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June 27, 2014

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Via Certified U.S. Mail

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Ecology Division
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Re: Proposed Prospective Purchaser Agreement
Former CleanCare Site

Dear Ms. Lawson & Ms. Rickman:

I am writing on behalf of Tacoma Taylor Property LLC ("TTP") to propose entering into a prospective purchaser agreement ("PPA") with the Department of Ecology ("Ecology") governing property that encompasses the former CleanCare Corporation ("CleanCare") site in Tacoma, Washington (the "Property" or "Site"). TTP's intent is to undertake several improvements of the Property that will reduce the potential for contaminants to migrate to the environment and to return the Property to productive use. As described below, we believe that entering into a PPA, as embodied in a consent decree, will meet the requirements of the Model Toxics Control Act ("MTCA"), specifically as set forth in RCW 70.105D.040, WAC 173-340-520, and Policy 520A. A more detailed description of the Property history, nature and extent of contamination, and work that TTP proposes to conduct on the Property is set forth in a report prepared by Landau Associates ("Landau"), enclosed as Exhibit A.

A. Facility Location

The Property is located in an industrial region in the tideflats area of Tacoma between the Hylebos and Blair waterways. It encompasses approximately four acres located at 1510/1540 Taylor Way (tax parcels 0321352050, 0321352054, and 0321352066). The nearest streets are

Taylor Way to the north, Alexander Avenue East to the south, Lincoln Avenue to the east, and East 11th Street to the west. Maps showing the location of the Property and adjacent property owners are provided as Figures 1 and 2 of Exhibit A. A recent topographic survey of the Property is provided as Appendix C of Exhibit A. The legal description of the Property is in Exhibit B.

The Property is located within an area that has been referred to by Ecology as the "Taylor Way/Alexander Avenue Fill Area," a collection of adjacent properties that share a similar fill history. The Property is flanked on the north and east by vacant Port of Tacoma property ("POT"), on the southeast by the former Educators Manufacturing property (now owned by POT), on the south by TTP Services, and on the west and northwest by Philip Services Corporation ("PSC"). Maps showing the extent of fill at the Property are provided as Figures 11, 12, and 13 of Exhibit A. Maps showing the extent of fill found by PSC (including the extent found at the Property) are provided as Exhibit C.

The Property is currently owned by Pierce County, who took title to the Property through a Treasurer's Deed recorded on December 31, 2009 following tax lien foreclosure proceedings in the Pierce County Superior Court. The Ecology Cleanup Site ID is 604, FS ID 37982391, and EPA's identification number is WAD 980738512.

B. Historical Use of the Property

The Property was filled beginning in the 1940s to raise the grades at the Property and adjacent properties, but remained undeveloped until the mid-1970s. Fill material included soil dredged from the Hylebos and Blair waterways and a significant amount of industrial waste material. From 1974 to 1999, CleanCare and other businesses operated a petroleum, solvent, and chemical recycling facility at the Property, which included four tank farms, two hazardous/dangerous waste container storage pads, and a processing area where solvents, oil, and antifreeze were distilled. CleanCare ceased operations in November 1999.

C. Names of PLPs

The potentially liable persons ("PLPs") at the Property include CleanCare, CleanCare's former employee David Bromley, and other entities that operated at or currently own neighboring parcels within the broader "Fill Area" site. These entities include: the Port of Tacoma, the estate of Donald Oline, General Metals, PSC, Occidental Chemical Corporation (specifically subsidiary Hooker), and Douglas Graham (the former owner of the Educators Manufacturing property). TTP intends to issue notice letters to these PLPs before commencing work at the Site.

TTP is not currently a PLP at the Property and has no reason to believe that it could be an off-site source of contamination at the Property. TTP is a privately held company. Its company officers and owners are the Banchero Malshuk Family Trust, managed by Stephen Banchero. Neither the

Trust nor Mr. Banchero is a PLP at the Property or have reason to believe that either party could be an off-site source of contamination at the Property.

D. Environmental Conditions

TTP has retained Landau to evaluate the environmental conditions at the Property and develop proposed remedial actions that will address environmental risks at the Property. Based on data obtained from public agencies, including Ecology and the Tacoma Pierce County Health Department ("TPCHD"), Landau has determined that environmental conditions at the Property are generally well characterized. This information includes investigations that agencies and third parties have conducted at the Property and at adjacent parcels to characterize soil and groundwater conditions. These investigations have shown the presence of buried industrial wastes in soil, including: (1) lime-solvent sludge; (2) auto shredder fluff; (3) wood debris from forest products industries at adjacent and nearby properties; and (4) petroleum tank-cleaning scales and sludge. These investigations have also identified metals, hydrocarbons, and chlorinated organic compounds in groundwater locally onsite, where:

- Concentrations of the most mobile and persistent contaminants (i.e, chlorinated solvents) are relatively low at the downgradient (eastern) property boundary in the upper fill aquifer.
- Groundwater contamination in the deeper alluvial aquifer (i.e., at depths greater than about 20 ft BGS) is relatively limited.
- The western property boundary is roughly coincident with a groundwater divide in the shallow aquifer limiting the potential for contaminant migration to the east.

Between about 1974 and 1999, a number of releases or potential releases of petroleum or solvent liquids were documented at the Site. These releases are documented through Ecology inspections, TPCHD sampling and CleanCare reports. In some instances, these releases were directly to the stormwater system or to soil at the Site.

In 1999, EPA collected surface soil samples and surface water samples, removed stationary and fixed waste drums, and capped parts of the Property in a removal action. EPA also blocked the existing stormwater system (to prevent releases from the Site) and constructed a temporary above-ground stormwater system that discharged to the sanitary sewer system. In 2000, EPA returned responsibility for the Site to Ecology, who took over operation and management of the stormwater system and security. During a recent site visit, Landau noted that the stormwater system was in disrepair and no longer functioning, causing stormwater to pond and likely infiltrate.

In 2001-2002, the TPCHD conducted an initial investigation of the Site pursuant to an Ecology-reviewed work plan. The investigation scope included installing 11 monitoring wells and advancing 15 geoprobe borings. Four quarters of groundwater samples were collected at the 11 new and 7 existing wells on the Property. Groundwater and soil samples were also collected

from the 15 geoprobe borings. Data collected during the initial investigation were used to perform a site hazard assessment and rank the Site a 3 on a scale of 1 (highest) to 5 (lowest), where ranks of 1 and 2 are generally considered the highest priority for cleanup by Ecology.

In 2005, PSC completed a remedial investigation for the property west of CleanCare. The investigation report included an evaluation of the history, filling, and hydrogeology on the Site. That report provides information on soil and groundwater conditions in the vicinity of the Site.[1]

The conceptual site model is presented in Exhibit A. In summary, sources of subsurface contamination appear to be related to: (1) historical landfilling; (2) chemical releases at the Site; and (3) contamination caused by adjacent properties (such as PSC). Known chemical releases at the Site include releases from historical tank farms and the March 26, 1999 release from the onsite storm sewer to the City of Tacoma storm sewer. Other releases may have included chemical spills directly to bare soil, chemical leaks from any of the historical sewer infrastructure, and (more recently) leaks associated with the inoperable temporary storm system that EPA installed. EPA thoroughly investigated and remediated impacts from the tank farms. Various parties have installed multiple soil borings and groundwater wells to characterize conditions. In 2006, Ecology evaluated the conditions and determined that the affected media at the Site are soil and groundwater. The nature and extent of volatile chemicals in soil and groundwater indicate that indoor air at buildings on the Property may also be affected by way of the vapor intrusion pathway.

Landau identified potential human and ecological receptors at the Site based on the nature and extent of affected media, and current and reasonable future use of the Property. Based on historical and current uses and zoning of the area, it is reasonable to assume that the Property will retain its industrial character and that future land uses will be consistent with the current zoning and land use regulations. Redevelopment of the Property would require limited trenching and excavation, so exposure to affected soil and shallow groundwater at the time of construction would be limited. TTP anticipates using existing buildings. Therefore, the potential human receptors include:

- Temporary Construction Workers—Personnel temporarily working within the site at depths where impacted groundwater is encountered or soil during future construction activities. This is consistent with Ecology's 2006 determination (Exhibit A, Appendix A).
- Occupants of Current and Future Buildings—Workers or customers who work within or utilize developed space above volatile organic compound subsurface contamination (example: former administration building).

There are no likely ecological receptors applicable to the Site, and it is already at least 65% capped (buildings and pavement) and mostly fenced. The institutional controls that TTP proposes to implement, described below, would provide physical barriers that prevent ecological

[1] The PSC report is available for review at Ecology's Southwest Regional Office in Lacey, Washington.

receptors from coming into contact with affected shallow soil and groundwater. Therefore, Landau anticipates that the Site will qualify for exclusion from further terrestrial ecological evaluation under WAC 173-340-7491(1)(b).

E. Proposed Work

Landau has evaluated the environmental conditions at the Property and recommended several actions that will mitigate the potential for contaminant migration and exposure. As shown in Exhibit A, Landau has summarized the substantial environmental data and historical information associated with the Site. The history is well documented and corroborated by extensive soil boring and groundwater sampling data. Landau has concluded that this information is sufficient to characterize the nature and extent of contamination at the Property and provide a basis for selecting a final remedy that is consistent with MTCA regulations.

On the basis of this information, and as described in Exhibit A, TTP will implement the construction elements of the cleanup action and will collect a baseline set of groundwater samples. First, TTP will construct a new stormwater system at the Property. This system will collect stormwater from the entire 4.25 acre area—before it contacts soil or shallow groundwater—and discharge it to the City of Tacoma stormwater or sanitary system. The above-ground system that EPA constructed in 1999 has been abandoned and stolen by vandals owing to poor security at the Property. Second, TTP will cap the entire Property with impervious surfaces to prevent infiltration of precipitation. Third, TTP will inventory monitoring wells at the Property, survey the wells, collect groundwater samples (one baseline event and four biennial events), and take groundwater level measurements to document natural attenuation rates since the wells were last sampled in 2001. Fourth, TTP will modify existing buildings at the Property to minimize the potential for vapor intrusion of volatile organic compounds into indoor air. Fifth, TTP will prepare and implement an operation and maintenance plan to maintain the cap, stormwater system, and indoor air quality system. Finally, the Property will be secured to minimize public access. This work will be conducted within one year of when TTP takes control of the Property. A detailed schedule based on an approximate start date is included in Exhibit A, Appendix H.

F. TTP's Proposed Use of the Property

TTP's intent in purchasing the Property is to enter into a long-term lease with Emerald Services, Inc. ("Emerald"), which will allow Emerald to expand its current operations on adjacent property. Specifically, the Property would be used for additional petroleum product storage, general delivery and storage of operations materials and equipment, and additional administration building space. This use is consistent with the zoning for the area—heavy industrial. The use code for the Property identified by the Pierce County Assessor is "2800-Chemical MFG"; TTP currently intends to keep the chemical manufacturing aspect of their business at their current facility, but would reserve the right to conduct chemical manufacturing activities at the Property in the future as needed. The intended uses of the Property would

require new tank foundations, but TTP would plan to use existing buildings. TTP and Landau have initiated discussions about TTP's proposed remedial actions and use of the Property with the City of Tacoma, specifically regarding stormwater drainage requirements. Emerald has also had informal discussions with Ecology regarding the types of activities that Emerald intends to conduct on the Property. The Property purchase and redevelopment will be financed by private investors in TTP. Those investors can attest to their financial ability to complete the work.

G. The Proposed Settlement Will Yield Substantial New Resources, Lead to a More Expeditious Cleanup and be Consistent with Cleanup Standards and Prior Orders

The Property has been in a state of stasis for many years. Following CleanCare's bankruptcy, federal and state regulators have been burdened with conducting removal actions, stabilizing the Property, and attempting to restrict public access. EPA was successful at eliminating immediate threats from on-site contamination to human health and the environment. However, the following elements of final cleanup have not been successfully implemented:

- Security measures.
- Stormwater management.
- Completing site cap that extends across entire site.

Based on recent site visits by Landau, the Property remains without a complete and competent impervious cap and, owing to the lack of security at the Property, the temporary stormwater system that EPA installed is no longer functional. Both of these deficiencies present a mechanism for stormwater infiltration resulting in enhanced contaminant migrations. Additionally, the lack of security presents a continued public health concern.

Migration of and exposure to the contamination that will be left in place will be mitigated by the use of containment and institutional controls. Additionally, it is likely that the shallow and alluvial aquifers beneath the site can be designated as non-potable allowing the point of compliance for groundwater to be set at the property boundary. In this context, TTP's proposal will address these concerns by reducing the potential release and transport of contamination from the Property, restricting public access, and protecting onsite workers from indoor air exposure above MTCA cleanup levels.

The resources that TTP is willing to provide are "substantial," per Policy 520A. In the absence of TTP's proposal, Ecology would be burdened with investing public resources to address the same environmental threats—either by conducting the work itself or by pursuing PLPs, none of whom have voluntarily stepped forward. In either event, it is unlikely that remedial actions will be conducted in a timely manner relative to the schedule in TTP's proposal.

H. The Proposed Settlement Will Provide a Substantial Public Benefit

In addition to the environmental benefits of TTP's proposal mentioned above, this settlement will provide a substantial public benefit by returning currently vacant industrial property to productive use. TTP's proposal is consistent with the zoned use for the area and will utilize many of the existing improvements on the Property in the manner they were designed. The Property has not been in use for approximately 15 years and therefore has not generated tax revenue or provided job opportunities. TTP's proposal will result in approximately ten to twenty new employees at this location.

Providing an opportunity for Emerald to expand its operations will benefit not only the City of Tacoma, but also the people of Washington as a whole. Emerald is the only company in Washington that provides recycling, remanufacturing, and reuse to develop products from industrial waste. This service implements the state goal of recycling and reusing before disposing. Creating and marketing high volumes of recycled "green" products offers significant environmental and economic benefits, allowing a large portion of our local petroleum based waste to be continuously reused within a local, sustainable system that minimizes the dependence on virgin petroleum while also lowering our region's carbon footprint and expanding commerce and jobs. Due in large part to Emerald's Tacoma operations, Emerald recently received the Washington State Recycling Association "recycler of the year" award. Expanding the Tacoma facility will allow Emerald to increase its recycling, reuse, and remanufacturing capacity and thereby provide services and significantly expand the industry's use of "green" recycled products to fill a current environmental and economic need that is currently lacking in Washington.

I. Scheduling Considerations

TTP and Pierce County have entered into a purchase and sale agreement for the Property. That agreement states that sale of the Property is contingent on execution of a PPA between TTP and Ecology. TTP is eager to move forward with the acquisition as soon as possible and is prepared to fund the actions discussed in this letter, including negotiating a prepayment agreement with Ecology to ensure that the cost of negotiating this agreement and overseeing the work can be covered. As a result, TTP is optimistic that Ecology will not require a prolonged application process before commencing consent decree negotiations. TTP can provide additional information that Ecology requires, but does not currently envision the need for a second round of application materials through a more detailed proposal. To that end, the enclosed technical report (Exhibit A) was designed to comprehensively summarize known site conditions, envision methods to close data gaps, and recommend remedial actions that will be consistent with MTCA and the cleanup goals for the Property.

The purchase and sale agreement between TTP and Pierce County is also contingent on a clean title of the Property. Satisfying this condition will require removal of the federal Lien filed

against the Property by the U.S. Environmental Protection Agency, notice of which is recorded as document 200112100869 in the Pierce County property records. TTP intends to pursue discussions with EPA regarding the lien after Ecology has had an opportunity to review TTP's proposal.

J. Proposed Public Participation Plan

A draft public participation plan that complies with WAC 173-340-600(9)(g) is attached as Exhibit D.

K. Conclusion

TTP looks forward to working with Ecology and its attorneys to discuss this proposal. TTP is hopeful that Ecology will look favorably on the opportunity to bring vacant property back to productive use, remove the hazard of an unsecured facility, and increase the recycling, reuse, and remanufacturing capacity available to Washington State. Please let me know when you are available to meet and discuss this proposal further.

Sincerely,

Bradley M. Marten

Enclosures

cc: Sally Toteff, Regional Director
Department of Ecology

Jim Pendowski, TCP Program Manager
Department of Ecology

Exhibit A

Site Characterization and Remedy Evaluation Report
CleanCare
Pierce County, Washington

June 25, 2014

Prepared for

Tacoma Taylor Property, LLC

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FIGURES

TABLES

APPENDICES

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LIST OF ABBREVIATIONS AND ACRONYMS

AST	Aboveground Storage Tank
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CCC	CleanCare Corporation
cfs	Cubic Foot per Second
City	City of Tacoma
CSBC	Crushed Surfacing Base Course
CUL	Cleanup Level
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ES	Emerald Services
ft	Feet
ISGP	Industrial Stormwater General Permit (Ecology)
MTCA	Model Toxics Control Act
NGVD29	National Geodetic Vertical Datum of 1929
PAH	Polycyclic Aromatic Hydrocarbon
PCE	Tetrachloroethene
PGG	Pacific Groundwater Group
POT	Port of Tacoma
PSC	PSC Environmental Services (formerly PSC)
PPA	Perspective Purchase Agreement
RCRA	Resource Conservation Recovery Act
sf	Square Foot
SHA	Site Hazard Assessment
START	Superfund Technical Assessment and Response Team
SWMM	Stormwater Management Manual (City of Tacoma)
SWPPP	Stormwater Pollution Prevention Plan
TCE	Trichloroethene
TPCHD	Tacoma-Pierce County Health Department
TPH-D	Diesel-range Total Petroleum Hydrocarbon
TPH-G	Gasoline-range Total Petroleum Hydrocarbon
TPH-O	Oil-range Total Petroleum Hydrocarbon
USGS	U.S. Geological Survey
µg/L	Micrograms per Liter
VC	Vinyl Chloride
VOC	Volatile Organic Compound
WAC	Washington Administrative Code
WWHM	Western Washington Hydrologic Model

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1.0 INTRODUCTION

This report presents the environmental conditions and proposed remedial actions for the former CleanCare site (the site, or property) located at 1510 Taylor Way in Tacoma, Washington (Figure 1). The CleanCare site is a former treatment, storage, disposal, and recycling facility located in the Port of Tacoma (POT). Following shutdown of the CleanCare Corporation (CCC) business in 1999, the property became a state cleanup site (Facility Site ID 37982391) and has subsequently been vacant. The property consists of three parcels currently owned by Pierce County. Tacoma Taylor Property (TTP) is interested in purchasing the property from Pierce County. TTP would then lease the property to Emerald Services (ES), which would enable ES to expand their petroleum recycling and refinery business that currently operates on an adjacent property to the south.

The purpose of this report is to support a prospective purchaser agreement (PPA) being submitted by TTP to the Washington State Department of Ecology (Ecology) as part of a proposal to acquire ownership of the property. This report documents the nature and extent of contamination at the site, presents a conceptual site model to identify human health and ecological exposure pathways, and proposes remedial actions that can be implemented as part of site redevelopment. These proposed remedial actions are designed to meet cleanup action requirements of the Model Toxic Control Act [MTCA Revised Code of Washington (RCW) 70.105D; Washington Administrative Code (WAC) 173-340-360(2)].

1.1 SITE HISTORY AND BACKGROUND

The CleanCare site is in Pierce County, located in the Tacoma Tideflats area approximately 3 miles northeast of downtown Tacoma. The 4.25 acre property consists of three parcels: 0321352050, 0321352054, and 0321352066). The major roadways near the property include Taylor Way to the north, Alexander Avenue to the south, and Lincoln Avenue to the east. Current zoning at the property is "PMI" or "Port Maritime and Industrial" and the site is bordered by industrial properties. CleanCare is flanked on the north and east by vacant POT properties, on the southeast by the former Educators Manufacturing property (now owned by POT), on the south by ES, and on the west and northwest by PSC Environmental Services (PSC). An access and drainage easement is provided for the CleanCare property through the PSC property to the north. A sanitary sewer easement is provided for the property through the former Educators Manufacturing property. Parcels, property ownership, and easements are shown on Figure 2.

The site is located on a man-made peninsula, with the Blair Waterway to the southwest, the Hylebos Waterway to the northeast, and Commencement Bay to the northwest. The site is relatively flat with surface elevations typically within the range of 12 to 14 ft National Geodetic Vertical Datum of 1929

(NGVD29). Filling occurred to raise grades at the site and adjacent properties during the 1940s through 1970s. Fill material included soil dredged from the Hylebos and Blair waterways and a significant amount of industrial waste material, including auto shredder fluff and Hooker/Occidental Chemical lime solvent sludge.

The property was undeveloped until the mid-1970s. From 1974 to 1999, several businesses including CCC operated a petroleum, solvent, and chemical recycling facility at the site. The facility had four separate tank farms, two hazardous/dangerous waste container storage pads, and a processing area where solvents, oil, and antifreeze were distilled (EPA 2000a). Table 1 provides a summary of the site history including site ownership since the 1920s. Historical site operations are shown on Figure 3 and the historical drainage utility plan is provided on Figure 4.

The CCC treatment business ceased operation on November 17, 1999. CCC eventually declared bankruptcy and abandoned the site leaving hazardous waste material unsecured on the premises. At the request of Ecology, the U.S. Environmental Protection Agency (EPA) assessed the need for an immediate removal action in 1999 (EPA website 2014). In 2000, EPA completed a large hazardous waste removal action and installed asphalt caps in three areas, eliminating immediate threats from above ground contamination to human health and the environment resulting in a stabilized site (EPA 2000a); additionally, EPA installed a temporary stormwater system. During the time of EPA's removal action, the tanks and equipment from former operations were largely salvaged by ES, which holds a security interest in the buildings and structures obtained from U.S. Bank after CCC declared bankruptcy. Once EPA completed their removal action, Ecology became responsible for oversight of the temporary storm water management system and site security (Ecology 2006a). A more complete account of the removal action is presented in Section 2.4.

1.2 REGULATORY SITE RANKING AND CLEANUP STATUS

In 2001, the Tacoma-Pierce County Health Department (TPCHD) began to conduct activities in support of producing a Site Hazard Assessment (SHA). Activities included a site reconnaissance to assess the stability of controls set in place by EPA and to conduct a comprehensive subsurface investigation in coordination with Ecology. In the SHA, the agency reported that the site was approximately 65 percent capped, broken and contaminated drainage infrastructure was replaced with a temporary above-grade system, and Ecology was left responsible for managing the temporary stormwater system (TPCHD 2001). The data presented in the SHA helped to identify what chemicals are present in soil and groundwater and which are above health-based risk screening criteria. When TPCHD issued the SHA in February 2002 the site was ranked a score of "3" (TPCHD 2002), on a scale from 1 (greatest risk

to human health and environment) to 5 (lowest risk to human health and environment) (Ecology 2004a). The TPCHD subsurface investigation is the most recent subsurface investigation conducted at the site.

In 2006, Ecology produced two significant documents that present Ecology-issued determinations for CleanCare regarding the following:

- Current human exposures (Ecology 2006a)
- Migration of contaminated groundwater (Ecology 2006b).

The documents both include the title "Documentation of Environmental Indicator Determination RCRA Corrective Action." The development of these determinations appears to have included a thorough review of all available CleanCare documentation (including TPCHD's findings) and review of documentation from neighboring cleanup sites. These documents state that the site media of concern are groundwater and subsurface soil (Ecology 2006a) and that the migration of groundwater has stabilized (Ecology 2006b). Each document was signed by TCP personnel Kaia Petersen (hydrogeologist) and K Seiler [Supervisor of the Hazardous Waste and Toxics Reduction (HWTR)] on September 21, 2006; they are provided here as Appendix A.

The current status of cleanup activities at the CleanCare site is summarized in Ecology's Cleanup Site Details summary which is provided through the Integrated Site Information System (ISIS). This summary documents the site as "awaiting cleanup" with confirmed concentrations of halogenated organics, metals priority pollutants, and petroleum products-unspecified above cleanup levels (Ecology website 2014). A copy of the Cleanup Site Details is provided as Appendix B.

1.3 REGULATORY FRAMEWORK

During the CCC treatment business operation (around 1995), the site is documented as having been under Resource Conservation Recovery Act (RCRA) Corrective Action Order Number 1090-07-26-3008. The "Facility EPA ID No." was WAD 980738512, which relates to it having been a RCRA site overseen by Ecology's HWTR Program (Ecology 2006a). However, in 2001 Ecology determined that since the CCC had abandoned the property, leaving no available resources or assets to clean up the site, the appropriate regulatory framework for the site would be MTCA rather than RCRA (Ecology 2006a). Therefore, the project was transferred from Ecology's HWTR Program to the Toxics Cleanup Program (TCP) in October 2001, and the site cleanup ceased being conducted under a corrective action order. The current "Cleanup Site ID" is 604 and the Facility Site ID is 37982391 (Appendix B).

1.4 CURRENT SITE UNDERSTANDING AND SITE VISITS

Landau Associates has performed four site visits: 1) initial site walk on January 31, 2014, 2) site drainage reconnaissance on February 13, 2014, 3) geotechnical investigation on March 20, 2014, and 4) topographic survey activities during the end of March 2014. Information obtained from the first two visits is summarized in this section, and information from the geotechnical investigation and topographic survey are discussed further in Section 4.0.

The current cap consists of the three temporary cap areas installed by EPA in 2000: historical asphalt paved areas, concrete tank pads, and buildings. TPCHD's 2001 estimate that the site is 65 percent paved appears to still be accurate. The temporary stormwater drainage system installed by the EPA is no longer functioning and was found to be in pieces. A significant volume of water was observed to be ponded in bermed areas (including former concrete tank pads) and around asphalt paved low points (typically where plugged drainage structures are located). Asphalt at the site is cracked in places. The structural integrity of the former tank pads and existing asphalt is unclear. Portions of the site are unpaved and include vegetation such as trees, Himalayan blackberries, scotch broom, and other weeds and shrubs. The perimeter fence is damaged at some locations. Current site conditions are shown on Figure 5.

As mentioned above, the temporary stormwater system is no longer functioning and it is unclear when it stopped functioning. Due to uncontrolled security at the site, it appears that all metal parts including pumps have been stolen from the system; remaining system components include some PVC piping, vaults, and aboveground storage tanks (ASTs). The low points where the temporary storm drainage system intercepted stormwater appear to be coincident with historical oily waste vaults. Field observations and historical records indicate that the oily waste line[1] was not fully capped, is damaged, and that oily waste residual contamination may be present in the standing water in the vicinity of the historical vaults. The location of the vaults and the ASTs previously used for stormwater management are shown on Figure 4.

1.5 INTENDED FUTURE USE OF PROPERTY AND INTERIM ACTIONS

TTP is interested in purchasing the subject property and would lease it to ES, who wants to expand current operations at its adjacent facility. The adjacent facility has operations including solvent and antifreeze recycling, hazardous waste fuel blending, used oil re-refining, storage and transfer of containerized hazardous wastes, and storage of re-refined oil product for customer distribution. ES would

[1] The oily waste line drainage route was mapped using historical site plans uncovered during an Ecology file review. Based on its historical layout, it appears that the oily waste line conveyed the most chemically concentrated of liquid wastes throughout the CleanCare property.

use the subject property for additional petroleum product storage, delivery, storage of operations materials and equipment, and additional administration building space. This use is consistent with the zoning for the area. The use code for the subject property identified by the Pierce County Assessor is "2800-Chemical MFG"; ES currently intends to keep the chemical manufacturing aspect of their business at their current facility, but may conduct chemical manufacturing activities at the subject property in the future as needed. The intended use of the property is anticipated to require new tank foundations, but the use of current site buildings is likely.

TTP has characterized environmental conditions at the property (Section 2.0) and understands that a final remedy has not yet been selected and implemented at the site. Although not liable for the contamination, TTP finds that engineered controls (i.e., capping and stormwater control) combined with institutional controls and natural attenuation is a suitable final remedy for the site given the future site use and limited evidence for contaminant migration. TTP has identified remedial actions that they would implement as part of site development. These actions, summarized below, would constitute the final remedy.

- Inventory monitoring wells on site and collect a complete base line round of groundwater samples to document natural attenuation processes at the site within the first 3 months following purchase of the property.
- Conduct a vapor intrusion assessment to determine if vapor mitigation is needed
- If needed, modify site buildings as appropriate to minimize vapor intrusion of volatile organic compounds (VOCs) into indoor air at levels above background or concentrations of concern; to include initial compliance indoor air monitoring.
- Completely cap the site with impervious surfaces (asphalt and concrete) designed to withstand site operations and vehicle traffic.
- Install a new stormwater system that collects stormwater throughout the 4.25 acre site and discharges it to the City of Tacoma stormwater system. The system will be designed to collect stormwater prior to contact with site soil.
- Secure the site to prevent or minimize access to the site from unauthorized persons.
- Prepare and implement an operations and maintenance plan to maintain the site cap, stormwater system and indoor air quality systems.
- Provide access to the perimeter of the site for the potentially liable parties to perform additional *in situ* remedial actions that do not interfere with site operations.
- Biennial groundwater sampling through the ninth year of property ownership.

The above list would be discussed and negotiated with Ecology during the PPA process.

1.6 REPORT ORGANIZATION

This report is organized as follows:

- Section 2.0 presents a summary of environmental conditions at the site
- Section 3.0 presents preliminary site screening levels and a conceptual model
- Section 4.0 presents a preliminary remedy evaluation
- Section 5.0 presents conclusions
- Section 6.0 provides a summary of appropriate use of this report
- Section 7.0 provides complete references cited within the text.

2.0 ENVIRONMENTAL CONDITIONS

Numerous investigations have characterized the physical setting and environmental conditions on the site and in the general vicinity of the tideflats area. A timetable of CleanCare property transactions, inspection details, and remedial action activities at neighboring properties are identified in Table 1. The locations of site explorations described and shown in historical documents are presented on Figure 6. The locations of existing monitoring wells that were observed during a recent topographic survey are provided in the topographic survey plans provided in Appendix C. Available details for monitoring wells are provided in Table 2.

2.1 SITE GEOLOGY

The site is located in the Puyallup River delta (the Tacoma Tideflats), thick deposits of marine estuary and alluvial sediments are present, which mainly consist of sand, silt, clay, and lesser amounts of gravel and peat layers (Hart Crowser, date unknown). In conjunction with maritime and industrial development, fill material has been placed on the upper tideflat surface. Three near-surface geologic units have been recognized under fill material at the site. The uppermost unit is organic-rich silt and clay with some silty sand. This unit may be referred to as the "upper silt" and may be continuous below the property, ranging from approximately 2 to 10 ft thick (Hart Crowser undated; PSC 2005). Data from U.S. Geological Survey (USGS) historical tideflat maps (1980) and fill thickness information (PSC 2005) suggest that the silt unit may be thinned or cut at or near the site by former channels that drained the tideflat. Below the upper silt unit is a unit of sand with some silty sand, which may be referred to as "middle sand" (Hart Crowser, date unknown). The middle sand is underlain by a third unit of silt with interbedded silty sand. These geologic units are fairly thick and continuous under the site. A cross-section through the northern portion of the site from PSC (2005) is provided as Figure 7; the location of the cross section is provided on Figure 6.

2.2 SITE HYDROGEOLOGY

The near-surface hydrogeology of the area near the subject property is similar to other areas of the tideflats. PSC (2005) describes "two distinct groundwater systems" in the CleanCare/PSC property area. The first groundwater system is defined by an artificial fill unit that forms the unconfined shallow groundwater zone. Shallow groundwater at the subject property is encountered at a depth of 4 to 5 ft below ground surface (BGS), and the thickness of the shallow groundwater zone ranges from approximately 5 to 10 ft (PSC 2005). The shallow groundwater zone is underlain by an organic silt unit, the former tidal silt surface, that acts as an aquitard for the shallow zone and a confining unit for the

underlying "middle sand". The second groundwater system is defined by the saturated "middle sand" that underlies the aquitard, and is referred to as the "deep aquifer" (PSC 2005). It is confined and shows some tidal influence. A conceptual hydrogeologic model presented by Phillip Services (PSC 2005) showing the local groundwater system at and near the subject property is presented on Figure 8. Groundwater wells with "CCW" followed by either an "A" or "B" are shallow aquifer wells screened in the fill and those followed by "C" are deep aquifer wells.

Groundwater elevations, gradients, hydraulic conductivity, aquifer porosity, and estimates of groundwater flow velocities for the shallow groundwater zone and deep aquifer are presented in PSC (2005). Groundwater flow in the shallow groundwater zone beneath the CleanCare site is easterly to northeasterly, based on the data presented by Pacific Groundwater Group (PGG 1995) and PSC (2005). Figure 9 shows the annual average groundwater elevation contours developed by CleanCare for the shallow groundwater zone; measurements were collected on a monthly basis from May 1994 through April 1995 (PGG 1995). Groundwater flow in the deep groundwater aquifer beneath the CleanCare site is northeasterly, based on data presented by PSC (2005). Figure 10 shows groundwater elevation contours developed by PSC (2005) for the deep groundwater zone; measurements were collected on December 17, 2001.

2.3 FILLING HISTORY

Many of the industries in the Tacoma Tideflats area were built on fill material that was placed on the former Puyallup River delta tideflat surface. Prior to 1924, this area was a tidal marsh/tideflat environment before the adjacent Blair and Hylebos waterways were dredged and the intervening land was filled. Additional filling began in the 1940s and continued into the 1970s in the area surrounding the subject property. By the late 1950s, the area had been partially filled with dredge spoils from the nearby waterways (Port of Tacoma 1961), leaving some low, swampy land with local ponded water. Filling with various industrial wastes was reported during the period when the site and adjacent property were owned by Mr. Don Oline from the late 1960s through the early 1980s. Boring logs from the CleanCare site confirm the presence of dredged soil and industrial wastes, including wood waste; auto shredder fluff, and lime-solvent sludge. The fill material throughout the subject property and surrounding areas is approximately 7 to 15 ft thick. The base of the fill is at 1 to 5 ft above mean sea level (SAIC 1990). Table 3 provides a summary of the filling history from information in Port of Tacoma files and reports from agency files.

2.3.1 Soil from Waterway Dredging

Overall, most of the fill units are not laterally continuous, although similar materials apparently were used as fill in various areas at roughly synchronous times. The oldest fill unit (fine to medium sand with trace silt) is the most continuous, forming a layer on top of the tideflat deposits across most of the properties in the area. This sand is composed of the hydraulic dredge spoils from the nearby waterways that were used for fill on the intervening land (SAIC 1990). Maps from the Port of Tacoma (1961) show that soil dredged from the Lincoln Avenue to East 11th Street portion of the Blair Waterway was placed on and near the site in 1951 through 1952.

2.3.2 Lime Waste

Two periods of filling with lime waste were identified, allegedly by the Hooker/Occidental Chemical Company and Domtar Industries. The first episode occurred primarily from 1972 to 1976, and is the most volumetrically significant. Lime waste fill is typically a white to gray, firm, clay- or silt-like, chalky material. It may occur in sand- to cobble-sized fragments and is commonly mixed with silt.

Most of the lime waste from Hooker/Occidental Chemical is spent catalyst from the production of chlorinated solvents, which is referred to as "lime-solvent sludge." It apparently contains chlorinated hydrocarbons, heavy metals, and asbestos.

All or most of the lime waste dumped by Domtar Industries consisted of powdered, hydrated limestone that is free of solvent contamination. An evaluation by PSC (2005) suggests Domtar lime waste was primarily placed west of the CleanCare parcels on the PSC parcels.

A less significant period of lime waste infilling took place later, as evidenced by near-surface sand, gravel, and lime present in the southern portion of the subject property (SAIC 1990). Figure 11 shows the approximate extent of buried lime-solvent sludge at the site based on available soil boring data.

2.3.3 Auto Shredder Fluff

Auto shredder fluff is pulverized or fragmented auto debris, including wire, glass shards, upholstery, tire shards, paint chips, metal, string, plastic, and rubber, intermixed with sand, gravel, or silt. There were at least two periods of auto shredder fluff filling. The first period occurred prior to the main lime waste fill and is present in a sandy gravel or silty matrix in the eastern part of the subject property. A second period of auto shredder fluff disposal is associated with near-surface silty sand, sandy silt, or clean sand on the subject property. The silty to clean sand with auto shredder fluff and oily material in the central portion of the property is the filled former waste oil pond (SAIC 1990). Figure 12 shows the approximate extent of buried auto shredder fluff waste at the site based on available soil boring data.

2.3.4 WOOD WASTE

Wood debris from forest products industries at adjacent and nearby properties was also placed at the subject property in some places to thicknesses as great as 10 ft (TPCHD boring B-15). Borings identified additional soil that was mixed with wood chips or wood waste. Figure 13 shows the approximate extent of buried wood waste at the property based on available soil boring data.

2.3.5 PETROLEUM PRODUCTS AND OTHER WASTE FILL

Petroleum tank-cleaning scales and sludge were also reportedly dumped in the area from the late 1960s through the mid-1970s. From approximately 1970 through 1975, oil-reclaiming wastewater and petroleum sludge and emulsion were placed in a pond (Figure 11) west-southwest of the subject property (Landau Associates 2006). This oil pond was later filled with fragmented auto interiors (auto shredder fluff) from General Metals scrap metal operation, as well as small amounts of lime, silty sand, and other materials (SAIC 1990). Soil explorations identified evidence of petroleum hydrocarbon product along the northern (CCW-8B and C) and southern (CCW-5B) portions of the subject property.

2.4 PAST REMOVAL ACTION

At the request of Ecology, EPA and its Superfund Technical Assessment and Response Team (START) conducted a removal assessment and data collection during November and December of 1999. Surface soil samples from unpaved areas and water samples (collected from contact water in secondary containment systems and non-contact water from low-lying areas onsite) were collected and submitted for laboratory analyses. Surface soil samples showed the presence of arsenic; polycyclic aromatic hydrocarbons (PAHs); and benzene, toluene, ethylbenzene, and xylene (BTEX) constituents above EPA Region 9 Preliminary Remediation Goals and Ecology MTCA cleanup levels (CULs; EPA 2000b). Contact water samples detected the presence of low levels of metals, semi-volatile organic compounds, and VOCs; non-contact standing water results were all below discharge limits.

EPA also installed asphalt caps in three areas of the CleanCare site as part of the removal action. Installation of the three caps required site grading, placement and compaction of crushed recycled concrete, placement of pavement [26,000 square feet (sf) of asphalt] and asphalt berms, and installation of above ground surface drainage collection features (EPA 2000a). The three capped areas and remaining pieces of the disconnected surface drainage structure are shown on Figure 5.

EPA and START transported all RCRA drums, oil sludge drums, antifreeze and glycol drums, and solvent drums off site for disposal. In total, 3,630 drums were removed from the CleanCare site. Once all liquid material from CleanCare's ASTs had been transferred offsite for disposal, 19 temporary

ASTs were removed, and four large ASTs were demolished. EPA removed a total of 2 million gallons of waste stored in containers and ASTs. There are no known underground storage tanks on the subject property. EPA returned responsibility for the CleanCare site to Ecology in September of 2000. Ecology also assumed responsibility for oversight of stormwater management and site security at that time (Ecology 2002).

2.5 NATURE AND EXTENT OF CONTAMINATION

Investigations at the site confirm the presence of buried industrial wastes and detections of metals, hydrocarbons, and chlorinated organic compounds in groundwater. Industrial waste was used as fill at the site and is a likely source for metals and organic contaminants. Records indicate that numerous spills and releases of petroleum, organic compounds, and other chemicals occurred up to the time of business closure in 1999; these may be sources of site groundwater contamination. In addition to site spills and releases, site groundwater impacts may also be associated with operations from neighboring cleanup sites (such as PSC).

A number of investigations have been conducted at the site to characterize soil and groundwater conditions. During CCC's operation, approximately eight wells were installed and six borings were conducted on site. Explorations targeted the shallow groundwater zone and the deep aquifer down to a maximum depth of 28 ft. During the time period of the emergency removal action in 2000, ES was granted permission to conduct a subsurface investigation at the site that consisted of 15 soil borings and collection of soil and groundwater samples. Explorations targeted the shallow groundwater zone to a maximum depth of 14 ft (CH2M Hill 2000). In 2001, TPCHD installed approximately[2] 11 additional wells (in the shallow zone and deep aquifer) and conducted a geoprobe investigation at 15 additional locations to collect soil and groundwater samples (TPCHD 2001). Following installation of the new wells, TPCHD collected four quarters of groundwater samples at 17 site wells from July 2001 through March 2002. A site exploration plan that includes the locations of the installed wells and the geoprobe borings is provided on Figure 6. Wells where quarterly samples were collected are shown on Figure 14.

Quarterly groundwater samples were analyzed for petroleum hydrocarbons, VOCs (related to both petroleum and chlorinated solvents), metals, and PAHs. A total of 37 quarterly samples were collected at shallow zone wells and 28 samples were collected at deep aquifer wells. Tables 4 and 5 present statistics for the shallow zone and deep aquifer groundwater samples, respectively. These results (and historical results) were reviewed by Ecology and it was determined that the migration of groundwater at the site has stabilized (Ecology 2006b).

[2] Not all of the proposed well locations from the TPCHD work plan were located during the recent topographic survey.

The most frequently detected chemicals in shallow groundwater (i.e., detected in at least 70 percent of samples) include all tested petroleum hydrocarbons [diesel (TPH-D), motor oil (TPH-O), and gasoline (TPH-G)]; BTEX; arsenic; and naphthalene. Chemicals that exceeded MTCA Method A CULs most frequently (i.e., detected above cleanup levels in at least 25 percent of samples) include TPH-D, TPH-O, TPH-G, benzene, arsenic, cadmium, mercury, benzo(a)pyrene, tetrachloroethene (PCE), trichloroethene (TCE), and vinyl chloride (VC).

Using data from the final quarterly sampling event, the TPCHD shallow zone geoprobe investigation, and the investigation conducted by ES in 2000, the spatial distribution of some of the constituents that exceeded MTCA Method A CULs was analyzed. This analysis was performed for arsenic, TPH-G, benzene, TPH-O, TCE (a parent product of VC), and VC. The results are presented on Figures 15 through 20. The figures also show the approximate layout of the historical oily waste drainage line which is understood to have conveyed contaminated wastewater during historical operations.

2.5.1 ARSENIC

Concentrations of arsenic above the MTCA Method A CUL of 5 micrograms per liter (µg/L) were found in both the shallow zone and deep aquifer. The maximum concentrations (greater than or equal to 500 µg/L) were found in the shallow zone at the north central portion of the site at two soil borings (1,000 and 15,000 µg/L) and at shallow well CCW-2B (4,580 µg/L). Concentrations found along the property boundary are typically below or slightly above the MTCA Method A CUL. The most elevated concentrations near the property boundary were at shallow wells CCW-3A (102 µg/L) and CCW-8B (132 µg/L), both located along the northern property boundary. Note that arsenic concentrations are for total arsenic; dissolved arsenic concentrations would be lower. A summary of the most recent arsenic groundwater concentrations is presented on Figure 15.

2.5.2 GASOLINE

Concentrations of TPH-G in the southern portion of the site and along the property boundary are generally non-detect or below the MTCA Method A CUL of 0.8 µg/L. Concentrations above the MTCA Method A CUL occurred only in the shallow zone (not in the deep aquifer) and were typically found in the north central part of the site and along the northeast and eastern property boundaries. The maximum concentrations (greater than or equal to 5 µg/L) were found in the shallow zone at the north central portion of the site at four soil borings (ranging from 5.1 to 26 µg/L) and at shallow well CCW-2A (7.07 µg/L). The highest concentration detected along the property boundary was 3.1 µg/L. A summary of the most recent TPH-G groundwater concentrations is presented on Figure 16.

2.5.3 BENZENE

Benzene detections generally correlate with gasoline detections. Concentrations of benzene below and above the MTCA Method A CUL of 5 µg/L are found throughout the property. Concentrations above the MTCA Method A CUL occurred only in the shallow zone (not in the deep aquifer). The highest concentrations were detected at nine soil borings (ranging from 66.5 to 370 µg/L) and at three shallow wells: CCW-2A (313 µg/L), CCW-2B (193 µg/L), and CCW-7B (182 µg/L) located in the north central and northeast portions of the property in the shallow zone. Concentrations found along the property boundary are typically below or just above the MTCA Method A CUL. The most elevated concentrations found near the property boundary were at shallow wells CCW-3A (102 µg/L) and CCW-8B (132 µg/L), both located along the northern border. A summary of the most recent benzene groundwater concentrations is presented on Figure 17.

2.5.4 MOTOR OIL

TPH-O is generally not detected in the central portion of the site, but is detected above the MTCA Method A CUL of 0.5 µg/L throughout other parts of the site in both the shallow zone and deep aquifer. The maximum concentration at the site was detected at shallow well CCW-3A at a concentration of 24.7 µg/L. A summary of the most recent TPH-O groundwater concentrations is presented on Figure 18.

2.5.5 TRICHLOROETHENE

TCE is detected in the north central portion of the site in the shallow zone only (not in the deep aquifer) at concentrations exceeding the MTCA Method A CUL of 5 µg/L. The highest concentrations (greater than or equal to 500 µg/L) were found in the shallow zone at two soil borings (900 and 7,400 µg/L) and at shallow well CCW-2A (655 µg/L). TCE was not detected along the property boundary. A summary of the most recent TCE groundwater concentrations is presented on Figure 19.

2.5.6 VINYL CHLORIDE

VC is primarily detected in the central to north central portion of the site in the shallow zone only (not in the deep aquifer) at concentrations that exceed the MTCA Method A CUL of 0.2 µg/L, and is typically not detected elsewhere. The maximum concentrations (greater than or equal to 20 µg/L) were found in the shallow zone at two soil borings (32 and 450 µg/L) and at shallow well CCW-2A (60.4 µg/L). As indicated, detections of VC are only found in the central and north central portion of the site, so VC was not detected along the property boundary. A summary of the most recent VC groundwater concentrations is presented on Figure 20.

2.6 CONTAMINANT FATE AND TRANSPORT

The site history indicates sources of contamination exist on the site and directly upgradient of the site on adjacent property. These sources of contamination have impacted groundwater particularly in the shallow zone in the north central portion of the property (near monitoring locations CCW-2a and boring location CC-GW-PA-11). However, contaminant migration horizontally toward the property boundary and vertically into the deep aquifer is limited, and was determined by Ecology to have stabilized. Ecology further determined contamination does not discharge to surface water bodies (Ecology 2006b). Limited contaminant migration potential is demonstrated by the distribution of constituents in groundwater. The highest concentrations typically occur in the north central portion of the site while downgradient concentrations at the eastern property boundary and in the deep aquifer are typically very low and below cleanup levels. The limited potential for contaminant migration is likely due to the types of contaminants present and the potential for natural attenuation in the subsurface.

The most widely distributed contaminants of concern in groundwater are petroleum hydrocarbons and related constituents (e.g., benzene). The mobility of petroleum hydrocarbons is typically limited in shallow groundwater environments because these constituents readily attenuate due to biological degradation in aerobic environments. While relatively high concentrations of petroleum hydrocarbons are present locally along the north property boundary, the potential for significant petroleum contaminant migration is limited based on biological degradation potential. Degradation typically occurs at the leading edge of the contaminant plume where aerobic aquifer conditions are most likely to occur.

Arsenic is the primary metal detected in groundwater. Arsenic mobility is also typically limited in shallow groundwater environments; however, mobility increases appreciably at low and high pH and in anaerobic environments. Current data at the property boundary indicates that total arsenic concentrations are only slightly above the cleanup level. It is likely that dissolved arsenic concentrations (which were not analyzed for the samples) are less than the cleanup level at the property boundary.

Typically the most mobile contaminants in groundwater are chlorinated solvents such as PCE and TCE. Their mobility is high because they are not readily absorbed to the solid aquifer matrix and they are persistent (e.g. do not readily degrade). However, in highly reducing environments, PCE and TCE will readily breakdown to daughter products (i.e., cis-1,2-dichloroethene and VC) and eventually to harmless byproducts (i.e., ethane, ethene) through a biologically mediated process known as reductive dechlorination. It appears that PCE and TCE are naturally attenuating on the property since chlorinated solvent concentrations are very low at downgradient property boundary. Reducing conditions are likely locally present due to the presence of petroleum hydrocarbons. The general lack of chlorinated solvent

compounds in the deep aquifer indicates that vertical migration of chlorinated solvents as a free phase dense non-aqueous phase liquid (DNAPL) is not occurring.

The most recent groundwater quality data is over 12 years old. Given that natural attenuation is occurring at the site, it is likely that concentrations have declined and groundwater contamination is less than the characterization presented on Figures 15 through 20.

3.0 PRELIMINARY SCREENING LEVELS

A number of chemicals have been detected in groundwater at site wells. The most recent groundwater results were evaluated and presented in Section 2.0. Chemicals that exceeded MTCA Method A CULs were mostly in the shallow aquifer; only two chemicals (arsenic and motor oil) exceeded in the deep aquifer. Chemicals that exceeded MTCA Method A CULs most frequently (i.e., detected above cleanup levels in at least 25 percent of samples) include TPH-D, TPH-O, TPH-G, benzene, arsenic, cadmium, mercury, benzo(a)pyrene, PCE, TCE, and VC (eleven total). These eleven chemicals appear to be representative of potential constituents of concern (PCOC) in site groundwater.

This section provides preliminary groundwater screening levels (SLs) for the PCOCs, which are human health-based risk levels that may be used for site monitoring activities. SLs were determined by developing and evaluating the preliminary conceptual site model (CSM) and selecting applicable screening criteria. These two steps are discussed in Sections 3.1 and 3.2, respectively. Soil screening levels are not included since site soil is well characterized and is generally[3] intended to be left in place and capped. The proposed remedy will eliminate the soil to groundwater pathway from infiltration of precipitation and control and eliminate exposure to contaminated soil. Minor volumes of soil may be excavated during construction activities so a health and safety plan and soil management plan would be prepared and followed to prevent exposure to temporary construction workers and contaminant migration. Surface water is not included here as it has been determined by Ecology that it is not a contaminated medium (Ecology 2006a).

3.1 PRELIMINARY CONCEPTUAL SITE MODEL

The preliminary CSM represents the most recent site groundwater conditions from 2001, identifying potential sources of hazardous substances, potentially affected media, and potential migration and exposure pathways for human and ecological receptors. It considers most recent conditions and future land use in assessing potential exposure pathways; only complete pathways result in exposure. A complete pathway includes a source and mechanism of release, an exposure medium, and an exposure route by which contact can occur.

Sources of site groundwater contamination appear to be related to 1) historical landfilling, 2) chemical releases at the site, and 3) contamination caused by adjacent properties (PSC 2005). Known chemical releases at the site include releases from historical tank farms (EPA 2000b) and the March 26,

[3] Initial site redevelopment evaluation suggests that a large volume of fill will need to be imported to elevate site grades and that minimal excavation will be required in the north central portion of the site. As mentioned, any soil generated from excavation would be used as fill in other portions of the site and would be capped. A health and safety plan and soil management plan would be developed at time of construction planning, which would include appropriate human health risk levels for soil.

