentheses following "ND". In the case of the (two) 4/06 sub-slab and the (two) 4/06 indoor air samples, the detection limit for TCE exceeded the SCG. However, this was recorded as a non-exceedance for all four samples because the result for these four samples was "ND".

Table 2
Remedial Alternative Costs

Remedial Alternative	Capital Cost (\$)	Annual Costs (\$)	Total Present Worth (\$)
No Action	0	0	0
No Further Action	38,000	28,000	467,000



900 0 900 1800 Meters



3000 0 3000 6000 Feet



Figure 1.
Site Location Map

Rockland Psychiatric Center
Orangeburg, New York

Source: Earth Tech Northeast, Inc. 2005;
USGS Nyack 7.5 Minute Quadrangle, 1979.

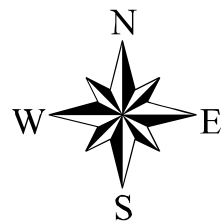
Prepared By:



A **tyco** International Ltd. Company

Date:

07/27/06



AREA OF STUDY
43.65 ACRES

LAND PURCHASED BY
TOWN OF ORANGETOWN

**ROCKLAND
PSYCHIATRIC
CENTER**

LEGEND

- Area of Study
- Approximate limit of VOC-Impacted groundwater and surface water (VOC contamination > 5 ppb) based on 2006 Remedial Investigation results. Extent may vary depending on hydrogeologic conditions.
- Approximate border of land purchased by the Town of Orangetown, based on LMS Phase II Investigation, 2002.

BOUNDARY OF SITE
(Limit of groundwater contamination plume and surface water SCG exceedance)
20.15 ACRES

LAKE
TAPPAN

Former Sludge Disposal Beds

Sewer Pump House
(Bldg 68)

Power House

Bldg. 50

Bldg. 49

Bldg. 45

Bldg. 47

Former
Laundry
Facility

SW/SED-5 (2005)

← Primary Overburden Groundwater Flow Direction

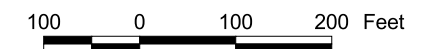
↓ Regional Bedrock Groundwater Flow Direction

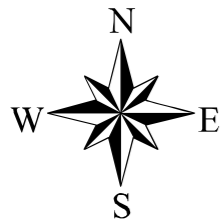
This map has been prepared from a CADD file provided by C.T. Male Associates, PC, Latham, NY. Horizontal Coordinate System is NYS Plane, NAD 1983. Vertical Datum: NAVD 1988 Contour Interval: One (1) foot. Previous sample locations were digitized from reports prepared by Lawler, Matusky & Skelly Engineers, LLP. The locations and elevations of monitoring wells installed in 2005 were surveyed by SY Kim, Land Surveyor, PC.

