Remedial Action Work Plan

Hudson River Psychiatric Center
Landfill Area 6

NYS Route 9
Town of Poughkeepsie
Dutchess County, New York

September 30, 2004

Chazen Project #: 40307.00

THE Chazen COMPANIES

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EXECUTIVE SUMMARY

Hudson Heritage CPCR Ventures L.L.C. ("HV") has entered into a contract of sale with the State of New York to purchase 155.9 acres of the former 324 (+/-) acre Hudson River Psychiatric Center (HRPC) property, in the Town of Poughkeepsie, NY. The former tax parcel ID for the full ~324 acre site is: Town 134689, Section 6163, Block 03, Lot 200152. The new tax parcel ID for the 155.9 acre subdivided purchase area is Town 134689, Section 6163, Block 03, Lot 011149.

Consistent with ongoing discussions with the New York State Department of Environmental Conservation ("NYSDEC"), HV has entered into a Voluntary Cleanup Program (VCP) agreement (Site V00657, Index W3-0969-03-07) for the "Landfill Six Site" (referred to as Landfill Six) on the property. Landfill Six is located on the southeast corner of the 155.9 acre parcel. The Landfill Six Site covers approximately 2.5 acres. In older reports (LMS, 1996; EA 2001, 2002) a larger area was also referred to as Landfill Six (Figure 1). The landfill area has been redefined as the 2.5 acre site that is the subject of the VCP Agreement.

The proposed post-remedy use for the 2.5 acre for Landfill Six is for general parking areas with access roadways, and ancillary open land. This use is consistent with a "Restricted Commercial" re-use, as defined in Section 3.4 of the NYSDEC May 2002 Voluntary Cleanup Program Guide.

HV's preferred and recommended Remedy for this site is to install an impermeable cap over greater than 90 percent of the site which largely meets 6 NYCRR Part 360 construction requirements. The cap will cover all areas of known buried solid waste on the site except areas nearest to the south site margin near the stream. Installing a cap in the area along the stream is not recommended due to relatively small benefits gained relative to loss of a wooded site perimeter boundary, riparian wetland vegetation, and steep but presently stable slopes. No capping is also proposed south of the southern property line due to a buried utility gas line on off-site lands as well as wetland vegetation and the stream (Figure 4).

HV's recommended site remedy also includes the following:

- Relocating a small quantity of waste found during Chazen's recent site work which is located southeast of the stream. These wastes would be repositioned under HV's proposed cap.

- Sealing an existing drain line from Ryan Hall, a collapsed corrugated metal pipe near the stream culvert, and a storm drain, all of which currently discharge or leak into the waste mass.

- Offering to extend HV's cap eastward to the margins of a railbed situated on lands of others. This eastward capping effort would also involve relocation or removal of one or more electric power lines.

The proposed cap and drain line removals are designed to substantially limit water movement into the main waste mass. Chazen's 2004 site investigation suggests the bedrock aquifer is not a source of groundwater flow into the waste mass. Thus, curtailing other points of water movement into the waste mass will directly and beneficially reduce amounts of water moving through the waste and lead to reductions or full termination of observable leachate discharges to the environment, which is a significant VCP remedial objective for this site.

1.0 INTRODUCTION AND SITE SUMMARY

1.1 Work Plan Objectives

This proposed Work Plan describes a preferred remedy for Landfill Six (Site V00657-3, index # W3-0969-03-07). The proposed remedy includes a cap largely compliant with 6 NYCRR Part 360 program requirements. The proposed remedy also meets selection factors in 6 NYCRR Part 375-1.10(c). Along the south boundary of Landfill Six, the proposed cap cannot be extended to the waste limits due to a property line. Significant slope, wetland vegetation constraints, and beneficial mature wooded areas also suggest leaving approximately 5,000 square feet of uncapped landfill area on the Landfill Six Site under proposed control of HV.

As defined in the Addendum to the Closure Investigation Report (TCC, July 2004), media to which individuals may be exposed include waste, sediment by the creek impacted by leachate precipitate, landfill gas, groundwater and surface water including leachate. Exposure pathways for each of these media are summarized on Table 5 and discussed further below.

Exposure to Solid Waste: Exposure to all buried solid waste is currently limited due to the presence of informal cover materials on the landfill footprint. The only area with exposed waste is found in the southeast corner of the site where waste is exposed in the stream bank. A complete exposure pathway exists at the stream bank location only. A "low risk" exposure risk status is assigned due to the limited size of the exposed are and the generally low human health hazard attributable to exposure to non-putrescible mixed municipal waste.

Exposure to Groundwater: No groundwater wells used for potable purposes are known to exist in the area. There is therefore no known exposure pathway to groundwater and the exposure risk status is "none."

Exposure to Landfill Gas: Only 2 of 22 gas collection points identified elevated explosive gases (Table 3) indicating presence only of localized gas generation. Test pitting conducted by EA (2001) and Chazen (2004) identified limited quantities of putrescible or wood wastes likely to generate excessive landfill gas emissions. Any landfill gas would migrate generally upward through the waste mass, resulting in an inhalation or explosive hazard over the landfill area. A "low risk" exposure risk status is assigned due to the limited overall size of the landfill, the limited fraction of waste prone to landfill gas decomposition processes, and the immediate opportunity for dilution of any landfill gas emissions once they mix with the atmosphere.

Exposure to Streambank Sediments Impacted by Leachate: Two areas along the creek bank exhibit soils that have accumulated visible concentrations of leachate precipitate. The two areas total approximately 40 square feet. A sediment sample from the most heavily stained soil area identified arsenic, lead and mercury modestly exceeding "moderate impact" sediment screening guidance values for benthic organisms (Table 1 Sample HRPC-A6-SS1). The most likely exposure threat to human health from these limited areas is dermal since the location is not amenable to ingestion by playing children. A "low" exposure risk status is assigned to these visibly contaminated sediments on the stream bank because of their limited areal extent and the only modest exceedence of the "moderate impact" screening guidance value.

Exposure to Surface Water and Stream Sediments: Pure leachate precipitate sampled at the site identified no "moderate impact" exceedences under sediment screening guidance values (Table 1, Sample HRPC-A6-SS2). Surface water samples also demonstrated that iron is the only analyte exceeding standards for Class D streams which is amplified as the stream flows past the site (Table 4). Thallium was not detected in either stream sample (Table 4). A streambed sediment sample (Table 1, Sample HRPC-A6-SS3) collected near the downstream property margin identified only arsenic slightly exceeding the "moderate impact" sediment screening guidance value established for the protection of aquatic ecosystems. An upstream streambank sediment identified various elevated metals at somewhat higher levels (Table 1 Sample HRPC-A6-SS1). The upstream-to-downstream decrease in compound detections may reflect the localized nature of analyte concentrations in streambottom sediments.

These data show that a complete exposure pathway exists in this area, but that taken in their totality, a "low" exposure risk status is warranted for the stream water and streambottom sediments, and associated aquatic ecosystems because arsenic only slightly exceeds sediment threshold guidance values in the stream and its concentration is decreased from the upstream sample, and because pure leachate precipitate and stream water samples contain exceedences only of compounds that pose low threat levels to human health (e.g. iron, ammonia, sodium).

The Qualitative Human Health Exposure Assessment prepared for Addendum to the Closure Investigation Report (TCC, July 2004) concluded that exposure pathways from solid waste, landfill gas, sediments along the stream bank, and streamwater/streambottom sediments exist at this site. Although exposure risk levels for each complete exposure pathway are judged to be low, this proposed Remedial Action Work Plan considers measures to further limit exposure risk levels. Primary consideration has been given to measures to reduce leachate transmission to the stream so that leachate-related and leachate generated exposures in and by the stream can decrease over time. Areas with exposed solid

waste area also contained by the proposed remedy and the limited quantities of landfill gas are managed by a gas venting layer and a gas vent.

The overall objective of the remedy proposed herein, appropriate to closure through the VCP program, is to remediate the Landfill Six Site to a level considered protective based on the Contemplated Use, and to eliminate off-site impacts from on-site sources to the degree practicable since wastes lie also under lands of adjoining parcel owners.

The contemplated use for the 2.5 acre Landfill Six location (The Site) is general parking areas and ancillary unused land. Such uses would be consistent with a Restricted Commercial re-use, as defined in Section 3.4 of the NYSDEC May 2002 Voluntary Cleanup Program Guide.

1.2 Site Location and Description

The 2.5 acre Site is located on the southeast corner of a 155.9 acre parcel, under contract for purchase by HV from the State of New York. The limits of waste are shown on Figure 2. Since HV cannot accept responsibility for wastes extending off the Hudson River Psychiatric Center (HRPC) property, the Landfill Six Site is defined as follows:

- To the south and east: Parcel property lines.
- To the north: a catchbasin south of Winslow Gate Road.
- To the northwest: the south margin of Ryan Drive, which is the same as the loop road passing by the site.
- To the west: the waste mass boundary east of the concrete slab near MWHR6-20.

These boundaries are approximately equivalent to the limits of buried waste, as shown on Figures 2 and 4 but terminate at the property's east and south property line, as shown on figures 1, 2, and 4. Inferred or confirmed waste extends beyond these site boundaries to the east where waste is found on the adjacent property to the banks of a railroad bed, and to the south where the southwest corner of Landfill Six extends onto lands owned by a gas utility.

1.3 Historic Site Use

A previously completed report by EA Engineering (2001) summarizes that wastes were disposed of in various locations on the 324-acre HRPC parcel for more than

100 years. Wastes reportedly consist primarily of household and commercial refuse and substantial coal ash. Two petroleum spills have occurred on the 324-acre parcel in the past (spill numbers 9707019 and 9304993) and both have been closed. Neither spill occurred in the location of Landfill Six.

Interviews with current and former employees (EA, 2001) indicate that in addition to municipal waste from the HRPC facility, Landfill Six may also contain coal ash from the heating plant, mixed construction debris from the HRPC facility, and potentially some municipal waste from the Town of Poughkeepsie (Figure 3). Air photo interpretation completed by EA (EA, 2001) identifies that no wastes had been deposited in Landfill Six in 1962 or 1964 photos, that some waste had been emplaced by 1966, and that waste emplacement had evidently ended by or before 1978.

1.4 Previous and Recent Site Investigations

According to EA (EA, 2001), three PCB remedial actions have been completed by LMS near and downstream from Landfill Six (as presently defined), pursuant to an Order on Consent with NYSDEC.

- May 1996: PCBs in a storm sewer system downstream from Landfill Six were removed.

- December 1997: PCBs in stream sediments between Landfill Six and NYS Route 9 were removed and disposed of off-site. The streambed and associated wetlands were restored. A Large Quantity Generator status was apparently secured for the PCB soil removal task (Information System ID: NYD980779490).

- July 1999: PCB-containing concrete under a transformer vault in a building on the parcel (the Cheney building) was removed.

- October 2002: NYSDEC provided a written record to the Hudson River Psychiatric Center that requirements have been met to delete the remediated area (DEC site # 314063) from the New York State Registry of Inactive Hazardous Waste Disposal Sites.

Specific to the presently defined boundaries of Landfill Six, EA Engineering sampled a leachate seep at Landfill Six in May of 2000 (Table 2). Iron and thallium were detected in concentrations exceeding NYS surface water standards for Class D streams. In 2000, EA also located and sampled two of three monitoring wells installed by LMS in 1991 near Landfill Six. Well MWHR6-16 lies along the upgradient edge of the waste (Figure 2). Sampling identified only manganese in concentrations exceeding NYS GA groundwater standards (Table 2). Well MWHR6-

19 lies downstream of the landfill in an area unrelated to the landfill and sampling identified iron, manganese, magnesium, sodium and chloride in concentrations above NYS GA groundwater standards. No VOCs were identified in either of these wells originally installed in 1991 by LMS (EA, 2001).

EA also advanced test pits at Landfill Six (EA, 2001). Observed materials in the test pits included municipal waste, lumber, bricks, coal ash, light gray ash, glass and bottles, pottery, shells, plastic objects, tires, paper and newspaper and metal objects including rakes and a lawn chair. Test pitting identified the general limits and depth of the wastes. EA estimated the landfill volume to be 33,460 cubic yards. Maximum observed waste thickness was 16 feet, extending to below the watertable (Figure 3). Test pitting indicated that the cap material consisted of sandy silt between 1 to 5 feet thick (EA, 2001). It is this area defined by EA (2001) that comprises the Source Area for this Voluntary Cleanup action and which is identified as the edge of the landfill in Figure 4.

Three additional monitoring wells were subsequently installed at Landfill Six in April 2002 by EA (EA, 2002). Well MWHR6-22 was installed upgradient of the landfill (Figure 2) and sampling identified iron, manganese, sodium, chloride, color and TDS above NYS GA standards (Table 2). Wells MWHR6-20 and MWHR6-21 were installed downgradient of the landfill, adjacent to the creek. Sampling of Well MWHR6-20 identified iron, manganese, sodium, color, ammonia, and TDS in concentrations exceeding NYS GA standards (Table 2). Sampling of Well MWHR6-21 identified the exceedences similar to those in MWHR6-20 and also 7.1 ppb dichlorodifluoromethane (NYS GA standard is 5 ppb) and 1.6 ppb benzene (NYS GA standard is 0.7 ppb). The monitoring wells installed in downgradient locations also confirmed that wastes lie below the water table and below the level of the creek (Figure 5).

In summary, the EA Engineering reports document the presence of groundwater within the waste mass at Landfill Six, downgradient groundwater samples containing elevated iron, ammonia, color and TDS, VOCs in concentrations less than 2X GA standards, and leachate discharges to the stream consisting primarily of iron. Results from these previous investigations appear valid and useable on the basis of surveyed drawings, professional quality documentation, QA/QC adherence and complete data validation or of all investigation materials.

More recently, The Chazen Companies (TCC) conducted a limited additional site investigation in 2003/2004 to identify sources of water contributing to leachate generation at Landfill Six (TCC, March 2004). The work included installation of bedrock wells near downgradient wells MWHR6-20 and MWHR6-21 to convert existing overburden wells to well couplets, installation of an upgradient overburden/bedrock couplet (MWHR6-23S/D), and replacement of monitoring well

MWHR6-22 with MWHR6-22R per Department requirements conveyed previously to EA. Completion of the three overburden/bedrock couplet pairs allowed assessments of upward or downward gradients near the stream and upgradient of the landfill, as documented in the March 2004 Chazen report. Work also included installation of temporary 1-inch piezometers in downgradient areas near the stream to further evaluate watertable elevations and waste profiles and installation of shallow piezometers in the stream. Field work also included test pitting to inspect the condition of various culverts traversing the waste mass including a concrete stream culvert, a concrete stormwater culvert, and a corrugated iron pipe near the concrete stream culvert that previously have carried stream flows. All monitoring wells and seeps were sampled by Chazen consistent with protocols for routine landfill monitoring.

Inspection of the culverts indicated that only the concrete stream culvert is a reliable water conveyance. The other two pipes leak water into the landfill. Monitoring data, and water level measurements in stream piezometers, 1-inch piezometers and monitoring wells identify downward gradients in the aquifer and slight upward gradients in the stream bed (Chazen, March 2004). All hydrogeologic data suggest that current leachate discharges are supported by leakage into the waste mass from through the current capping material or from leaking water conveyance pipes. There is not hydraulic evidence that leachate is supported by aquifer discharges from a regional overburden or bedrock aquifer system.

Landfill gases were investigated by EA (2001). Test pitting logs show little to no putrescible wastes. Twenty two perimeter sampling sites are shown on Figure 3. Sampling results are shown on Table 3. Elevated explosive gas emissions were noted in two perimeter locations. All other perimeter locations showed no or low percent Lower Explosive Limit (LEL) emissions. Oxygen levels were below atmospheric concentrations in approximately half of perimeter sampling locations. Low to no VOC emissions were noted during the March 2004 TCC investigation,

Since the March 2004 TCC investigation, TCC in consultation with NYSDEC has also updated prior evaluations of the stream on the south side of the site by sampling surface water and leachate precipitate/stream bottom sediments in the stream. The sediment samples collected under observation of NYSDEC focused on identifiable leachate precipitate, where observable. Analytes evaluated in the laboratory were specified in consultation with NYSDEC.

For overall stream characterization purposes, two leachate precipitate samples were collected upstream near another site landfill (Landfill Five) and three samples were collected at Landfill Six. Of these, sample HRPC-A6-SS1 was collected on a small mudflat deposit along the stream margin visibly discolored by leachate discharges (approx. ten feet upstream from SG-2, Figure 4). On the basis of visible

characteristics, this sample would constitute the "worst case" soil sample in native soil areas near the stream. Sample HRPC-A6-SS2 consisted of leachate precipitate found suspended in the outlet of a small leachate seep (approx. ten feet downstream from SG-4, Figure 4, and at location of A6-LCH4 on Figure 2). Sample HRPC-A6-SS3 consisted of a downstream, general streambed sample (collected approx. 15 feet downstream from PZ-1, Figure 4). All samples were analyzed as soil samples although having varying moisture contents.

Sample results are summarized on Table 1. Laboratory data are included in Appendix A. In general, the samples containing pure leachate flocculant upstream of the site (samples HRPC-A5-SS1 and HRPC-A5-SS1A) and at the site (sample HRPC-A6-SS2) contained no analytes above remedial guidance values for Screening Contaminated Sediments (Table 1). The two additional samples which each included stream substrate material (HRPC-A6-SS1 and HRPC-A6-SS2) slightly exceed "moderate" impact guidance values for iron, mercury, arsenic and/or lead.

Open water stream samples collected near the headwall along the southeast site (near SG-1, Figure 4) margin and downstream where the stream leaves the landfill Six area (near PZ-1 on Figure 4). The samples identified sodium exceedences of Class D groundwater standards in both upstream and downstream samples, iron exceedences in both upstream and downstream samples (which become higher in the downstream sample), and dissolved an aluminum exceedence only in the upstream sample (Table 4).

The two stream quality samples (Table 4) indicate that leachate discharges from Landfill Six increase dissolved iron concentrations in this Class D stream. Both the upstream and downstream samples exceed Class D surface water standards. The downstream sample is less than 3 times the standard. Concentrations of iron in the downstream sample suggests that impacts from leachate are not significant, as more elevated concentrations would be anticipated if a greater leachate volume were being emitted.

Ammonia and turbidity concentrations are increased to lesser degrees, as are color and manganese but these analytes do not exceed any published guidance or standards. No dissolved lead, arsenic, thallium or mercury was detected in either upstream or downstream stream samples although these metals were found in sediment samples or have been found previously in leachate.

The source of aluminum in the upstream stream water sample is unknown. The source of sodium and chloride in both upstream and downstream samples may be associated with road deicing activities. Iron in the upstream sample may be associated with leachate discharges from upstream landfills. The increase in iron

concentrations as the stream passes Landfill Six is attributed to Landfill Six leachate discharges.

The soil/sediment samples (Table 1) indicate that leachate precipitate does not by itself exceed moderate or severe guidance thresholds for contaminated sediments (HRPC-A5-SS1 and HRPC-A5-SS1A and sample HRPC-A6-SS2). However, where leachate precipitate has impacted natural soils, precipitate concentrations slightly exceed moderate impact guidance thresholds for lead, arsenic and mercury and generally exceed moderate or severe guidance for iron. There is a marked decrease in concentrations from SS1 upstream to SS3 downstream, suggesting that impacts are mitigated with distance from leachate emission points, such that the downstream sediments are below moderate impacts guidance values for all metals except arsenic which is close to guidance levels and iron.

1.5 Site Conditions Summary and Existing Contaminants

Based on the above review of environmental conditions at Site Six, HV identifies the following summary relationships at Landfill Six:

- Wastes on the site are covered only by local silt and soil; consequently, the site lacks a closure device that could limits leachate releases by limiting direct surficial recharge of the wastes by precipitation.

- Test pits and piezometers have indicated that wastes lie below the watertable.

- On the basis of a limited sampling record, some groundwater quality defects have been identified in upgradient and downgradient wells as summarized below.

    - Sodium and chloride exceedences are found in most upgradient and downgradient monitoring wells. These may be related to road de-icing on or near the landfill area and environs.

    - Iron, magnesium, manganese, and TDS exceedences are found in most upgradient and downgradient monitoring wells. These may be attributed to local geologic formations (e.g., background) and laboratory digestion methods, although iron and manganese leachate seeps confirm some landfill related amplification.

    - Dichlorodifluoromethane and benzene were found in one downgradient monitoring well. The VOC concentration was approximately twice NYS GA standards.

- MTBE is present in one upgradient monitoring well in a concentration below NYS GA standards.

- Ammonia is present in downgradient overburden monitoring wells although not in downgradient bedrock wells in concentrations exceeding NYS GA standards.

- Recent leachate precipitate and stream sediment data identify concentrations of mercury, arsenic, lead, and iron just above guidance values for moderately contaminated sediments (Table 1) and iron in stream water above surface water standards (Table 4). No ammonia was found above surface water standards in a seep sample (Table 2).

- PCBs found previously in areas downstream of Landfill Six have been remediated.

1.6 Geology and Hydrogeology

The site consists of a former ravine backfilled with solid wastes, with the natural stream re-routed around the ravine's perimeter. Bedrock under the site consists of minimally-fractured shale and silty-sandstone from the Ordovician age Austin Glen formation. Soils on the site are generally thin and derived from residual glacial lake deposits or glacial till. Slug testing in wells (TCC 2004) indicates these soils are generally low-permeability and so would limit groundwater recharge or transmission.

Three monitoring well couplets have been installed on the site. Upgradient couplet MWHR6-23 S/D demonstrates a significant downward hydraulic gradient (Chazen March 2004, Table 2) whereby surficial recharge is expected to migrate downward through overburden soils into the bedrock formation. Couplets MWHR6-20 S/D and MWHR6-21 S/D are situated downgradient on the landfill and also display modest downward hydraulic gradients in the geologic formation (Chazen, March 2004, Table 2), indicative of aquifer recharge conditions in this area. Bedrock is somewhat low-permeability, ranging between 7.7 x 10^{-4} cm/sec to 7.1 x 10^{-3} cm/sec for bedrock wells. Overburden permeability ranges between 2.2 x 10^{-2} cm/sec in areas with till (MWHR6-23S, MWHR6-22R, MWHR6-21S) to very low permeability where clay sediments were encountered (MWHR6-20S) (Chazen March 2004, Table 4). Permeability contrasts between overburden soils and shallow bedrock likely explain the evident lack of significant leachate found in the deeper, bedrock wells (Table 2).

Piezometers installed in the streambed have demonstrated modest upward gradients from overburden sediments into the stream (Chazen 2004 Table 3). Some

iron staining on the stream bottom supports an interpretation that the open stream is a gaining stream, as do recent precipitate samples (Table 1). The overall rate of groundwater movement through the site is estimated to be low on the basis of limited observed flows of leachate and due to the shallow hydraulic gradient under the center of the site (Figure 5) and to the modest hydraulic conductivity of contributing upgradient overburden and bedrock formations (Chazen, March 2004, Table 4) as well as generally thin saturated thickness of the waste.

The watertable at the site (Figures 2 and 4) indicates that groundwater migrates generally from north to south across the site. Groundwater levels are lower in the waste mass than in surrounding native materials, suggesting a more permeable material. The watertable is lowest along the southern portion along a failing corrugated metal drain pipe which may have formerly conveyed the site stream and suggesting this pipe may still facilitate some shallow groundwater drainage.

1.7 Subsurface and Surface Structures

Various stormwater, building drain and stream conveyances presently pass through the waste mass. These are shown on Figure 4 and are described below:

- A concrete stream conveyance lies along the east boundary of Landfill Six. The conveyance was inspected during recent site evaluations (TCC, 2004) and found to be installed above the watertable and to have no meaningful leaks. Water leaves the culvert at a headwall structure at the southeast corner of Landfill Six.

- A corrugated metal pipe lies parallel to the concrete stream culvert in the same general location as the stream culvert and is in decaying condition.

- A storm drain carrying stormwater from facility areas north of Landfill Six passes through the center of Landfill Six. It was also inspected during recent site evaluations (TCC, 2004) and found to be installed above the water table but to be leaking into the waste mass at failed joints.

- A building drain from Ryan Hall also drains toward and into the waste mass. No effort was made to assess its condition since HV's intention is to grout it in place and so terminate its water flows into Landfill Six.

In addition to these sub-surface structures, one or more telephone poles are installed in the waste along the east margin of Landfill Six and potentially on property of the adjacent landowner.

A buried natural gas line lies off the property and along the south margin of the site (Figure 4). Portions of the gas line may be buried in wastes which are part of Landfill Six but which are off lands proposed for purchase by HV.

1.8 Explosive gas

Landfill gas monitoring was conducted by EA (EA, 2001). Twenty two perimeter sampling sites are shown on Figure 2. Sampling results are shown on Table 3. Elevated explosive gas emissions were noted only in two perimeter locations so landfill gas emissions appear limited and localized. All other perimeter locations showed no or low Percent Lower Explosive Limit (LEL) emissions. Oxygen levels were below atmospheric concentrations in approximately half of perimeter sampling locations. Low to no VOC emissions were noted.

Test pitting conducted by EA (2001) and Chazen (2004) identified little putrescible or wood waste that would generate excessive landfill gas emissions.

2.0 CONTEMPLATED USE

Approximately half of the Landfill Six Site is intended to be used as a paved overflow parking area. The balance of the site will be unused perimeter lands. No landscaping or intentional access provisions are contemplated which would encourage routine public use of these areas.

Due to the specific contemplated land use, the "Restricted Commercial" site use category best fits the site and was previously specified in the application into the Voluntary Cleanup Program submitted previously by HV.

The contemplated use provides significant separation from human contact due to proposed capping and blacktop over most of Landfill Six. The managed areas will be somewhat accessible along the creek following the south site perimeter.

3.0 SUMMARY OF PROPOSED REMEDY

3.1 Proposed Remedy

Four site specific remediation objectives have been identified for this site. These include:

- Preventing ingestion/direct contact with the contaminated fill materials and impacted stream sediments.
- Minimizing landfill leachate discharges into the unnamed stream and groundwater by preventing direct and indirect infiltration into the waste mass.
- Preventing usage of groundwater without adequate monitoring and if necessary treatment.
- Preventing lateral subsurface migration of landfill decomposition gases such as methane from the waste mass.

The proposed remedy described in this work plan meets these objectives in the following ways:

- A landfill cap is proposed over most of the buried wastes. Its design is largely consistent with standards established in 6 NYCRR Part 360 for landfill closure. It will prevent ingestion or direct contact with fill materials in areas to be covered.
- No landfill cap is proposed for an area of approximately 5,000 square feet situated along the south site margin. Two feet of cover material will be provided over any contaminated material across this entire waste disposal area. Where solid waste or soils discolored by leachate precipitate are present in the uppermost two feet in this area, a two foot layer of clean soil will be spread to prevent ingestion or direct contact with impacted soils. HV will at its discretion either simply add two feet of clean soil cover over existing wastes, or relocate up to two feet of existing wastes under the proposed landfill cap area before providing the clean soil cover.
- The proposed landfill cap will prevent direct and indirect infiltration of surfacewater into the waste mass, leading to minimization of leachate discharges into the unnamed stream and groundwater.

- Groundwater Institutional Controls are proposed to preclude the property owner from using groundwater as a source of potable or process water without property treatment as determined by the Dutchess County Department of Health. The Institutional Controls also require the property owner to secure written approval from DEC before excavating any portion of the proposed final cover system

- Landfill decomposition gases from the buried wastes will be managed under the proposed remedy by use of a landfill gas collection layer and a landfill gas vent. To ensure effectiveness of this remedy, the post-closure monitoring plan includes a gas monitoring program.

More detailed descriptions of each proposed remedial component follows:

- The proposed impermeable cap will be installed over greater than ninety percent of Landfill Six. The cap includes a gas collection layer under a geo-composite liner. The liner is protected on top by a stone layer under blacktop on parts of the site and by a soil and topsoil layer over the balance of the capped site. A gas vent will release any landfill gases.

    - No cap material or other modifications is proposed in an area covering approximately 5,000 square feet along the south site perimeter, preserving existing steep slopes, existing beneficial and screening vegetation, and wetland vegetation adjoining the stream. Where either visible discoloration or ash or other obvious solid waste are evident in the upper two feet of soils in this area, two feet of clean soil cover will be provided. Soil cover will either be applied directly over visibly impacted soils or two feet of waste materials will be relocated to the landfill capping area before the two-foot clean soil buffer is added, at the discretion of the Volunteer.

    - No capping activity is proposed south of the property line although prior investigations (EA, 2001; Chazen March 2004) confirm the presence of wastes extending in the southwest corner of the landfill onto property of others. The property to the south is used for a buried natural gas line which would complicate any subsurface remedy contemplated in this area.

    - HV is willing to extend the proposed cap eastward to the base of a railroad grade owned by others and to relocate or de-activate one or more utility poles to fully cap the east limits of waste. HV will contact NYSDEC immediately to discuss remediation alternatives if access to

the railroad right-of-way is not secured prior to commencing remediation.

- Three existing water conveyances will be abandoned in place by grout injection. These include the drain line from Ryan Hall, a stormwater conveyance through the center of the site, and a corrugated metal pipe near the steam culvert. Discharge from the Ryan Hall drain line and the stormwater conveyance will be routed past the landfill as part of other property improvements.

- A limited quantity of waste in the south east corner of Landfill Six, beyond the limits of waste shown on Figures 2 and 4 and southeast of the stream headwall, will be relocated to lie under the proposed cap. The area from which waste is relocated will be graded and seeded. The estimated extent of the subject waste is approximately 50 feet (east to west) by 60 feet (north to south). Prior test pits indicated this waste is not more than approximately 3 feet thick on average, thinning to the south. The total volume of waste in this area does not exceed approximately 300 yards. Of this, approximately half lies on lands owned by the adjacent railroad parcel so HV can only commit firmly to relocation of half of this waste until permission is secured from CSX to undertake remediation on the property to the east of the Site.

Project Plans and Specifications are attached as Appendix C.

3.2 Expanded Description of the Remedy

3.2.1 Pre-Remedial Site Investigation

Sufficient investigation has been completed to allow implementation of a remedy without further pre-remedial site investigation.

3.2.2 Soil Gas Sampling, Analysis, and Monitoring

The proposed remedy includes a sand gas collection layer under the proposed cap and gas vents. A single gas vent will be located near the area where perimeter monitoring previously identified elevated explosive gas concentrations.

Landfill gas monitoring was conducted by EA (EA, 2001). Twenty-two perimeter sampling sites are shown on Figure 2. Sampling results are shown on Table 3. Elevated explosive gas emissions were noted only in two perimeter locations so landfill gas emissions appear localized at this site. All other perimeter locations showed no or low Percent Lower Explosive Limit (LEL) emissions. Oxygen levels were below atmospheric concentrations in approximately half of perimeter sampling

locations. Low to no VOC emissions were noted. Test pitting conducted by EA (2001) and Chazen (2004) identified few to no putrescible or wood wastes that would generate excessive landfill gas emissions.

3.2.3 Structure & Soil Removal

No solid waste will be removed from the site as part of the proposed remedy.

Limited waste consolidation is proposed in the southeast corner of the property where waste extends around and south of the stream headwall outlet. Wastes presently in this location will be relocated northward onto the main landfill area. Limits of waste in this southeastern location will be determined in the field on the basis of visual confirmation, to verify that excavation has proceeded to virgin ground. Once excavation is complete, a confirmatory soil sample will be collected from the exposed native soil and analyzed for metals and VOCs listed in Part 360-2.11(d)(6) baseline suite of parameters. During relocation work, filter fabric fencing will be established along the creek to prevent slump of materials into the unnamed stream. Materials will be excavated using a front-end loader or excavator and moved either directly onto the landfill area or transferred to the landfill area in a dump truck or other similar vehicle. In the event that the railroad parcel does not allow permission to excavate soils on their property, HV will terminate waste excavation along the property line and use sufficient clean fill to brace the waste face using a 3 on 1 slope for the bracing soils.

3.2.4 Abandonment of Drain Lines

The damaged and rusting corrugated metal pipe will be abandoned by identifying it's location at approximately 200 foot intervals using an excavator and pressure grouting concrete slurry into the pipe to the degree feasible.

The stormwater pipe will be intercepted in an upstream location and routed eastward to the stream conveyance. Once this diversion is complete, concrete slurry will be pumped into the abandoned stormwater line until it emerges at the downstream end.

A new drainline from Ryan Hall will be constructed as shown on the Design Drawings. Once complete, the old line can be abandoned by injection of concrete slurry.

Any other drain lines encountered during site activities will be decommissioned and abandoned by injection of concrete slurry.

3.2.5 Site Restoration/Cover System

A landfill-grade impermeable cap is proposed for most of the Site. The cap will include finished blacktop areas and graded/seeded areas. Areas scheduled for grading and seeding will have a cover system consisting of protective capping materials and a topsoil layer. Areas scheduled for blacktop will have a barrier stone layer and blacktop. All capped areas will receive an impermeable geosynthetic clay liner to limit infiltration of precipitation.

Bedrock monitoring wells MWHR6-20D, MWHR6-21D and MWHR6-23D will be abandoned following protocols described in 6 NYCRR Part 360-2.11(a)(8)(iv). The wells will be abandoned under supervision of a field geologist.

3.2.6 Institutional Controls

Institutional easements limiting future penetration or other modifications to the proposed remedies will be prepared for review and approval by NYSDEC and then attached to deed records for the site. A draft property deed notice will be provided prior to implementation of the remedy.

HV understands its obligation to provide a Declaration of Covenants and Restrictions to run with the land providing restrictions consistent with the implemented remedy of the Remedial Action Work Plan. This Declaration will be submitted within 30 days of the Department's determination that additional remediation is not needed based on use restrictions and/or performance monitoring, at the discretion of the Department.

3.2.7 Operation, Monitoring and Maintenance

Under Section 2.6 of the draft Voluntary Cleanup Program Guide (May 2002), an operation, monitoring and maintenance (OM&M) plan will be finalized subsequent to construction of the remedy. An OM&M plan is warranted for the site since the effectiveness of the remedy depends on the use of engineering controls (landfill cap) and institutional controls (deed restrictions).

The OM&M plan will detail servicing required to maintain the proposed cap, erosion and stormwater control devices, and environmental monitoring wells.

The general components of a proposed long-term site monitoring plan consists of the following:

1. Quarterly inspection

a. Inspection of capped areas to ensure cap and cover integrity.

b. Explosive gas monitoring of the landfill cap gas vent, catch basins CB1 through CB6, the proposed water quality inlet basin.

c. Inspection of current leachate discharge areas, including tabulation of estimated rates of discharge.

2. Annual sampling of overburden monitoring wells MWHR6-22R, MW-HR6-23S, MWHR6-20S and MWHR6-21S. The samples would be analyzed for routine parameters as listed under 6 NYCRR Part 360-2.11(d)(6). If leachate outflows are witnessed, the flows would also be sampled for routine parameters.

3. An annual certification report will be provided to NYSDEC confirming the integrity of the remedial engineering controls and providing results of quarterly inspections and annual sampling.

HV understands its obligation to submit for review and approval a complete and approvable OM&M plan before it can receive an Assignable Release for Landfill Six subject to reservations listed in Section 4.4 of the draft Voluntary Cleanup Program Guide.

4.0 ENGINEERING EVALUATION OF REMEDY

4.1 Remedial Action Selection (RAS) Report

Various remedial approaches were contemplated for this site. These included waste removal and full or partial waste isolation by capping and/or by *in-situ* dewatering to dry out and so isolate the waste mass above the watertable. Criteria used to arrive at the recommended remedy included those listed in 6 NYCRR Part 375-1.10 except for cost effectiveness or community acceptance, as discussed below.

Review of the Qualitative Human Health Exposure Assessment and observation of leachate discharges to the stream flowing past the south site margin served to focus the remedial action selection process on ways to limit water movement into or out of the waste mass while seeking ways to preserve natural habitat found on the south margin of the site.

A buried gas line lies along the south property line. Waste has been mapped under the gas line by EA (2001) in the southwest corner of Landfill Six although without test pit confirmation. Mature woodlands and wetland vegetation also lie along the creek at the south site margin. Where these lie off the property, HV is not volunteering to extend remedial efforts across the property line.

To the east, identified waste also extends onto lands owned by others and not under present contract of purchase by HV. In this area, HV is willing to extend remedial efforts across the property line if permission from the adjacent landholder is provided.

The remedial action selection process has selected capping of Landfill Six to minimize penetration of precipitation into site wastes. Additionally, three subsurface water conveyances will be abandoned in-place to eliminate leachate generation from these sources. To prevent damage to existing forested and wetland vegetation areas a 5,000-square foot uncapped natural buffer area is proposed along the south site margin. The landfill cap on the balance of the site is largely compliant with 6 NYCRR Part 360 requirements. HV also offers to extend the cap onto lands of the adjacent railbed landowner, should permission be provided by the owner. HV will contact NYSDEC immediately if permission to extend the cap onto these off-site lands cannot be secured before commencing remediation.

4.1.1 Protection of Human Health and the Environment

The proposed remedy was selected to resolve specific remedial action objectives, including eliminating leachate generation due to infiltration of precipitation

through the waste mass and subsurface flow of water through leaking conveyances, elimination of dermal contact exposure risks with solid waste, and natural attenuation and natural burial of sediments containing elevated metals. The proposed remedy is protective of human health and the environment insofar as it is designed to:

- Reduce or substantially limit leachate discharges from Landfill Six to those sections of the creek which would come under ownership by HV if the site purchase is successfully concluded.

- Provide a full cap over greater than ninety percent of the Landfill Six Site, beneficially limiting human or environmental contact with the buried solid wastes.

- Preserves the wooded steep slopes and riparian wetland vegetation found along the creek, protecting a visual screen along the creek relative the adjacent property to the south, and providing a natural filter for overland flows near the creek.

- The monitoring program proposed for the site will provide confirmatory evidence of effectiveness of the proposed remedy.

4.1.2 Compliance with Standards, Criteria and Guidance

The site presently contains groundwater and leachate seeps (surface water) exceeding groundwater and surface water standards. The primary objective of the proposed remedy is to substantially isolate groundwater under Landfill Six by limiting infiltration of precipitation into the waste mass.