1999 release from the onsite storm sewer to the City storm sewer that prompted disconnecting the onsite system (EPA2000b). Other releases may have included chemical spills directly to bare soil, chemical leaks from any of the historical sewer infrastructure (such as the oily waste line; see Figure 4), and (more recently) leaks associated with the inoperable temporary storm system that EPA installed. Impacts from the tank farms were thoroughly investigated and remediated by the EPA. Soil borings have been conducted throughout the site, in areas other than the tanks farms, and contamination has been found; sources could be from any of those discussed above. Impacts attributed to historical sewer lines or from the somewhat recently neglected temporary storm system constructed by the EPA appear to have been investigated.

The historical leaking tank farms are primary release mechanisms by which constituents of concern may be transferred from the source to affected environmental media. Secondary release mechanisms include leaching and infiltration from soil into groundwater and vapor migration from soil (or impacted groundwater) into indoor air spaces. The primary source areas that have been identified (tank farms) and the surrounding soil (immediately adjacent) were excavated and hauled off property in between December 1999 and September 2000 (EPA 2000a). It is anticipated that residual soil contamination is present however an effective cap and stormwater system will control leaching from soil to groundwater. The primary affected medium of concern at the site is shallow groundwater, and potentially indoor air.

Potential human and ecological receptors were identified for the site based on current and reasonable future site land use. It is anticipated that the site will retain its industrial character and that future land uses will be consistent with the current zoning and land use regulations. Potential human receptors include:

- Occupants of Current and Future Buildings – Workers or customers who work within or utilize developed space above volatile organic compound subsurface contamination (example: former administration building)
- Temporary Construction Workers – Personnel temporarily working within the site at depths where impacted groundwater is encountered (or soil) during future construction activities.

There are no likely potential ecological receptors applicable to the site. Although MTCA requires consideration of terrestrial plants and animals that may potentially be exposed to hazardous substances, the site is expected to qualify for exclusion from further terrestrial ecological evaluation under WAC 173-340-7491(1)(b) because virtually any potential residual contaminated soil is or will be covered by buildings, paved roads, pavement, or other physical barriers that will prevent exposure. An institutional control, as required by WAC 173-340-440, will have to be established because contamination remains in soil within 15 ft of the ground surface; TTP understands this requirement and is prepared to implement

institutional controls (Section 1.5). Several previous investigations documenting soil quality conditions at the site were completed and soil is considered well characterized; approximately 65% of the site is currently capped. Therefore, the complete exposure pathways with a low potential for exposure identified for qualitative evaluation included only:

- Potential future exposures of office building occupants (workers and customers) to constituents of concern in air via inhalation
- Potential exposure of temporary construction workers via dermal contact and inhalation of constituents of concern in site groundwater.

These exposure pathways will be considered in development of screening criteria and preliminary SLs in the following sections.

3.2 GROUNDWATER SCREENING CRITERIA AND SCREENING LEVELS

Groundwater screening criteria were developed for the constituents of concern based on the preliminary CSM and MTCA requirements. Two sets of preliminary groundwater screening criteria were developed: 1) criteria protective of indoor air (related to the vapor intrusion exposure pathway), and 2) criteria for drinking water beneficial uses. The two sets of preliminary groundwater screening criteria are summarized below in Section 3.2.1 and 3.2.2, respectively.

3.2.1 PROTECTION OF INDOOR AIR

Groundwater screening criteria protective of indoor air were developed for unrestricted land use in accordance with Ecology's draft vapor intrusion guidance document (draft VI guidance; Ecology 2009b). The draft VI guidance provides guidance on calculating shallow groundwater SLs protective of indoor air, assuming there is a potential for vapor intrusion. The draft VI guidance defines shallow groundwater as groundwater at the water table or in perched zones above the water table. The draft VI guidance provides Equation 1, Generic Groundwater VI Screening Levels, for the calculation of shallow groundwater SLs (or SLGW), which is as follows:

$$SL_{GW} = \frac{SL_{IA}}{VAF * UCF * H_{CC}}$$

Where

SL_{GW}	Screening level in groundwater protective of indoor air, micrograms per liter (µg/L)
SL_{IA}	Acceptable indoor air screening level, µg/m^3
VAF	Vapor attenuation factor (VAF; unitless); a default value of 0.001 should be used
UCF	Unit conversation factor, 1000 liters per cubic meter (L/m^3)
H_{CC}	Henry's Law constant, unitless

The SLGW is a function of the indoor air SL (shown here as SLIA), the Henry's Law constant (HCC; which defines the steady-state relationship between liquid and vapor phase concentrations of volatile chemicals), and a vapor attenuation factor.

In order to calculate SLGW for a given chemical of concern, the associated SLIA for that chemical must be developed first in accordance with WAC 173 340 750. The current zoning is "PMI" or "Port Maritime and Industrial" and is bordered by industrial properties. Therefore, the associated SLIA required to calculate the groundwater screening criteria will be based on the standard MTCA Method C industrial land use CULs.

Of the PCOC, the volatile organic compounds include PCE, TCE, VC, and benzene and all four have a MTCA Method C indoor air CUL[4]; therefore, SLGW values were developed only for PCE, TCE, VC, and benzene. Using the industrial land use provides an appropriate evaluation of constituents of concern for initial screening of data and addresses the potential vapor intrusion exposure pathway identified in the CSM. The resulting groundwater screening criteria protective of indoor air are provided in Table 6 and the calculations are provided in Appendix D. The screening criteria is intended to be used for the most shallow groundwater data, collected most closely to the top of the water table.

3.2.2 PROTECTION OF MOST BENEFICIAL USE

The Method A CULs for groundwater are considered applicable for use as screening criteria. Groundwater throughout the site is not used as drinking water; however, to provide a conservative evaluation of constituents, and to address potential exposure pathways identified in the CSM, screening criteria were based on drinking water as the highest potential beneficial use for groundwater. Per WAC 173-340-720(3)(b), under MTCA Method A, groundwater CULs for potable water must be at least as stringent as all of the following:

- MTCA Method A table values (WAC 173-340-900, Table 720-1)
- Concentrations established under state and federal laws, including MCLs established under the Safe Drinking Water Act (SDWA; 40 CFR 141), MCL goals for non-carcinogens established under the SDWA; MCLs established by the state board of health (WAC 246-290)
- Concentrations that do not exceed natural background or the PQL for indicator hazardous substances for which there are no MTCA table values or applicable state and federal laws.

Based on these criteria, the MTCA Method A table values (WAC 173-340-900, Table 720-1) are applicable as screening criteria for the site. Method A table values are available for all 11 PCOCs. The

[4] The MTCA Method C value for vinyl chloride has two options for cancer potency factor depending on population type that may be exposed to vinyl chloride in indoor air. This factor is a key variable used to calculate the CUL. Of the two factor options, the more conservative value was selected to cover all potential employee types (including pregnant women).

groundwater screening criteria are presented in Table 7. The values presented in Table 7 were used to screen available groundwater data in Section 2.0.

4.0 PRELIMINARY REMEDIAL DESIGN EVALUATION

The final remedy will account for environmental conditions (Section 2.0) and potential exposure pathways (Section 3.0) appropriate for the proposed site use. As discussed, the future use would be industrial and the property would be used for petroleum product storage (using ASTs), delivery and storage of operations materials and equipment, and occupation of existing administration building space. The petroleum product storage would be located at the former tank farm capped area in the northwest corner of the site. Petroleum product transfers would require frequent travel of heavy trucks along a defined route from the existing ES property located to the south of CleanCare to the petroleum storage tanks. Operations materials and equipment would likely be stored beneath the various canopy structures around the property (Buildings 5, 7, and 8 on Figure 5). The existing administration building space is Building 1 on Figure 5.

Given the intended future use and the current understanding of environmental subsurface conditions, components of the final remedy include the following:

- Groundwater compliance monitoring
- Vapor intrusion assessment, possible mitigation, and indoor air compliance monitoring
- Complete asphalt cap
- Install new storm drainage system
- Repair fencing and install additional security features
- Other institutional controls (e.g., operations and maintenance plan, deed restriction).

Of the above remedy components, each is discussed in the subsequent sections (4.1 through 4.4) except for fencing and security and other institutional control measures. Most of the site is adequately fenced, but some repairs are needed. Security features (such as alarms and video) will be installed as appropriate to secure the site. A preliminary schedule for remedy implementation is provided in Section 4.5.

4.1 GROUNDWATER COMPLIANCE MONITORING

A groundwater monitoring well network at the CleanCare site is in place and is shown on Figure 14. Within the first three months of property ownership, TTP would conduct baseline groundwater sampling at a total of nine wells. Groundwater samples would be analyzed for VOCs, metals, TPH (TPH-G and TPH-O), and PAHs. After the baseline sampling event, groundwater monitoring would be conducted on a biennial basis for the first nine years; the same analytes would be tested as was for the baseline sampling with the exception of PAHs. TTP would prepare a sampling and analysis plan and

quality assurance project plan prior to baseline sampling. All laboratory reports would be sent directly to Ecology for data management and reporting.

4.2 VAPOR INTRUSION

Assessing the potential for vapor intrusion at the site begins with screening the most recent groundwater data (particularly the shallow zone) using the VI GW SLs established in Section 3.2.1. Using the most recent VOC results for benzene, TCE, and VC shown on Figure 17, 18, and 19, the areas where these chemicals are greater than or equal to their respective GW VI SLs are delineated on Figure 21. Based on this evaluation, benzene is the most wide-spread constituent. Also, VC is more widespread than parent compound TCE. Since the extent of VC is greater than TCE, it is assumed that the extent of TCE's parent compound (PCE) would be even more limited than TCE. Therefore, the area exceeding VI GW SLs for VC provides an adequately conservative delineation representative of the chlorinated compound PCOCs. The combined VI GW plume (i.e., area where benzene and/or VC exceed GW VI SLs) appears to extend beneath a number of canopies and most site buildings. The intended use of site buildings is primarily for recycling, re-refining and storage related activities however some limited administrative and office use might also occur.

Groundwater results from a new baseline sampling event (Section 4.1) should be screened to see if conditions have significantly changed from concentrations documented on Figure 21. Beyond collection of new groundwater samples, those buildings that overlie the updated combined VI GW plume should be surveyed and a Tier II assessment should be conducted in accordance with Ecology's draft vapor intrusion guidance (Ecology 2009). Depending on the results of the Tier II assessment, vapor intrusion mitigation controls should be implemented at appropriate building locations during property redevelopment to ensure future worker health and safety. Upon initiating a vapor mitigation control system, performance indoor air monitoring would be conducted to help calibrate the system to verify indoor air cleanup levels protective of worker health and safety are being met. Once the system is working as intended, compliance indoor air monitoring would begin on an appropriate, regular basis. In the event that groundwater VOC concentrations increase in shallow groundwater, the frequency of indoor air monitoring may need to be increased to verify that the indoor air cleanup levels are still met.

4.3 CAP

Approximately 65 percent of the site is covered by existing pavement and buildings, which serve as an effective cap against direct-contact with contamination and helps to prevent infiltration of stormwater. To complete the cap at the site and to support heavy truck traffic, additional pavement is

needed. For the purposes of this evaluation, pavement will be classified into two categories based on function: light duty and heavy duty. Light-duty areas will receive little to no truck traffic, while heavy-duty areas will receive moderate to heavy truck traffic and will function as truck driveways, turnarounds, and entrances. To determine the appropriate physical properties per pavement type, a geotechnical field evaluation was conducted and the recommendations are reported in Appendix E. With the geotechnical recommendations and an understanding of the future property use, a summary of light- and heavy-duty pavement areas and materials is as follows:

- Approximately 28,000 sf of heavy-duty pavement will be installed over existing pavement; this area will consist of 3 inch asphalt to be installed over existing asphalt.
- Approximately 4,500 sf of heavy-duty pavement will be installed over existing unpaved areas at the site; this area will consist of 4-inch asphalt over 10 inches of Crushed Surfacing Base Course (CSBC).
- Approximately 62,500 sf of light-duty pavement will be installed over existing unpaved areas at the site; this area will consist of 2.5-inch asphalt over 4 inches of CSBC.

Light- and heavy-duty pavement areas are shown on Figure 22. In addition to the paved surface areas, asphalt wedge curb would be placed around the perimeter of the site (except at driveways) and asphalt swales would be installed as part of the storm drainage component of the remedy (Section 4.2.2.3). Although beyond the scope of this evaluation, additional asphalt berming would be incorporated at the site to serve as structural best management practices for source control practices.

4.4 STORM DRAINAGE

The storm drainage component of the remedy requires that site stormwater:

- Be kept from contacting subsurface contamination, and
- Be managed in accordance with applicable local and state National Pollution Discharge Elimination System requirements.

The cap will prevent stormwater from contacting subsurface soil contamination at the property. Site re-grading and filling, new pavement, and other drainage infrastructure will prevent stormwater from contacting shallow groundwater contamination.

The primary stormwater permitting requirements observed during this evaluation are from the City's Stormwater Management Manual (SWMM) associated with site redevelopment and Ecology's Industrial Stormwater General Permit (ISGP) associated with source control and pollution prevention. The requirements from the SWMM and ISGP considered here are limited to those that have a large impact on site drainage improvements and associated cost. This evaluation is considered preliminary and does not constitute a stormwater site plan for construction or a stormwater pollution prevention plan (SWPPP) for ISGP compliance.

Development of a preliminary drainage layout requires downstream and onsite drainage assessments. The downstream system has been evaluated to assess the feasibility of conveying site drainage to the City's Taylor Way storm sewer through the existing drainage system of a neighboring property and to approximate the allowable additional drainage volume that the system of the neighboring property can accommodate (see Section 4.2.1). The onsite drainage was evaluated to develop a preliminary drainage layout at the property and to inform preliminary scope and costs for the final remedy (see Section 4.2.2).

4.4.1 DOWNSTREAM DRAINAGE

CleanCare stormwater is intended to drain from the property to the City storm sewer in Taylor Way. To reach the City storm sewer, the CleanCare drainage would connect into the PSC property's drainage system where stormwater from the two properties (CleanCare and PSC) would combine. The PSC drainage system includes three catch basins and piping along the access road, two ditches along Taylor Way, and two driveway culverts. A site map showing the potential drainage pathway from the CleanCare property to the City storm sewer is provided on Figure 23.

There is an existing drainage easement in place that allows the CleanCare property to connect into the PSC drainage system. To assess the integrity and capacity of the storm drainage infrastructure from the CleanCare property to the City storm sewer, both qualitative and quantitative assessments of the PSC drainage system were conducted.

4.4.1.1 Qualitative Assessment

A qualitative assessment was completed in accordance with the City SWMM, Volume 3, Chapter 9, Section 9.2.2.1. Site visits were conducted to observe the PSC property and the existing PSC drainage system. The first site walk was conducted on February 13, 2014; the weather condition was sunny. The topography appeared flat, which is consistent with the findings of the topographic survey (Appendix C). The three catch basins along the Taylor Way access road did not contain flowing stormwater during the site walk, but appeared to be relatively new and well maintained; some sediment accumulation was observed in the southernmost catch basin. A second site walk was conducted on March 25, 2014 to assess the current conditions of the stormwater ditches along Taylor Way, the weather was rainy throughout the day. The east ditch contained some standing water. The west ditch contained a larger volume of standing water and appeared relatively full. During a site visit on March 26, 2014, the east ditch was dry and the west ditch was almost dry with a minor amount of standing water at the outlet pipe;

the weather was relatively dry with light showers in the afternoon. The locations of the catch basins and the ditches are provided on Figure 23 and photos of these features are provided in Appendix F.

Since the area is tidally influenced (PGG 1995), a preliminary assessment of potential groundwater intrusion along the PSC drainage system was conducted. Groundwater elevation studies conducted by PSC on the PSC property near the existing stormwater system (PSC 2005) and elevation data for the stormwater system collected during the topographic survey were used. Specifically, historical groundwater elevation measurements from June, September, and December 2001 (PSC 2005) were compared to the access road drainage system pipe invert elevations and average ditch bottom elevations. There appears to be adequate vertical separation between the shallow groundwater table and both the access road drainage system and east ditch to prevent groundwater intrusion. However, the shallow groundwater elevation during the rainy season appears higher than the west ditch bottom elevation and therefore, the west ditch may be subject to groundwater intrusion; this suggests that the standing water observed in the west ditch on March 25, 2014 may have been representative of both stormwater and groundwater. The supporting data analysis table and figures used to assess groundwater intrusion are provided in Appendix F.

4.4.1.2 Quantitative Assessment

A quantitative assessment was completed in accordance with the City SWMM, Volume 3, Chapter 9, Section 9.2.2.2. First, the PSC property was divided into three drainage sub-basins based on a stormwater drainage pattern study conducted by PSC (PSC 2005); the sub-basins are shown in Figure 24. Next, the Rational Method was utilized as described in Section 9.3.3 of the City's SWMM to determine drainage flow rates throughout the PSC drainage system for different rainfall events. Then, the flow rates and dimensions of the drainage system features (pipes and ditches) were used to evaluate the system's capacity using the Manning's formula.

Per the SWMM, the pipe system needs to convey the 10-year[5] flow event without overtopping and the ditches need to convey the 100-year flow event with adequate freeboard[6] to prevent or minimize overtopping. This analysis concluded that the pipe system along the access road can manage a 10-year flow up to approximately 2.7 cubic feet per second (cfs), and that it currently receives a 10-year flow of approximately 1.24 cfs. Therefore, the drainage system currently only utilizes approximately half of its capacity, indicating that it can receive additional drainage up to 1.46 cfs. For the ditches, the analysis indicates that there is more than 0.5 ft of freeboard during a 100-year storm event, which is the minimum

[5] According to the City's SWMM, private pipe systems less than 24 inches in diameter will be designed to convey a 10-year storm event.

[6] Freeboard is the vertical separation from the top of the ponded water in the ditch to the grade surrounding the ditch perimeter.

required by the SWMM. However, the analysis did not account for potential shallow groundwater intrusion into the west ditch.

In addition to further assessing the groundwater intrusion of the west ditch and its relation to capacity, the City would likely require analysis of the City system at the connection point with the west ditch (City of Tacoma 2014). This analysis would be conducted as part of a stormwater site plan prepared during site development permitting. Additional information regarding the quantitative assessment, including the flow rates determined by the Rational Method and the capacity calculation outputs, are provided in Appendix G.

4.4.2 ONSITE DRAINAGE

Evaluation of onsite drainage included review of the historical infrastructure, current site grades, and development of a potential drainage layout supportive of the intended future use. These individual evaluations are presented in the following subsections.

4.4.2.1 Historical Drainage

Using a number of historical site plans, the approximate historical utility drainage plan was compiled and is presented on Figure 4. As shown, site storm drainage was historically conveyed off site through the southernmost parcel from an onsite pump station to the public storm system along Lincoln Avenue. To reach Lincoln Avenue, the drainage ran through a joint-property private storm sewer line located on the Educator property.

Between June 1998 and March 1999 Ecology identified cross-contamination of stormwater with oil and solvents at the CleanCare site (EPA 2000b). On March 26, 1999, CleanCare had an incident where approximately 1,000 to 2,000 gallons of oily wastes allegedly spilled into the onsite stormwater system which drained off site to the City's stormwater ditch along Lincoln Avenue (EPA 2000b). In September 1999 Ecology observed that all onsite storm drains were blocked and stormwater was accumulating on site. In December of 1999, EPA took over the site and began management of site contact and non-contact stormwater (EPA 2000b). In an EPA Action Memorandum from January 2000 (EPA 2000b), EPA claimed that the threat of contaminated ponded stormwater migrating off-site via surface water runoff was extremely high. EPA then overhauled the onsite stormwater system to be an aboveground stormwater management system. Once EPA left the site in about December 2000, management and operations of the stormwater management system was delegated to Ecology (EPA 2000a).

As discussed in Section 1.2, the system set up by EPA became inoperable in the 2000s and stormwater is likely to have generally ponded on site since. Field observations indicate that remaining catch basins and vaults likely contain residual waste liquids and solids from the oily waste line and possibly contaminated shallow groundwater; therefore, the catch basins and vaults are assumed to be unfit for future use. The condition of remaining ASTs used by EPA for stormwater management is unknown. Since the remaining catch basins and vaults would not be reused, they would be properly plugged and abandoned during future redevelopment activities.

4.4.2.2 Current Site Grades

The current site grade and surface features were mapped during the topographic survey (Appendix C). The site is relatively flat with surface elevations typically within the range of 12 to 14 ft NGVD29. The minimum and maximum spot elevations documented were 11.7 and 16.7 ft, but these elevations were observed along the property border and are not characteristic of the overall site. The perimeter of the site was walked to observe runoff and runon conditions. There appear to be no runon conditions at the site, but there is currently some runoff that occurs via sheet flow along the eastern perimeter of the property; the current sheet flow runoff condition would be discontinued upon installation of the complete site cap with wedge curbing and the other storm drainage infrastructure.

For property redevelopment, the drainage is intended to connect into the south catch basin on the PSC access road, which would require an inlet pipe invert elevation from CleanCare of approximately 11.35 ft NGVD29. The current surface grade is approximately 12.7 ft NGVD29 at both the northern end of CleanCare (closest to the south catch basin) and at the southern end of CleanCare. Due to the flat grade and limitations in use of the subsurface for piping, the property grades would need to be modified and some drainage pumps appear necessary. Using the topographic survey as a basis, approximate site surface contours are shown on Figure 25.

4.4.2.3 Preliminary Onsite Drainage Plan

The key elements of the preliminary onsite drainage plan include the following:

- Site cap and wedge curbing
- Sheet flow adjustments by careful filling and regrading
- Asphalt swales
- Trench drains
- Controlled routing of building roof downspouts
- Shallow catch basins/vaults with sump pumps

- Surface and shallow subsurface piping (H-20 loading rated where necessary)
- ASTs for stormwater detention.

These key elements address stormwater collection, conveyance, and detention. The preliminary onsite drainage plan showing the approximate location of these key features is provided on Figure 26. Stormwater treatment elements such oil/water separation and basic treatment were not included in this assessment but may be necessary depending on the site redevelopment plan. Locations onsite where chemical transfer and storage would occur and where stormwater runoff would drain to the sanitary sewer would be separated from the storm drainage sub-basins, as shown on Figure 26.

Site drainage would flow from south to north and would be divided into three drainage sub-basins: A, B, and C. Major site features used to determine the boundaries of the sub-basins include the proposed new access road with a crown along the southern extent, existing buildings, property boundaries, available locations for detention tanks, and the offsite connection point to the north. As shown on Figure 26, drainage from sub-basin A and B would be pumped to ASTs located near the north end of the site; the positioning of the tanks accounts for City standard setbacks for detention systems: 5 ft from property line and 10 ft from any building structure. The plan shows that drainage is released from the detention tanks to the onsite vault near the northern property boundary (vault C1), and that the vault then drains to the southernmost catch basin along PSC's access road. The outlet of the detention tanks would likely have an orifice restriction or valve to control the rate of discharge. Sub-basin C is a relatively small area and is shown to drain directly to the onsite northern vault (vault C1), without detention. Emergency overflow for the sub-basin A tank would drain to the onsite vault and eventually to the PSC property to the north. An overflow pipe on the detention tanks from sub-basin B would allow overflow to drain to the detention pond[7] at the neighboring property to the east, where some sheet flow from the CleanCare site currently drains.

As part of the development of this preliminary drainage plan, approximate detention tank sizing was conducted using the Western Washington Hydrologic Model (WWHM) in accordance with the City SWMM. Sub-basin A is estimated to need approximately 25,000 gallons of detention tank storage volume; Figure 26 shows one standard tank with a capacity of 25,000 gallons. Sub-basin B is estimated to need approximately 63,000 gallons of detention tank storage volume. Figure 26 shows three available standard size horizontal cylindrical tanks with a cumulative capacity of 63,000 gallons. Those tank types and dimensions are provided to give a sense of scale, but the actual tanks utilized could also be typical rectangular 21,000 or 18,000 gallon steel tanks that could fit within the general area shown on Figure 26.

[7] According to EPA records, the pond is a stormwater retention pond that the City of Tacoma installed (EPA 2000b).

Running WWHM and assuming the drainage layout shown on Figure 26, the combined 10-year flow for the three sub-basins from the onsite vault is approximately 0.94 cfs. As discussed in Section 4.2.1.2 above, the available capacity of the PSC drainage system along the access road was estimated to be 1.46 cfs. Therefore, the PSC drainage system along the access road appears to have capacity for the 10-year flow from CleanCare.

4.5 REMEDY IMPLEMENTATION SCHEDULE

The date of the future property transfer between Pierce County and TTP is unknown. However, assuming it may be around June 1, 2015, a preliminary remedy implementation schedule has been constructed showing the activities that TTP would likely conduct during the first year of ownership. The schedule is provided as Appendix H.

The main tasks included in this schedule are as follows:

- Baseline groundwater sampling
- Vapor intrusion assessment
- Permits, designs, and contractor documents for site redevelopment
- Site redevelopment construction

This schedule assumes that the monitoring well network is complete, and that no additional wells are necessary. Also, all denoted Ecology document review periods are assumed to be a maximum of 45 days; this is consistent with Ecology's new LEAN process (Coleman, M 2014). This schedule provides just less than 6 months for the permits, design, and contractor document task. Redevelopment of the site (and implementation of structural components of the final remedy) is anticipated to take about 3 months. After completion of the engineered components of the remedy, institutional controls will be implemented to prevent activities that might affect the integrity of the final remedy or result in exposure to hazardous substances.

5.0 CONCLUSION

In the interest of purchasing the site and putting it to a beneficial use, TTP has evaluated the site environmental conditions and a potential long-term remedy for the site. Conditions at the site are well characterized, the site has a complete monitoring well network, and a partial cap of the site is already in place as part of the final site remedy. With a complete site monitoring well network, compliance monitoring can be conducted by PLPs and Ecology (Section 4.1). The most recent environmental data indicates that impacts attributed to historical site releases generally remain within the site footprint and that contaminants are likely to have further degraded over the past 12 years due to natural attenuation.

Given the site land use designation (industrial) and the proposed site use, the primary structural components of the long-term remedy include improving and completing the cap, installing a new storm drainage system, ensuring the site is fully secure (fencing and other security features), and, if necessary, installing vapor mitigation systems at applicable buildings. The current site cap paved areas are in good condition and an evaluation for completing the cap has been performed (Section 4.3). A preliminary drainage layout has been developed (Section 4.4), which will involve some site grading and filling. Site drainage is anticipated to require installation of some stormwater drainage transfer pumps and further analysis to confirm that the downstream joint use storm drain system shared with PSC has adequate capacity at the City storm sewer system tie in location. The need for vapor mitigation controls would be determined by conducting a vapor intrusion assessment (Section 4.2).

Site redevelopment and implementation of these structural institutional controls is feasible, and TTP's willingness to provide these resources is "substantial" per Policy 520A (Ecology undated). With incorporation of a compliance monitoring program (groundwater, and possibly indoor air) and these structural institutional controls, the long-term site remedy will be complete and operational, and should meet the substantive threshold requirements of the MTCA (WAC 173-340-360(2)(a).

6.0 APPROPRIATE USE OF THIS REPORT

This site characterization report has been prepared for the exclusive use of the Tacoma Taylor Property, LLC for specific application to the CleanCare site. No other party is entitled to rely on the information, conclusions, and recommendations included in this document without the express written consent of Landau Associates. Further, the reuse of information, conclusions, and recommendations provided herein for extensions of the project or for any other project, without review and authorization by Landau Associates, shall be at the user's sole risk. Landau Associates warrants that within the limitations of scope, schedule, and budget, our services have been provided in a manner consistent with that level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality under similar conditions as this project. We make no other warranty, either express or implied.

This document has been prepared under the supervision and direction of the following key staff.

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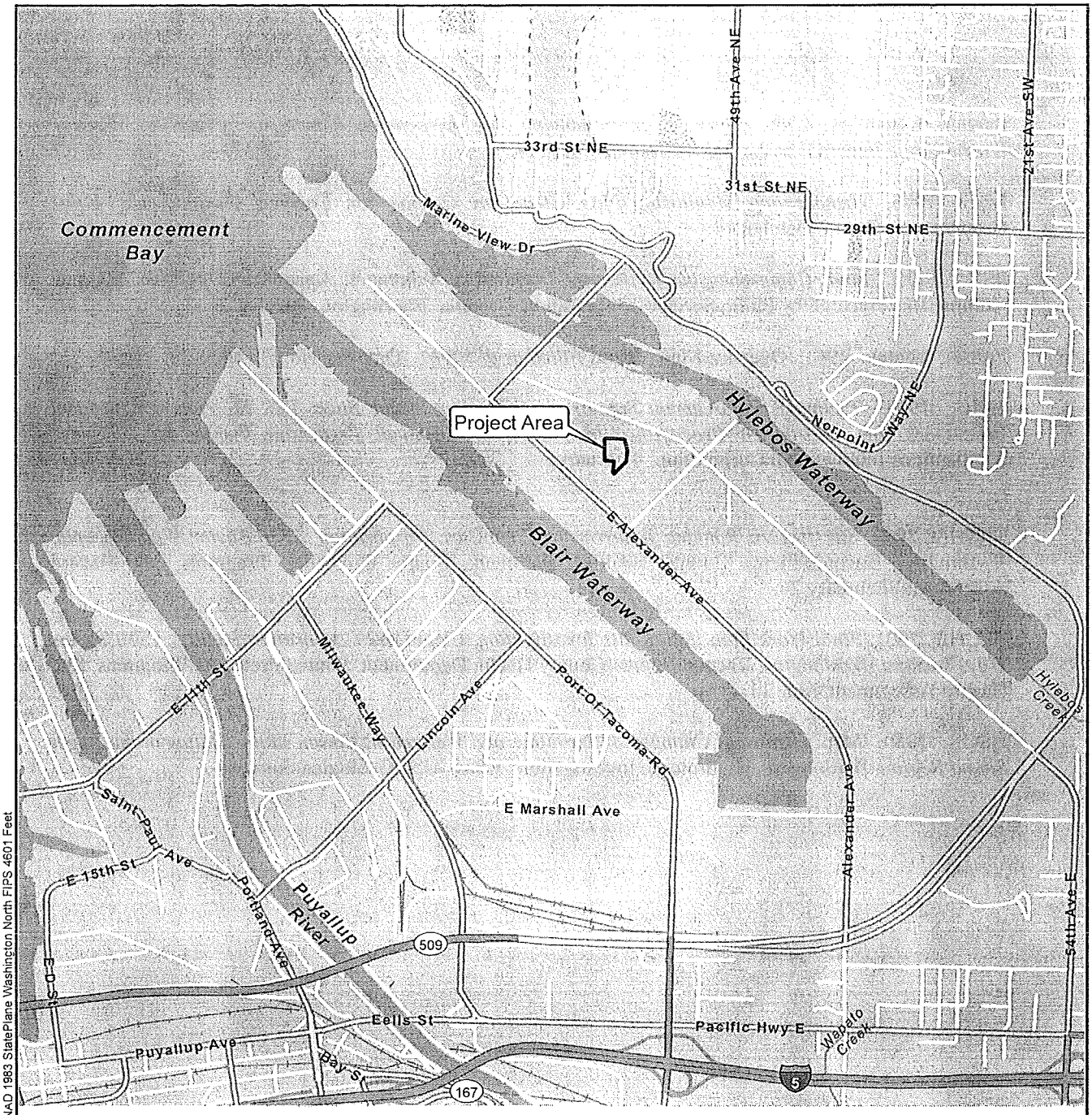

Data Source: Esri 2012

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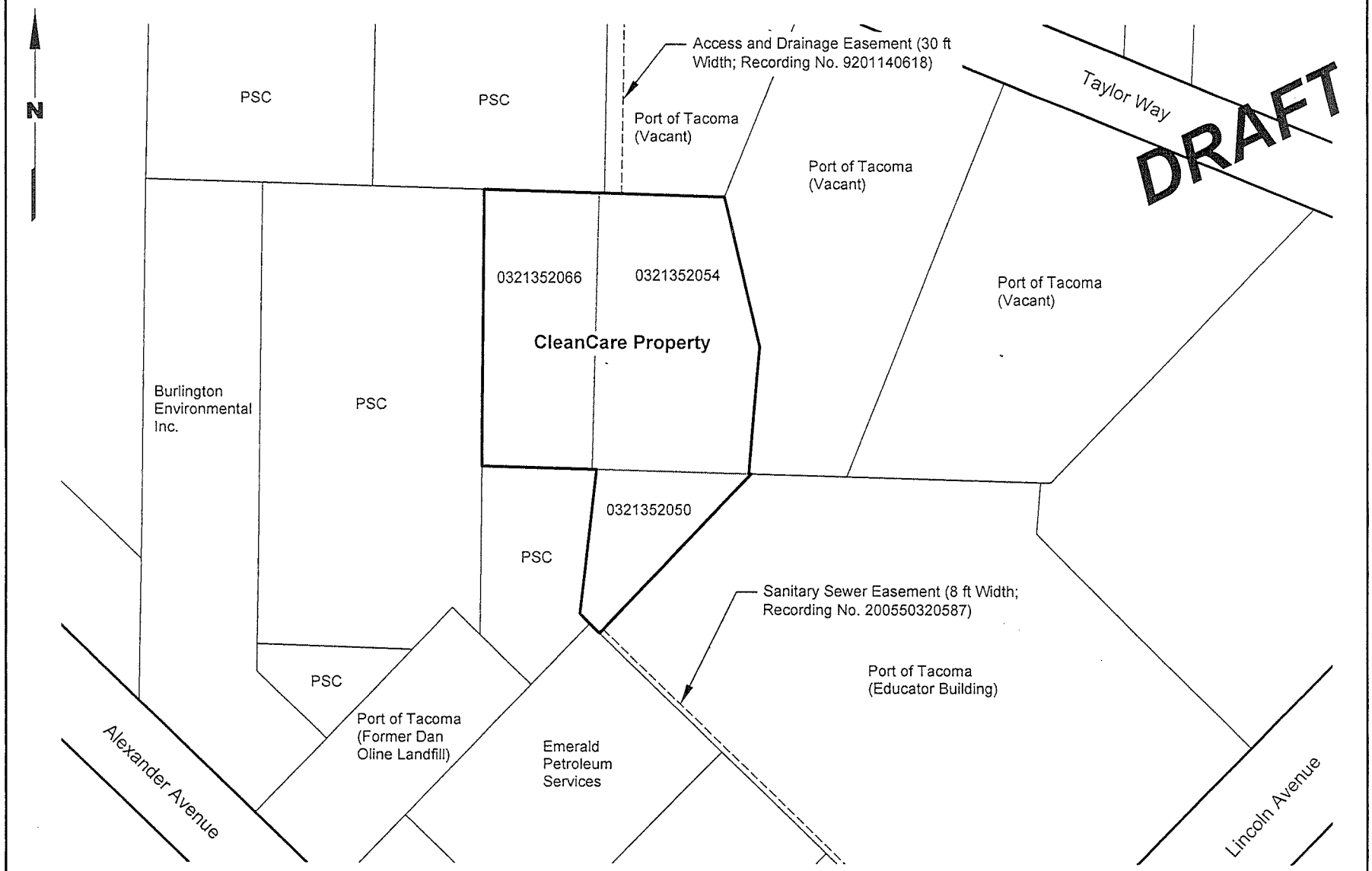
CleanCare Property Port of Tacoma Tacoma, Washington	**Vicinity Map**	Figure 1



Base map source: City of Tacoma GIS Data 2005

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CleanCare Property Port of Tacoma Tacoma, Washington	**Parcels, Ownership, and Select Easements**	Figure 2

EPA CLEAN CARE JANUARY 2000

CleanCare Site, Tacoma Washington

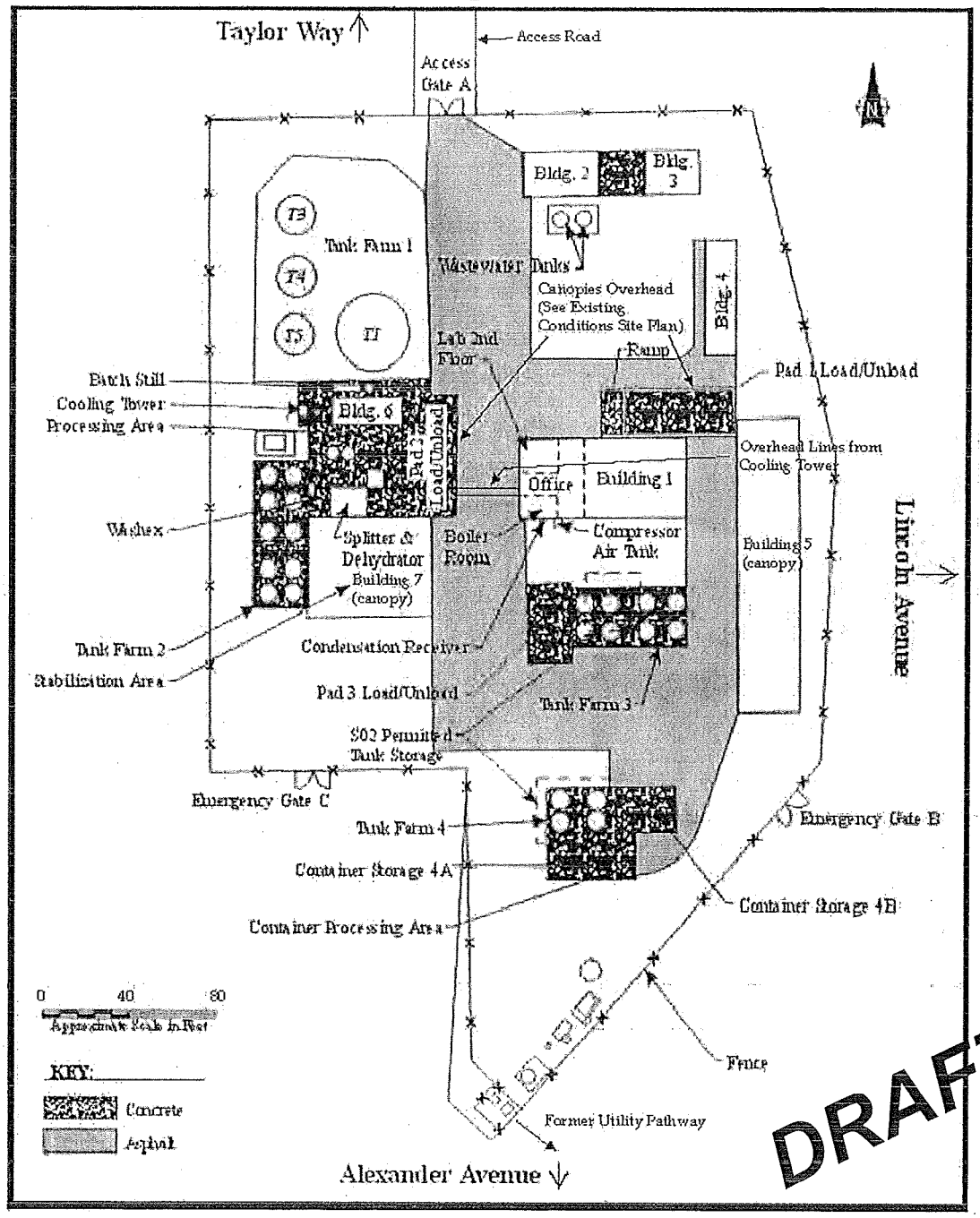
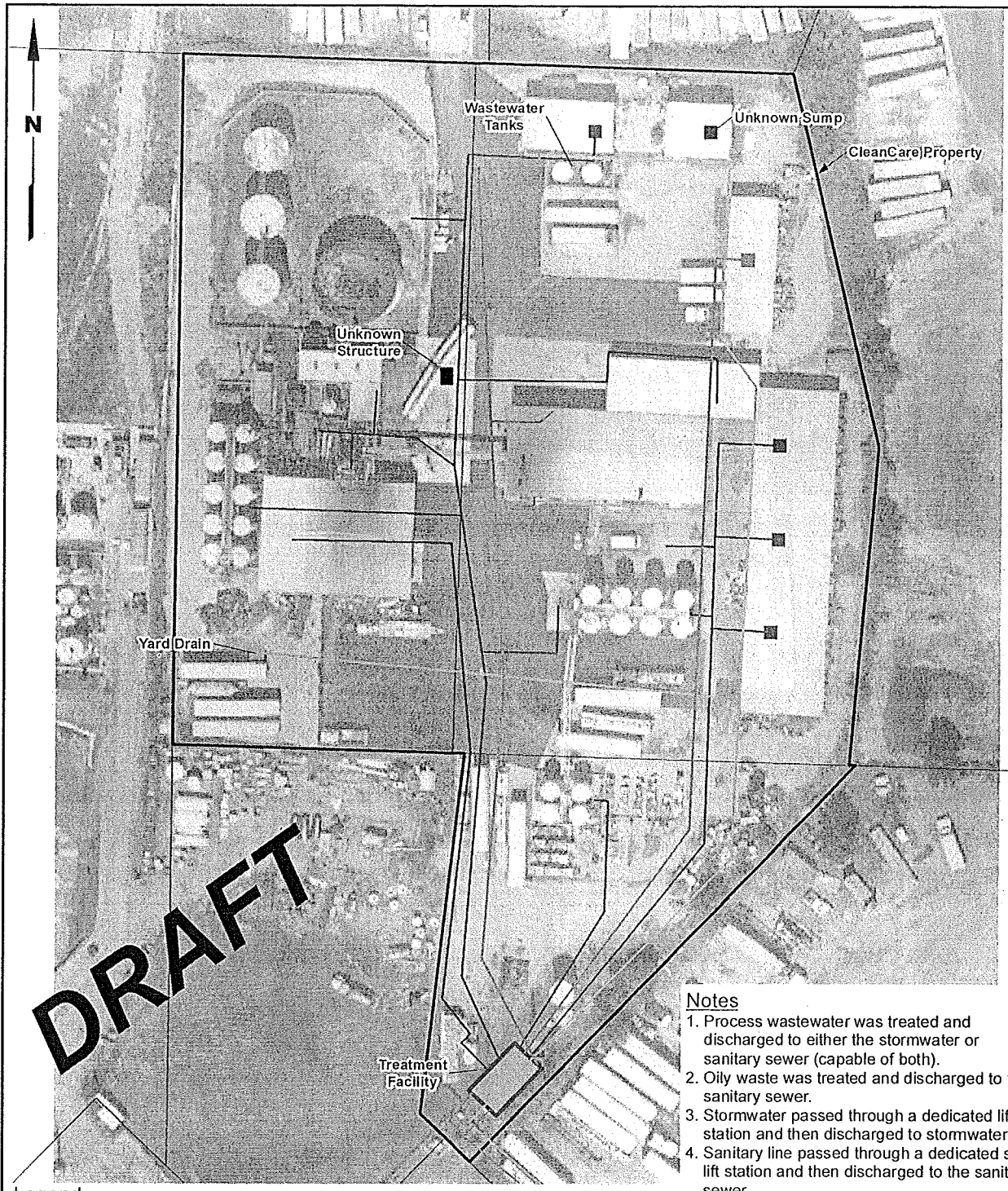


Figure source: EPA CleanCare Superfund Fact Sheet

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Historical Operations Site Plan**

Figure 3

5/13/14 \\tacoma3\PROJECT\992 QCF\006.010\TFigures\EPA Site Plan.docx



Notes

1. Process wastewater was treated and discharged to either the stormwater or sanitary sewer (capable of both).
2. Oily waste was treated and discharged to the sanitary sewer.
3. Stormwater passed through a dedicated lift station and then discharged to stormwater sewer.
4. Sanitary line passed through a dedicated sanitary lift station and then discharged to the sanitary sewer.
5. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Chemical Line
- Oily Waste Line
- Process Wastewater Line
- Sanitary Sewer Line
- Storm Sewer Line
- Sump
- Treatment Facility
- Subject Property
- Tax Parcels

0 80 160

Scale in Feet

Data Source: Pierce County GIS; City of Tacoma.
Aerial Photo Date: 1998

G:\Projects\99210061010\014\F04HistoricalUtilities.mxd 4/30/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

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CleanCare Property Port of Tacoma Tacoma, Washington	**Historical CleanCare Utility Drainage Plan**	Figure 4

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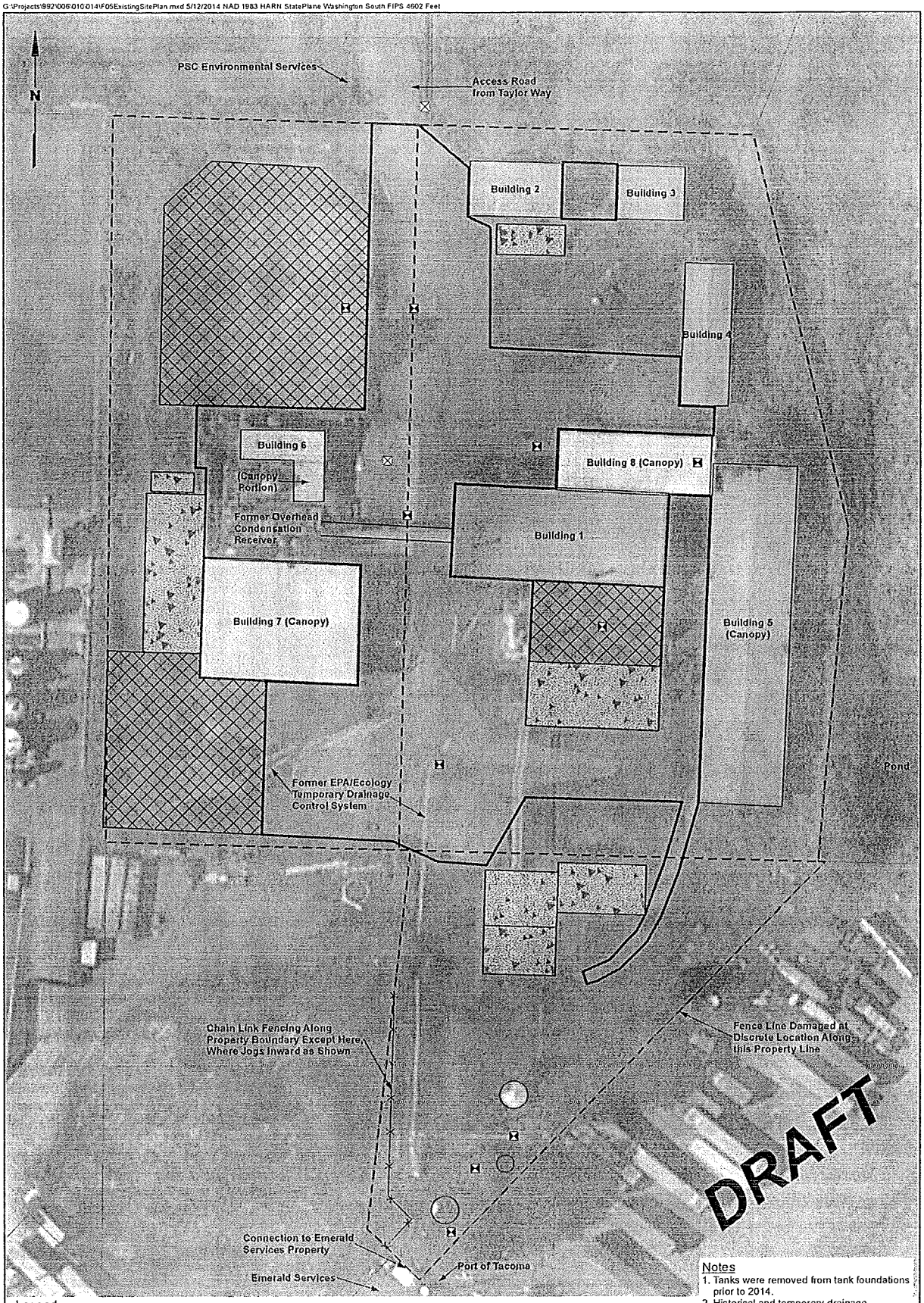

Legend

- Subject Parcels
- Onsite Asphalt (Non-Cap)
- Remaining Tank Foundations
- Asphalt Capped Area
- Buildings
- Tax Parcels 0321352066 = Parcel ID
- Above Ground Stormwater Tanks
- Max Observed Standing Water
- Chain Link Fence
- Catch Basin
- Vault

0 50 100

Scale in Feet

Notes

1. Tanks were removed from tank foundations prior to 2014.
2. Historical and temporary drainage infrastructure damaged and disconnected.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Sources: Pierce County GIS; Puget Sound Lidar Consortium; Esri World Imagery.

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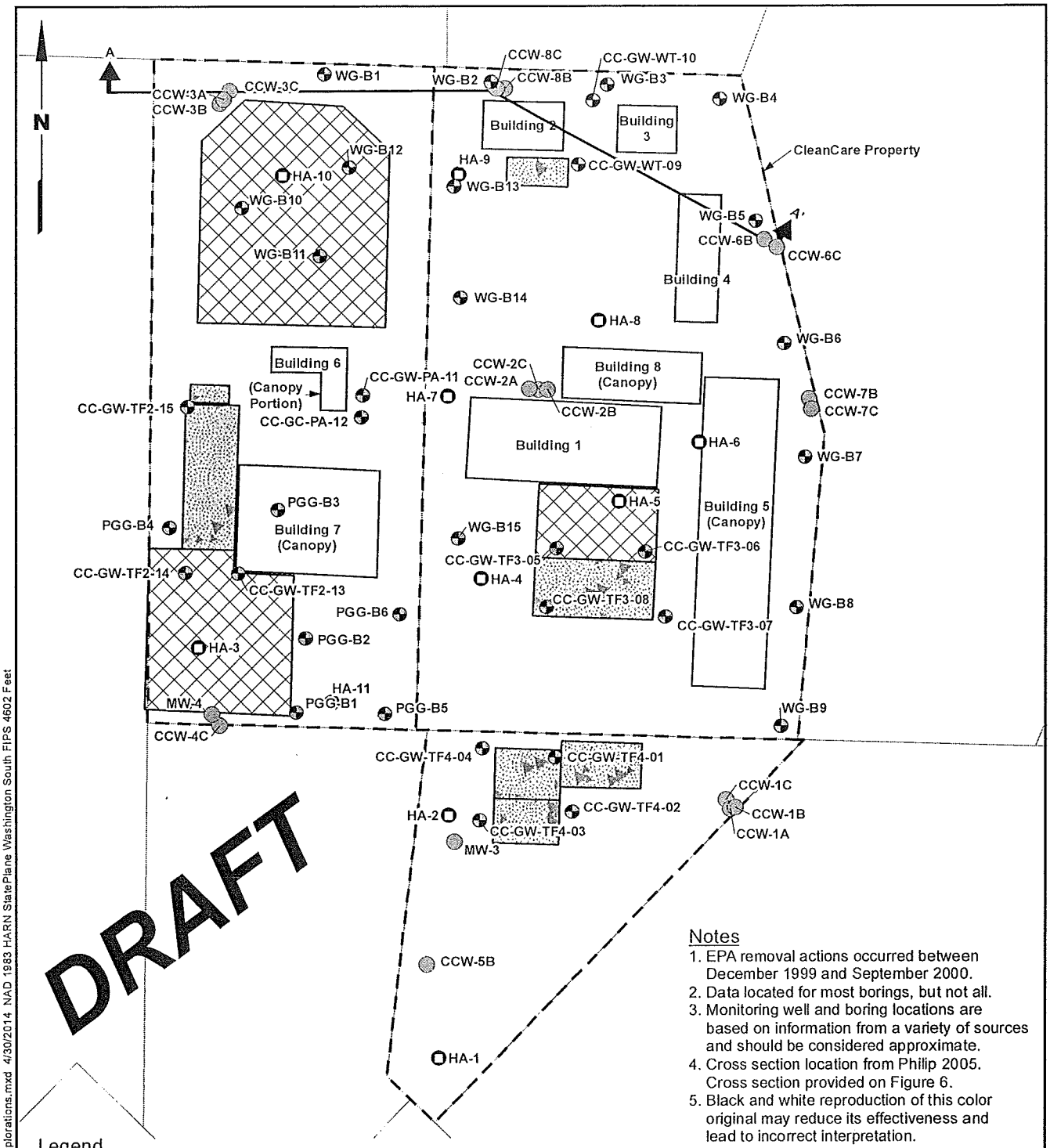
CleanCare Property
Port of Tacoma
Tacoma, Washington

Existing Conditions Site Plan

Figure 5



Data Source: Pierce County GIS; Features Interpreted from Historical Documents.