**FIGURE 2
BOUNDARY OF SITE**

ROCKLAND PSYCHIATRIC CENTER
Laundry Facility Site
Orangeburg, New York

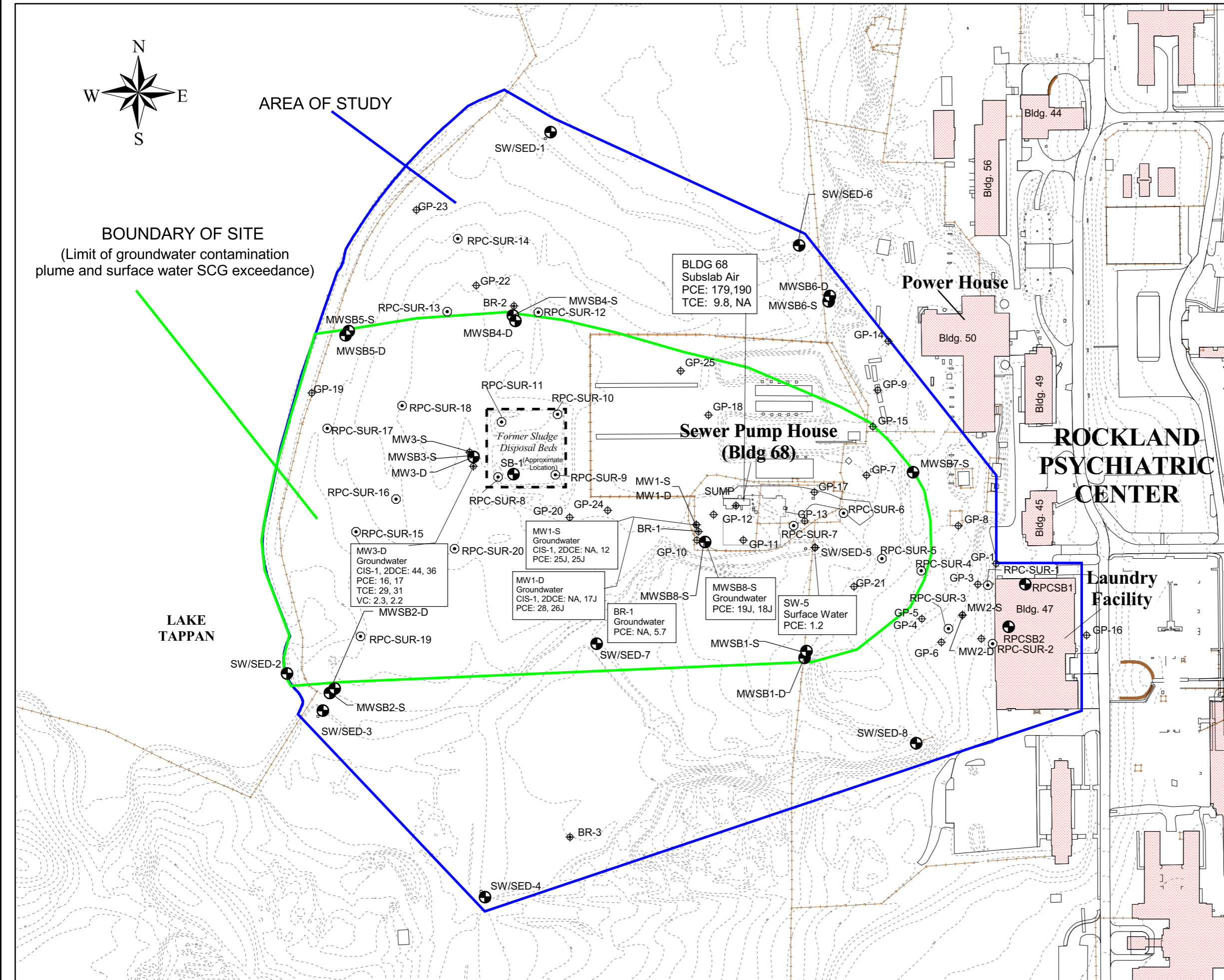
August 2006
SCALE
1" = 200'





AREA OF STUDY

BOUNDARY OF SITE
(Limit of groundwater contamination plume and surface water SCG exceedance)



LEGEND

- ⊕ Previous Sample Locations
GP - Geoprobe Boring
MW - Monitoring Well
BR - Bedrock Monitoring Well
- RI Sample Locations
MWSB - 2005 Monitoring Wells
RPCSB - 2005 Soil Boring
SB - 2005 Soil Boring
SW/SED - 2005 Surface Water and Sediment Sample Collected
- Note: No surface water or sediment samples were collected at SW/SED-2
- ⊙ 2006 Sampling Locations
RPC-SUR - 2006 Surface Soil Sample Collected

Boxes show analytical results which exceed SCGs. Groundwater and surface water results are shown in ug/L for sampling in April and July 2005 (separated by a comma). Air results are shown in ug/m3 for sampling in March 2005 and April 2006 (separated by a comma).

NA = Result not above the SCG.

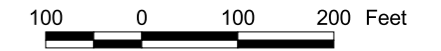
This map has been prepared from a CADD file provided by C.T. Male Associates, PC, Latham, NY. Horizontal Coordinate System is NYS Plane, NAD 1983. Vertical Datum: NAVD 1988 Contour Interval: One (1) foot. Previous sample locations were digitized from reports prepared by Lawler, Matusky & Skelly Engineers, LLP. The locations and elevations of monitoring wells installed in 2005 were surveyed by SY Kim, Land Surveyor, PC.