The proposed remedy seeks to reduce or fully eliminate leach seeps to the environment.

The present site consists of an inactive municipal solid waste site which has not been closed in conformance with 6 NYCRR Part 360. The proposed remedy is largely in compliance with 6 NYCRR Part 360, meets selection factors in 6 NYCRR Part 375-1.10(c), and meets objectives under the VCP program to protect human health and the environment. Variances from strict closure under Part 360 conditions includes slopes less than minimum, fewer gas vents than typically required, and variances from thicknessess for gas venting and protective layer barriers around the landfill geomembrane. These variances were judged to be acceptable due to the relatively small leachate volumes observed at the site and the ability of HV to actively provide OM&M to the site in the future.

Landfill Six currently includes no stormwater management components. The proposed remedy includes new and beneficial stormwater controls shown on the attached engineering drawings.

To meet SCGs found in 6 NYCRR Part 360 standards, the proposed remedy includes management of limited quantities of landfill gas by providing a functional collection layer and a single gas vent. The proposed remedy also moves the site toward compliance with groundwater GA standards by reducing volumes of water entering the water mass through the construction of a landfill cap and by decommissioning three leaking culverts/water conveyances. As a result, the proposed remedy will also improve surfacewater quality by reducing leachate flows into the stream that adjoins the site. Finally, the project is designed to improve soil and streambottom sediment quality by reducing volumes of leachate entering these media and precipitating analytes onto sediment media, allowing attenuative processes and sediment mixing to reduce or dilute current residues.

4.1.3 Short-Term Effectiveness

Waste relocation from the southeast corner of Landfill Six onto the main waste area offers an immediate site improvement since precipitation currently flows through these wastes into the stream.

Grouting of the failing corrugated metal pipe, a leaking stormwater drain, and the building drain from Ryon Hall will effect further immediate reductions in water entry into the waste mass, thereby reducing water movement through the waste mass which presently contributes to leachate generation.

Capping the majority of Landfill Six will also immediately curtail existing precipitation seepage into the waste mass, yet further reducing water quantities currently entering the waste mass and contributing to leachate generation.

Preservation of wooded slopes and wetlands along the creek provide a short-term and long-term benefit by preserving visual screens, a natural area, and a silt-entrapment area during and following remedy implementation which will protect the stream from silt and other erosion/runoff impacts. Preserving this small area without a landfill cap will not generate meaningful leachate quantities since steep slopes minimize infiltration by precipitation and short travel paths of any interflow to the stream would have minimize contact time with any buried wastes.

Little exposure to contaminant sources would occur during implementation of the proposed remedy. Extensive test pitting at the site by EA (2001) and Chazen (March 2004) have identified no VOC or dermal contact media which might offer short-term implementation risks to workers during waste relocation. A Health and

Safety Plan has been prepared to develop appropriate responses to standard hazards associated with construction sites (Appendix A).

4.1.4 Long-Term Effectiveness

Construction of an impermeable cap over the majority of Landfill Six and decommissioning of three existing leaky water conveyances through the waste mass will be effective in the long-term in reducing of flows of water into the waste that currently support leachate flows into the stream along the south side of Landfill Six. The cap will also provide a preferential long-term point of release for any limited landfill gases.

The reduction in leachate flux reaching the stream and the proposed waste relocation will reduce impacts to stream both immediately as leachate discharges are curtailed and long-term as natural attenuation and additional depositional layers of sediment in the streambed mitigate sediment quality

Ensuring the full long-term benefits of the remedy will require protection through an OM&M program to maintain the cap that provides source containment and limits leachate generation.

The proposed remedy therefore provides long-term effectiveness in reducing leachate discharges and contact with waste material.

4.1.5 Reduction of Toxicity, Mobility or Volume

The proposed remedy does not reduce the volume or potential toxicity of waste. Capping and consolidation of the waste will, however, reduce the effective mobility of the waste since the proposed remedy will reduce the ability of source contaminants to migrate (mobility) via leachate to sediment areas or the stream.

4.1.6 Implementability

The remedy is readily implementable. Existing level and exposed areas can be readily graded and capped without requiring significant tree removal or wetland modification along the south site margin. Abandoning three existing water conveyances in place is readily implementable without requiring extensive excavation and waste manipulation although the stormwater and the basement drain lines will require up-pipe relocation by HV to other outlet areas.

The design of the remedy is sufficiently streamlined that multiple qualified contractors exist to implement the remedy. Required closure materials are also not limited or unique so scheduling delays due to material availability would not be

anticipated. It is our understanding that permits for stormwater controls during remedy implementation can also be secured directly through the VCP project manager under the VCP without requiring involvement from other departments.

4.1.7 Limitation of the Proposed Remedy

The proposed remedy does not extend southward to the full limits of the waste because the southwest corner of the landfill does not lie on land which HV proposes to purchase. A buried natural gas line also lies on this adjacent parcel and appears to extend through the area of buried waste.

This condition complicates HV's proposed remedy since leachate generated in this off-site area is also expected to be migrating to the stream. To minimize impacts of any leachate discharges to the stream from the Landfill Six Site, near the southwest margin of landfill six, HV's proposed remedy includes a landfill cap extended fully to the property line. No uncapped landfill area would be left in this part of the landfill area under proposed control of HV. Accordingly, minimal leachate will be generated in this portion of the Landfill Six Site which could migrate onto the off-site landfill area.

4.2 Certification of the Remedial Action Selection (RAS) Report

"I certify that the Remedial Action Selection Report evaluates a remedy that can achieve site cleanup goals, was prepared following good engineering practices, and has been evaluated against the required factors listed in 6 NYCRR 375-1.10(c)."

Daniel W. Stone — Name

9/30/04 — Date

5.0 REMEDY IMPLEMENTATION

5.1 Remedy Implementation

The remedy can be readily implemented although select permits and approvals are required. These include discerning whether the adjacent property owner to the east wishes HV to extend grading and capping remedies onto the margins of the rail line and arrangements to remove and decommission unused power poles along the east site perimeter. Because greater than 1 acre of land will be disturbed, a stormwater permit for construction activities will be required. The proposed remedy requires no wetland, stream disturbance or utility disturbance permits/protocols.

The project is subject to SEQRA, as summarized in Section 2.4 of the draft Voluntary Cleanup Program Guidance (May 2002). Since the proposed remedy leaves intact the natural wooded and wetland areas along the stream and since the landfill cap is intended as an environmental benefit, it would appear the proposed remedy could be approved as a positive benefit under SEQRA.

No mapped NYSDEC wetland adjoins Site Six. No activity is proposed in any wetland areas along the creek which could fall under an Army Corps wetlands delineation.

The proposed cap does diverge from a standard 6 NYCRR Part 360 closure in ways judged appropriate to the limited environmental exposures at the site and the mid-1970 time-period during which landfill operations ceased. The proposed cap also conforms generally with the Part 360 standards at the time that waste disposal ceased since this proposal includes 12 inches of cover and a low-permability GCL, which is judged equivalent to or better than 24 inches of clay cap. The variances include:

- The proposed topsoil layer is 4 inches, not 6 inches
- The proposed Barrier Protection Layer is 8 inches, not 24 inches
- The proposed Gas Venting Layer is 6 inches, not 12 inches
- The proposed GCL Barrier Layer is not certified to meet 10^{-7} permeability rates and is not a HDPE membrane or an 18 inch Low Permeability Clay Barrier Layer.
- One Gas Vent is proposed instead of three vents at one vent per acre
- Existing slopes do not achieve a minimum slope of 4 percent.
- No Leachate Collection System is proposed.
- The cap does not extend fully to the creek along the south side of landfill.

5.2 Mobilization and Site Access

Site access will be through existing roadways through the HRPC site. Adequate area is available for truck traffic and staging of materials.

5.3 Site Preparation

Site preparation will consist of removal of stockpiled tree stumps. Grading and limited tree clearing will follow in conformance with the erosion and sediment control plan and general site plan for the site. No wood debris will be stockpiled for burial in the landfill.

Although the probability of discovering any previously unrecognized underground utilities is low, the UFPO hotline (1-800-962-7962) will be called at least 10 days prior to beginning site work to mark any existing utility lines in the area.

The property owner to the east will be contacted and negotiations relative to access, liability, and OM&M obligations will be evaluated to determine if permission to remove existing utility pole(s) can be resolved and if landfill capping can be extended on this property.

5.4 Site Security & Traffic Control Plan

No specific site security or traffic control plans are needed since the surrounding property will be fully under control of HV once the real estate transaction is completed.

5.5 Soil Excavation Limits

Minimal soil excavation is proposed under this plan. Most work consists of nominal grading and trenching associated with installation of a landfill cap and perimeter anchor trenches. Boundaries of the work area are shown on the attached engineering plans. Landfill cover soil varies in thickness from approximately one to three feet. The material consists of brown silty soil with little organic matter and is suitable for barrier protection layer material over the GCL Barrier Layer. Landfill cover soil that can be removed and stockpiled onsite for re-use will be visually screened in the field as it is removed to ensure that waste or other debris are not included in this process.

A limited volume of additional waste lies in the southeast corner of the site, southeast of the stream culvert discharge headwall. Waste in this area will be excavated and moved onto the main waste area where it will be compacted and graded to lie under the proposed landfill cap. The limits of waste excavation in this

area will be defined in the field by property lines, availability of permission to excavate toward the railroad bed, and by limits of observable waste. A post-excavation sample of re-exposed native soils will be analyzed for volatile organic compounds and metals listed in Part 360-2.11(d)(6) baseline suite of parameters. NYSDEC will be contacted immediately if permission to remove wastes on the off-site parcel is not secured by the time that remediation commences. Once waste is relocated from this area, seed and mulch will be placed on the remediated area in accordance with seeding and planting details shown on the attached landfill closure plan for vegetated portions of the landfill.

5.6 Soil Buffer in Uncapped Landfill Areas

To minimize disturbance to existing stream, mature trees, and stable banks along the southern site margin, approximately 5,000 square feet along the southern site margin are not proposed for landfill capping. However, where solid waste is visible within two feet of grade in this area, or wherever exposed soils are discolored by leachate precipitate, a two foot layer of clean soil will be spread to prevent ingestion or direct contact with impacted soils. In areas needing the two-foot buffer, HV will at its discretion either simply add two feet of clean soil cover or will relocate up to two feet of existing impacted wastes to under the proposed landfill cap area before providing the two-foot clean soil cover. Identification of the areas warranting the 2-foot soil cover will be made in consultation with NYSDEC during remedial action implementation.

The barrier layer will consist of 2 feet of clean soils brought from elsewhere and pre-tested to confirm an absence of lead, arsenic or mercury above sediment screening guidance values. If soils with visible solid waste or precipitate staining are identified in areas with existing steep slopes, these will be stabilized using geomesh before vegetative plantings of native grass mixes are spread. Where no geomesh is needed, the buffer soils will simply be graded, seeded, and mulched to establish vegetative cover. Silt fencing will be installed along the streambank during such work activities to control potential for sediment runoff. If the sampling program determines that extensive portions of the 5,000 square foot area requires the 2-foot buffer cover, more complex stormwater and sediment/erosion control measures may be warranted and a sediment and erosion control plan will be provided with the sampling data to NYSDEC to protect the stream and existing site soils.

5.7 Stormwater Management & Erosion and Sediment Control Plan

The landfill closure design includes a bioretention facility that exceeds the criteria established in NYSDEC's Stormwater Design Manual (August 2003 edition) and diverts flows exceeding the NYSDEC water quality volume to storm pipe outlet

ES1. The following description of the design and operational intent is provided for clarity.

The proposed stormwater management system and water quality treatment Bioretention (F-5) Facility was designed in accordance with Section 6.4 of the New York State Stormwater Management Design Manual (*NYS SMDM*), August 2003 Edition and in accordance with the 2003 "New York State Pollution Discharge Elimination System (SPDES) General Permit for Stormwater Discharges Associated with Construction Activities GP-02-01".

Erosion and sediment control plans are included with the attached engineering plans for landfill closure. Protocols for temporary stockpiles for cover soils and materials are also shown on attached engineering plans.

Water Quality Bioretention Facilities can be designed as off-line or on-line treatment systems. The water quality volume typically contains higher pollutant concentrations than those in the extended runoff periods. The proposed Water Quality Bioretention Facility is a retention/treatment basin for the water quality storm event only and is designed to be an off-line practice. On-line water quality (WQ_v) systems can potentially allow the volume of water captured to be displaced and can result in the release of captured pollutants due to subsequent runoff events.

The proposed stormwater system allows for the initial runoff or water quality volume to be captured and diverted to the bioretention facility, while the larger storm events are diverted to a flared pipe end section with a velocity dissipating stone outlet protection. Surface runoff flows into the on-site closed pipe network system (i.e. storm sewer) and is conveyed to the bioretention treatment area by the Water Quality Inlet - WQ1. The WQ_v is diverted to the bioretention facility and the treated effluent is conveyed by the underdrain collection system to End Section – ES2 and finally to the stream. Flows in excess of the WQ_v (i.e. 2, 10, 25, and 100-year events) are bypassed through the on-site closed pipe network system to End Section - ES1 and eventually conveyed to the stream.

The proposed bioretention facility was designed to treat the WQ_v produced from the proposed parking lot and road area within the landfill limits and is located outside the footprint of the landfill. The proposed location was chosen to limit the probability of captured rain water to infiltrate the landfill closure area.

The proposed Water Quality Bioretention Facility was designed using a 1.1 inch rainfall event to determine the WQ_v to be captured, retained, and treated. The volume to be captured was based on the 1.0± acre area of the proposed parking lot and road area that is within the landfill limits and is considered to be completely impervious (i.e. a total impervious cover of 1.0± acres). The WQ_v was determined to

be 4,059 cubic feet (0.093± acre-feet) using the 90% Rule as per Section 4.2 of the *NYS SMDM*, August 2003 Edition.

The required surface area of the bioretention filter bed was sized based upon the requirements provided in Section 6.4.4 Treatment – Subsection, Design Guidance. The required surface area of the filter bed was determined to be 3,866 square feet (sf). The area provided by the proposed bioretention facility is 4,120± sf which provides an additional 6.2% of water quality treatment above the volume required to be treated by the NYSDEC WQ_v 90% Rule.

The need for rip-rap and associated wetland disturbance is eliminated for the water quality treatment Bioretention (F-5) Facility's underdrain pipe outlet since the discharge flow velocity for pipe end section ES-2 will not exceed 6 fps, so the use of rock outlet or bank protection measures will not be required.

The need for rip-rap shown for pipe end section ES-1 is unavoidable since the stormwater discharge may create an erosive condition to occur along the existing slopes. The purpose of the riprap is to protect the outfall structure or end section from damage due to erosion, ice, or debris during high storm flow events. No wetland disturbance will occur at end section of ES-1 since riprap ends along the limits of the wetland area. The proposed pipe end section and rip rap mitigation measures will not impede or limit the natural flow pattern of the water course/wet area along the south side of the site.

The bioretention facility can be relocated or expanded to include the future development needs when final development of the site occurs. The future storm water quality treatment designs for the final project development plans will include the water quality volume (i.e. WQ_v) created by the Area #6 landfill closure.

As required by NYS SMDM Appendix C.3 Construction Specifications for Bioretention, Sand Filters, and Open Channels; the bioretention facility may not be constructed until all contributing drainage area has been stabilized.

5.8 Equipment Decontamination Procedures

No hazardous waste has been identified on this site. Only nominal grading and trenching are required to implement the proposed remedy. Prior test pitting conducted in the southeast corner where waste relocation is proposed identified only municipal solid waste and construction debris materials. Accordingly, no significant equipment decontamination procedures are required other than vehicle washes.

The contractor will be responsible for maintenance of, or relocation of, an existing decontamination pad on the site during remedial activities. No equipment that has

traveled directly over waste material will be allowed to travel from inside the footprint of the landfill to other areas on or off the property without being washed.

5.9 Air Monitoring Plan/Contingency Planning

During work periods when presently buried solid waste may be disturbed, a Chazen environmental technician will scan for organic vapors using a photionization detector. This may include work occurring during:

- Stripping of existing cover soils for later reuse as barrier protection layer material.
- Preparation of anchor trenches
- Relocation of waste from the southeast site margin to the main landfill area.

The technician will screen both cover soils and the breathing zone during these work tasks. Any excavated material will be screened as material is relocated or if potentially hazardous material is encountered. A Contingency plan is provided in Appendix B if hazardous materials are encountered.

Only limited waste relocation is planned as part of this remedy, associated with moving wastes from the southeast corner of the site onto the main landfill mass area. This area has been significantly explored by test pitting and no hazardous materials were noted, however, if potentially hazardous material is identified by visual screening, a composite field sample will be collected for headspace analysis. If photoionization detector readings exceed 100 ppm or if soils show obvious visual contamination (powder, stains, liquids), the soil will be set aside on plastic for analytical testing and possible off-site disposal.

Although the majority of material in the landfill is anticipated to be inert (e.g. plastic, soil, ash construction debris), a combustible gas meter will also be used on site during periods when waste is being exposed (anchor trenches) or relocated (work in the southeast corner).

5.10 Community Air Monitoring Plan

Total particulate/dust will be monitored upwind and downwind locations by a Chazen environmental technician at least twice daily on days when waste relocation or landfill capping activity is occurring. A miniRam, DataRam or equivalent particulate recorder will be used and results documented in the technician's field journal.

Landfill closure activities have the potential to release measureable quantities of dust (particulate matter). Particulate matter less than 10 microns (ie. PM10) is regulated by both State and federal regulations. The action level for PM10 is 150 ug/m^3 at downwind sampling locations, or any reported increase of more than 100 ug/m^3 over an upgradient reading. Prior to site work activities, upwind readings will be taken to differentiate between site-related air emissions and ambient levels.

If instruments indicate an exceedence of action levels, any activities causing the high PM10 concentrations will be terminated until measures are implemented to reduce emissions, such as wetting of soils or working in ways that expose smaller open areas.

5.11 Vector Control

Although materials observed during test pitting appears unlikely to attract vectors, the contractor will cover waste material with onsite cover soils or other materials at the end of each work day.

6.0 HEALTH AND SAFETY PLAN

A health and safety plan has been prepared for TCC employees describing potential hazard exposures and providing a map showing the most direct route to a hospital (Appendix A). The Construction Contractor will be required to prepare their own health and safety plan to address their workers.

7.0 QUALITY ASSURANCE/QUALITY CONTROL PLAN

An Engineer's Certification Report will be prepared within 90 days after completion of remediation outlining the completed activities associated with implementing the proposed remedy. For the landfill component of the proposed remedy, the Certification Report will include construction certifications required under 6 NYCRR Part 360. As built drawings will be provided as well as a complete OM&M Plan.

No environmental sampling is required as part of the proposed remedy since the only proposed actions include waste relocation, construction of a landfill cap, and abandonment of various culverts and pipes and existing bedrock monitoring wells.

As part of the Construction Quality Assurance / Quality Control Plan for the proposed remedy, TCC will document and observe the following:

- Monitor removal of existing stumps, live trees, and other existing general debris.
- Injection of concrete slurry into culverts to be abandoned.
- Oversight of waste relocation from the southeast corner of the Landfill Six Site into compacted lifts on the main landfill waste area.
- Review sources(s) and conformance testing of construction materials, as specified in Design Drawings.
- Grading and compacting of the site to pre-closure contours
- Placement of the bedding layer, GCL liner, barrier protection layer or crushed stone, and topsoil or asphalt binder, as specified in Design Drawings.
- Evaluate erosion control measures implemented during site work.
- Evaluate completed soil components for proper elevations and condition.
- Confirm that site activities do not occur which would damage the GCL liner, and oversee any necessary repairs.

Additional Construction QA and QC to be incorporated during landfill closure activities are detailed on the design drawing set, included as Appendix C.

8.0 CITIZEN PARTICIPATION PLAN

It is anticipated that the NYSDEC project manager will issue a notice of availability of this Remedial Action Work Plan once the RAWP is deemed acceptable and complete. The notice will provide a 30-day comment period during which written comments by others may be submitted to the Department.

9.0 SCHEDULE

Once the proposed remedy is accepted by the Department, it is anticipated that construction can be completed within two years. A detailed construction schedule is provided in Table 6.

10.0 REPORTING

Monthly project progress reports will be provided to the Department beginning at the time that implementation approvals are provided and terminating once the Engineer's Certification Report is submitted.

11.0 REFERENCES

Chazen Companies, March 2004, Hudson River Psychiatric Center Landfill Area 6 Supplemental Closure Investigation Report.

EA Engineering, P.C. et al, January 2001, Landfill Characterization Investigation Report Areas 1, 2, 3, 5, 6, 7, and 8 Hudson River Psychiatric Center, Poughkeepsie, NY.

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LMS, 1996, Remedial Investigation of Area 6 PCB Site at Hudson River Psychiatric Center Poughkeepsie, NY NYDEC ID No. 3-14-063.

Figures

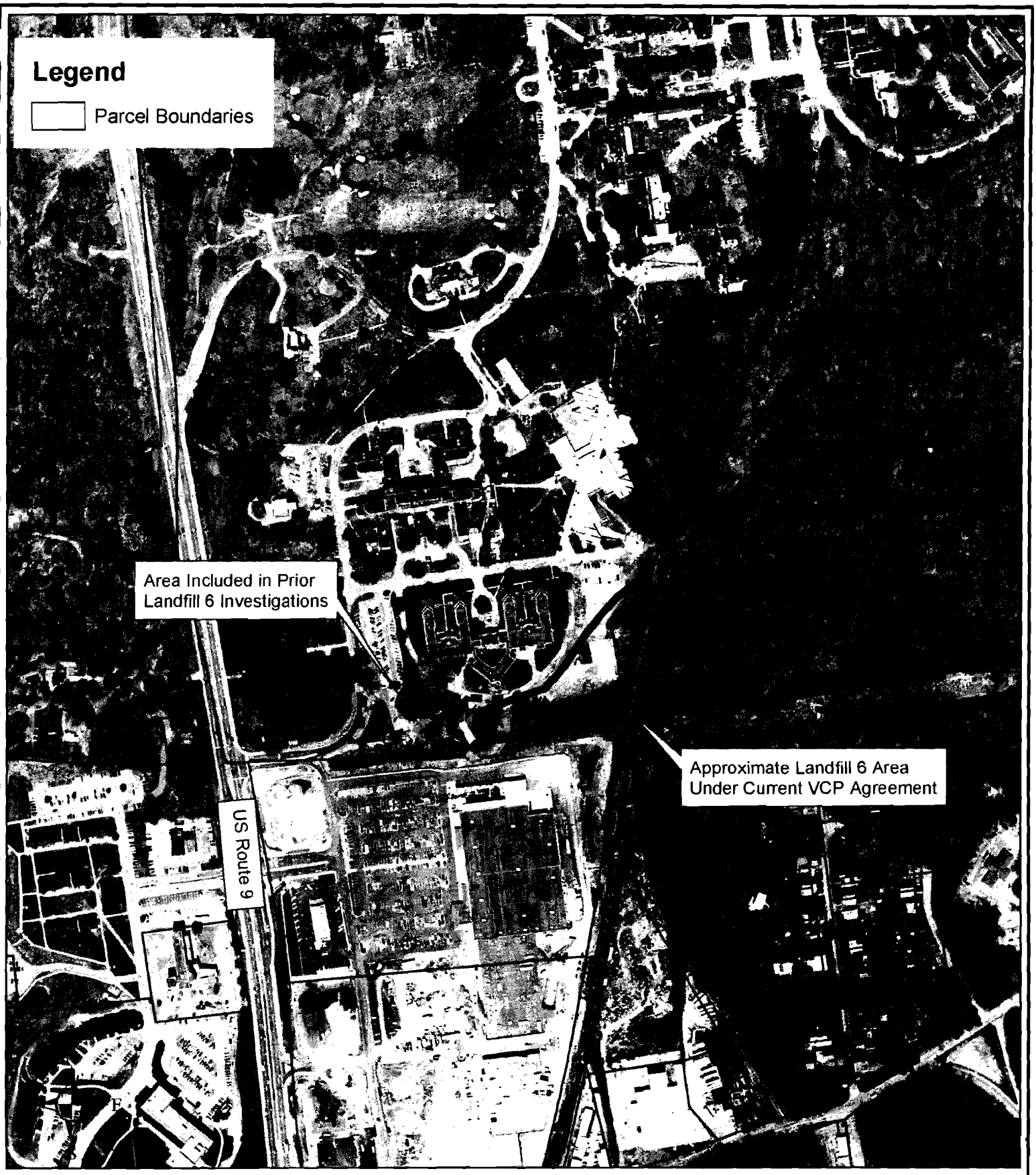

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FIGURE 1-SITE LOCATION MAP

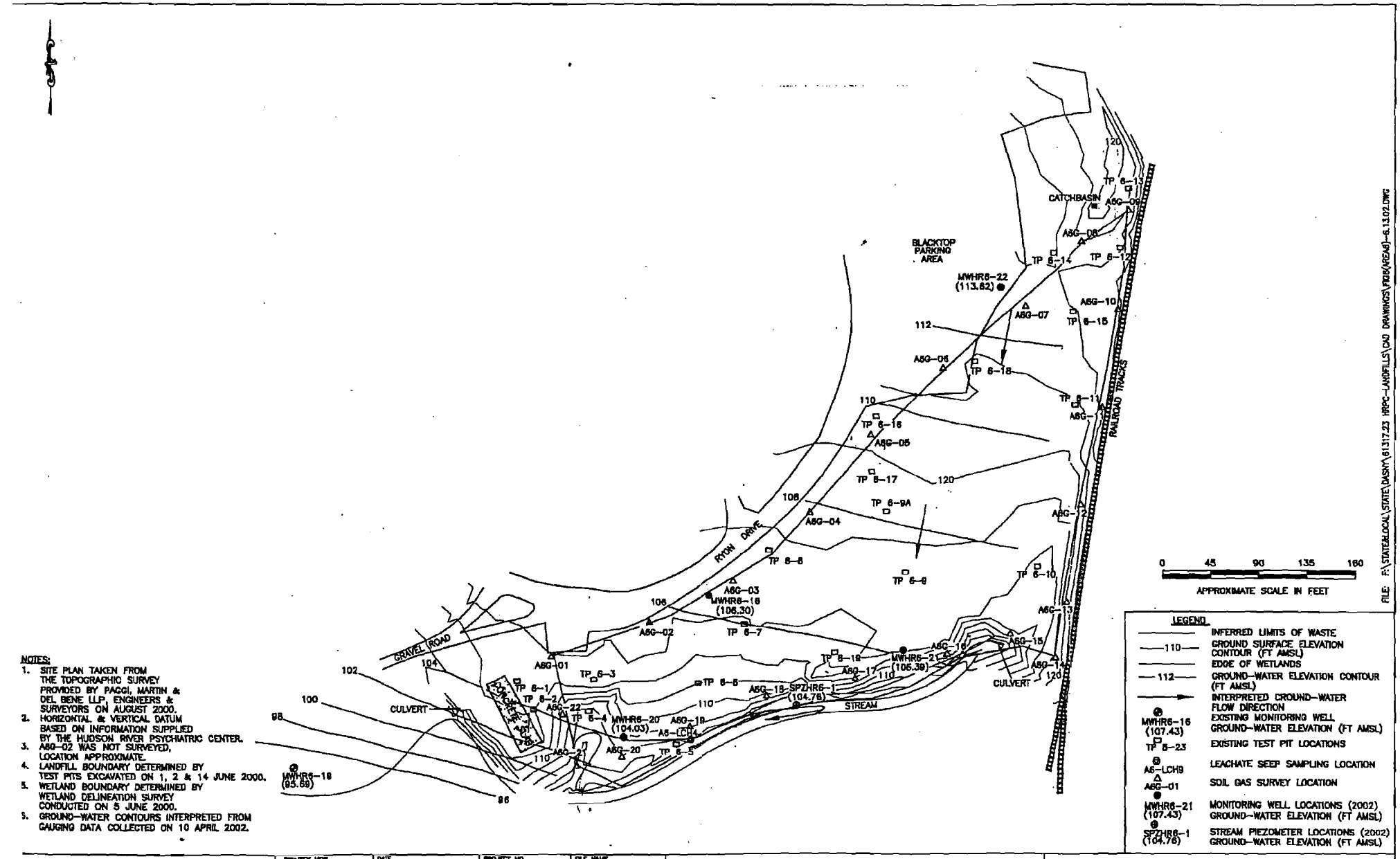
Hudson River Psychiatric Center
Poughkeepsie, Dutchess County, New York

USGS Topographic Map of the Poughkeepsie NY Quadrange. 1995
7.5 Minute Series Dutchess County Real Property Services - Tax Parcel Data

Date: September 2004

Scale: 1 inch: 400 feet

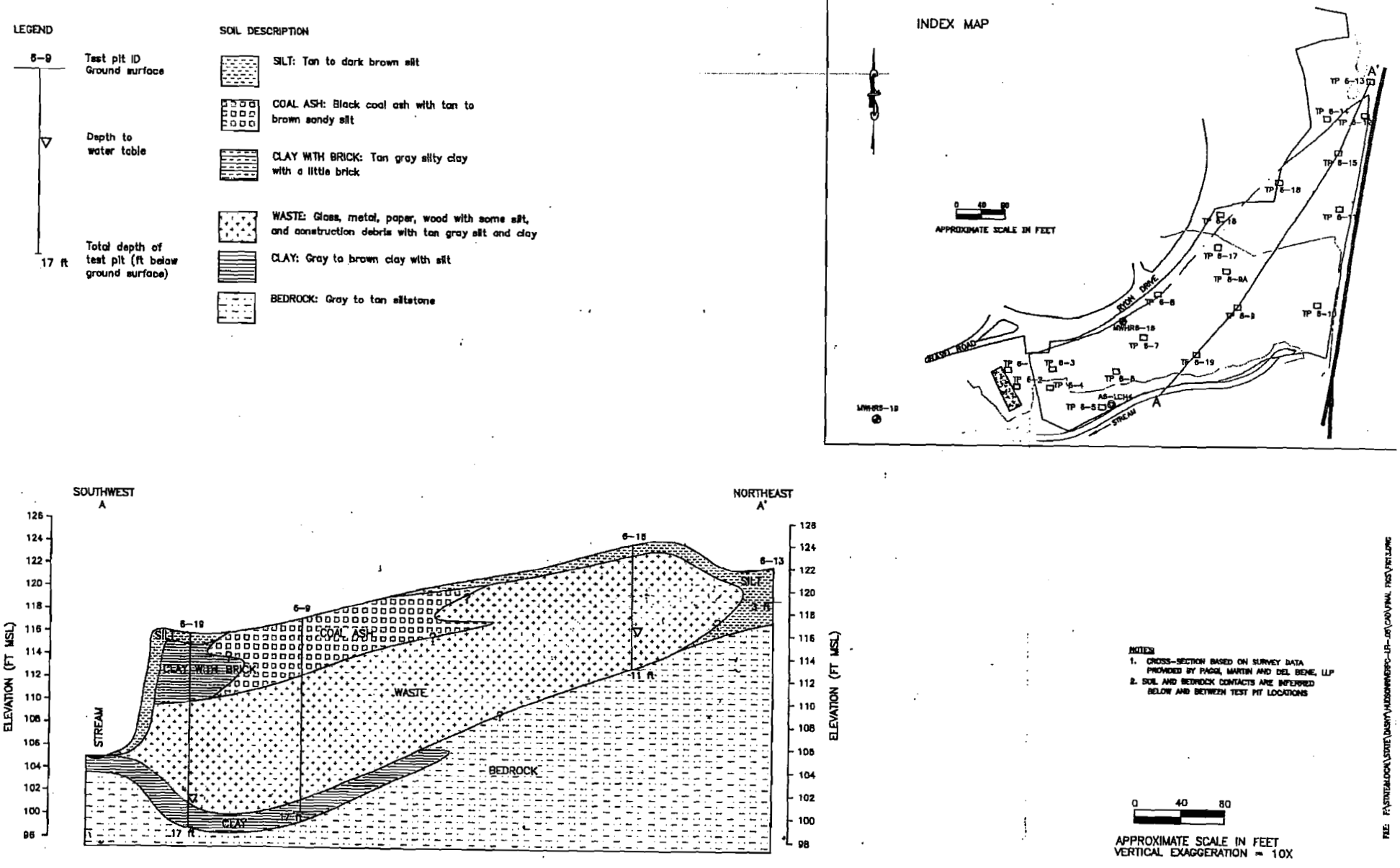
Project #: 40307.00



NOTES:
1. SITE PLAN TAKEN FROM THE TOPOGRAPHIC SURVEY PROVIDED BY PAGGI, MARTIN & DEL BENE LLP, ENGINEERS & SURVEYORS ON AUGUST 2000.
2. HORIZONTAL & VERTICAL DATUM BASED ON INFORMATION SUPPLIED BY THE HUDSON RIVER PSYCHIATRIC CENTER.
3. A6G-02 WAS NOT SURVEYED, LOCATION APPROXIMATE.
4. LANDFILL BOUNDARY DETERMINED BY TEST PITS EXCAVATED ON 1, 2 & 14 JUNE 2000.
5. WETLAND BOUNDARY DETERMINED BY WETLAND DELINEATION SURVEY CONDUCTED ON 5 JUNE 2000.
6. GROUND-WATER CONTOURS INTERPRETED FROM GAUGING DATA COLLECTED ON 10 APRIL 2002.

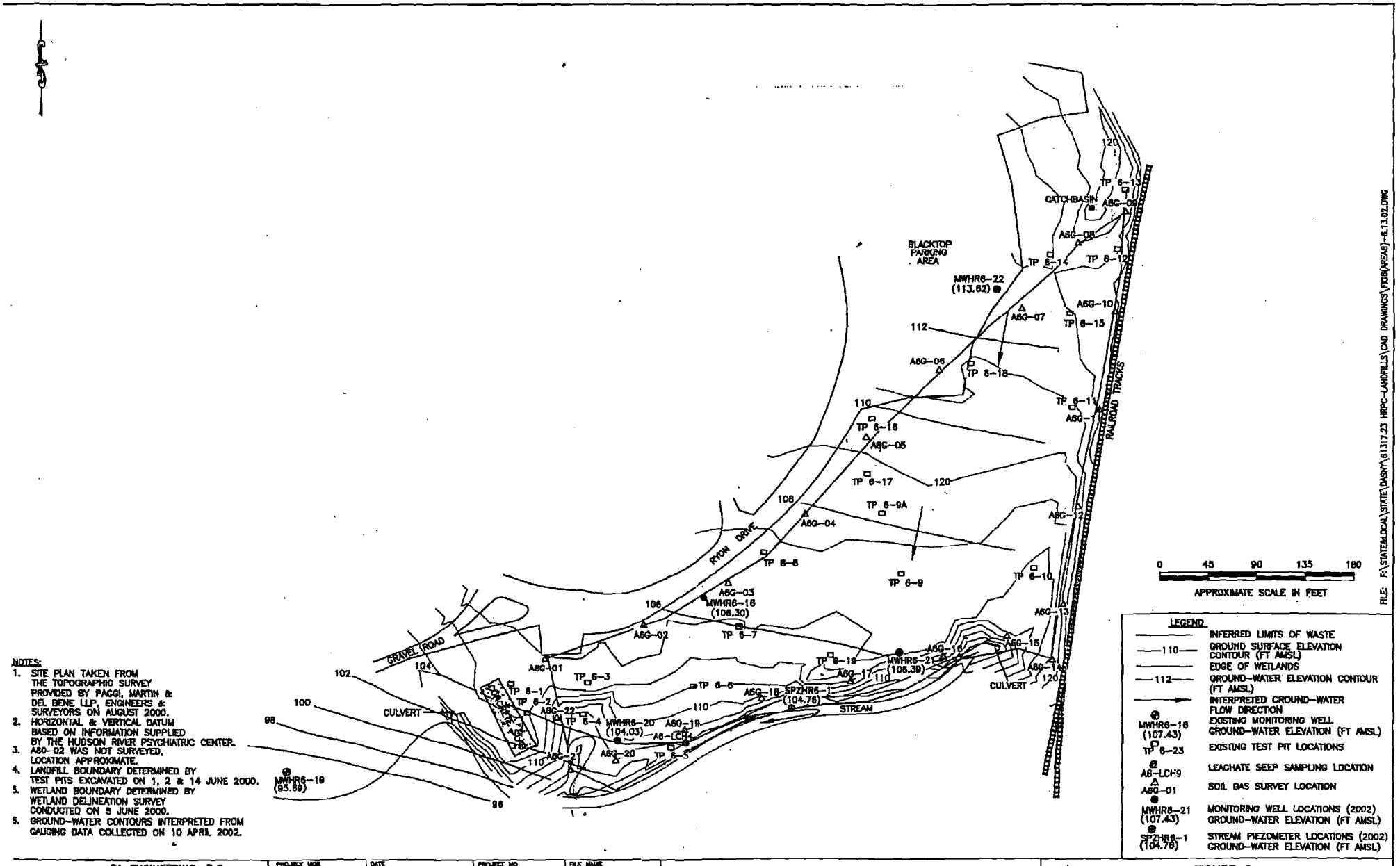
EA ENGINEERING, P.C. AND ITS AFFILIATE EA ENGINEERING, SCIENCE, AND TECHNOLOGY	PROJECT MGR: DM	DATE: 10 JULY 2002	PROJECT NO: 61317.23	FILE NAME: FIG6.DWG	HUDSON RIVER PSYCHIATRIC CENTER POUGHKEEPSIE, NEW YORK
	CHECKED BY: KD	DRAWN BY: SAP	DASHY PROJECT NO: 2375609999	SCALE: AS SHOWN	FIGURE 6 SITE MAP OF LANDFILL AREA 6

Figure 2 – From EA (2002)



EA ENGINEERING, P.C. AND ITS AFFILIATE EA ENGINEERING, SCIENCE, AND TECHNOLOGY	PROJECT MGR: DM	DATE: 26 JAN 2001	PROJECT NO: 61317.05	FILE NAME: FIG13.DWG	HUDSON RIVER PSYCHIATRIC CENTER POUGHKEEPSIE, NEW YORK
	CHECKED BY: KD	DRAWN BY: JG	DIGNT PROJECT NO: 59995	SCALE: AS SHOWN	FIGURE 13 CROSS-SECTION OF LANDFILL AREA 6

Figure 3 – From EA (2002)



NOTES:
1. SITE PLAN TAKEN FROM THE TOPOGRAPHIC SURVEY PROVIDED BY PAGGI, MARTIN & DEL BENE LLP, ENGINEERS & SURVEYORS ON AUGUST 2000.
2. HORIZONTAL & VERTICAL DATUM BASED ON INFORMATION SUPPLIED BY THE HUDSON RIVER PSYCHIATRIC CENTER.
3. A6G-02 WAS NOT SURVEYED, LOCATION APPROXIMATE.
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5. WETLAND BOUNDARY DETERMINED BY WETLAND DELINEATION SURVEY CONDUCTED ON 5 JUNE 2000.
5. GROUND-WATER CONTOURS INTERPRETED FROM GAUGING DATA COLLECTED ON 10 APRIL 2002.