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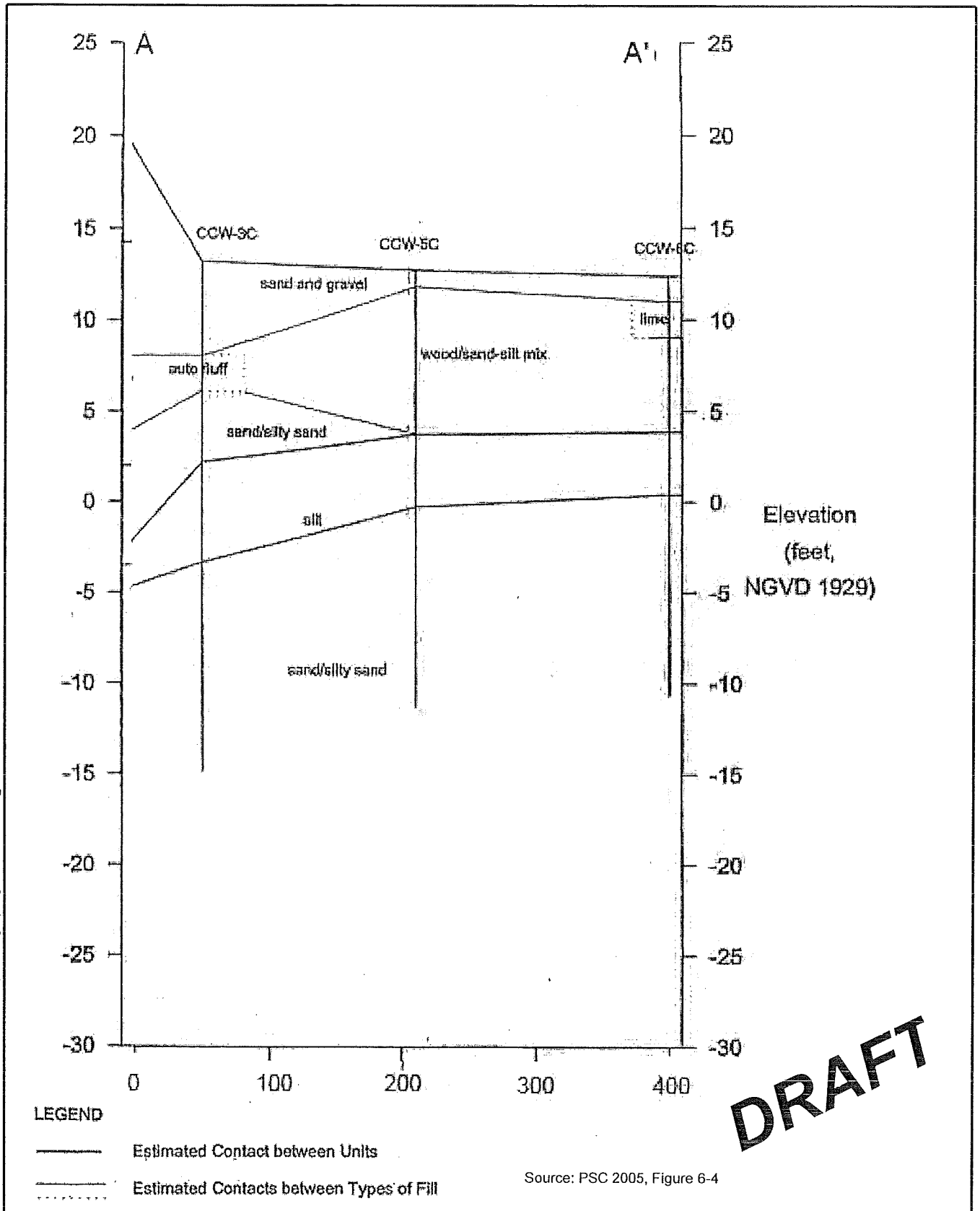
LANDAU ASSOCIATES

CleanCare Property Port of Tacoma Tacoma, Washington	**Site Explorations**	Figure 6

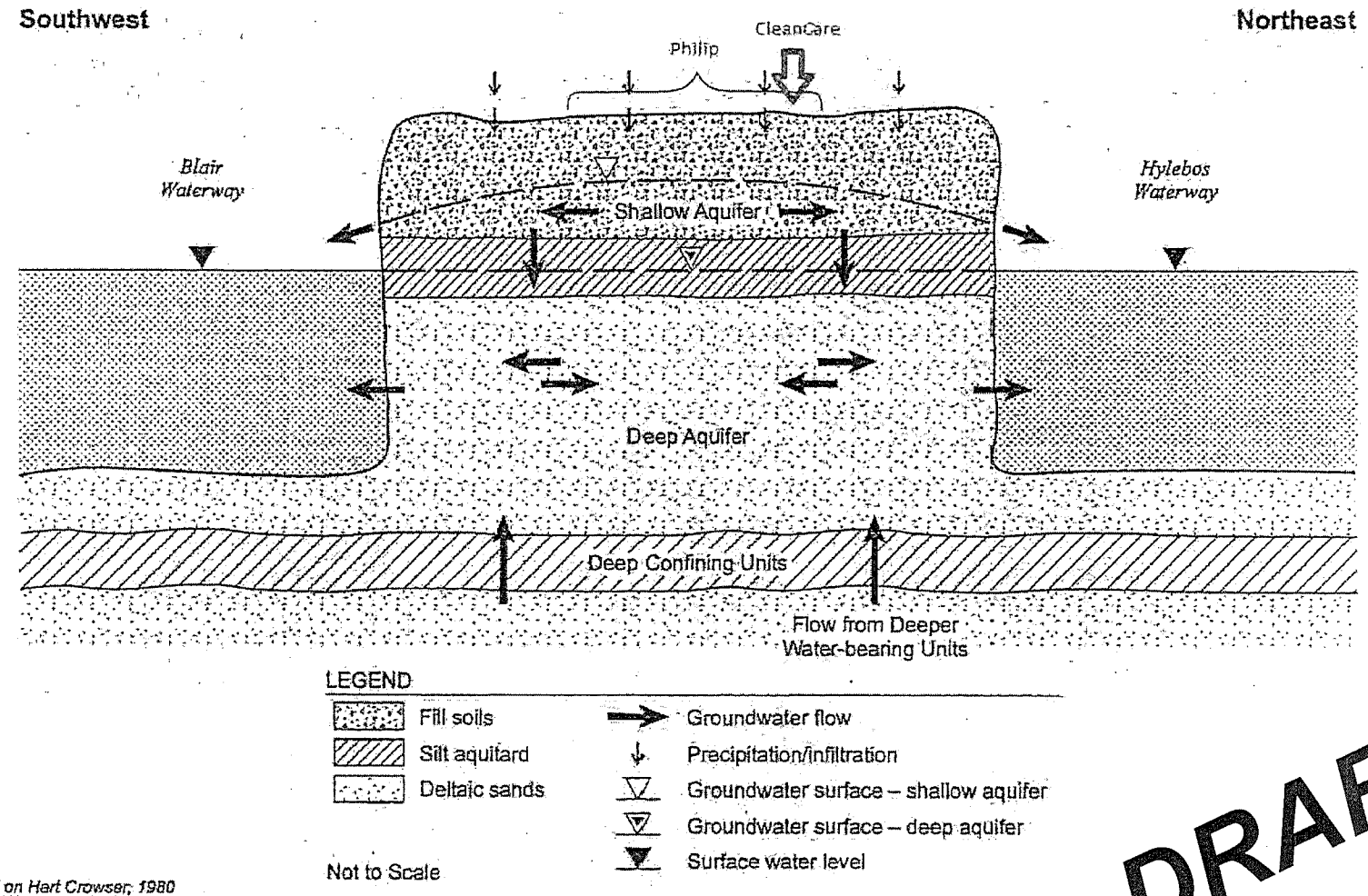


Source: PSC 2005, Figure 6-4

5/13/14 Y:\992 QCF\006.010\R\SiteChar&ConceptualDesignRpt\Figures\Section 2.0\F7_Geo Xsec.docx

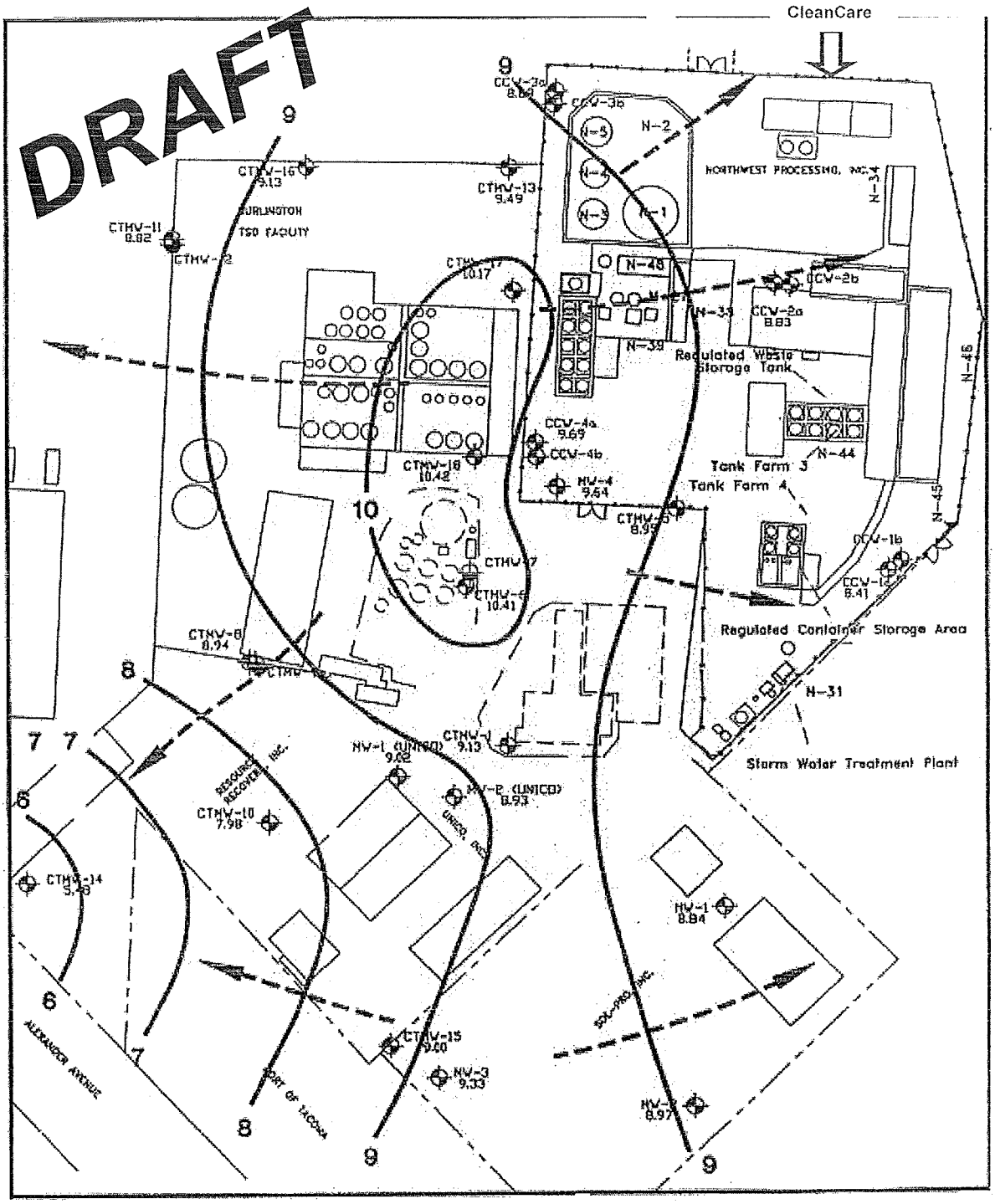
LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Geologic Cross Section A-A'**

Figure
7



Source: PSC 2005, Figure 7-19

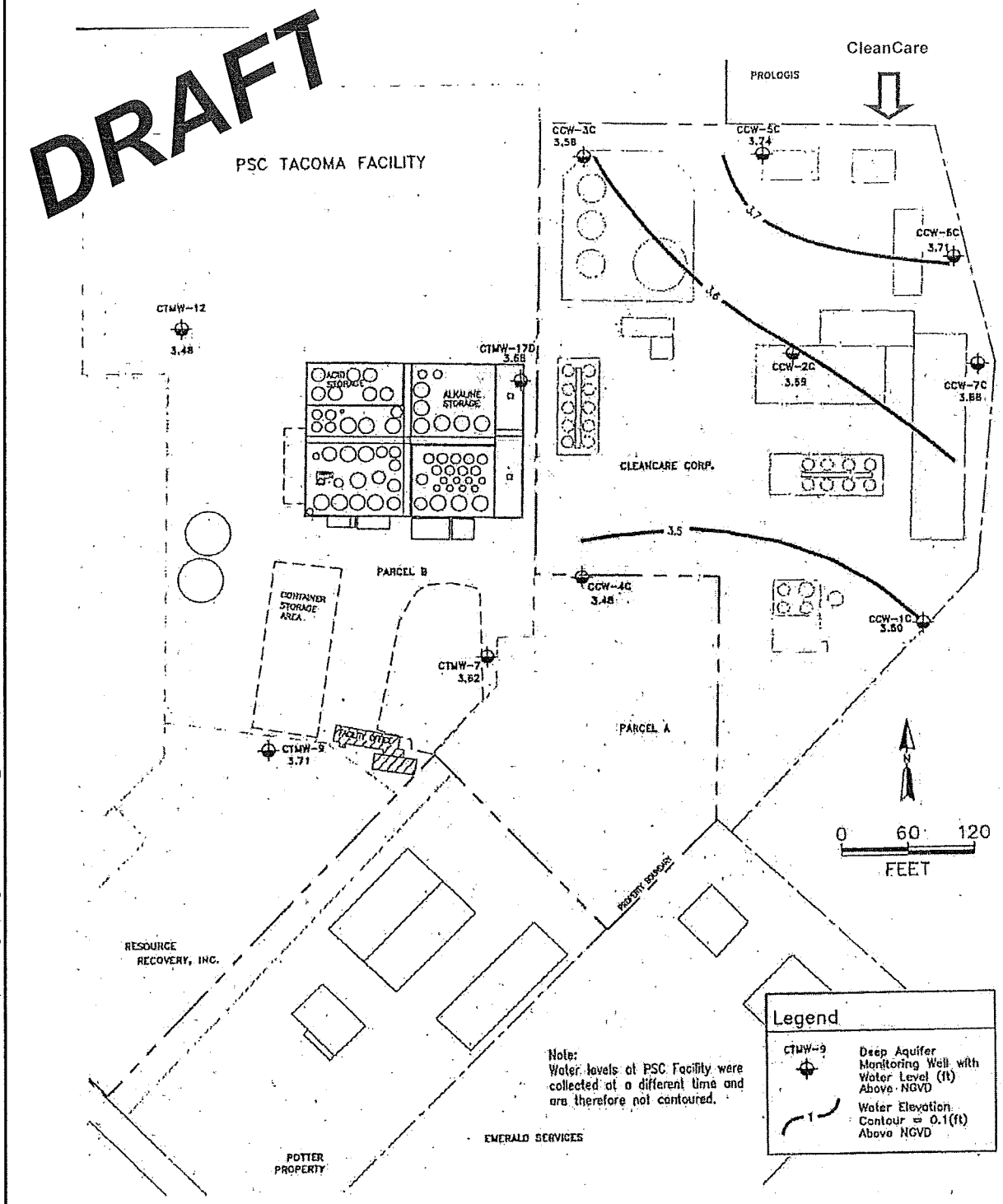
LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Conceptual Hydrogeologic Model**	Figure 8



5/13/14 \\tacoma3\PROJECT\992 QCF\006.C10\RI\SiteChar&ConceptualDesignRpt\Figures\Section 2.0\F9_Ave GWE.docx

LANDAU ASSOCIATES

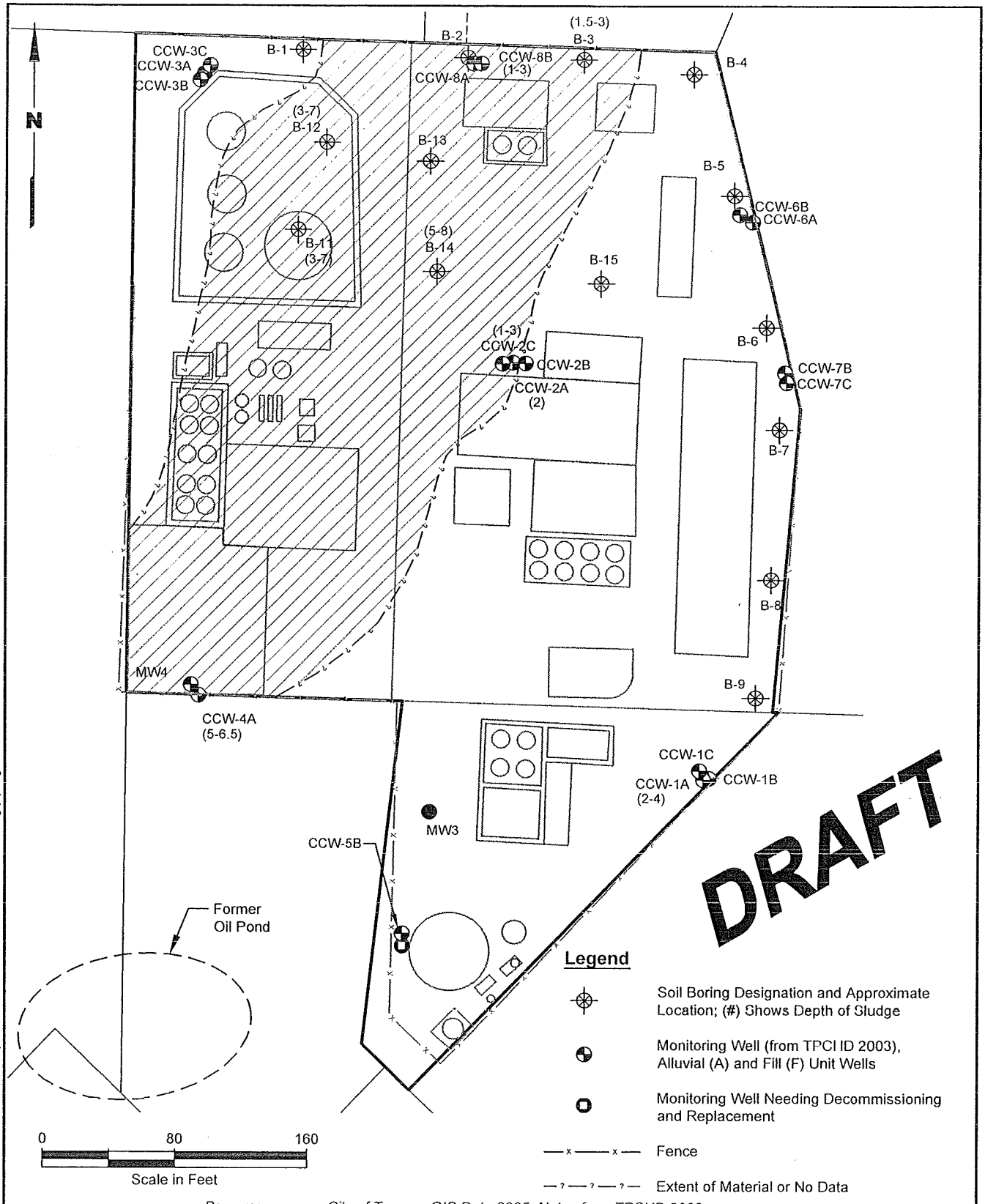
CleanCare Property Port of Tacoma Tacoma, Washington	**Average Groundwater Elevations Shallow Zone - May 1994 to April 1995**	Figure 9



Source: PSC 2005, Figure 7-14; Data collected December 17, 2001

5/13/14 \\tacoma3\PROJECT\992 QCF\006.010\R\SiteChar&ConceptualDesignRpt\Figures\Section 2.0\F10_GWE Deep.docx

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Groundwater Elevations** **Deep Zone – December 2001**
		Figure 10

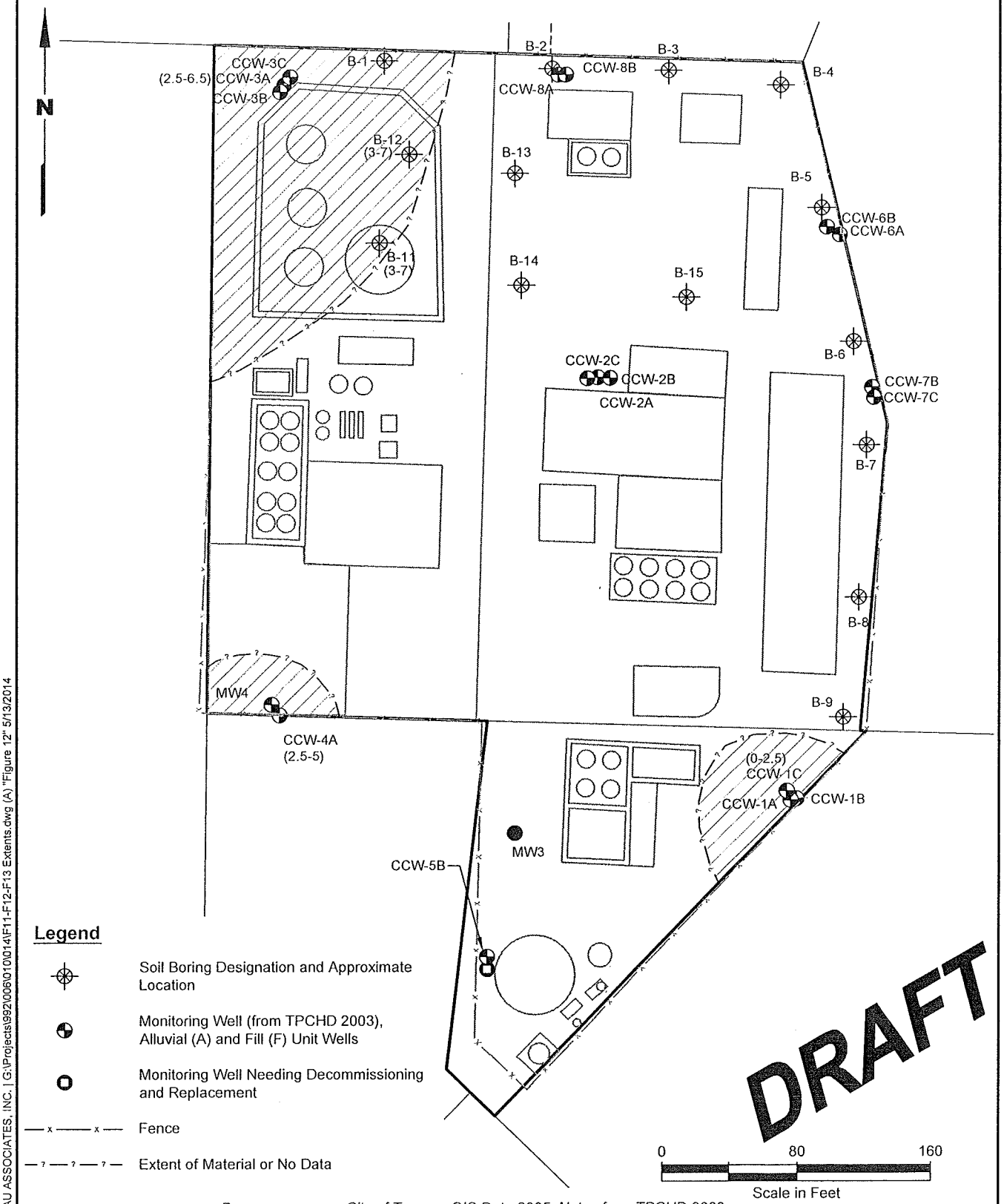


Base map source: City of Tacoma GIS Data 2005; Notes from TPCHD 2003

LANDAU ASSOCIATES, INC. | G:\Projects\992\006\010\014\F11-F12-F13 Extents.dwg (A) "Figure 10" 5/13/2014

LANDAU ASSOCIATES

CleanCare Property Port of Tacoma Tacoma, Washington	**Approximate Extent of Buried Lime-Solvent Sludge**	Figure 11

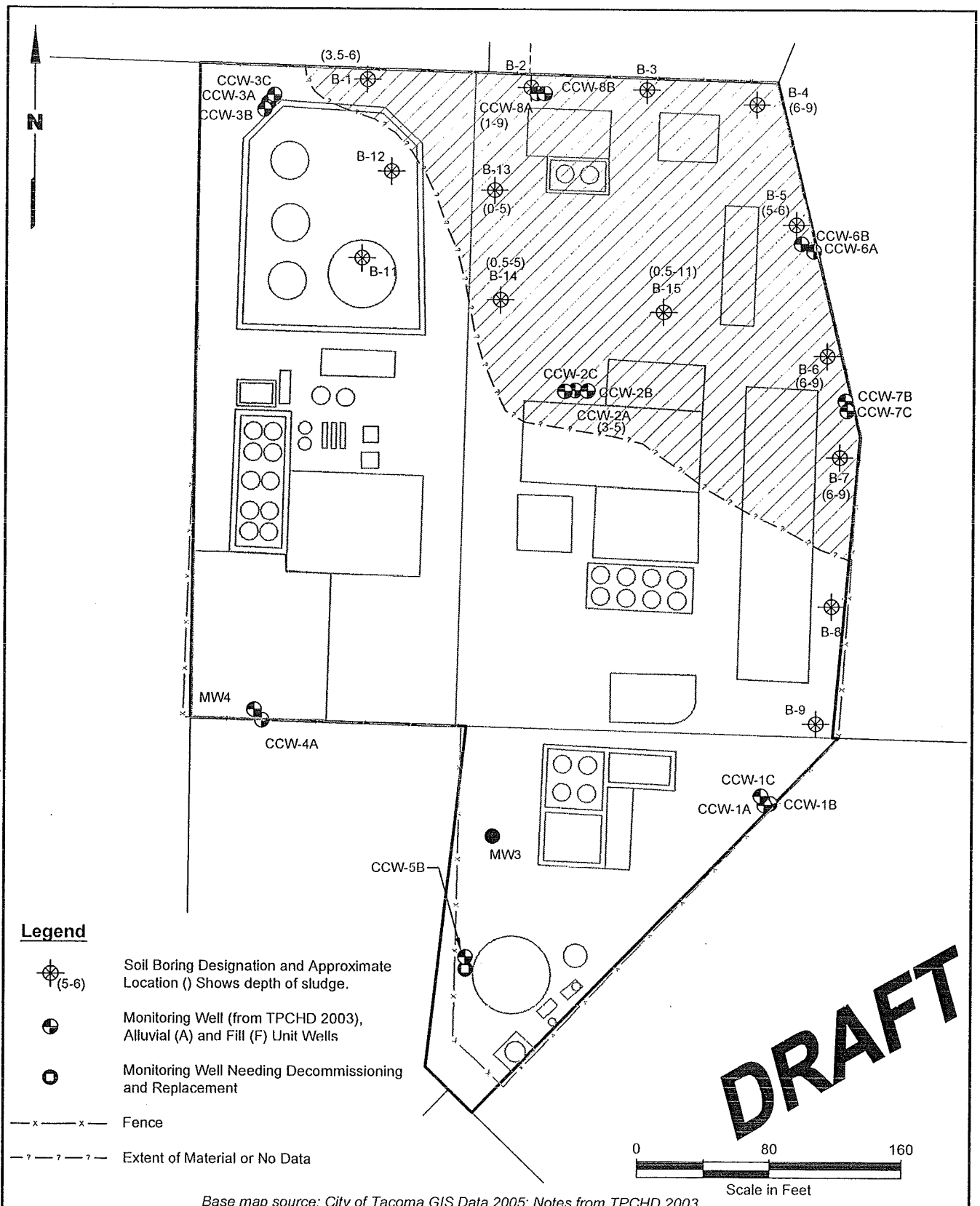


Base map source: City of Tacoma GIS Data 2005; Notes from TPCHD 2003

LANDAU ASSOCIATES, INC. | G:\Projects\992\006\010\014\F11-F12-F13 Extents.dwg (A) "Figure 12" 5/13/2014

LANDAU ASSOCIATES

CleanCare Property Port of Tacoma Tacoma, Washington	**Approximate Area with Auto Shredder Fluff**	Figure 12



Base map source: City of Tacoma GIS Data 2005; Notes from TPCHD 2003

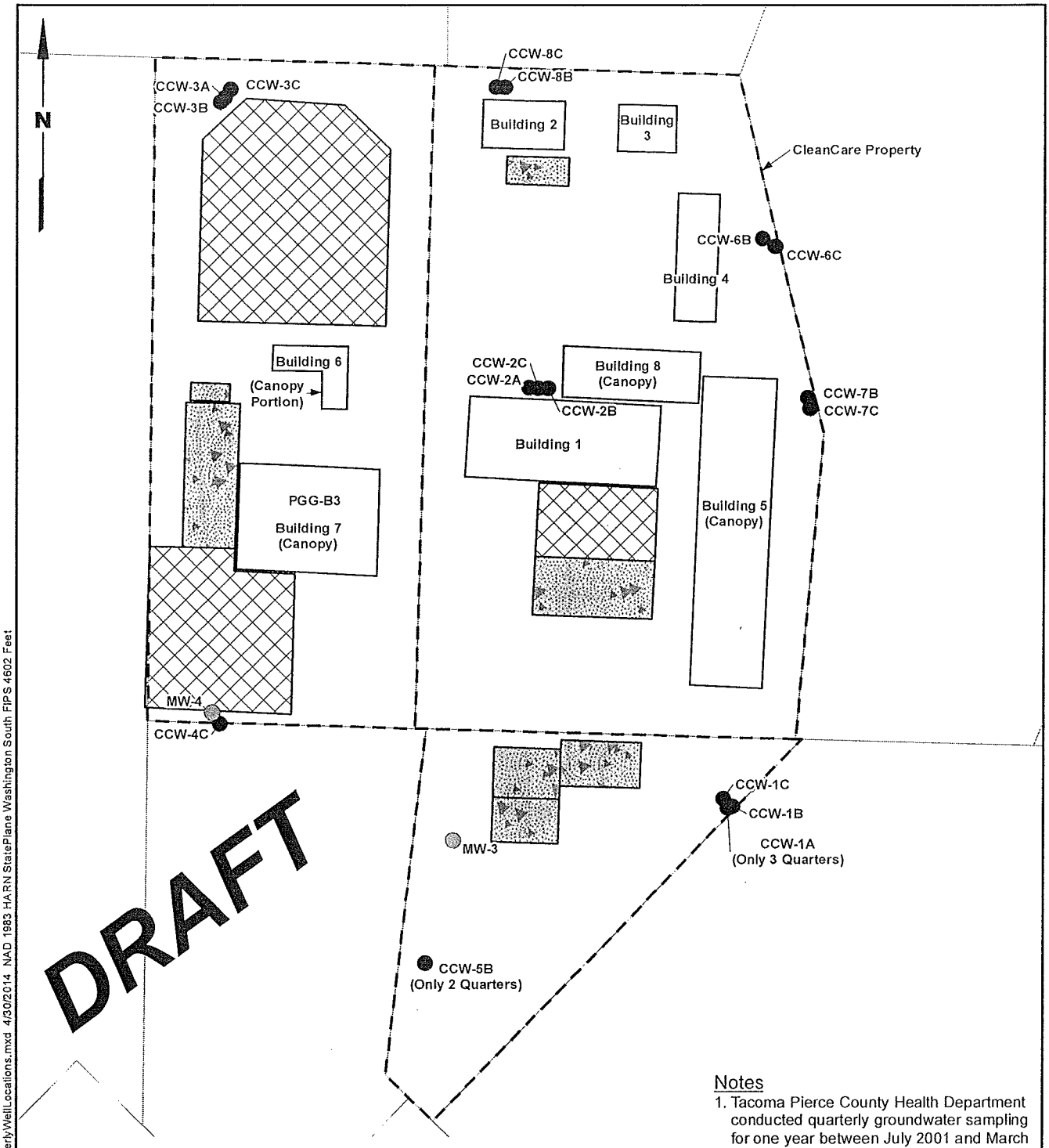
LANDAU ASSOCIATES, INC. | G:\Projects\992\006\010\014\F11-F12-F13 Extents.dwg (A) "Figure 13" 5/13/2014

LANDAU ASSOCIATES

CleanCare Property
Port of Tacoma
Tacoma, Washington

Approximate Location of Wood Waste Fill

Figure
13



Notes

1. Tacoma Pierce County Health Department conducted quarterly groundwater sampling for one year between July 2001 and March 2002.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Existing Monitoring Well
- Sampled
- Not Sampled
- Subject Parcels
- Buildings
- Tax Parcels
- Remaining Tank Foundations
- Asphalt Capped Area

0 80 160

Scale in Feet

Data Source: Pierce County GIS; Features Interpreted from Historical Documents.

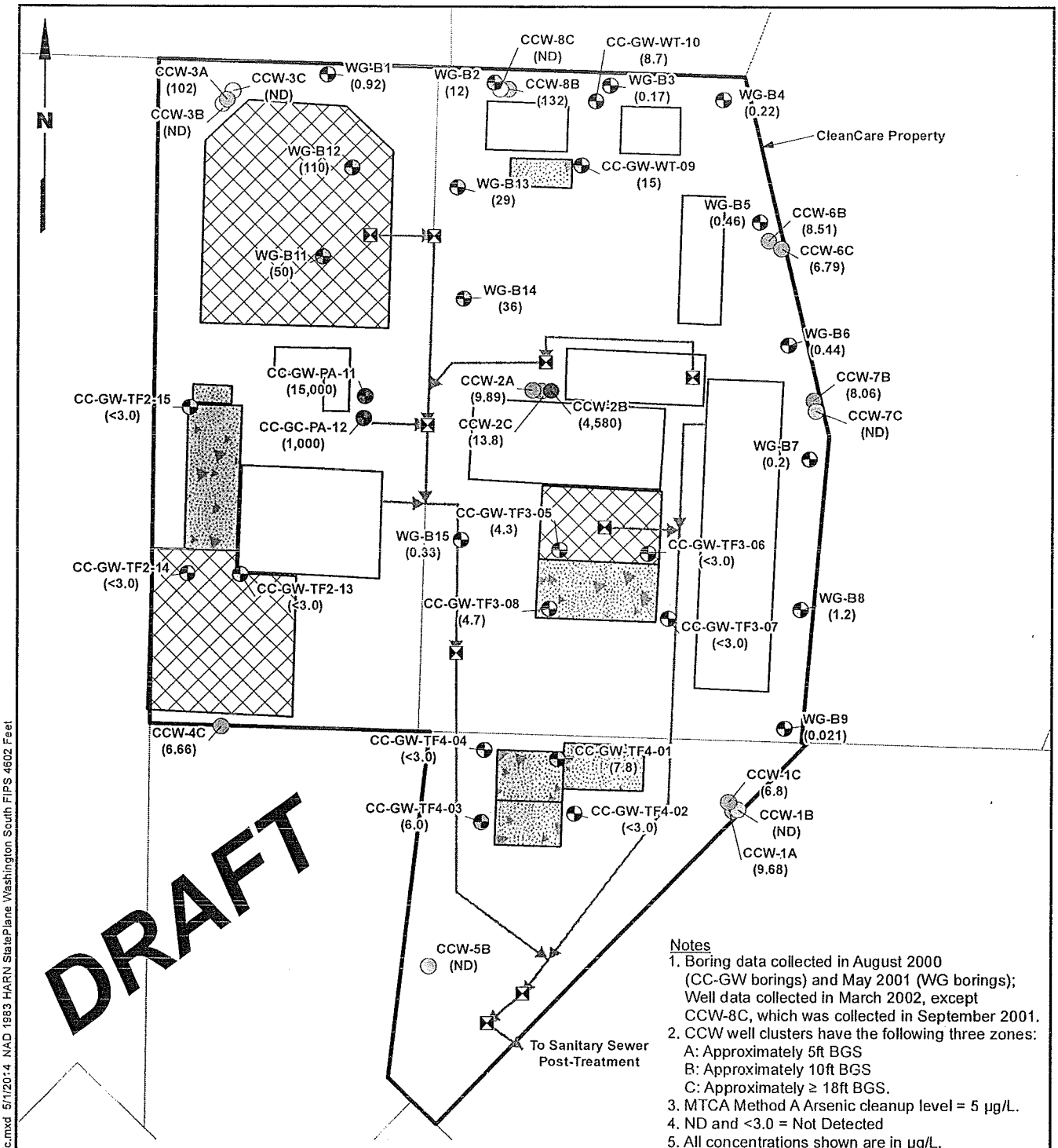
G:\Projects\99210060\10\014\F14QuarterlyWellLocations.mxd 4/30/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

LANDAU ASSOCIATES

CleanCare Property
Port of Tacoma
Tacoma, Washington

Quarterly Monitoring Well Locations

Figure 14



Notes
1. Boring data collected in August 2000 (CC-GW borings) and May 2001 (WG borings); Well data collected in March 2002, except CCW-8C, which was collected in September 2001.
2. CCW well clusters have the following three zones:
   A: Approximately 5ft BGS
   B: Approximately 10ft BGS
   C: Approximately ≥ 18ft BGS.
3. MTCA Method A Arsenic cleanup level = 5 µg/L.
4. ND and <3.0 = Not Detected
5. All concentrations shown are in µg/L.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend
- Monitoring Well
- Geoprobe Sample
- Vault
- Subject Property
- Buildings
- Historical Oily Waste Line
- Remaining Tank Foundations
- Asphalt Capped Area
- Tax Parcels

Arsenic Concentration
- ND - <5 µg/L
- 5 - <500 µg/L
- ≥500 µg/L

0 80 160
Scale in Feet

Data Source: Pierce County GIS; Features Interpreted from Historical Documents.

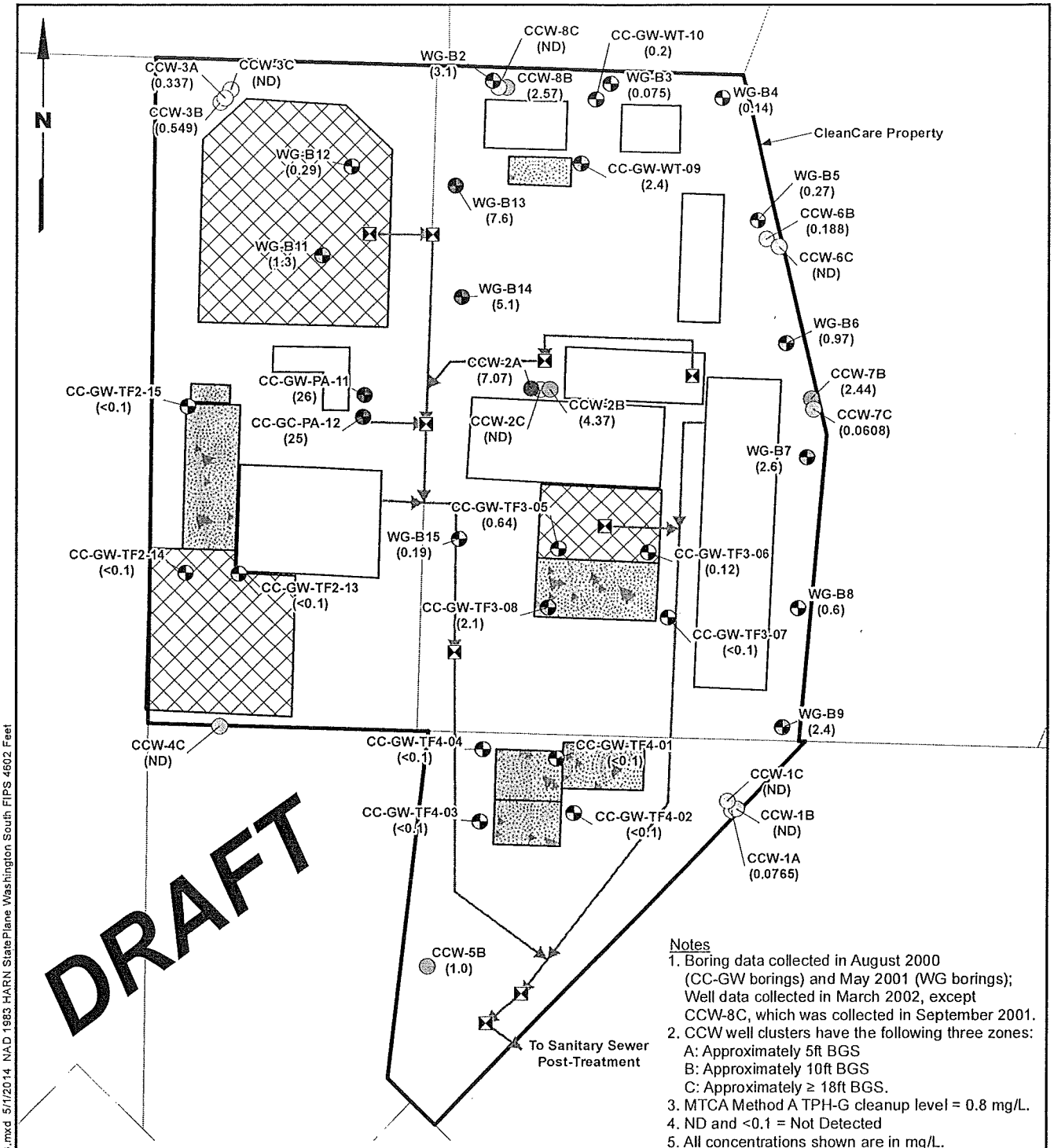
G:\Projects\992\006\010\014\F15Arsenic.mxd 5/1/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

LANDAU ASSOCIATES

CleanCare Property
Port of Tacoma
Tacoma, Washington

Arsenic - Most Recent Groundwater Concentrations

Figure 15



Notes
1. Boring data collected in August 2000 (CC-GW borings) and May 2001 (WG borings); Well data collected in March 2002, except CCW-8C, which was collected in September 2001.
2. CCW well clusters have the following three zones:
   A: Approximately 5ft BGS
   B: Approximately 10ft BGS
   C: Approximately ≥ 18ft BGS.
3. MTCA Method A TPH-G cleanup level = 0.8 mg/L.
4. ND and <0.1 = Not Detected
5. All concentrations shown are in mg/L.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well
- Geoprobe Sample
- Vault
- Subject Property
- Buildings
- Historical Oily Waste Line
- Remaining Tank Foundations
- Asphalt Capped Area
- Tax Parcels

TPH-G Concentration

- ND - <0.8 mg/L
- 0.8 - <5 mg/L
- ≥5 mg/L

0 80 160
Scale in Feet

Data Source: Pierce County GIS; Features Interpreted from Historical Documents.

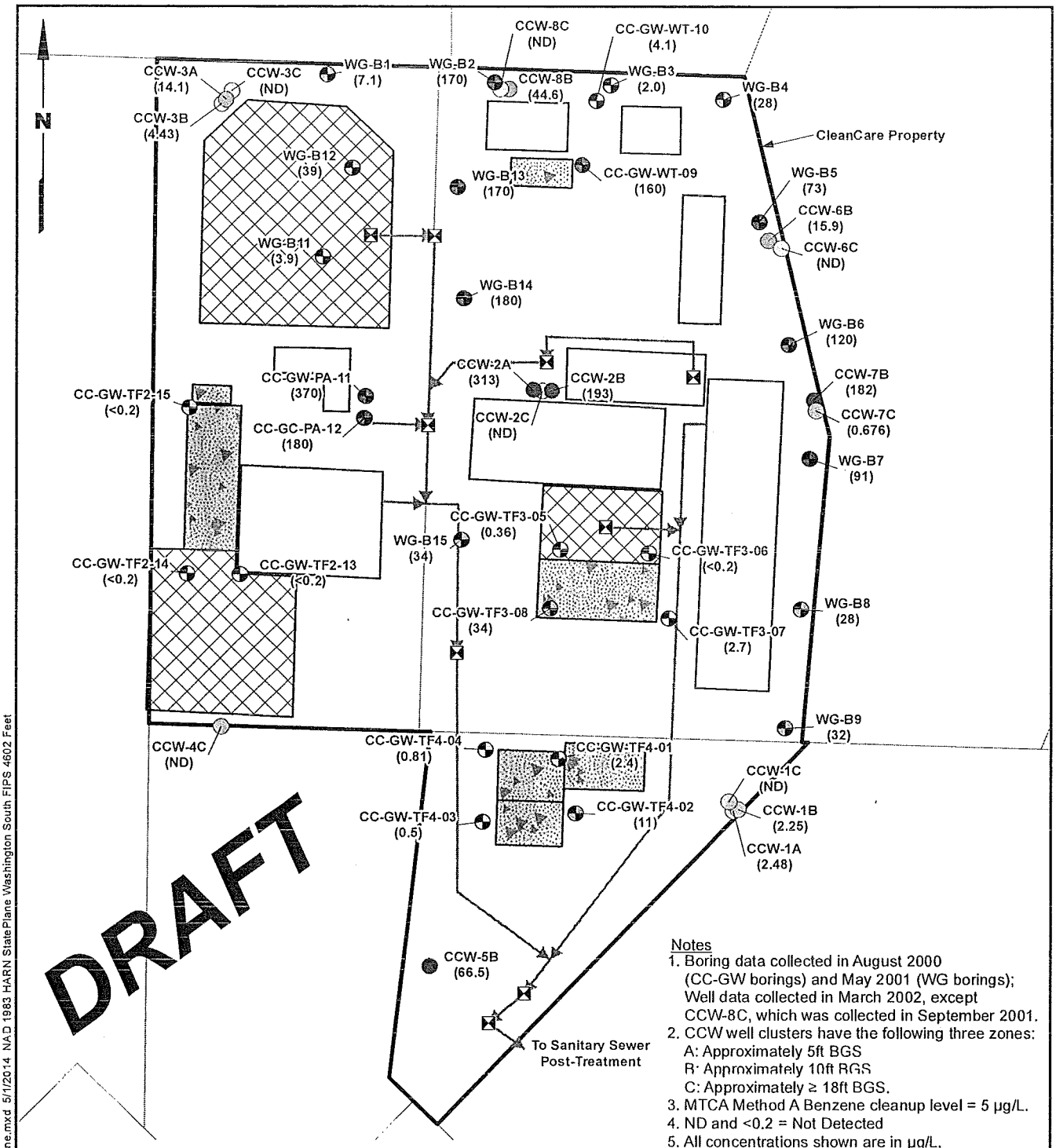
G:\Projects\992\006\010\014\F16TPH-G.mxd 5/1/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

LANDAU ASSOCIATES

CleanCare Property
Port of Tacoma
Tacoma, Washington

Gasoline - Most Recent Groundwater Concentrations

Figure 16



Notes
1. Boring data collected in August 2000 (CC-GW borings) and May 2001 (WG borings); Well data collected in March 2002, except CCW-8C, which was collected in September 2001.
2. CCW well clusters have the following three zones:
   A: Approximately 5ft BGS
   B: Approximately 10ft BGS
   C: Approximately ≥ 18ft BGS.
3. MTCA Method A Benzene cleanup level = 5 µg/L.
4. ND and <0.2 = Not Detected
5. All concentrations shown are in µg/L.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well
- Geoprobe Sample
- Vault
- Subject Property
- Buildings
- Historical Oily Waste Line
- Remaining Tank Foundations
- Asphalt Capped Area
- Tax Parcels

Benzene Concentration

- ND - 5 µg/L
- 5 - <50 µg/L
- ≥50 µg/L

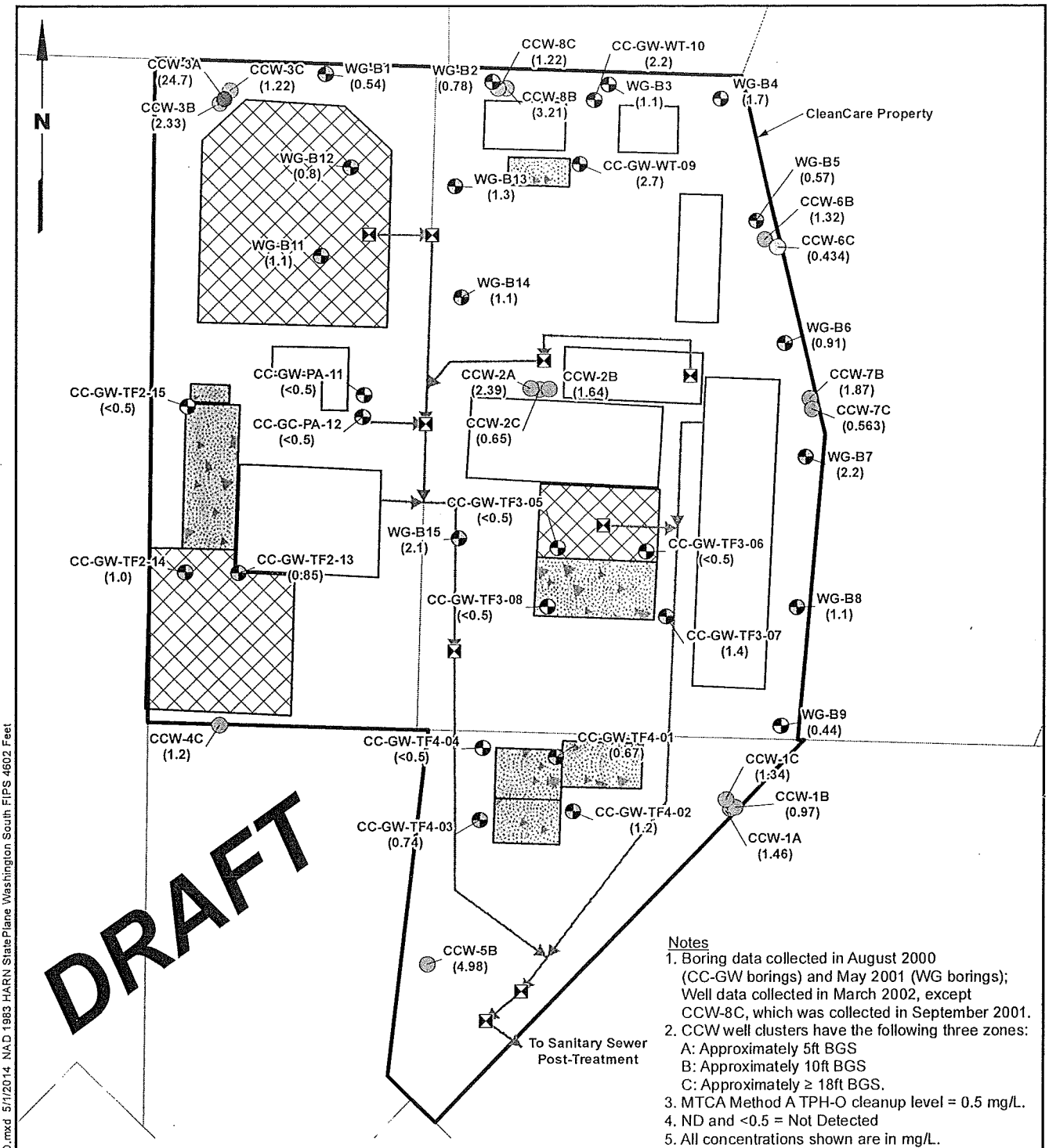
0 80 160
Scale in Feet

Data Source: Pierce County GIS; Features Interpreted from Historical Documents.