**FIGURE 3
SAMPLE LOCATIONS
AND SCG EXCEEDANCES**

ROCKLAND PSYCHIATRIC CENTER
Laundry Facility Site
Orangeburg, New York

August 2006
SCALE

1" = 200'



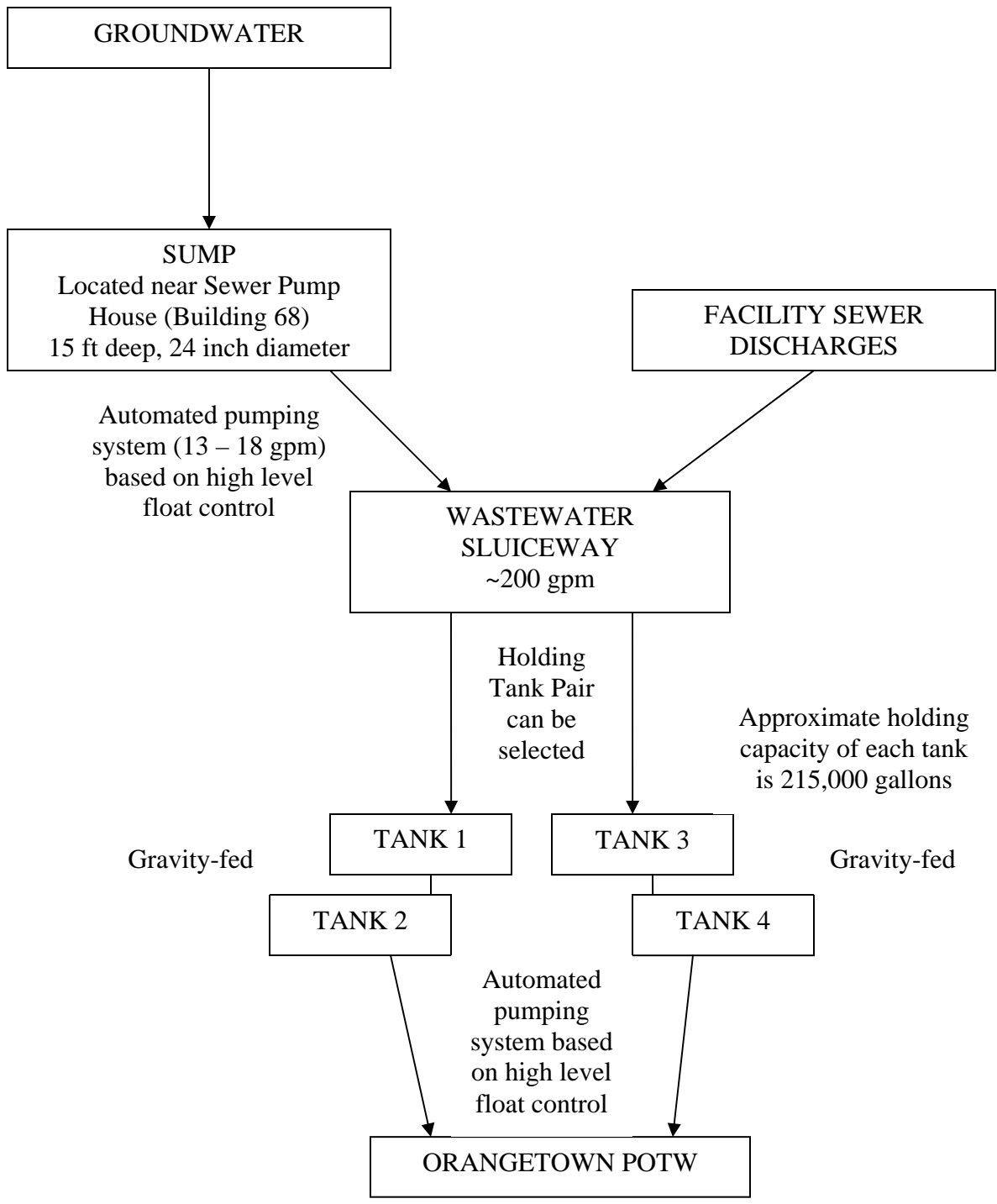


FIGURE 4
SUMP DISCHARGE FLOW DIAGRAM
 ROCKLAND PSYCHIATRIC CENTER
 Laundry Facility Site
 Orangeburg, New York
 August 2006

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