EA ENGINEERING, P.C. AND ITS AFFILIATE EA ENGINEERING, SCIENCE, AND TECHNOLOGY	PROJECT MGR: DM	DATE: 10 JULY 2002	PROJECT NO: 61317.23	FILE NAME: FIG6.DWG
	CHECKED BY: KD	DRAWN BY: SAP	DASNY PROJECT NO: 2375609999	SCALE: AS SHOWN

HUDSON RIVER PSYCHIATRIC CENTER
POUGHKEEPSIE, NEW YORK

FIGURE 6
SITE MAP OF
LANDFILL AREA 6

Figure 2 – From EA (2002)

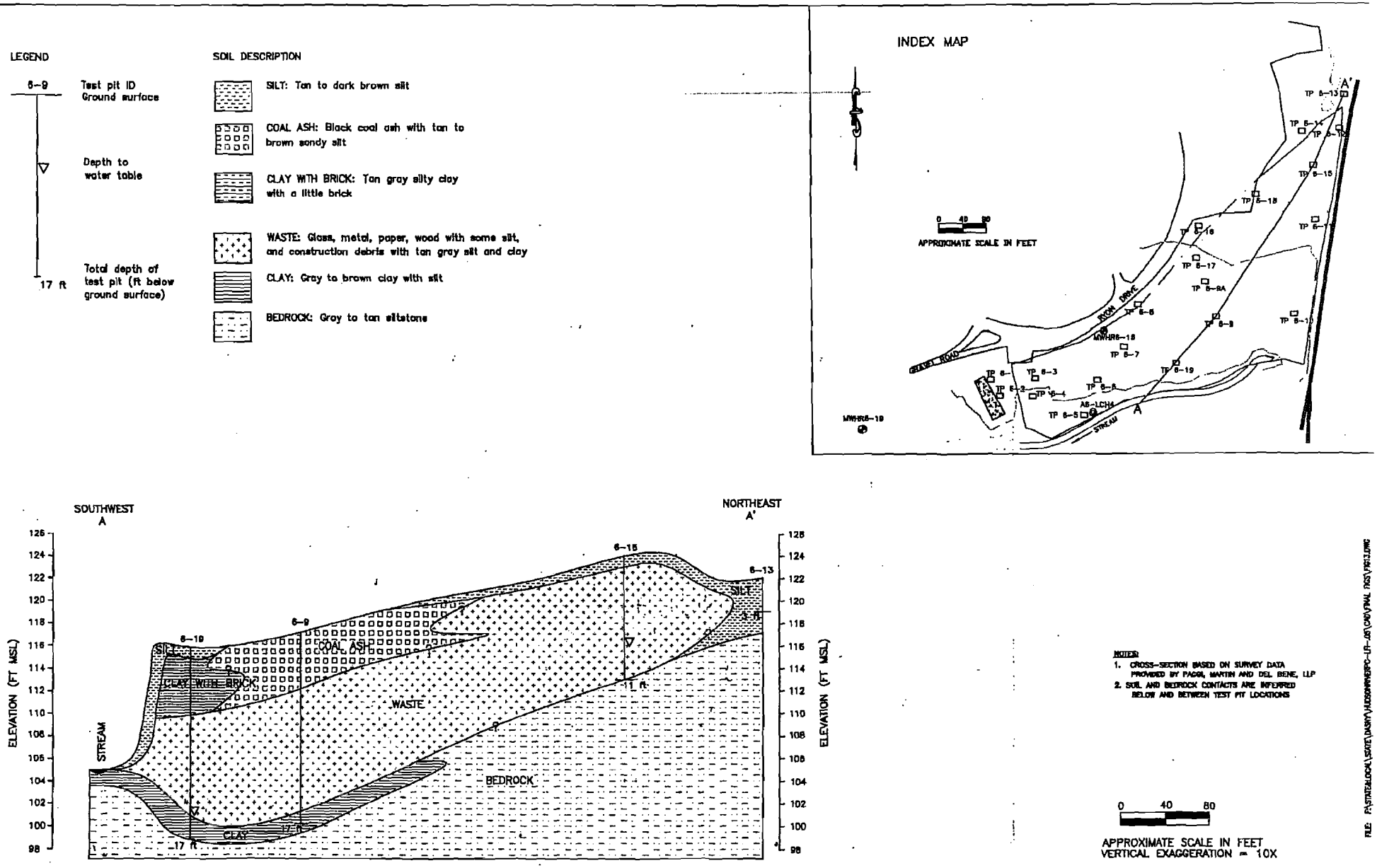
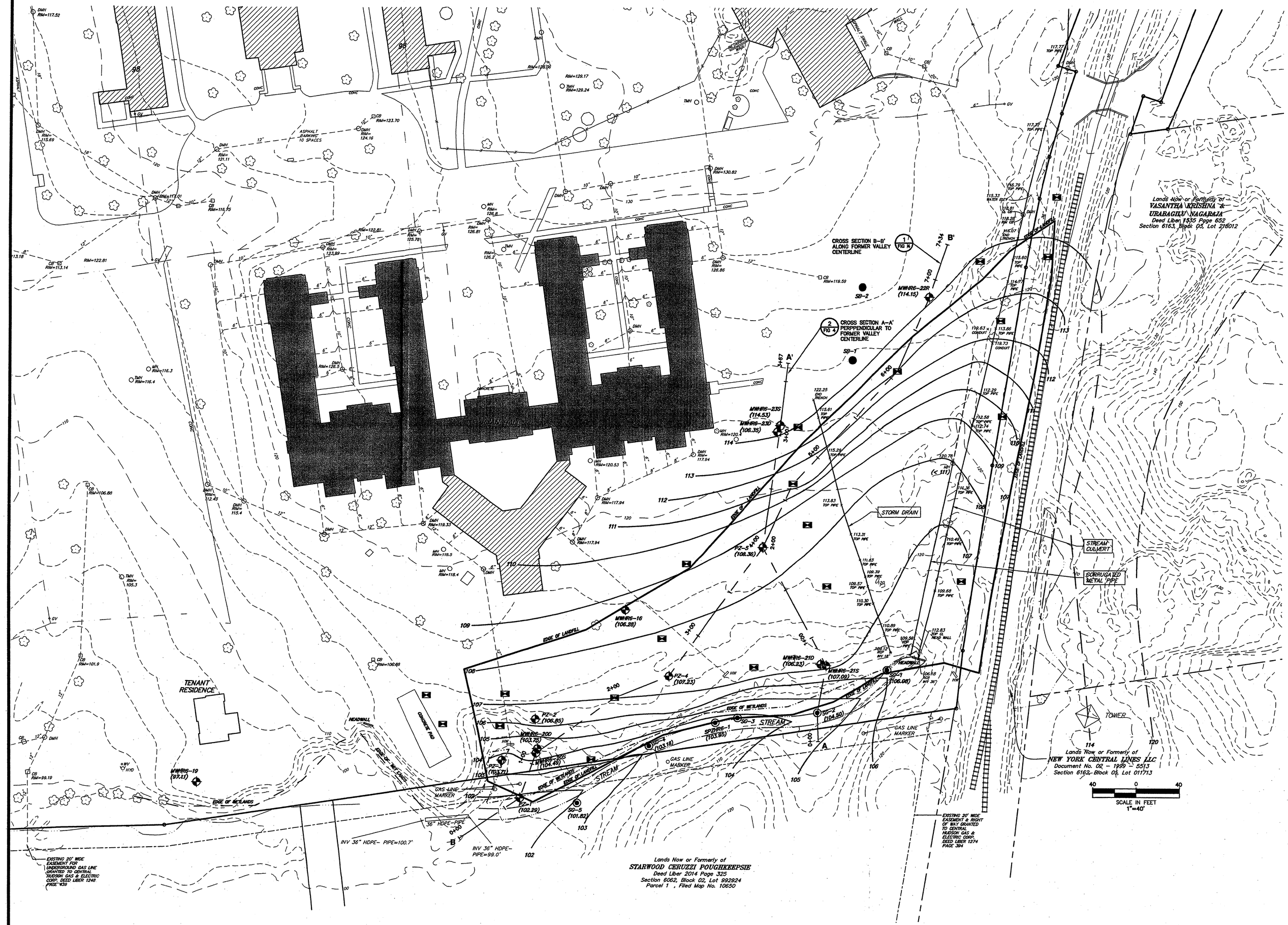


Figure 3 – From EA (2002)



1 / FIG 3 **PLAN**
POTENTIOMETRIC SURFACE MAP
SCALE: HORIZONTAL 1"=40'

LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- NYSDEC WETLANDS LINE
- NYSDEC 100' BUFFER LINE
- ACOE WETLANDS LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- X 108.7 EXISTING SPOT GRADE
- EXISTING RETAINING WALL
- EXISTING SWALE
- EXISTING DRAINAGE LINE
- CB EXISTING CATCH BASIN
- DMH EXISTING DRAINAGE MANHOLE
- CB EXISITING CATCH BASIN
- HW EXISTING HEADWALL
- ES EXISTING END SECTION
- EXISTING TREE LINE
- EXISTING TREE/SHRUB
- EDGE OF LANDFILL
- SB-1 SOIL BORING LOCATION
- SG-2 (101.82) STAFF GAUGE LOCATION *(WATER EL.)*
- PZ-1 (102.39) PIEZOMETER LOCATION *(WATER EL.)*
- MWRC-23D (106.35) MONITORING WELL LOCATION *(WATER EL.)*
- EA ENGINEERING TEST PIT LOCATION
- 106 WATER TABLE CONTOUR (FEET)

NOTE:

WATER ELEVATIONS CALCULATED FROM WATER LEVEL MEASUREMENTS TAKEN ON 10/23/03 (TABLE 2).

WATER TABLE CONTOURS DASHED WHERE INFERRED.

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

Dutchess County Office: 21 Fox Street, Poughkeepsie, New York 12601, Phone: (845) 454-3980
Capital District Office: 30 Gurley Avenue, Troy, New York 12182, Phone: (518) 235-8200
Orange County Office: 263 Route 17K, Newburgh, New York 12550, Phone: (845) 567-1133
North Country Office: 110 Glen Street, Glens Falls, New York 12801, Phone: (518) 812-0513

rev.	date	description

HUDSON RIVER PSYCHIATRIC CENTER–LANDFILL AREA 6 CLOSURE INVESTIGATION

POTENTIOMETRIC SURFACE MAP

TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn	checked
DWP	
date	scale
10/14/03	1"=40'
project no.	
40307	
sheet no.	
Figure 4	

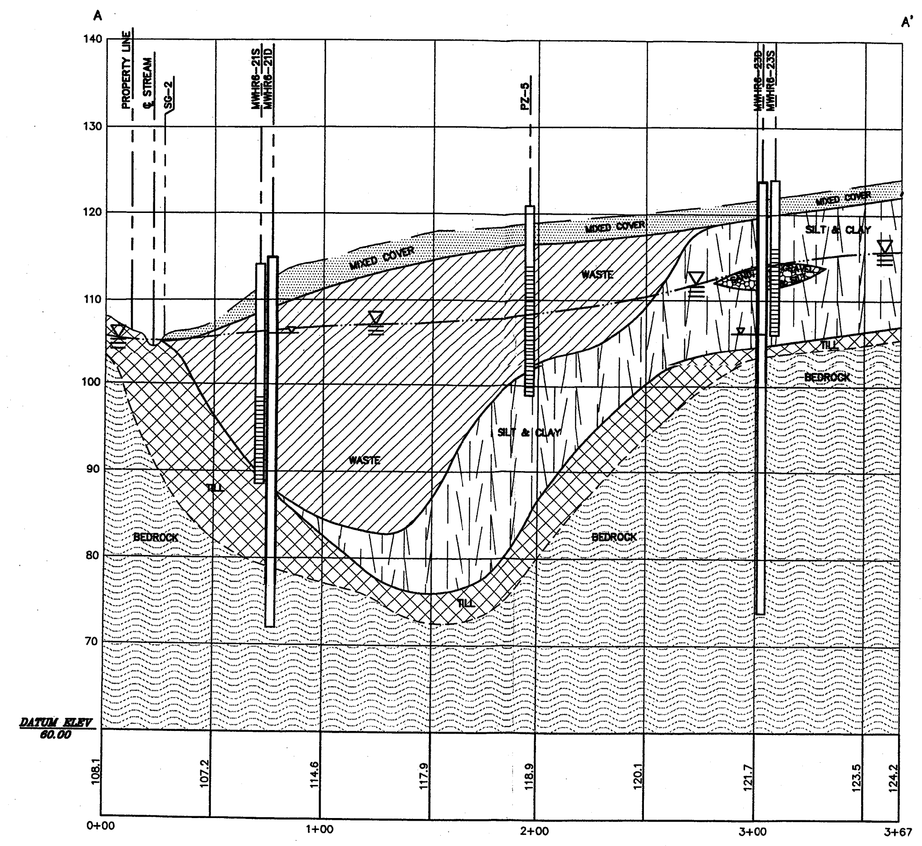
Drawing Name: X:\40300-40400\40307.00 (HRPC-Hydrogeo)\LDWG\DWG\Figures\Figure 3 -LANDFILL Area 6.dwg
Xref's Attached: BASE Landfill, BBASE Hatch, X-PROFILE LANDFILL Area 6
Date Printed: Mar 16, 2004, 11:50am

LEGEND:

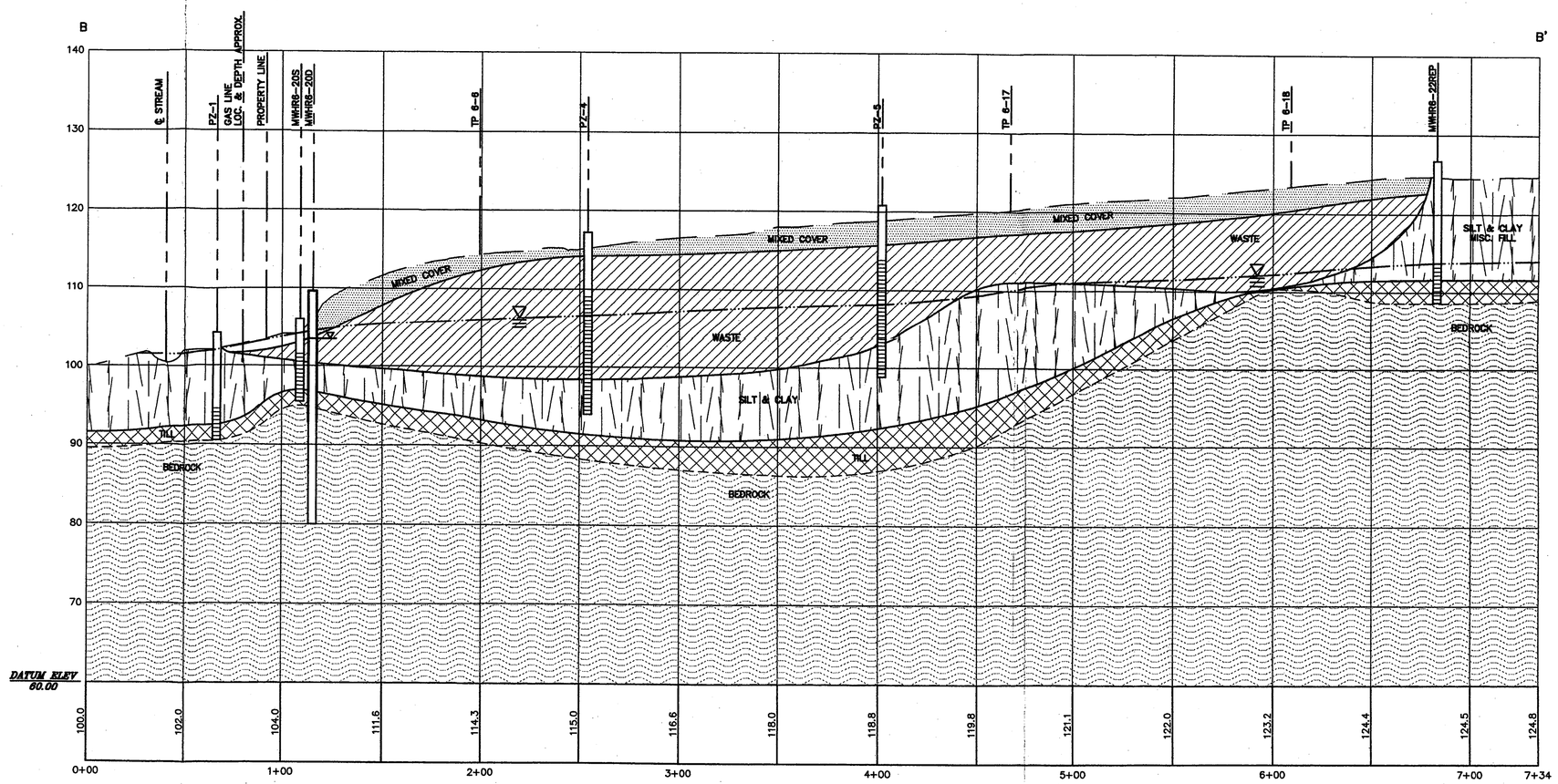
- EXISTING GROUND
- BEDROCK
- WATER TABLE
- MIXED COVER
- WASTE
- SILT & CLAY
- SAND & GRAVEL
- TILL
- BEDROCK

NOTE:

1. WELL DIMENSIONS NOT TO SCALE.
2. ALL BOUNDARIES INFERRED BASED ON FINDINGS FORM FIELD INVESTIGATION, HISTORICAL TOPOGRAPHIC MAPS , AND INFORMATION FROM "LANDFILL CLOSURE INVESTIGATION REPORT" BY EA ENGINEERING.



1 / FIG 4 **CROSS SECTION A-A' PERPENDICULAR TO FORMER VALLEY CENTERLINE**
SCALE: HORIZONTAL 1"=40'
VERTICAL 1"=10'



2 / FIG 4 **CROSS SECTION B-B' ALONG FORMER VALLEY CENTERLINE**
SCALE: HORIZONTAL 1"=40'
VERTICAL 1"=10'

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

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rev.	date	description

HUDSON RIVER PSYCHIATRIC CENTER–LANDFILL AREA 6 CLOSURE INVESTIGATION

CROSS SECTIONS

TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn	checked
DMP	
date	scale
10/14/03	AS SHOWN
project no.	
40307.00	
sheet no.	
Figure 5	

Drawing Name: X:\4\40320-40400\40307.00 (HRPC-Hydrogeo)\ENG\DWG\Figures\Figure 4 --PROFILES LANDFILL Area 6.dwg
Xref's Attached: X--PROFILE LANDFILL Area 6

Tables

Table 1 - Landfill Six
Stream Sediment/Leachate Precipitate Samples
Collected July 12, 2004

[illegible]	Unit	[illegible] for Screening Contaminated Sediments (moderate impact)	Technical Guidance for Screening Contaminated Sediments ([illegible] impact)	[illegible] background	recommended TAGM [illegible]	[illegible] background Leachate Floc in stream bed	[illegible] Leachate floc in stream bed	[illegible] soil on floodplain	[illegible] Leachate in stream [illegible]	[illegible] sediment
						All lab results reported in mg/kg				
aluminum	ppm	NS	NS	33,000	background	50.0	22.8	3,840	1,100	7,630
iron	ppm	20,000	40,000	2,000 - 550,000	2,000 or background	2,180	2,050	42,900	9,790	26,100
manganese	ppm	460	1100	50-5,000	background	16.6	9.62	391	121	426
silica	NS	NS	NS	NS	NS	na	na	na	na	na
mercury	ppm	0.15	1.3	0.001 - 0.2	0.1	nd	nd	0.17	nd	0.11
arsenic	ppm	6	33	3.0 - 12	7.5 or background	0.342	0.275	9.57	1.6	6.95
lead	ppm	31	110	200-500*	background	0.337	0.194	41.5	19.6	24.6
TOC	NS	NS	NS	NS	NS	940	nd	30000	3300	8700

* background values for suburban/metropolitan areas
NS No Standard

The Chazen Companies
July 21, 2004

Table 2 - Groundwater Quality Data

Hudson River Psychiatric Center, Landfill Area 6

		General Location	UPGRADIENT FROM LANDFILL						OFF-SITE	
		Client Sample ID	MWHR6-16	MWHR6-16	MWHR6-22R	MWHR6-22	MWHR6-23S	MWHR6-23D	MWHR6-19	MWHR6-19
		Lab	York	CHEMTECH	York	CHEMTECH	York	York	York	CHEMTECH
		Lab Sample ID	03070846-08	L8330ASP-021850	03070846-03	P2144-06	03070846-04	03070846-05	03070846-07	L8330ASP-021848
		Date Sampled	7/29/2003	5/11/2000	7/29/2003	4/10/2002	7/29/2003	7/29/2003	7/29/2003	5/11/2000
		NYCRR Part 360 List	Routine	Baseline	Baseline	Baseline	Baseline	Baseline	Routine	Baseline
		Sampled By	TCC	EA ENGINEERING	TCC	ENGINEERING	TCC	TCC	TCC	EA ENGINEERING
PARAMETERS	STANDARDS	UNIT	Results	Results	Results	Results	Results	Results	Results	Results
FIELD PARAMETERS										
Temperature	ns	degrees celcius	14.6	14.0	16.7	14.54	18.2	16.0	14.6	12.72
CONDUCTIVITY	ns	umhos/cm	na	0.785	na	4.38	na	na	na	2.8
pH	ns	units	7.53	7.08	7.12	6.54	7.09	7.86	7.53	7.05
TURBIDITY (visual)	ns		clear	0	clear	163	clear	clear	clear	20.0
LEACHATE INDICATORS										
TOTAL KJELDAHL NITROGEN	ns	mg/L		nd@1.0	3	4	1	1		nd@1.0
AMMONIA	2,000	ug/L	nd@50	nd@200	710	800	nd@50	nd@50	nd@50	440
NITRATE	10,000	ug/L	nd@50	nd@50	nd@50	nd@50	240	nd@50	370	nd@50
C.O.D	ns	ug/L	24,000		134,000	500	39,000	110,000	39,000	
B.O.D. (5-DAY)	ns	mg/L			8.0	3	1.0	1.0		
TOTAL ORGANIC CARBON	ns	mg/L	1.9	2.9	4.1	2.1	nd@1.0	1.4	1.2	2.4
TOTAL DISSOLVED SOLIDS	ns	mg/L	500	330	2,864	3,400	707	636	1,916	1,100
TURBIDITY (analytical)	ns	NTU	na		116.00		0.34	2.30	na	
SULFATE	250,000	ug/L	65,400	34,000	49,100	39,000	75,800	97,900	62,500	45,000
ALKALINITY AS CaCO3	ns	mg/L		250		400				350
ALKALINITY-TOTAL [2]		mg/l	280						188	
PHENOLS, TOTAL	1	ug/L	nd@50	24	nd@50	nd@2.5	nd@50	nd@50	nd@50	nd
CHLORIDE	250,000	ug/L	67,400	43,000	1,310,000	1,400,000	224,000	160,000	446,000	660,000
BROMIDE	2,000	ug/L	nd@200	nd@1.0	300	nd@1	nd@200	nd@200	360	nd@1.0
HARDNESS, TOTAL	ns	mg/L CaCO3	305	280	771	880	301	313	690	890
COLOR	ns	Pt-Co units		10	300	66	1	5		25
BORON	1,000	ug/L				18				
INORGANIC PARAMETERS										
ALUMINUM	100	ug/L		181	56	nd@7.3	18	30		244
ANTIMONY	2	ug/L		nd@24.3	nd@8	nd@4.7	nd@8	nd@8		nd@24.3
ARSENIC	25	ug/L		5	nd@10	nd@2.8	nd@10	nd@10		7.0
BARIUM	ns	ug/L		56	189	144	36	216		762
BERYLLIUM	3**	ug/L		1	nd@1	nd@0.10	nd@1	nd@1		nd@1.0
CADMIUM	5	ug/L	nd@5	1	nd@3	nd@0.40	nd@3	nd@3	nd@5	1
CALCIUM	ns	ug/L	105,000	97,200	250,000	283,000	95,500	97,400	208,000	273,000
CHROMIUM	5	ug/L		3	6	nd@0.60	nd@5	nd@5		nd
CHROMIUM, HEXAVALENT	5	ug/L		nd	nd@10	nd@10	nd@10	nd@10		nd
COBALT	5	ug/L		3	nd@5	8	nd@5	nd@5		11
COPPER	200	ug/L		nd	nd@6	3	nd@6	nd@6		nd
CYANIDE, TOTAL	200	ug/L			nd@10	nd@10	nd@10	nd@10		
IRON	300	ug/L	12	197	14,000	4,850	nd@5	143	nd@5	1,400
LEAD	25	ug/L	nd@5	4.0	5	nd@2.1	nd@3	nd@3	nd@5	1
MAGNESIUM	35000**	ug/L	10,600	9,540	35,600	43,100	15,300	17,100	41,400	49,000
MANGANESE	300	ug/L	81	579	6,410	6,270	135	227	nd@5	407
MERCURY	1	ug/L		0.10	nd@0.2	nd@0.20	nd@0.2	nd@0.2		nd@0.10
NICKEL	100	ug/L		7	nd@9	nd@1.8	nd@9	nd@9		4

Table 2 - Groundwater Quality Data

Hudson River Psychiatric Center, Landfill Area 6

		General Location	UPGRADIENT FROM LANDFILL						OFF-SITE	
		Client Sample ID	MWHR6-16	MWHR6-16	MWHR6-22R	MWHR6-22	MWHR6-23S	MWHR6-23D	MWHR6-19	MWHR6-19
		Lab	York	CHEMTECH	York	CHEMTECH	York	York	York	CHEMTECH
		Lab Sample ID	03070846-08	L8330ASP-021850	03070846-03	P2144-06	03070846-04	03070846-05	03070846-07	L8330ASP-021848
		Date Sampled	7/29/2003	5/11/2000	7/29/2003	4/10/2002	7/29/2003	7/29/2003	7/29/2003	5/11/2000
		NYCRR Part 360 List	Routine	Baseline	Baseline	Baseline	Baseline	Baseline	Routine	Baseline
		Sampled By	TCC	EA ENGINEERING	TCC	ENGINEERING	TCC	TCC	TCC	EA ENGINEERING
PARAMETERS	STANDARDS	UNIT	Results	Results	Results	Results	Results	Results	Results	Results
POTASSIUM	ns	ug/L	**10,400**	**835**	**91,100**	**8,070**	**10,300**	**37,100**	**18,600**	**2**
SELENIUM	10	ug/L		**1**	nd@10	nd@3.0	nd@10	nd@10		**4**
SILVER	50	ug/L		**1.1**	nd@3	nd@1.0	nd@3	nd@3		nd@1.1
SODIUM	20,000	ug/L	**20,400**	**15,300**	**59,300**	**543,000**	**50,500**	**35,800**	**56,600**	**115,000**
THALLIUM	0.5	ug/L		nd	nd@10	**5**	nd@10	nd@10		nd
VANADIUM	ns	ug/L		nd@10	nd@5	**0.70**	nd@5	nd@5		nd
ZINC	2000**	ug/L		**30.0**	**21**	**41.0**	**13**	**12**		**24**
ORGANIC PARAMETERS										
1,1,1,2-TETRACHLOROETHANE	*	ug/L		nd@10		nd@1.5				nd@10
1,1,1-TRICHLOROETHANE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
1,1,2,2-TETRACHLOROETHANE	*	ug/L		nd@10	nd@1	nd@2.2	nd@1	nd@1		nd@10
1,1,2-TRICHLOROETHANE	1	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
1,1-DICHLOROETHANE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
1,1-DICHLOROETHYLENE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
1,1-DICHLOROPROPYLENE	*	ug/L			nd@1		nd@1	nd@1		
1,2,3-TRICHLOROBENZENE	*	ug/L			nd@1	nd@1.6	nd@1	nd@1		
1,2,3-TRICHLOROPROPANE	nd	ug/L		nd@10	nd@1	nd@2.2	nd@1	nd@1		nd@10
1,2,3-TRIMETHYLBENZENE	*	ug/L			nd@1		nd@1	nd@1		
1,2,4-TRICHLOROBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
1,2,4-TRIMETHYLBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
1,2-DIBROMO-3-CHLOROPROPANE	nd	ug/L		nd@10	nd@1	nd@2.1	nd@1	nd@1		nd@10
1,2-DIBROMO-3-CHLOROPROPANE	nd	ug/L		nd@10		nd@2.1				nd@10
1,2-DIBROMOETHANE	ns	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
1,2-DICHLOROBENZENE	3	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
1,2-DICHLOROETHANE	1	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
1,2-DICHLOROETHYLENE (TOTAL)	*	ug/L			nd@1		nd@1	nd@1		
1,2-DICHLOROPROPANE	1	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
1,3,5-TRIMETHYLBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
1,3-DICHLOROBENZENE	3	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
1,3-DICHLOROPROPANE	*	ug/L			nd@1		nd@1	nd@1		
1,4-DICHLOROBENZENE	3	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
1-CHLOROHEXANE	ns	ug/L			nd@1		nd@1	nd@1		
2,2-DICHLOROPROPANE	*	ug/L			nd@1		nd@1	nd@1		
2-BUTANONE	ns	ug/L		nd@10						nd@10
2-CHLOROETHYL VINYL ETHER	ns	ug/L				nd@9.6				
2-CHLOROTOLUENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
2-HEXANONE	50	ug/L		nd@10		nd@12				nd@10
4-CHLOROTOLUENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
4-METHYL-2-PENTANONE	ns	ug/L		nd@10						nd@10
ACETONE	50	ug/L		nd@10		nd				nd@10
ACROLEIN	*	ug/L				nd@43				
ACRYLONITRILE	ns	ug/L		nd@50		nd@7.5				nd@50

Table 2 - Groundwater Quality Data

Hudson River Psychiatric Center, Landfill Area 6

		General Location	UPGRADIENT FROM LANDFILL						OFF-SITE	
		Client Sample ID	MWHR6-18	MWHR6-16	MWHR6-22R	MWHR6-22	MWHR6-23S	MWHR6-23D	MWHR6-19	MWHR6-18
		Lab	York	CHEMTECH	York	CHEMTECH	York	York	York	CHEMTECH
		Lab Sample ID	03070846-09	LB330ASP-021850	03070846-03	P2144-06	03070846-04	03070846-05	03070846-07	LB330ASP-021848
		Date Sampled	7/29/2003	5/11/2000	7/29/2003	4/10/2002	7/29/2003	7/29/2003	7/29/2003	5/11/2000
		NYCRR Part 360 List	Routine	Baseline	Baseline	Baseline	Baseline	Baseline	Routine	Baseline
		Sampled By	TCC	EA ENGINEERING	TCC	ENGINEERING	TCC	TCC	TCC	EA ENGINEERING
PARAMETERS	STANDARDS	UNIT	Results	Results	Results	Results	Results	Results	Results	Results
BENZENE	1	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
BROMOBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
BROMOCHLOROMETHANE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
BROMODICHLOROMETHANE	50	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
BROMOFORM	ns	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
BROMOMETHANE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
CARBON DISULFIDE	ns	ug/L		nd@10						nd@10
CARBON TETRACHLORIDE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
CHLOROBENZENE	*	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
CHLOROETHANE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
CHLOROFORM	7	ug/L		nd@10	nd@1		1	nd@1		nd@10
CHLOROMETHANE	ns	ug/L		nd@10	nd@1	nd@1.5	nd@1	nd@1		nd@10
CIS-1,2-DICHLOROETHENE	*	ug/L		nd@10						nd@10
CIS-1,3-DICHLOROPROPYLENE	1	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
DIBROMOCHLOROMETHANE	*	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
DIBROMOMETHANE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
DICHLORODIFLUOROMETHANE	*	ug/L			nd@1		nd@1	nd@1		
ETHYLBENZENE	*	ug/L		nd@10	nd@1	nd@1.5	nd@1	nd@1		nd@10
HEXACHLOROBUTADIENE	1	ug/L			nd@1	nd@1	nd@1	nd@1		
ISOPROPLYBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
ISOPRPYLBENZENE	*	ug/L				nd@1				
METHYL tert-BUTYL ETHER (MTBE)	10	ug/L			3	2	nd@1	nd@1		
METHYLENE CHLORIDE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
NAPHTHALENE	20**	ug/L			nd@1	nd@1	nd@1	nd@1		
n-BUTYLBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
n-PROPYLBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
o-XYLENE	*	ug/L		nd@10	nd@1	nd@1.7	nd@1	nd@1		nd@10
p- & m-XYLENES	*	ug/L		nd@10	nd@1	nd@1.5	nd@1	nd@1		nd@10
p-ISOPROPYLTOLUENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
sec-BUTYLBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
STYRENE	*	ug/L		nd@10	nd@1	nd@1	nd@1	nd@1		nd@10
tert-BUTYLBENZENE	*	ug/L			nd@1	nd@1	nd@1	nd@1		
TETRACHLOROETHYLENE	*	ug/L		nd@10	nd@1	nd@1.6	nd@1	nd@1		nd@10
TOLUENE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
TRANS-1,2-DICHLOROETHENE	*	ug/L		nd@10						nd@10
TRANS-1,3-DICHLOROPROPYLENE	1	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
TRICHLOROETHYLENE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
TRICHLOROFLOUROMETHANE	*	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10
VINYL ACETATE	ns	ug/L		nd@10						nd@50
VINYL CHLORIDE	2	ug/L		nd@10	nd@1		nd@1	nd@1		nd@10

Table 2 - Groundwater Quality Data

Hudson River Psychiatric Center, Landfill Area 6

		General Location	DOWNGRADIENT FROM LANDFILL							
		Client Sample ID	MWHR6-20S	MWHR6-20S	MWHR6-20D	MWHR6-21S	MWHR6-21S	MWHR6-21D	Seep	Seep
		Lab	York	CHEMTECH	York	York	CHEMTECH	York	Chemtech	York
		Lab Sample ID	03070846-06	P2144-01	03070846-01	03070846-09	P2144-03	03070846-02	21848S	0401434-01
		Date Sampled	7/29/2003	4/10/2002	7/29/2003	7/29/2003	4/10/2002	7/29/2003	5/11/2000	1/20/2004
		NYCRR Part 360 List	Routine	Baseline	Baseline	Routine	Baseline	Baseline	Baseline	Routine
		Sampled By	TCC	EA ENGINEERING	TCC	TCC	EA ENGINEERING	TCC	EA Engineering	TCC
PARAMETERS	STANDARDS	UNIT	Results	Results	Results	Results	Results	Results	Results	Results
FIELD PARAMETERS										
Temperature	ns	degrees celcius	18.9	9.96	12.7	13.4	10.43	12.4		6.6
CONDUCTIVITY	ns	umhos/cm	na	1.50	na	na	1.24	na		580
pH	ns	units	6.81	6.48	7.59	7.14	6.55	7.64		6.94
TURBIDITY (visual)	ns		clear	na	clear	clear	8	clear		clear
LEACHATE INDICATORS										
TOTAL KJELDAHL NITROGEN	ns	mg/L		11	1		9.0	1	1	
AMMONIA	2,000	ug/L	95,000	4,200	nd@50	39,400	5,400	nd@50	390	770
NITRATE	10,000	ug/L	nd@50	nd@50	nd@50	nd@50	nd@50	90	nd @ 500	50
C.O.D	ns	ug/L	24,000	23,000	nd@10000	39,000	2,000	16,000	15,000	14
B.O.D. (5-DAY)	ns	mg/L		38	1.0		7	nd@1.0	4	
TOTAL ORGANIC CARBON	ns	mg/L	13	17	nd@1.0	6.4	5.3	1.6	4.1	2.4
TOTAL DISSOLVED SOLIDS	ns	mg/L	816	1,500	508	657	720	440	510	300
TURBIDITY (analytical)	ns	NTU	na		11.30	na		5.06		9.26
SULFATE	250,000	ug/L	14,900	52,000	66,900	60	1,500	65,500	250,000	17,800
ALKALINITY AS CaCO3	ns	mg/L		520			420		350	
ALKALINITY-TOTAL [2]		mg/l								214
PHENOLS, TOTAL	1	ug/L	nd@50	nd@2.5	nd@50	nd@50	nd@2.5	nd@50	28	nd@50
CHLORIDE	250,000	ug/L	27,400	130,000	133,000	259,000	140,000	48,800	210,000	16,200
BROMIDE	2,000	ug/L	300	nd@1	nd@200	nd@200	nd@1	nd@200	nd @ 1000	
HARDNESS, TOTAL	ns	mg/L CaCO3	639	450	304	277	360	305	1,000	217
COLOR	ns	Pt-Co units		480	50		420	20	5	
BORON	1,000	ug/L		18			60			
INORGANIC PARAMETERS										
ALUMINUM	100	ug/L		nd@7.3	40		67	24	1,740	
ANTIMONY	2	ug/L		nd@4.7	nd@8		nd@4.7	nd@8		
ARSENIC	25	ug/L		nd@2.8	nd@10		nd@2.8	nd@10	13	
BARIUM	ns	ug/L		163	166		393	26	482	
BERYLLIUM	3**	ug/L		nd@0.10	nd@1		nd@0.10	nd@1		
CADMIUM	5	ug/L	nd@5	nd@0.40	nd@3	nd@5	nd@0.40	nd@3	nd @ 1.3	nd@5
CALCIUM	ns	ug/L	205,000	139,000	99,100	86,100	113,000	105,000	110,000	73,900
CHROMIUM	5	ug/L		nd@0.60	nd@5		1	nd@5	nd @1.3	
CHROMIUM, HEXAVALENT	5	ug/L		nd@10	nd@10		nd@10	nd@10	nd @ 0.01	
COBALT	5	ug/L		5	nd@5		0.60	nd@5	5	
COPPER	200	ug/L		nd@0.90	nd@6		3	nd@6	20	
CYANIDE, TOTAL	200	ug/L		nd@10	nd@10		nd@10	nd@10	nd @ 10	
IRON	300	ug/L	40,300	18,900	1,500	32,600	58,700	664	178,000	6,880
LEAD	25	ug/L	nd@5	3.0	nd@3	nd@5	nd@2.1	nd@3	35	nd@5
MAGNESIUM	35000**	ug/L	30,900	26,000	13,600	15,000	19,200	10,300	14,700	7,840
MANGANESE	300	ug/L	10,500	3,230	445	12,000	1,250	114	4,310	634
MERCURY	1	ug/L		nd@0.20	nd@0.2		nd@0.20	nd@0.2		
NICKEL	100	ug/L		9	nd@9		nd@1.8	nd@9	nd @ 1	