G:\Projects\992\006\010\014\F17Benzene.mxd 5/1/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

LANDAU ASSOCIATES

CleanCare Property Port of Tacoma Tacoma, Washington	**Benzene - Most Recent Groundwater Concentrations**	Figure 17



Notes
1. Boring data collected in August 2000 (CC-GW borings) and May 2001 (WG borings); Well data collected in March 2002, except CCW-8C, which was collected in September 2001.
2. CCW well clusters have the following three zones:
   A: Approximately 5ft BGS
   B: Approximately 10ft BGS
   C: Approximately ≥ 18ft BGS.
3. MTCA Method A TPH-O cleanup level = 0.5 mg/L.
4. ND and <0.5 = Not Detected
5. All concentrations shown are in mg/L.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend
- Monitoring Well
- Geoprobe Sample
- Vault
- Subject Property
- Buildings
- Historical Oily Waste Line
- Remaining Tank Foundations
- Asphalt Capped Area
- Tax Parcels

TPH-O Concentration
- ND - <0.5 mg/L
- 0.5 - <5 mg/L
- ≥5 mg/L

0 80 160
Scale in Feet

Data Source: Pierce County GIS; Features Interpreted from Historical Documents.

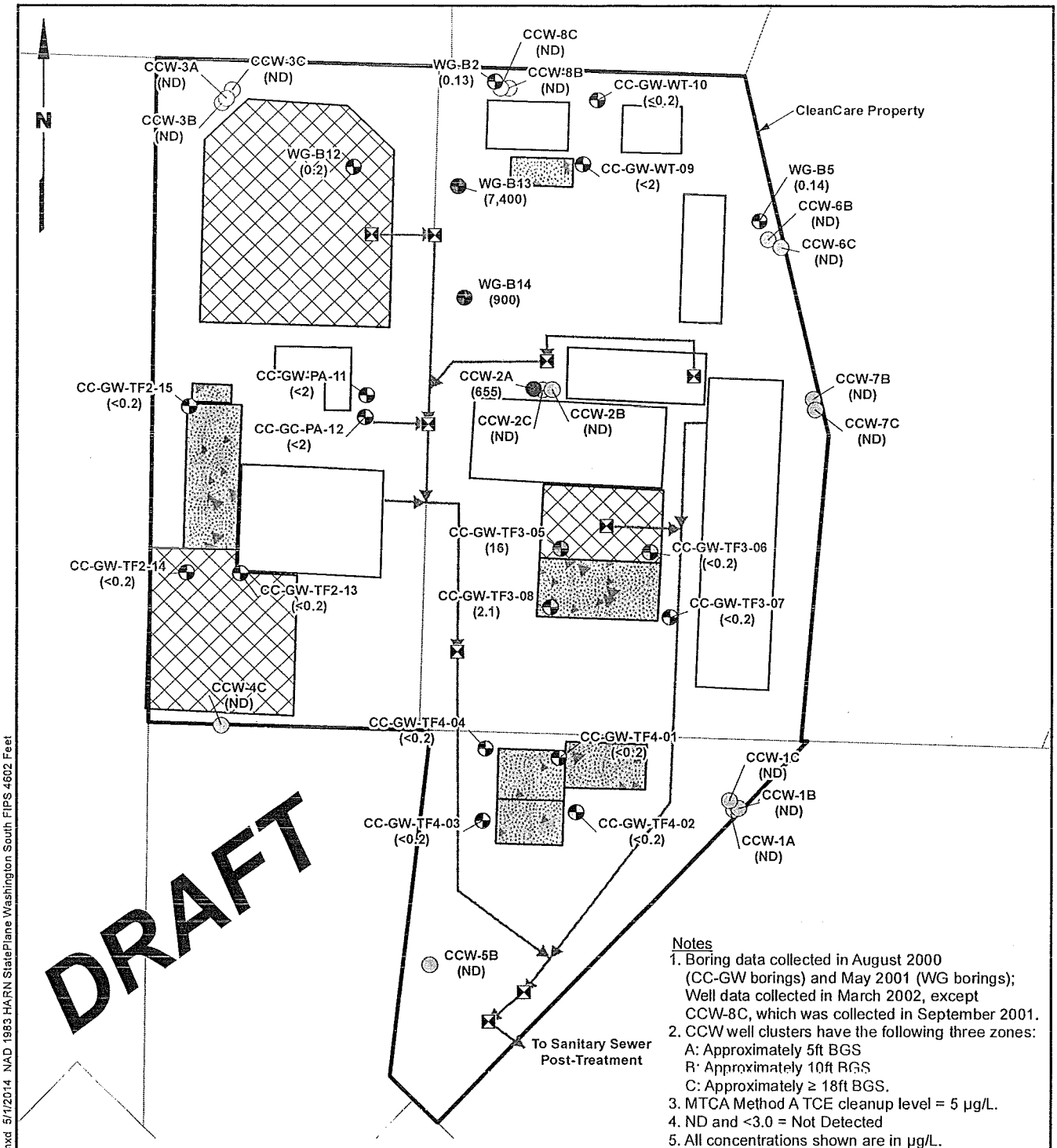
G:\Projects\992\006\010\014\F18TPH-O.mxd 5/1/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

LANDAU ASSOCIATES

CleanCare Property
Port of Tacoma
Tacoma, Washington

Motor Oil - Most Recent Groundwater Concentrations

Figure 18



Notes
1. Boring data collected in August 2000 (CC-GW borings) and May 2001 (WG borings); Well data collected in March 2002, except CCW-8C, which was collected in September 2001.
2. CCW well clusters have the following three zones:
   A: Approximately 5ft BGS
   B: Approximately 10ft BGS
   C: Approximately ≥ 18ft BGS.
3. MTCA Method A TCE cleanup level = 5 µg/L.
4. ND and <3.0 = Not Detected
5. All concentrations shown are in µg/L.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend
- Monitoring Well
- Geoprobe Sample
- Vault
- Subject Property
- Buildings
- Historical Oily Waste Line
- Remaining Tank Foundations
- Asphalt Capped Area
- Tax Parcels

TCE Concentration
- ND - <5 µg/L
- 5 - <500 µg/L
- ≥500 µg/L

0 80 160
Scale in Feet

Data Source: Pierce County GIS; Features Interpreted from Historical Documents.

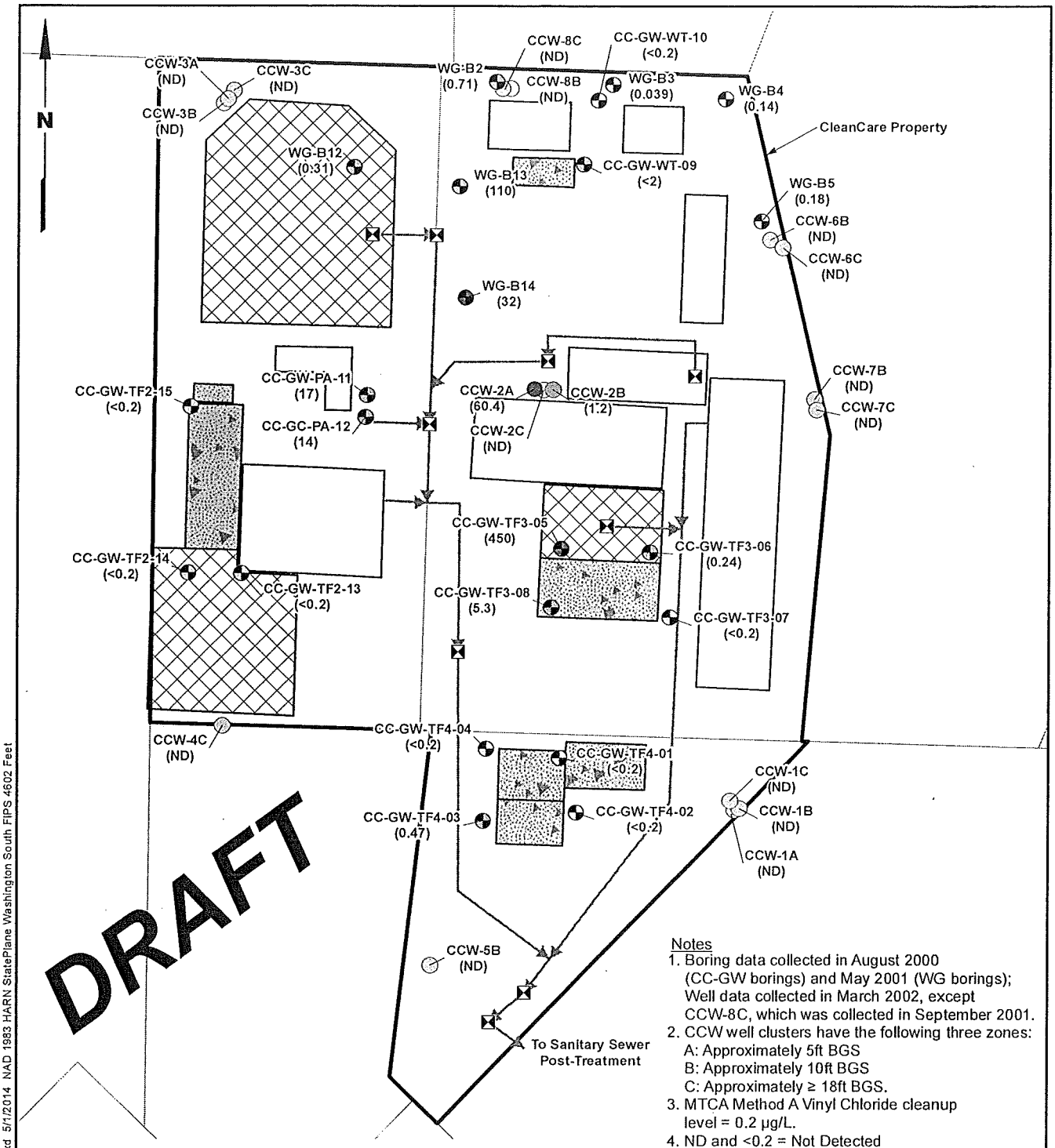
G:\Projects\992\006\010\014\F19TCE.mxd 5/1/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

LANDAU ASSOCIATES

CleanCare Property
Port of Tacoma
Tacoma, Washington

TCE - Most Recent Groundwater Concentrations

Figure 19



Notes
1. Boring data collected in August 2000 (CC-GW borings) and May 2001 (WG borings); Well data collected in March 2002, except CCW-8C, which was collected in September 2001.
2. CCW well clusters have the following three zones:
   A: Approximately 5ft BGS
   B: Approximately 10ft BGS
   C: Approximately ≥ 18ft BGS.
3. MTCA Method A Vinyl Chloride cleanup level = 0.2 µg/L.
4. ND and <0.2 = Not Detected
5. All concentrations shown are in µg/L.
6. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Legend

- Monitoring Well
- Geoprobe Sample
- Vault
- Subject Property
- Buildings
- Historical Oily Waste Line
- Remaining Tank Foundations
- Asphalt Capped Area
- Tax Parcels

Vinyl Chloride Concentration
- ND - <0.2 µg/L
- 0.2 - <20 µg/L
- ≥20 µg/L

0 80 160
Scale in Feet

Data Source: Pierce County GIS; Features Interpreted from Historical Documents.

G:\Projects\992\006\010\014\F20VC.mxd 5/1/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet

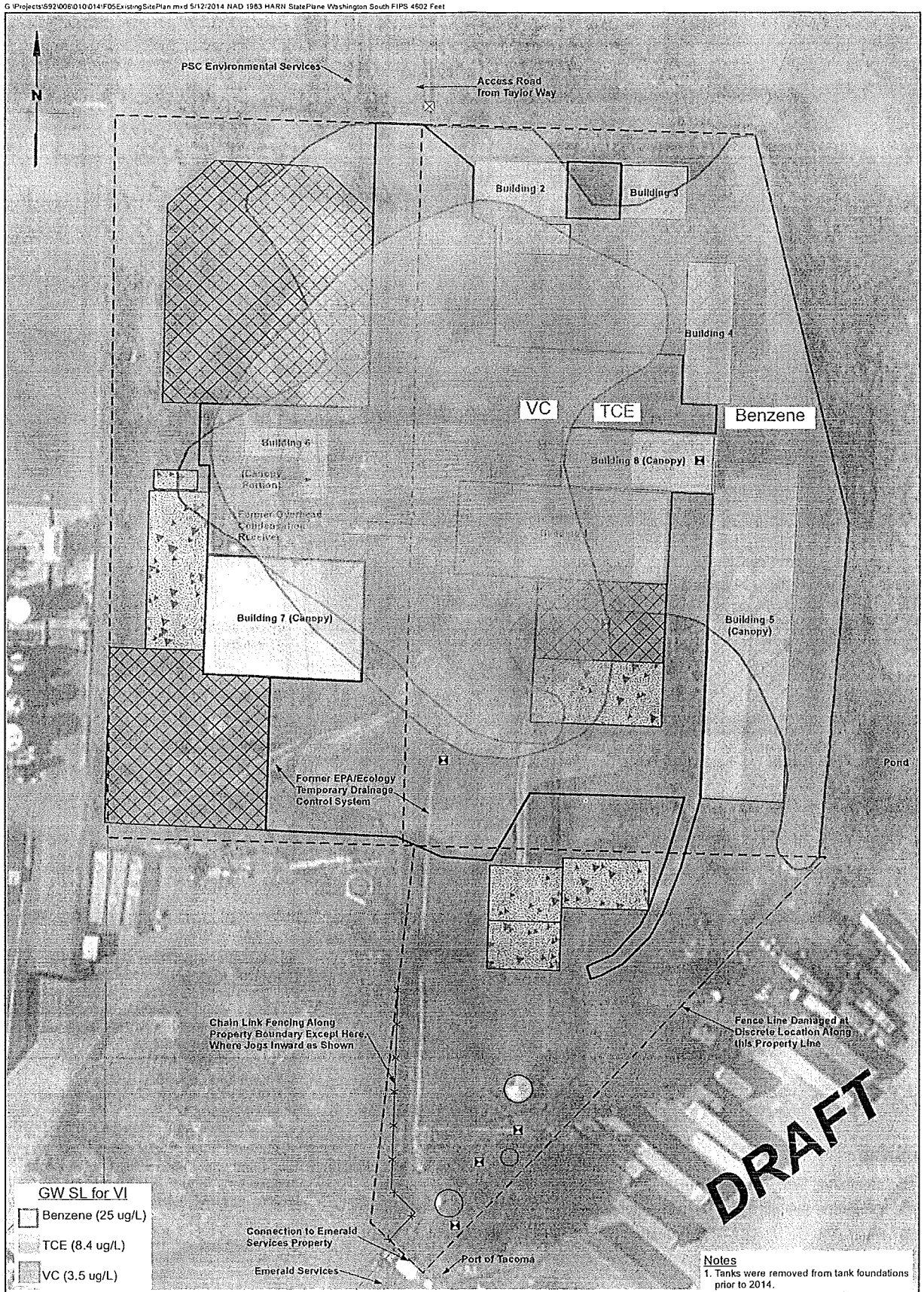
LANDAU ASSOCIATES

CleanCare Property
Port of Tacoma
Tacoma, Washington

Vinyl Chloride - Most Recent Groundwater Concentrations

Figure 20

G:\Projects\592\008\010\014\F05ExistingSitePlan.mxd 5/12/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet



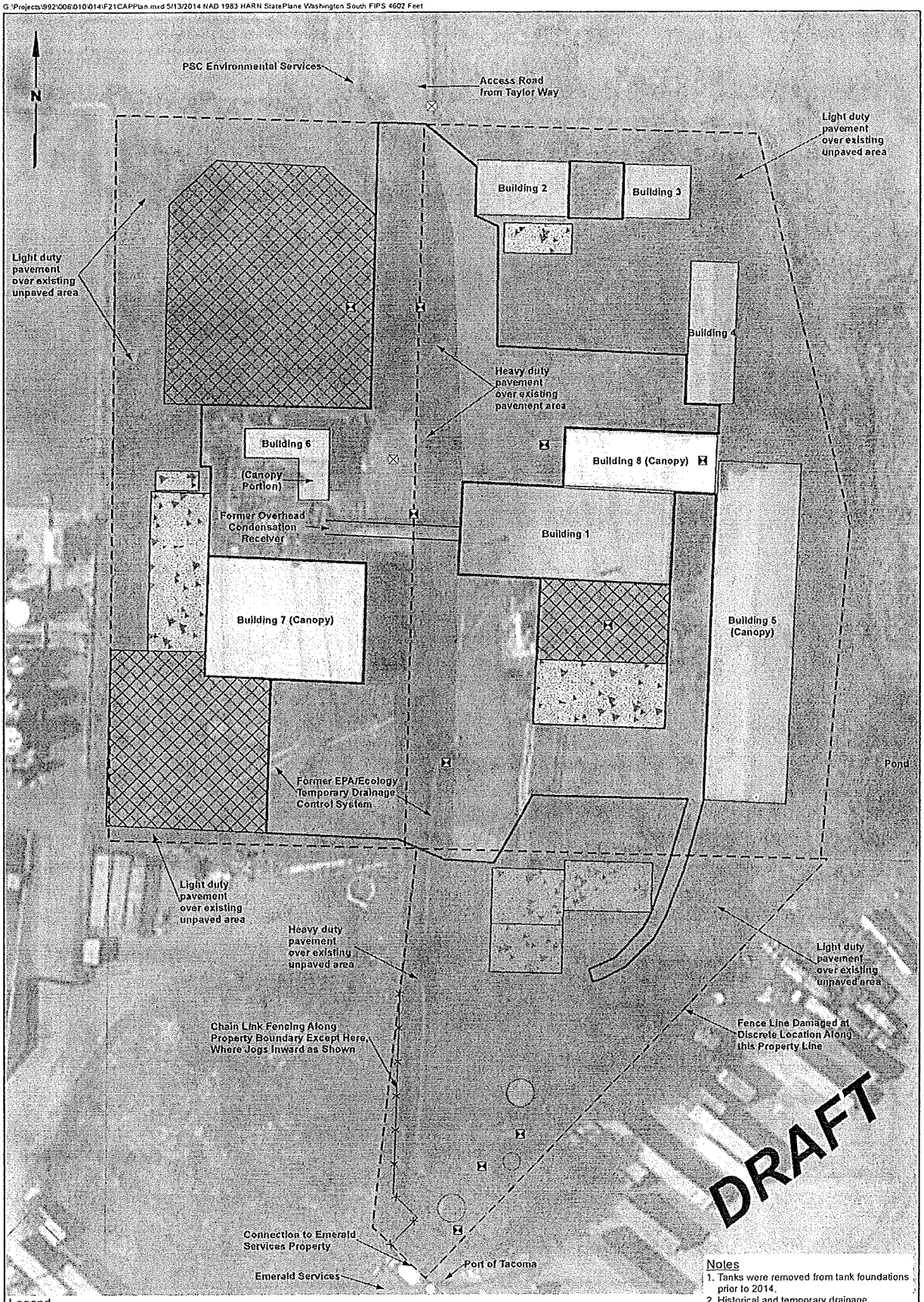
Notes
1. Tanks were removed from tank foundations prior to 2014.
2. Historical and temporary drainage infrastructure damaged and disconnected.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Sources: Pierce County GIS; Puget Sound Lidar Consortium; Esri World Imagery.

LANDAU ASSOCIATES

CleanCare Property Port of Tacoma Tacoma, Washington	Most Recent Groundwater Concentrations - Vapor Intrusion Screening	Figure 21

G:\Projects\992\006\010\014\F21CAPPlan.mxd 5/13/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet



Legend

- Subject Parcels
- Current Onsite Asphalt (Non-Cap)
- Remaining Tank Foundations
- EPA Asphalt Capped Area
- Buildings
- Tax Parcels 0321352066 = Parcel ID
- Above Ground Stormwater Tanks
- Chain Link Fence
- Catch Basin
- Vault

0 50 100

Scale in Feet

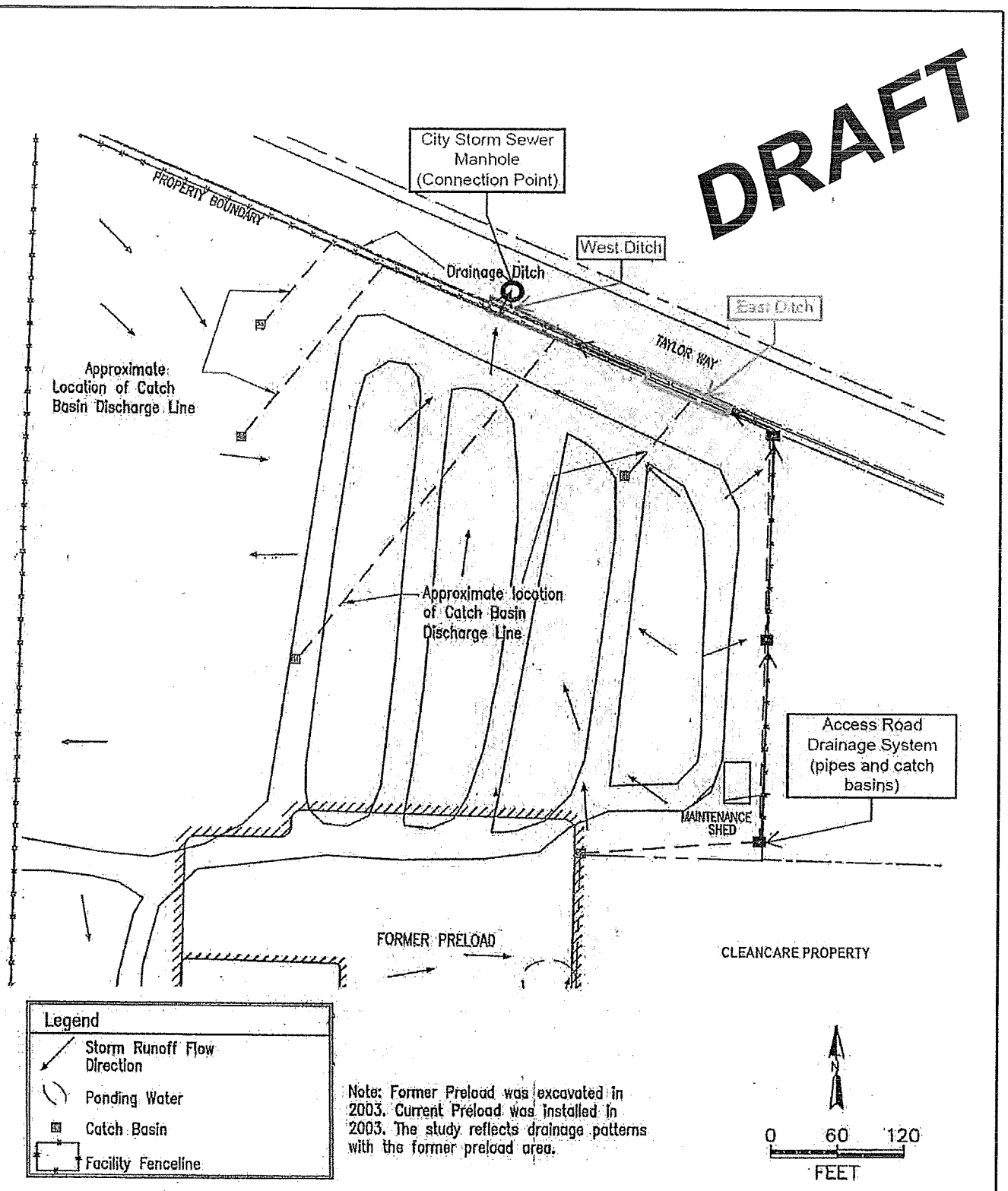
Notes

1. Tanks were removed from tank foundations prior to 2014.
2. Historical and temporary drainage infrastructure damaged and disconnected.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Sources: Pierce County GIS; Puget Sound Lidar Consortium; Esri World Imagery.

LANDAU ASSOCIATES

CleanCare Property Port of Tacoma Tacoma, Washington	Cap Improvement Areas and Existing Site Features	Figure 22

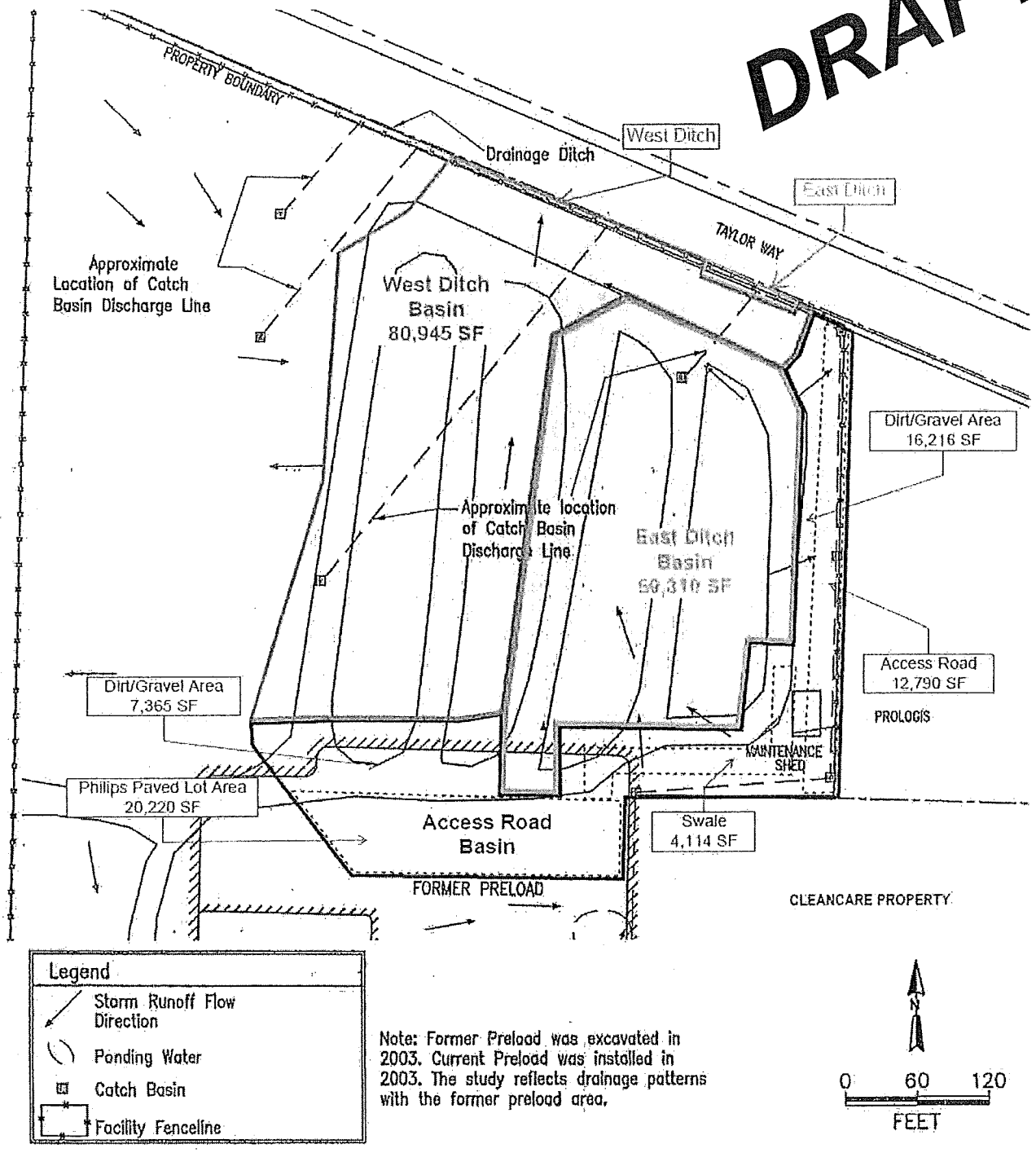


Source: PSC 2005, Figure 2-5a

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Downstream Drainage Pathway**

Figure 23

5/13/14 \\tacoma3\PROJECT\992 QCP\006.010\R\SiteChar&ConceptualDesignRpt\AppendicesIE_QuanDS\Basins.docx



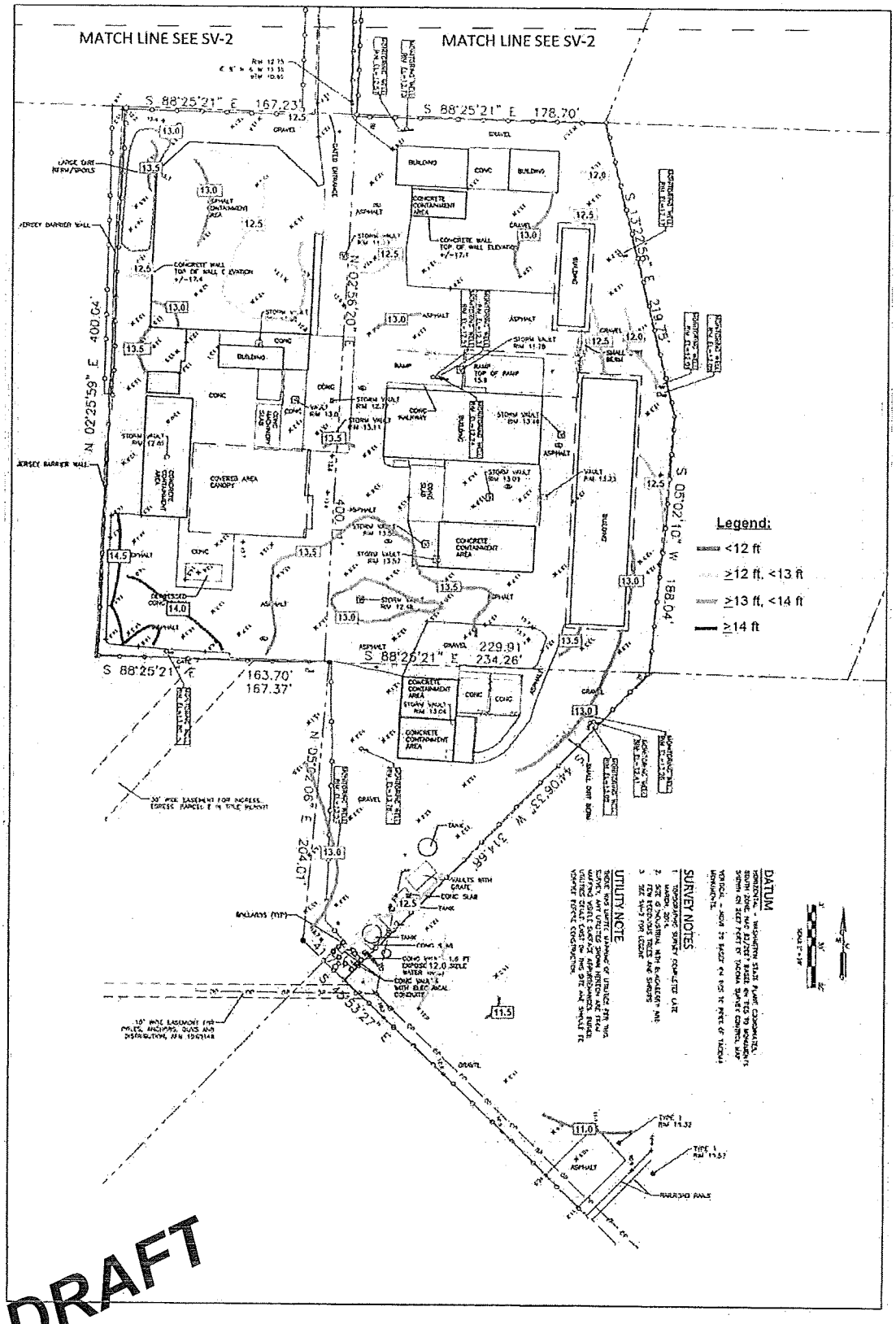
Source: PSC 2005, Figure 2-5a

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Philip Property Stormwater Drainage Sub-basins**

Figure 24

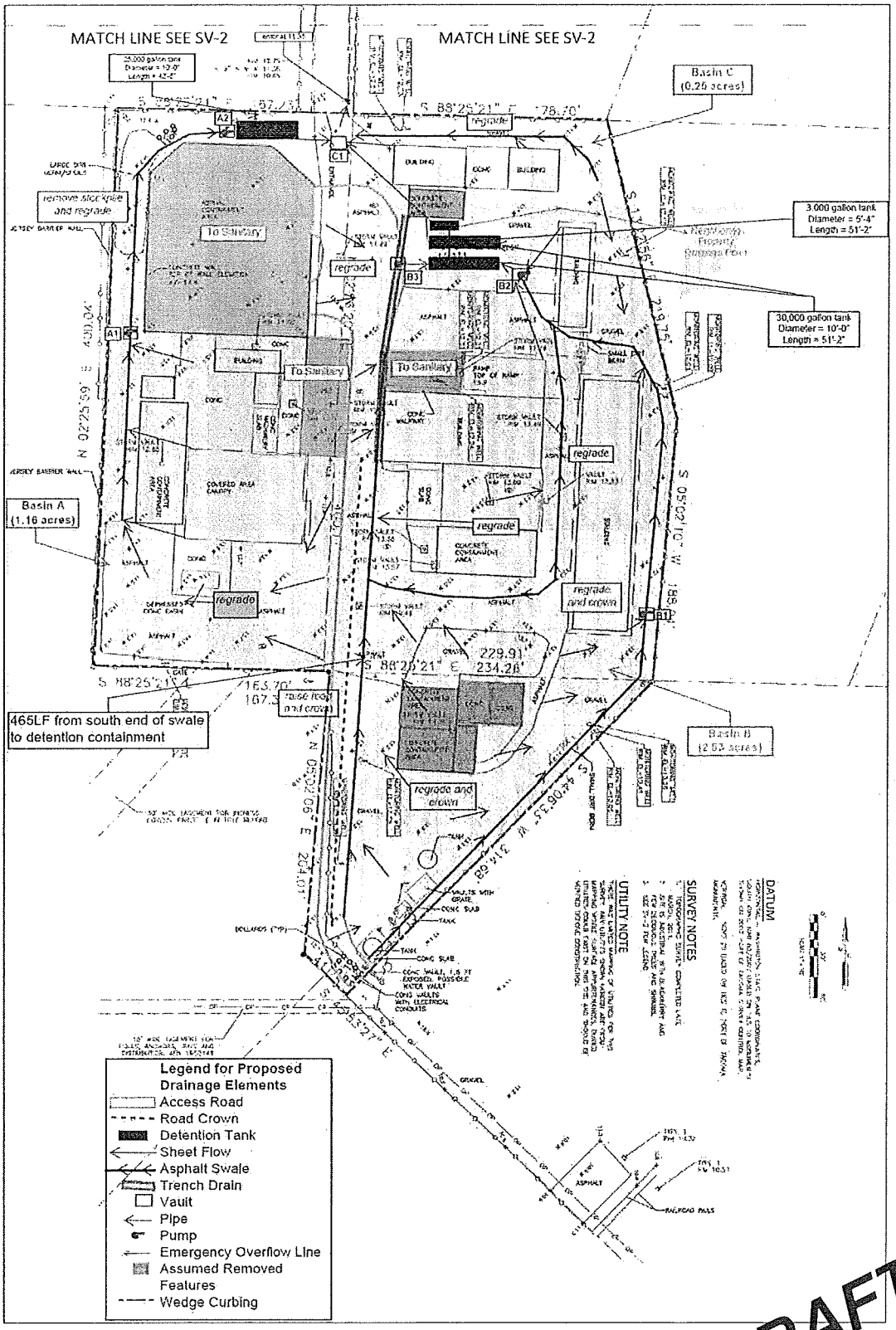
5/13/14 \\tacoma3\PROJECT\992 QCF\006.010\R\SiteChar&ConceptualDesignRpt\AppendicesIE_QuanDS\Basins.docx

5/13/14 Y:\992 QCF\006 010\R\SiteChar&ConceptualDesignRpt\Figures\Section 3.0\Fig25 DrainageLayout.docx



Background Figure Source: Mtn2Coast, LLC survey deliverable

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	Topography	Figure 25



Background Figure Source: Mtn2Coast, LLC survey deliverable

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	Preliminary Proposed Drainage Plan	Figure 26

TABLE 1
SUMMARY OF REGULATORY, SITE OPERATION, AND KEY INVESTIGATIONS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Date(s)	Event	Description of Activity	Information Source	RI Activity	RA Activity
1926	Property sold	Arthur and Mattie Pritchard sold property to Kate Harrison.	EPA CleanCare Action Memo; January 5, 2000		
1941	Property sold	Kate Harrison sold property to Aline Harrison Taylor.	EPA CleanCare Action Memo; January 5, 2000		
1952	Claim filed for property	Port of Tacoma files claim and apparently acquires the property.	EPA CleanCare Action Memo; January 5, 2000		
1961	Property sold	Port of Tacoma sold property to the Educators Manufacturing Company.	Statutory Warranty Deed; January 4, 1957		
1962	Property sale	From Educators Manufacturing to Educators Furniture & Supply	Statutory Warranty Deed; August 24, 1962		
1968	Quit Claim Deed	From EF Hauserman Company to Educators Manufacturing	Quit Claim Deed; February 28, 1968		
1969	Quit Claim Deed	From EF Hauserman Company to Educators Manufacturing	Quit Claim Deed; March 26, 1968		
1969	Property sold	Educators Manufacturing sold property to Donald and Alba Oline. Lime waste, auto shredder fluff, and sludge allegedly from Hooker/Occidental Chemicals were disposed of at the site between 1969 and 1981.	EPA CleanCare Action Memo; January 5, 2000, Statutory Warranty Deed; April 10, 1969		
1970	Property sale	From Hauserman, Inc. to Donald & Alba Oline	Statutory Warranty Deed; December 18, 1970		
1974	Property lease (for parcels 2052 and 2054)	Grading and placement of soil fill. Poligen (division of Lilyblad) leases parcels and commences small tank farm operation in 1975. The operation was a chemical and petroleum recycling business through late 1970s.	ProLogis Ecology Agreed Order No. 1160		
1981	Property sold	The Solidus Corporation, which owned neighboring parcel 2054 that Poligen was also operating on, purchases the property.	Statutory Warrantee Deed; April 27, 1981		
1981	Property sale (parcel 2050)	From Tacoma Pacific Inc. to R. & A. Moore, D. & P. Foote, and M. & D. McCallum	Statutory Warranty Deed; September 2, 1981		
1981	Quit Claim Deed	From Poligen, Inc. (division of Lilyblad) to Solidus Corp.	Quit Claim Deed; October 9, 1981		
1981	Ecology inspections	In March 1981, Ecology conducts inspection visits to Don Oline property (landfill) describing industrial wastes, leachate, and a release.	Ecology Inspection Report; March 17, 1981, March 30, 1981	X	
1982	Property sale (parcel 2054)	From Lindal Cedar Homes, Inc. to Solidus Corp.	Statutory Warranty Deed; January 15, 1982		
1982	Chemical storage onsite	Virgin mineral spirits, diesel, gasoline, and used oil stored on site. Additionally, Poligen managed used mineral spirits, bilge oils, and paint thinners on site.	ProLogis Ecology Agreed Order No. 1160		
1983	Property sale (parcel 2050)	From R. & A. Moore, D. & P. Foote, and M. & D. McCallum to Solidus Corp.	Statutory Warranty Deed; April 27, 1983		
1986	Property development	Northwest Processing constructed facility.	Ecology Statement of Basis; October 23, 2002		
1988	RCRA Part B Application	Northwest Processing submits RCRA Part B Application to operate a Dangerous Waste management facility.	Ecology Statement of Basis; October 23, 2002		
1989	Regulatory violation	Ecology issues $114,000 fine for illegally storing waste and other violations of WAC 173-303.	EPA CleanCare Action Memo; January 5, 2000		

TABLE 1
SUMMARY OF REGULATORY, SITE OPERATION, AND KEY INVESTIGATIONS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Date(s)	Event	Description of Activity	Information Source	RI Activity	RA Activity
1989	Adjacent site - property added to Superfund	Former AOL property added to EPA Region X Commencement Bay Superfund site listing.	ProLogis Ecology Agreed Order No. 1160		
1989	Permit application denial	Ecology issues Notice of Deficiency to 1988 permit application.	EPA CleanCare Action Memo; January 5, 2000		
late 1980s	Company name change	Poligen became Northwest Processing.	EPA CleanCare Action Memo; January 5, 2000		
1990	Permit application	Submittal of revised Part B permit Application. Part A application to EPA for interim status.	EPA CleanCare Action Memo; January 5, 2000		
1990	Adjacent site - Phase I and II ESA	Dames & Moore conducts Phase I and Phase II ESAs and soil vapor study on former AOL Express property.	AOL Express Final IRA (Dames & Moore 1999)	X (a)	
1991	Permit application denial	Ecology denies interim status and Part B application, upholds 1989 fine, and issues second Notice of Deficiency and warning letter.	EPA CleanCare Action Memo; January 5, 2000		
1992	Company merge	Northwest Processing (formerly Poligen) merges into CleanCare. Managed and recycled solvent.	ProLogis Ecology Agreed Order No. 1160, EPA CleanCare Action Memo; January 5, 2000		
1992	RCRA Consent Order	Northwest Processing signs RCRA Consent Order for corrective action, along with ChemPro and Sol-Pro.	EPA CleanCare Action Memo; January 5, 2000		
1992	Interim status granted	EPA grants interim status and issues fine for late Part A application.	EPA CleanCare Action Memo; January 5, 2000		
1994-1998	Site investigations	Installed monitoring wells; conducted a boring and collected fill soil samples; conducted quarterly sampling events for two quarters.	Pacific Groundwater Group Letter, Groundwater Monitoring at CleanCare; January 11, 1999	X	
1994	Property sale	From Solidus Corp. to CleanTech, Inc.	Statutory Warranty Deed; October 28, 1994		
1994	Permit application denial	CleanCare submits revised Part B permit application; Ecology issues Administrative Order and third Notice of Deficiency.	EPA CleanCare Action Memo; January 5, 2000		
1995	Property sale	From CleanTech, Inc. to CleanCare Corp.	Statutory Warranty Deed; August 7, 1995		
1995	Primary property access	Moved access road from 1701 Alexander Avenue to 1510 Taylor Way	EPA CleanCare Action Memo; January 5, 2000		
1995	Permit application	CleanCare submits revised Part B permit application.	EPA CleanCare Action Memo; January 5, 2000		
1997	Property sold	Property purchased by Bromley Marr ECOS. A sludge processing system and a concrete pad were installed.	EPA CleanCare Action Memo; January 5, 2000		
1997	Permit application denial	Ecology issues Notice of Deficiency to 1995 permit application.	EPA CleanCare Action Memo; January 5, 2000		
1999	CleanCare closes	CleanCare closes business. Key employees retained to manage stormwater collection and the remaining site inventory.	EPA CleanCare Action Memo; January 5, 2000		
1999	CleanCare abandoned	CleanCare ceased operations and abandoned the facility. Dangerous waste left on site.	Ecology Statement of Basis; October 23, 2002		
1999	Adjacent site - ProLogis final IRA	Dames & Moore conducts final Independent Remedial Action (IRA) on former AOL Express property.	AOL Express Final IRA (Dames & Moore 1999)		X (a)

TABLE 1
SUMMARY OF REGULATORY, SITE OPERATION, AND KEY INVESTIGATIONS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Date(s)	Event	Description of Activity	Information Source	RI Activity	RA Activity
1999	Site investigations	Ecology conducts inspection and sampling at CleanCare facility.	EPA CleanCare Action Memo; January 5, 2000	X	
1999	Ecology issues penalty	Ecology issues $486,000 penalty for March 26, 1999 discharge of 1,000-2,000 gallons of oily wastes and other violations in storing and managing hazardous wastes.	EPA CleanCare Action Memo; January 5, 2000		
1999	EPA Delivery Order	EPA issues Delivery Order 081-10-02 to Environmental Quality Management under the Emergency and Rapid Response Services Contract.	EPA CleanCare Action Memo; January 5, 2000		
1999	EPA Emergency Removal Program assistance	Ecology requests assistance from EPA and its Superfund Technical Assessment and Response Team (START) to address removal actions after CleanCare closes business. Low levels of metals, semi-volatile organic compounds, and volatile organic compounds detected in water samples collected from secondary containment systems. Stormwater samples all below discharge limits. Surface soil samples showed presence of arsenic, PAHs, and BTEX above MTCA Method A cleanup values. In December 1999, EPA assumes responsibility for emergency action.	EPA CleanCare Action Memo; January 5, 2000	X	
2000	Adjacent site - ProLogis site, NFA letter issued	Ecology issues a No Further Action (NFA) letter to AOL Express regarding petroleum contamination.	ProLogis Ecology Agreed Order No. 1160		
2000	Site investigations	CH2M Hill conducts investigation (including geoprobe) at CleanCare site for Emerald Petroleum Services, Inc. Only groundwater samples were analyzed. Composite soil samples were collected and analyzed, but results not deemed acceptable by ECY (preferred discrete samples). Work appears to have been conducted in 2000, before EPA completed all removal actions.	CH2M Hill Work Plan Report; May 2, 2000	X	
2000	Adjacent site - Sol-Pro Focused Environmental Investigation	Review of data and limited soil and groundwater sampling at the former Sol-Pro site for Emerald Services. Appears to be due diligence.	CH2M Hill Report; May 2, 2000	X	
2000	Emergency response activities at site	EPA decommissioned equipment, demolish Tank Farm 1, installed a stormwater management system, and stabilized conditions at the CleanCare site. EPA authorized and conducted asphalt capping at three areas on the site (former Tank Farm 1, the area between former Tank Farm 3 and Building 1, and an area between monitoring well MW-4 and Building 7). EPA and START transported all RCRA drums, oil sludge drums, antifreeze and glycol drums, and solvent drums offsite for disposal. Emptied and removed 19 temporary ASTs and demolished four large ASTs.	EPA Pollution Report; October 13, 2000		X
2001-2002	CleanCare groundwater monitoring	Well installation and quarterly groundwater monitoring by Tacoma-Pierce County Health Department (TPCHD). Groundwater from the shallow zone had levels of contaminants that exceeded the MTCA Method A cleanup levels, including arsenic, cadmium, lead, mercury, gasoline, diesel, oil, naphthalene, PAHs, benzene, vinyl chloride, TCE, PCE, and 1,2-DCA. Analytes detected above the MTCA Method A cleanup levels in the deep/lower aquifer included arsenic, oil, diesel, and naphthalene. Analysis of subsurface soil samples detected arsenic, cadmium, chromium, lead, PAHs, and total petroleum hydrocarbon (gasoline, diesel, and oil) above MTCA Method A cleanup levels.	TPCHD memo and ProLogis Ecology Agreed Order No. 1160	X	
2001	Regulatory framework change	CleanCare was transferred from Ecology's Hazardous Waste and Toxic Reduction program to the Toxics Cleanup Program in October 2001.	Ecology 2006a		

TABLE 1
SUMMARY OF REGULATORY, SITE OPERATION, AND KEY INVESTIGATIONS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Date(s)	Event	Description of Activity	Information Source	RI Activity	RA Activity
2002	Ecology Statement of Basis	Denial of Dangerous Waste management permit, includes detailed chronology.	Ecology Statement of Basis; October 23, 2002		
2004	Adjacent site - ProLogis, early PLP letter issued	Ecology issues Potentially Liable Person (PLP) status letter to ProLogis.	ProLogis Ecology Agreed Order No. 1160		
2004	Adjacent site - ProLogis, RI/FS Work Plan submitted	ProLogis submits RI/FS Work Plan to Ecology; Ecology approves.	ProLogis Ecology Agreed Order No. 1160		
2005	Adjacent site - PSC, RI Report	Investigation and report completed in 2005 for Ecology HW/TR RCRA group.	PSC 2005		
2005	Consent Order and remedial investigation activities	ProLogis submits RI/FS Work Plan to Ecology; Ecology approves and issues.	Ecology Agreed Order	X	
2005	Early PLP letters and 30-Day Notice of Waiver	CleanCare PLP letters issued by Ecology to Don Oline, Glenn Wassman (Occidental Chemical Corporation), Jim Jubiak (Schnitzer Steel), and David Bromley (CleanCare)	Ecology Letters; September 23, 2005		
2006	Documentation of Environmental Indicator Determination RCRA Corrective Action	Ecology reports indicate site media of concern are groundwater and subsurface soil, and that the migration of groundwater has stabilized.	Ecology 2006a,b		

Notes:
(a) Work conducted at nearby property.

TABLE 2
GROUNDWATER MONITORING WELL DETAILS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Well ID	Installation Date	Surface Completion	Construction Depth (ft BGS)	Screen Depth Interval (ft BGS) Upper	Lower	Screened Hydrogeologic Unit	Northing (Y)	Easting (X)	TOC Elevation (ft)	Ground Surface Elevation (ft)	DOE Tag #	Consultant
CCW-1A	1994	Flush mount	6	4	5.8	Shallow aq.	712219.3	1171352.2	12.77	12.99	--	PGG
CCW-1B	1994	Flush mount	9.8	7.8	9.6	Shallow aq.	712220.2	1171355.1	12.12	12.67	--	PGG
CCW-1C	2001	Flush mount	23	18	23	Deep aq.	712224.8	1171349.4	13.06	13.08	AGL480	TPCHD
CCW-2A	1994	Flush mount	6	4	5.8	Shallow aq.	--	--	--	--	--	PGG
CCW-2B	1994	Flush mount	13	11	12.8	Shallow aq.	--	--	--	--	--	PGG
CCW-2C	2001	Flush mount	24	19	24	Deep aq.	712471.7	1171237.4	12.06	12.56	AGL478	TPCHD
CCW-3A	1994	Flush mount	6	4	5.8	Shallow aq.	712646.2	1171049.7	13.75	12.56	--	PGG
CCW-3B	1994	Flush mount	11.5	9	10.8	Shallow aq.	712643.4	1171047.3	14.11	12.71	--	PGG
CCW-3C	2001	Flush mount	28	23	28	Deep aq.	712651.1	1171053.4	15.68	13.13	AGL477	TPCHD
CCW-4A	1994	Flush mount	6	4	5.8	Shallow aq.	--	--	--	--	--	--
CCW-4B	1994	Flush mount	12.5	10	11.8	Shallow aq.	--	--	--	--	--	--
CCW-4C	2000	Flush mount	24	19	24	Deep aq.	712270.1	1171047.4	13.72	13.62	AGL481	TPCHD
CCW-5B	2001	Flush mount	11	6	11	Shallow aq.	712125.7	1171171.2	13.32	13.67	AGL479	TPCHD
CCW-6B	2001	Flush mount	9	3.5	8.5	Shallow aq.	712561.7	1171372.4	12.31	12.48	AGL473	TPCHD
CCW-6C	2001	Flush mount	23	18	28	Deep aq.	712557.1	1171380.1	12.13	12.36	AGL474	TPCHD
CCW-7B	2001	Flush mount	11	4	9	Shallow aq.	712466.1	1171399.6	11.91	12.07	AGL475	TPCHD
CCW-7C	2001	Flush mount	26	21	26	Deep aq.	712460	1171400.8	12.06	12.13	AGL476	TPCHD
CCW-8B	2001	Flush mount	11	5	10	Shallow aq.	712652.4	1171217.6	12.62	12.81	AGL471	TPCHD
CCW-8C	2001	Flush mount	24	19	24	Deep aq.	712651.6	1171212.7	12.4	12.7	AGL472	TPCHD
MW-3	1986	--	--	4.5	9.5	Shallow aq.	712199.6	1171187.5	13.62	13.42	--	--
MW-4	1986	--	--	4.5	9.5	Shallow aq.	712269.5	1171020.3	13.15	13.3	--	Hart-Crowser

= Not sampled during TPCHD quarterly monitoring
PGG = Pacific Groundwater Group
TPCHD = Tacoma-Pierce County Health Department
-- = Information unknown

(a) MW-4 surveyed in 2000; all other wells surveyed in 2001.

(b) Vertical survey datum is National Geodetic Vertical Datum of 1929. Horizontal information is Washington State Plane Coordinate System, South Zone (North American Datum 1983). The horizontal accuracy was +/- 0.1 ft. The vertical accuracy was +/- 0.01 ft.

Notes:
Disclaimer: Data in this table was compiled from tables created by TPCHD, Hugh G. Goldsmith & Associates, Inc., and Philip Services Corporation. Landau Associates makes no warranties as to the correctness of the original information.

TABLE 3
FILLING AND INDUSTRIAL HISTORY
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Date(s)	Event	Description of Activity	Information Source
1924		Tideflat; no development	SAIC Report in the ProLogis AO Exhibit G
Pre-1931	Adjacent site - filling and development of Buffelen Mill	Buffelen Lumber Mill operated near former Northwest Processing property. Wood waste and silty sand used as fill in area. Sand likely from waterway dredging.	ProLogis Ecology Agreed Order No. 1160
1940s	Early phase of filling	Filling with soil dredged from the Blair and Hylebos Waterways.	SAIC Report in the ProLogis AO Exhibit G
1951-1952	Filling with dredged soil	Filling of eastern portion of the property with soil dredged from Blair Waterway between Lincoln and 11th Avenue.	Port of Tacoma 1961 Filling Plan Map
1969-1981	At subject property and adjacent parcels - landfilling with soil and industrial wastes	Property Owner Don Oline reportedly runs landfilling operation and accepts industrial waste as fill. Auto shredder fluff, lime-solvent sludge waste (from Hooker Chemical), Domtar lime waste sludges, and dredge soil dumped in marsh, pond, and other areas at and near former Northwest Processing property. Petroleum tank-cleaning scales and sludges also dumped on site.	ProLogis Ecology Agreed Order No. 1160 and Ecology 1981 Inspection Report
1974	Property lease and development (for parcels 2052 and 2054)	Grading and placement of soil fill. Poligen (division of Lilyblad) leases parcels and commenced small tank farm operation in 1975. The operation was a chemical and petroleum recycling business through late 1970s.	ProLogis Ecology Agreed Order No. 1160

TABLE 4
SHALLOW GROUNDWATER ANALYTICAL DATA STATISTICS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Parameter (µg/L)	MTCA Method A (Groundwater, µg/L)	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detection	Maximum Detection	Number of Detects Exceeding MTCA Method A	Frequency of Detections over MTCA Method A
TPH								
#2 Diesel	500	37	37	100%	1.4	19400	27	73%
Motor Oil	500	37	37	100%	0.94	24700	27	73%
Gasoline by NWTPH-G	800/1000	37	32	86%	0.12	13000	13	35%
BTEX								
Benzene	5	37	35	95%	2.17	320	24	65%
Ethylbenzene	700	37	28	76%	0.311	412	0	0%
m,p-Xylene	--	37	27	73%	0.41	390	--	--
o-Xylene	--	37	31	84%	0.097	240	--	--
Toluene	1000	37	35	95%	0.163	545	0	0%
METALS								
Arsenic	5	37	26	70%	0.0052	8200	20	54%
Cadmium	5	37	3	8%	2.3	12.8	1	3%
Chromium	50	37	15	41%	0.012	24.6	0	0%
Lead	15	37	25	68%	0.00064	752	6	16%
Mercury	2	37	1	3%	621	621	1	3%
PAH								
Naphthalene	160	37	31	84%	0.11	424	6	16%
Benzo(a)pyrene	0.1	37	1	3%	1.12	1.12	1	3%
VOCs								
cis-1,2-Dichloroethene	70	37	22	59%	0.07	4920	4	11%
Tetrachloroethene	5	37	8	22%	0.11	12000	5	14%
Trichloroethene	5	37	9	24%	0.086	6100	5	14%
Vinyl chloride	0.2	37	10	27%	0.4	640	10	27%
Methylene chloride	5	37	8	22%	0.2	11.2	1	3%

Bold indicates >25% frequency of detections over MTCA Method A
-- = not applicable

TABLE 5
DEEP GROUNDWATER ANALYTICAL DATA STATISTICS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Parameter (µg/L)	MTCA Method A (Groundwater, µg/L)	Number of Samples	Number of Detects	Frequency of Detection	Minimum Detection	Maximum Detection	Number of Detects Exceeding MTCA Method A	Frequency of Detections over MTCA Method A
TPH								
#2 Diesel	500	28	28	100%	0.26	2850	18	64%
Motor Oil	500	28	28	100%	0.31	3180	19	68%
Gasoline by NWTPH-G	800/1000	28	4	14%	2.5	97.8	0	0%
BTEX								
Benzene	5	28	7	25%	0.066	99	1	4%
Ethylbenzene	700	28	3	11%	0.077	31	0	0%
m,p-Xylene	--	28	3	11%	0.22	31	--	--
o-Xylene	--	28	3	11%	0.096	8.2	--	--
Toluene	1000	28	8	29%	0.099	2.8	0	0%
METALS								
Arsenic	5	28	16	57%	0.0059	13.8	12	43%
Cadmium	5	28	0	0%	--	--	0	0%
Chromium	50	28	16	57%	0.014	35.7	0	0%
Lead	15	28	4	14%	0.00052	8.99	0	0%
Mercury	2	28	0	0%	--	--	0	0%
PAH								
Naphthalene	160	28	11	39%	0.14	81	0	0%
Benzo(a)pyrene	0.1	28	0	0%	--	--	0	0%
VOCs								
cis-1,2-Dichloroethene	70	28	4	14%	0.06	0.27	0	0%
Tetrachloroethene	5	28	3	11%	0.15	1.1	0	0%
Trichloroethene	5	28	2	7%	0.072	0.25	0	0%
Vinyl chloride	0.2	28	4	14%	0.058	0.883	2	7%
Methylene chloride	5	28	2	7%	0.129	0.885	0	0%

Bold indicates >25% frequency of detections over MTCA Method A
-- = not applicable

TABLE 6
GROUNDWATER VAPOR INTRUSION SCREENING CRITERIA
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

	Industrial Land Use Screening Criteria		
	Indoor Air (µg/m^3)		Groundwater (µg/L)
Constituents	MTCA Method C Standard Formula Value CUL (Used as Indoor Air Screening Level)	Risk (a)	Shallow Groundwater SL Protective of Method C Air CUL
Benzene	3.2	Carcinogenic	25
PCE	40	Non-Carcinogenic	100
TCE	2.0	Non-Carcinogenic	8.4
VC	2.8	Carcinogenic	3.5

MTCA = Model Toxics Control Act
PCE = Tetrachloroethene
TCE = Trichloroethene
VC = Vinyl Chloride
CUL = cleanup level
SL = screening level
µg/m^3 = micrograms per cubic meter
µg/L = micrograms per liter

(a) Both non-carcinogenic and carcinogenic screening criteria were examined. For these constituents of concern, the carcinogenic risk values are the most protective.

Notes:
1. MTCA Method C values based on CLARC database (accessed May 15, 2014).
2. Supporting calculations for the shallow groundwater screening level are provided in Appendix X.

TABLE 7
PRELIMINARY GROUNDWATER SCREENING LEVELS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Constituent	MTCA Method A Table Value (µg/L)
TOTAL PETROLEUM HYDROCARBONS (µg/L)	
NWTPH-Dx	
Diesel Range Organics (TPH-D)	500
Motor Oil (TPH-O)	500
NWTPH-Gx	
Gasoline Range Organics (TPH-G)	800/1000 (b)
BTEX (µg/L)	
Benzene	5
VOLATILES (µg/L)	
Tetrachloroethene (PCE)	5
Trichloroethene (TCE)	5
Vinyl Chloride (VC)	0.2
DISSOLVED METALS (µg/L)	
Arsenic	5
Cadmium	5
Mercury	2
PAHs (µg/L)	
Naphthalene	--
2-Methylnaphthalene	--
1-Methylnaphthalene	--
Total Naphthalenes (d)	160
Acenaphthylene	--
Acenaphthene	--
Fluorene	--
Phenanthrene	--
Anthracene	--
Fluoranthene	--
Pyrene	--
Benzo[a]anthracene	--
Chrysene	--
Benzo[b]fluoranthene	--
Benzo[k]fluoranthene	--
Benzo[a]pyrene	--

TABLE 7
PRELIMINARY GROUNDWATER SCREENING LEVELS
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Constituent	MTCA Method A Table Value (µg/L)
Indeno[1,2,3-cd]pyrene	--
Dibenz(a,h)anthracene	--
Benzo[g,h,i]perylene	--
cPAH TEQ (e)	0.1 (f)

Notes

(a) MTCA Method A CULs were used as screening criteria.

(b) MTCA Method A cleanup level is 800 ug/L if benzene is present and 1000 ug/L if benzene is not present.

(c) Cleanup level cannot be exceeded by the sum of individual xylene concentrations.

(d) MTCA Method A cleanup level for naphthalenes is a total value for naphthalene, 1-methyl naphthalene, and 2-methyl naphthalene.

(e) TEQ = toxicity equivalency factor as described in WAC 173-340-708(8).

(f) cPAH cleanup screening levels based on practical quantitation limit (PQL) for individual cPAHs.

(g) Preliminary cleanup levels are the screening criteria for the determined constituents of concern.

APPENDIX A

RCRA Corrective Action – Documentation of Environmental Indicator Determination

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Current Human Exposures Under Control, Environmental Indicator (EI) RCRAInfo Code CA725

Facility Name: CleanCare Corporation
Facility Address: 1510 Taylor Way, Tacoma, Washington 98421
Facility EPA ID No.: WAD ~~980638512~~ 980738512

1. Has **all** available relevant/significant information on known and reasonably suspected releases to soil, groundwater, surface water/sediments, and air, subject to RCRA Corrective Action (e.g., from Solid Waste Management Units (SWMUs), Regulated Units (RUs), and Areas of Concern (AOCs)), been **considered** in this EI determination?

   ___X___ If yes, check here and continue with #2 below.

   _____ If no, reevaluate existing data, or

   _____ If data are not available, skip to #6 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental indicators (EIs) are measures being used by the RCRA corrective action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EIs developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Current Human Exposures Under Control" EI

A positive "Current Human Exposures Under Control" EI determination ("YE" status code) indicates that there are no "unacceptable" human exposures to "contamination" (i.e., contaminants in concentrations in excess of appropriate risk-based levels) that can be reasonably expected under current land- and groundwater-use conditions (for all "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While final remedies remain the long-term objective of the RCRA corrective action program the EI are near-term objectives which are currently being used as program measures for the Government Performance and Results Act of 1993, GPRA). The "Current Human Exposures Under Control" EI are for reasonably expected human exposures under current land- and groundwater-use conditions only, and do not consider potential future land- or groundwater-use conditions or ecological receptors. The RCRA corrective action program's overall mission to protect human health and the environment requires that final remedies address these issues (i.e., potential future human exposure scenarios, future land and groundwater uses, and ecological receptors).

Duration/Applicability of EI Determinations

EI determinations status codes should remain in RCRAInfo national database only as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

2. Are groundwater, soil, surface water, sediments, or air **media** known or reasonably suspected to be "contaminated"[1] above appropriately protective risk-based "levels" (applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA corrective action (from SWMUs, RUs or AOCs)?

	Yes	No	?	Rationale/Key Contaminants
Groundwater	X			See below
Air (indoor)[2]		X		
Surface Soil (e.g., <2 feet)			X	
Surface Water		X		
Sediment		X		
Subsurface Soil (e.g., >2 feet)	X			See below
Air (outdoor)		X		

_____ If no (for all media), skip to #6, and enter "YE," status code after providing or citing appropriate "levels," and referencing sufficient supporting documentation demonstrating that these "levels" are not exceeded.

__X__ If yes (for any media), continue after identifying key contaminants in each "contaminated" medium, citing appropriate "levels" (or provide an explanation for the determination that the medium could pose an unacceptable risk), and referencing supporting documentation.

_____ If unknown (for any media), skip to #6 and enter "IN" status code

Rationale and Reference(s): The CleanCare Corporation is an abandoned interim status TSD facility on four acres in Tacoma's tideflats, adjacent to Commencement Bay and between the Blair and Hylebos waterways. Neighboring properties include the Philip/BEI Tacoma facility to the west, the ProLogis property to the north and east, the Emerald Services facility to the southeast, and the Potter property to the south.

Formerly known as Northwest Processing, Inc., the facility processed used oil into fuel in the mid 1980s. Over the years, more activities were added, including recycling antifreeze and parts washer solvent, blending hazardous waste fuel, and consolidating hazardous wastes generated by

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriately protective risk-based "levels" (for the media, that identify risks within the acceptable risk range).

[2] Recent evidence (from the Colorado Dept. of Public Health and Environment, and others) suggests that unacceptable indoor air concentrations are more common in structures above groundwater with volatile contaminants than previously believed. This is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration necessary to be reasonably certain that indoor air (in structures located above (and adjacent to) groundwater with volatile contaminants) does not present unacceptable risks

small quantity generators. Northwest Processing was incorporated into CleanCare Corporation in 1992. Northwest Processing submitted a Part A application to the U.S. Environmental Protection Agency (EPA) in 1990 to establish interim status to store dangerous waste The company asserted that waste antifreeze designated as a hazardous waste under the toxicity characteristic rules newly adopted by EPA. EPA accepted the application as valid in 1992. As a result, the company was allowed to store dangerous waste at this location. CleanCare submitted a Part B permit application and a series of revisions from 1988 through 1999 to the Washington State Department of Ecology (Ecology). Ecology's review of the application resulted in four notices of deficiency between 1989 and 1999.

In 1992, EPA entered into separate interim status 3008(h) consent orders with Northwest Processing, Inc. and two neighboring facilities, Burlington Environmental (now owned by Philip Services Corporation) and Sol-Pro, Inc. (now owned by Emerald Services, Inc.) to investigate and, if necessary, to clean up their respective sites Northwest Processing's order required its owner to monitor groundwater and investigate sources of contamination at the facility.

Northwest Processing, Inc. expanded its services to recycle antifreeze and parts-washing solvent. It also became part of the newly formed CleanCare Corporation in 1992. Ecology conducted a series of compliance inspections at the CleanCare facility in 1998 and 1999. During these inspections Ecology found numerous violations of the Dangerous Waste Regulations and several violations of Chapter 90.48 of the Revised Code of Washington (RCW), Washington's water pollution statute. In July 1999, Ecology issued an enforcement order to CleanCare along with two penalties totaling $486,000. CleanCare filed an appeal of this order to the PCHB in September 1999, but withdrew the appeal before the scheduled hearing date.

In November 1999, CleanCare notified Ecology through its legal council of its intent to close the interim status facility. CleanCare ceased operation at 1507 Taylor Way on November 17, 1999, leaving dangerous waste on-site. EPA's Superfund program, at Ecology's request, took over site security in September of 1999, and began removal of wastes left on-site that posed the greatest threat to human health and the environment. EPA removed a total of two million gallons of waste stored in containers and above-ground storage tanks. Nineteen temporary above-ground storage tanks were removed Four above-ground tanks were demolished, and a limited soil investigation was conducted in three areas before EPA applied 26,000 square feet of asphalt to temporarily cap the site After completing these removal and stabilization activities, EPA returned responsibility for the site back to Ecology in September 2000.

Ecology has been responsible for oversight of storm water management and site security since that time. Ecology concluded that without a viable owner with resources or assets, there is no effective regulatory pathway to pursue the cleanup of the CleanCare site using corrective action under Chapter 173-303 WAC or Resource Conservation and Recovery Act (RCRA) The appropriate regulatory framework for contaminated sites without viable owners and/or operators is the Model Toxics Control Act (MTCA) and its implementing regulation, Chapter 173-340 WAC. Responsibility for oversight of the facility was transferred from Ecology's Hazardous Waste and Toxics Reduction (HWTR) Program to Ecology's Toxics Cleanup Program (TCP) in October 2001. In December 2002, Ecology denied a dangerous waste management permit to the CleanCare Corporation and terminated interim status for the facility

Subsurface investigations in and around waste management units at the site by EPA and the Tacoma-Pierce County Health Department (TPCHD) indicate that both soils and groundwater are contaminated with hazardous constituents. These constituents consist of both organic and inorganic contaminants found in solvents and used oil, both managed at CleanCare However, historical documents and investigations indicate CleanCare was built on property filled in with industrial waste during the 1960s and 1970s. Land use in this area is heavily industrial. In the 1930s, the property and neighboring properties were part of a tidal marshland Dredge spoil was placed on the properties in the 1940s and early 1950s and a freshwater marsh formed. Prior to the mid-1970s, during the operation of the former Don Oline Landfill, the marsh was filled with heterogeneous mixture of sand, gravel, and various waste materials. Fill materials included demolition debris, lime solvent sludge from operations at Hooker Chemical (renamed Occidental Chemical Corporation), dredge spoils from adjacent waterways, wood waste, and ground-up automobile interiors (known as auto fluff). The lime solvent sludge contained chlorinated solvent compounds and heavy metals. Given this information and the limited data from recent site investigations, it is difficult at this time to ascribe non-petroleum based contamination to CleanCare's waste management activities.

The facility has undergone a site assessment and has been assigned a ranking of two (2) Under MTCA, facilities are assigned a rank from one (1) to five (5) Those sites with a rank of 1 have the highest priority for cleanup due to potential exposure pathways to humans or sensitive environmental receptors. Those sites with a ranking of 5 are deemed to pose little threat to human health and the environment.

The CleanCare facility was built upon a portion of the former Don Oline Landfill Some neighboring properties are located on the footprint of the former landfill Soil and groundwater investigations have occurred on the Potter and Philip properties. [Refer to ***Final Comprehensive RI Report, Philip Services Corporation, Tacoma Facility, Tacoma, Washington***, dated January 21, 2005] Soil and groundwater investigations are on the nearby ProLogis property have, for the most part, determined the extent of the landfill footprint in soil and groundwater [Refer to ***ProLogis Taylor Way Property, Remedial Investigation***, dated June 2006.] The investigations at CleanCare and ProLogis are overseen by the Department of Ecology's Toxics Cleanup Program (TCP).

Ecology's TCP and HWTR Program recognize that there is an areawide groundwater contamination as a result of the former Don Oline Landfill. HWTR and TCP have agreed to address soil contamination individually on the neighboring properties under separate mechanisms, including permits, agreed orders, or consent decrees. Ecology intends to address the issues concerning areawide groundwater under an agreed order or consent decree with multiple potentially liable parties (PLPs).

3. Are there **complete pathways** between "contamination" and human receptors such that exposures can be reasonably expected under the current (land- and groundwater-use) conditions?

Summary Exposure Pathway Evaluation Table
Potential **Human Receptors** (Under Current Conditions)

"Contaminated" Media	~~Residents~~	Workers	~~Day-Care~~	Construction	~~Trespassers~~	Recreation	Food[3]
Groundwater		No		Yes		No	No
Air (indoors)		No		No		No	No
Soil (surface, e.g., <2 ft)		No		No		No	No
Surface Water		No		No		No	No
Sediment		No		No		No	No
Soil (subsurface e.g., >2 ft)		No		Yes		No	No
Air (outdoors)		No		No		No	No

Instructions for Summary Exposure Pathway Evaluation Table:

1. Strike-out specific Media including Human Receptors' spaces for Media which are not "contaminated") as identified in #2 above.

2. Enter "yes" or "no" for potential "completeness" under each "Contaminated" Media - - Human Receptor combination (Pathway)

Note: In order to focus the evaluation to the most probable combinations some potential "Contaminated" Media - Human Receptor combinations (Pathways) have dash spaces ("---"). While these combinations may not be probable in most situations they may be possible in some settings and should be added as necessary.

_____ If no (pathways are not complete for any contaminated media-receptor combination), skip to #6, and enter "YE" status code, after explaining and/or referencing condition(s) in-place, whether natural or man-made, preventing a complete exposure pathway from each contaminated medium (e.g , use optional Pathway Evaluation Work Sheet to analyze major pathways).

__X__ If yes (pathways are complete for any "Contaminated" Media - Human Receptor combination), continue after providing supporting explanation.

_____ If unknown (for any "Contaminated" Media - Human Receptor combination), skip to #6 and enter "IN" status code.

Rationale and Reference(s):

Residences: There are no residential areas at the facility, immediately adjacent to the facility, or above the contaminated groundwater.
Workers: There are currently no workers at the facility. If there were workers at the facility, they would not be exposed to contaminated subsurface soils and groundwater unless they have been uncovered.

[3] Indirect Pathway/Receptor (e.g., vegetables, fruits, crops, meat and dairy products, fish, shellfish, etc)

Day care: There are no known day care businesses at the facility or nearby.
Construction: There are no construction or remediation activities currently occurring at the facility. If there were, construction and remediation activities at the facility or nearby may expose workers to contaminants in groundwater and subsurface soils.
Trespassers: The facility is fenced and locked. While there is a chance that trespassers may gain access to the facility by climbing the fence, this institutional control satisfactorily interrupts this pathway.
Recreation: There are no recreation activities at the facility. Recreational use of the nearby waterways is limited, but it has been determined that contaminated groundwater does not reach nearby waterways.
Food: There maybe some subsistence and other fishing or food collection activities in and along the nearby waterways. But it has been determined that contaminated groundwater does not reach nearby waterways.

4 Can the **exposures** from any of the complete pathways identified in #3 be reasonably expected to be **"significant"**[4] (i.e., potentially "unacceptable" because exposures can be reasonably expected to be: 1) greater in magnitude (intensity, frequency and/or duration) than assumed in the derivation of the acceptable "levels" (used to identify the "contamination"); or 2) the combination of exposure magnitude (perhaps even though low) and contaminant concentrations (which may be substantially above the acceptable "levels") could result in greater than acceptable risks)?

__X__ If no (exposures can not be reasonably expected to be significant (i.e., potentially "unacceptable") for any complete exposure pathway) - skip to #6 and enter "YE" status code after explaining and/or referencing documentation justifying why the exposures (from each of the complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If yes (exposures could be reasonably expected to be "significant" (i.e., potentially "unacceptable") for any complete exposure pathway) - continue after providing a description (of each potentially "unacceptable" exposure pathway) and explaining and/or referencing documentation justifying why the exposures (from each of the remaining complete pathways) to "contamination" (identified in #3) are not expected to be "significant."

_____ If unknown (for any complete pathway) - skip to #6 and enter "IN" status code

Rationale and Reference(s): There are no ongoing construction activities at the CleanCare facility. While there are currently no investigation or remedial activities conducted at the facility, any investigation or remedial activities would be conducted under a site safety plan to avoid exposure to contaminated subsurface soils and groundwater.

5 Can the "significant" **exposures** (identified in #4) be shown to be within **acceptable** limits?

_____ If yes (all "significant" exposures have been shown to be within acceptable limits), continue and enter "YE" after summarizing and referencing documentation justifying why all "significant" exposures to "contamination" are

[4] If there is any question on whether the identified exposures are "significant" (i.e , potentially "unacceptable") consult a human health risk assessment specialist with appropriate education, training and experience

within acceptable limits (e.g., a site-specific Human Health Risk Assessment).

_____ If no (there are current exposures that can be reasonably expected to be "unacceptable"), continue and enter "NO" status code after providing a description of each potentially "unacceptable" exposure.

_____ If unknown (for any potentially "unacceptable" exposure), continue and enter "IN" status code.

Rationale and Reference(s):_____

_____

6. Check the appropriate RCRAInfo status codes for the Current Human Exposures Under Control EI event code (CA725), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (and attach appropriate supporting documentation as well as a map of the facility):

__X__ YE - Yes, "Current Human Exposures Under Control" has been verified. Based on a review of the information contained in this EI Determination, "Current Human Exposures" are expected to be "Under Control" at the former CleanCare Corporation facility, EPA ID No. WAD 980738512, located at 1510 Taylor Way, Tacoma, Washington under current and reasonably expected conditions. This determination will be reevaluated when the Agency/State becomes aware of significant changes at the facility.

____ NO - "Current Human Exposures" are NOT "Under Control."

____ IN - More information is needed to make a determination.

Completed by Kaia Petersen Date 9/21/06
Kaia Petersen
Hydrogeologist

Supervisor K Seiler Date 9/21/06
K Seiler, Supervisor
Hazardous Waste and Toxics Reduction, Southwest Regional Office
Department of Ecology

Locations where references may be found:

Department of Ecology, Southwest Regional Office, Central Files
P.O Box 47775, Olympia, Washington 98504-7775, or
300 Desmond Drive, Lacey, Washington 98503

Contact telephone and e-mail numbers

Kaia Petersen
(360) 407-6359
kpet461@ecy.wa gov

FINAL NOTE: THE HUMAN EXPOSURES EI IS A QUALITATIVE SCREENING OF EXPOSURES AND THE DETERMINATIONS WITHIN THIS DOCUMENT SHOULD NOT BE USED AS THE SOLE BASIS FOR RESTRICTING THE SCOPE OF MORE DETAILED (E.G., SITE-SPECIFIC) ASSESSMENTS OF RISK.

DOCUMENTATION OF ENVIRONMENTAL INDICATOR DETERMINATION
RCRA Corrective Action
Migration of Contaminated Groundwater Under Control, RCRAInfo Code CA750

Facility Name: **CleanCare Corporation**
Facility Address: **1510 Taylor Way, Tacoma, Washington 98421**
Facility EPA ID No.: **WAD 98073812**

1. Has all available relevant/significant information on known and reasonably suspected releases to the groundwater media, subject to RCRA corrective action (e.g., from solid waste management units (SWMUs), regulated units (RUs), and areas of concern (AOCs)), been considered in this EI determination?

   __X__ If yes, check here and continue with #2 below.

   _____ If no, reevaluate existing data, or

   _____ If data are not available, skip to #8 and enter "IN" (more information needed) status code.

BACKGROUND

Definition of Environmental Indicators (for the RCRA Corrective Action)

Environmental indicators (EI) are measures being used by the RCRA corrective action program to go beyond programmatic activity measures (e.g., reports received and approved, etc.) to track changes in the quality of the environment. The two EIs developed to-date indicate the quality of the environment in relation to current human exposures to contamination and the migration of contaminated groundwater. An EI for non-human (ecological) receptors is intended to be developed in the future.

Definition of "Migration of Contaminated Groundwater Under Control" EI

A positive "Migration of Contaminated Groundwater Under Control" EI determination ("YE" status code) indicates that the migration of "contaminated" groundwater has stabilized, and that monitoring will be conducted to confirm that contaminated groundwater remains within the original "area of contaminated groundwater" (for all groundwater "contamination" subject to RCRA corrective action at or from the identified facility (i.e., site-wide)).

Relationship of EI to Final Remedies

While final remedies remain the long-term objective of the RCRA corrective action program, EIs are near-term objectives which are currently being used as Program measures for the Government Performance and Results Act of 1993, GPRA). The "Migration of Contaminated Groundwater Under Control" EI pertains ONLY to the physical migration (i.e., further spread) of contaminated ground water and contaminants within groundwater (e.g., non-aqueous phase liquids or NAPLs). Achieving this EI does not substitute for achieving other stabilization or final remedy requirements and expectations associated with sources of contamination and the need to restore, wherever practicable, contaminated groundwater to be suitable for its designated current and future uses.

Duration / Applicability of EI Determinations

EI determinations status codes should remain in RCRAInfo national database only as long as they remain true (i.e., RCRAInfo status codes must be changed when the regulatory authorities become aware of contrary information).

2. Is groundwater known or reasonably suspected to be "contaminated"1 above appropriately protective "levels" (i.e., applicable promulgated standards, as well as other appropriate standards, guidelines, guidance, or criteria) from releases subject to RCRA corrective action, anywhere at, or from, the facility?

   __X__ If yes, continue after identifying key contaminants, citing appropriate "levels," and referencing supporting documentation.

   _____ If no, skip to #8 and enter "YE" status code, after citing appropriate "levels," and referencing supporting documentation to demonstrate that groundwater is not "contaminated."

   _____ If unknown, skip to #8 and enter "IN" status code.

   Rationale and Reference(s): The CleanCare Corporation is an abandoned interim status TSD facility on four acres in Tacoma's tideflats, adjacent to Commencement Bay and between the Blair and Hylebos waterways. Neighboring properties include the Philip/BEI Tacoma facility to the west, the ProLogis property to the north and east, the Emerald Services facility to the southeast, and the Potter property to the south.

   Formerly known as Northwest Processing, Inc., the facility processed used oil into fuel in the mid 1980s. Over the years, more activities were added, including recycling antifreeze and parts washer solvent, blending hazardous waste fuel, and consolidating hazardous wastes generated by small quantity generators. Northwest Processing was incorporated into CleanCare Corporation in 1992. Northwest Processing submitted a Part A application to the U.S. Environmental Protection Agency (EPA) in 1990 to establish interim status to store dangerous waste. The company asserted that waste antifreeze designated as a hazardous waste under the toxicity characteristic rules newly adopted by EPA. EPA accepted the application as valid in 1992. As a result, the company was allowed to store dangerous waste at this location. CleanCare submitted a Part B permit application and a series of revisions from 1988 through 1999 to the Washington State Department of Ecology (Ecology). Ecology's review of the application resulted in four notices of deficiency between 1989 and 1999.

   In 1992, EPA entered into separate interim status 3008(h) consent orders with Northwest Processing, Inc. and two neighboring facilities, Burlington Environmental (now owned by Philip Services Corporation) and Sol-Pro, Inc. (now owned by Emerald Services, Inc.) to investigate and, if necessary, to clean up their respective sites. Northwest Processing's order required its owner to monitor groundwater and investigate sources of contamination at the facility.

[1] "Contamination" and "contaminated" describes media containing contaminants (in any form, NAPL and/or dissolved, vapors, or solids, that are subject to RCRA) in concentrations in excess of appropriate "levels" (appropriate for the protection of the groundwater resource and its beneficial uses).

Northwest Processing, Inc. expanded its services to recycle antifreeze and parts-washing solvent. It also became part of the newly formed CleanCare Corporation in 1992. Ecology conducted a series of compliance inspections at the CleanCare facility in 1998 and 1999. During these inspections Ecology found numerous violations of the Dangerous Waste Regulations and several violations of Chapter 90.48 of the Revised Code of Washington (RCW), Washington's water pollution statute. In July 1999, Ecology issued an enforcement order to CleanCare along with two penalties totaling $486,000. CleanCare filed an appeal of this order to the PCHB in September 1999, but withdrew the appeal before the scheduled hearing date.

In November 1999, CleanCare notified Ecology through its legal council of its intent to close the interim status facility. CleanCare ceased operation at 1507 Taylor Way on November 17, 1999, leaving dangerous waste on-site. EPA's Superfund program, at Ecology's request, took over site security in September of 1999, and began removal of wastes left on-site that posed the greatest threat to human health and the environment. EPA removed a total of two million gallons of waste stored in containers and above-ground storage tanks. Nineteen temporary above-ground storage tanks were removed. Four above-ground tanks were demolished, and a limited soil investigation was conducted in three areas before EPA applied 26,000 square feet of asphalt to temporarily cap the site. After completing these removal and stabilization activities, EPA returned responsibility for the site back to Ecology in September 2000.

Ecology has been responsible for oversight of storm water management and site security since that time. Ecology concluded that without a viable owner with resources or assets, there is no effective regulatory pathway to pursue the cleanup of the CleanCare site using corrective action under Chapter 173-303 WAC or Resource Conservation and Recovery Act (RCRA). The appropriate regulatory framework for contaminated sites without viable owners and/or operators is the Model Toxics Control Act (MTCA) and its implementing regulation, Chapter 173-340 WAC. Responsibility for oversight of the facility was transferred from Ecology's Hazardous Waste and Toxics Reduction (HWTR) Program to Ecology's Toxics Cleanup Program (TCP) in October 2001. In December 2002, Ecology denied a dangerous waste management permit to the CleanCare Corporation and terminated interim status for the facility.

Subsurface investigations in and around waste management units at the site by EPA and the Tacoma-Pierce County Health Department (TPCHD) indicate that both soils and groundwater are contaminated with hazardous constituents. These constituents consist of both organic and inorganic contaminants found in solvents and used oil, both managed at CleanCare. However, historical documents and investigations indicate CleanCare was built on property filled in with industrial waste during the 1960s and 1970s. Land use in this area is heavily industrial. In the 1930s, the property and neighboring properties were part of a tidal marshland. Dredge spoil was placed on the properties in the 1940s and early 1950s and a freshwater marsh formed. Prior to the mid-1970s, during the operation of the former Don Oline Landfill, the marsh was filled with heterogeneous mixture of sand, gravel, and various waste materials. Fill materials included demolition debris, lime solvent sludge from operations at Hooker Chemical (renamed Occidental Chemical Corporation), dredge spoils from adjacent waterways, wood waste, and ground-up automobile interiors (known as auto fluff). The lime solvent sludge contained chlorinated solvent compounds and heavy metals. Given this information and the limited data from recent site investigations, it is difficult at this time to ascribe non-petroleum based contamination to CleanCare's waste management activities.

The facility has undergone a site assessment and has been assigned a ranking of two (2). Under MTCA, facilities are assigned a rank from one (1) to five (5). Those sites with a rank of 1 have the highest priority for cleanup due to potential exposure pathways to humans or sensitive environmental receptors. Those sites with a ranking of 5 are deemed to pose little threat to human health and the environment.

The CleanCare facility was built upon a portion of the former Don Oline Landfill. Some neighboring properties are located on the footprint of the former landfill. Soil and groundwater investigations have occurred on the Potter and Philip properties. [Refer to ***Final Comprehensive RI Report, Philip Services Corporation, Tacoma Facility, Tacoma, Washington***, dated January 21, 2005.] Soil and groundwater investigations are on the nearby ProLogis property have, for the most part, determined the extent of the landfill footprint in soil and groundwater. [Refer to ***ProLogis Taylor Way Property, Remedial Investigation***, dated June 2006.] The investigations at CleanCare and ProLogis are overseen by the Department of Ecology's Toxics Cleanup Program (TCP).

Ecology's TCP and HWTR Program recognize that there is an areawide groundwater contamination as a result of the former Don Oline Landfill. HWTR and TCP have agreed to address soil contamination individually on the neighboring properties under separate mechanisms, including permits, agreed orders, or consent decrees. Ecology intends to address the issues concerning areawide groundwater under an agreed order or consent decree with multiple potentially liable parties (PLPs).

3. Has the **migration** of contaminated groundwater **stabilized** (such that contaminated groundwater is expected to remain within "existing area of contaminated groundwater"[2] as defined by the monitoring locations designated at the time of this determination)?

__X__ If yes, continue, after presenting or referencing the physical evidence (e.g., groundwater sampling/measurement/migration barrier data) and rationale why contaminated groundwater is expected to remain within the (horizontal or vertical) dimensions of the "existing area of groundwater contamination"[2]).

_____ If no (contaminated groundwater is observed or expected to migrate beyond the designated locations defining the "existing area of groundwater contamination"), skip to #8 and enter "NO" status code, after providing an explanation.

_____ If unknown, skip to #8 and enter "IN" status code.

Rationale and Reference(s): The CleanCare facility is built on a portion of a former industrial waste landfill, along with Philip's Tacoma facility and nearby properties. The extent of the landfill outside of the CleanCare property, along with soil and groundwater contamination from the landfill, has determined through investigations on neighboring properties.

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[2] **"existing area of contaminated groundwater" is an area (with horizontal and vertical dimensions) that has been verifiably demonstrated to contain all relevant groundwater contamination for this determination, and is defined by designated (monitoring) locations proximate to the outer perimeter of "contamination" that can and will be sampled/tested in the future to physically verify that all "contaminated" groundwater remains within this area, and that the further migration of "contaminated" groundwater is not occurring.** Reasonable allowances in the proximity of the monitoring locations are permissible to incorporate formal remedy decisions (i.e., including public participation) allowing a limited area for natural attenuation.'

The nature and extent of the landfill footprint has been investigated under an agreed order between the ProLogis property owners and the Department of Ecology's Toxics Cleanup Program (TCP). In 2006, ProLogis submitted a summary of the results of three quarters of groundwater monitoring. Following a review of the monitoring results, Ecology is able to state migration of contaminated groundwater at the CleanCare facility has stabilized (such that contaminated groundwater is expected to remain within an existing area of contaminated groundwater).

TCP and Ecology's Hazardous Waste and Toxics Reduction (HWTR) Program recognize that there is an areawide groundwater contamination as a result of the former Don Oline Landfill. HWTR and TCP have agreed to address soil contamination individually on the neighboring properties under separate mechanisms, including permits, agreed orders, or consent decrees. Ecology intends to address the issues concerning areawide groundwater under an agreed order or consent decree with multiple potentially liable parties (PLPs), so the outer perimeter of contaminated groundwater will be sampled and analyzed in the future to confirm that contaminated groundwater remains in this area and that further migration of contaminated groundwater is not occurring.

4. Does "contaminated" groundwater **discharge** into **surface water** bodies?

_____ If yes, continue after identifying potentially affected surface water bodies.

__X__ If no, skip to #7 (and enter a "YE" status code in #8, if #7 = yes) after providing an explanation and/or referencing documentation supporting that groundwater "contamination" does not enter surface water bodies.

_____ If unknown, skip to #8 and enter "IN" status code.

Rationale and Reference(s): Soil and groundwater investigations are on the nearby ProLogis property have, for the most part, determined the extent of the landfill footprint in soil and groundwater. In 2006, ProLogis submitted a summary of the results of three quarters of groundwater monitoring. Following a review of the monitoring results, Ecology is able to state migration of contaminated groundwater at the CleanCare facility has stabilized and that contaminated groundwater does not discharge into neighboring surface water bodies. [Refer to ***ProLogis Taylor Way Property, Remedial Investigation***, dated June 2006.]

5. Is the **discharge** of "contaminated" groundwater into surface water likely to be **"insignificant"** (i.e., the maximum concentration[3] of each contaminant discharging into surface water is less than 10 times their appropriate groundwater "level," and there are no other conditions (e.g., the nature, and number, of discharging contaminants, or environmental setting), which significantly increase the potential for unacceptable impacts to surface water, sediments, or eco-systems at these concentrations)?

_____ If yes, skip to #7 (and enter "YE" status code in #8 if #7 = yes), after documenting: 1) the maximum known or reasonably suspected concentration[3] of key contaminants discharged above their groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) provide a statement of professional judgment/explanation (or reference documentation) supporting that the discharge of groundwater

[3] As measured in groundwater prior to entry to the groundwater-surface water/sediment interaction (e.g., hyporheic) zone.

contaminants into the surface water is not anticipated to have unacceptable impacts to the receiving surface water, sediments, or eco-system.

_____ If no (the discharge of "contaminated" groundwater into surface water is potentially significant), continue after documenting: 1) the maximum known or reasonably suspected concentration of <u>each</u> contaminant discharged above its groundwater "level," the value of the appropriate "level(s)," and if there is evidence that the concentrations are increasing; and 2) for any contaminants discharging into surface water in concentrations[3] greater than 100 times their appropriate groundwater "levels," the estimated total amount (mass in kg/yr) of each of these contaminants that are being discharged (loaded) into the surface water body (at the time of the determination), and identify if there is evidence that the amount of discharging contaminants is increasing.

_____ If unknown, enter "IN" status code in #8.

Rationale and Reference(s):_____

_____

6. Can the **discharge** of "contaminated" groundwater into surface water be shown to be "**currently acceptable**" (i.e., not cause impacts to surface water, sediments or eco-systems that should not be allowed to continue until a final remedy decision can be made and implemented[4])?

_____ If yes, continue after either: 1) identifying the Final Remedy decision incorporating these conditions, or other site-specific criteria (developed for the protection of the site's surface water, sediments, and eco-systems), and referencing supporting documentation demonstrating that these criteria are not exceeded by the discharging groundwater; OR 2) providing or referencing an interim-assessment,[5] appropriate to the potential for impact, that shows the discharge of groundwater contaminants into the surface water is (in the opinion of a trained specialists, including ecologist) adequately protective of receiving surface water, sediments, and eco-systems, until such time when a full assessment and final remedy decision can be made. Factors which should be considered in the interim-assessment (where appropriate to help identify the impact associated with discharging groundwater) include: surface water body size, flow, use/classification/habitats and contaminant loading limits, other sources of surface water/sediment contamination, surface water and sediment sample results and comparisons to available and appropriate surface water and sediment "levels," as well as any other factors, such as effects on ecological receptors (e.g., via bio-assays/benthic surveys or site-specific ecological Risk Assessments), that the overseeing regulatory agency would deem appropriate for making the EI determination.

---

[4] Note, because areas of inflowing groundwater can be critical habitats (e.g., nurseries or thermal refugia) for many species, appropriate specialist (e.g., ecologist) should be included in management decisions that could eliminate these areas by significantly altering or reversing groundwater flow pathways near surface water bodies.

[5] The understanding of the impacts of contaminated groundwater discharges into surface water bodies is a rapidly developing field and reviewers are encouraged to look to the latest guidance for the appropriate methods and scale of demonstration to be reasonably certain that discharges are not causing currently unacceptable impacts to the surface waters, sediments or eco-systems.

_____ If no (the discharge of "contaminated" groundwater can not be shown to be "**currently acceptable**"), skip to #8 and enter "NO" status code, after documenting the currently unacceptable impacts to the surface water body, sediments, and/or eco-systems.

_____ If unknown, skip to #8 and enter "IN" status code.

Rationale and Reference(s):_____

_____

7. Will groundwater monitoring/measurement data (and surface water/sediment/ecological data, as necessary) be collected in the future to verify that contaminated groundwater has remained within the horizontal (or vertical, as necessary) dimensions of the "existing area of contaminated groundwater?"

__X__ If yes, continue after providing or citing documentation for planned activities or future sampling/measurement events. Specifically identify the well/measurement locations which will be tested in the future to verify the expectation (identified in #3) that groundwater contamination will not be migrating horizontally (or vertically, as necessary) beyond the "existing area of groundwater contamination."

_____ If no, enter "NO" status code in #8.

_____ If unknown, enter "IN" status code in #8.

Rationale and Reference(s): Ecology's Hazardous Waste and Toxics Reduction (HWTR) Program and Toxics Cleanup Program (TCP) recognize that there is an areawide groundwater contamination as a result of the former Don Oline Landfill. The HWTR Program and TCP have agreed to address soil contamination individually on the neighboring properties under separate mechanisms, including permits, agreed orders, or consent decrees. Ecology intends to address the issues concerning areawide groundwater under an agreed order or consent decree with multiple potentially liable parties (PLPs), so the outer perimeter of contaminated groundwater will be sampled and analyzed in the future to confirm that contaminated groundwater remains in this area and that further migration of contaminated groundwater is not occurring.

8. Check the appropriate RCRAInfo status codes for the Migration of Contaminated Groundwater Under Control EI (event code CA750), and obtain Supervisor (or appropriate Manager) signature and date on the EI determination below (attach appropriate supporting documentation as well as a map of the facility).

__X__ YE - Yes, "Migration of Contaminated Groundwater Under Control" has been verified. Based on a review of the information contained in this EI determination, it has been determined that the "Migration of Contaminated Groundwater" is "Under Control" at the former CleanCare Corporation facility, EPA ID No. WAD 980738512, located at 1510 Taylor Way, Tacoma, Washington 98421. Specifically, this determination indicates that the migration of "contaminated" groundwater is under control, and that monitoring will be conducted to confirm that contaminated groundwater remains within the "existing area of contaminated groundwater" This determination will be re-evaluated

when the Agency becomes aware of significant changes at the facility.

____ NO - Unacceptable migration of contaminated groundwater is observed or expected.

____ IN - More information is needed to make a determination.

Completed by Kaia Petersen Date 9/21/06
Kaia Petersen
Hydrogeologist

Supervisor K Seiler Date 9/21/06
K Seiler, Supervisor
Hazardous Waste and Toxics Reduction, Southwest Regional Office
Department of Ecology

Locations where references may be found:

Department of Ecology, Southwest Regional Office, Central Files
P.O. Box 47775, Olympia, Washington 98504-7775 or
300 Desmond Drive, Lacey, Washington 98503
(360) 407-6300

Contact telephone and e-mail numbers

Kaia Petersen
(360) 407-6359
kpet461@ecy.wa.gov

APPENDIX B

Site Cleanup Details

PIERCE COUNTY

SITE I

Clean Care Corp

CleanupSite ID: 604 FS ID: 37982391

Alternate Name(s): Clean Care Corp, CLEAN CARE CORPORATION, CLEANCARE CORP TACOMA

LOCATION:

View Vicinity Map

Address: 1510 TAYLOR WY
TACOMA 98421-4127

Lat/Long: 47.26760 -122.38901
Township/Range/Section: 21N 3E 35

Legislative District: 27
Congressional District: 9

STATUS:

View Site Web Page

Ecology Status: **Awaiting Cleanup**
WARM BIN#: **3**

Responsible Unit: **Southwest**
Site Manager: **Teel, Steve**
Statute: **MTCA**

Is Brownfield?
Environmental Covenant?
Is PSI Site? **Yes**

UST Site ID:
WRIA ID: 10

NFA Received? NFA Date: NFA Reason:

ASSOCIATED CLEANUP UNIT(s)

cuID	Cleanup Unit Name	Unit Type	Process Type	Unit Status	Size (Acres)	ERTS ID
3750	Clean Care Corp	Upland	Ecology-supervised or conducted	Awaiting Cleanup		

SITE ACTIVITIES:

Applies to:	Related ID (Unit-LUST-VCP)	Activity Display Name	Status	Start Date	End Date	Legal Mechanism	Performed By	Project Manager
CleanupSite		Initial Investigation / Federal Preliminary Assessment	Completed	3/1/2001	3/31/2002		Ecology w/ Contractor	County Health-SW
CleanupSite		Early Notice Letter(s)			6/1/2005			Balaraju, Panjini
CleanupSite		Site Hazard Assessment/Federal Site Inspection	Completed	1/8/2002	2/12/2002		Ecology w/ Contractor	County Health-SW
CleanupSite		Hazardous Sites Listing/NPL			2/26/2002			Balaraju, Panjini

AFFECTED MEDIA & CONTAMINANTS:

Contaminant:	Media: Ground Water	Surface Water	Soil	Sediment	Air	Bedrock
Base/Neutral/Acid Organics	C		C			

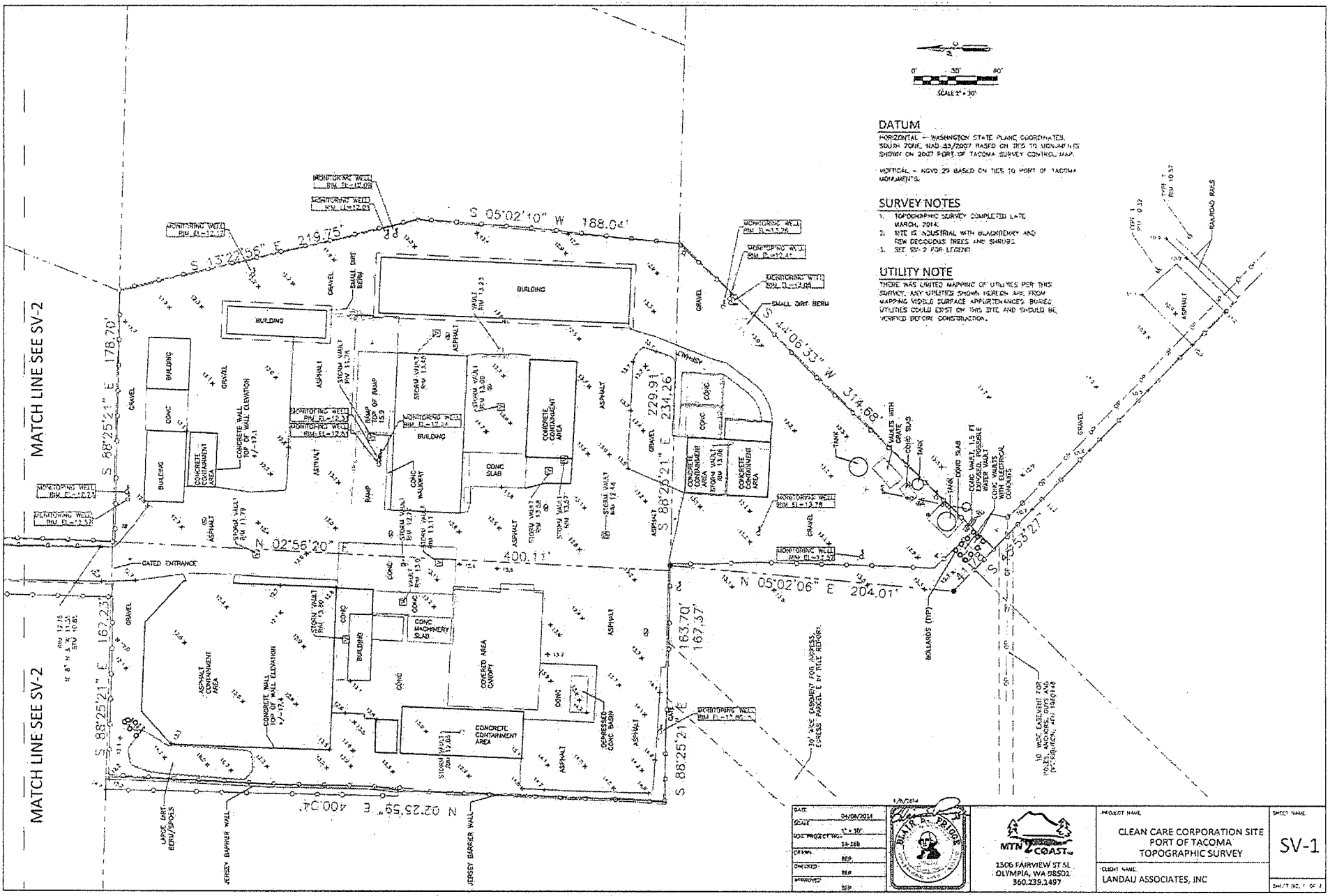
Halogenated Organics	C	C
Metals Priority Pollutants	C	C
Petroleum Products-Unspecified	C	C

Key:

B - Below Cleanup Level
C - Confirmed Above Cleanup Level
S - Suspected
R - Remediated
RA - Remediated-Above
RB - Remediated-Below

APPENDIX C

Professional Topographic Survey



DATUM

HORIZONTAL – WASHINGTON STATE PLANE COORDINATES, SOUTH ZONE, NAD 83/2007 BASED ON TIES TO MONUMENTS SHOWN ON 2007 PORT OF TACOMA SURVEY CONTROL MAP.