Table 2 - Groundwater Quality Data

Hudson River Psychiatric Center, Landfill Area 6

		General Location	DOWNGRADIENT FROM LANDFILL							
		Client Sample ID	MWHR6-20S	MWHR6-20S	MWHR6-20D	MWHR6-21S	MWHR6-21S	MWHR6-21D	Seep	Seep
		Lab	York	CHEMTECH	York	York	CHEMTECH	York	Chemtech	York
		Lab Sample ID	03070846-06	P2144-01	03070846-01	03070846-09	P2144-03	03070846-02	21849S	0401434-01
		Date Sampled	7/29/2003	4/10/2002	7/29/2003	7/29/2003	4/10/2002	7/29/2003	5/11/2000	1/20/2004
		NYCRR Part 360 List	Routine	Baseline	Baseline	Routine	Baseline	Baseline	Baseline	Routine
		Sampled By	TCC	EA ENGINEERING	TCC	TCC	EA ENGINEERING	TCC	EA Engineering	TCC
PARAMETERS	STANDARDS	UNIT	Results	Results	Results	Results	Results	Results	Results	Results
POTASSIUM	ns	ug/L	**26,300**	**12,600**	**10,800**	**83,300**	**4,340**	**93,600**	**3,610**	**1,540**
SELENIUM	10	ug/L		nd@3.0	nd@10		nd@3.0	nd@10	**9**	
SILVER	50	ug/L		nd@1.0	nd@3		nd@1.0	nd@3		
SODIUM	20,000	ug/L	**22,800**	**90,600**	**28,800**	**85,400**	**65,000**	**17,400**	**106,000**	**7,540**
THALLIUM	0.5	ug/L		**nd@5.4**	nd@10		**5**	nd@10	**26**	
VANADIUM	ns	ug/L		**nd@0.70**	nd@5		**0.70**	nd@5	**15**	
ZINC	2000**	ug/L		**54**	**18**		**40**	**14**	**96**	
ORGANIC PARAMETERS										
1,1,1,2-TETRACHLOROETHANE	*	ug/L		nd@1.5			nd@1.5		nd @ 10	
1,1,1-TRICHLOROETHANE	*	ug/L		nd@1.5	nd@1		nd@1.5	nd@1		
1,1,2,2-TETRACHLOROETHANE	*	ug/L		nd@1.5	nd@1		nd@2.2	nd@1	nd @ 10	
1,1,2-TRICHLOROETHANE	1	ug/L		nd@1.1	nd@1		nd@1.1	nd@1		
1,1-DICHLOROETHANE	*	ug/L		nd@1	nd@1		nd@1	nd@1		
1,1-DICHLOROETHYLENE	*	ug/L		nd@1.6	nd@1		nd@1.6	nd@1		
1,1-DICHLOROPROPYLENE	*	ug/L		nd@1.3	nd@1		nd@1.3	nd@1		
1,2,3-TRICHLOROBENZENE	*	ug/L		nd@1.6	nd@1		nd@1.6	nd@1		
1,2,3-TRICHLOROPROPANE	nd	ug/L		nd@2.2	nd@1		nd@2.2	nd@1	nd @ 10	
1,2,3-TRIMETHYLBENZENE	*	ug/L			nd@1		nd@1	nd@1		
1,2,4-TRICHLOROBENZENE	*	ug/L		nd@1	nd@1		nd@1	nd@1		
1,2,4-TRIMETHYLBENZENE	*	ug/L		nd@1	nd@1		nd@1	nd@1		
1,2-DIBROMO-3-CHLOROPROPANE	nd	ug/L		nd@2.1	nd@1		nd@2.1	nd@1		
1,2-DIBROMO-3-CHLOROPROPANE	nd	ug/L		nd@2.1			nd@2.1		nd @ 10	
1,2-DIBROMOETHANE	ns	ug/L		nd@1	nd@1		nd@1	nd@1		
1,2-DICHLOROBENZENE	3	ug/L		nd@1	nd@1		nd@1	nd@1	nd @ 10	
1,2-DICHLOROETHANE	1	ug/L		nd@2.5	nd@1		nd@2.5	nd@1		
1,2-DICHLOROETHYLENE (TOTAL)	*	ug/L			nd@1			nd@1		
1,2-DICHLOROPROPANE	1	ug/L		nd@3.6	nd@1		nd@3.6	nd@1		
1,3,5-TRIMETHYLBENZENE	*	ug/L		nd@1	nd@1		nd@1	nd@1		
1,3-DICHLOROBENZENE	3	ug/L		nd@1	nd@1		nd@1	nd@1	nd @ 10	
1,3-DICHLOROPROPANE	*	ug/L		nd@1	nd@1		nd@1	nd@1		
1,4-DICHLOROBENZENE	3	ug/L		nd@1	nd@1		nd@1	nd@1	nd @ 10	
1-CHLOROHEXANE	ns	ug/L			nd@1			nd@1		
2,2-DICHLOROPROPANE	*	ug/L		nd@1.1	nd@1		nd@1.1	nd@1		
2-BUTANONE	ns	ug/L					nd@5.6			
2-CHLOROETHYL VINYL ETHER	ns	ug/L		nd@9.6			nd@9.6			
2-CHLOROTOLUENE	*	ug/L		nd@1	nd@1		nd@1	nd@1		
2-HEXANONE	50	ug/L		nd@12			nd@12			
4-CHLOROTOLUENE	*	ug/L		nd@1	nd@1		nd@1	nd@1		
4-METHYL-2-PENTANONE	ns	ug/L					nd@3			
ACETONE	50	ug/L		**13**			nd@5.8			
ACROLEIN	*	ug/L		nd@43			nd@43			
ACRYLONITRILE	ns	ug/L		nd@7.5			nd@7.5		nd @ 50	

Table 2 - Groundwater Quality Data

Hudson River Psychiatric Center, Landfill Area 6

NOTES

[1]The standard for the sum of the CIS- and TRANS- isomers is 0.4 ug/L

[2]Reported "as CaCO3" for Chemtech data

* The principal organic contaminant standard for groundwater of 5 ug/L applies to this substance.

** The given number is a guidance value. No standard has been established.

A blank in the table indicates that the sample was not tested for that analyte.

Entries of the form "nd@" indicate that the analyte was not detected above the minimum detection level. The minimum detection level is given by the number following the ampersand.

Entries of "nd" indicate that the analyte was not detected above the minimum detection level, but the minimum detection level was not specified by the laboratory.

Values reported in the "HARDNESS, TOTAL" line were identified as "Hardness as CaCO3" (measured in mg/L) in the ChemTech reports and as "Total Hardness" (measured in mg /L CaCO3) in the York report.

Values reported in the "AMMONIA" line were identified as "Nitrogen, Ammonia" in the ChemTech reports and as "Ammonia" in the York report.

Chemtech reports included wells numbered MW4R6-19 and MW4R6-22. These are assumed in this report to be misreadings from the chain of custody of "MWHR6-19" and "MWHR6-22", and have been changed.

Due to the installation of couplets and the reinstallation of one well, the following changes were made in designations of pre-esting wells:

MWHR6-20 was renamed **MWHR6-20S**
MWHR6-21 was renamed **MWHR6-21S**
MWHR6-22 was replaced and renamed **MWHR6-22RP**

Table 3 - Landfill Monitoring Data
Landfill Six

SUMMARY OF LANDFILL GAS MONITORING AT AREA 6

Identification Number	Depth to Bottom (ft)	Percent Lower Explosive Limit	Percent Carbon Dioxide	Percent Methane	Percent Oxygen	Total Volatile Hydrocarbons (ppm_v)[(a)]	Distance Between Probes (ft)
A6G-01	3	0.0	0.0	0.0	20.6	0.0	---
A6G-02	3	0.0	0.0	0.0	20.7	1.5	95
A6G-03	3	0.0	2.4	0.0	15.6	4.3	95
A6G-04	3	0.0	0.0	0.0	20.6	1.2	95
A6G-05	3	0.0	0.0	0.0	20.6	0.0	95
A6G-06	3	404.0	8.4	22.2	1.9	0.0	95
A6G-07	3	336.0	9.1	21.8	3.2	0.0	95
A6G-08	3	0.0	0.0	0.0	20.2	0.0	83
A6G-09	3	0.0	0.1	0.0	20.1	0.0	54
A6G-10	3	0.0	1.2	0.0	18.8	0.0	95
A6G-11	3	0.0	0.0	0.0	20.5	0.0	95
A6G-12	3	0.0	0.4	0.0	19.9	0.0	95
A6G-13	3	0.0	0.2	0.0	20.2	0.0	95
A6G-14	3	0.0	0.1	0.0	20.1	0.0	55
A6G-15	3	0.0	0.0	0.0	20.2	0.0	52
A6G-16	3	0.0	0.2	0.0	19.7	0.0	69
A6G-17	3	0.0	0.5	0.0	19.7	0.0	94
A6G-18	3	0.0	0.0	0.0	20.5	0.0	91
A6G-19	3	0.0	2.9	0.0	18.3	0.0	81
A6G-20	3	4.0	0.3	0.2	19.8	0.0	80
A6G-21	3	0.0	0.0	0.0	20.2	0.0	44
A6G-22	3	0.0	2.7	0.0	17.3	0.0	51

(a) Based on measurements taken with photoionization detector. Photoionization detector measurements considered a conservative approximation of total volatile hydrocarbon concentrations at sample location due to instrument response limitations.

NOTE: Dashes (---) indicate initial probe location.

Sampling date: 6/21/00
Source: EA, 2001, Landfill Characterization Investigation Report, Areas 1, 2, 3, 5, 6, 7 and 8.

Table 4 - Landfill Six
Surface Water Samples
Collected July 12, 2004

	# NYCRR Part 366 Parameter List		7/12/2004 Baseline	7/12/2004 Baseline
PARAMETERS	NYSDEC TOGS 1.1.1 Class D Surface Water Standard *	UNIT	SW-1 (upstream)	SW-2 (downstream)
CONDUCTIVITY	ns	umhos/cm	730	710
CONDUCTIVITY (laboratory)	ns	umhos/cm	952	825
pH	ns	units	8.0	7.7
pH (laboratory)	ns	units	7.88	7.60
TURBIDITY (visual)	ns	none	clear	clear
TURBIDITY (laboratory)	ns	NTU	1.88	5.20
TOTAL KJELDAHL NITROGEN	ns	mg/L	0.49	0.39
AMMONIA	**	ug/L	80	120
NITRATE	10,000	ug/L	1,100	950
C.O.D	ns	mg/L	nd	nd
B.O.D. (5-DAY)	ns	mg/L	9	7
TOTAL ORGANIC CARBON	ns	mg/L	1.7	1.7
TOTAL DISSOLVED SOLIDS	ns	mg/L	588	543
SULFATE	250,000	ug/L	31,100	31,800
ALKALINITY-TOTAL	ns	mg/l	234	240
PHENOLS, TOTAL	1	ug/L	nd	nd
CHLORIDE	250,000	ug/L	131,000	112,000
BROMIDE	2,000	ug/L	nd	nd
HARDNESS, TOTAL	ns	mg/L CaCO3	259	266
COLOR	ns	Pt-Co units	10	20
ALUMINUM	100	ug/L	**109**	50
ANTIMONY		ug/L	nd	**nd**
ARSENIC		ug/L	nd	nd
BARIUM	1,000	ug/L	56	50
BERYLLIUM		ug/L	nd	nd
CADMIUM		ug/L	nd	nd
CALCIUM	ns	ug/L	86,600	88,900
CHROMIUM		ug/L	nd	nd
CHROMIUM, HEXAVALENT		ug/L	nd	nd
COBALT		ug/L	nd	nd
COPPER		ug/L	nd	nd
CYANIDE, TOTAL		ug/L	nd	nd
IRON	300	ug/L	**315**	**837**
LEAD		ug/L	nd	nd
MAGNESIUM	35,000	ug/L	10,400	10,700
MANGANESE	300	ug/L	123	179
MERCURY		ug/L	nd	nd
NICKEL		ug/L	nd	nd
POTASSIUM	ns	ug/L	3,210	2,740
SELENIUM		ug/L	nd	nd
SILVER		ug/L	nd	nd
SODIUM	20,000	ug/L	**105,000**	**81,600**
THALLIUM		ug/L	nd	nd
VANADIUM		ug/L	nd	nd
ZINC	262-268***	ug/L	9	7
1,1,1,2-TETRACHLOROETHANE		ug/L	nd	nd
1,1,1-TRICHLOROETHANE		ug/L	nd	nd
1,1,2,2-TETRACHLOROETHANE		ug/L	nd	nd
1,1,2-TRICHLOROETHANE		ug/L	nd	nd
1,1-DICHLOROETHANE		ug/L	nd	nd
1,1-DICHLOROETHYLENE		ug/L	nd	nd
1,1-DICHLOROPROPYLENE		ug/L	nd	nd
1,2,3-TRICHLOROBENZENE		ug/L	nd	nd
1,2,3-TRICHLOROPROPANE		ug/L	nd	nd
1,2,3-TRIMETHYLBENZENE		ug/L	nd	nd
1,2,4-TRICHLOROBENZENE		ug/L	nd	nd
1,2,4-TRIMETHYLBENZENE		ug/L	nd	nd
1,2-DIBROMO-3-CHLOROPROPANE		ug/L	nd	nd
1,2-DIBROMOETHANE		ug/L	nd	nd
1,2-DICHLOROBENZENE		ug/L	nd	nd
1,2-DICHLOROETHANE		ug/L	nd	nd
1,2-DICHLOROETHYLENE (TOTAL)		ug/L	nd	nd

Table 4 - Landfill Six
Surface Water Samples
Collected July 12, 2004

			7/12/2004 Baseline	7/12/2004 Baseline
	6 NYCRR Part 360 Parameter List			
PARAMETERS	NYSDEC TOGS 1.1.1 Class D Surface Water Standard *	UNIT	SW-1 (upstream)	SW-2 (downstream)
1,2-DICHLOROPROPANE		ug/L	nd	nd
1,3,5-TRIMETHYLBENZENE		ug/L	nd	nd
1,3-DICHLOROBENZENE		ug/L	nd	nd
1,3-DICHLOROPROPANE		ug/L	nd	nd
1,4-DICHLOROBENZENE		ug/L	nd	nd
1-CHLOROHEXANE		ug/L	nd	nd
2,2-DICHLOROPROPANE		ug/L	nd	nd
2-BUTANONE		ug/L	nd	nd
2-CHLOROETHYL VINYL ETHER		ug/L	nd	nd
2-CHLOROTOLUENE		ug/L	nd	nd
2-HEXANONE		ug/L	nd	nd
4-CHLOROTOLUENE		ug/L	nd	nd
4-METHYL-2-PENTANONE		ug/L	nd	nd
ACETONE		ug/L	nd	nd
ACROLEIN		ug/L	nd	nd
ACRYLONITRILE		ug/L	nd	nd
BENZENE		ug/L	nd	nd
BROMOBENZENE		ug/L	nd	nd
BROMOCHLOROMETHANE		ug/L	nd	nd
BROMODICHLOROMETHANE		ug/L	nd	nd
BROMOFORM		ug/L	nd	nd
BROMOMETHANE		ug/L	nd	nd
CARBON DISULFIDE		ug/L	nd	nd
CARBON TETRACHLORIDE		ug/L	nd	nd
CHLOROBENZENE		ug/L	nd	nd
CHLOROETHANE		ug/L	nd	nd
CHLOROFORM		ug/L	nd	nd
CHLOROMETHANE		ug/L	nd	nd
cis-1,2-DICHLOROETHENE		ug/L	nd	nd
cis-1,3-DICHLOROPROPYLENE		ug/L	nd	nd
DIBROMOCHLOROMETHANE		ug/L	nd	nd
DIBROMOMETHANE		ug/L	nd	nd
DICHLORODIFLUOROMETHANE		ug/L	nd	nd
ETHYLBENZENE		ug/L	nd	nd
HEXACHLOROBUTADIENE		ug/L	nd	nd
ISOPROPLYBENZENE		ug/L	nd	nd
METHYL tert-BUTYL ETHER (MTBE)		ug/L	nd	nd
METHYLENE CHLORIDE		ug/L	nd	nd
NAPHTHALENE		ug/L	nd	nd
n-BUTYLBENZENE		ug/L	nd	nd
n-PROPYLBENZENE		ug/L	nd	nd
o-XYLENE		ug/L	nd	nd
p- & m-XYLENES		ug/L	nd	nd
p-ISOPROPYLTOLUENE		ug/L	nd	nd
sec-BUTYLBENZENE		ug/L	nd	nd
STYRENE		ug/L	nd	nd
tert-BUTYLBENZENE		ug/L	nd	nd
TETRACHLOROETHYLENE		ug/L	nd	nd
TOLUENE		ug/L	nd	nd
TRANS-1,2-DICHLOROETHENE		ug/L	nd	nd
TRANS-1,3-DICHLOROPROPYLENE		ug/L	nd	nd
TRICHLOROETHYLENE		ug/L	nd	nd
TRICHLOROFLOUROMETHANE		ug/L	nd	nd
VINYL ACETATE		ug/L	nd	nd
VINYL CHLORIDE		ug/L	nd	nd

"na" indicates data is not available
"ns" indicates no surface water standard is listed in NYSDEC TOGS 1.1.1
"nd" indicates the parameter was not detected above the laboratory method detection limit
* Standards listed for detected parameters. If no standard was listed for a "Class D" water in TOGS 1.1.1, then the next most stringent standard listed in TOGS 1.1.1 was used. Results which exceed the surface water standard have been shaded.
** refer to pH-temperature chart in TOGS 1.1.1; lowest reported standard is 820 ppb
*** the standard for Zinc was calculated according to the hardness equations specified in NYSDEC TOGS 1.1.1

Table 5 - Qualitative Human Health Exposure Matrix
Landfill Six Site

Contaminant Source	Contaminant Release & Transport Mechanism	Point of Exposure	Route of Exposure	Potentially Exposed Populations Under Proposed Future Use	Complete Exposure Pathway	Risk of Exposure
Solid Waste	Solid waste only exposed if exhumed or unburied.	No waste presently exposed other than small bank exposures near stream headwall	Dermal. Particulate Inhalation (dust, ash)	Informal contact by residents or visitors from larger project property.	Yes	Low (based on limited exposed waste mass and limited threat level)
Groundwater	Groundwater passes through solid waste and becomes contaminated	None. No known nearby potable wells	Dermal. Ingestion.	None	No	None (based on incomplete Exposure Pathway)
Landfill Gas	Gas migrates vertically to grade in select areas	Emissions directly over landfill.	Inhalation. Explosive Hazard.	Those walking or parking on Landfill Six.	Yes	Low (based on low putrescible waste fraction, small landfill size, limited explosive gas readings, and non-contained site)
Sediments Impacted by Leachate along the Creek	Leachate precipitates inorganic load at soil/atmosphere interface.	Surface soils immediately adjacent to stream bank (estimated 50 square feet)	Dermal	Informal contact by residents or visitors from larger project property.	Yes	Low (based on limited area of stained soils, limited exceedence of "moderate" impact threshold, and limited likelihood of dermal contact)
Stream water and Streambed Sediments	Streambottom sediments and the stream receive leachate outflows from Landfill Six	Stream and Streambed	Dermal	Informal contact by residents or visitors from larger project property.	Yes	Low (based on limited sediment exceedence of "moderate" impact threshold (arsenic), and increases only in aesthetic water quality exceedences (iron)

Table 6 – Proposed Construction Schedule

September 27, 2004
Hudson Heritage, LLC - Hudson River Psychiatric Center
Town of Poughkeepsie, NY
TCC Job #40307.00

RE: Area 6 Landfill Closure - Draft Construction & Project Schedule

ID	Task Name - Description	Duration (days)	Start	Finish
1	NYSDEC review of Final Remedial Action Work Plan	9	**9/15/04**	9/24/04
2	Remedial Action Work Plan approved	1	9/24/04	**9/25/04**
3	Develop and publish Fact Sheet	5	9/25/04	9/30/04
4	Public comment period	**30**	10/1/04	10/31/04
5	Secure access agreement for railroad right-of-way; if possible	120	10/31/04	2/28/05
6	Complete SWPPP Per NYSDEC Stormwater GP-02-01 SPDES Permit for Construction Activity	31	11/1/04	12/1/04
34	Submit NOT to Close NYSDEC Stormwater GP-02-01 SPDES Permit for Construction Activity	14	11/1/06	11/14/06
35	Demobilzation	14	11/1/06	11/14/06
36	Submit Final Engineering Landfill Closure Report (Modeled after Engineer Certification Report from Part 360)	**90**	11/15/06	2/13/07
37	NYSDEC review of Engineering Report	**45**	2/14/07	3/31/07
38	Engineering Report approved	30	4/1/07	**4/30/07**
39	Implement O&M Plan (Modeled after Post Closure OM&M Plan from Part 360).	730	5/1/07	5/1/09

Note: The above schedule includes potential delays due to interference with other on-site construction activities and inclement weather conditions.

Appendix A:
Health & Safety Plan

SITE SPECIFIC HEALTH AND SAFETY PLAN

Plan Preparation Date: July 22, 2004

Project Name: Hudson River Psych Center – Landfill Area 6

Project Number: 40307.00

Site Location: Route 9, Poughkeepsie, New York

Description of Work to be Completed: This project includes closure work at a landfill, including limited waste remobilization, general grading, and capping. The bulk of landfill wastes have been confirmed to be construction debris ash, and soil cover layers. The Chazen Companies will observe operations of a drill rig for well abandonment and various heavy vehicles used for landfill closure, such as excavators, bulldozers, bobcat and dump trucks. TCC will not operate this equipment. The role of TCC is to screen soils for contamination by odor and/or PID readings, classify soil types, advise implementation of the contingency plan if hazardous materials are identified, and collect geotechnical samples confirming landfill construction requirements.

On-site Contractors: To be determined.

Underground Utilities: Utility marking is needed. As per TCC policy, the contractor shall call in utility markouts.

Primary Hazards: Heavy equipment contact. Slip/trip/fall accidents. Adequate outdoor ventilation is expected which should minimize respiratory exposure to any airborne solid waste particulates. No VOC or chemical/dermal hazards are expected, based on prior test pitting during site investigation work.

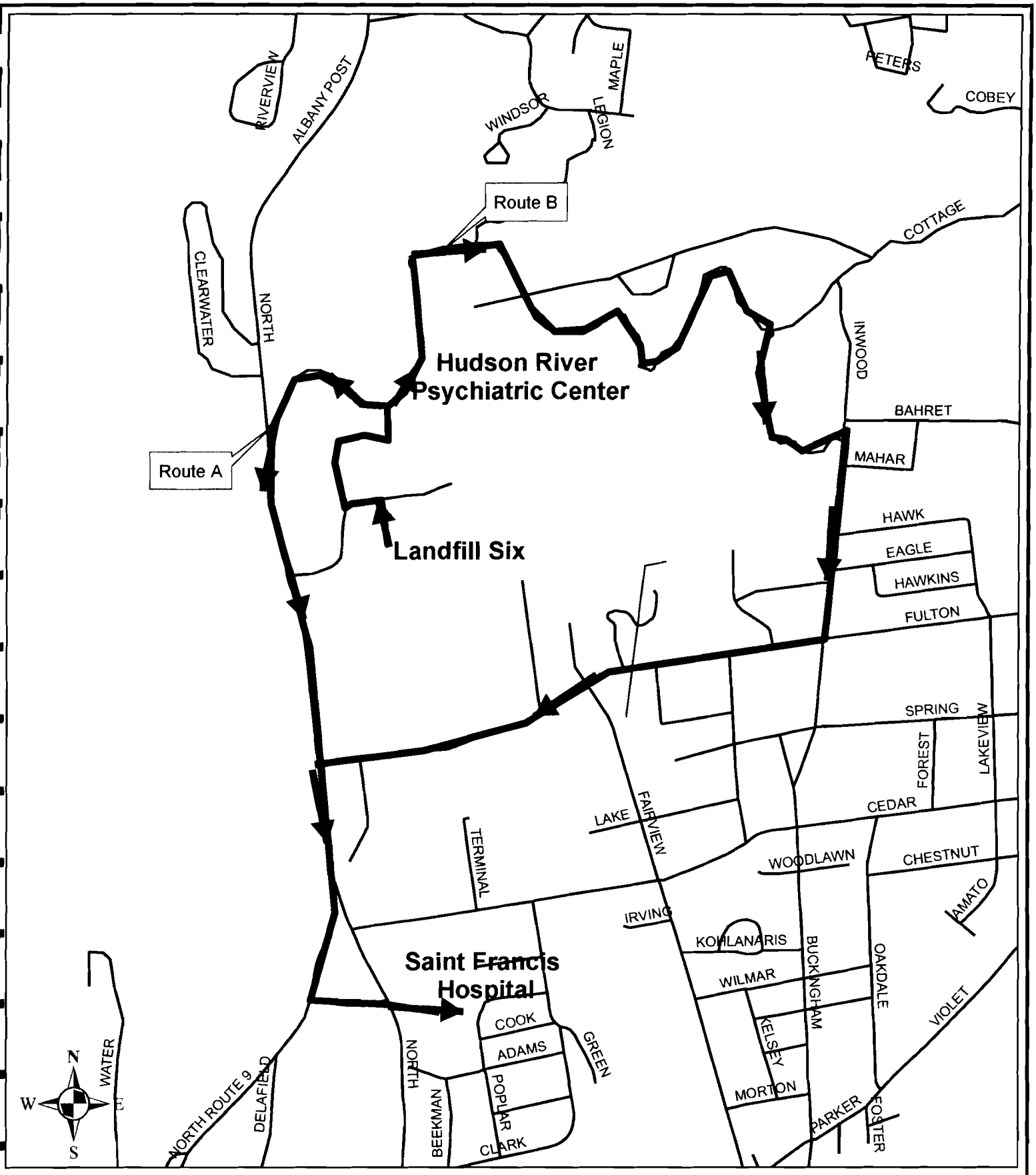
PPE Needed: Modified Level D to include street clothes, workshoes, hardhat and safety glasses when working around heavy equipment and traditional drilling rig. Safety glasses and nitrile gloves optional when collecting samples.

Health and Safety Precautions: Adequate outdoor ventilation is expected which should minimize respiratory exposure. If any signs of chemical contamination or explosive gases are encountered, such as unusual odor, surface staining, leachate, PID reading at or above 1 ppm, or visual observations of contamination, the project should be temporarily halted. The project should not resume until the substances/odors are identified, and employee safety is assessed and appropriate health and safety precautions are formulated and conveyed to the project team. An upgrade to Level C should be made if site circumstances warrant additional protection. Drilling or site waste relocation work should not commence until utilities have been clearly marked and utility locations have been conveyed to the project team. All personnel should remain at a safe distance from heavy equipment. Personnel should remain at least twenty feet from equipment during excavating and should be clearly visible by the equipment operator at all times. A distance of at least one hundred feet should be maintained when clearing any brush or trees.

EMERGENCY SERVICES:

Hospital: **St. Francis Hospital** **241 North Road** **Poughkeepsie, New York**	845-483-5000
Ambulance, Fire, Police:	911
Poison Control Center:	1-800-336-6997
National Response Center	1-800-424-8802
NYSDEC Oil & Chemical Spills *24-hour Hotline*	1-800-457-7362

Directions to St. Francis Hospital and route map are attached.



THE Chazen COMPANIES

ENGINEERS/SURVEYORS
PLANNERS
ENVIRONMENTAL SCIENTISTS

Dutchess County Office:
21 Fox St. Poughkeepsie, NY 12601
Phone: (845) 454-3980

Orange County Office:
263 Route 17K Newburgh, NY 12550

Capital District Office:
20 Gurley Avenue Troy, NY 12182

Glens Falls Office:
110 Glen Street Glens Falls, NY 12801

Hudson River Psychiatric Center
Route To Saint Francis Hospital

Poughkeepsie, Dutchess County, New York

USGS Topographic Map of the Poughkeepsie NY Quadrange. 1995
7.5 Minute Series Dutchess County Real Property Services - Tax Parcel Data

Date:
September 2004

Scale:
1 inch: 1,000 feet

Project #:
40307.00

Appendix B:
Contingency Plan

CONTINGENCY PLAN

This contingency plan has been developed to provide courses of action that should be taken in responding to events that may occur during landfill reclamation activities. This section has been written to meet the requirements of 6 NYCRR Part 360-2.18. This contingency plan supplements the site-specific Health and Safety Plan (H&SP) prepared for the site.

1.0 SITE SAFETY

1.1 Training Requirements

The site engineer or their representative at the landfill site will be required to have, at a minimum, 40-hour hazardous waste operations initial training and annual 8-hour refresher training. Personnel operating monitoring equipment will be familiar with that equipment and its use. In addition, site personnel will be familiar with the correct use of personal protective equipment. A Site Health and Safety Officer will be designated on a full-time basis during waste relocation activities and during any other period when wastes may be exhumed, such as when installing anchor trenches. The Site Health and Safety Officer will be trained in hazardous waste and emergency response operations.

1.2 Personal Protective Equipment Requirements

It is anticipated that Level D personal protective equipment will be used for all site activities. Level D will consist of the following:

- Steel-toed boots
- Hard hat when equipment is in use
- Gloves (chemically resistant gloves will be available if required)
- Disposable coveralls, if necessary

Should hazard conditions exceed the anticipated personal protective equipment requirements, operations will be suspended by the Site Safety and Health Officer until adjustments can be made to assure safety for site workers.

2.0 ON-SITE PERSONAL INJURY/EMERGENCY

If an emergency is encountered during solid waste relocation, the site workers should evacuate to a safe location upwind, if possible, from the source of the emergency if the emergency is of a hazardous material nature. The Site Safety and Health Officer should specify this location at the start of

work activities, and will determine if all personnel are present and accounted for. If emergency services are needed, they should be notified immediately. The Project Manager and Site owner will be notified as soon as possible. Directions to the nearest hospital are provided with the H&SP.

The following information will be provided when reporting and emergency:

1. Name and location of person reporting
2. Location of incident/accident
3. Name and affiliation of injured party
4. Description of injuries, fire, spill, and explosion
5. Status of medical aid and/or other emergency control efforts
6. Details of any chemical involved
7. Summary of accident, including suspected cause and time it occurred
8. Temporary control measures taken to minimize further risk

This information is not to be released under any circumstances to parties other than those listed in this section and emergency response team members.

3.0 SITE HAZARDS

The following subsections describe physical hazards that may potentially be present at the site.

3.1 Excavation Area

The Site Safety and Health Officer will observe areas where excavations will take place or are occurring. The site will be visually inspected for the presence of general safety hazards (e.g., trip/slip hazards, unstable surfaces or steep grades, sharp objects) prior to beginning work. If any hazards are present, these hazards will be recorded and precautionary measures, such as the removal of the hazards or marking potential hazards, will be taken to prevent injury.

It is not anticipated that any underground utilities will be discovered; nevertheless, no excavation activities will commence until UFPO (1-800-962-7962) has been notified of the anticipated excavation activities and underground utilities are marked out.

Heavy machinery will be required to stay a minimum of 10 ft from any aboveground utilities, such as cables, power lines, electrical lines, or electrical equipment. Personnel should be aware that although an area may be cleared, it does not mean that unanticipated hazards will not appear.

Hazards from invasive excavation include electrical hazards, explosion, and asphyxiation, as well as costly and time consuming hazards associated with damaging communication, sewer, and water lines.

During excavation activities, any utilities marked/flagged in the area of the excavation should be hand dug to prevent incidental damage from heavy equipment. If resistance is encountered and the source of resistance cannot be definitely identified, the area should be hand dug until identification of the material can be made. No one is to enter any excavation over 4 ft in depth unless proper shoring has been placed or the sidewalls are maintained with a sidewall slope of 45 degrees, in accordance with Occupational Safety and Health Administration Standards for Excavations (29 CFR 1926.650-.652).

3.2 Heavy Equipment

The use of heavy equipment (bulldozers, excavators, backhoes, etc.) may pose safety hazards to site workers. Heavy equipment work must be conducted only by trained, experienced personnel. If possible, personnel must remain outside the turning radius of large, moving equipment. At a minimum, personnel must maintain visual contact with the equipment operator. No guards, safety appliances, or other devices may be removed or made ineffective unless repairs or maintenance is required, and then only after power has been shut off and locked out. Safety devices must be replaced once repair or maintenance is complete. Exhaust from equipment must be directed so that it does not endanger workers or obstruct the view of the operator. When not operational, equipment must be set and locked so that it cannot be activated, released, dropped, etc. Site workers will be warned of the dangers when working around construction equipment and the swinging arms of any heavy machinery. Fire extinguishers will be maintained in company vehicles.

Although the work site is somewhat remotely located, pedestrians may still be susceptible to site hazards or may present a hazard to site workers. Equipment must be located in an area that does not present a danger to pedestrians or bystanders. Barriers must be used to separate the work area from vehicular traffic if it exists. Safety cones should be placed around the work area to create a buffer, and the site workers should wear safety vests constructed of a highly reflective material.

3.3 Weather Conditions

Weather conditions should always be taken into consideration. Whenever unfavorable conditions or potential for lightning arise, the TCC Project Manager of their representative will evaluate both the safety hazards and the

inability of employees to effectively perform given tasks under such conditions. Activities will be halted at the discretion of TCC or Contractors.

3.4 Fires

Since the potential for fires is always present, the Site Health and Safety Officer must continuously monitor the area for combustible gases or flammable materials when waste relocation operations have the potential to generate a spark, and employees should always be alert for unexpected events such as ignition of chemicals or a sudden release of materials under pressure, and be prepared to act in these emergencies. Fire extinguisher will be present onsite and site personnel will be informed of their locations. Emergency phone numbers are listed in the Health & Safety Plan.

3.5 Explosion

The potential for explosion exists whenever working in an area with unknown materials. As in the case of fires, workers will always be alert for unexpected events and be prepared to act in these emergencies. Workers should also be aware that explosions can happen as a result of a fire and likewise fires can happen as a result of an explosion. Emergency phone numbers are listed in the Health & Safety Plan.

3.6 Landfill Gases (Chemical)

During excavation operations, air monitoring will be conducted using a combustible gas indicator and a photoionization detector. Monitoring will be performed when an activity is started, intermittently in the breathing zone or at the point of vapor generation. Background measurements will be taken before work is started and noted in the field notebook.

3.7 Dust

If excessive dust appears during operations, donning of appropriate personal protection equipment (i.e., dust masks) by onsite workers will be considered. Water control and suppression techniques will immediately be employed to control excessive dust and to avoid any delays or safety and health problems.

3.8 Litter/Odor Control

Litter/odor control will be part of the daily activity to control blowing litter/waste and odors. When appropriate, special efforts will be made to remove litter that could potentially be blown offsite. Odor/litter control will also be maintained by the daily covering of active excavation and

consolidation areas at the end of the day, as required. If odors increase to an intolerable level, lime can be mixed with the waste to reduce odors. If odor or litter problems are encountered, these areas will be covered with coal ash or clean fill after each day to minimize the potential for odors or litter.

3.9 Noise

Work around large equipment often creates excessive noise. Noise can cause workers to be startled, annoyed, or distracted; can cause physical damage to the ear, resulting in pain and temporary and/or permanent hearing loss; and can interfere with communication. If workers are subjected to noise exceeding an 8-hour time-weighted average sound level of 85 dBA (decibels on the A-weighted scale), hearing protection will be selected with an appropriate noise reduction rating to comply with 29 CFR 1910.95 and reduce noise levels to or below the permissible values. Hearing protection will be available at the work site.

3.10 Vectors

Vector problems related to reclamation activities are not anticipated. However, if vectors are encountered, actions will be taken to prevent vectors from endangering site workers or nearby areas. These actions will include use of a professional exterminator, if required, to control vector populations. Particular attention should be paid to vectors such as rodents, deer ticks, mosquitoes, spiders, poisonous plants, and any other creatures which could induce illness when bitten or touched. Site workers will take the necessary precautions to ensure their safety against these vectors. Measures should include:

- Insect repellent
- Coveralls
- Boots
- Gloves
- Hard hats.

3.11 Release of Hazardous Materials

The site Health & Safety Officer or TCC Project Manager or their representative will halt all work activities in the event of a release of hazardous materials. All workers will then report to a predetermined location for a head count. If emergency services are needed, they should be notified immediately (H&SP). The Project Manager will be notified as soon as possible.

3.12 Drums or Other Containers

Items such as metal or plastic drums, 55-gal drums, or liquid-filled containers may be encountered during landfill reclamation. If encountered, these containers could pose a threat to workers and/or the environment. A drum is defined as an item made of metal, which has in the past, is presently, or has been designed to contain a liquid, solid, or sludge. For excavation purposes, drums must contain non-refuse product. Drum carcasses are defined as any segment or portion of a drum that is not intact or able to contain a liquid, solid, or sludge. To limit potential exposure to hazards, the following procedures will be followed if containers are encountered:

- Care will be taken to prevent damaging containers that are uncovered during excavation. If possible, containers that are observed in the landfill mass will be removed in a manner that will maintain their integrity.

- Containers that are removed will be placed on plastic sheeting or secondary containment (drum overpacks or containment skids). If leaks or stained soils are suspected or observed, worker's breathing zone and downwind areas will be monitored with a photoionization detector, flame ionization detector, or combustible gas indicator.

- If impacted soil is encountered, it will be segregated and placed on plastic sheeting. Analytical sampling will be selected by TCC. Disposal options for stained soil, drummed material, or other material suspected to be impacted will be determined following receipt of analytical laboratory results.

3.13 Asbestos Material (Friable or Non-Friable)

Although not anticipated, the potential exists for asbestos material to be present in the landfill mass. Asbestos material, if encountered, may pose a threat to site workers if it is in a friable or airborne form. Asbestos material is more likely to become airborne if dry or uncovered. The following procedures will be followed to limit potential exposure hazards:

- If suspected asbestos material is encountered, care will be taken to keep the material covered and/or moist. The material will be sampled by a New York State Certified Asbestos Inspector to assess whether the material is asbestos or whether it may contain friable or non-

friable material. Pending receipt of sample results, no further excavation will be completed in that portion of the landfill.

- If friable or non-friable asbestos material is confirmed to be present, it will be removed in coordination with and asbestos removal contractor. Site personnel will not attempt to disturb, excavate, or move asbestos-containing material.

3.14 Tires

Although tires are not anticipated to pose a safety or health threat to site workers, tires will be segregated from other landfill material. Tires will be stockpiled and removed from the site for disposal at a transfer station, permitted landfill, or recycling facility.

Appendix C:
Design Drawing Set

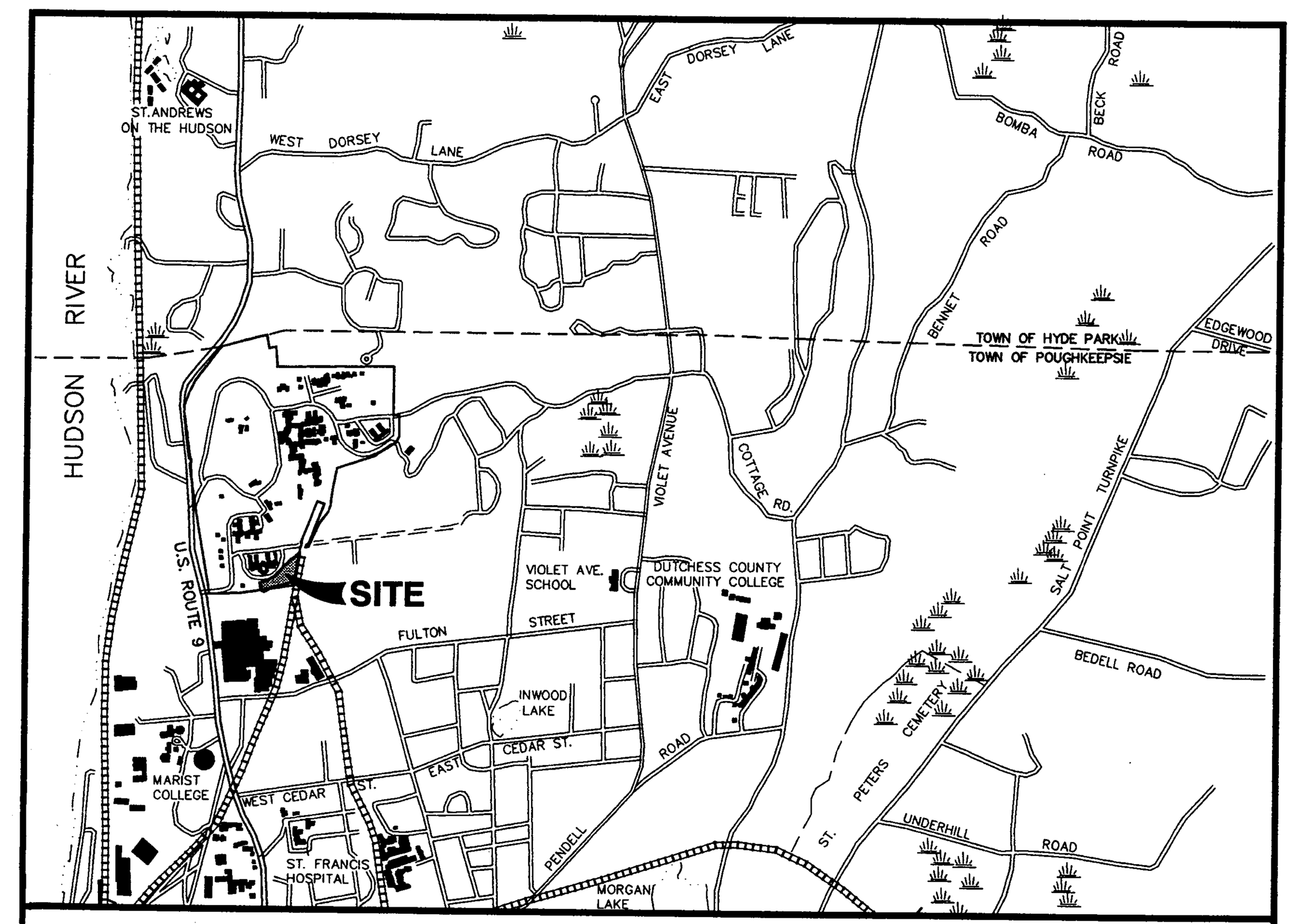
SITE PLANS PREPARED FOR

AREA 6 LANDFILL CLOSURE

AT THE

HUDSON RIVER PSYCHIATRIC CENTER

TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY NEW YORK



VICINITY MAP SCALE : 1"= 2000' ±

OWNER/APPLICANT

HUDSON HERITAGE LLC

21 FOX STREET
POUGHKEEPSIE, NY 12601
ATTN: MR. ALEX REESE
PH: (845) 454-3980
FAX: (845) 454-4026

LIST OF DRAWINGS:

SHEET	TITLE
T 1	TITLE SHEET
SP 1	EXISTING CONDITIONS PLAN
SP 2	PROPOSED WASTE GRADING & DEMOLITION PLAN
SP 3	PROPOSED FINAL CAP GRADING, UTILITY & EROSION CONTROL PLAN
SC 1	LANDFILL CROSS SECTIONS
SD 1	LANDFILL CLOSURE DETAILS
SD 2	EROSION CONTROL DETAILS & NOTES
SD 3	STORMWATER AND WATER DETAILS

ISSUED FOR NYSDEC REVIEW - NOT FOR CONSTRUCTION

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

Dutchess County Office: 21 Fox Street, Poughkeepsie, New York 12601, Phone: (845) 454-3980
Capital District Office: 20 Gurley Avenue, Troy, New York 12182, Phone: (518) 235-8050
Orange County Office: 263 Route 17K, Newburgh, New York 12550, Phone: (845) 567-1133
North Country Office: 110 Glen Street, Glens Falls, New York 12801, Phone: (518) 812-0513

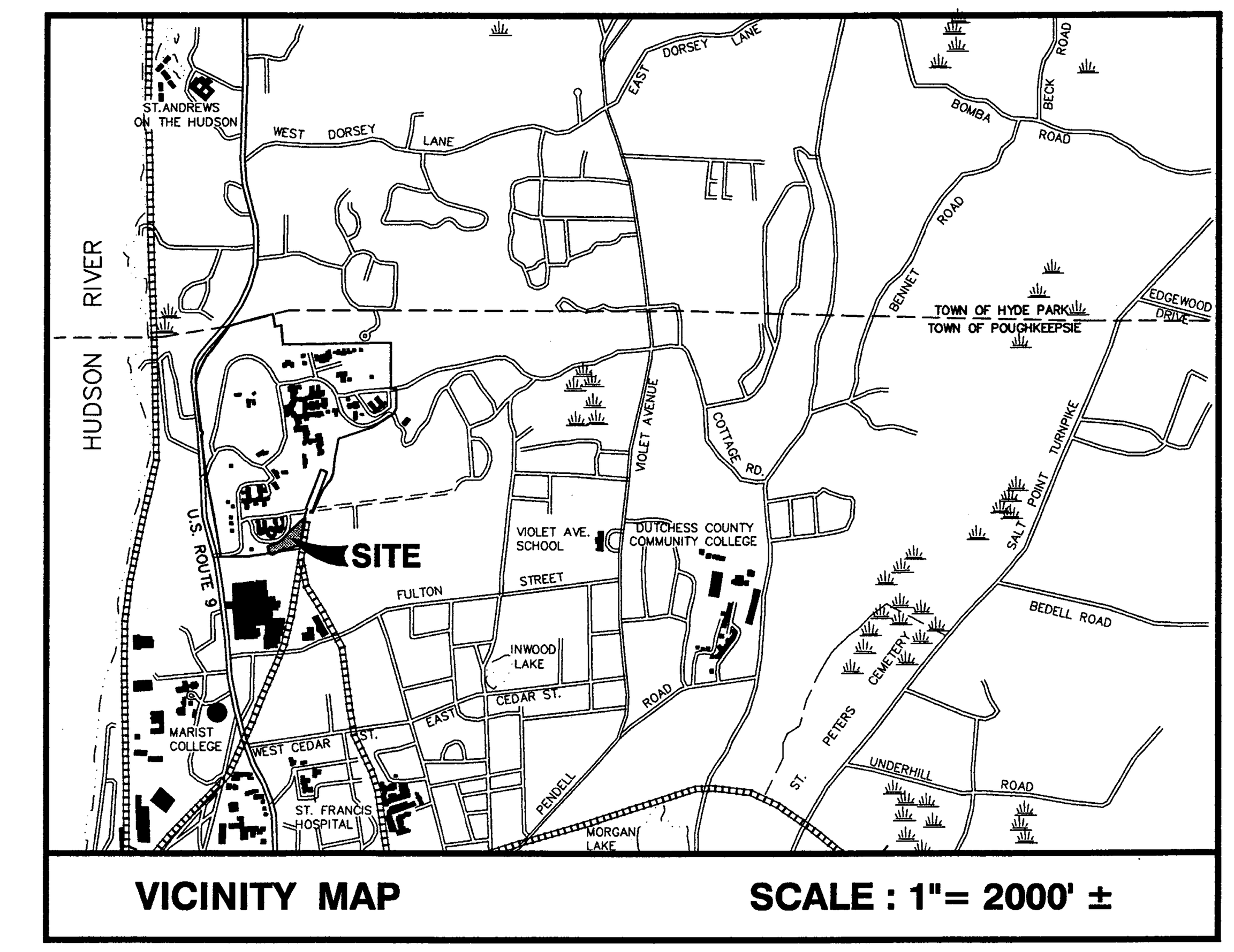
rev.	date	description
2	09/30/04	REVISED PER NYSDEC COMMENTS
1	05/17/04	REVISED PER CLIENT COMMENTS

HUDSON HERITAGE LLC

AREA 6 LANDFILL CLOSURE
TITLE SHEET

TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn	checked
DEC	
date	scale
02/09/04	AS SHOWN
project no.	
40307.00	
sheet no.	
T1	



VICINITY MAP **SCALE : 1"= 2000' ±**

LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- EDGE OF WETLAND
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING SPOT GRADE
- EXISTING FENCE
- EXISTING STONE WALL
- EXISTING RETAINING WALL
- EXISTING SWALE
- EXISTING WATER LINE
- EXISTING STEAM LINE
- EXISTING STEAM CONDENSATION LINE
- EXISTING SANITARY SEWER LINE
- EXISTING STORM SEWER LINE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE LINE
- EXISTING ALARM LINE
- EXISTING OVERHEAD WIRES
- EXISTING WELL
- EXISTING HYDRANT
- EXISTING WATER VALVE
- EXISTING WATER SHUT OFF VALVE
- EXISTING PIV VALVE
- EXISTING WATER STRUCTURE UNKNOWN
- EXISTING DRAINAGE MANHOLE
- EXISTING CATCH BASIN
- EXISTING HEADWALL
- EXISTING END SECTION
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER CLEAN OUT
- EXISTING STEAM MANHOLE
- EXISTING UTILITY POLE
- EXISTING UTILITY POLE W/LIGHT
- EXISTING LIGHT POLE
- EXISTING ELECTRIC MANHOLE
- EXISTING TRANSFORMER
- EXISTING SPLICE BOX
- EXISTING ELECTRIC STRUCTURE UNKNOWN
- EXISTING GAS METER
- EXISTING GAS VALVE
- EXISTING UTILITY TUNNEL
- EXISTING SIGN
- EXISTING TREE LINE
- EXISTING TREE/SHRUB
- SB-1 SOIL BORING LOCATION
- SG-2 STAFF GAUGE LOCATION
- PZ-3 PIEZOMETER LOCATION
- MWHR6-4 MONITORING WELL LOCATION
- LIMITS OF LANDFILL

FLOOD ZONE NOTE

PARCELS SHOWN HEREON LIE WITHIN FLOOD ZONE X AS SHOWN ON FEMA/FIRM MAPPING FOR THE TOWN OF POUGHKEEPSIE, NEW YORK, DUTCHESS COUNTY, COMMUNITY PANEL#361142 0001C, PANEL 1 OF 9, DATED SEPTEMBER 8, 1999. BY DEFINITION : AREAS OF 500-YEAR FLOOD; AREAS OF 100-YEAR FLOOD WITH AVERAGE DEPTHS OF LESS THAN 1 FOOT OR WITH DRAINAGE AREAS LESS THAN 1 SQUARE MILE; AND AREAS PROTECTED BY LEVEES FROM 100-YEAR FLOOD. ALSO AREAS DETERMINED TO BE OUTSIDE 500-YEAR FLOODPLAIN.

DEED REFERENCE:

SOURCE OF TITLE - (GRANTORS TO THE PEOPLE OF THE STATE OF NEW YORK)

1. JAMES ROOSEVELT & REBECCA H. ROOSEVELT
   LIBER 139, PAGE 604, RECORDED JUNE 29, 1867
2. WILLIAM B. DAVIES & FRANCES W. DAVIES
   LIBER 139, PAGE 603, RECORDED JUNE 28, 1867
3. EDWARD S. BEADLE & ADELINE BEADLE AND WILLIAM KELLY & ELISABETH S. KELLY
   LIBER 139, PAGE 600, RECORDED JUNE 15TH, 1867
4. CHARLES P. ANGELL & MINNIE A. ANGELL & SARAH E. ANGELL
   LIBER 237, PAGE 61, RECORDED JULY 28, 1888
5. MARY E. HILLEBRAND & CHARLES W. HILLEBRAND
   LIBER 237, PAGE 64, RECORDED JULY 28, 1888
6. JOHN W. ROWNAN & AMELIA ROWNAN
   LIBER 243, PAGE 373, RECORDED MAY 28, 1889
7. NOAH WIXSON & JOANNA WIXSON
   LIBER 261, PAGE 457, RECORDED APRIL 2, 1892
8. LOUISA P. MILLER & WILLIAM H. MILLER
   LIBER 293, PAGE 44
9. MARY L. PELL ESTATE, FANNIE P. ILER, EXECUTOR
   LIBER 297, PAGE 118
10. FREEMAN ZEIGLER & MARIA ZEIGLER
    LIBER 332, PAGE 328, RECORDED MAY 18, 1904
11. HARRIET W. WINSLOW
    LIBER 376, PAGE 44, RECORDED SEPTEMBER 9, 1912
12. PATRICK MCGLYNN & SILINA MCGLYNN
    LIBER 945, PAGE 363, RECORDED JUNE 7, 1957

TAX PARCEL NUMBER:

A PORTION OF CURRENT:
TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK
TAX GRID NUMBER: TOWN 134689, SECTION 6163, BLOCK 03, LOT 200152

NEW PROPOSED PARCEL 1:
TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK
TAX GRID NUMBER: TOWN 134689, SECTION 6163, BLOCK 03, LOT 011149

NEW PROPOSED REMAINING LANDS OF THE PEOPLE OF THE STATE OF NEW YORK:
TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK
TAX GRID NUMBER: TOWN 134689, SECTION 6163, BLOCK 03, LOT 301169

REFERENCE MAPS:

1.) NON-FILED MAP ENTITLED " DORMITORY AUTHORITY OF THE STATE OF NEW YORK, NEW YORK STATE OFFICE OF MENTAL HEALTH, HUDSON RIVER PSYCHIATRIC CENTER, TOWNS OF POUGHKEEPSIE & HYDE PARK, DUTCHESS COUNTY, NEW YORK, BOUNDARY MAP " SHEETS 1 AND 2 PREPARED BY HAWK ENGINEERING , P.C. AND DATED NOVEMBER 20, 1996.

2.) NON-FILED MAP ENTITLED " BOUNDARY MAP, HUSON RIVER STATE HOSPITAL, DEPARTMENT OF MENTAL HYGIENE " PREPARED BY M.N. SINACORI, DIST. ENGINEER, DIST. 8 AND DATED JULY 17, 1964.

3.) NON-FILED MAP ENTITLED " MAP OF SURVEY OF LANDS TO BE ACQUIRED BY HUDSON HERITAGE, LLC, DATED MAY 7 2003, PREPARED BE THE CHAZEN COMPANIES.

4.) TOPOGRAPHY SHOWN HEREON WAS TAKEN FROM MAPS PROVIDED BY THE NYS DORMATORY AUTHORITY.

5.) STREAM LOCATION, WETLANDS, TEST PITS AND LIMIT OF LANDFILL SHOWN HEREON FROM A MAP ENTITLED "TOPOGRAPHIC SURVEY-LANDFILL AREA NO. 6, HUDSON RIVER PSYCHIATRIC CENTER", DATED AUGUST 2000, BY PAGGI, MARTIN AND DEL BENE

6.) MAP ENTITLED " MID-HUDSON CENTER, 3 LOT SUBDIVISION " PREPARED BY CHAZEN ENGINEERING & LAND SURVEYING CO., P.C. AND FILED WITH THE DUTCHESS COUNTY CLERK'S OFFICE ON AUGUST 26, 1998 AS FILED MAP No.10650.

NOTES:

UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

ONLY COPIES FROM THE ORIGINAL OF THIS SURVEY MARKED WITH AN ORIGINAL OF THE LAND SURVEYOR'S INKED SEAL OR HIS EMBOSSED SEAL SHALL BE CONSIDERED TO BE VALID TRUE COPIES.

CERTIFICATIONS INDICATED HEREON SIGNIFY THAT THIS SURVEY WAS PREPARED IN ACCORDANCE WITH THE EXISTING CODE OF PRACTICE FOR PROFESSIONAL LAND SURVEYORS AS ADOPTED BY THE NEW YORK STATE ASSOCIATION OF PROFESSIONAL LAND SURVEYORS. SAID CERTIFICATIONS SHALL RUN ONLY TO THE PERSON SO NOTED. CERTIFICATIONS ARE NOT TRANSFERABLE TO ADDITIONAL INSTITUTIONS, THEIR SUCCESSORS AND/OR ASSIGNS, OR SUBSEQUENT OWNERS.

THE CERTIFICATIONS HEREON ARE NOT TRANSFERABLE UNLESS SPECIFICALLY STATED.

THE LOCATION OF UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS ARE NOT ALWAYS KNOWN AND OFTEN MUST BE ESTIMATED. IF ANY UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS EXIST OR ARE SHOWN, THE IMPROVEMENTS OR ENCROACHMENTS ARE NOT COVERED BY THIS CERTIFICATE.

SURVEYED FROM RECORD DESCRIPTION AND AS IN POSSESSION.

SUBSURFACE STRUCTURES NOT VISIBLE OR READILY APPARENT ARE NOT SHOWN AND THEIR LOCATION AND EXTENT ARE NOT CERTIFIED.

SUBJECT TO COVENANTS, EASEMENTS, RESTRICTIONS, CONDITIONS AND AGREEMENTS OF RECORD.

DWELLINGS SHOWN HEREON SERVED BY UNDERGROUND UTILITIES.

ALL PHYSICAL FEATURES ON SITE ARE FROM HAWK ENGINEERING, P.C. MAP, REFERENCE MAP No.1, WITH THE EXCEPTION OF SOIL BORING, STAFF GAUGE, PIEZOMETER AND MONITORING WELL LOCATIONS (PER PAGGI, MARTIN AND DEL BENE), THE MAIN BUILDING LOCATION AND U.S. ROUTE 9, WERE LOCATED BY CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

WETLANDS SHOWN HEREON ARE TAKEN FROM A MAP BY PAGGI, MARTIN & DEL BENE (SEE MAP REFERENCE #5).

ISSUED FOR NYSDEC REVIEW - NOT FOR CONSTRUCTION

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Planners
Environmental Scientists

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rev.	date	description
2	09/30/04	NO CHANGE THIS SHEET
1	05/17/04	REVISED PER CLIENT COMMENTS

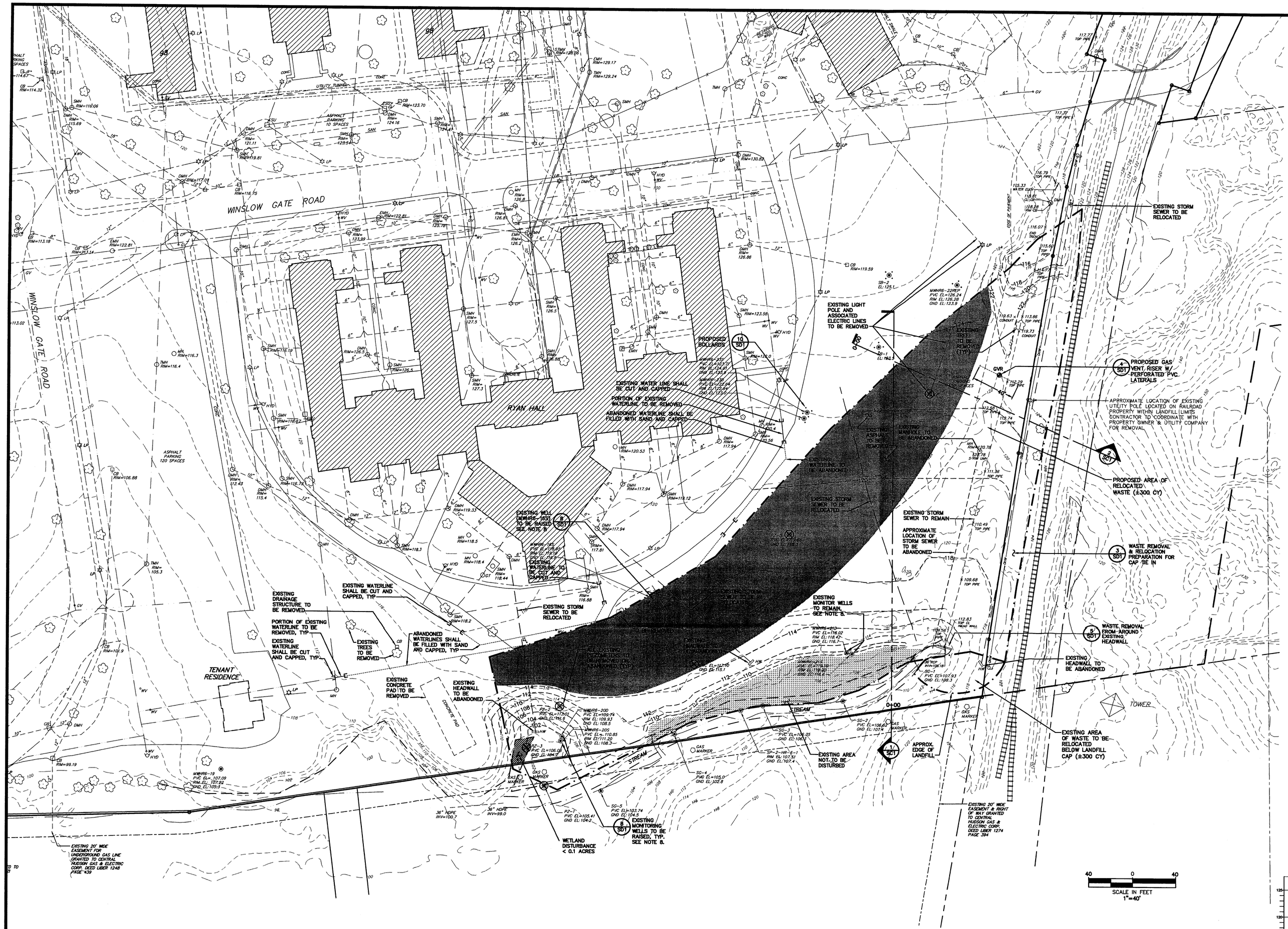
HUDSON HERITAGE LLC

AREA 6 LANDFILL CLOSURE
EXISTING CONDITIONS PLAN

TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn	checked
DEC	
date 02/09/04	scale 1"=40'
project no. 40307.00	
sheet no. SP1	

5772



LEGEND:

●——	NO PHYSICAL BOUNDS
—— — — ——	ADJACENT PROPERTY LINE
- - - - - -	EDGE OF WETLAND
— —110— —	EXISTING MAJOR CONTOUR
- - - - - -	EXISTING MINOR CONTOUR
X 108.7	EXISTING SPOT GRADE
——x——x——	EXISTING FENCE
	EXISTING STONE WALL
	EXISTING RETAINING WALL
	EXISTING SWALE
	EXISTING WATER LINE
	EXISTING WATER LINE ABANDONED
	EXISTING STEAM LINE
	EXISTING STEAM CONDENSATION LINE
8" SAN	EXISTING SANITARY SEWER LINE
6"	EXISTING STORM SEWER LINE
	EXISTING GAS LINE
	EXISTING ELECTRIC LINE
	EXISTING TELEPHONE LINE
	EXISTING ALARM LINE
	EXISTING OVERHEAD WIRES
Ⓦ WELL	EXISTING WELL
HYD	EXISTING HYDRANT
○ WV	EXISTING WATER VALVE
SO	EXISTING WATER SHUT OFF VALVE
○ PIV	EXISTING PIV VALVE
○ WSU	EXISTING WATER STRUCTURE UNKNOWN
○ DMH	EXISTING DRAINAGE MANHOLE
□ CB	EXISITING CATCH BASIN
HW	EXISTING HEADWALL
ES	EXISTING END SECTION
○ SMH	EXISTING SANITARY SEWER MANHOLE
○ CO	EXISTING SANITARY SEWER CLEAN OUT
○ STMH	EXISTING STEAM MANHOLE
UP	EXISTING UTILITY POLE
UP/LP	EXISTING UTILITY POLE W/LIGHT
LP	EXISTING LIGHT POLE
○ EMH	EXISTING ELECTRIC MANHOLE
T	EXISTING TRANSFORMER
□ SB	EXISTING SPLICE BOX
□ ESU	EXISTING ELECTRIC STRUCTURE UNKNOWN
GM	EXISTING GAS METER
○ GV	EXISTING GAS VALVE
	EXISTING UTILITY TUNNEL
	EXISTING SIGN
	EXISTING TREE LINE
	EXISTING TREE/SHRUB
◉ SB-1	SOIL BORING LOCATION
◉ SG-2	STAFF GAUGE LOCATION
◉ PZ-3	PIEZOMETER LOCATION
◉ MWHR6-4	MONITORING WELL LOCATION
▨	EXISTING AREA TO REMAIN UNDISTURBED
—·—·—	LIMITS OF LANDFILL (2.56± AC)
● GVR	PROPOSED GAS VENT RISER
◉	PROPOSED BOLLARDS AT MONITOR WELLS
— — — —	PROPOSED CONTOUR – FINAL WASTE GRADE
▩	PROPOSED SUBGRADE FOR PAVED CAP SECTION
2 SC1	LANDFILL CROSS SECTION (SEE SHEET SC1)

DEMOLITION NOTES:

1. SURVEY EXISTING CONDITIONS, VERIFY AND CORRELATE WITH REQUIREMENTS INDICATED TO DETERMINE EXTENT OF SELECTIVE DEMOLITION REQUIRED. ALSO CORRELATE DEMOLITION LIMITS WITH LAYOUT, UTILITY, GRADING AND LANDSCAPE PLANS.

2. MAINTAIN EXISTING UTILITIES TO REMAIN IN SERVICE AND PROTECT THEM AGAINST DAMAGE DURING SELECTIVE DEMOLITION OPERATION.

3. CONDUCT DEMOLITION OPERATIONS TO PREVENT INJURY TO PEOPLE AND DAMAGE TO ADJACENT BUILDINGS AND FACILITIES TO REMAIN. ENSURE SAFE PASSAGE OF PEOPLE AROUND SELECTIVE DEMOLITION AREA.

4. USE WATER MIST, TEMPORARY ENCLOSURES AND OTHER SUITABLE METHODS TO LIMIT THE SPREAD OF DUST AND DIRT. COMPLY WITH GOVERNING ENVIRONMENTAL PROTECTION REGULATIONS. DO NOT USE WATER WHEN IT MAY DAMAGE EXISTING CONSTRUCTION, SUCH AS ICE, FLOODING AND POLLUTION. (SEE EROSION CONTROL PLAN AND DETAILS).

5. REMOVE AND TRANSPORT DEBRIS IN A MANNER THAT WILL PREVENT SPILLAGE ON ADJACENT SURFACES AND AREAS.

6. CLEAN ADJACENT STRUCTURES AND IMPROVEMENTS OF DUST, DIRT AND DEBRIS CAUSED BY SELECTIVE DEMOLITION OPERATIONS. RETURN ADJACENT AREAS TO CONDITION EXISTING BEFORE START OF SELECTIVE DEMOLITIONS.

7. PROMPTLY DISPOSE OF DEMOLISHED MATERIALS. DO NOT ALLOW DEMOLISHED MATERIALS TO ACCUMULATE ON-SITE. DO NOT BURN DEMOLISHED MATERIALS ON-SITE.

8. CARE MUST BE TAKEN TO PREVENT DAMAGE TO EXISTING WELLS. BOLLARDS SHALL BE INSTALLED TO PROTECT THE MONITORING WELLS (MW). INSTALL CONSTRUCTION FENCING AROUND WELL OR WELL CLUSTER PRIOR TO COMMENCEMENT OF CONSTRUCTION.

9. PROCEDURE TO ABANDON EXISTING STORMWATER SEWER:
SEAL (IE: BRICK-UP) OUTLET END SECTION AND PLACE CONCRETE/SAND DELIVERY HOSE WITHIN THE ENTIRE LENGTH OF THE INTERIOR PIPE LINE. WITHDRAW HOSE, FROM OUTLET END TO INLET END WHILE CONCRETE SAND IS FORCED/BLOWN IN FROM COMPRESSOR. WHEN ENTIRE PIPE IS BACKFILLED WITH SAND, REMOVE HOSE AND SEAL (IE: BRICK-UP) INLET END SECTION.

10. CONTRACTOR SHALL BE RESPONSIBLE FOR SELECTING AND MAINTAINING STABILIZED TRENCH SLOPES UNDER FIELD CONDITIONS AT ALL TIMES. TEMPORARY SHORING OF EXCAVATED AREAS SHALL COMPLY WITH CURRENT OSHA REGULATIONS.

11. PRIOR TO CONSTRUCTION THE CONTRACTOR SHALL FIELD VERIFY ALL PROPOSED UTILITY RELOCATIONS, PROPOSED ABANDONMENTS AND PROPOSED CROSSINGS. THE CONTRACTOR SHALL EXCAVATE TEST PITS TO DETERMINE DEPTH AND CONDITION OF EXISTING UTILITIES AS REQUIRED.

12. PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL INSTALL ORANGE SNOW FENCING AND/OR SILT FENCING TO DEFINE THE WORK AREAS THAT ARE NOT TO BE DISTURBED.

13. ALL EXISTING DRAINAGE STRUCTURES SHALL BE PROVIDED WITH INLET PROTECTION BARRIERS DURING THE PROPOSED WASTE GRADING PHASE.

FOR FULL SCALE LANDFILL SECTION VIEWS SEE SHEET SC1

1 SC1 **LANDFILL SECTION**
SCALE: NTS

2 SC1 **LANDFILL SECTION**
SCALE: NTS

ISSUED FOR NYSDEC REVIEW - NOT FOR CONSTRUCTION

DANIEL W. STONE
No. 52135

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2	09/30/04	REVISED PER NYSDEC COMMENTS
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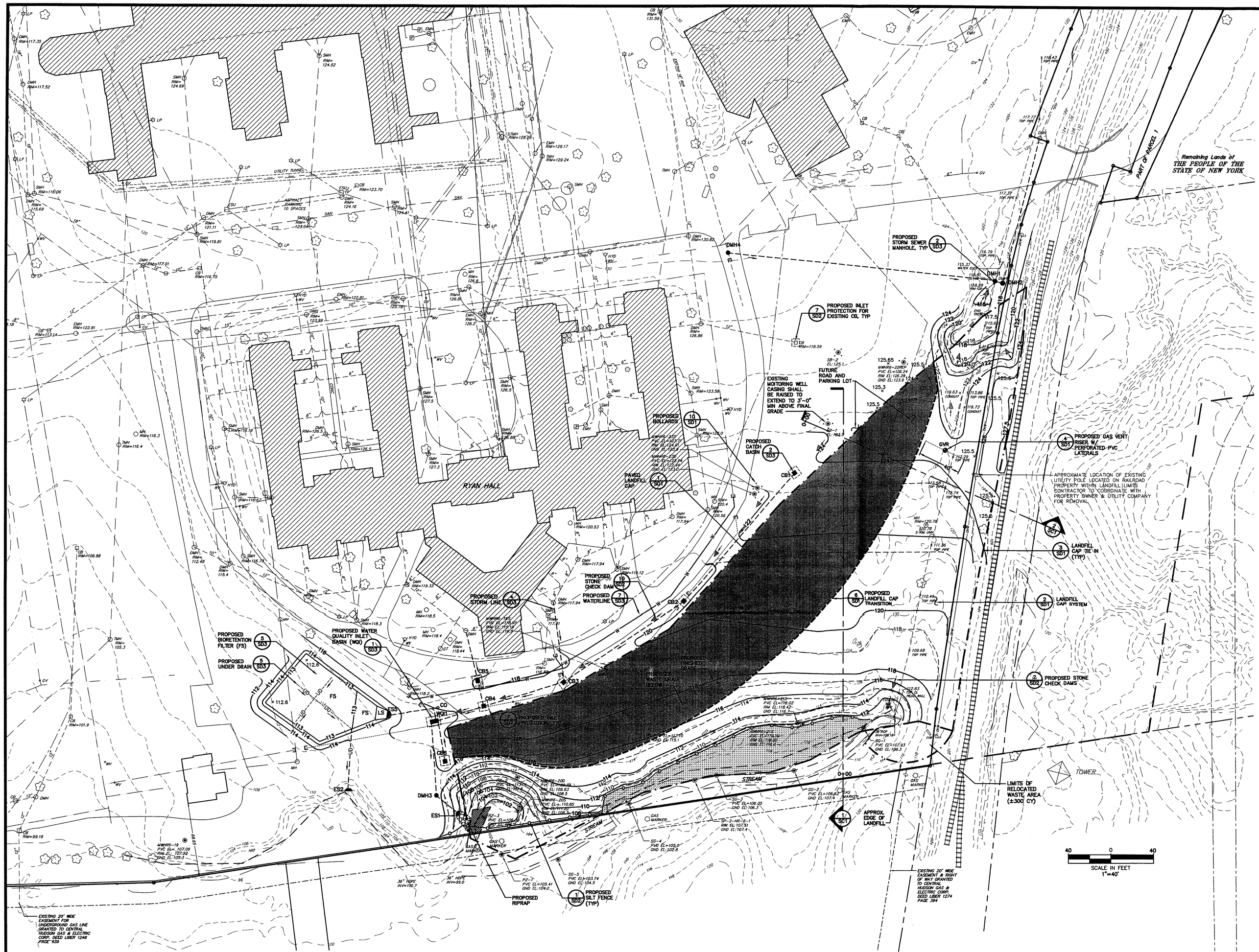
HUDSON HERITAGE LLC

AREA 6 LANDFILL CLOSURE PROPOSED WASTE GRADING AND DEMOLITION PLAN

TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn DEC	checked
date 02/09/04	scale 1"=40'
project no. 40307.00	
sheet no. SP2	



LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- EDGE OF WETLAND
- NYSDEC 100' BUFFER LINE
- ACOE WETLANDS LINE
- EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- EXISTING SPOT GRADE
- EXISTING FENCE
- EXISTING STONE WALL
- EXISTING RETAINING WALL
- EXISTING SWALE
- EXISTING WATER LINE
- EXISTING WATER LINE ABANDONED
- EXISTING STEAM LINE
- EXISTING STEAM CONDENSATION LINE
- EXISTING SANITARY SEWER LINE
- EXISTING STORM SEWER LINE
- EXISTING GAS LINE
- EXISTING ELECTRIC LINE
- EXISTING TELEPHONE LINE
- EXISTING ALARM LINE
- EXISTING OVERHEAD WIRES
- EXISTING WELL
- EXISTING HYDRANT
- EXISTING WATER VALVE
- EXISTING WATER SHUT OFF VALVE
- EXISTING PIV VALVE
- EXISTING WATER STRUCTURE UNKNOWN
- EXISTING DRAINAGE MANHOLE
- EXISITING CATCH BASIN
- EXISTING HEADWALL
- EXISTING END SECTION
- EXISTING SANITARY SEWER MANHOLE
- EXISTING SANITARY SEWER CLEAN OUT
- EXISTING STEAM MANHOLE
- EXISTING UTILITY POLE
- EXISTING UTILITY POLE W/LIGHT
- EXISTING LIGHT POLE
- EXISTING ELECTRIC MANHOLE
- EXISTING TRANSFORMER
- EXISTING SPLICE BOX
- EXISTING ELECTRIC STRUCTURE UNKNOWN
- EXISTING GAS METER
- EXISTING GAS VALVE
- EXISTING UTILITY TUNNEL
- EXISTING SIGN
- EXISTING TREE LINE
- EXISTING TREE/SHRUB
- SOIL BORING LOCATION
- STAFF GAUGE LOCATION
- PIEZOMETER LOCATION
- MONITORING WELL LOCATION
- LIMITS OF LANDFILL
- PROPOSED CONTOUR – FINAL CAP GRADE
- PROPOSED CONTOUR – FINAL WASTE GRADE
- PROPOSED SPOT GRADE
- EROSION CONTROL BARRIER STRAW
- EROSION CONTROL BARRIER/SILT FENCE
- PROPOSED WATERLINE
- PROPOSED STORM DRAIN LINE
- PROPOSED DRAINAGE SWALE
- PROPOSED PAVED CAP SECTION
- PROPOSED CATCH BASIN
- PROPOSED WATER QUALITY INLET
- PROPOSED STORM SEWER MANHOLE
- PROPOSED END SECTION WITH RIP RAP APRON
- EXISTING AREA TO REMAIN UNDISTURBED
- PROPOSED GAS VENT RISER
- PROPOSED BOLLARDS AT MONITOR WELLS
- PROPOSED BIORETENTION WATER QUALITY TREATMENT AREA
- PROPOSED FILTER STRIP
- PROPOSED LEVEL SPREADER
- PROPOSED UNDER DRAIN
- PROPOSED STONE CHECK DAM
- LANDFILL CROSS SECTION (SEE SHEET SC1)

GENERAL NOTES:

1. GRADES SHOWN HEREON REPRESENT THE FINISH GRADES OF THE TOP OF THE FINAL CLOSURE SYSTEM.
2. GAS VENTS SHALL BE PLACE WITH LATERALS PARALLEL TO THE SLOPE.
3. THE TOP OF THE LANDFILL SHALL BE GRADED TO PROVIDE POSITIVE DRAINAGE SLOPE, ADEQUATE TO PROVIDE FOR RUNOFF AND TO PREVENT PONDING OF WATER ON THE LANDFILL.
4. FUTURE ROAD, PARKING LOT AND DRAINAGE SYSTEM TO BE DEVELOPED WITH THE PROPOSED RYAN HALL REVITALIZATION / RENEWAL PLAN.