VERTICAL – NGVD 29 BASED ON TIES TO PORT OF TACOMA MONUMENTS.

SURVEY NOTES

1. TOPOGRAPHIC SURVEY COMPLETED LATE MARCH, 2014.
2. SITE IS INDUSTRIAL WITH BLACKBERRY AND FEW DECIDUOUS TREES AND SHRUBS.
3. SEE SV-2 FOR LEGEND.

UTILITY NOTE

THERE WAS LIMITED MAPPING OF UTILITIES PER THIS SURVEY. ANY UTILITIES SHOWN HEREON ARE FROM MAPPING VISIBLE SURFACE APPURTENANCES. BURIED UTILITIES COULD EXIST ON THIS SITE AND SHOULD BE VERIFIED BEFORE CONSTRUCTION.

DATE	04/08/2014
SCALE	1" = 30'
CCC PROJECT NO.	13-168
DRAWN	BEP
CHECKED	BEP
APPROVED	BEP

4/8/2014

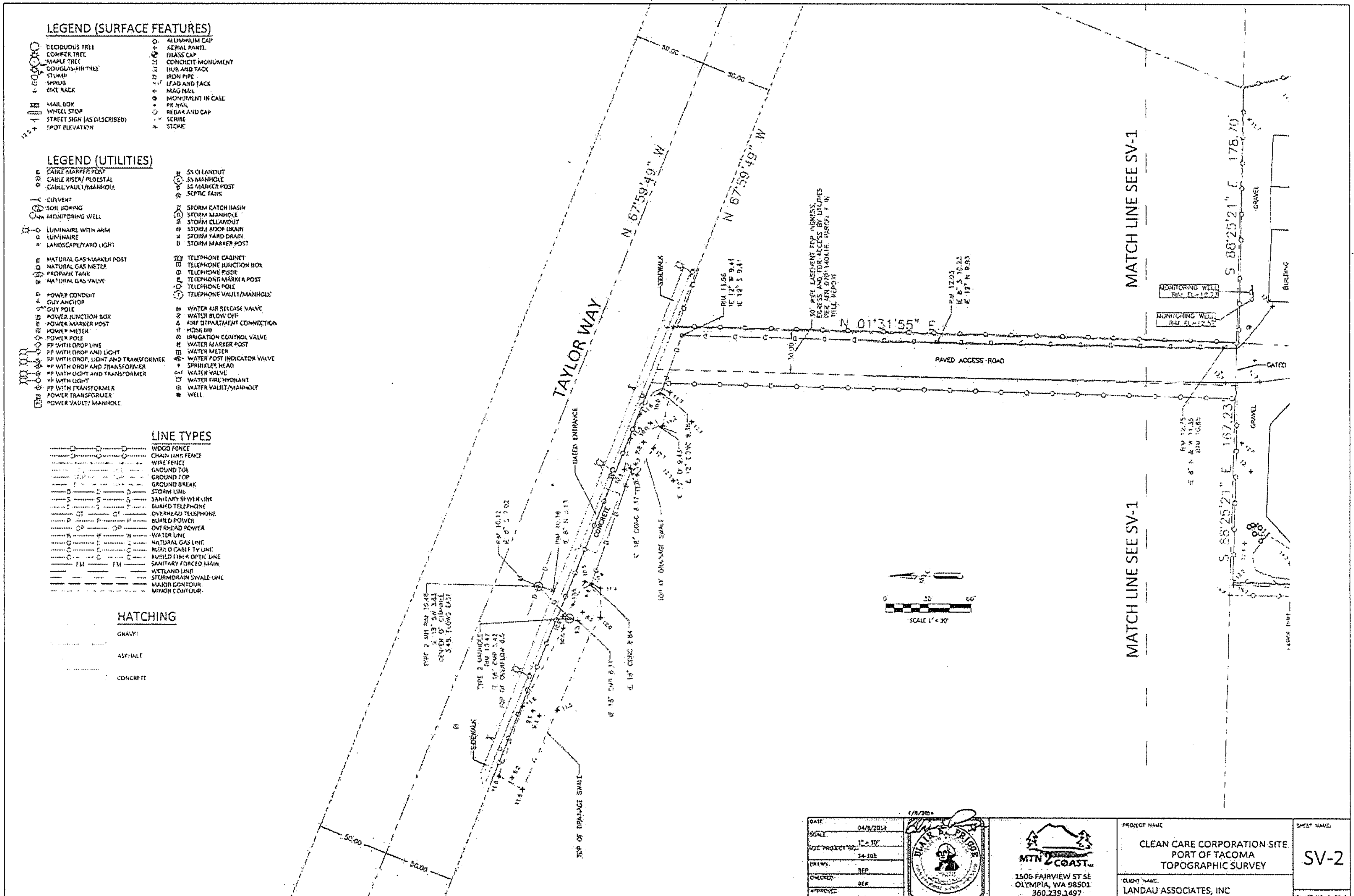
MTN 2 COAST LLC
1506 FAIRVIEW ST SE
OLYMPIA, WA 98501
360.239.1497

PROJECT NAME
CLEAN CARE CORPORATION SITE
PORT OF TACOMA
TOPOGRAPHIC SURVEY

CLIENT NAME
LANDAU ASSOCIATES, INC

SHEET NAME
SV-1

SHEET NO. 1 OF 1


LEGEND (SURFACE FEATURES)
DECIDUOUS TREE
CONIFER TREE
MAPLE TREE
DOUGLAS-FIR TREE
STUMP
SHRUB
BIKE RACK
MAIL BOX
WHEEL STOP
STREET SIGN (AS DESCRIBED)
SPOT ELEVATION
ALUMINUM CAP
AERIAL PANEL
BRASS CAP
CONCRETE MONUMENT
HUB AND TACK
IRON PIPE
LEAD AND TACK
MAG NAIL
MONUMENT IN CASE
PK NAIL
REBAR AND CAP
SCRIBE
STONE
LEGEND (UTILITIES)
CABLE MARKER POST
CABLE RISER/ PEDESTAL
CABLE VAULT/MANHOLE
CULVERT
SOIL BORING
MONITORING WELL
LUMINAIRE WITH ARM
LUMINAIRE
LANDSCAPE/YARD LIGHT
NATURAL GAS MARKER POST
NATURAL GAS METER
PROPANE TANK
NATURAL GAS VALVE
POWER CONDUIT
GUY ANCHOR
GUY POLE
POWER JUNCTION BOX
POWER MARKER POST
POWER METER
POWER POLE
PP WITH DROP LINE
PP WITH DROP AND LIGHT
PP WITH DROP, LIGHT AND TRANSFORMER
PP WITH DROP AND TRANSFORMER
PP WITH LIGHT AND TRANSFORMER
PP WITH LIGHT
PP WITH TRANSFORMER
POWER TRANSFORMER
POWER VAULT/ MANHOLE
SS CLEANOUT
SS MANHOLE
SS MARKER POST
SEPTIC TANK
STORM CATCH BASIN
STORM MANHOLE
STORM CLEANOUT
STORM ROOF DRAIN
STORM YARD DRAIN
STORM MARKER POST
TELEPHONE CABINET
TELEPHONE JUNCTION BOX
TELEPHONE RISER
TELEPHONE MARKER POST
TELEPHONE POLE
TELEPHONE VAULT/MANHOLE
WATER AIR RELEASE VALVE
WATER BLOW OFF
FIRE DEPARTMENT CONNECTION
HOSE BIB
IRRIGATION CONTROL VALVE
WATER MARKER POST
WATER METER
WATER POST INDICATOR VALVE
SPRINKLER HEAD
WATER VALVE
WATER FIRE HYDRANT
WATER VAULT/MANHOLE
WELL
LINE TYPES
WOOD FENCE
CHAIN LINK FENCE
WIRE FENCE
GROUND TOE
GROUND TOP
GROUND BREAK
STORM LINE
SANITARY SEWER LINE
BURIED TELEPHONE
OVERHEAD TELEPHONE
BURIED POWER
OVERHEAD POWER
WATER LINE
NATURAL GAS LINE
BURIED CABLE TV LINE
BURIED FIBER OPTIC LINE
SANITARY FORCED MAIN
WETLAND LINE
STORMDRAIN SWALE LINE
MAJOR CONTOUR
MINOR CONTOUR
HATCHING
GRAVEL
ASPHALT
CONCRETE
TAYLOR WAY
N 67°59'49" W
N 67°59'49" W
30.00
30.00
50.00
50.00
SIDEWALK
GATED ENTRANCE
CONCRETE
TOP OF DRAINAGE SWALE
TOP OF DRAINAGE SWALE
TYPE 2 MANHOLE
TYPE 2 MH RIM 10.48
CENTER OF CHANNEL
S 45, FLOWS EAST
RIM 11.56
IE 12" N 9.41
IE 12" S 9.41
RIM 12.03
IE 8" S 10.22
IE 12" N 9.93
10' WIDE EASEMENT FOR INGRESS, EGRESS AND FOR ACCESS BY UTILITIES PER AFN 0201140618 PARCEL F IN TITLE REPORT
N 01°31'55" E
PAVED ACCESS ROAD
GATED
GRAVEL
BUILDING
MONITORING WELL
MONITORING WELL
MATCH LINE SEE SV-1
MATCH LINE SEE SV-1
S 88°25'21" E 178.70'
S 88°25'21" E 167.23'
0
30'
60'
SCALE 1" = 30'
DATE: 04/8/2014
SCALE: 1" = 30'
M2C PROJECT NO.: 14-108
DRAWN: BEP
CHECKED: BEP
APPROVED: BEP
MTN 2 COAST
1506 FAIRVIEW ST SE
OLYMPIA, WA 98501
360.239.1497
PROJECT NAME:
CLEAN CARE CORPORATION SITE
PORT OF TACOMA
TOPOGRAPHIC SURVEY
CLIENT NAME:
LANDAU ASSOCIATES, INC
SHEET NAME:
SV-2

APPENDIX D

Vapor Intrusion Screening Calculations

TABLE D-1
PRELIMINARY INDUSTRIAL INDOOR AIR CULs AND SLs
CLEAN CARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

	Air (µg/m³) (a)			Screening Levels Protective of MTCA Method C			
	MTCA Method C		EPA Region 10 Value (b)	Soil Gas (µg/m3)		Groundwater (µg/L)(d)	
Constituent of Concern	CUL (Carc.)	CUL (Non-Carc.)	IAAL Sub-Chronic (Non-Carc)	SL (Carc.)	SL (Non-Carc.)	SL (Carc.)	SL (Non-Carc.)
Benzene	3.2	30	--	110	1000	25	230
PCE	96	40	--	3200	1300	240	100
TCE	6.3	2.0	8.4	210	67	26	8.4
VC	2.8	102	--	94	3400	3.5	120

= Applicable CUL or SL

Carc. = Carcinogenic
CUL = Cleanup Level
Non-Carc. = Non-Carcinogenic
PCE = Tetrachloroethene
SL = Screening Level
TCE = Trichloroethene
µg/m³ = micrograms per cubic meter
µg/L = micrograms per liter
VC = Vinyl Chloride

Notes
(a) Air screening criteria will be applied to indoor air samples, crawl space and basement air samples, and ambient air samples.
(b) The sub-chronic non-carcinogenic indoor air action lavel comes from the EPA Region 10 (EPA 2012).
Once the US EPA OSWER creates an official value, the EPA Region 10 sub-chronic value will be replaced.
(c) The Henry's Law constant used to calculate the shallow groundwater screening level assumes a temperature of 13 degrees Celsius per the U.S. temperature map provided by the EPA On-line Tools for Site Assessment Calculation for Henry's Law Constants.

TABLE D-2
INDUSTRIAL METHOD C CARCINOGENIC RISK CULs AND SLs FOR BENZENE
CLEAN CARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

$CPF_{BENZENE}$ (kg-day/mg) = 0.027 *CPFi from Clarc accessed 5/15/14*

H_{cc} @ 13° Celsius (C) = 0.132 *Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment*

Constants from MTCA Equation 750-2, for Carcinogens with reduced RISK per WAC 173-340-750 (4)(b)(ii)(B)

RISK	=	1.E-05 Acceptable cancer risk level
ABW (kg)	=	70 Average body weight over exposure duration
AT (yr)	=	75 Averaging time
UCF (µg/mg)	=	1000 Unit conversion factor
CPF	=	Carcinogenic potency factor per WAC 173-340-708(8) (kg-day/mg)
BR (m^3/day)	=	20 Breathing/inhalation rate
ABS (unitless)	=	1 Inhalation absorption fraction
ED (yr)	=	30 Exposure duration
EF (unitless)	=	1 Exposure frequency

Find: (a) Indoor Air Cleanup Level (CUL_{IA}), (b) Soil Gas Screening Level (SL_{SG}), and (c) Shallow GW Screening Level (SL_{GW})

Equations:

(1) CUL_{IA} (µg/m^3) = $\frac{RISK \times ABW \times AT \times UCF}{CPF \times BR \times ABS \times ED \times EF}$ — *MTCA Equation 750-2*

(2) SL_{SG} (µg/m^3) = CUL_{IA} / VAF

Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(3) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$

Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

Solve:

(a)	CUL_{IA} (µg/m^3) =	3.2
(b)	SL_{SG} (µg/m^3) =	110
(c)	SL_{GW} (µg/L) =	25

Consistent with Ecology's Clarc, accessed 5/15/14

TABLE D-3
INDUSTRIAL METHOD C NON-CARCINOGENIC RISK CULs AND SLs FOR BENZENE
CLEAN CARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

$RfD_{BENZENE}$(mg/kg-day) = 0.0086 *RfD from Clarc accessed 5/15/14*

H_{cc} @ 13° Celsius (C) = 0.132 *Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment*

Constants from MTCA Equation 750-1, for Non-carcinogens per WAC 173-340-750 (4)(b)(ii)(A)

ABW (kg)	=	70	Average body weight over exposure duration
UCF (µg/mg)	=	1000	Unit conversion factor
HQ (unitless)	=	1	Hazard Quotient
AT (yr)	=	30	Averaging time
BR (m^3/day)	=	20	Breathing/inhalation rate
ABS (unitless)	=	1	Inhalation absorption fraction
ED (yr)	=	30	Exposure duration
EF (unitless)	=	1	Exposure frequency

Find: (a) Indoor Air Cleanup Level (CUL_{IA}), (b) Soil Gas Screening Level (SL_{SG}), and (c) Shallow GW Screening Level (SL_{GW})

Equations:

(1) CUL_{IA} (µg/m^3) = $\frac{RfD \times ABW \times UCF \times HQ \times AT}{BR \times ABS \times ED \times EF}$ ***MTCA Equation 750-1***

(2) SL_{SG} (µg/m^3) = CUL_{IA} /VAF

Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(3) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$

Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

Solve:

(a)	CUL_{IA} (µg/m^3) =	30
(b)	SL_{SG} (µg/m^3) =	1000
(c)	SL_{GW} (µg/L) =	230

Consistent with Ecology's Clarc, accessed 5/15/14

TABLE D-4
INDUSTRIAL METHOD C CARCINOGENIC RISK CULs AND SLs FOR PCE
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

CPF_{PCE} (kg-day/mg) = 0.00091 *CPFi from Clarc accessed 5/15/14*

H_{cc} @ 13° Celsius (C) = 0.393 *Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment*

Constants from MTCA Equation 750-2, for Carcinogens with reduced RISK per WAC 173-340-750 (4)(b)(ii)(B)

RISK	=	1.E-05 Acceptable cancer risk level
ABW (kg)	=	70 Average body weight over exposure duration
AT (yr)	=	75 Averaging time
UCF (µg/mg)	=	1000 Unit conversion factor
CPF	=	Carcinogenic potency factor per WAC 173-340-708(8) (kg-day/mg)
BR (m^3/day)	=	20 Breathing/inhalation rate
ABS (unitless)	=	1 Inhalation absorption fraction
ED (yr)	=	30 Exposure duration
EF (unitless)	=	1 Exposure frequency

Find: (a) Indoor Air Cleanup Level (CUL_{IA}), (b) Soil Gas Screening Level (SL_{SG}), and (c) Shallow GW Screening Level (SL_{GW})

Equations:

(1) CUL_{IA} (µg/m^3)= $\frac{RISK \times ABW \times AT \times UCF}{CPF \times BR \times ABS \times ED \times EF}$ ***MTCA Equation 750-2***

(2) SL_{SG} (µg/m^3) = CUL_{IA} /VAF

Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(3) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$

Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

Solve:

(a)	CUL_{IA} (µg/m^3)=	96
(b)	SL_{SG} (µg/m^3) =	3200
(c)	SL_{GW} (µg/L) =	240

Consistent with Ecology's Clarc, accessed 5/15/14

TABLE D-5
INDUSTRIAL METHOD C NON-CARCINOGENIC RISK CULs AND SLs FOR PCE
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

RfD_{PCE}(mg/kg-day) = 0.011 *RfD from Clarc accessed 5/15/14*

H_{cc} @ 13° Celsius (C) = 0.393 *Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment*

Constants from MTCA Equation 750-1, for Non-carcinogens per WAC 173-340-750 (4)(b)(ii)(A)

ABW (kg)	=	70	Average body weight over exposure duration
UCF (µg/mg)	=	1000	Unit conversion factor
HQ (unitless)	=	1	Hazard Quotient
AT (yr)	=	30	Averaging time
BR (m^3/day)	=	20	Breathing/inhalation rate
ABS (unitless)	=	1	Inhalation absorption fraction
ED (yr)	=	30	Exposure duration
EF (unitless)	=	1	Exposure frequency

Find: (a) Indoor Air Cleanup Level (CUL_{IA}), (b) Soil Gas Screening Level (SL_{SG}), and (c) Shallow GW Screening Level (SL_{GW})

Equations:

(1) CUL_{IA} (µg/m^3)= $\frac{RfD \times ABW \times UCF \times HQ \times AT}{BR \times ABS \times ED \times EF}$ *MTCA Equation 750-1*

(2) SL_{SG} (µg/m^3) = CUL_{IA} /VAF

Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(3) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$

Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

Solve:

(a)	CUL_{IA} (µg/m^3)=	40
(b)	SL_{SG} (µg/m^3) =	1300
(c)	SL_{GW} (µg/L) =	100

Consistent with Ecology's Clarc, accessed 5/15/14

TABLE D-6
INDUSTRIAL METHOD C CARCINOGENIC RISK CULs AND SLs FOR TCE
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

$IUR_{TCE}(m^3/\mu g)$ = 0.000004 ***Approximate iotal inhalation unit risk from EPA IRIS database for kidney cancer, Non-Hodgkin's Lymphoma (NHL), and liver cancer for adult scenario; IRIS has 4.1E-6.***

H_{cc} @ 13° Celsius (C) = 0.238 ***Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment***

Constants from MTCA Equation 750-2, for Carcinogens with reduced RISK per WAC 173-340-750 (4)(b)(ii)(B)

RISK	=	1.E-05 Acceptable cancer risk level
ABW (kg)	=	70 Average body weight over exposure duration
AT (yr)	=	75 Averaging time
UCF (µg/mg)	=	1000 Unit conversion factor
CPF	=	Carcinogenic potency factor per WAC 173-340-708(8) (kg-day/mg)
BR (m^3/day)	=	20 Breathing/inhalation rate
ABS (unitless)	=	1 Inhalation absorption fraction
ED (yr)	=	30 Exposure duration
EF (unitless)	=	1 Exposure frequency

Find: (a) CPF, (b) Indcor Air Cleanup Level (CUL_{IA}), (c) Soil Gas Screening Level (SL_{SG}), and (d) Shallow GW Screening Level (SL_{GW})

Equations:

(1) CPF (kg-day/mg) = $\frac{IUR \times ABW \times UCF}{BR}$ — ***From EPA Risk Assessment Guidance for Superfund Appendix E***

(2) CUL_{IA} ($\mu g/m^3$)= $\frac{RISK \times ABW \times AT \times UCF}{CPF \times BR \times ABS \times ED \times EF}$ — ***MTCA Equation 750-2***

(3) SL_{SG} ($\mu g/m^3$)= CUL_{IA} /VAF — ***Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document***
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(4) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$ — ***Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document***
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

Solve:

(a)	CPF (kg-day/mg) =	0.014
(b)	CUL_{IA} ($\mu g/m^3$)=	6.3
(c)	SL_{SG} ($\mu g/m^3$)=	210
(d)	SL_{GW} (µg/L) =	26

Consistent with Ecology's Clarc, accessed 5/15/14

TABLE D-7
INDUSTRIAL METHOD C NON-CARCINOGENIC RISK CULs AND SLs FOR TCE
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

RfD_{TCE}(mg/kg-day) = 0.00057 *RfD from Clarc accessed 5/15/14*

H_{cc} @ 13° Celsius (C) = 0.238 *Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment*

Constants from MTCA Equation 750-1, for Non-carcinogens per WAC 173-340-750 (4)(b)(ii)(A)

ABW (kg)	=	70 Average body weight over exposure duration
UCF (µg/mg)	=	1000 Unit conversion factor
HQ (unitless)	=	1 Hazard Quotient
AT (yr)	=	30 Averaging time
BR (m^3/day)	=	20 Breathing/inhalation rate
ABS (unitless)	=	1 Inhalation absorption fraction
ED (yr)	=	30 Exposure duration
EF (unitless)	=	1 Exposure frequency

Find: (a) Indoor Air Cleanup Level (CUL_{IA}), (b) Soil Gas Screening Level (SL_{SG}), and (c) Shallow GW Screening Level (SL_{GW})

Equations:

(1) CUL_{IA} (µg/m^3)= $\frac{RfD \times ABW \times UCF \times HQ \times AT}{BR \times ABS \times ED \times EF}$ *MTCA Equation 750-1*

(2) SL_{SG} (µg/m^3)= CUL_{IA} /VAF

Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(3) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$

Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

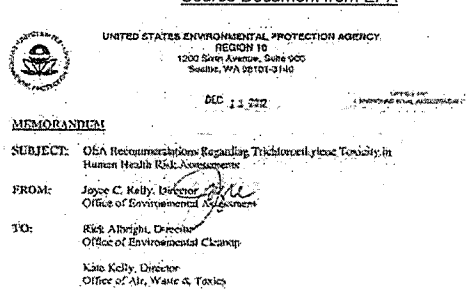
Solve:

(a)	CUL_{IA} (µg/m^3)=	2.0	Consistent with Ecology's Clarc, accessed 5/15/14
(b)	SL_{SG} (µg/m^3)=	67	
(c)	SL_{GW} (µg/L) =	8.4	

TABLE D-8
COMMERCIAL/INDUSTRIAL EPA REGION 10 SUB-CHRONIC CULs AND SLs FOR TCE
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

Source Document from EPA



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 10
1200 Sixth Avenue, Suite 900
Seattle, WA 98101-3140

DEC 1 1 2002

MEMORANDUM

SUBJECT: OEA Recommendations Regarding Trichloroethylene Toxicity in Human Health Risk Assessments

FROM: Joyce C. Kelly, Director
Office of Environmental Assessment

TO: Rick Albright, Director
Office of Environmental Cleanup

Kate Kelly, Director
Office of Air, Waste & Toxics

Applicable Indoor Air Screening Criteria Source Citation

For calculation of a protective concentration of TCE in indoor air in a commercial/industrial setting, the default Superfund chronic scenario assumes 8 hours/day, 5 days/week, 250 days per year, which like the default residential calculation assumes an absence of two weeks during a year. The chronic indoor air concentration representing a hazard quotient of 1.0 for this scenario is 8.8 $\mu g/m^3$.[2] For the short-term exposure concern, when women of reproductive age may be present at any time, the exposure frequency should be increased to 260 days per year to eliminate the assumption that there is a yearly two-week absence, since any given 21-day period is to be protective. This results in an indoor air criterion of 8.4 $\mu g/m^3$ representing a hazard quotient of 1.0. If the exposure time and frequency at a given commercial/industrial building is known to be other than the default Superfund assumption of 8 hrs/day, 5 days/week, 250 days/year, additional adjustments may be made in the calculation of building-specific, short-term exposure concentrations, just as they also may be made for the calculation of the building-specific chronic exposure concentrations.

H_{cc} @ 13° Celsius (C) = 0.238 *Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment*

Constants from MTCA Equation 750-1, for Non-carcinogens per WAC 173-340-750 (4)(b)(ii)(A)

UCF (µg/mg) = 1000 Unit conversion factor

Find: (a) Indoor Air Cleanup Level (CUL_{IA}), (b) Soil Gas Screening Level (SL_{SG}), and (c) Shallow GW Screening Level (SL_{GW})

Equations:

(1) SL_{SG} ($\mu g/m^3$)= CUL_{IA} /VAF

Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(2) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$

Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

Solve:

(a)	CUL_{IA} ($\mu g/m^3$)=	8.4	EPA Region 10 recommended industrial/commercial sub-chronic indoor air action level
(b)	SL_{SG} ($\mu g/m^3$)=	230	
(c)	SL_{GW} (µg/L) =	35	

TABLE D-9
INDUSTRIAL METHOD C CARCINOGENIC RISK CULs AND SLs FOR VC
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

$IUR_{VC}(\mu g/m^3)$ = 0.0000088 *Inhalation unit risk from EPA IRIS and Clarc "Additional Information" sheet*

H_{cc} @ 13° Celsius (C) = 0.816 *Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment*

Constants from MTCA Equation 750-2, for Carcinogens with reduced RISK per WAC 173-340-750 (4)(b)(ii)(B)

RISK	=	1.E-05 Acceptable cancer risk level
ABW (kg)	=	70 Average body weight over exposure duration
AT (yr)	=	75 Averaging time
UCF (µg/mg)	=	1000 Unit conversion factor
CPF	=	Carcinogenic potency factor per WAC 173-340-708(8) (kg-day/mg)
BR (m^3/day)	=	20 Breathing/inhalation rate
ABS (unitless)	=	1 Inhalation absorption fraction
ED (yr)	=	30 Exposure duration
EF (unitless)	=	1 Exposure frequency

Find: (a) CPF, (b) Indoor Air Cleanup Level (CUL_{IA}), (c) Soil Gas Screening Level (SL_{SG}), and (d) Shallow GW Screening Level (SL_{GW})

Equations:

(1) CPF (kg-day/mg) = $\frac{IUR \times ABW \times UCF}{BR}$ — *From EPA Risk Assessment Guidance for Superfund Appendix E*

(2) CUL_{IA} ($\mu g/m^3$) = $\frac{RISK \times ABW \times AT \times UCF}{CPF \times BR \times ABS \times ED \times EF}$ — *MTCA Equation 750-2*

(3) SL_{SG} ($\mu g/m^3$) = CUL_{IA} / VAF

Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(4) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$

Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

Solve:

(a)	CPF (kg-day/mg) =	0.031
(b)	CUL_{IA} ($\mu g/m^3$) =	2.8
(c)	SL_{SG} ($\mu g/m^3$) =	94
(d)	SL_{GW} (µg/L) =	3.5

TABLE D-10
INDUSTRIAL METHOD C NON-CARCINOGENIC RISK CULs AND SLs FOR VC
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Given:

RfD_{VC}(mg/kg-day) = 0.029 *RfD from Clarc accessed 5/15/14*

H_{cc} @ 13° Celsius (C) = 0.816 *Henry's Law Constant (H_{cc}) from EPA On-line Tools for Site Assessment*

Constants from MTCA Equation 750-1, for Non-carcinogens per WAC 173-340-750 (4)(b)(ii)(A)

ABW (kg)	=	70	Average body weight over exposure duration
UCF (µg/mg)	=	1000	Unit conversion factor
HQ (unitless)	=	1	Hazard Quotient
AT (yr)	=	30	Averaging time
BR (m^3/day)	=	20	Breathing/inhalation rate
ABS (unitless)	=	1	Inhalation absorption fraction
ED (yr)	=	30	Exposure duration
EF (unitless)	=	1	Exposure frequency

Find: (a) Indoor Air Cleanup Level (CUL_{IA}), (b) Soil Gas Screening Level (SL_{SG}), and (c) Shallow GW Screening Level (SL_{GW})

Equations:

(1) CUL_{IA} (µg/m^3)= $\frac{RfD \times ABW \times UCF \times HQ \times AT}{BR \times ABS \times ED \times EF}$ *MTCA Equation 750-1*

(2) SL_{SG} (µg/m^3) = CUL_{IA} /VAF

Eqn 2. Generic soil gas VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
The sub-slab soil gas screening level is based on a Vapor Attenuation Factor (VAF) of 0.03, per EPA's updated database (EPA's Vapor *Intrusion Database: Evaluation and Characterization of Attenuation Factors for Chlorinated Volatile Organic Compounds and Residential Buildings*; EPA 530-R-10-002. *March 16, 2012) and communications with Ecology.*

(3) SL_{GW} (µg/L) = $\frac{CUL_{IA}}{VAF \times UCF \times H_{cc}}$

Eqn 1. Generic groundwater VI SLs from Ecology's Draft Vapor Intrusion Guidance Document
VAF = 0.001 (unitless; default)
UCF = 1000 L/m^3
H_{cc} = Chemical- and temperature-dependent value. H_{cc} values are based on an average Washington shallow groundwater temperature of 13 °C, consistent with Ecology's draft vapor intrusion guidance document.

Solve:

(a)	CUL_{IA} (µg/m^3)=	102	Consistent with Ecology's Clarc, accessed 5/15/14
(b)	SL_{SG} (µg/m^3) =	3400	
(c)	SL_{GW} (µg/L) =	120	

TABLE D-11
BENZENE - VALUES FROM CLARC
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

CLARC Summary	Chemical:	Benzene
	CAS #:	71-43-2
Air, Method C, Carcinogen, Standard Formula Value (µg/m3)		3.2E+00
Air, Method C, Non-carcinogen, Standard Formula Value (µg/m3)		3E+01
Henrys Law Constant (unitless) (Hcc) (unitless)		2.3E-01
Inhalation Cancer Potency Factor (CPFi) (kg-day/mg)		2.7E-02
Inhalation Cancer Potency Factor Based on Kidney Cancer with Mutagenic Mode of Action and Potential for Early-life Exposure		Not Researched
Inhalation Cancer Potency Factor Based on Liver Cancer		Not Researched
Inhalation Reference Dose (RfDi) (mg/kg-day)		8.6E-03

"Researched-No Data" means research has been conducted and no data exists in the database for this parameter.

"Not Researched" means research has not been conducted and no value exists in the database for this parameter.

Note: Values are from the Washington State Department of Ecology's CLARC website (https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx), accessed May 15, 2014.

TABLE D-12
PCE - VALUES FROM CLARC
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

CLARC Summary (Chemical / CAS #)	tetrachloroethylene 127-18-4
Air, Method C, Carcinogen, Standard Formula Value (µg/m3)	9.6E+01
Air, Method C, Non-carcinogen, Standard Formula Value (µg/m3)	4E+01
Henrys Law Constant (unitless) (Hcc) (unitless)	7.5E-01
Inhalation Cancer Potency Factor (CPFi) (kg-day/mg)	9.1E-04
Inhalation Cancer Potency Factor Based on Kidney Cancer with Mutagenic Mode of Action and Potential for Early-life Exposure	Not Researched
Inhalation Cancer Potency Factor Based on Liver Cancer	Not Researched
Inhalation Reference Dose (RfDi) (mg/kg-day)	1.1E-02

"Researched-No Data" means research has been conducted and no data exists in the database for this parameter.

"Not Researched" means research has not been conducted and no value exists in the database for this parameter.

Note: Values are from the Washington State Department of Ecology's CLARC website (https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx), accessed May 15, 2014.

TABLE D-13
TCE - VALUES FROM CLARC
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

CLARC Summary	Chemical:	trichloroethylene
	CAS #:	79-01-6
Air, Method C, Carcinogen, Standard Formula Value (µg/m3)		6.3E+00
Air, Method C, Non-carcinogen, Standard Formula Value (µg/m3)		2E+00
Henrys Law Constant (unitless) (Hcc) (unitless)		4.2E-01
Inhalation Cancer Potency Factor (CPFi) (kg-day/mg)		see additional information
Inhalation Cancer Potency Factor Based on Kidney Cancer with Mutagenic Mode of Action and Potential for Early-life Exposure (mg/kg-day)		3.5E-03
Inhalation Cancer Potency Factor Based on Liver Cancer (mg/kg-day)		3.5E-03
Inhalation Reference Dose (RfDi) (mg/kg-day)		5.7E-04

"Researched-No Data" means research has been conducted and no data exists in the database for this parameter.

"Not Researched" means research has not been conducted and no value exists in the database for this parameter.

CLARC Guidance — Trichloroethylene — September 2012

Table 2: New Trichloroethylene (TCE) Inhalation Unit Risk Factors (URF) and Inhalation Cancer Potency (Slope) Factors (CPFi) [7] (Used for calculating air cleanup levels)		
Toxicity Value Based on Kidney Cancer With A Mutagenic Mode of Action & Potential for Early Life Exposure (ELE)	Toxicity Value Based on Non-Hodgkin Lymphoma (NHL)	Toxicity Value Based on Liver Cancer
URF = 10^{-6} $(\mu g/m^3)^{-1}$	URF = 2E-06 $(\mu g/m^3)^{-1}$	URF = 10^{-6} $(\mu g/m^3)^{-1}$
Converted to CPFi (a) = 3.5E-03 $(mg/kg\text{-}day)^{-1}$	Converted to CPFi (a) = 7.0E-03 $(mg/kg\text{-}day)^{-1}$	Converted to CPFi (a) = 3.5E-03 $(mg/kg\text{-}day)^{-1}$
ELE Adjustment Factor (b) 32.6 ug-year/kg-day	No adjustment needed	No adjustment needed
IRIS also provides the sum of the three individual cancer types, resulting in **total inhalation unit risk factor of 4.1E-06 $(ug/m^3)^{-1}$ or CPFi of 1.44E-02 $(mg/kg\text{-}day)^{-1}$**. This cancer potency factor is used for calculation of Method C air cleanup levels.		

Note: Values are from the Washington State Department of Ecology's CLARC website (https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx), accessed May 15, 2014.

TABLE D-14
VC - VALUES FROM CLARC
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

CLARC Summary	Chemical: vinyl chloride CAS #: 75-01-4
Air, Method C, Carcinogen, Standard Formula Value (µg/m3)	see additional information
Air, Method C, Non-carcinogen, Standard Formula Value (µg/m3)	1E+02
Henrys Law Constant (unitless) (Hcc) (unitless)	1.1E+00
Inhalation Cancer Potency Factor (CPF-i) (kg-day/mg)	see additional information
Inhalation Cancer Potency Factor Based on Kidney Cancer with Mutagenic Mode of Action and Potential for Early life Exposure	Not Researched
Inhalation Cancer Potency Factor Based on Liver Cancer	Not Researched
Inhalation Reference Dose (RfDi) (mg/kg-day)	2.9E-02

"Researched-No Data" means research has been conducted and no data exists in the database for this parameter.

"Not Researched" means research has not been conducted and no value exists in the database for this parameter.

Vinyl Chloride Cleanup Levels MTCA Direct Contact for carcinogenicity Air	
Standard Method B	Standard Method C
Eqn. 750-2,	Using Eqn. 750-2
Target risk: 10^{-6}	Target risk: 10^{-5} Adult
CPF 3.1E-02 per mg/kg-day; Air unit risk 8.8E-03 per mg/m^3 X day/20 m^3 X 70 kg = 3.1E-02 per mg/kg-day	CPF 3.1E-02 per mg/kg-day (see Note)
Air Method B Cleanup Level: 0.28 ug/m^3	Air Method C Cleanup Level: 2.8 ug/m^3
Note: CPF 1.6E-02 per mg/kg-day [air unit risk 4.4E-03 per mg/m^3 X day/20 m^3 X 70 kg = 1.6E-02 per mg/kg-day] may be used only if it is determined that children and pregnant women will not be exposed.	

employees may be pregnant women, so stick w/more protective CPF

Note: Values are from the Washington State Department of Ecology's CLARC website (https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx), accessed May 15, 2014.

APPENDIX E

Geotechnical Evaluation of Existing Cap, Pavement, and Surface Soil

DRAFT
TECHNICAL MEMORANDUM

LANDAU ASSOCIATES
ENVIRONMENTAL | GEOTECHNICAL | NATURAL RESOURCES

TO: Mr. Steven Banchero, Emerald Services

FROM: Joshua D. Elliott, P.E. and Calvin McCaughan, P.E.

DATE: May 6, 2014

RE: **GEOTECHNICAL SITE EVALUATION**
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

INTRODUCTION

This technical memorandum summarizes the results of our geotechnical evaluation and presents recommendations for select planned improvements at the former CleanCare Property in the Port of Tacoma (Port). The project location is shown on Figure 1. Topics covered in this letter include an evaluation of existing pavement conditions, a discussion of future storage tank foundation support alternatives, and geotechnical recommendations for design and construction of the proposed access road from the south. This work was completed for Emerald Services in general accordance with our proposed scope of services dated February 12, 2014.

PROJECT UNDERSTANDING

Emerald Services is considering purchasing the former CleanCare property in the Port. Our understanding of environmental conditions at the site is discussed under separate cover. If purchased, Emerald Services is considering constructing aboveground storage tanks for water, wastewater, and petroleum products on the site. Truck traffic is expected across much of the rest of the site. The purpose of this letter is to summarize existing physical and geologic conditions at the site and discuss structural needs for pavement sections and options for storage tank foundation support. Our project understanding is based on our communication with Emerald Services, our shallow subsurface explorations completed on March 20, 2014, our review of subsurface explorations on the site conducted by others, and our experience with similar projects in the Port.

SITE CONDITIONS

This section contains a description of the surface conditions observed at the time of our field exploration (March 20, 2014), a discussion of the local geology, and a summary of observed and inferred subsurface soil and groundwater conditions.

Surface Conditions

The project site is located in the Port, between Taylor Way and Alexander Avenue as shown on Figure 1. The total area of the site is about 4.25 acres, with the main body of the site forming a roughly 800 foot (ft) by 800 ft square. The site is approximately 1,200 ft southwest of the Hylebos Waterway and 1,300 ft northeast of the Blair Waterway. Property in the immediate vicinity of the site is generally characterized as industrial.

The majority of the site is covered by pavements, remnant foundation slabs, and buildings. Vegetation on site is mostly limited to weeds and mosses. Site topography is relatively flat, with elevations ranging from about 12 to 14 ft above sea level (National Geodetic Vertical Datum of 1929).

Geologic Setting

The Port lies within the present-day Puyallup River delta complex. The delta is bounded on the southwest and northeast by steeply sloping hillsides composed of consolidated glacial and interglacial deposits. Prior to development of the Port in 1877, the shoreline in the vicinity of the Blair and Hylebos Waterways was located about ⅛ to ¼ mile southeast of the present-day 11th Street East corridor (Bortleson et al. 1980). The tideflats (shoreline to lower low-waterline) extended outward to about the current position of the mouth of the Blair and Hylebos Waterways. The area inland from the shoreline was largely a salt and fresh water estuary with numerous sloughs and embayments. In 1877, the Puyallup River flowed into Commencement Bay near the western edge of the delta complex, fairly close to its present-day location. Hylebos Creek was located near the base of the north valley wall in about the position of the existing Hylebos Waterway. Wapato Creek likely entered the delta near the south end of the existing Blair Waterway. With development of the area, the Puyallup River was straightened, and armored flood control dikes were constructed to constrain the river. The Hylebos Waterway, along with the other waterways within the Port, was created by dredging. Dredged spoils were generally placed in the tidelands, near shore, and upland areas to establish the existing topography. Site history is further detailed in our Phase I Environmental Site Assessment (Landau Associates 2006).

Mapped geology at the site was obtained from the *Geologic Map of the Tacoma North 7.5-minute Quadrangle, Washington* (Troost, K.G., and Booth, D.B. in review). Near-surface deposits in the project area are mapped as artificial fill. As noted above, artificial fill consists of dredged spoils but can also consist of fill from unknown sources. Consequently, near-surface soil conditions can be highly variable, often containing a mixture of sand, silt, gravel, cobbles, and debris. The observed geology is generally consistent with the mapped geology.

The materials underlying the fill are inferred to comprise Puyallup River alluvium. This material typically consists of very loose/very soft to medium dense/stiff interbedded sand and silt. The Puyallup River alluvium is likely hundreds of feet thick at the site; it is known to be 500 to 600 ft thick along the northern extent of the Port. In general, alluvium deposits within the upper 80 to 100 ft have a well-documented risk for soil liquefaciton under present building code design level earthquakes.

Field Exploration and Subsurface Conditions

Subsurface conditions were explored on March 20, 2014 using a combination of asphalt coring and hand auger boring at 11 locations (HA-1 through HA-11) at the approximate locations shown on Figure 2. Asphalt coring was completed by All City Sawing and Drilling, LLC of Auburn, Washington under subcontract to Landau Associates. Hand auger borings were completed by a Landau Associates geologist and engineer, who also observed, logged, and sampled the subsurface soil conditions. Figure 3 provides a key to understanding the summary logs (Figures 4 through 9). Conditions encountered in the explorations are detailed in the summary logs and summarized below.

Explorations HA-1 through HA-11 were advanced to depths ranging from about 1¼ to 4½ ft below the ground surface (BGS) using a combination of asphalt coring, hand augering, and other hand implements. Explorations generally encountered 3 to 4 inches of asphalt concrete over 1 to 3 ft of medium dense to very dense sandy gravel with silt (base course). Hand augers HA-1, HA-6, and HA-7 extended through the base course into looser/softer soils. These underlying soils consisted of medium dense sand with gravel and shell fragments (HA-1); soft, white gypsum and wood fragments (HA-6); and medium dense, gravelly sand (HA-7). We interpret the soil encountered in all explorations as artificial fill of various origins. Hand augers HA-3, HA-5, and HA-10 were advanced in areas previously capped by the U.S. Environmental Protection Agency in 2000 during source removal actions (Landau Associates 2006). Soil within about 6 to 12 inches of the asphalt was observed to be partially cemented (i.e., was very hard to break up and dig through) in all three of these borings.

Additional subsurface information for the site was obtained from reports by others (Pacific Groundwater Group 1994 and TechSolv Consulting Group 2001). Seventeen boring logs from these reports (provided in Attachment 1) were reviewed and the logs generally show 6 to 12 inches of asphalt or gravel over fill. Fill typically extends to about 4 to 8 ft BGS, is highly variable in content, and often contains trash and debris. Soil immediately below the fill extending as deep as 12 ft BGS typically consists of loose, fine to medium sand with variable amounts of silt and organic material (wood fragments and roots). Alluvial deposits encountered below the organic soil generally consist of very soft to soft clay

and silt, and very loose to loose, fine to medium sand extending to depths explored (about 6 to 28 ft BGS). Approximate locations of the 17 past explorations are shown on Figure 2.

Landau Associates previously advanced borings at nearby properties for unrelated projects (approximate locations are shown on Figure 1). In one of these borings (B-1), about 1,300 ft south of the site, we observed similar conditions to those described in the historical borings in the upper 20 ft, with alluvial deposits generally becoming coarser with depth and grading to medium dense around 30 ft BGS, dense around 50 ft BGS, and very dense around 90 ft BGS. Two additional borings were advanced north of the project site: RRI-B-6(R) located about 1,100 ft northwest of the site, and RRI-B-7(R) located about 600 ft northeast of the site. Both of these borings were advanced to about 26.5 ft BGS and encountered similar conditions (fill over alluvium, with the upper several feet of alluvium containing organic material).

At the time of exploration (March 20, 2014), groundwater was observed in seven of the explorations advanced for the study at depths ranging from about ¼ to 2½ ft BGS. Explorations that did not encounter groundwater were terminated at depths of 1.5 ft or shallower. Previous reports indicate groundwater levels ranging from about 4 to 7 ft BGS across the site. It should be noted that the groundwater conditions reported on the summary logs are for the specific locations and dates indicated and therefore, may not be indicative of other locations and/or times. Furthermore, these explorations were completed during the wet season following a period of high precipitation. A sewer drainage system is present at the site but was not functioning at the time of our site visit, with large ponds of standing water at some locations. The approximate depth to water for explorations where water was encountered is shown on Figure 2.

EXISTING PAVEMENT AREAS EVALUATION AND RECOMMENDATIONS

The existing pavement at the site is in relatively good condition. We observed only minor cracking and no major signs of deformation during our field exploration, although portions of the site were submerged with standing water and unobservable at that time. Based on our field exploration, the existing pavement section generally consists of about 3 to 4 inches of asphalt concrete pavement over at least 1 ft of medium dense to very dense, sandy gravel with silt (fill). While looser/softer fill deposits exist at depth, the gravel mat in the upper portion appears to be thick enough to form a solid subgrade for construction of new pavement. This applies to both the capped areas and the other paved areas.

The recommendations in this section of the report assume existing site grades are maintained or raised and should be considered preliminary. These recommendations will not be applicable if site grades are lowered; thereby, reducing the thickness of the structural "crust" that overlies softer/looser soil. Prior

to finalizing pavement plans, Landau Associates should be retained to evaluate specific information about traffic volume and vehicle type.

For proposed light-duty areas (little to no truck traffic), the existing pavement section appears to be structurally suitable. We recommend that pavement cracks be filled and sealed to enhance pavement longevity. For heavy-duty areas (truck drives, entrances, etc.) we recommend a 2 to 3 inch asphalt overlay be placed over the existing asphalt surface. If the pavement is milled prior to completing the overlay, the thickness of the overlay should be increased by the depth of the milling. Asphalt concrete should be hot mix asphalt (HMA) Class ½-inch with PG64-22 binder. All paving, pavement repair, and pavement preparation activities should be completed in general accordance with Section 5-04 of the 2014 Washington State Department of Transportation (WSDOT) *Standard Specifications for Road, Bridge, and Municipal Construction* (WSDOT 2014).

Environmental laboratory analyses were not conducted for the exploration geotechnical samples; therefore, it is not known if the pavement is contaminated. If any existing asphalt concrete pavement is removed, excavated pavements should be hauled to an approved disposal location and construction workers should take appropriate health and safety precautions. Alternatively, asphalt concrete could be recycled and reused on site as structural or non-structural fill. If asphalt concrete is reused in structural areas, it should be crushed to meet design gradation requirements and blended with non-bituminous structural fill material so that the finished product does not exceed 20 percent by weight of recycled asphalt concrete.

NEW ACCESS ROAD PAVEMENT RECOMMENDATIONS

An appropriate asphalt pavement section for heavy-duty areas (proposed access road, truck drives, entrances, etc.) should consist of a minimum of 4 inches of asphalt pavement over 10 inches of crushed surfacing material. For light-duty areas (little to no truck traffic), 2.5 inches of asphalt pavement over 4 inches of crushed surfacing material should be appropriate. Crushed surfacing material should be compacted to at least 95 percent of the maximum dry density as determined by ASTM International (ASTM) D 1557 and meet the requirements for Crushed Surfacing Base Course (CSBC) listed below. The upper 2 inches of crushed surfacing could consist of Crushed Surfacing Top Course (CSTC) to facilitate fine grading of the surface. Asphalt concrete should be HMA Class ½-inch with PG64-22 binder. The subgrade should be placed on a firm and unyielding subgrade compacted to at least 95 percent of the maximum dry density as determined by ASTM D 1557. Prior to finalizing pavement plans, Landau Associates should be retained to evaluate specific information about traffic volume and vehicle type.

GRADATION REQUIREMENTS FOR
CRUSHED SURFACING BASE COURSE AND
CRUSHED SURFACING TOP COURSE

Sieve Size	Percent Passing CSBC	CSTC
1¼"	99-100	
1"	80-100	
¾"		99-100
⅝"	50-80	
½"		80-100
No. 4	25-45	46-66
No. 40	3-18	8-24
No. 200	7.5 max.	10.0 max.

EXISTING SLABS DISCUSSION AND EVALUATION

The existing concrete slabs also appear to be in good structural condition. We observed no major cracks or deformation in any of the concrete pads during our field exploration, although portions of the site were submerged and unobservable. We did not core through the concrete slabs, nor were we able to locate any as-built drawings, so the slab thickness and potential presence of piling is unknown. Without knowing more about these areas, we cannot comment on their structural integrity.

To further evaluate the potential for re-use of the existing concrete slabs, we recommend that you: 1) continue the search for as-built drawings, 2) if drawings are unavailable, hire a contractor to excavate and/or core in select locations to document the slab thickness, reinforcement, and foundation support conditions, and 3) retain the services of a structural engineer to work with Landau Associates in the final evaluation process.

NEW STORAGE TANK FOUNDATION SUPPORT

Subsurface soil conditions in the project vicinity will require that foundations be designed to either mitigate or tolerate potential hazards associated with moderate bearing capacity, settlement, and seismic events (liquefaction and lateral spreading). Earthquake hazards are further discussed below. Based on our experience in the Port, three foundation types may be suitable for the planned storage tanks. These foundation types are qualitatively discussed in the following sections with respect to bearing capacity, settlement, and resistance to seismic hazards.

Earthquake Hazards

The Port area has been mapped as having a high susceptibility for liquefaction to occur during a significant seismic event (Palmer et al. 2003). The project area is underlain by loose hydraulic fill and post-Vashon alluvial deposits which are often prone to soil liquefaction and corresponding lateral spreading resulting from a major earthquake in the Puget Sound region.