CONSTRUCTION NOTES:

1. ALL UNDERGROUND UTILITIES ARE SHOWN IN THEIR RELATIVE POSITION AND ARE FOR INFORMATIONAL PURPOSES ONLY. CONTRACTOR TO VERIFY THEIR ACTUAL LOCATION IN THE FIELD PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
2. CONTRACTOR IS RESPONSIBLE FOR EMPLOYING AND MAINTAINING ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING CONSTRUCTION.
3. CONTRACTOR IS RESPONSIBLE FOR PROPERLY AND SAFELY MAINTAINING AREA BETWEEN ALL ADJOINING PROPERTIES.
4. ANY CONDITION ENCOUNTERED IN THE FIELD DIFFERING FROM THOSE SHOWN HEREON, SHALL BE REPORTED TO THE DESIGN ENGINEER BEFORE CONSTRUCTION IS TO PROCEED.
5. NO WORK, STORAGE OR TRESPASS SHALL BE PERMITTED BEYOND THE BOUNDARIES OF ANY EASEMENTS.
6. DISPOSE OF ALL DEBRIS OFF THE SITE. NO BURNING OR BURY PITS WILL BE PERMITTED.
7. REMOVE NOTED VEGETATION, TREES, STUMPS, GRASSES, ORGANIC SOILS, DEBRIS AND DELETERIOUS MATERIALS WITHIN THE AREAS SLATED FOR CONSTRUCTION.
8. STRIP ALL TOPSOIL PRIOR TO COMMENCING EARTHWORK OPERATIONS. TOP SOIL MAY BE STORED AND REUSED IN LAWN AND PLANTING AREAS ONLY.
9. BOX ALL TREES AND HOUSE ALL SHRUBS AND HEDGES BEFORE PLACING EARTH AGAINST OR NEAR THEM. ORNAMENTAL TREES, SHRUBS AND HEDGES WHICH MUST BE REMOVED DURING CONSTRUCTION SHALL BE HEALED IN AND RE-PLANTED IN AS GOOD A CONDITION AS THEY WERE BEFORE THEIR REMOVAL. ANY DAMAGED TREES, SHRUBS AND/OR HEDGES SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
10. ALL EARTHWORK SHALL BE SMOOTHLY AND EVENLY BLENDED INTO EXISTING CONDITIONS. IN THE EVENT THAT WORK OUTSIDE OF PROPERTY BOUNDARIES IS NECESSARY, THE PERMISSION OF THE ADJOINING PROPERTY OWNER MUST FIRST BE OBTAINED.
11. ALL PAVEMENT RESTORATION TO MEET AND MATCH EXISTING GRADES.
12. ALL SAW CUT LINES SHALL BE PARALLEL AND CURVILINEAR TO TO EXISTING OR PROPOSED CURBING AND SHALL BE A CONSTANT DISTANCE OF 3 FEET AWAY FROM SUCH.
13. SEWER MAINS IN RELATION TO WATER MAINS: WHERE POSSIBLE, SEWERS SHALL BE LAID AT LEAST 10 (TEN) FEET HORIZONTALLY FROM ANY EXISTING OR PROPOSED WATER MAIN. VERTICAL SEPARATION SHALL BE MAINTAINED TO PROVIDE 18 (EIGHTEEN) INCHES BETWEEN TOP OF SEWER AND THE INVERT OF THE WATER MAIN AT UTILITY CROSSINGS. WHEN IMPOSSIBLE TO OBTAIN THE PROPER VERTICAL SEPARATION, SDR-26 PVC PIPE SHALL BE USED 10 (TEN) FEET ON EACH SIDE OF THE WATER MAIN BEING CROSSED.
14. CONTRACTOR SHALL RESTORE LAWNS, DRIVEWAYS, WALKS CURBS, FENCES ETC. TO A CONDITION AT LEAST AS GOOD AS THEY WERE BEFORE BEING DISTURBED. MAILBOXES, POSTS, ETC. SHALL BE PROTECTED OR REMOVED AND REPLACED EXACTLY AS THEY WERE BEFORE BEING DISTURBED. DAMAGED ITEMS SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
15. ALL STORM SEWER PIPE TO BE HDPE UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER, TOWN OR ENGINEER.
16. ALL SANITARY SEWER PIPE TO SDR26 UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER, TOWN OR ENGINEER.
17. ALL WATER PIPE TO CLASS 52 DIP UNLESS OTHERWISE NOTED OR DIRECTED BY THE OWNER, TOWN OR ENGINEER.

DRAINAGE STRUCTURE TABLE

ES1	DMH3	WQI1	CB6	CB5	CB4	CB3	CB2	CB1	ES2 UD-OUTLET	DMH1	ES5	DMH2	DMH4
	RIM=114.0±	RIM=117.7±	RIM=116.6	RIM=118.0	RIM=118.2	RIM=118.9±	RIM=119.8±	RIM=122.9±		RIM=118.28		RIM=118.0	RIM=130.0
	INV IN=110.0	INV IN=115.5		INV IN=116.1	INV IN=116.0	INV IN=116.8	INV IN=117.6			INV IN=113.2		INV IN=113.4	INV IN=122.3±
		INV IN(CB6)=114.5				INV IN(CB2)=116.8				INV IN=113.2			
		INV OUT(8")=115.2								INV IN=113.2			
INV OUT=107.5	INV OUT=108.0	INV OUT(15")=114.5	INV OUT=114.7	INV OUT=116.1	INV OUT=116.0	INV OUT=116.8	INV OUT=117.6	INV OUT=119.0	INV OUT=106.0	INV OUT=113.2	INV OUT=114.2	INV OUT=113.4	INV OUT=122.3±
	30 LF 15" CPE @ 1.67%	70 LF 15" CPE @ 6.4% TO DMH3	40 LF 15" CPE @ 1.0%	20 LF 15" CPE @ 0.5%	45 LF 15" CPE @ 1.1%	75 LF 15" CPE @ 1.1%	135 LF 15" CPE @ 0.6%	160 LF 15" CPE @ 0.9%		±425 LF EXIST 36" RCP @ 1.6%		10 LF 15" CPE @ 2.0%	250 LF 18" CPE @ 3.6%
TO PIPE OUTLET CONDITION	TO ES1	50 LF 8" PVC @ 2.0 % TO ES5 LEVEL SPREADER	TO WQI1	TO CB6	TO WQI1	TO CB4	TO CB3	TO CB2	TO PIPE OUTLET CONDITIONS	TO EXISTING HEADWALL INV OUT=106.18	TO BIORETENTION WQ AREA F5 LEVEL SPREADER	TO DMH1	TO DMH1
SEE DETAIL 7/SD2		SEE DETAIL 5/SD3							SEE DETAIL 7/SD2	SEE DETAIL 5/SD1	SEE DETAIL 6/SD3	SEE DETAIL 2/SD3	SEE DETAIL 2/SD3

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rev.	date	description
2	09/30/04	REVISED PER NYSDEC COMMENTS
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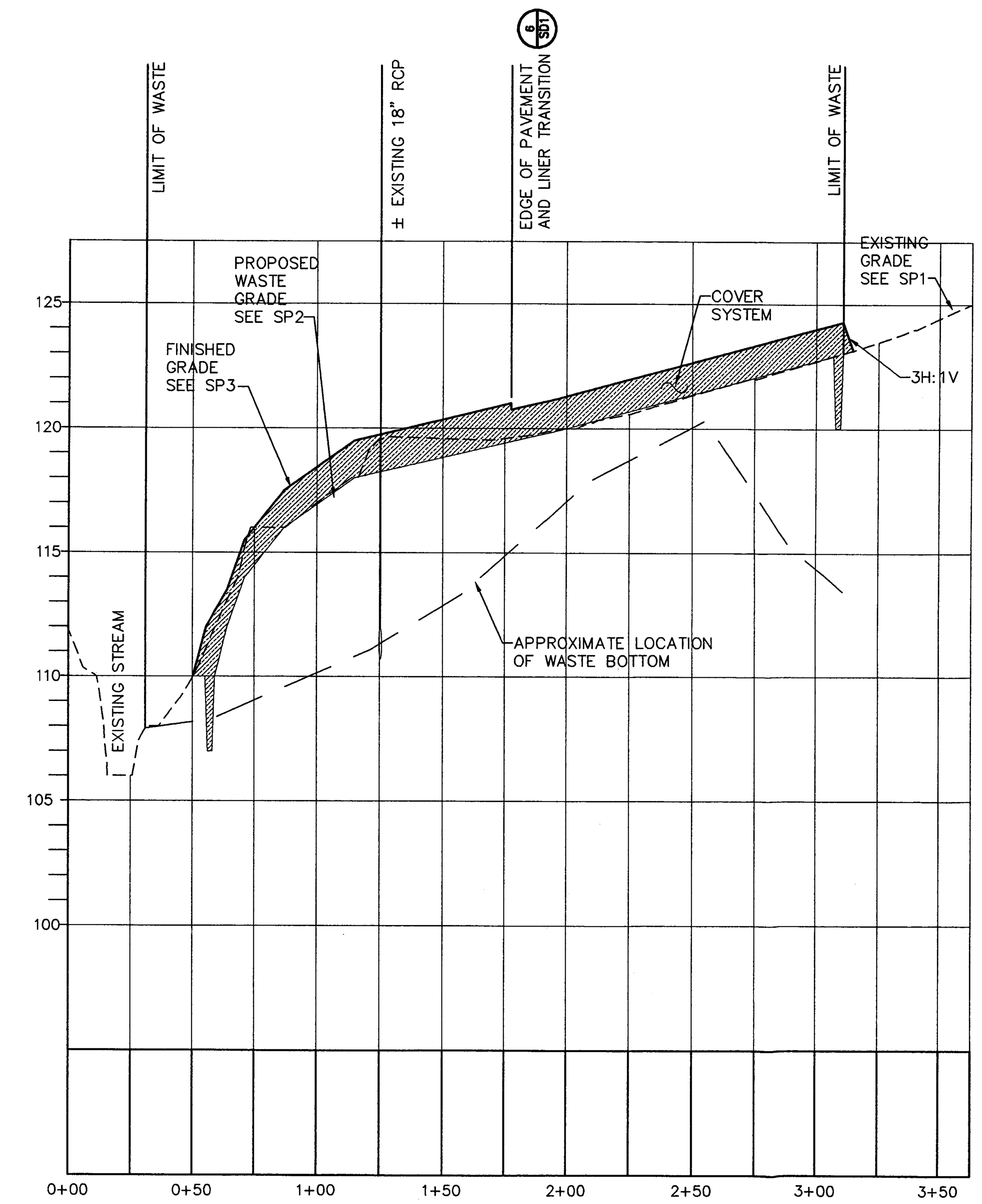
HUDSON HERITAGE LLC

AREA 6 LANDFILL CLOSURE
PROPOSED FINAL CAP GRADING, UTILITY AND EROSION CONTROL PLAN

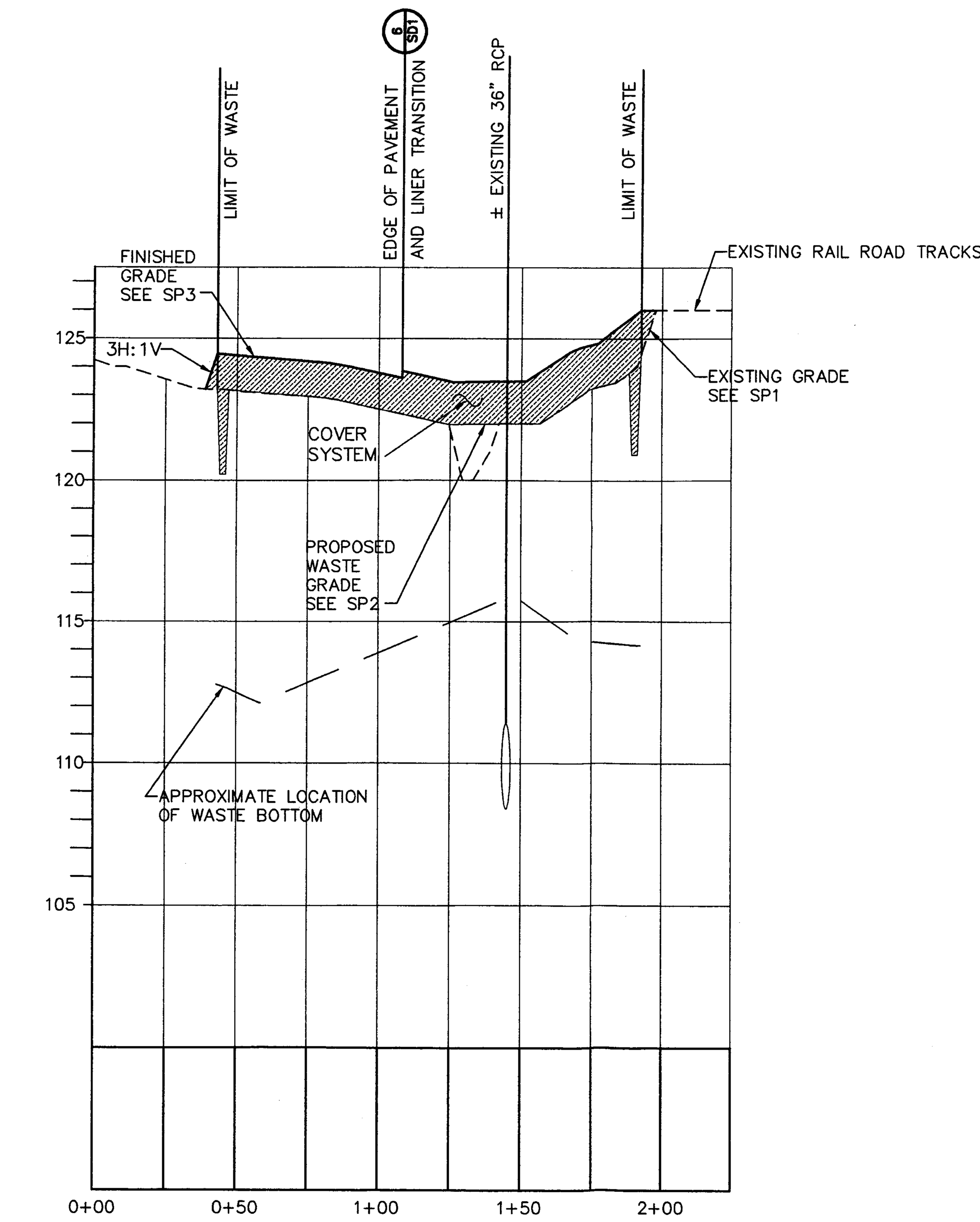
TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn	checked
DEC	
date	scale
02/09/04	1"=40'
project no.	
40307.00	
sheet no.	
SP3	

Drawing Name: X:\4\40300-40400\40307.00 (HRPC-Hydrogeo)\ENG\DWG\SP3-LANDFILL.dwg



LANDFILL CROSS SECTION 1
SCALE: 1"=40' HORIZONTAL 1"=4' VERTICAL



LANDFILL CROSS SECTION 2
SCALE: 1"=40' HORIZONTAL 1"=4' VERTICAL

ISSUED FOR NYSDEC REVIEW - NOT FOR CONSTRUCTION

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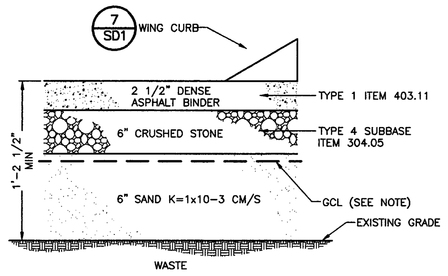
HUDSON HERITAGE LLC

AREA 6 LANDFILL CLOSURE
LANDFILL CROSS SECTIONS

TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn	checked
DEC	
date 02/09/04	scale AS SHOWN
project no. 40307.00	
sheet no. SC1	

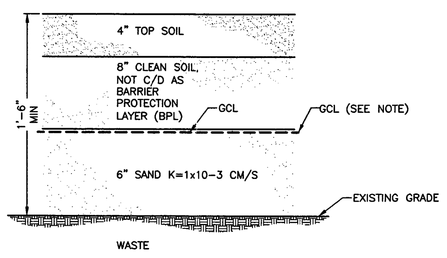
Drawing Name: X:\4\40300-40400\40307.00 (HRPC-Hydropark)\ENG\DWG\SC1-LANDFILL.dwg



GCL NOTES

1. (CETCO BENTONMAT ON FOR ALL SLOPES EQUAL OR STEEPER THAN 3:1).
2. (CETCO BENTONMAT ST FOR ALL OTHER SLOPES, OR EQUAL).

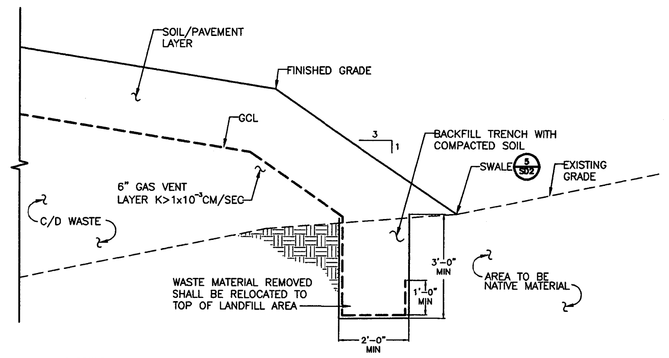
1 SD1 **PAVED CAP SECTION**
SCALE: NOT TO SCALE



GCL NOTE

1. (CETCO BENTONMAT ON FOR ALL SLOPES EQUAL OR STEEPER THAN 3:1)
2. (CETCO BENTONMAT ST FOR ALL OTHER SLOPES, OR EQUAL)

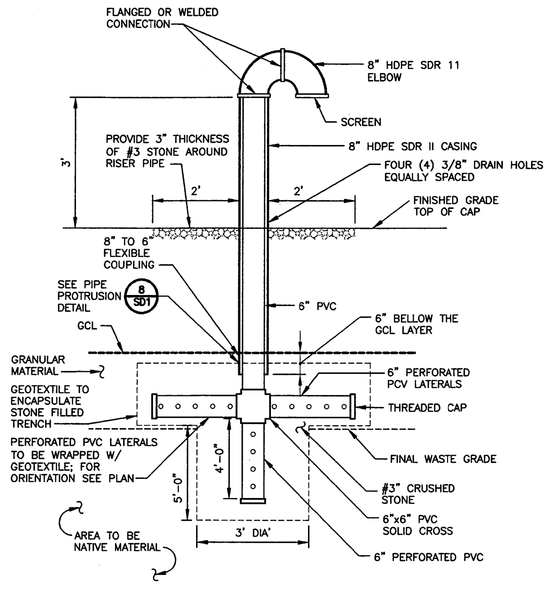
2 SD1 **LANDFILL CAP SECTION**
SCALE: NOT TO SCALE



NOTES

1. ANCHOR TRENCH REQUIRED AT TOP OF SLOPE AND AT LIMITS OF LANDFILL EDGE.
2. GCL TRANSITION SEAMS AT PREPARED MODERATE SUBGRADE SLOPES LESS THAN 3:1 AND AT END-OF-PANEL SECTIONS SHALL HAVE 2.0 FT OVERLAPPED SEAMS SHINGLED IN THE DIRECTION OF THE SURFACE GRADE.

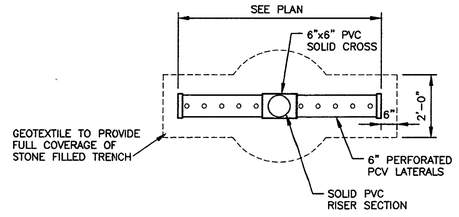
3 SD1 **COVER TIE-IN DETAIL**
SCALE: NOT TO SCALE



GCL NOTE

1. SEE CAP SECTIONS FOR DETAILED EARTH LAYERING INFORMATION

4 SD1 **GAS VENT RISER**
SCALE: NOT TO SACALE



PLAN VIEW

LINER NOTES:

1.0 GENERAL: GEOSYNTHETIC (GEOCMPOSITE) CLAY LINER AS MANUFACTURED BY CETCO BENTONMAT OR EQUAL.

1.1 INSTALL GCL IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS AND INSTALLATION GUIDELINES.

1.2 MATERIAL CERTIFICATIONS FOR EACH LOT MUST BE SUBMITTED TO ENGINEER/OWNER PRIOR TO INSTALLATION OF GCL.

1.3 ROLLS SHALL BE PROPERLY LABELED IN ACCORDANCE WITH ASTM D4873. LABELS SHALL CONTAIN AT A MINIMUM: NAME, ADDRESS AND PHONE NUMBER OF MANUFACTURER, STYLE, ROLL NUMBER, LOT NUMBER, SERIAL NUMBER AND DIMENSIONS. LABELS SHALL BE CLEARLY VISIBLE.

2.0 HANDLING AND STORAGE

2.1 ROLLS OF GCL SHALL BE HANDLED IN ACCORDANCE WITH THE GUIDELINES SET FORTH IN ASTM D4872.

2.2 THE METHOD OF LOADING THE GCL ROLLS, TRANSPORTING THEM AND OFF LOADING THEM AT THE JOB SITE SHOULD NOT CAUSE ANY DAMAGE TO THE GCL, ITS CORE, NOR ITS PROTECTIVE WRAPPING.

2.3 ANY PROTECTIVE WRAPPING THAT IS DAMAGED OR STRIPPED OFF OF THE ROLLS SHALL BE REPAIRED IMMEDIATELY.

2.4 IF ANY OF THE CLAY HAS BEEN LOST DURING TRANSPORTATION OR FROM DAMAGE OF ANY TYPE, THE OUTER LAYERS OF GCL SHOULD BE DISCARDED UNTIL UNDAMAGED PRODUCT IS EVIDENCED. THE REMAINING ROLL MUST BE REWRAPPED IN ACCORDANCE WITH THE MANUFACTURER'S ORIGINAL METHOD TO PREVENT HYDRATION OR FURTHER DAMAGE TO THE REMAINING ROLL.

2.5 THE LOCATION OF TEMPORARY FIELD STORAGE SHOULD NOT BE IN AREAS WHERE WATER CAN ACCUMULATE. THE ROLLS SHOULD BE STORED ON HIGH FLAT GROUND OR ELEVATED OFF OF THE GROUND SO AS NOT TO FORM A DAM CREATING THE PONDING OF WATER.

2.6 THE ROLLS SHALL NOT BE STACKED SO HIGH AS TO CAUSE THINNING OF THE PRODUCT AT POINTS OF CONTACT. AT NO TIME SHALL THE ROLLS BE STORED MORE THAN 5 ROLLS HIGH. FURTHERMORE, THEY SHOULD BE STACKED IN SUCH A WAY THAT ACCESS FOR CONFORMANCE TESTING IS POSSIBLE.

2.7 ROLLS SHALL BE COVERED WITH TARPS AND KEPT DRY DURING STORAGE AND PRIOR TO INSTALLATION.

2.8 NO EQUIPMENT SHALL MOVE DIRECTLY ON THE GCL EXCEPT AS ALLOWED BY MANUFACTURER'S GUIDELINES.

3.0 ACCEPTANCE AND CONFORMANCE TESTING

3.1 AT TIME OF SHIPMENT, THE LOT CONFORMANCE TESTING OF THE MATERIAL FROM EACH LOT SHALL BE PERFORMED AT THE MANUFACTURERS FACILITY FOR SUBMITTAL TO THE ENGINEER/OWNER. TESTS SHALL INCLUDE:

BENTONITE SWELL INDEX	ASTM D5890
BENTONITE FLUID LOSS	ASTM D5891
BENTONITE MASS/AREA	ASTM D5993
GCL PEEL STRENGTH	ASTM D4632
GCL GRAB STRENGTH	ASTM D4632
GCL INDEX FLUX	ASTM D5887
GCL PERMEABILITY	ASTM D5084
GCL HYDRATED INTERNAL SHEAR STRENGTH	ASTM D5321

4.0 INSTALLATION/PLACEMENT

4.1 ENGINEER SHALL BE PRESENT AT ALL TIMES DURING HANDLING, PLACEMENT AND COVERING OF GCLS.

4.2 SUB GRADE MUST BE PREPARED TO 95% OF IT MAXIMUM STANDARD PROCTOR DENSITY (ASTM D698). SUB GRADE COMPACTION SHALL BE VERIFIED BY AN INDEPENDENT TESTING AGENCY .

4.3 GCL SHALL BE PLACED ON A FIRM SMOOTH AND UNYIELDING CUSHION LAYER. THE CUSHION LAYER SHALL BE COMPACTED TO 95% ITS MAXIMUM STANDARD PROCTOR DENSITY IN ACCORDANCE WITH ASTM D698. THE CUSHION LAYER SHALL BE FREE OF ORGANICS AND STONES GREATER THAN 3-INCHES IN LEAST DIMENSION. STONE PERMITTED IN THE CUSHION LAYER SHALL BE WELL ROUNDED, NON-ANGULAR STONES. THE TOP 6" OF THE CUSHION LAYER SHALL BE UNIFORM SAND MATERIAL.

4.4 THE INSTALLER SHALL TAKE THE NECESSARY PRECAUTIONS TO PROTECT MATERIALS UNDERLYING THE GCL. CONSTRUCTION EQUIPMENT CAN BE USED TO DEPLOY THE GCL PROVIDING EXCESSIVE RUTTING IS NOT CREATED. EXCESSIVE RUTTING SHALL BE DEFINED AS RUTS DEEPER THAN 1-INCH.

4.5 GCL SHALL NOT BE PLACED ON FROZEN GROUND. ALL ORGANIC MATERIAL, STONE AND OTHER DELETERIOUS MATERIAL SHALL BE REMOVED PRIOR TO PLACEMENT OF THE GCL.

4.6 GCL SHALL BE OVERLAPPED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS, BUT NO LESS THAN 6-INCHES. POWDERED BENTONITE SHALL BE PLACED WITHIN THE OVERLAP REGION IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

4.7 DURING PLACEMENT, CARE MUST BE TAKEN NOT TO ENTRAP IN OR BENEATH THE GCL, FUGITIVE CLAY, STONES OR SAND.

4.8 ON SIDE SLOPES, THE GCL SHALL BE ANCHORED AT THE TOP AND THEN UNROLLED SO AS TO KEEP THE MATERIAL FREE OF WRINKLES AND FOLDS DURING PLACEMENT.

5.0 REPAIRS

5.1 ANY PATCH, USED FOR REPAIR OF A TEAR OR RIP IN THE GEOTEXTILE, SHALL BE DONE USING THE SAME TYPE AS THE DAMAGED GEOTEXTILE OR OTHER APPROVED GEOTEXTILE BY THE ENGINEER.

5.2 THE SIZE OF THE GCL/GEOTEXTILE PATCH MUST EXTEND AT LEAST 12-INCHES BEYOND ANY PORTION OF THE DAMAGED GEOTEXTILE AND BE ADHESIVE OR HEAT BONDED TO THE PRODUCT TO AVOID SHIFTING DURING BACKFILLING WITH SOIL OR COVERING WITH ANOTHER GEOSYNTHETIC.

5.3 IF BENTONITE PARTICLES ARE LOST FROM WITHIN THE GCL OR IF THE CLAY HAS SHIFTED, THE PATCH SHOULD CONSIST OF THE FULL GCL PRODUCT. IT SHOULD EXTEND AT LEAST 12-INCHES BEYOND THE EXTENT OF THE DAMAGE AT ALL LOCATIONS. FOR THOSE GCLS REQUIRING ADDITIONAL BENTONITE CLAY IN OVERLAP SEAMING, THE SIMILAR PROCEDURE SHOULD BE USED FOR PATCHING.

6.0 BACKFILLING AND COVER

6.1 THE GCL SHALL BE COVERED WITH SOIL FREE OF FROST, DEBIS, ORGANICS AND STONES GREATER THAN 3-INCHES IN LEAST DIMENSION.

6.2 THE GCL SHOULD NOT BE COVERED BEFORE THE OBSERVATION AND APPROVAL BY THE ENGINEER.

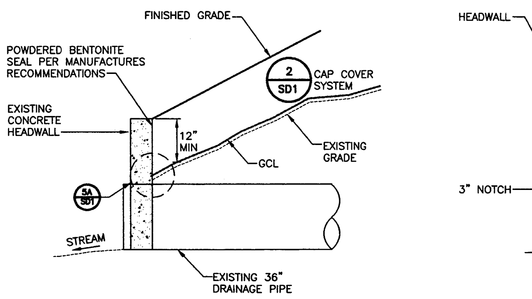
6.3 BACKFILL SHALL BE PLACED IN COMPACTED LIFTS OVER THE GCL.

6.4 VEHICLES SHALL NOT BE OPERATED ON THE GCL WITHOUT THE FOLLOWING MINIMUM COVER:

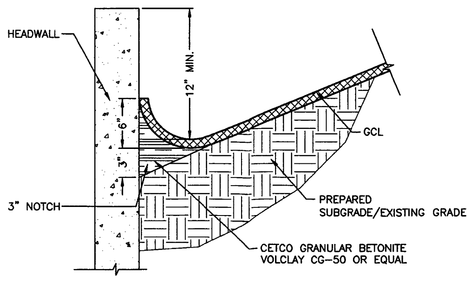
VEHICLE GROUND PRESSURE (PSF)	LIFT THICKNESS (FT)
<5	1.0
<10	1.5
<20	2.0
>20	3.0

6.5 THE SOIL COVER SHALL BE CONSTRUCTED SUCH THAT THE GCL IS NOT DAMAGED. UNLESS OTHERWISE SPECIFIED, THE DIRECTION OF BACKFILLING SHOULD PROCEED IN THE DIRECTION OF DOWN GRADIENT SHINGLING OF THE GCL OVERLAPS. CONTINUOUS OBSERVATION OF THE SOIL PLACEMENT IS RECOMMENDED.

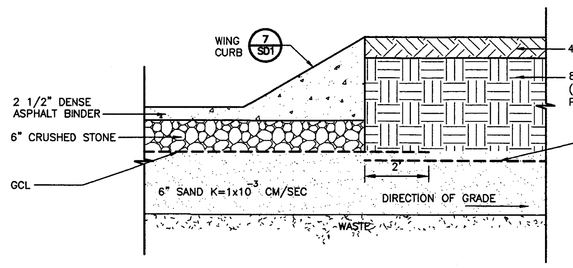
6.6 THE OVERLYING MATERIAL SHOULD NOT BE DEPLOYED SUCH THAT EXCESS TENSILE STRESS IS MOBILIZED IN THE GCL. ON SIDE SLOPES, THIS REQUIRES SOIL BACKFILL TO PROCEED FROM THE BOTTOM OF THE SLOPE UPWARD.



5 SD1 **HEADWALL TIE-IN DETAIL**
SCALE: NTS



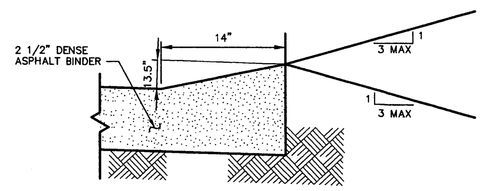
5A SD1 **GCL SEAL AT HEADWALL STRUCTURE DETAIL**
SCALE: NTS



NOTE

1. SEE CAP SECTIONS AND COVER TIE-IN DETAIL FOR DETAILED INFORMATION.

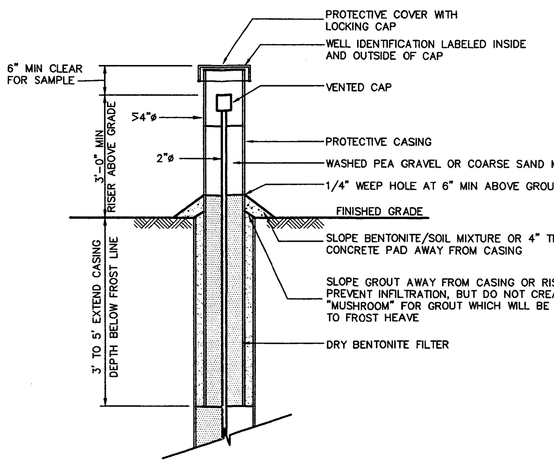
6 SD1 **LINER TRANSITION DETAIL**
SCALE: NOT TO SCALE



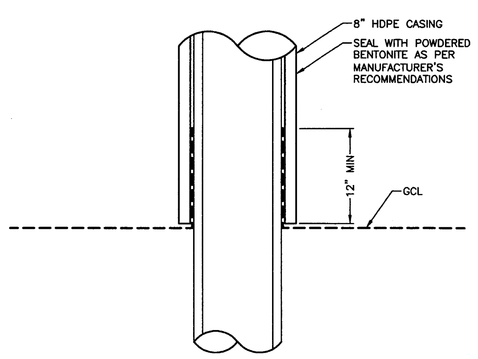
NOTE

1. SEE CAP SECTIONS FOR DETAILED INFORMATION

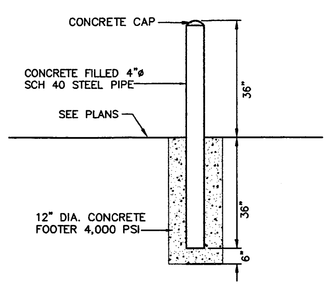
7 SD1 **WING CURB**
SCALE: NTS



8 SD1 **MONITORING WELL EXTENTION DETAIL**
SCALE: NTS



9 SD1 **PIPE PENETRATION DETAIL**
SCALE: NTS



NOTE

1. SEE PIPE PENETRATION DETAIL, THIS SHEET, FOR REQUIREMENTS LOCATED WITHIN LANDFILL CAP.

10 SD1 **BOLLARD TIE-IN DETAIL**
SCALE: NTS

ISSUED FOR NYSDEC REVIEW - NOT FOR CONSTRUCTION

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

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rev.	date	description
2	09/30/04	NO CHANGE THIS SHEET
1	05/17/04	REVISED PER CLIENT COMMENTS

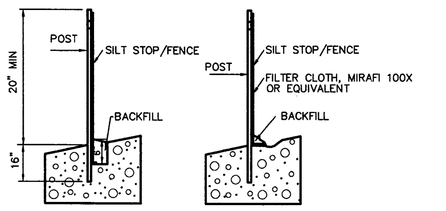
HUDSON HERITAGE LLC

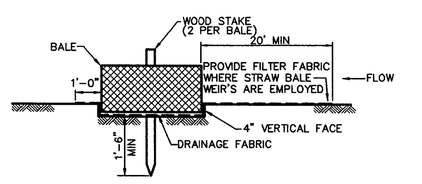
AREA 6 LANDFILL CLOSURE
LANDFILL CLOSURE DETAILS

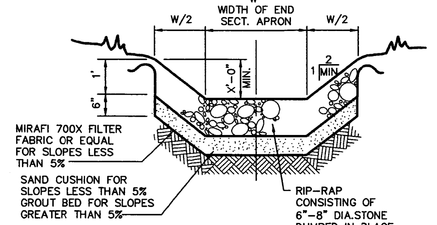
TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

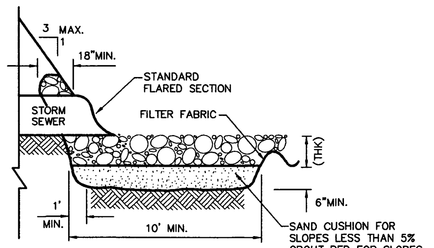
drawn	checked
DEC	
date	scale
02/09/04	AS SHOWN
project no.	
40307.00	
sheet no.	
SD1	

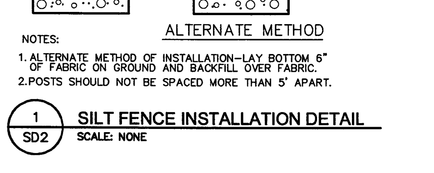
Drawing Name: X:\4\40300-40400\40307.00 (HRPC-Hydrogeo)\ENG\DWG\SD1-LANDFILL.dwg

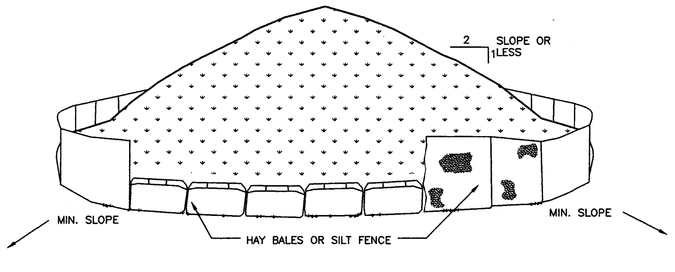


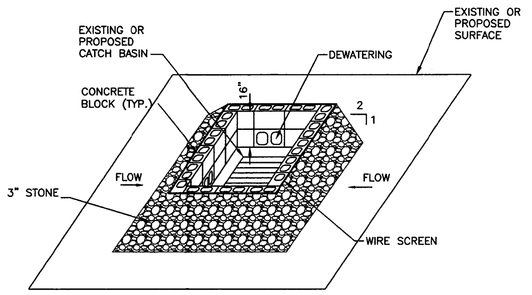


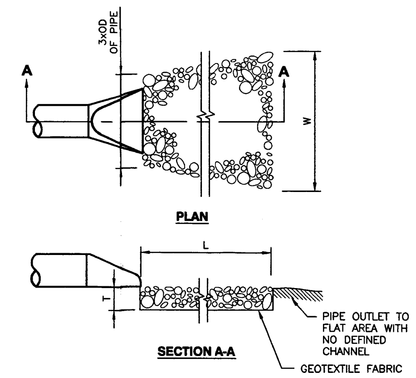


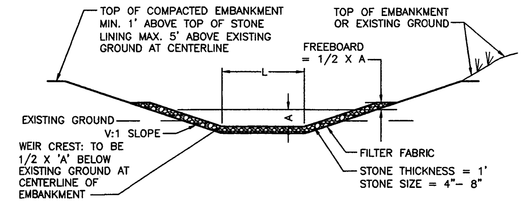


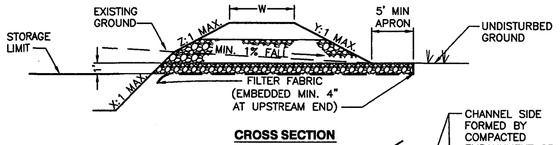


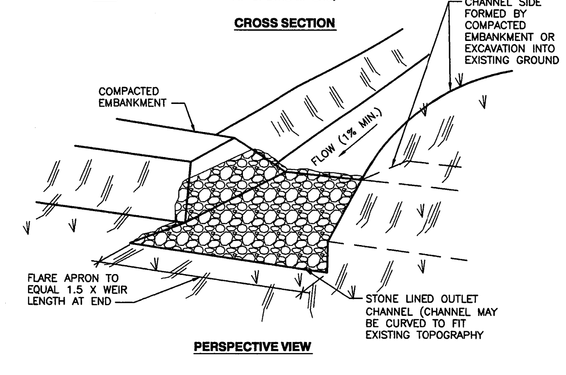


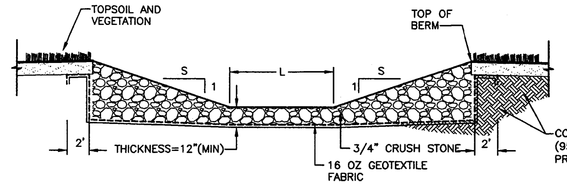












NOTES:
1. ALTERNATE METHOD OF INSTALLATION-LAY BOTTOM 6" OF FABRIC ON GROUND AND BACKFILL OVER FABRIC.
2. POSTS SHOULD NOT BE SPACED MORE THAN 5' APART.

1 SD2 SILT FENCE INSTALLATION DETAIL
SCALE: NONE

2 SD2 STRAW BALE BEDDING
SCALE: NONE

3 SD2 END SECTION WITH STONE LINED APRON
SCALE: NONE

4 SD2 GRASS LINED SWALE
SCALE: NONE

INSTALLATION NOTES

1. AREA CHOSEN FOR STOCKPILING OPERATIONS SHALL BE DRY AND STABLE.
2. MAXIMUM SLOPE OF STOCKPILE SHALL BE 1 : 2.
3. UPON COMPLETION OF SOIL STOCKPILING, EACH PILE SHALL BE SURROUNDED WITH EITHER SILT FENCING OR HAY BALES, THEN STABILIZED WITH VEGETATION OR COVERED.
4. SEE SPECIFICATIONS FOR INSTALLATION OF SILT FENCE AND HAY BALES.

5 SD2 SOIL STOCK PILE DETAIL
SCALE: NONE

NOTES
1. INLET PROTECTION SHALL BE PLACED IN ACCORDANCE WITH NEW YORK STATE GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL.
2. LAY ONE BLOCK ON EACH SIDE OF THE STRUCTURE ON ITS SIDE FOR DEWATERING.
3. HARDWARE CLOTH OR 1/2" WIRE MESH SHALL BE PLACED OVER BLOCK OPENINGS TO SUPPORT STONE.

6 SD2 PLACEMENT AND CONSTRUCTION OF AN INLET PROTECTION BARRIER
SCALE: NONE

LOCATION	d_{50} (IN)	T (FT)	L	W
8" DIA. XHCI	6	1.25	8	9
15" CPE	6	1.25	12	14

7 SD2 PIPE OUTLET CONDITIONS
SCALE: NOT TO SCALE

8 D2 RIP-RAP OUTLET SEDIMENT TRAP DETAIL
SCALE: NOT TO SCALE

GRADING AND TREE PROTECTION NOTES:

1. ALL EARTHWORK SHALL BE SMOOTHLY AND EVENLY BLENDED INTO EXISTING CONDITIONS.
2. THE EROSION CONTROL MEASURES DEPICTED ON THESE PLANS ARE REQUIRED AS MINIMUM. THE CONTRACTOR IS RESPONSIBLE FOR IMPLEMENTING AND AND ALL GENERAL AND PARTICULAR MEASURES AS DEEMED NECESSARY BY THE OWNER'S FIELD REPRESENTATIVES AND THE ENGINEER.
3. TEMPORARY PROTECTION: PROVIDE TEMPORARY FENCING, BARRICADES, OR OTHER SUITABLE GUARDS LOCATED OUTSIDE THE DRIP LINE (OUTER PERIMETER OF BRANCHES) TO PROTECT TREES AND OTHER PLANTS TO REMAIN, FROM DAMAGE.
4. PROTECT TREE ROOT SYSTEMS FROM DAMAGE DUE TO NOXIOUS MATERIALS CAUSED BY RUNOFF OR SPILLAGE WHILE MIXING, PLACING OR STORING CONSTRUCTION MATERIALS. PROTECT ROOT SYSTEMS FROM FLOODING, ERODING OR EXCESSIVE WETTING CAUSED BY DEWATERING OPERATIONS.
5. DO NOT STORE CONSTRUCTION MATERIALS, DEBRIS OR EXCAVATED MATERIAL WITHIN TREE DRIP LINE OF REMAINING TREES. DO NOT PERMIT VEHICLES OR FOOT TRAFFIC WITHIN THE DRIP LINE, AND PREVENT SOIL COMPACTION OVER ROOT SYSTEMS.
6. WHERE EXCAVATION FOR NEW CONSTRUCTION IS REQUIRED WITHIN TREE DRIP LINES, HAND EXCAVATE TO MINIMIZE DAMAGE TO ROOT SYSTEMS. USE NARROWTINE SPADING FORKS AND COMB SOIL TO EXPOSE ROOTS.
   A. RELOCATE ROOTS IN BACKFILL AREAS WHEREVER POSSIBLE. IF ENCOUNTERING LARGE, MAIN LATERAL ROOTS, EXPOSE BEYOND EXCAVATION LIMITS AS REQUIRED TO BEND AND RELOCATE WITH- OUT BREAKING. IF ENCOUNTERING IMMEDIATELY ADJACENT TO LOCATION OF NEW CONSTRUCTION AND RELOCATION IS NOT PRACTICAL, CUT ROOTS APPROXIMATELY 3 INCHES BACK FROM NEW CONSTRUCTION.
   B. DO NOT ALLOW EXPOSED ROOTS TO DRY OUT BEFORE PLACING PERMANENT BACKFILL. PROVIDE TEMPORARY EARTH COVER OR PACK WITH PEAT MOSS AND WRAP WITH BURLAP. WATER AND MAINTAIN IN A MOIST CONDITION AND TEMPORARILY SUPPORT AND PROTECT ROOTS FROM DAMAGE UNTIL THEY ARE PERMANENTLY RELOCATED AND COVERED WITH EARTH.
7. WHERE UTILITY TRENCHES ARE REQUIRED WITHIN TREE DRIP LINES, TUNNEL UNDER OR AROUND THE ROOTS BY DRILLING, AUGER BORING PIPE JACKING OR DIGGING BY HAND.
   A. ROOT PRUNING: DO NOT CUT MAIN LATERAL ROOTS OR TAP ROOTS; CUT ONLY SMALLER ROOTS THAT INTERFERE WITH INSTALLATION ON NEW WORK. CUT ROOTS WITH SHARP PRUNING INSTRUMENT; DO NOT BREAK OR CHOP.
8. GRADE LOWERING: WHERE NEW FINISHED GRADE IS INDICATED BELOW EXISTING GRADE AROUND TREES, SLOPE GRADE AWAY FROM TREES.
   A. ROOT PRUNING: PRUNE TREE ROOTS EXPOSED DURING GRADE LOWERING. DO NOT CUT MAIN LATERAL ROOTS OR TAP ROOTS: CUT ONLY SMALLER ROOTS. CUT ROOTS WITH SHARP PRUNING INSTRUMENTS: DO NOT BREAK OR CHOP.
9. MINOR FILL: WHERE EXISTING GRADE IS 6 INCHES OR LESS BELOW ELEVATION OF FINISHED GRADE SHOWN AROUND TREES, FILL WITH TOPSOIL. PLACE TOPSOIL IN A SINGLE UNCOMPACTED LAYER AND HAND GRADE TO REQUIRED FINISHED ELEVATIONS.
10. DO NOT REGRADE MORE THAN 6 INCHES ABOVE EXISTING GRADE AROUND TREES. PROVIDE TREE PROTECTION FOR FILL OVER 6 INCHES.
11. PRUNE REMAINING TREES AFFECTED BY TEMPORARY AND NEW CONSTRUCTION.
12. PRUNE REMAINING TREES TO COMPENSATE FOR ROOT LOSS CAUSED BY DAMAGING OR CUTTING ROOT SYSTEM. PROVIDE SUBSEQUENT MAINTENANCE DURING CONTRACT PERIOD.
13. PRUNING STANDARDS: PRUNE TREES ACCORDING TO THE NATIONAL ARBORIST ASSOCIATION'S "PRUNING STANDARDS FOR SHADE TREES".
14. CUT BRANCHES WITH SHARP PRUNING INSTRUMENTS: DO NOT BREAK OR CHOP.
15. CHIP BRANCHES REMOVED FROM TREES. SPREAD MATERIALS WHERE INDICATED OR AS DIRECTED BY THE ENGINEER/ARCHITECT.

CONSTRUCTION SPECIFICATIONS FOR RIP-RAP OUTLET SEDIMENT TRAP

1. THE AREA UNDER EMBANKMENT SHALL BE CLEARED, GRUBBED AND STRIPPED OF ANY VEGETATION AND ROOT MAT. THE POOL AREA SHALL BE CLEARED.

2. THE FILL MATERIAL FOR THE EMBANKMENT SHALL BE FREE OF ROOTS OR OTHER WOODY VEGETATION AS WELL AS OVERSIZED STONES, ROCKS, ORGANIC MATERIAL OR OTHER OBJECTIONABLE MATERIAL. THE EMBANKMENT SHALL BE COMPACTED BY TRAVERSING WITH EQUIPMENT WHILE IT IS BEING CONSTRUCTED. MAXIMUM HEIGHT OF EMBANKMENT SHALL BE FIVE (5) FEET, MEASURED AT THE CENTERLINE OF THE EMBANKMENT.

3. ALL FILL SLOPES SHALL BE 2:1 OR FLATTER, CUT SLOPES 1:1 OR FLATTER.

4. ELEVATION OF THE TOP OF ANY DIKE DIRECTING WATER INTO TRAP MUST EQUAL OR EXCEED THE HEIGHT OF THE EMBANKMENT.

5. FILTER CLOTH SHALL BE PLACED OVER THE BOTTOM AND SIDES OF THE OUTLET CHANNEL PRIOR TO PLACEMENT OF STONE. SECTIONS OF FABRIC MUST OVERLAP AT LEAST ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO THE EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL. FILTER FABRIC SHALL BE CONTECH NON-WOVEN GEOTEXTILE C-60NW OR APPROVED EQUAL.

6. STONE USED IN THE OUTLET CHANNEL SHALL BE FOUR (4) TO EIGHT (8) INCHES (RIP-RAP). TO PROVIDE A FILTERING EFFECT, A LAYER OF FILTER CLOTH SHALL BE EMBEDDED ONE (1) FOOT WITH SECTION NEAREST THE ENTRANCE PLACED ON TOP. FABRIC SHALL BE EMBEDDED AT LEAST SIX (6) INCHES INTO EXISTING GROUND AT ENTRANCE OF OUTLET CHANNEL.

7. SEDIMENT SHALL BE REMOVED AND TRAP RESTORED TO ITS ORIGINAL DIMENSIONS WHEN SEDIMENT HAS ACCUMULATED TO 1/2 THE DESIGN DEPTH OF THE TRAP. REMOVED SEDIMENT SHALL BE DEPOSITED IN A SUITABLE AREA AND IN SUCH A MANNER THAT IT WILL NOT ERODE.

8. THE STRUCTURE SHALL BE INSPECTED AFTER EACH RAIN AND REPAIRED AS NEEDED.

9. CONSTRUCTION SHALL BE CARRIED OUT IN SUCH A MANNER THAT EROSION AND WATER POLLUTION ARE MINIMIZED.

10. THE STRUCTURE SHALL BE REMOVED AND THE AREA STABILIZED WHEN DRAINAGE AREA HAS BEEN PROPERLY STABILIZED.

11. STAKES SHALL BE PLACED IN THE GROUND (2 MIN.) INDICATING CLEANOUT ELEVATION.

EROSION AND SEDIMENT CONTROL MEASURES

THE SOIL EROSION AND SEDIMENT CONTROL MEASURES OUTLINED HEREIN ARE CONSIDERED TO BE AN INTEGRAL PART OF THE STORMWATER POLLUTION PREVENTION PLAN.

TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES

GENERAL MEASURES:

1. DAMAGE TO SURFACE WATERS RESULTING FROM EROSION AND SEDIMENTATION SHALL BE MINIMIZED BY STABILIZING DISTURBED AREAS AND BY REMOVING SEDIMENT FROM CONSTRUCTION SITE DISCHARGES.

2. AS MUCH AS IS PRACTICAL, EXISTING VEGETATION SHALL BE PRESERVED. FOLLOWING THE COMPLETION OF CONSTRUCTION ACTIVITIES IN ANY PORTION OF THE SITE, PERMANENT VEGETATION SHALL BE ESTABLISHED ON ALL EXPOSED SOILS.

3. SITE PREPARATION ACTIVITIES SHALL BE PLANNED TO MINIMIZE THE SCOPE AND DURATION OF SOIL DISRUPTION.

4. PERMANENT TRAFFIC CORRIDORS SHALL BE ESTABLISHED AND "ROUTES OF CONVENIENCE" SHALL BE AVOIDED. STABILIZED CONSTRUCTION ENTRANCES SHALL BE INSTALLED AT ALL POINTS OF ENTRY ONTO THE PROJECT SITE.

5. CONSTRUCTION TRAFFIC SHALL NOT CROSS STREAMS OR DITCHES EXCEPT AT SUITABLE CROSSING FACILITIES, AND SHALL NOT OPERATE UNNECESSARILY WITHIN WATERWAYS OR DRAINAGE DITCHES.

PARTICULAR MEASURES

STABILIZED CONSTRUCTION ENTRANCE:

1. THE STABILIZED CONSTRUCTION ENTRANCE, UTILIZED DURING CONSTRUCTION, SHALL BE MAINTAINED IN A CONDITION THAT SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED, OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY.

WHEELS SHALL BE CLEANED TO REMOVE SEDIMENT PRIOR TO ENTRANCE ONTO PUBLIC RIGHTS-OF-WAY. WHEN WASHING IS REQUIRED, IT SHALL BE DONE ON AN AREA STABILIZED WITH STONE AND WHICH DRAINS INTO AN APPROVED SEDIMENT TRAPPING DEVICE.

PERIODIC INSPECTIONS AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

2. STORM DRAIN SEDIMENT FILTER: PRIOR TO THE COMMENCEMENT OF CONSTRUCTION, STORM DRAIN INLET PROTECTION BARRIERS SHALL BE CONSTRUCTED AT EXISTING STORM DRAINS AS REQUIRED. THEY SHALL BE MAINTAINED IN GOOD CONDITION UNTIL FINAL VEGETATIVE COVER IS WELL ESTABLISHED ON ALL DISTURBED AREAS UPSTREAM OF THE INLET.

3. IMMEDIATELY FOLLOWING COMPLETION OF ANY AND ALL OF THE PROPOSED STORM DRAIN INLETS, STORM DRAIN INLET PROTECTION BARRIERS SHALL BE CONSTRUCTED. THESE SHALL FUNCTION TO PREVENT SEDIMENT ENTRANCE INTO THE STORM DRAINS. THEY SHALL BE MAINTAINED IN GOOD CONDITION UNTIL FINAL VEGETATIVE COVER IS WELL ESTABLISHED ON ALL DISTURBED AREAS UPSTREAM OF THE INLET.

4. DRAINAGE DITCH SEDIMENT FILTERS: UNTIL SUCH TIME AS FINAL SITE STABILIZATION IS COMPLETED, DITCHES SHALL RECEIVE TREATMENT WITH STONE CHECK DAMS SO AS TO EFFECTIVELY TRAP SEDIMENT AND MINIMIZE ITS RELEASE OFF-SITE. STONE CHECK DAMS SHALL BE CONSTRUCTED WITHIN EACH DITCH BEGINNING AT ITS DOWNSTREAM TERMINUS AND SHOULD BE PLACED AT INTERVALS OF LESS THAN 100 FEET.

5. HAY BALE BERMS OR SILT FENCES: HAY BALE BERMS OR SILT FENCES SHALL BE CONSTRUCTED AROUND ALL STOCKPILESOF FILL, TOPSOIL, AND EXCAVATED OVERBURDEN THAT ARE TO REMAIN EXPOSED FOR PERIODS LESS THAN 30 DAYS. HAY BALE BERMS AND SILT FENCES SHALL BE ANCHORED AND MAINTAINED IN GOOD CONDITION UNTIL SUCH TIME AS SAID STOCKPILES ARE REMOVED AND STOCKPILING AREAS ARE BROUGHT TO FINAL GRADE AND PERMANENTLY STABILIZED.

6. TOPSOIL AND FILL THAT IS TO REMAIN STOCKPILED ON-SITE FOR PERIODS GREATER THAN 30 DAYS SHALL BE STABILIZED BY SEEDING. PRIOR TO THE SEEDNG OPERATION, THE STOCKPILED MATERIAL SHALL BE GRADED AS NEEDED AND FEASIBLE TO PERMIT THE USE OF CONVENTIONAL EQUIPMENT FOR SEEDBED PREPARATION, SEEDING, MULCH APPLICATION, AND MULCH ANCHORING.

7. IN NO CASE SHALL ERODIBLE MATERIALS BE STOCKPILED WITHIN 25 FEET OF ANY DITCH, STREAM, OR OTHER SURFACE WATER BODY.

CONSTRUCTION SPECIFICATIONS

STONE SHALL BE PLACED ON A FILTER FABRIC FOUNDATION.

STONE SIZE – USE 3/4" STONE MINIMUM, OR RECLAIMED OR RECYCLED CONCRETE EQUIVILENT.

SIDE SLOPE (S) – 3:1 SLOPE OR LESS.

LENGTH (L) – LENGTH OF LEVEL PORTION VARIES (10 FT. TYPICAL) REFER TO EROSION CONTROL PLAN.

THICKNESS – NOT LESS THAN TWELVE (12) INCHES.

WIDTH – FIVE (5) FOOT MINIMUM WITH 1% CROSS PITCH MINIMUM.

MAINTENANCE – THE STONE FILTER SHALL BE MAINTAINED IN A CONDITION WHICH WILL PREVENT TRACKING OR FLOWING OF SEDIMENT FROM THE SPILLWAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.

ALL DISTURBED AREAS SHALL BE VEGETATED OR OTHERWISE PROTECTED AGAINST SOIL EROSION.

PERIODIC INSPECTION AND NEEDED MAINTENANCE SHALL BE PROVIDED AFTER EACH RAIN.

UPON COMPLETING CONTRUCTION, THE STONE FILTER FOR THE SILTATION BASINS SHALL BE REMOVED (WITH TRAP SEDIMENT) AND THE GRADES RESTORED TO THE DESIGN CONDITIONS.

9 SD2 STONE FILTER DETAIL
SCALE: NOT TO SCALE

PERMANENT EROSION AND SEDIMENT CONTROL MEASURES:

1. PERMANENT VEGETATIVE COVER: IMMEDIATELY FOLLOWING THE COMPLETION OF CONSTRUCTION ACTIVITY IN ANY PORTION OF THE SITE, PERMANENT VEGETATION SHALL BE ESTABLISHED ON ALL EXPOSED SOILS. ALL DISTURBED AREAS SHALL BE SEEDED AND MULCHED AS SOON AS PRACTICAL FOLLOWING DISTURBANCE TO STABILIZE BARE SOIL AND PROMOTE THE PROMPT RE-ESTABLISHMENT OF VEGETATION:

A. AN ADEQUATE SEEDBED SHALL BE PREPARED BY SCARIFYING COMPACTED SOIL AND REMOVING SURFACE DEBRIS AND OBSTACLES.

B. LIME SHALL BE APPLIED SUFFICIENTLY TO ATTAIN A SOIL ACIDITY pH OF 6.0 TO 7.0.

C. FERTILIZER (5-10-10 MIXTURE OR EQUIVALENT) SHALL BE APPLIED PER SOIL TEST RESULTS OR AT A RATE OF 600 LBS. PER ACRE.

D. DISTURBED AREAS WHICH WILL REMAIN TEMPORARILY FALLOW FOR PERIODS GREATER THAN 14 DAYS SHALL BE SEEDED AT THE FOLLOWING RATE TO PRODUCE TEMPORARY GROUND COVER: 30 LBS. RYEGRASS (ANNUAL OR PERENNIAL) PER ACRE. DURING THE WINTER, USE 100 LBS. CERTIFIED "AROOSTOOK" WINTER RYE (CEREAL RYE) PER ACRE.

E. PERMANENT SEEDING SHALL BE APPLIED ON 4" MIN TOPSOIL AT THE FOLLOWING RATE FOR ROUGH OR OCCASIONAL MOWING AREAS:

8 LBS EMPIRE BIRDSFOOT TREFOIL OR COMMON WHITE CLOVER PER ACRE PLUS
200 LBS TALL FESCUE PER ACRE PLUS
2 LBS REDTOP OR 5 LBS RYEGRASS (PERENNIAL) PER ACRE

FOR MOWED AREAS:
65 LBS KENTUCKY BLUEGRASS PER ACRE
65 LBS RYEGRASS (PERENNIAL) PER ACRE

F. ALL SEEDING SHALL BE PERFORMED USING THE BROADCAST METHOD OR HYDROSEEDING, UNLESS OTHERWISE APPROVED.

G. ALL DISTURBED AREAS SHALL BE STABILIZED SUBSEQUENT TO SEEDING BY APPLYING 2 TONS OF STRAW MULCH PER ACRE. STRAW MULCH SHALL BE ANCHORED BY APPLYING 750 LBS OF WOOD FIBER MULCH PER ACRE WITH A HYDROSEEDER, OR TUCKING THE MULCH WITH SMOOTH DISCS OR OTHER MULCH ANCHORING TOOLS TO A DEPTH OF 3". MULCH ANCHORING TOOLS SHALL BE PULLED ACROSS SLOPES ALONG TOPOGRAPHIC CONTOURS.

2. ALL UNNECESSARY REMOVAL OF HEALTHY TREES SHALL BE AVOIDED. MATERIALS SHALL NOT BE STORED NOR MACHINERY OPERATED WITHIN THE DRIP-LINE OF THE TREES TO REMAIN.

3. ALL SLOPES OF 2:1 OR STEEPER ARE TO BE STABILIZED WITH STONE RIPRAP AND SOIL STABILIZATION FABRIC WHEN APPLICABLE.

MAINTENANCE OF EROSION AND SEDIMENT CONTROL MEASURES:

1. THE DEVELOPER/CONTRACTOR OR HIS BUILDER SHALL ON A DAILY BASIS INSPECT AND MAINTAIN THE INTEGRITY AND FUNCTION OF ALL TEMPORARY EROSION CONTROL MEASURES THROUGHOUT THE DURATION OF THE DEVELOPMENT PROCESS. THE DEVELOPER SHALL HAVE A QUALIFIED PROFESSIONAL INSPECT ALL EROSION AND SEDIMENT CONTROL MEASURES AT LEAST EVERY 7 CALENDAR DAYS AND WITHIN 24 HOURS OF THE END OF A STORM EVENT OF 0.5 INCHES OR GREATER. A LOG OF ALL SITE INSPECTIONS SHALL BE MAINTAINED ON SITE AND MADE AVAILABLE FOR REVIEW BY THE PERMITING AUTHORITY.

2. TO ASSURE PROPER FUNCTION, SILTATION BARRIERS SHALL BE MAINTAINED IN GOOD CONDITION AND REINFORCED, EXTENDED, REPAIRED, OR REPLACED AS NECESSARY. WASHOUTS SHALL BE IMMEDIATELY REPAIRED, RE-SEEDED, AND PROTECTED FROM FURTHER EROSION.

3. ALL ACCUMULATED SEDIMENT SHALL BE REMOVED AND CONTAINED IN APPROPRIATE SPOIL AREAS.

4. WATER SHALL BE APPLIED TO NEWLY SEEDED AREAS AS NEEDED UNTIL GRASS COVER IS WELL ESTABLISHED. WATER SHALL BE APPLIED TO EXPOSED SOILS, AS NECESSARY, TO EFFECTIVELY CONTROL WIND EROSION OF THE PROJECT SITE AS DESIGNED.

5. THE SEDIMENT BASIN SHALL BE CLEANED OUT WHEN THE LEVEL OF SEDIMENT REACHES 6 INCHES BELOW THE INVERT OF THE PRIMARY INLET OF THE OUTLET CONTROL STRUCTURE. THE CONSTRUCTION FABRIC WILL BE CLEANED OR REPLACED WHEN THE SEDIMENT POOL NO LONGER DRAINS PROPERLY.

6. SEDIMENT SHALL BE REMOVED FROM BEHIND THE SEDIMENT FENCE WHEN IT BECOMES ABOUT 0.5 FT DEEP AT THE FENCE. THE SEDIMENT FENCE SHALL BE REPAIRED AS NECESSARY TO MAINTAIN BARRIER.

7. ALL SEEDED AREAS SHALL BE FERTILIZED, RESEEDED AS NECESSARY, AND MULCHED ACCORDING TO SPECIFICATIONS IN THE VEGETATIVE PLAN TO MAINTAIN A VIGOROUS, DENSE VEGETATIVE COVER.

8. ALL STORM WATER MANAGEMENT STRUCTURES (I.E. CATCH BASIN) SHALL BE REGULARLY INSPECTED FOR SEDIMENT ACCUMULATIONS. CATCH BASINS AND SEDIMENT TRAPS SHALL BE CLEANED WHEN SEDIMENT DEPTH REACHES A MAXIMUM OF 1/2 THE AVAILABLE SUMP DEPTH.

CONSTRUCTION SPECIFICATIONS:

1. STONE SHALL BE PLACED ON A FILTER FABRIC FOUNDATION.
2. SET SPACING OF CHECK DAMS SUCH THAT THE ELEVATIONS OF THE DOWNSTREAM DAM ARE AT THE SAME ELEVATION OF THE TOE OF THE UPSTREAM DAM.
3. EXTEND THE STONE A MINIMUM OF 1.5 FEET BEYOND THE DITCH BANKS TO PREVENT CUTTING AROUND THE DAM.
4. PROTECT THE CHANNEL DOWNSTREAM OF THE LOWEST CHECK DAM FROM SCOUR AND EROSION WITH STONE OR LINER AS APPROPRIATE.

10 SD2 STONE CHECK DAM DETAIL
SCALE: NOT TO SCALE

CONSTRUCTION SEQUENCING

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH THE FOLLOWING CONSTRUCTION SEQUENCE:

1. CONTRACTOR AND HIS/HER SUBCONTRACTORS SHALL READ AND UNDERSTAND THE CONDITIONS OF THE "*NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION (NYSDEC) STATE POLLUTANT DISCHARGE ELIMINATION (SPDES) GENERAL PERMIT FOR STORM WATER DISCHARGES FROM CONSTRUCTION ACTIVITY*", GP-02-01 FOR THIS PROJECT.

2. CONTRACTOR AND HIS/HER SUBCONTRACTORS SHALL SIGN A COPY OF THE GENERAL PERMIT, GP-02-01, CERTIFICATION STATEMENT.

3. CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS NECESSARY FOR THE WORK OUTLINED HEREIN.

4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTATION OF ALL STORM WATER POLLUTION PREVENTION MEASURES.

5. CONTRACTOR SHALL HOLD A PRECONSTRUCTION CONFERENCE WITH THE OWNER'S REPRESENTATIVES AT LEAST ONE WEEK PRIOR TO STARTING CONSTRUCTION.

6. PRIOR TO COMMENCING ANY CLEARING, GRUBBING, EARTHWORK ACTIVITIES, ETC. AT THE SITE, THE CONTRACTOR SHALL FLAG THE WORK LIMITS AND SHALL INSTALL ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (I.E. SILT FENCES, TREE PROTECTION/BARRIER FENCES, STABILIZED CONSTRUCTION ENTRANCES, STORM DRAIN SEDIMENT FILTERS, DRAINAGE DITCH SEDIMENT FILTERS, ETC.) INDICATED ON THE PROJECT DRAWINGS. TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES MUST BE CONSTRUCTED, STABILIZED, AND FUNCTIONAL BEFORE SITE DISTURBANCE BEGINS WITHIN THEIR TRIBUTARY AREAS.

7. CONTRACTOR SHALL CLEAR AND GRUB THE AREA OF THE STORMWATER DETENTION BASIN. THIS AREA SHALL NOT EXCEED FIVE (5) ACRES IN EXTENT WITHOUT TEMPORARY STABILIZATION.

8. PRIOR TO COMMENCING CLEARING, GRUBBING AND/OR EARTHWORK ACTIVITIES IN ANY OTHER AREA OF THE SITE, THE CONTRACTOR SHALL INSTALL INLET AND OUTLET PROTECTION MEASURES (RIPRAP OVERFLOW WEIR(S), CULVERT INLET/OUTLET PROTECTION, ETC.) AND SHALL STABILIZE THE AREAS DISTURBED DURING THE CONSTRUCTION.

9. THE CONTRACTOR SHALL CONSTRUCT A TEMPORTARY SEDIMENT TRAP AS PER "NEW YORK STATE GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL," AT LOCATION(S) APPROVED BY THE ENGINEER. CONTRACTOR SHALL INSTALL TEMPORARY DIVERSION MEASURES WITH ASSOCIATED STABILIZATION MEASURES (I.E., VEGETATIVE COVER, DRAINAGE DITCH SEDIMENT FILTERS, STORM DRAIN SEDIMENT FILTERS, ETC.) TO ASSURE THAT STORMWATER RUNOFF IS CONVEYED TO THE TEMPORARY SEDIMENT BASIN.

10. TEMPORARY DIVERSION MEASURES SHALL BE LOCATED IN A MANNER THAT WILL ASSURE THAT THE AREA TRIBUTARY TO EACH DIVERSION DOES NOT EXCEED FIVE (5) ACRES. THESE TEMPORARY DIVERSION MEASURES SHALL BE INSPECTED DAILY AND REPAIRED/STABILIZED AS NECESSARY TO MINIMIZE EROSION.

11. CONTRACTOR SHALL COMMENCE SITE CONSTRUCTION ACTIVITIES AS REQUIRED.

12. IMMEDIATELY FOLLOWING COMPLETION OR SUSPENSION OF CONSTRUCTION ACTIVITIES IN ANY PORTION OF THE SITE, PERMANENT VEGETATION SHALL BE ESTABLISHED ON ALL EXPOSED SOILS.

13. PRIOR TO FINALIZING CONSTRUCTION, ALL CATCH BASINS AND DRAINAGE LINES SHALL BE CLEANED OF ALL SILT AND SEDIMENT.

14. UPON ESTABLISHMENT OF PERMANENT VEGETATIVE COVER ON ALL DISTURBED AREAS OF THE SITE, THE CONTRACTOR SHALL REMOVE THE CONSTRUCTION FABRIC FROM THE PRIMARY INLET OF THE OUTLET CONTROL STRUCTURE. THIS SHALL ONLY BE DONE WHEN THE PRIMARY OUTLET IS NO LONGER SUBMERGED.

15. CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES AND IMMEDIATELY ESTABLISH PERMANENT VEGETATION ON THE AREAS DISTURBED DURING THEIR REMOVAL.

16. ALL EROSION CONTROL INSTALLATION AND MAINTENANCE MEASURES SHALL MEET THE REQUIREMENTS OF THE NEW YORK STATE SOIL AND WATER CONSERVATION SOCIETY DOCUMENT "NEW YORK STATE GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL," UNITED STATES DEPARTMENT OF TRANSPORTATION, FEDERAL HIGHWAY ADMINISTRATION GUIDELINES, AND THE LATEST "URBAN EROSION AND SEDIMENT CONTROL GUIDE BOOK" OF THE DUTCHESS COUNTY SOIL AND WATER CONSERVATION DISTRICT.

17. ON-SITE DUST CONTROL SHALL BE ACCOMPLISHED BY STANDARD METHODS OF LIGHTLY WATERING ALL EXPOSED SOIL AND RAPIDLY STABILIZING THE REGRADED AREAS WITH TOPSOIL, LOAM AND/OR SEEDING.

18. THE PROJECT ENGINEER SHALL BE NOTIFIED NO LESS THAN 48 HOURS PRIOR TO THE START OF ANY SITE WORK AND BY SUCH NOTIFICATION SHALL BE PROVIDED WITH THE NAME OF TELEPHONE NUMBER OF THE GENERAL CONTRACTOR RESPONSIBLE FOR SUCH WORK.

19. PRIOR TO COMMENCEMENT OF CONSTRUCTION, A QUALIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (HIRED BY OWNER) SHALL CONDUCT AN ASSESSMENT OF THE SITE AND CERTIFY THAT THE APPROPRIATE EROSION AND SEDIMENT CONTROL STRUCTURES AS DEPICTED ON THE PLANS HAVE BEEN ADEQUATELY INSTALLED AND IMPLEMENTED. CONTRACTOR SHALL CONTACT THE QUALIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL ONCE THE EROSION AND SEDIMENT CONTROL STRUCTURES HAVE BEEN INSTALLED.

20. THE QUALIFIED PROFESSIONAL MAY RECOMMEND THAT THE CONTRACTOR INSTALL ADDITIONAL EROSION CONTROL MEASURES IF DEEMED NECESSARY TO PROTECT ANY UNDISTURBED AREAS OF THE SITE. ANY SUCH REQUESTS SHALL BE MADE DIRECTLY TO THE CONTRACTOR AND FOLLOWED UP WITH A WRITTEN NOTIFICATION TO THE DEVELOPER. IN ADDITION, THE QUALIFIED PROFESSIONAL SHALL BE CONSULTED ON ANY SPECIAL ADDITIONS OR DELETIONS OF EROSION CONTROL MEASURES WARRANTED BY CHANGING FIELD CONDITIONS. THE NOI MAY NEED TO BE UPDATED AS A RESULT OF THESE CHANGES.

21. THE OWNER SHALL FILE A NOTICE OF INTENT (NOI) WITH THE NYSDEC PRIOR TO COMMENCING CONSTRUCTION ACTIVITIES AND A NOTICE OF TERMINATION (NOT) WITH NYSDEC FOLLOWING CONSTRUCTION ACTIVITIES.

22. IF GROUNDWATER IS ENCOUNTERED DURING CONSTRUCTION ACTIVITIES, THE CONTRACTOR SHALL CONSTRUCT A DEWATERING PIT (A.K.A. SUMP PIT) TO TRAP AND FILTER WATER FOR PUMPING TO A SUITABLE DISCHARGE AREA. THE DEWATERING PIT SHALL BE CONSTRUALL POST |CTED IN ACCORDANCE WITH THE EROSION SEDIMENT CONTROL BEST MANAGEMENT PRACTICES MANUAL SERIES (1991) AND NEW YORK STATE GUIDELINES FOR URBAN EROSION AND SEDIMENT CONTROL, LATEST EDITION.

23. WHEN ALL DISTURBED AREAS ARE STABLE, ALL TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES SHALL BE REMOVED PER THE APPROVAL OF THE QUALIFIED PROFESSIONAL AS DESCRIBED IN THE NYSDEC SPDES GENERAL PERMIT.

LITTER AND CONSTRUCTION DEBRIS CONTROL MEASURES

THE CONTRACTOR SHALL BE RESPONSIBLE FOR COMPLYING WITH THE FOLLOWING LITTER AND CONSTRUCTION DEBRIS CONTROL MEASURES:

1. CONTRACTOR SHALL DISPOSE OF ALL CONSTRUCTION DEBRIS OFF-SITE AT A FACILITY APPROVED FOR THE TYPE OF MATERIAL GENERATED AT THE SITE.