Liquefaction is defined as a significant rise in pore water pressure within a soil mass caused by earthquake-induced cyclic shaking. The shear strength of liquefiable soil is reduced during large and/or long-duration earthquakes as the soil consistency approaches that of a semi-solid slurry, which can result in significant and widespread structural damage if not properly mitigated. Deposits of loose, granular soil below the water table and within about 80 ft of the ground surface are most susceptible to liquefaction. Damage caused by foundation rotation, slope failure, lateral spreading, and other ground movements are regularly observed in seaport areas as a result of liquefaction.

The actual magnitude and extent of liquefaction will depend on many factors, including the duration and intensity of the ground shaking during the seismic event and local soil and groundwater conditions. Liquefaction-induced settlement estimates (based on theoretical calculations) often exceed 12 inches in the Port.

Liquefaction-induced lateral spreading is defined as the lateral displacement of gently sloping ground as a result of soil liquefaction. The magnitude of lateral spreading generally diminishes as a function of distance from the slope. Given its distance from the Blair and Hylebos Waterways, it is unlikely that lateral spreading would affect the site.

Shallow Foundations

The bearing capacity in the immediate vicinity of the tanks will need to be evaluated if shallow foundations are considered. Based on our experience in the Port, allowable bearing capacities on the order of 1,500 to 3,000 pounds per square foot can be anticipated, depending on several factors. Flexible bottom product storage tanks founded on shallow foundations in other parts of the Port with similar soil conditions have experienced total settlements up to 2 ft. The majority of these settlements occur immediately upon loading, during the water settling process. This process generally consists of slowly filling the tanks with water while monitoring the settlement with survey equipment. The water settlement process can last weeks to months. With total settlements of this magnitude, differential settlements are often great enough to require releveling of the shallow foundations after the initial water loading.

The primary benefit to the use of shallow foundations is their relatively low cost. One potential drawback of this method is that shallow groundwater may be encountered during construction, requiring

pumping, removal, and disposal of potentially contaminated soil and groundwater. Another drawback is the time associated with water settling and the potential risk that the foundation would need to be re-leveled, causing yet more downtime and increased cost. Finally, even if the shallow foundations are determined to meet life-safety seismic design objectives, it is typically concluded that severe structure damage could occur, requiring tank replacement after a significant earthquake.

Liquefaction-induced total and differential settlements associated with shallow foundations could be large, potentially resulting in tank overturning or rupture. If this risk is significant (based on an analysis by the structural engineer that uses the geotechnical engineer's settlement estimates), one of the settlement mitigation alternatives discussed below should be considered.

Stone Columns

Stone columns are a vertical foundation support element, similar to piles in plan and section view, but built with crushed rock/stone instead of concrete or steel. Typical stone columns are about 3 ft in diameter, comprised of compacted, free-draining gravel, and constructed in a grid pattern with columns spaced about 7 to 10 ft on-center. The construction process involves displacing the *in situ* soil with a vibrating mandrill, then building a column of compacted gravel. Typical column depths vary and depend on several factors. Stone column depths for a recent tank farm constructed in the Port were on the order of 20 to 30 ft. We have also completed projects in the Port where stone columns extend to 80 ft to provide additional protection against liquefaction-induced settlement. The tank foundation is typically supported by a concrete or gravel ring foundation or with a structural slab.

This process of ground improvement helps mitigate the previously discussed settlement risks through densification of the *in situ* soil as well as creating a network of paths for pore water pressure dissipation. As a result, bearing capacities are greatly increased, and total and differential settlements reduce to about half that of shallow foundations. While this does not eliminate the liquefaction hazard, it substantially increases the soil strength in the column zone and effectively limits liquefaction to areas surrounding and below the columns' zone of influence. Water settling is still required for product storage tanks founded on stone columns, but the settlement time is typically cut in half. The risk for re-leveling the tank is generally low for tanks supported by stone columns. While more expensive than shallow foundation construction, stone columns are typically much less expensive than pile foundations. The stone column installation process typically brings some of the displaced soil to the surface, which may be contaminated and would require special handling and disposal.

Driven Piles

Driven piles can vary greatly in size, type, and arrangement. Open ended steel pipe piles and precast concrete piles are the most common driven pile foundation types in the Port. In our experience at the Port, piles driven for support of heavy foundation loads typically extend to between 80 and 130 ft BGS in order to bear on soil that is unlikely to liquefy during an earthquake, while also rendering static settlements negligible. A structural slab is used to span the piles and provide direct support for the tank.

Provided piles are driven from the existing ground surface (rather than lowering site grades), shallow groundwater at the site should not be an appreciable issue during foundation construction. Unlike stone column construction, the subsurface soil remains in the ground, eliminating the need to dispose of significant amounts of potentially contaminated soil. Of the three options discussed, driven piles provide the highest bearing capacity with the lowest settlement risk. The risk for construction delays associated with water settling is minimal. Driven piles can also be designed so that the tanks are operable after a significant seismic event. While typically the most expensive foundation option, this option eliminates the need to dispose of contaminated water and soil.

CLOSURE

In our professional opinion, the soil conditions at the project site are suitable for the planned improvements from a geotechnical perspective, provided the recommendations in this technical memorandum are considered. Additional geotechnical explorations and analyses will be required to support final design of tank foundation support.

Within the limitations of scope, schedule, and budget, the analyses, conclusions, and recommendations presented in this technical memorandum were prepared in accordance with generally accepted professional geotechnical and environmental engineering principles and practices in this area at the time this report was prepared. We make no other warranty, either express or implied. Thank you for the opportunity to be of service on this project. If you have any questions or require additional information, please call (253) 926-2493.

JDE/CAM/jrc

REFERENCES

Bortleson, G.C., M.J. Chrzastowski, and A.K. Helgerson. 1980. *Historical Changes of Shoreline and Wetland at Eleven Major Deltas in the Puget Sound Region, Washington.* USGS Hydrologic Investigations Atlas HA-617.

Landau Associates, Inc. 2006. *Phase I Environmental Site Assessment, CleanCare Property, Tacoma, Washington.* Prepared for the Port of Tacoma. May 18.

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Palmer, S.P., W.J. Perkins, and W.P. Grant. 2003. *Liquefaction Susceptibility of the Greater Tacoma Urban Area, Pierce and King Counties, Washington.* Washington State Department of Natural Resources GM-51.

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Troost, K.G. and D.B. Booth. in review. *Geologic Map of the Tacoma North 7.5-Minute Quadrangle, Washington.* U.S. Geological Survey Miscellaneous Field Investigation, scale 1:24,000.

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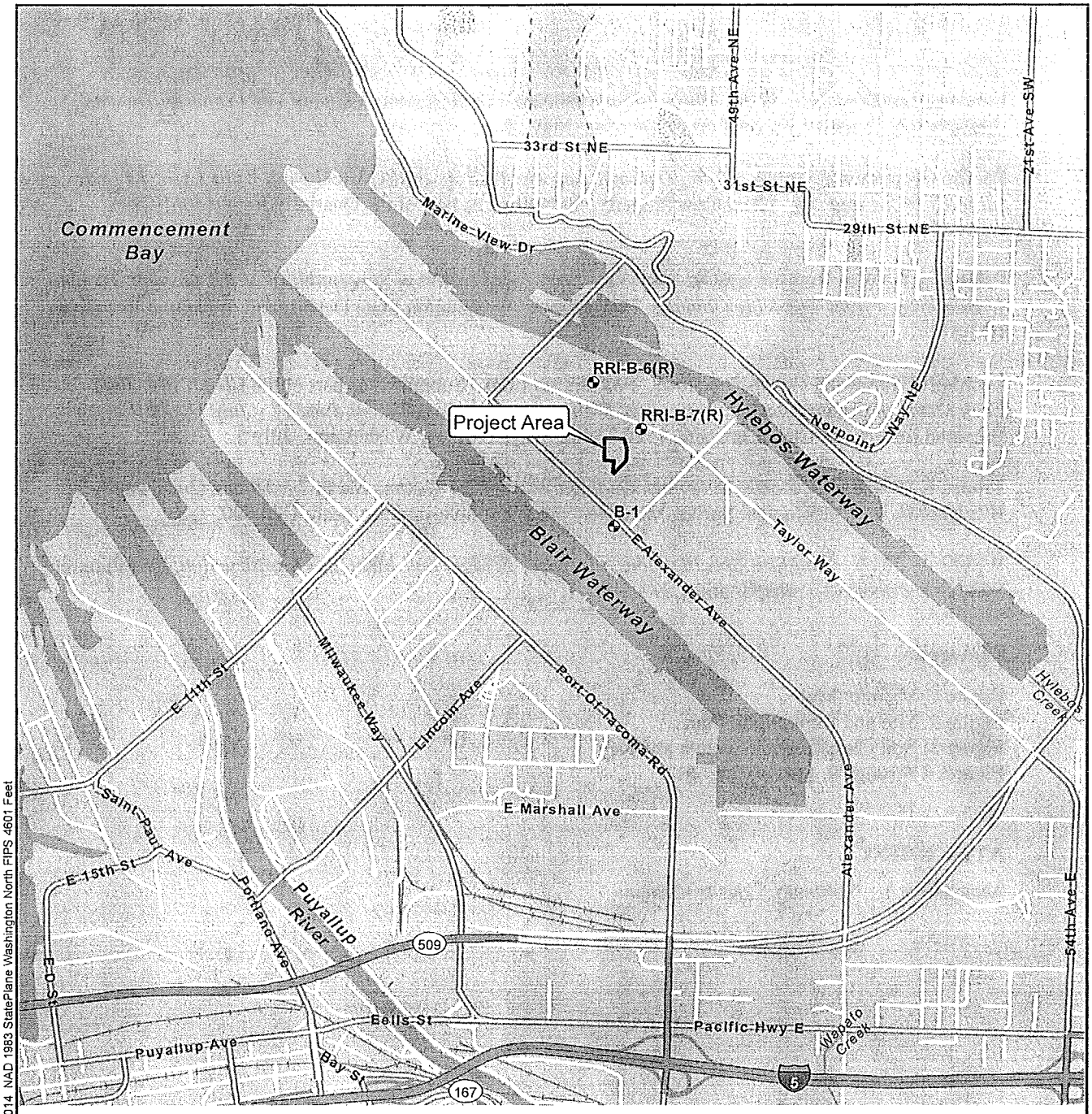
FIGURES

Figure 1: Vicinity Map
Figure 2: Site and Exploration Plan
Figure 3: Soil Classification System and Key
Figures 4 through 9: Summary Logs

ATTACHMENT

Attachment 1: Summary Logs by Others



G:\Projects\992006\010\F1\VicMap_Geo.mxd 3/12/2014 NAD 1983 StatePlane Washington North FIPS 4601 Feet

N

Legend

B-1 Approximate Location and Designation of Nearby Borings Advanced for Others

0 0.5 1

Miles

Data Source: Esri 2012

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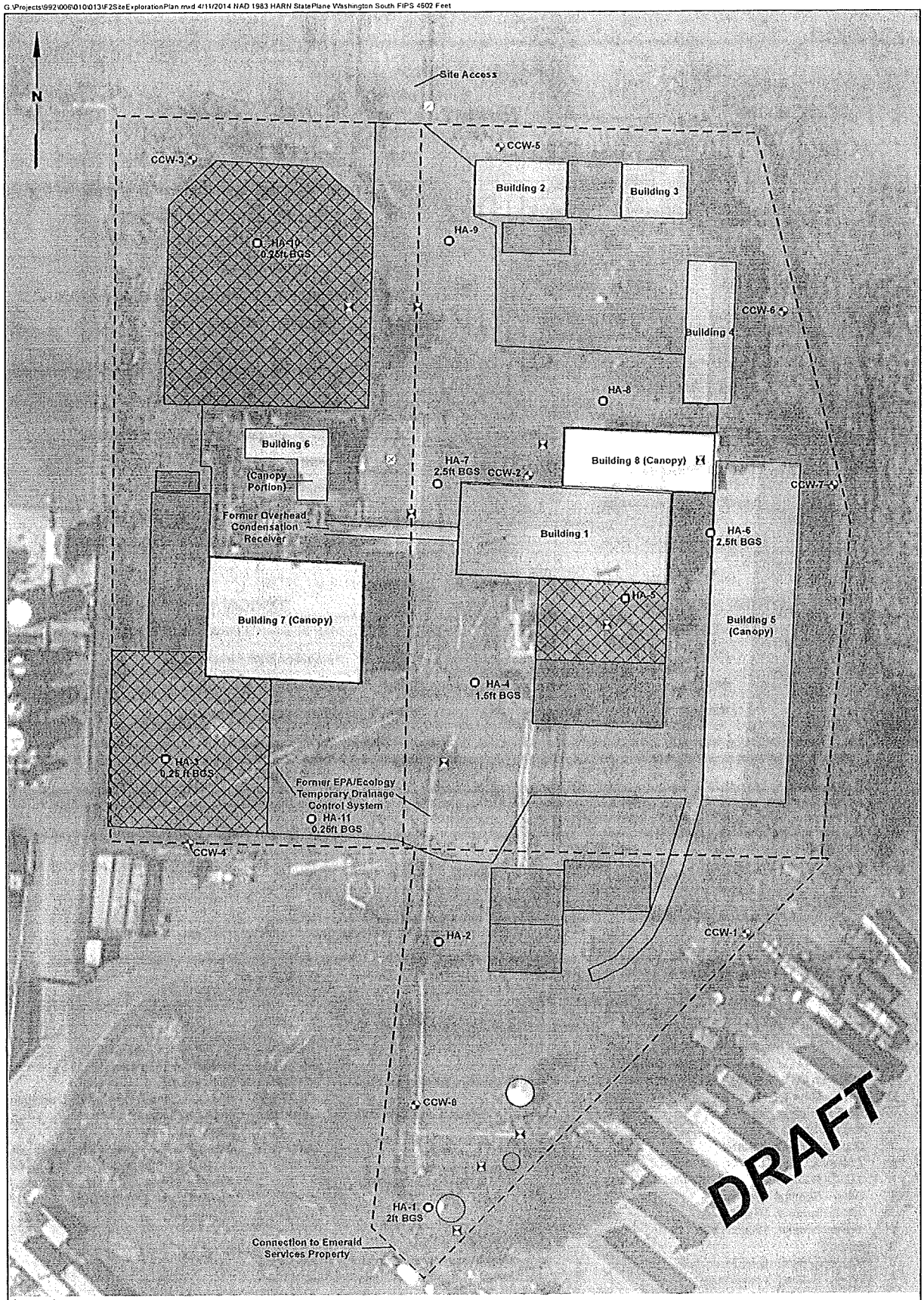
CleanCare Property Port of Tacoma Tacoma, Washington	**Vicinity Map**	Figure 1

G:\Projects\992\006\010\013\F2SiteExplorationPlan.mxd 4/11/2014 NAD 1983 HARN StatePlane Washington South FIPS 4602 Feet



Legend

- HA-1 2ft BGS — Approximate Location and Designation of Hand Augers and Depth to Water (if encountered)
- CCW-1 — Approximate Location and Designation of Borings by Others
- Catch Basin
- Vault
- Subject Parcels
- Asphalt (Non-Cap)
- Former Tank Foundations
- Pavement Capped Area
- Buildings
- Stormwater Tanks

0 50 100
Scale in Feet

LANDAU ASSOCIATES

Notes

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Sources: Pierce County GIS; Puget Sound Lidar Consortium; Esri World Imagery.

CleanCare Property Port of Tacoma Tacoma, Washington	Site and Exploration Plan	Figure 2

Soil Classification System

	MAJOR DIVISIONS		GRAPHIC SYMBOL	USCS LETTER SYMBOL[1]	TYPICAL DESCRIPTIONS [2][3]
COARSE-GRAINED SOIL (More than 50% of material is larger than No. 200 sieve size)	GRAVEL AND GRAVELLY SOIL (More than 50% of coarse fraction retained on No. 4 sieve)	CLEAN GRAVEL (Little or no fines)		GW	Well-graded gravel; gravel/sand mixture(s); little or no fines
				GP	Poorly graded gravel; gravel/sand mixture(s); little or no fines
		GRAVEL WITH FINES (Appreciable amount of fines)		GM	Silty gravel; gravel/sand/silt mixture(s)
				GC	Clayey gravel; gravel/sand/clay mixture(s)
	SAND AND SANDY SOIL (More than 50% of coarse fraction passed through No. 4 sieve)	CLEAN SAND (Little or no fines)		SW	Well-graded sand; gravelly sand; little or no fines
				SP	Poorly graded sand; gravelly sand; little or no fines
		SAND WITH FINES (Appreciable amount of fines)		SM	Silty sand; sand/silt mixture(s)
				SC	Clayey sand; sand/clay mixture(s)
FINE-GRAINED SOIL (More than 50% of material is smaller than No. 200 sieve size)	SILT AND CLAY (Liquid limit less than 50)			ML	Inorganic silt and very fine sand; rock flour; silty or clayey fine sand or clayey silt with slight plasticity
				CL	Inorganic clay of low to medium plasticity; gravelly clay; sandy clay; silty clay; lean clay
				OL	Organic silt; organic, silty clay of low plasticity
	SILT AND CLAY (Liquid limit greater than 50)			MH	Inorganic silt; micaceous or diatomaceous fine sand
				CH	Inorganic clay of high plasticity; fat clay
				OH	Organic clay of medium to high plasticity; organic silt
	HIGHLY ORGANIC SOIL			PT	Peat; humus; swamp soil with high organic content

OTHER MATERIALS	GRAPHIC SYMBOL	LETTER SYMBOL	TYPICAL DESCRIPTIONS
PAVEMENT		AC or PC	Asphalt concrete pavement or Portland cement pavement
ROCK		RK	Rock (See Rock Classification)
WOOD		WD	Wood, lumber, wood chips
DEBRIS		DB	Construction debris, garbage

Notes:
1. USCS letter symbols correspond to symbols used by the Unified Soil Classification System and ASTM classification methods. Dual letter symbols (e.g., SP-SM for sand or gravel) indicate soil with an estimated 5-15% fines. Multiple letter symbols (e.g., ML/CL) indicate borderline or multiple soil classifications.
2. Soil descriptions are based on the general approach presented in the Standard Practice for Description and Identification of Soils (Visual-Manual Procedure), outlined in ASTM D 2488. Where laboratory index testing has been conducted, soil classifications are based on the Standard Test Method for Classification of Soils for Engineering Purposes, as outlined in ASTM D 2487.
3. Soil description terminology is based on visual estimates (in the absence of laboratory test data) of the percentages of each soil type and is defined as follows:

Primary Constituent:	> 50% - "GRAVEL," "SAND," "SILT," "CLAY," etc.
Secondary Constituents:	> 30% and ≤ 50% - "very gravelly," "very sandy," "very silty," etc.
	> 15% and ≤ 30% - "gravelly," "sandy," "silty," etc.
Additional Constituents:	> 5% and ≤ 15% - "with gravel," "with sand," "with silt," etc.
	≤ 5% - "with trace gravel," "with trace sand," "with trace silt," etc., or not noted.

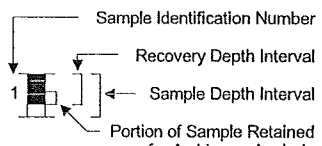
4. Soil density or consistency descriptions are based on judgement using a combination of sampler penetration blow counts, drilling or excavating conditions, field tests, and laboratory tests, as appropriate.

Drilling and Sampling Key

SAMPLER TYPE

Code	Description
a	3.25-inch O.D., 2.42-inch I.D. Split Spoon
b	2.00-inch O.D., 1.50-inch I.D. Split Spoon
c	Shelby Tube
d	Grab Sample
e	Single-Tube Core Barrel
f	Double-Tube Core Barrel
g	2.50-inch O.D., 2.00-inch I.D. WSDOT
h	3.00-inch O.D., 2.375-inch I.D. Mod. California
i	Other - See text if applicable
1	300-lb Hammer, 30-inch Drop
2	140-lb Hammer, 30-inch Drop
3	Pushed
4	Vibrocore (Rotosonic/Geoprobe)
5	Other - See text if applicable

SAMPLE NUMBER & INTERVAL



Field and Lab Test Data

Code	Description
PP = 1.0	Pocket Penetrometer, tsf
TV = 0.5	Torvane, tsf
PID = 100	Photoionization Detector VOC screening, ppm
W = 10	Moisture Content, %
D = 120	Dry Density, pcf
-200 = 60	Material smaller than No. 200 sieve, %
GS	Grain Size - See separate figure for data
AL	Atterberg Limits - See separate figure for data
GT	Other Geotechnical Testing
CA	Chemical Analysis

Groundwater

▽	Approximate water level at time of drilling (ATD)
▼	Approximate water level at time other than ATD

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Clean Care Property
Port of Tacoma
Tacoma, Washington

Soil Classification System and Key

Figure 3

HA-1

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 12.26 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0	12					GP-GM	Brown, sandy GRAVEL with silt and roots (medium dense, moist) **(FILL)** - grades to dense at 6"	
1						SP	Gray, fine to coarse SAND with gravel (medium dense, moist) - grades to wet - abundant shell fragments from 3 to 4 ft	▽ ATD
2	10							
3								
4								
5								

Test Pit Completed 03/20/14
Total Depth of Test Pit = 4.0 ft.

HA-2

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 12.74 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0	12					GP-GM	Brownish-gray, sandy GRAVEL with silt and roots (loose, moist) **(FILL)** - grades to medium dense to dense at 3 inches	Groundwater not encountered.
1								
2								
3								
4								
5								

Test Pit Completed 03/20/14
Total Depth of Test Pit = 1.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. NAD 1983 StatePlane Washington South FIPS 4602 Feet: N 712,069.4, E 1,171,178.2

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Clean Care Property
Port of Tacoma
Tacoma, Washington

Log of Test Pits

Figure 4

HA-3

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 13.50 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0	12					AC	Asphalt concrete (3 inches)	ATD
1						GP-GM	Brown, sandy GRAVEL with silt; apparent cementation (very dense, wet) (FILL)	
2						GM	Gray, silty, very sandy GRAVEL (dense, wet)	
3								
4								
5								

Test Pit Completed 03/20/14
Total Depth of Test Pit = 2.4 ft.

HA-4

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 13.16 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0	12					AC	Asphalt concrete (4 inches)	
1						GP-GM	Gray, sandy GRAVEL with silt (dense, moist) (FILL)	ATD
2							- grades to wet at 1.6 ft	
3								
4								
5								

Test Pit Completed 03/20/14
Total Depth of Test Pit = 1.7 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. NAD 1983 StatePlane Washington South FIPS 4602 Feet: N 712,316.7, E 1,171,034.7

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Port of Tacoma
Tacoma, Washington

Log of Test Pits

Figure 5

HA-5

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 13.76 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0						AC	Asphalt concrete (3.5 inches)	Groundwater not encountered.
1						GP-GM	Gray, sandy GRAVEL with silt and cobble; apparent cementation (very dense, moist) (FILL)	

Test Pit Completed 03/20/14
Total Depth of Test Pit = 1.2 ft.

HA-6

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 13.05 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0						AC	Asphalt concrete (3.5 inches)	
1	12					GP-GM	Gray, sandy GRAVEL with silt (very dense, moist) (FILL)	
2						GM	Dark gray, silty, sandy GRAVEL (medium dense, wet)	▽ ATD
3	10					GYP	White GYPSUM (soft, moist to wet) - abundant wood fragments from 4 to 4.5 ft	
4								
5								

Test Pit Completed 03/20/14
Total Depth of Test Pit = 4.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. NAD 1983 StatePlane Washington South FIPS 4602 Feet: N 712,404.1, E 1,171,286.1

992006.01 5/5/14 \\TACOMA3\PROJECT\992 QCF\006.010\T\GEOTECH\992006.010.GPJ TEST PIT LOG

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Port of Tacoma
Tacoma, Washington

Log of Test Pits

Figure 6

HA-7

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	
0	12					AC	Asphalt concrete (1 inch) over gravel (1/2 inch) over asphalt concrete (3 inches)
1						GP-GM	Gray, sandy GRAVEL with silt and cobble (medium dense to dense, moist) (FILL)
2						SP	Brown, gravelly, fine to coarse SAND (medium dense, moist)
3	10						- grades to wet ▽ ATD
4							
5							

Excavation Method: Hand Auger
Ground Elevation (ft): 12.95 (NGVD 29)
Excavated By: JDE/KMH
Logged By: JDE/KMH

Test Pit Completed 03/20/14
Total Depth of Test Pit = 3.0 ft.

HA-8

SAMPLE DATA				SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	
0	12					AC	Asphalt concrete (3 inches)
1						GW	Brownish-gray, sandy GRAVEL (1 inch) (medium dense, moist) (BASECOURSE)
2						GP-GM	Gray, sandy GRAVEL with silt and cobble (very dense, moist) (FILL)
3							Groundwater not encountered.
4							
5							

Excavation Method: Hand Auger
Ground Elevation (ft): 12.90 (NGVD 29)
Excavated By: JDE/KMH
Logged By: JDE/KMH

Test Pit Completed 03/20/14
Total Depth of Test Pit = 1.5 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. NAD 1983 StatePlane Washington South FIPS 4602 Feet: N 712,467.6, E 1,171,183.8

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Clean Care Property
Port of Tacoma
Tacoma, Washington

Log of Test Pits

Figure 7

HA-9

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 12.10 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0	12					AC	Asphalt concrete (3 inches)	Groundwater not encountered.
1						GP-GM	Gray, sandy GRAVEL with silt (very dense, moist) (FILL)	
2							Test Pit Completed 03/20/14 Total Depth of Test Pit = 1.7 ft.	
3								
4								
5								

HA-10

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 12.51 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0	12					AC	Asphalt concrete (2.5 inches)	▽ ATD
1						GP-GM	Brown, sandy GRAVEL with silt; apparent cementation (very dense, wet) (FILL)	
2						GP-GM	Gray, very sandy GRAVEL with silt (very dense, wet)	
3							Test Pit Completed 03/20/14 Total Depth of Test Pit = 1.2 ft.	
4								
5								

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. NAD 1983 StatePlane Washington South FIPS 4602 Feet: N 712,601.1, E 1,171,190.2

992006.01 5/5/14 \\TACOMA3\PROJECT\992 QCP\006.010\TGEOTECH\992006.010.GPJ TEST PIT LOG

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Clean Care Property
Port of Tacoma
Tacoma, Washington

Log of Test Pits

Figure 8

HA-11

SAMPLE DATA					SOIL PROFILE			GROUNDWATER
Depth (ft)	Elevation (ft)	Sample Number & Interval	Sampler Type	Test Data	Graphic Symbol	USCS Symbol	Excavation Method: Hand Auger Ground Elevation (ft): 12.95 (NGVD 29) Excavated By: JDE/KMH Logged By: JDE/KMH	
0	12					AC	Asphalt concrete (3.5 inches)	▽ ATD
1						GP-GM	Gray, sandy GRAVEL with silt (dense to very dense, wet) (FILL)	
2								
3								
4								
5								

Test Pit Completed 03/20/14
Total Depth of Test Pit = 1.2 ft.

Notes:
1. Stratigraphic contacts are based on field interpretations and are approximate.
2. Reference to the text of this report is necessary for a proper understanding of subsurface conditions.
3. Refer to "Soil Classification System and Key" figure for explanation of graphics and symbols.
4. NAD 1983 StatePlane Washington South FIPS 4602 Feet: N 712,283.3, E 1,171,114.6

992006.01 5/5/14 \\TACOMA3\PROJECT\992 QCF\006.010\T\GEOTECH\992006.010.GPJ TEST PIT LOG

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Clean Care Property
Port of Tacoma
Tacoma, Washington

Log of Test Pits

Figure 9

ATTACHMENT 1

Summary Logs by Others

TECHSOLV

TechSolv Consulting Group, Inc.
12930 NE 178th Street, Woodinville, WA 98072
(425) 402-8277 FAX (425) 402-7917

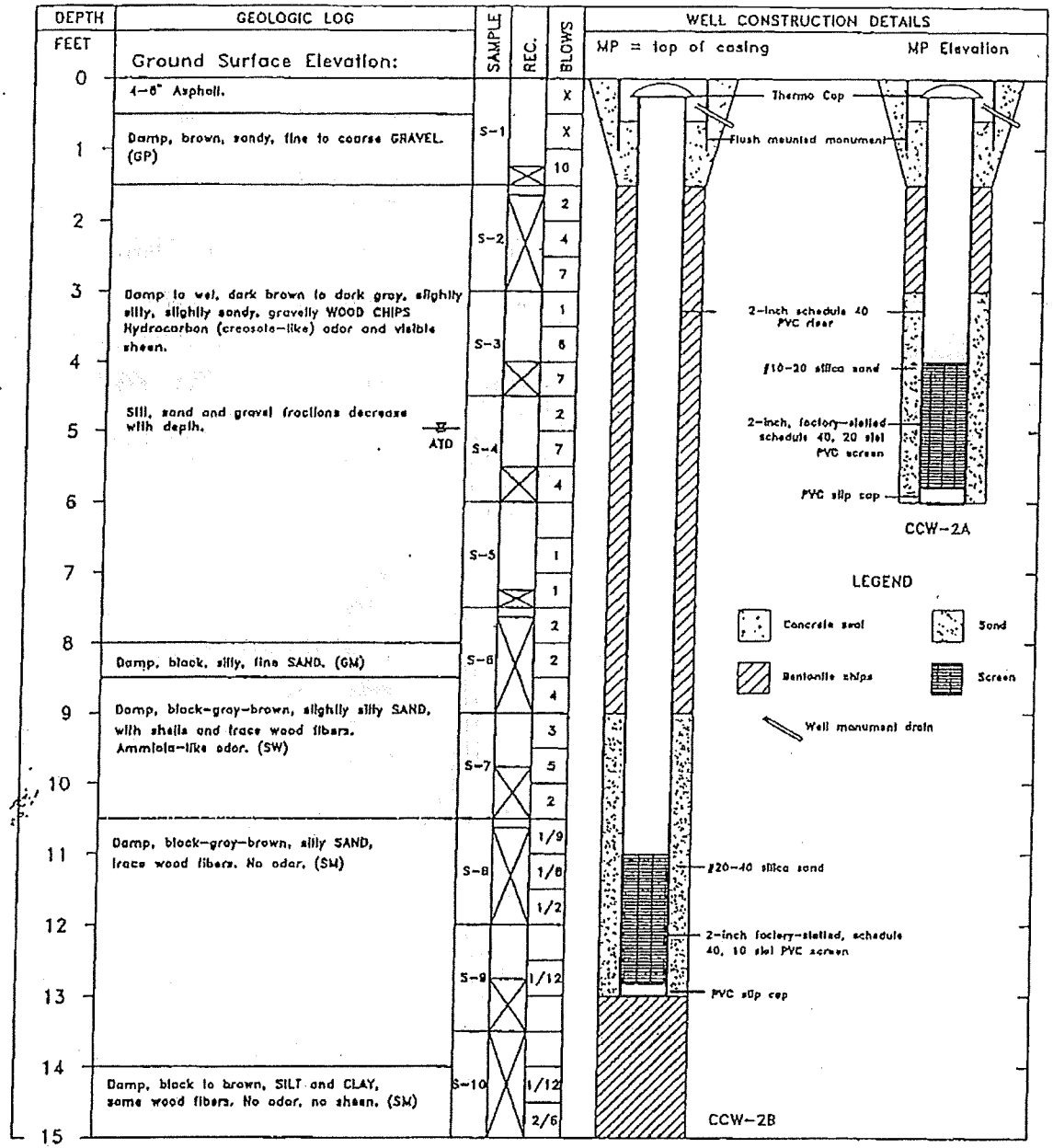
RECEIVED
AUG 01 2001
Tacoma-Pierce County
Health Dept.

SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-1C	Page: 1 of 1
	Contractor: Cascade Drilling, Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Cody Pulis, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: July 3, 2001	Date Finished: July 5, 2001
Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 23 to 18	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~7
Filter Pack Interval (ft bgs): 23 to 17	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 17 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 10.92
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0							6" asphalt
1	2	NR	1-3	286	SP		Moderate brown 5YR 4/4 coarse sand with some gravel and wood waste, moist with strong solvent odor.
2							
3	12	NR	3-5	132	SP		Same as above with lime solvent sludge.
4							
5	18	NR	5-7	26	SP		Olive black 5Y 2/1 fine to medium sand, wet with no solvent or hydrocarbon odor.
6							
7	20	NR	7-9	9	SP		▽ Same as above but saturated with water.
8							
9	24	NR	9-10	7	SP		Same as above
10					ML		Olive gray 5Y 4/1 silt with rootlets and reeds.
11	24	NR	11-13	6	OL		Same as above but color is olive black 5Y 2/1 and more plant material.
12							
13	24	NR	13-15	5	OL		Olive gray 5Y 4/1 silt with rootlets and reeds, no solvent or hydrocarbon odor.
14							
15	24	NR	15-17	4	ML		Olive gray 5Y 4/1 silt with fine sand, no solvent or hydrocarbon odor.
16							
17	24	NR	17-19	3	SP		Olive black 5Y 2/1 fine to medium sand with silt interbeds.
18							
19	24	NR	19-21	7	SP		Olive black 5Y 2/1 fine to medium sand saturated with water, no solvent or hydrocarbon odor.
20							
21							
22							
23							End of Boring at 23 feet.

GEOLOGIC LOG AND WELL AS-BUILTS, MONITORINGS WELL CCW-2A AND CCW-2B



Total Depth = 15 Feet

NOTE: Descriptions of odors and sheens are included on this log where noted in the field.

No references to odors or sheens generally indicates the absence of odors or sheens.

FIGURE ##, GEOLOGIC LOG AND WELL AS-BUILTS
MONITORING WELLS CCW-2A & CCW-2B

PACIFIC GROUNDWATER GROUP
JE9205.03

PROJECT NAME: Clean Care
WELL INDENTIFICATION NUMBERS: CCW-2A, CCW-2B
DRILLING METHOD: Hollow Stem Auger
DRILLER: Charles Richard
FIRM: Holt Drilling
CONSULTING FIRM: Pacific Groundwater Group
REPRESENTATIVE: Chad Bring

LOCATION: NW¼ SW¼ Sec.
DATUM: NGVD
WATER LEVEL ELEVATION:
INSTALLED: February 1-2, 1994
DEVELOPED: February 14, 1993
START CARD NO.: 06851

TECH SOLV

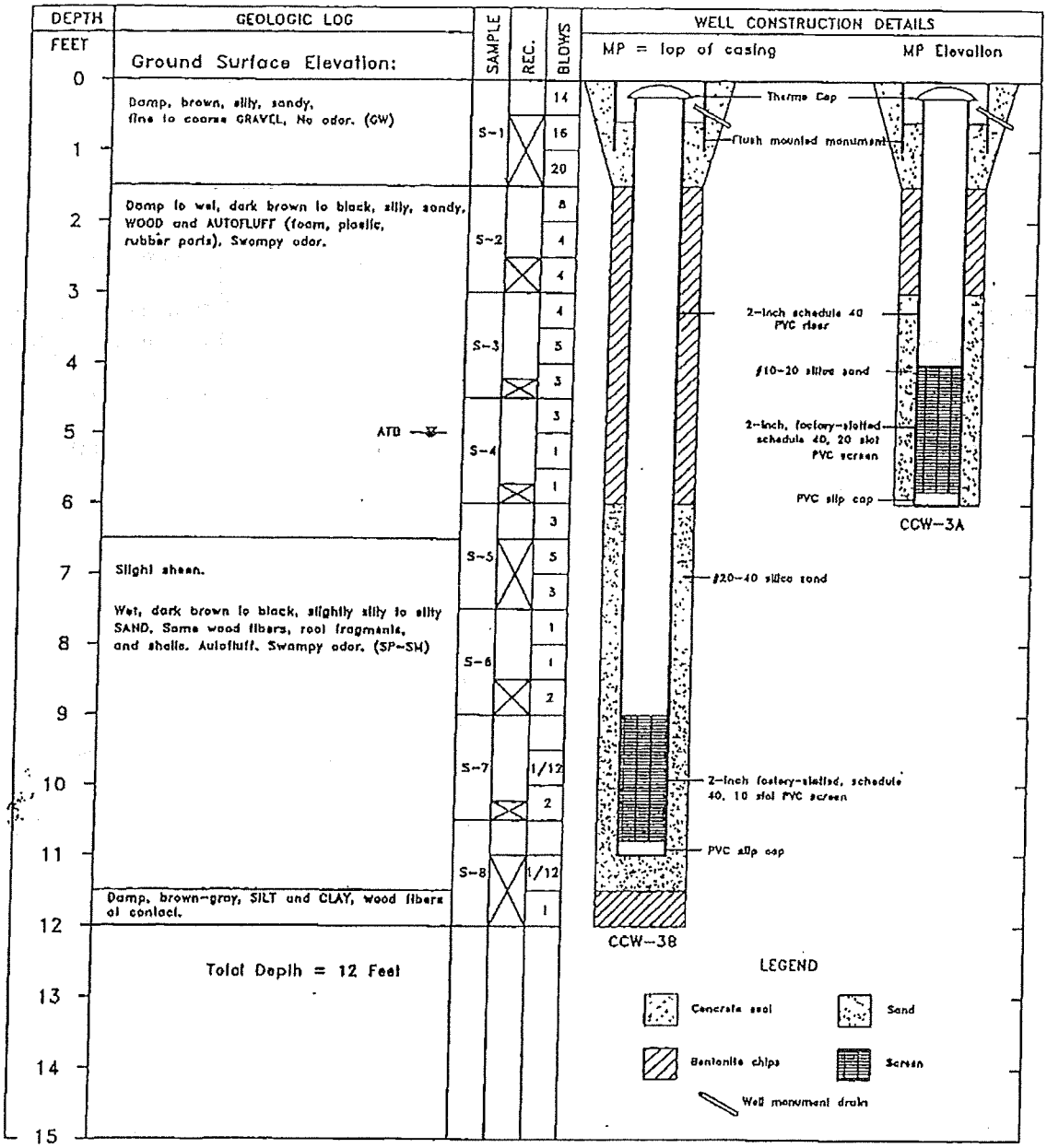
TechSolv Consulting Group, Inc.
12930 NE 178th Street, Woodinville, WA 98072
(425) 402-8277 FAX (425) 402-7917

SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-2C	Page: 1 of 1
	Contractor: Cascade Drilling, Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Yancy White, Charles Chambarger, Steve Choate	Drill Rig: CME-75
	Date Started: July 2, 2001	Date Finished: July 3, 2001
Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 24 to 19	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~4.5
Filter Pack Interval (ft bgs): 24 to 18	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 18 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 9.85
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0							6" Asphalt
1	6	5,3,11	1-3	33	NA		Greenish gray 5G 6/1 lime solvent sludge.
2							
3	NR	3,4,7,10	3-5	NR	NA		No recovery. Wood waste and fine sand in the cuttings.
4							
5	3	6,8,3,3	5-7	NA	NA		Wood plug, strong hydrocarbon odor, wet.
6							
7	3	1,1,1,1	7-9	270	NA		Same as above.
8							
9	3	7,6,1,1	9-11	283	GP		Moderate brown 5YR 4/4 medium gravel with fine sand and wood waste saturated with water, strong hydrocarbon odor.
10							
11	3	6,4,4,4	11-13	15	SP		Olive black 5Y 2/1 fine to medium sand with coarse gravel, saturated with water and has a slight hydrocarbon odor.
12							
13							
14	12	10,10,10	14-15.5	301	SM		Olive black 5Y 2/1 silty sand with rootlets and wet with hydrocarbon odor.
15	12	3,5,58	15.5-17	13	SM		Moderate brown 5YR 2/1 coarse sand at 15 feet.
16	NR	NA	16-18	NR	NA		No recovery.
17							16' 10" Olive black 5Y 2/1 fine to medium sand moist with no hydrocarbon odor.
18	24	NA	18-20	5	SP		
19							
20	NA	NA	20-22	7	SP		Same as above.
21							
22							
23							
24							End of Boring at 24 feet.

GEOLOGIC LOG AND WELL AS-BUILTS, MONITORING WELLS CCW-3A AND CCW-3B



NOTE: Descriptions of odors and sheens are included on this log where noted in the field.
No references to odors or sheens generally indicates the absence of odors or sheens.

FIGURE ##, GEOLOGIC LOG AND WELL AS-BUILTS
MONITORING WELLS CCW-3A & CCW-3B

PACIFIC GROUNDWATER GROUP
JE9205.03

PROJECT NAME: Clean Care
WELL INDENTIFICATION NUMBERS: CCW-3A, CCW-3B
DRILLING METHOD: Hollow Stem Auger
DRILLER: Charles Richard
FIRM: Holt Drilling
CONSULTING FIRM: Pacific Groundwater Group
REPRESENTATIVE: Chad Bring

LOCATION: NW¼ SW¼ Sec.
DATUM: NGVD
WATER LEVEL ELEVATION:
INSTALLED: February 1-2, 1994
DEVELOPED: February 14, 1994
START CARD NO.: 06851

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SOIL BORING LOG

Project Name and Location: Former CleanCare Site, 1510 Taylor Way, Tacoma, Washington	**Boring Number:** CCW-3C	Page: 1 of 2
	Contractor: Cascade Drilling, Inc.	**Drilling Method:** HSA
	Drill Crew: Brian Gose, Frank Scott, Steve Choate	**Drill Rig:** CME-75
	Date Started: June 29, 2001	**Date Finished:** July 2, 2001
Surface Elevation: NA	**Logged by:** R. Honsberger	**Protective Cover:** 6" metal above ground casing with locking cover
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 28 to 23	**Screen:** 2" dia. 0.010" slot PVC	**Water Level While Drilling (ft bgs):** ~5
Filter Pack Interval (ft bgs): 28 to 22	**Riser:** 2" dia. PVC	
Seal Interval (ft bgs): 22 to 2	**Seal Type:** bentonite	**Water Level at Completion (ft bgs):** 13.35
Grout Interval (ft bgs): 2 to 0	**Filter Pack:** 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0							
1	12	40,32, 15,17	1-3	2	GP		Coarse gravel fill with a fine to medium sand matrix, dry.
2							
3	1	15,11,12 ,5	3-5	2	GP		Same as above.
4							
5	NR	NA	5-7	NR	NA		▽ Miscellaneous automobile debris in the cuttings.
6							
7	12	3,4,2,2	7-9	14	SP		Olive black 5Y 2/1 fine to medium sand saturated with water. Very slight hydrocarbon odor.
8							
9	6	2,1,1,1	9-11	18	SP		Same as above with wood waste and silt.
10							
11	8	1,1,1,1	11-13	2	ML		Olive gray 5Y 4/1 silt with rootlets and reeds, moist with no hydrocarbon odor.
12							
13	4	2,1,1,1	13-15	2	ML		Olive black 5Y 2/1 silt with rootlets and reeds, moist with no hydrocarbon odor.
14							
15	24	NA	15-17	2	ML		Olive gray 5Y 4/1 silt with rootlets and reeds, moist with no hydrocarbon odor.
16							At 16.5 feet Olive black 5y 2/1 fine to medium sand saturated with water, with no hydrocarbon odor.
17	24	4,4,4,6	17-19	3	SP		Olive black 5Y 2/1 fine to medium sand with silt interbeds, saturated with water with no hydrocarbon odor.
18							
19	24	3,4,7,11	19-21	2	SP		Same as above.
20							

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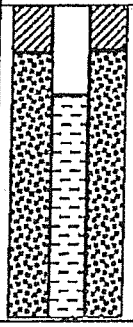
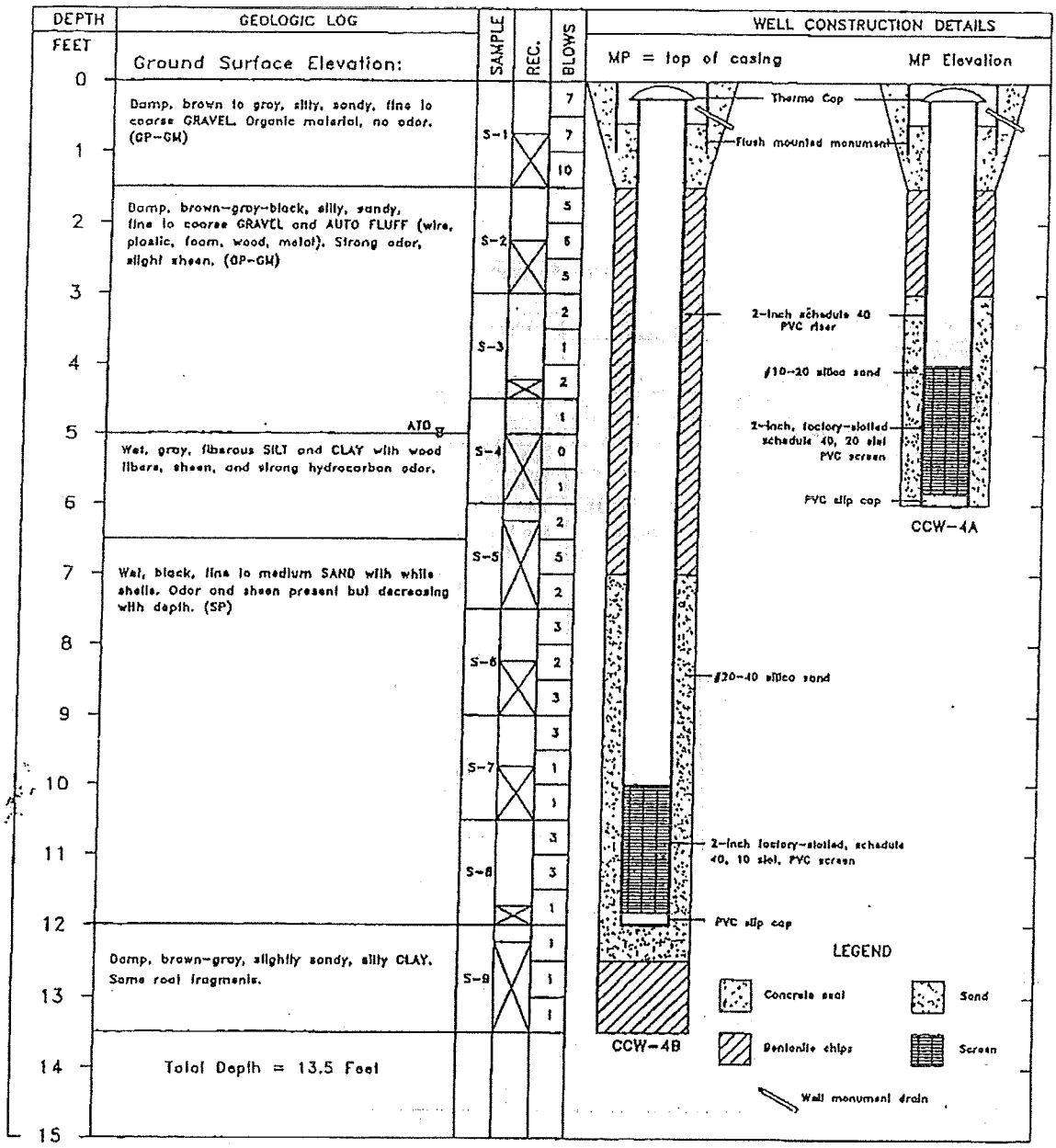
SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-3C	Page: 2 of 2
	Contractor: Cascade Drilling, Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Brian Gose, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: June 29, 2001	Date Finished: July 2, 2001

Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 6" metal above ground casing with locking cover
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 28 to 23	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~5
Filter Pack Interval (ft bgs): 28 to 22	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 22 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 13.35
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
21	24		21-23	2	SP		Olive black 5Y 2/1 fine to medium sand saturated with water. No hydrocarbon odor.
22							
23							
24							
25							
26							
27							
28							End of Boring at 28 feet

GEOLOGIC LOG AND WELL AS-BUILTS, MONITORING WELLS CCW-4A AND CCW-4B



NOTE: Descriptions of odors and sheens are included on this log where noted in the field. No references to odors or sheens generally indicates the absence of odors or sheens.

FIGURE ##, GEOLOGIC LOG AND WELL AS-BUILTS
MONITORING WELLS CCW-4A & CCW-4B

PACIFIC GROUNDWATER GROUP
JE9205.03

PROJECT NAME: Clean Care
WELL INDENTIFICATION NUMBERS: CCW-4A, CCW-4B
DRILLING METHOD: Hollow Stem Auger
DRILLER: Charles Richard
FIRM: Holt Drilling
CONSULTING FIRM: Pacific Groundwater Group
REPRESENTATIVE: Chad Bring

LOCATION: NW¼ SW¼ Sec.
DATUM: NGVD
WATER LEVEL ELEVATION:
INSTALLED: February 1-2, 1994
DEVELOPED: February 14, 1994
START CARD NO.: 06851

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SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-4C	Page: 1 of 1
	Contractor: Cascade Drilling Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Brian Gose, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: July 5, 2001	Date Finished: July 5, 2001

Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 24 to 19	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~5
Filter Pack Interval (ft bgs): 24 to 18	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 18 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 9.93
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0					GP		12" Gravel fill.
1	12	16,12,6,3	1-3	3	GM		Grayish brown 5YR 3/2 angular coarse to fine gravel with fine to medium sand, dry with no hydrocarbon odor.
2							
3	8	NA	3-5	3	GM		Same as above with miscellaneous automobile debris.
4							
5	8	1,3,2,3	5-7	4	SP		Moderate brown 5YR 3/4 fine to medium sand with miscellaneous automobile debris, dry with no hydrocarbon odor.
6							
7	16	1,1,2,1	7-9	3	SP		Olive black 5Y 2/1 fine to medium sand with shell fragments. Saturated with water.
8							
9	12	4,5,5	9-10	3	SP		Same as above with auto fluff and few medium gravels.
10	6	4,5	10-11	3	SP		Olive black 5Y 2/1 fine to coarse sand with medium gravel, slight hydrocarbon odor and saturated with water.
11	12	5,1	11-12	3	SP		Same as above.
12	12	3,1	12-13	4	ML		Olive gray 5Y 4/1 silt with rootless and other plant material.
13	1	2,1	13-14	1	OL/OH		Trace amounts of peat and slight hydrocarbon odor.
14	12	0,0,12	14-16	1	ML		Olive gray 5Y 4/1 silt with rootlets and trace fine sand. No hydrocarbon odor.
15							
16	20	NA	16-18	1	ML		Same as above.
17							
18	20	6,2,5,3	18-20	0	SP		Olive black 5Y 2/1 fine to medium sand saturated with water, no hydrocarbon odor.
19							
20							
21							
22							
23							
24							End of Boring at 24 feet.