2. NO BURNING OR BURY PITS WILL BE PERMITTED ON-SITE.

3. TEMPORARY STORAGE CONTAINERS SHALL BE PROVIDED AS NECESSARY TO CONTROL LITTER AND CONSTRUCTION DEBRIS FROM ENTERING ON-SITE STORM WATER DISCHARGES.

4. PRIOR TO LEAVING THE SITE EACH DAY, THE CONTRACTOR SHALL INSPECT THE PROJECT SITE AND PLACE ALL LITTER AND CONSTRUCTION DEBRIS IN APPROPRIATE STORAGE CONTAINERS.

ISSUED FOR NYSDEC REVIEW - NOT FOR CONSTRUCTION

No. 52135

THE
Chazen
COMPANIES
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Planners
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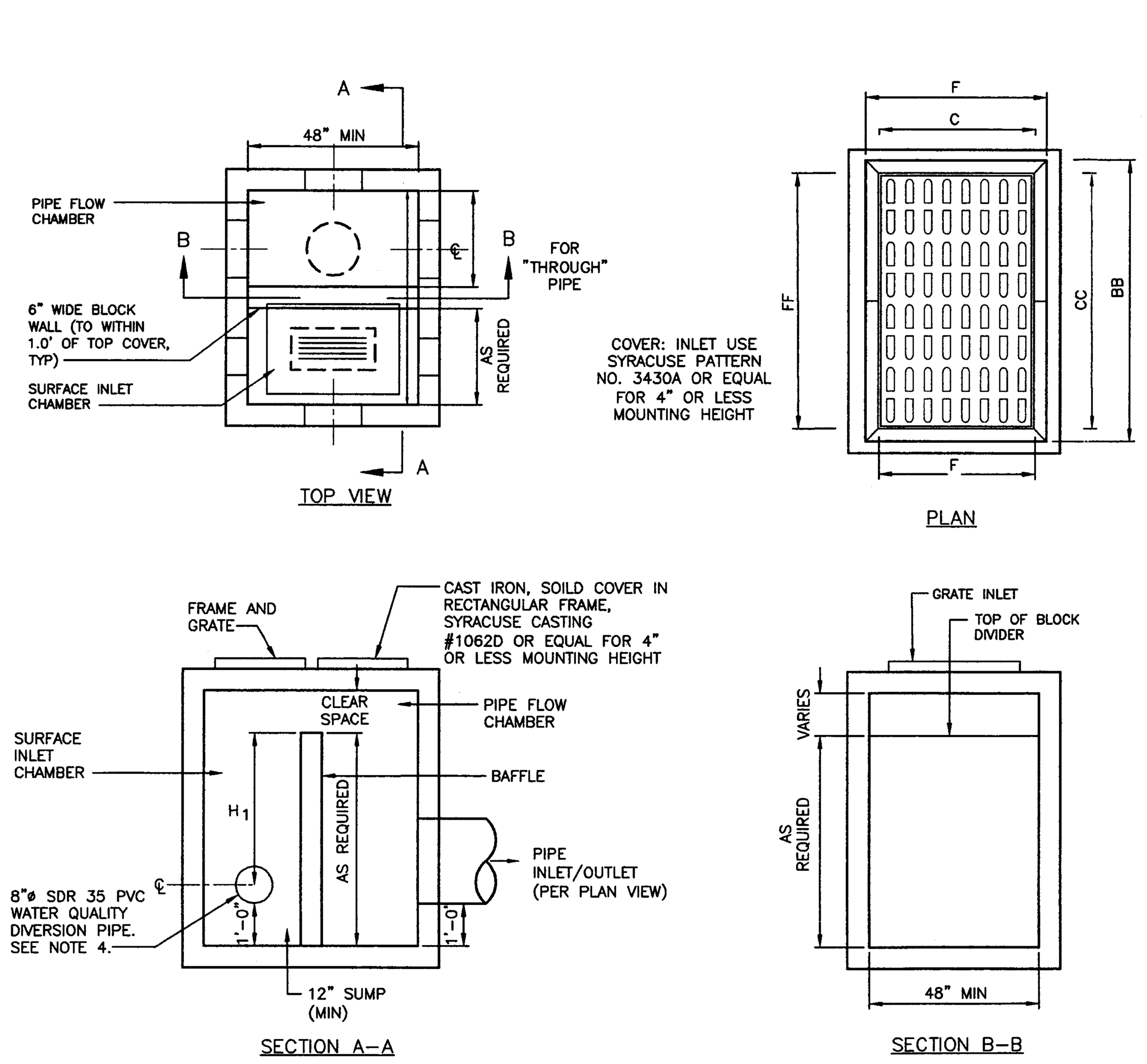
rev.	date	description
2	09/30/04	NO CHANGE THIS SHEET
1	05/17/04	REVISED PER CLIENT COMMENTS

HUDSON HERITAGE LLC

AREA 6 LANDFILL CLOSURE
EROSION CONTROL DETAILS
AND NOTES

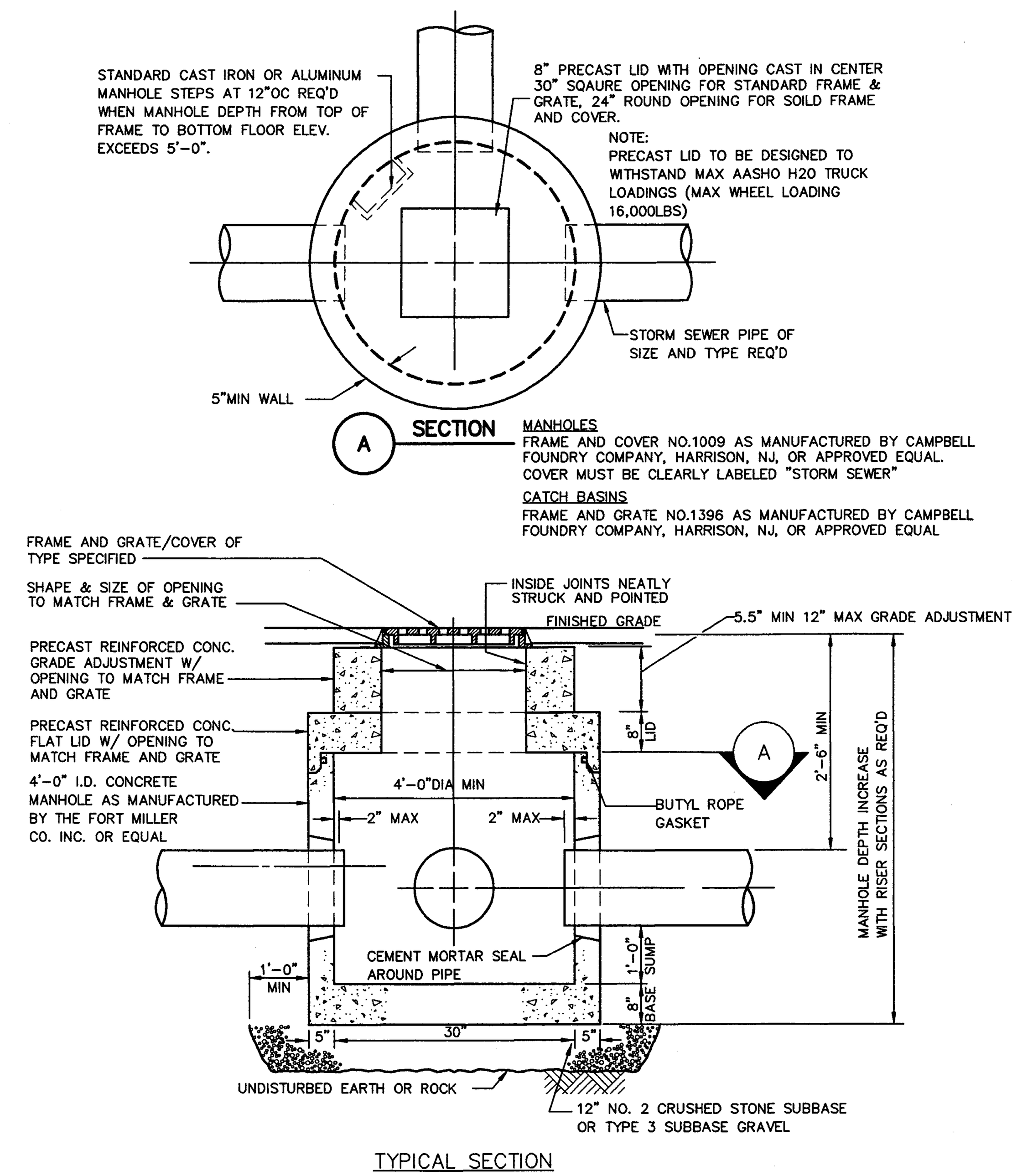
TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn DEC	checked
date 02/09/04	scale AS SHOWN
project no. 40307.00	
sheet no. SD2	

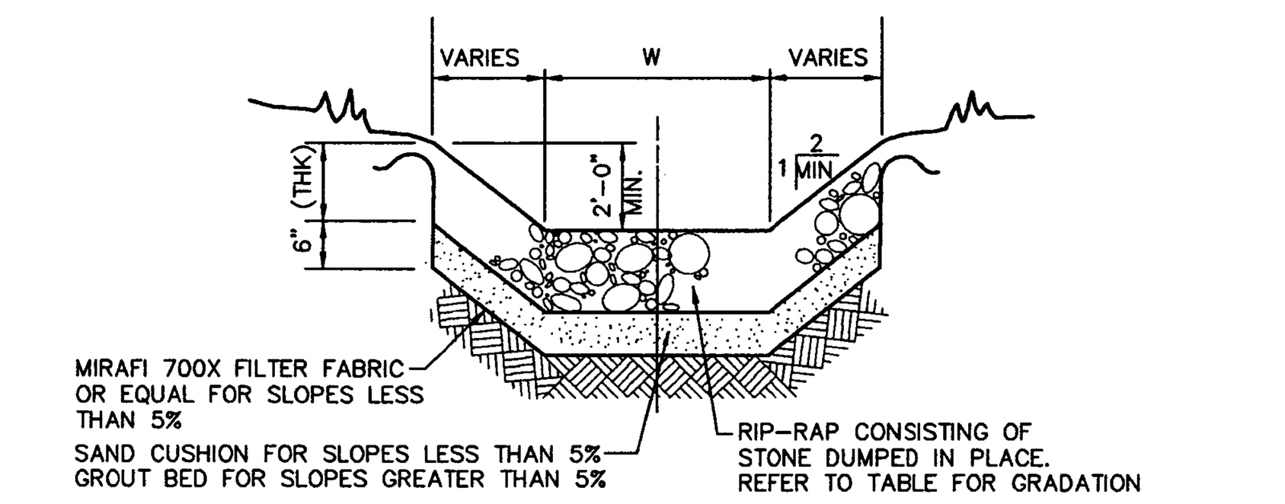


NOTES:
1. ALTERNATE CONFIGURATION OF 2 CATCH BASIN UNIT MAY BE SUBMITTED BY CONTRACTOR WITH APPROVAL FROM PROJECT ENGINEER. CLEAR SPACE ABOVE BAFFLE SHALL BE 12" TYPICAL.
2. CAST IRON CATCH BASIN TRAP, SYRACUSE FOUNDRY 2561 OR APPROVED EQUAL TO BE INSTALLED AT WATER QUALITY DIVERSION PIPE OUTLET.
3. PIPE PENETRATIONS SHALL BE AS SHOWN ON THE STORMWATER UTILITY PLAN.
4. SEE SWPPP FOR WATER QUALITY DIVERSION PIPE AND BAFFLE DIMENSIONS.

1 / SD3 **WATER QUALITY CATCH BASIN/ SPLITTER BOX DETAIL**
SCALE: NOT TO SCALE



2 / SD3 **PRECAST CONCRETE STORM SEWER MANHOLE/CATCH BASIN**
SCALE: NONE



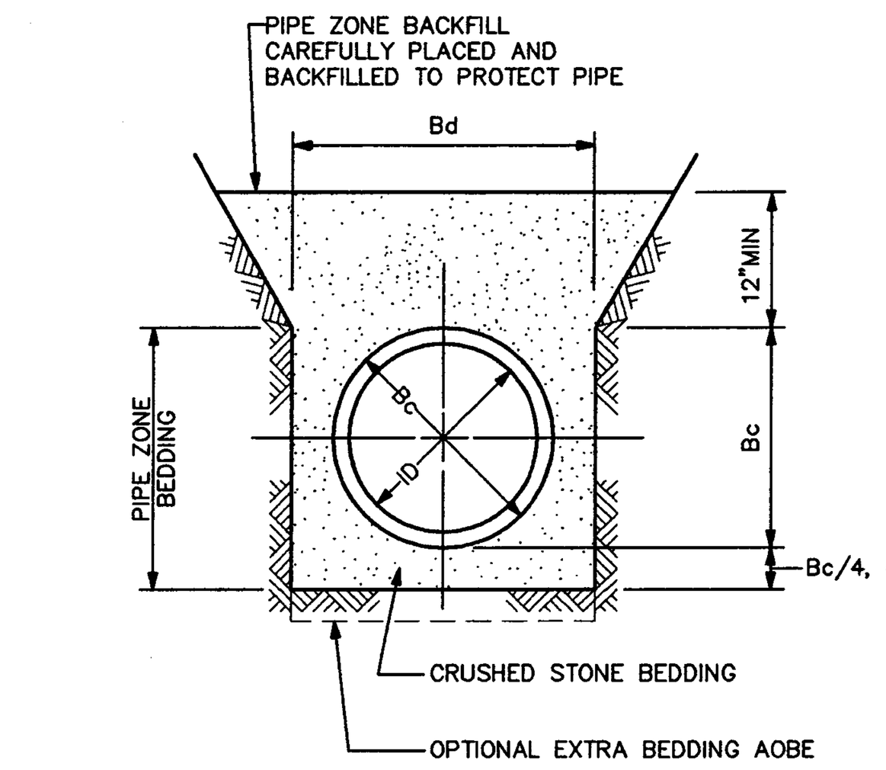
STONE LINED CHANNEL AND APRON SECTIONS

MIN THICKNESS (THK)	STONE FILLING ITEM	V MAX*2 2' DEPTH	SEE NOTES	STONE SIZE[1]	PERCENT OF TOTAL BY WEIGHT	MANNING'S ROUGHNESS COEFF "N"
9"	FINE	11.0 FPS	2,3,4	SMALLER THAN 8" LARGER THAN 3" SMALLER THAN NO. 10 SIEVE	90–100 50–100 0–10	0.0314
15"	LIGHT	13.0 FPS	2,3,4	LIGHTER THAN 100 LBS LARGER THAN 6" SMALLER THAN 1/2"	90–100 50–100 0–10	0.0352
18"	MEDIUM	15.5 FPS	2,3,4	HEAVIER THAN 100 LBS SMALLER THAN 4"	50–100 0–10	0.0395
30"	HEAVY	17.0 FPS	2,3,4	HEAVIER THAN 100 LBS SMALLER THAN 6"	50–100 0–10	0.0423

*1 SOURCE: HYDRAULIC ENGINEERING CIRCULAR NO. 15 DESIGN OF STABLE CHANNELS WITH FLEXIBLE LININGS
*2 SOURCE: SOILS DESIGN PROCEDURE SDP2, BANK AND CHANNEL PROTECTIVE LINING DESIGN PROCEDURES

NOTES:
1. STONE SIZES, OTHER THAN WEIGHTS, REFER TO THE AVERAGE OF THE MAXIMUM AND MINIMUM DIMENSIONS OF A STONE PARTICLE AS ESTIMATED BY THE ENGINEER.
2. MATERIALS SHALL CONTAIN LESS THAN 20 PERCENT OF STONES WITH A RATIO OF MAXIMUM TO MINIMUM DIMENSIONS GREATER THAN THREE.
3. AIR-COOLED BLAST FURNACE SLAG, COBBLES OR GRAVEL HAVING AT LEAST ONE FRACTURED FACE PER ACCEPTABLE SUBSTITUTES FOR STONE UNDER THESE ITEMS, PROVIDED THAT SOUNDNESS AND GRADATION REQUIREMENTS ARE MET.
4. MATERIALS SHALL CONTAIN A SUFFICIENT AMOUNT OF STONES SMALLER THAN THE AVERAGE STONE SIZE TO FILL THE SPACES BETWEEN THE STONES.

3 / SD3 **STONE LINE CHANNEL WITH STONE FILLING REQUIREMENTS**
SCALE: NONE

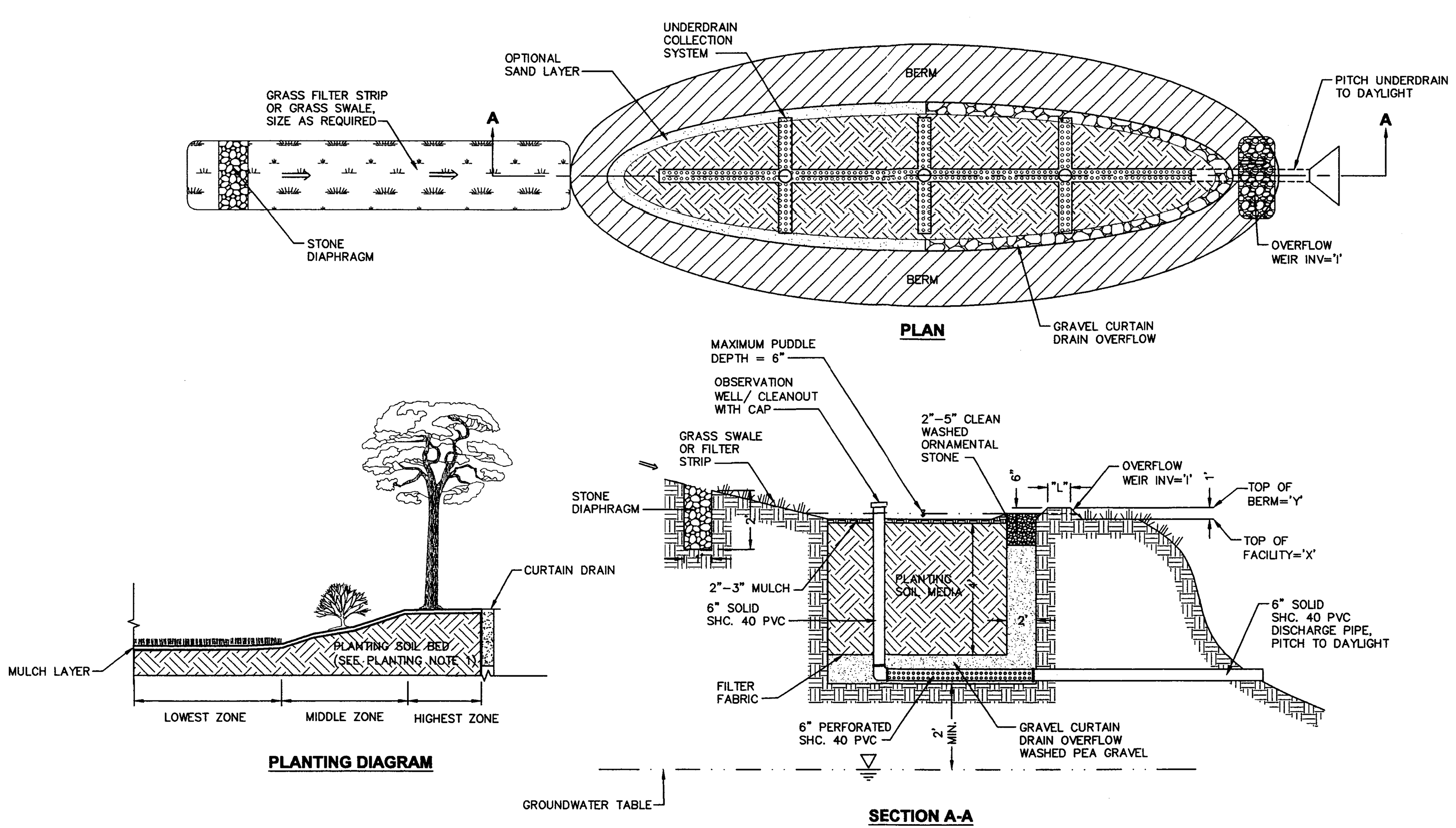


CORRUGATED HDPE PIPE

PIPE DIMENSIONS[1]			TRENCH DIMENSIONS			
NOMINAL SIZE	ID	Bc	ID/4	Bc/4	Bd(ft)	ROCK EXCAVATION BELOW PIPE (d)
6"	6"	7"	1.5"	1.75"	3.0'	6"
8"	8"	9"	2"	2.25"	3.0'	6"
10"	10"	12"	2.5"	3.0"	3.0'	6"
12"	12"	15"	3"	4"	3.0'	6"
15"	15"	18"	4"	5"	3.0'	6"
18"	18"	21"	5"	6"	3.0'	6"
24"	24"	28"	6"	8"	3.0'	6"
30"	30"	35"	8"	10"	4.5'	6"
36"	36"	41"	8"	10"	5.0'	6"

NOTE:
1. STORM SEWER PIPE TO BE SMOOTH WALL.
2. ALL SLEEVES SHALL BE WATERTIGHT.
3. GASKETS SHALL CONFORM TO ASTM F477.
4. GASKETS AND SLEEVES SHALL BE LUBRICATED AS RECOMMENDED BY THE MANUFACTURER.
5. FITTINGS SHALL BE IN CONFORMANCE WITH AAHTO M294.

4 / SD3 **STORM SEWER CORRUGATED HDPE PIPE BEDDING**
SCALE: NONE



PLANTING SOIL CHARACTERISTICS:

PARAMETER	VALUE
PH RANGE	5.2 TO 7.0
ORGANIC MATTER	1.5 TO 4.0%
MAGNESIUM	35 LBS PER ACRE, MINIMUM
PHOSPHORUS	75 LBS PER ACRE, MINIMUM
POTASSIUM	85 LBS PER ACRE, MINIMUM
SOLUBLE SALTS	< 500 PPM
CLAY	10 TO 25%
SILT	30 TO 55%
SAND	35 TO 60%

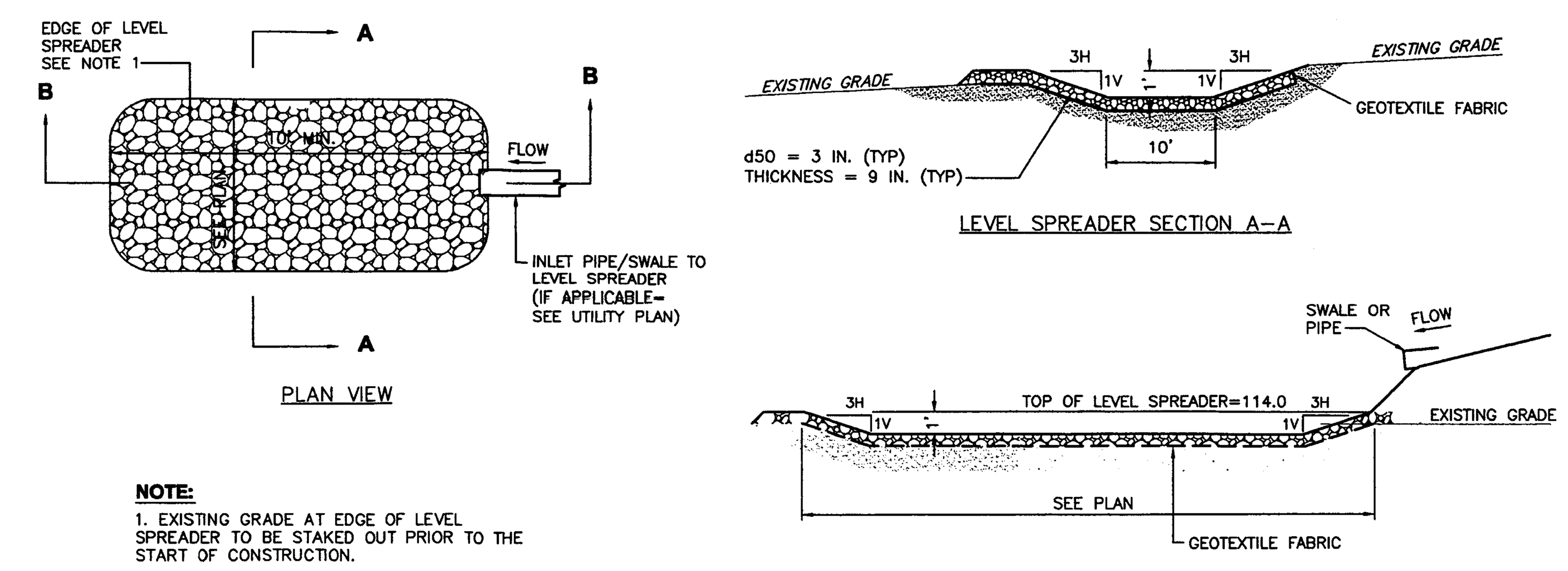
NOTES:
1. BIORETENTION FACILITIES SHALL BE INSTALLED AND MAINTAINED IN ACCORDANCE WITH "THE NEW YORK STATE STORMWATER MANAGEMENT DESIGN MANUAL", OCTOBER 2001.

BIORETENTION FACILITY	LOCATION	L (FT)	Y (FT)	X (FT)	INV (I)
A	#6 LF	5	114.0	113.0	113.0

2. EXTERIOR BORDER AND INTERNAL WEIRS SHALL BE TREX COMPOSITE BOARD (2"x10") AS PER PLAN SP3.

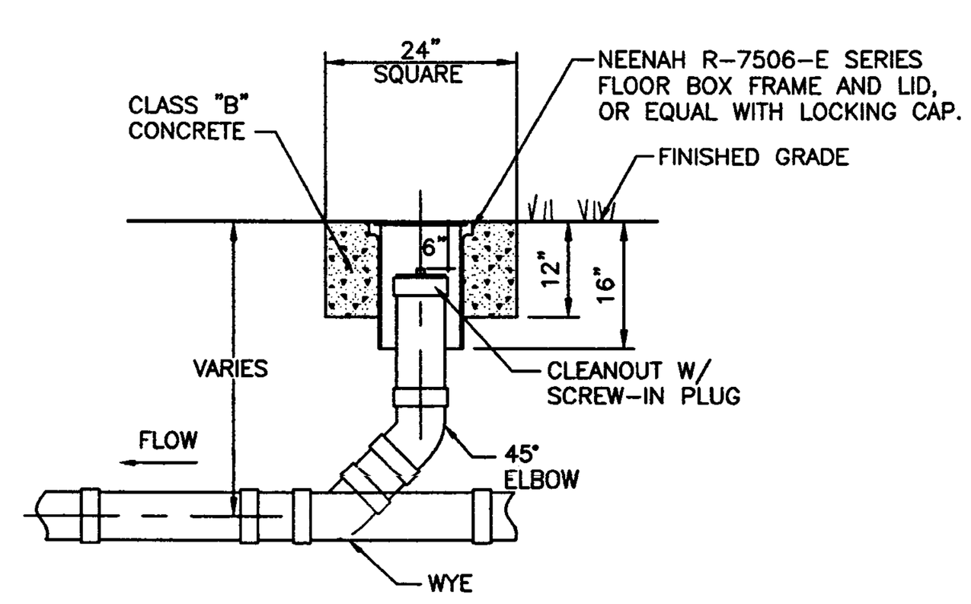
PLANTING NOTES:
1. THE PLANTING SOIL BED CHARACTERISTICS ARE CRITICAL TO THE FUNCTIONALITY OF THE BIORETENTION SYSTEM. THE SOIL SHOULD BE FREE OF STONES, STUMPS, ROOTS, OR OTHER WOODY MATERIAL OVER 1" IN DIAMETER. PLACEMENT OF THE PLANTING SOIL SHOULD BE IN LIFTS OF 12" TO 18", LOOSELY COMPACTED (TAMPED LIGHTLY WITH A SMALL DOZER OR BACKHOE BUCKET). THE SOIL SHALL HAVE A PERMEABILITY OF AT LEAST 0.5" PER HOUR.
2. THE MULCH LAYER SHOULD BE STANDARD LANDSCAPE STYLE, SINGLE OR DOUBLE, SHREDDED HARDWOOD MULCH OR CHIPS.
3. WOODY VEGETATION SHOULD NOT BE PLANTED IN THE VICINITY OF INFLOW LOCATIONS.

5 / SD3 **BIORETENTION FACILITY DETAIL AND PLANTING SCHEDULE**
SCALE: NOT TO SCALE



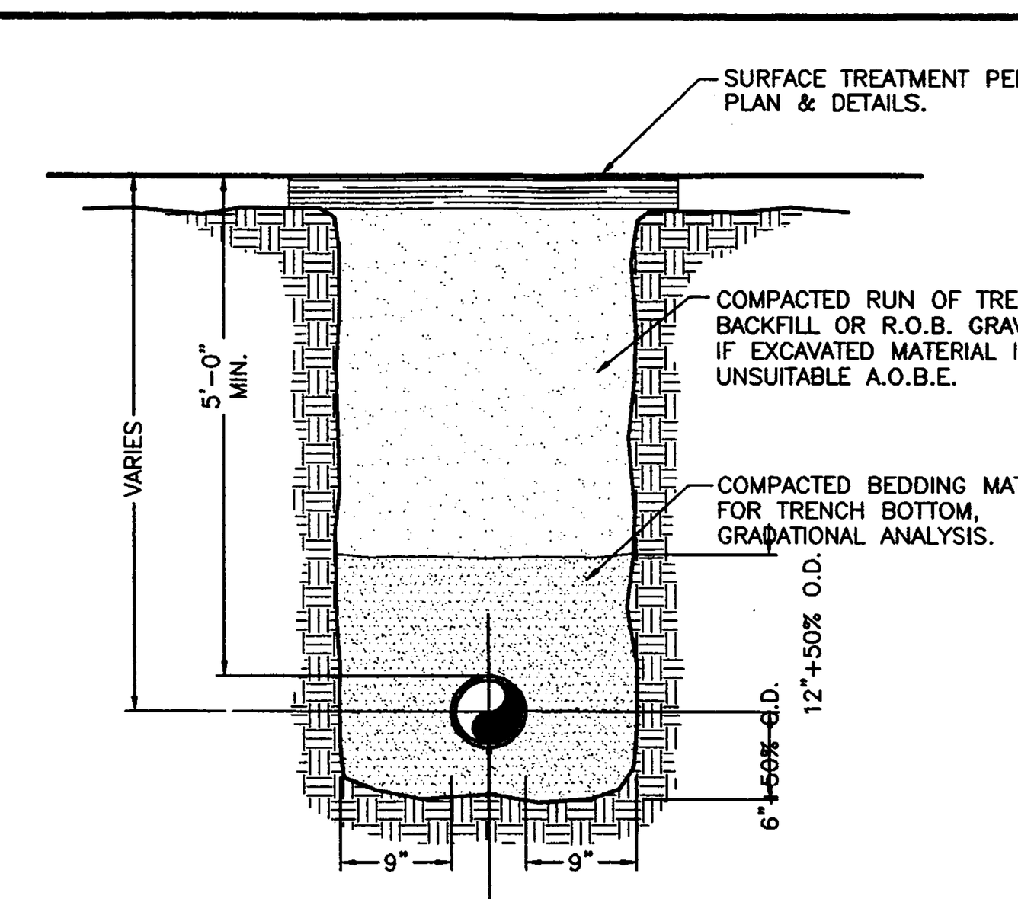
NOTE:
1. EXISTING GRADE AT EDGE OF LEVEL SPREADER TO BE STAKED OUT PRIOR TO THE START OF CONSTRUCTION.

6 / SD3 **LEVEL SPREADER DETAIL F5**
SCALE: NOT TO SCALE



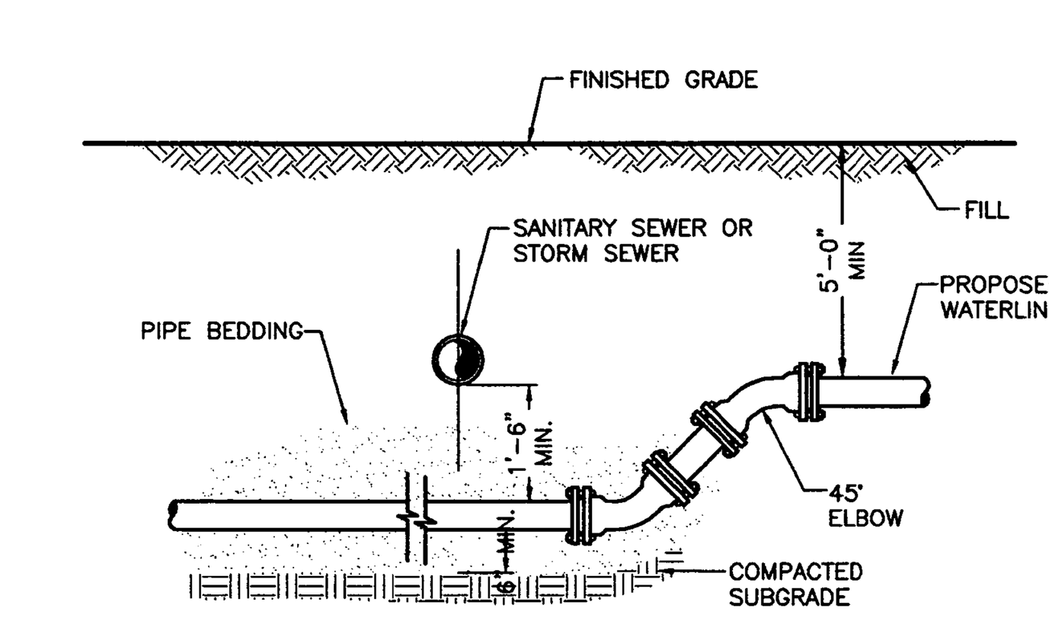
NOTES:
1. PVC PIPE AND FITTINGS SHALL BE ASTM D-3033 OR D-3034 SDR-35.
2. TO BE USED FOR GRAVITY PORTION OF THE WATER QUALITY TREATMENT SYSTEM.

9 / SD3 **CLEANOUT DETAIL-GRAVITY FLOW**
SCALE: NOT TO SCALE



NOTES:
1. PIPE BEDDING SHALL BE A NATURAL RUN-OF-BANK (R.O.B.) SAND GRADED FROM FINE TO COARSE PARTICLES, OR A GRADED MIXTURE OF CRUSHED STONE OR CRUSHED GRAVEL. IN ANY CASE MATERIAL USED SHALL NOT EXCEED 2". BEDDING MATERIAL OR STONE GRADATIONS USED SHALL BE APPROVED BY THE ENGINEER.
2. INSTALL CONTINUOUS DETECTABLE MARKING TAPE DURING BACKFILLING OF TRENCH FOR UNDERGROUND WATER SERVICE PIPING. LOCATE TAPE 12" BELOW FINISHED GRADE, DIRECTLY OVER PIPING.
3. THE PROPOSED WATERMAINS SHALL BE INSTALLED WITH A MINIMUM COVER OF FIVE (5) FEET AND SHALL BE CEMENT LINED DUCTILE IRON, CLASS 52.
4. SHEETING SHALL BE IMPLEMENTED IN ACCORDANCE WITH O.S.H.A. STANDARDS.

7 / SD3 **TYPICAL WATER PIPE IN TRENCH DETAIL**
SCALE: NOT TO SCALE



NOTES:
1. WHEN THE ELEVATION OF THE SEWER CAN NOT BE VARIED TO MEET THE ABOVE REQUIREMENTS, THE WATER MAIN SHALL BE RELOCATED TO PROVIDE THIS REQUIRED SEPARATION OR RECONSTRUCTED WITH MECHANICAL JOINT PIPE FOR A DISTANCE OF TEN (10) FEET ON EACH SIDE OF THE SEWER. ONE FULL LENGTH OF WATER MAIN SHALL BE CENTERED OVER THE SEWER SO THAT BOTH JOINTS WILL BE AS FAR AWAY FROM THE SEWER AS POSSIBLE.
2. WHEN IT IS IMPOSSIBLE TO OBTAIN VERTICAL SEPARATION AS STIPULATED ABOVE, BOTH THE WATER MAIN AND THE SEWER MAIN SHALL BE CONSTRUCTED OF MECHANICAL JOINT DUCTILE IRON PIPE AND SHALL BE PRESSURE TESTED TO ASSURE WATER TIGHTNESS, OR ENCASED IN CONCRETE IN ACCORDANCE WITH HEALTH DEPARTMENT.
3. FOR MINIMUM PIPE RESTRAINTS, SEE SCHEDULE OF JOINT RESTRAINTS.

8 / SD3 **WATERLINE OFFSET DETAIL**
SCALE: NOT TO SCALE

SCHEDULE OF JOINT RESTRAINT
(NO. OF PIPE LENGTHS – 18' LENGTH)

PIPE SIZE (INCHES)	FITTING TYPE 90°	45°	22 1/2°	TEE
8"	4	2	1	4
6"	2	1	1	2

NOTES:
1. FOR PLUGS, RESTRAIN PIPE LENGTH GIVEN FOR 90° BEND.
2. LENGTH OF PIPE TO BE RESTRAINED IS THE LENGTH FOR EACH SIDE OF THE FITTING, IE: FOR 6"Ø PIPE A 90° BEND SHALL BE RESTRAINED TWO (2) LENGTHS ON EACH SIDE OF THE BEND.
3. WHERE WATERMAINS ARE TO BE DUCTILE IRON, ALL JOINTS SHALL BE RESTRAINED TYPE USING FIELD LOCK GASKETS IN ACCORDANCE WITH THE LENGTHS SHOWN IN THE TABLE ABOVE.

ISSUED FOR NYSDEC REVIEW - NOT FOR CONSTRUCTION

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

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rev.	date	description
2	09/30/04	NO CHANGE THIS SHEET
1	05/17/04	REVISED PER CLIENT COMMENTS

HUDSON HERITAGE LLC
AREA 6 LANDFILL CLOSURE
STORMWATER AND WATER DETAILS
TOWN OF POUGHKEEPSIE, DUTCHESS COUNTY, NEW YORK

drawn	checked
DEC	
date: 02/09/04	scale: AS SHOWN
project no. 40307.00	
sheet no. SD3	