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SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-5B	Page: 1 of 1
	Contractor: Cascade Drilling Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Brian Gose, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: June 27, 2001	Date Finished: June 27, 2001
Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 10 to 5	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~5
Filter Pack Interval (ft bgs): 11 to 4	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 4 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 4.82
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0					GP		6" Coarse angular gravel.
1	14	32,9,12	1-3	3	SP		Moderate brown 5YR 4/4 fine sand with wood waste and lime solvent sludge. Slight solvent odor.
2							
3	5	3,8,6,6	3-5	8	SP		Moderate brown 5YR 4/4 fine to medium sand with wood waste and few fine gravels dry with hydrocarbon odor and no solvent odor.
4							
5	5	3,8,6,6	5-7	NM	SP		▽ Same as above with a visible sheen on the water in the sampler.
6							
7	10	3,3,2,2	7-9	10	SM		Black to dusky brown fine to medium sand with wood waste and lenses of silty clay. Saturated with product.
8							
9	24	NA	9-11	7	OL		Greenish gray 5Y 4/1 silty clay with rootlets and plant material, moist with no solvent or hydrocarbon odor.
10							
11							End of boring at 11 feet.

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SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-5C	Page: 1 of 1
	Contractor: Cascade Drilling Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Brian Gose, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: June 27, 2001	Date Finished: June 27, 2001
Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 24 to 19	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~5
Filter Pack Interval (ft bgs): 24 to 18	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 18 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 9.93
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0							
1							Subsurface conditions are the same as Well CCW-5B to 11 feet bgs. No soil samples collected.
2							
3							
4							
5							
6							
7							
8							
9							
10							
11	24	1,2,3,4	11-13	0	OL		Olive gray 5Y 4/1 silty clay with rootlets and plant material, no solvent or hydrocarbon odor.
12							
13	24	1,1,1,2	13-15	1	OL		Same as above, but silty sand at 14.5 feet.
14							
15	24	2,5,9,11	15-17	0	SM		Brownish black 5YR 2/1 silty sand with Olive gray 5Y 4/1 silt interbeds, moist to damp with no solvent or hydrocarbon odor.
16							
17	24	2,1,1,2	17-19	0	SP		Brownish black 5YR 2/1 fine to medium sand, saturated with water. No solvent or hydrocarbon odor.
18							
19							
20							
21							
22							
23							
24							End of Boring at 24 feet.

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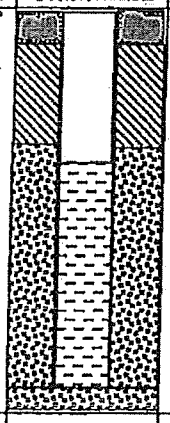
SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-6B	Page: 1 of 1
	Contractor: Cascade Drilling Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Brian Gose, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: June 27, 2001	Date Finished: June 27, 2001

Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 8.5 to 3.5	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~4.5
Filter Pack Interval (ft bgs): 9 to 3	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 3 to 1	Seal Type: bentonite	Water Level at Completion (ft bgs): 4.37
Grout Interval (ft bgs):1 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0					GP		6" Coarse angular gravel.
1	12	1,1	1-3	1	NA		Brownish gray 5YR 4/1 lime solvent sludge with wood waste.
2							
3	12	1,1,3,5	3-5	0	NA		Wood waste dry with no hydrocarbon odor.
4							
5	10	1,3,5,6	5-7	20	OL		▽ Olive gray 5Y 4/1 Silty clay, very wet, slight hydrocarbon odor.
6							
7	NR	1	7-8	NR	NA		No recovery.
8	12	1,2	8-9	1	SM		Olive black 5Y 2/1 silt with fine sand, very soft, saturated with water and has no hydrocarbon odor.
9							End of Boring at 9'

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SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-6C	Page: 1 of 1
	Contractor: Cascade Drilling Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Brian Gose, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: June 28, 2001	Date Finished: June 28, 2001
Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 23 to 18	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~4.5
Filter Pack Interval (ft bgs): 23 to 17	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 17 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 9.61
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0							
1							Subsurface conditions are the same as Well CCW-6B to 9 feet bgs. No soil samples collected.
2							
3							
4							
5							
6							
7							
8							
9	NR	NA	9-11	NR	NA		No recovery.
10	24	1	10-12	1	ML		Olive gray 5Y 4/1 silty clay with rootlets and some wood waste, moist, no hydrocarbon odor.
11							
12	24	1,2,2,1	12-14	2	ML		Same as above with olive black 5Y 2/1 silty sand at 13.5 feet.
13							
14	24	1,2,5,7	14-16	3	ML		Olive gray 5Y 4/1 silt with sand. At 15.5 feet brownish black 5YR 2/1 fine to medium sand saturated with water.
15							
16	20	NA	16-18	0	SP		Brownish black 5YR 2/1 fine to medium sand, saturated with water and no hydrocarbon odor.
17							
18							
19							
20							
21							
22							
23							End of Boring at 23 feet.

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SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-7B	Page: 1 of 1
	Contractor: Cascade Drilling Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Brian Gose, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: June 28, 2001	Date Finished: June 28, 2001

Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 9 to 4	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~5
Filter Pack Interval (ft bgs): 11 to 3	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 3 to 1.5	Seal Type: bentonite	Water Level at Completion (ft bgs): 3.95
Grout Interval (ft bgs): 1.5 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (In.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0					GP		6" Coarse angular gravel.
1	20	1,2,3,2	1-3	35	NA		Olive black 5Y 2/1 fine solvent sludge and wood waste damp with hydrocarbon odor.
2							
3	12	1,2,3,2	3-5	12	NA		Olive black 5Y 2/1 wood waste.
4							
5	12	1,4,7,14	5-7	31	NA		▽ Olive black 5Y 2/1 wood waste saturated with water and product, hydrocarbon odor and sheen.
6							
7	6	27,3,3,3	7-8	25	NA		Same as above
8	6		8-9	11	NA		Same as above.
9	2	1,2	9-10	3	ML		Same as above with trace of olive black 5Y 2/1 silty clay
10	12	2	10-11	3	ML		Olive gray 5Y 4/1 silt with plant material, saturated with water and no hydrocarbon odor.
11							End of boring at 11 feet

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SOIL BORING LOG

Project Name and Location:	Boring Number: CCW-7C	Page: 1 of 1
	Contractor: Cascade Drilling Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Brian Gose, Hank Monroe, Steve Choate	Drill Rig: CME-75
	Date Started: June 28, 2001	Date Finished: June 28, 2001
Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 26 to 21	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~5
Filter Pack Interval (ft bgs): 26 to 20	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 20 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 9.84
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0							
1							Subsurface conditions are the same as Well CCW-7B to 11 Feet bgs. No soil samples collected.
2							
3							
4							
5							▽
6							
7							
8							
9							
10							
11	24	0,0,2,4	11-13	3	ML		Olive gray 5Y 4/1 silt with rootlets and plant material, no hydrocarbon odor.
12							
13	24	1,2,4,5	13-15	3	ML		Same as above.
14							
15	24	2,2	15-17	3	ML		Olive gray 5Y 4/1 silt with rootlets interbedded with olive black 5Y 2/1 fine to medium sand, saturated with water.
16							
17	20	5,3,4,6	17-19	3	ML		Same as above.
18							
19	18	5,7,10, 12	19-21	2	SP		Olive black 5Y 2/1 fine to medium sand saturated with water with few silt interbeds.
20							
21	24	5,7,10, 12	21-23	NA	SP		Olive black 5Y 2/1 fine to medium sand saturated with water and no hydrocarbon odor.
22							
23							
24							
25							
26							End of Boring at 26 feet.

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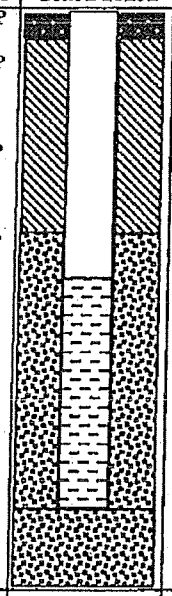
(425) 402-8277 FAX (425) 402-7917

SOIL BORING LOG

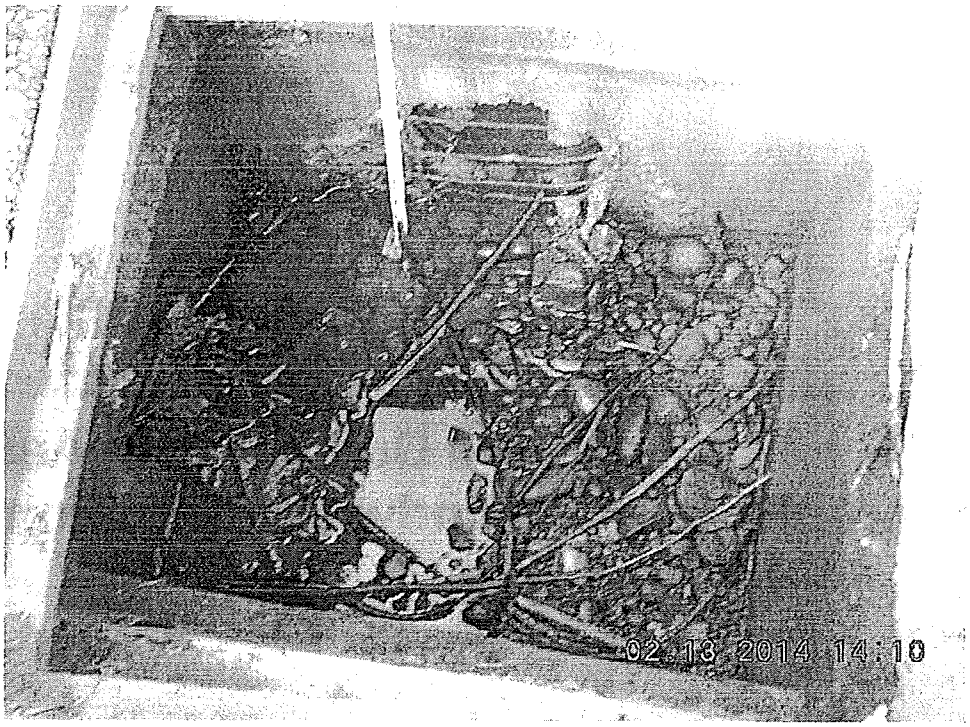
Project Name and Location:	Boring Number: CCW-8B	Page: 1 of 1
	Contractor: Cascade Drilling Inc.	Drilling Method: HSA
Former CleanCare Site 1510 Taylor Way Tacoma, Washington	Drill Crew: Drill Crew: Cody Pulis, Frank Scott, Steve Choate	Drill Rig: CME-75
	Date Started: July 3, 2001	Date Finished: July 3, 2001

Surface Elevation: NA	Logged by: R. Honsberger	Protective Cover: 8" water tight manhole
Top of Casing Elevation: NA		
Well Construction Information:		
Screened Interval (ft bgs): 11 to 6	Screen: 2" dia. 0.010" slot PVC	Water Level While Drilling (ft bgs): ~7
Filter Pack Interval (ft bgs): 11 to 5	Riser: 2" dia. PVC	
Seal Interval (ft bgs): 5 to 2	Seal Type: bentonite	Water Level at Completion (ft bgs): 5.15
Grout Interval (ft bgs): 2 to 0	Filter Pack: 2/12 sand	

Depth (ft bgs)	Recov. (in.)	Blow Counts	Sample Interval	OVM / PID (ppm)	USCS Symbol	Well Construction	Sample Description
0					GP		6" Coarse angular gravel.
1	12	8,12,13, 18	1-3	285	SP		Olive black 5Y 2/1 fine to medium sand with few course gravels and a strong hydrocarbon odor.
2							
3	20	8,8,9,11	3-5	338	SP		Olive black 5Y 2/1 medium sand with shell fragments, moist with a strong hydrocarbon odor, stains gloves.
4							
5	18	4,6,6,6	5-7	425	SP		Olive black 5Y 2/1 fine to medium sand with shell fragments, damp with a strong hydrocarbon odor, stains gloves.
6							
7	24	3,3,4,4	7-9	214	SP		▽ Same as above but saturated with water slight sheen on water.
8							
9	24	0,0,0,4	9-11	167	SP		Same as above.
10							
11	12	2,3	11-12	9	OL		Olive gray 5Y 4/1 silt with a trace of fine sand plant, saturated with water and slight hydrocarbon odor.
12							
							End of boring at 12 feet.

APPENDIX F

Qualitative Downstream Assessment Photographs and Groundwater Intrusion Analysis



1. South catch basin

2. Middle catch basin; unable to open during site visit.

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Selected Site Photographs**

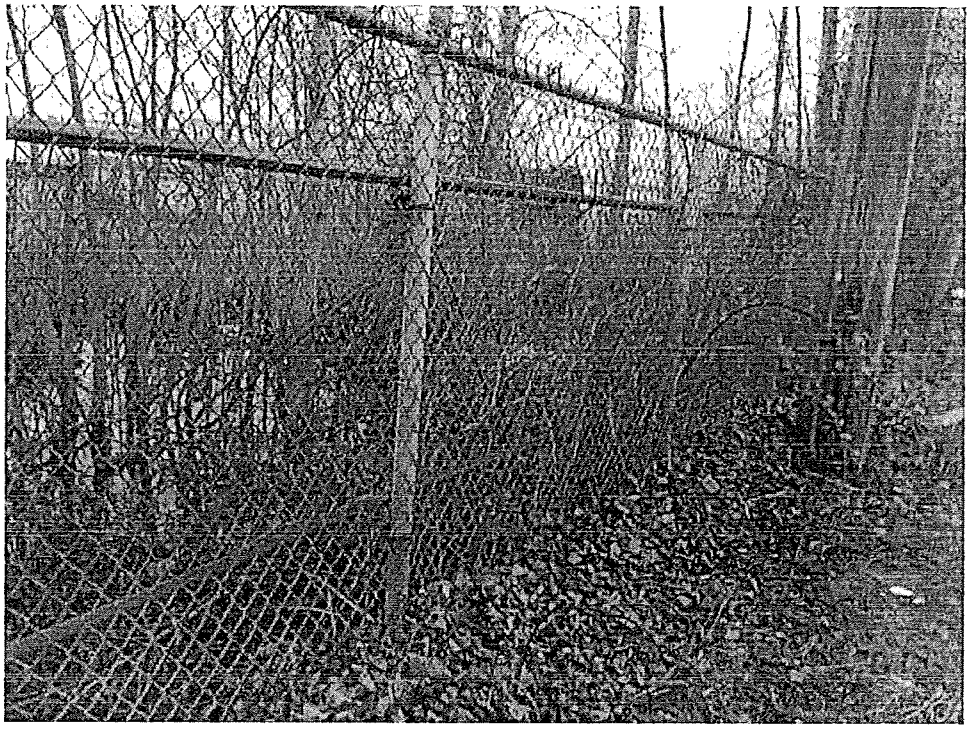
Figure
F-1a

3. North catch basin.

4. East ditch; shows inlet culvert from the north catch basin.

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Selected Site Photographs**

Figure
F-1b



5. West ditch; standing water observed throughout ditch on March 25, 2014.

6. West ditch; relatively low water level observed on March 26, 2014.

LANDAU ASSOCIATES	CleanCare Property Port of Tacoma Tacoma, Washington	**Selected Site Photographs**

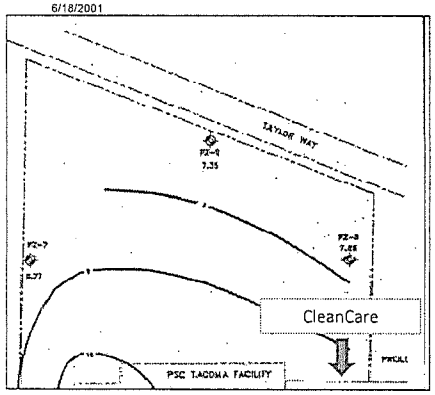
Figure
F-1c

TABLE F-1
PSC DRAINAGE SYSTEM GROUNDWATER INTRUSION ASSESSMENT
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

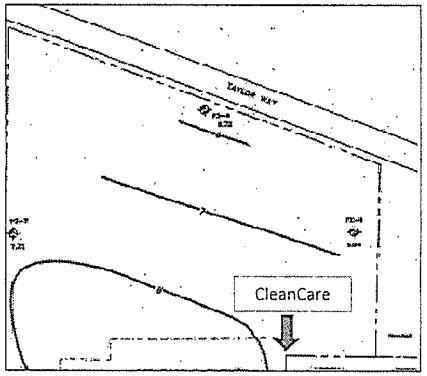
Piezometer	Aquifer	Date	GWE (NGVD29)	Drainage Feature	Lowest Elevation (NGVD29)		Depth to GW	Potential GW Intrusion?	Average Elevation (NGVD29)		Depth to GW	Potential GW Intrusion?
PZ-8	Shallow	6/18/2001	7.35	West Ditch	Ditch Bottom	6.3	-1.05	Yes	Ditch Bottom	7.87	0.52	No
		9/10/2001	5.72				0.58	No			2.15	No
		12/17/2001	10.54				-4.24	Yes			-2.67	Yes
PZ-9	Shallow	6/18/2001	7.86	East Ditch	Ditch Bottom	8.3	0.44	No	Ditch Bottom	9.53	1.67	No
		9/10/2001	6.94				1.36	No			2.59	No
		12/17/2001	9.08				-0.78	Yes			0.45	
		6/18/2001	7.86	Access Road Drainage Pipe	DS invert	9.41	1.55	No				
		9/10/2001	6.94				2.47	No				
		12/17/2001	9.08				0.33	No				

GWE Figures from PSC 2005

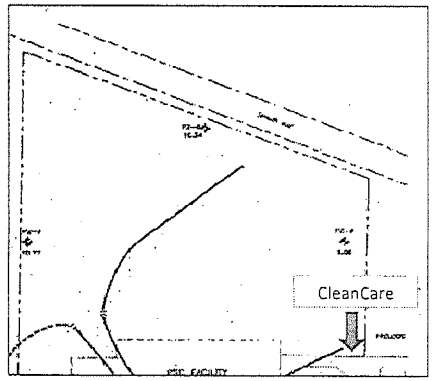
Measurement Date
6/18/2001



Measurement Date
9/10/2001



Measurement Date
12/17/2001



GW = Groundwater
GWE = Groundwater Elevation
NGVD29 = National Geodetic Vertical Datum of 1929

APPENDIX G

Quantitative Downstream Assessment

TABLE G-1
RATIONAL METHOD FLOW RATES FOR DOWNSTREAM SYSTEM
CLEANCARE PROPERTY
PORT OF TACOMA
TACOMA, WASHINGTON

Contributing Basins/Segments	Collection Points				
	AccessRd S CB	AccessRd Mid CB	AccessRd N CB (Total for Pipe System)	East Ditch	West Ditch
Dirt/Gravel Area					X
Dirt/Gravel Area				X	
PSC Paved Lot Area	X				
Dirt/Gravel Area	X				
Grassy Swale and Grass Strip	X				
S half of Access Rd to Mid CB		X			
S CB pipe to Mid CB		X			
N half of Access Rd to N CB			X		
Mid CB to N CB			X		
Q (cfs) (10-yr)	0.66	0.95	**1.24**	2.53	3.46
Q (cfs) (ditch, 100-yr)	1.00	1.44	1.87	**3.77**	**5.15**

PSC prop. to S CB

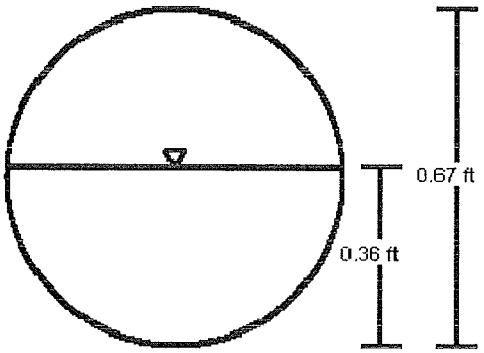
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00560	ft/ft
Normal Depth	0.36	ft
Diameter	0.67	ft
Discharge	0.66	ft³/s

Cross Section Image



V: 1
H: 1

S CB to Mid CB

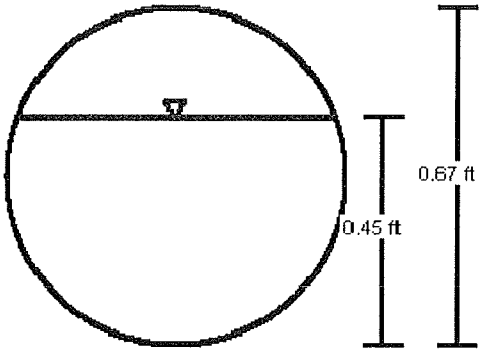
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00560	ft/ft
Normal Depth	0.45	ft
Diameter	0.67	ft
Discharge	0.95	ft³/s

Cross Section Image



V: 1
H: 1

Mid CB to N CB

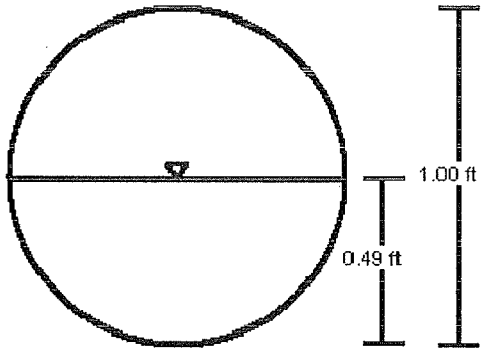
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.010	
Channel Slope	0.00300	ft/ft
Normal Depth	0.49	ft
Diameter	1.00	ft
Discharge	1.24	ft³/s

Cross Section Image



Y: 1
H: 1

Cross Section for East Ditch

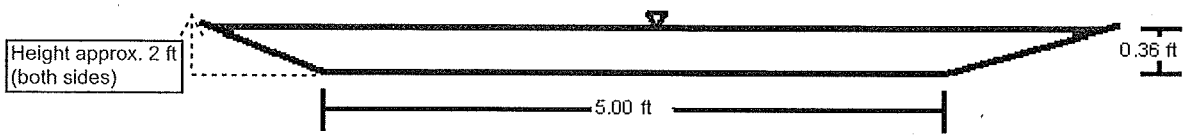
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.069	
Channel Slope	0.03100	ft/ft
Normal Depth	0.36	ft
Left Side Slope	2.50	ft/ft (H:V)
Right Side Slope	3.50	ft/ft (H:V)
Bottom Width	5.00	ft
Discharge	3.77	ft³/s

Cross Section Image



Approximate freeboard is 2ft - 0.36ft
= approx. 1.64 ft

V: 1
H: 1

Cross Section for West Ditch

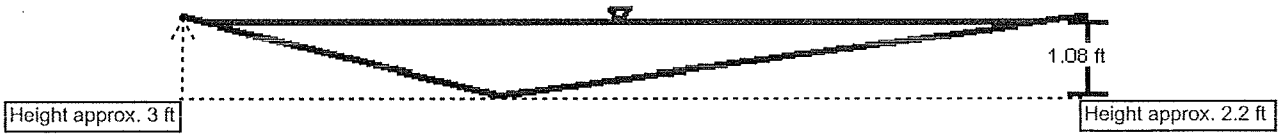
Project Description

Friction Method	Manning Formula
Solve For	Normal Depth

Input Data

Roughness Coefficient	0.069	
Channel Slope	0.00300	ft/ft
Normal Depth	1.08	ft
Left Side Slope	4.00	ft/ft (H:V)
Right Side Slope	7.30	ft/ft (H:V)
Discharge	5.15	ft³/s

Cross Section Image



Approximate minimum freeboard is
2.2ft - 0.36ft = approx. 1.12 ft

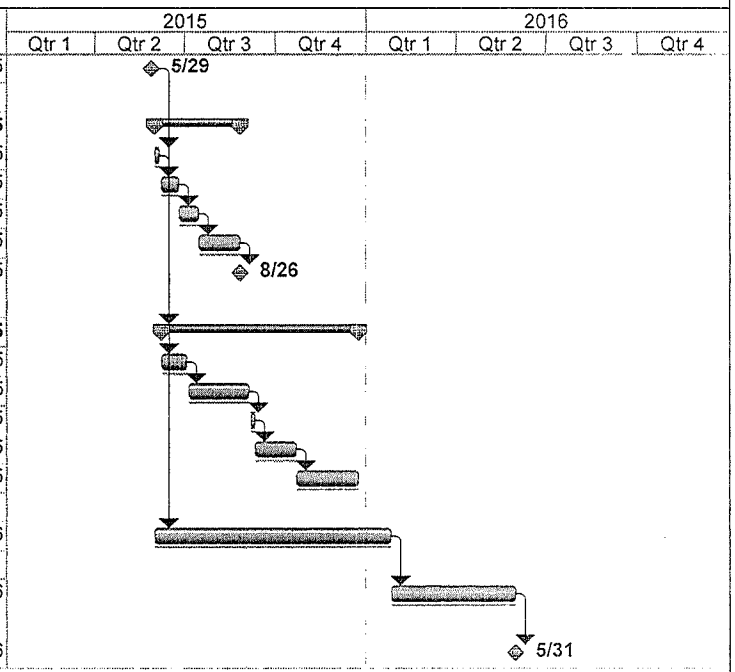
V: 1
H: 1

APPENDIX H

Schedule

CleanCare Remedy Implementation Schedule - Preliminary

ID	Task Name	Duration	Start	Finish
1	TTP, LLC Takes Ownership	0 days	Fri 5/29/15	Fri 5/29/15
2				
3	**Baseline Groundwater Sampling**	**63 days**	**Mon 6/1/15**	**Wed 8/26/15**
4	Field Work (Well Recon & Sampling)	5 days	Mon 6/1/15	Fri 6/5/15
5	Lab Analysis	14 days	Mon 6/8/15	Thu 6/25/15
6	Data Mgt & Analysis	14 days	Fri 6/26/15	Wed 7/15/15
7	Tech Memo & Compliance Plan Recommendations	30 days	Thu 7/16/15	Wed 8/26/15
8	Submit to ECY	0 days	Wed 8/26/15	Wed 8/26/15
9				
10	**Vapor Intrusion Assessment**	**144 days**	**Mon 6/8/15**	**Thu 12/24/15**
11	Vapor Intrusion Assessment Work Plan	20 days	Mon 6/8/15	Fri 7/3/15
12	ECY Review and Approval with Conditions	45 days	Mon 7/6/15	Fri 9/4/15
13	Field Work	4 days	Mon 9/7/15	Thu 9/10/15
14	Tech Memo & Mitigation Design Recommendations	30 days	Fri 9/11/15	Thu 10/22/15
15	ECY Review and Approval with Conditions	45 days	Fri 10/23/15	Thu 12/24/15
16				
17	Permits, Desgns, and Contractor Documents	172 days	Mon 6/1/15	Tue 1/26/16
18				
19	Site Redevelopment Construction	90 days	Wed 1/27/16	Tue 5/31/16
20				
21	Emerald Services Begins to Lease Property	0 days	Tue 5/31/16	Tue 5/31/16



Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

Exhibit B

FIRST AMERICAN TITLE INSURANCE COMPANY

Exhibit "A"

Vested Owner: Pierce County

Real property in the County of Pierce, State of Washington, described as follows:

PARCEL A:

The North 400 feet of the East half of the East half of the West half of the Northeast quarter of the Northwest quarter of Section 35, Township 21, North, Range 3 East, of the Willamette Meridian, in Tacoma, Pierce County, Washington.

PARCEL B:

Commencing at the Northeast corner of the Northeast quarter of the Northwest quarter of Section 35, Township 21 North, Range 3 East of the Willamette Meridian; thence North 89°49'00" West along the North line thereof, 490.0 feet to the true point of beginning; thence South 14°30'22" East 219.54 feet; thence South 03°49'00" West parallel with the East line of said Subdivision, 188.00 feet to the Southerly line of the North 400 feet of said Subdivision; thence North 89°49'00" West along said Southerly line 233.15 feet to the West line of the East half of the Northeast quarter of the Northwest quarter of said Section 35, Township 21 North, Range 3 East of the Willamette Meridian; thence North 01°39'00" East along said West line 400.13 feet to the Northwest corner of said Subdivision; thence South 89°49'00" East 178.88 feet to the true point of beginning, in Tacoma, Pierce County, Washington.

PARCEL C:

Beginning at the intersection of the East line of the Northeast quarter of the Northwest quarter of Section

35, Township 21 North, Range 3 East of the Willamette Meridian, and the Northerly line of Lincoln Avenue as deeded to City of Tacoma by deed recorded under Recording No. 1567268; thence at right

angles to said line of Lincoln Avenue North 47°12'00" West 796.40 feet to the true point of beginning; thence North 47°12'00" West 40.78 feet to the West line of the East 650 feet of the Northeast quarter of the Northwest quarter of said Section 35, Township 21 North, Range 3 East of the Willamette Meridian; thence North 03°44'00" East along said line 203.97 feet to the South line of the North 400 feet of said Subdivision; thence South 89°49'00" East along said South line 230.10 feet to a point bearing North 42°48'00" East from the true point of beginning; thence South 42°48'00" West 314.16 feet to the true point of beginning, in Tacoma, Pierce County, Washington.

PARCEL D:

A non-exclusive easement, 30 feet in width, for ingress and egress, being 15 feet on each side of the following described center line: Commencing at the monument at the intersection of Lincoln Avenue and

Alexander Avenue in the Northwest quarter of Section 35, Township 21 North, Range 3 East of the Willamette Meridian; thence Northwesterly along the monument line of said Alexander Avenue a distance

of 1,084.20 feet; thence on an angle to the right of 90°00'00" a distance of 60.00 feet to the point of beginning of this easement; thence continuing along said line at 90°00'00" to said Alexander Avenue, a distance of 150.00 feet; thence on an angle to the left of 01°39'12", a distance of 496.89 feet to the Southerly line of the North 400.00 feet of the East half of the East half of the West half of the Northeast quarter of the Northwest quarter of said Section 35, Township 21 North, Range 3 East of the Willamette Meridian, and the terminus of this center line description, in Tacoma, Pierce County, Washington.

Parcel E:

An easement for ingress and egress in, over, along and across the East 30 feet of the following described

parcel:

Commencing on the South line of Government Lot 8, Section 26, Township 21 North, Range 3 East,

W.M., in Pierce County, Washington, at a point 330 feet East of the Southwest corner of said Lot 8;

thence parallel with the West line of said Lot 8, North 524.24 feet to the Southerly line of Taylor Way;

thence South 69°23'32" East, 366.08 feet along the Southerly line of said Taylor Way;

thence South 391.29 feet to the South line of said Lot 8;

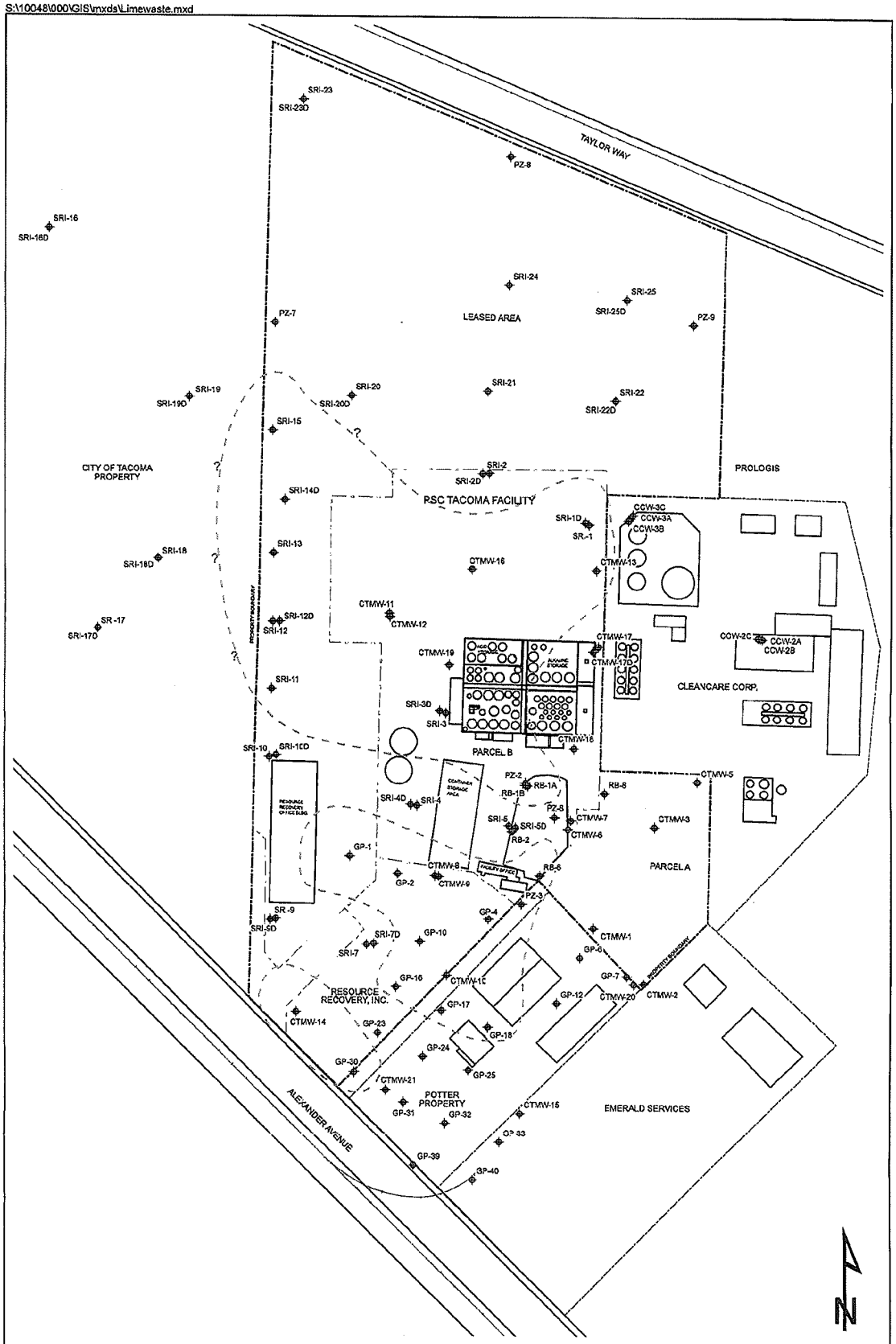
thence West 338.89 feet to the point of beginning.

Tax Parcel Number: 032135-2066, 032135-2054, 032135-2050

Situs Address: 1540 & 1510 Taylor Way, Tacoma, WA 98421

Exhibit C

S:\10048\000\GIS\mxda\Limewaste.mxd



LEGEND

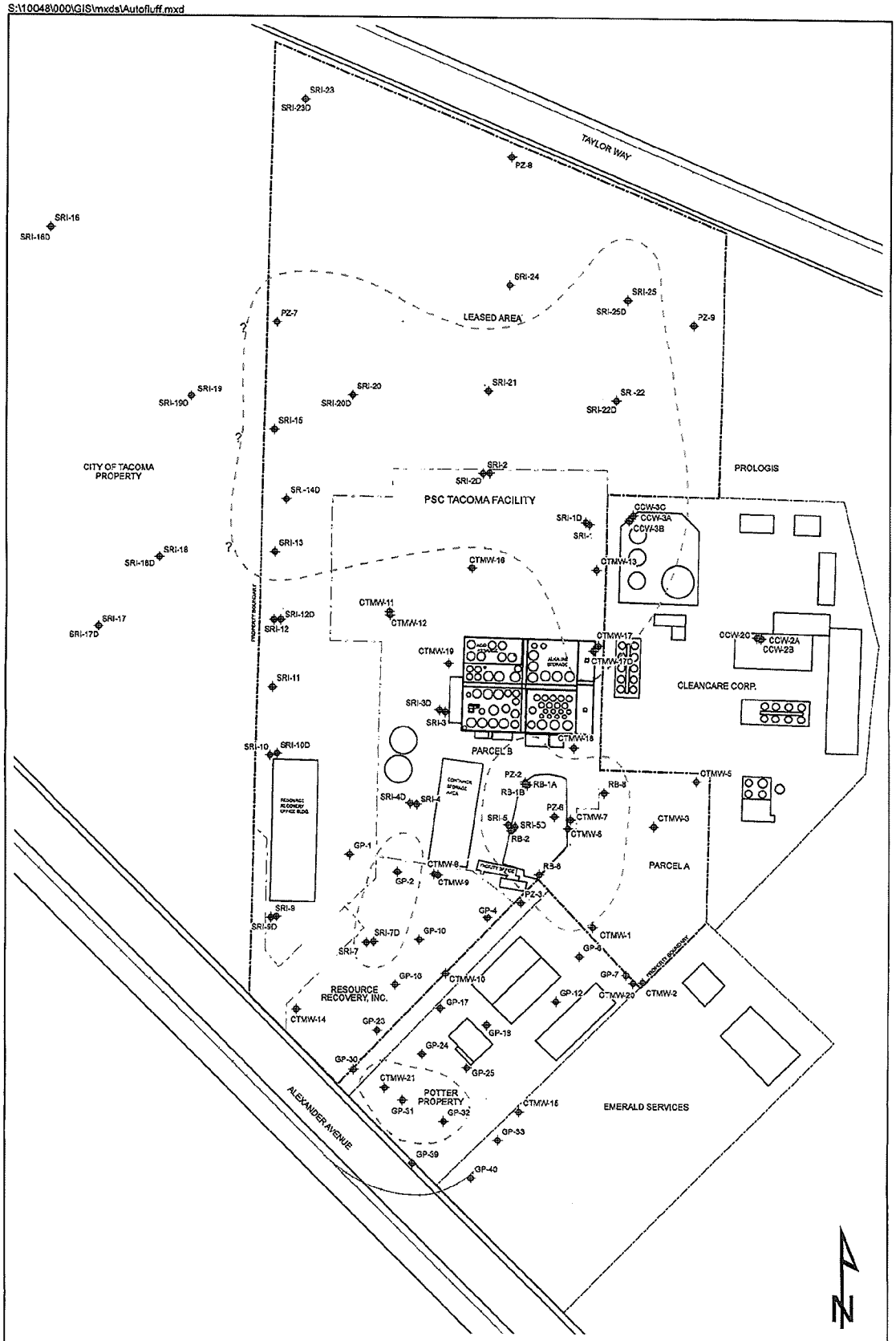
- Boring Locations
- Approximate Area of Lime Waste

0 35 70 140 Feet

EXTENT OF LIME WASTE FILL
PSC Tacoma Facility
Tacoma, Washington

GEOMATRIX	Project No. 10048	Figure 3-3

S:\10048\000\GIS\mxds\Autofluff.mxd



LEGEND

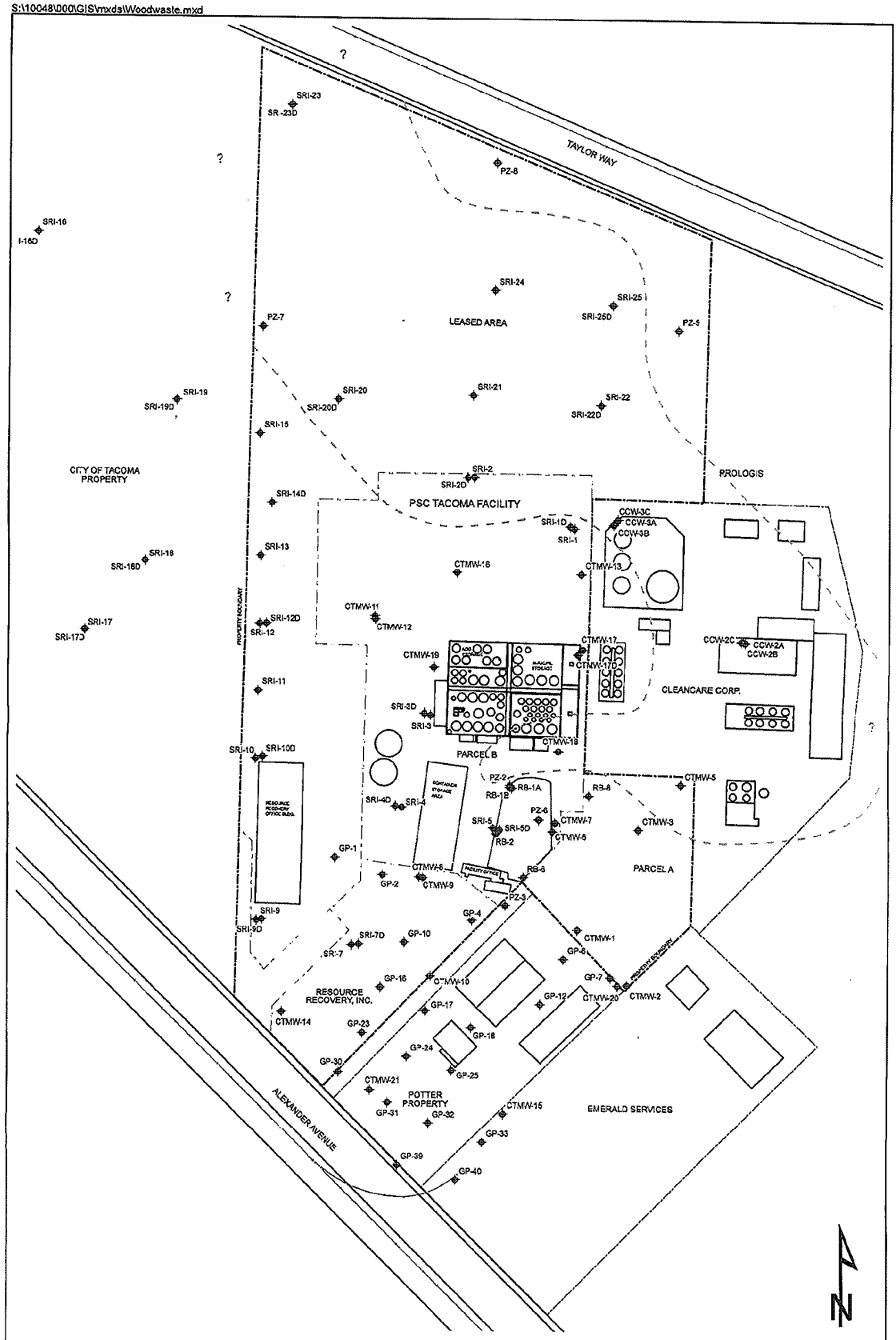
- Boring Locations
- Approximate Area of Autofluff

0 35 70 140 Feet

EXTENT OF AUTO-FLUFF FILL
PSC Tacoma Facility
Tacoma, Washington

GEOMATRIX	Project No. 10048	Figure 3-4

S:\10048\000\GIS\mxds\Woodwaste.mxd



LEGEND

- Boring Locations
- Approximate Area of Wood Waste

0 35 70 140 Feet

EXTENT OF WOOD WASTE FILL
PSC Tacoma Facility
Tacoma, Washington

GEOMATRIX | Project No. 10048 | Figure 3-5

Exhibit D

INTRODUCTION

The Washington State Department of Ecology (Ecology) has developed this public participation plan to promote meaningful community involvement during the negotiation of a prospective purchaser agreement (PPA) between Ecology and Tacoma Taylor Properties, LLC (TTP) regarding the former CleanCare Site (Site) located at1510/1540 Taylor Way in Tacoma, Washington. The PPA is being negotiated under the Model Toxics Control Act (Chapter 70.105D RCW), which requires public participation in PPAs and consent decrees. This plan describes the tools that Ecology uses to inform the public about site activities and identify opportunities for community involvement.

LOCATION AND MAP

The CleanCare Site is located in Pierce County in the Tacoma Tideflats area approximately 3 miles northeast of downtown Tacoma. The addresses are 1510 and 1540 Taylor Way, Tacoma, Washington, at Township 21, Range 3E, and Section 26.

The Site is located on a man-made peninsula, with the Blair Waterway to the southwest, the Hylebos Waterway to the northeast, and Commencement Bay to the northwest. The site is relatively flat with surface elevations typically within the range of 12 to 14 ft National Geodetic Vertical Datum of 1929 (NGVD29).

BACKGROUND

The Property was filled beginning in the 1940s to raise the grades at the Site and adjacent properties, but remained undeveloped until the mid-1970s. Fill material included soil dredged from the Hylebos and Blair waterways and a significant amount of industrial waste material. From 1974 to 1999, CleanCare Corporation and other businesses operated a petroleum, solvent, and chemical recycling facility at the Site, which included four tank farms, two hazardous/dangerous waste container storage pads, and a processing area where solvents, oil, and antifreeze were distilled. CleanCare ceased operations in November 1999. Pierce County acquired the Site in 2010 following foreclosure.

The potentially liable persons (PLPs) include CleanCare Corporation, CleanCare's former employee David Bromley, and other entities that operated at or currently own neighboring parcels within the broader "Fill Area" site. These entities include: the Port of Tacoma, the estate of Donald Oline, General Metals, Philip Services Corporation (PSC), Occidental Chemical Corporation, and Douglas Graham (the former owner of the Educators Manufacturing property).

TTP has retained Landau Associates (Landau) to evaluate the environmental conditions at the Property and develop a proposed remedial action. Based on data obtained from public agencies, including Ecology and the Tacoma Pierce County Health Department (TPCHD), Landau has determined that site conditions at the Property are generally well characterized. Historical research and multiple investigations at the Property and at adjacent parcels have been conducted to characterize soil and groundwater conditions. These investigations have shown the presence of buried industrial wastes in soil, including: (1) lime-solvent sludge; (2) auto shredder fluff;

(3) wood debris from forest products industries at adjacent and nearby properties; and (4) petroleum tank-cleaning scales and sludge. These investigations have also identified metals, hydrocarbons, and chlorinated organic compounds in groundwater locally onsite, where:

- Concentrations of the most mobile and persistent contaminants (i.e, chlorinated solvents) are relatively low at the downgradient (eastern) property boundary in the upper fill aquifer.
- Groundwater contamination in the deeper alluvial aquifer (i.e., at depths greater than about 20 ft BGS) is relatively limited.
- The western property boundary is roughly coincident with a groundwater divide in the shallow aquifer limiting the potential for contaminant migration to the east.

Between about 1974 and 1999, a number of releases or potential releases of petroleum or solvent liquids were documented at the Site. These releases are documented through Ecology inspections, TPCHD sampling, and CleanCare reports. In some instances, these releases were directly to the stormwater system or to soil at the Site.

In 1999, EPA collected surface soil samples and surface water samples, removed stationary and fixed waste drums, and capped parts of the Property in a removal action. EPA also blocked the existing stormwater system (to prevent releases from the site) and constructed a temporary above-ground stormwater system that discharged to the sanitary sewer system. In 2000, EPA returned responsibility for the Site to Ecology, who also took over operation and management of the stormwater system. During a recent site visit, Landau noted that the stormwater system was in disrepair and no longer functioning, causing stormwater to pond and likely infiltrate.

In 2001-2002, the TPCHD conducted an initial investigation of the Site pursuant to an Ecology-reviewed work plan. The investigation scope included installing 11 monitoring wells and advancing 15 geoprobe borings. Four quarters of groundwater samples were collected at the 11 new and 7 existing wells on the Property. Groundwater and soil samples were also collected from the 15 geoprobe borings. Data collected during the initial investigation were used to perform a site hazard assessment (SHA) and rank the site a 3 on a scale of 1 (highest) to 5 (lowest), where ranks of 1 and 2 are generally considered the highest priority for cleanup by Ecology.

In 2005, PSC completed a remedial investigation for the property west of CleanCare. The investigation report included an evaluation of site history and filling and hydrogeology on the CleanCare property.

PUBLIC PARTICIPATION ACTIVITIES AND RESPONSIBILITIES

The purpose of this Public Participation Plan is to promote public understanding and participation in the MTCA activities planned for this site. This section of the plan addresses how Ecology will share information and receive public comments and community input on the Site activities.

Ecology uses a variety of activities to increase public participation in the investigation and

cleanup of MTCA sites. Ecology will use input provided by the community whenever possible. The following is a list of the public involvement activities that Ecology will use, their purposes, and descriptions of when and how they will be used during the cleanup.

PUBLIC COMMENT PERIODS

Comment periods are the main way Ecology obtains feedback from the public on site cleanup investigations. Comment periods usually last 30 days and are required at key points during the investigation, before final decisions are made.

During a comment period, the public can comment in writing. Verbal comments are taken if a public hearing is held. After formal comment periods, Ecology reviews all comments received and may respond in a document called a Responsiveness Summary.

Ecology will consider the need for changes or revisions based on input from the public. If significant changes are made, then a second comment period may be held. If no significant changes are made, then the draft document(s) will be finalized.

Public comment periods will be held for:

- The consent decree embodying the PPA.
- The draft cleanup action plan.
- Removing the Site from the Hazardous Sites List when cleanup is complete.
- Periodic reviews.

PUBLIC MEETINGS AND HEARINGS

Public meetings may be held at key points during the investigation and cleanup process. Ecology may also offer public meetings for actions expected to be of particular interest to the community. These meetings will be held at locations convenient to the community. A public meeting will also be scheduled if ten or more people request one.

INFORMATION REPOSITORIES

Information repositories are places where the public may read and review site information, including documents that are the subject of a public comment period. Ecology has two repositories for the CleanCare Site:

- Tacoma Public Library, 1102 Tacoma Ave, Tacoma WA 98402, (253) 383-2429
- Washington State Department of Ecology, 300 Desmond Drive, Lacey, WA 98503. Please call (360) 407-6045 for an appointment.

Site information also will be posted on Ecology's Web site at _____.

SITE REGISTER

Ecology's Toxics Cleanup Program uses its bimonthly Site Register to announce all of its public meetings and comment periods, as well as many other activities. To receive the Site Register in electronic or hard copy format, contact Seth Preston at (360) 407-6848 or email him at Seth.Preston@ecy.wa.gov. It is also available on Ecology's web site at http://www.ecy.wa.gov/programs/tcp/pub_inv/pub_inv2.html.

MAILING LIST

Ecology is compiling a mailing list for the Site. It includes individuals, groups, public agencies, elected officials, private businesses, and other known interested parties. The list will be maintained at Ecology's Southwest Regional Office and will be updated when individuals request to be added or removed.

FACT SHEETS

Ecology will mail fact sheets to persons and organizations interested in the Site to inform them of public meetings and comment opportunities and important site activities. Ecology also may mail fact sheets about the progress of site activities.

WEB SITE

The CleanCare website will have information about public comment periods, investigation progress, and future work:
https://fortress.wa.gov/ecy/gsp/Sitepage.aspx?csid=604.

NEWSPAPER DISPLAY ADS

Ecology will place ads in the Tacoma News Tribune to announce public comment periods and public meetings or hearings for the Site.

PLAN UPDATE

This public participation plan may be updated as the project proceeds. If an update is necessary, the revised plan will be submitted to the public for comment.

CONTACTS

If you have questions or need more information about this plan or the CleanCare Site, please contact:
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Toxics Cleanup Program, Southwest Regional Office
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Olympia, WA 98504-7775

Phone (360) 407-6247
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_____, Public Involvement Coordinator
Washington State Department of Ecology
300 Desmond Drive
Lacey, WA 98503
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GLOSSARY

Comment Period: A time period during which the public can review and comment on various documents and proposed actions. For example, a comment period may be provided to allow community members to review and comment on proposed studies or draft reports.

Contaminant: Any hazardous substance that does not occur naturally or occurs at greater than natural background levels.

Information Repository: A file containing current information, technical reports, and reference documents available for public review. The information repository is usually located in a public building that is convenient for local residents such as a public school, city hall, or library.

Public Notice: At a minimum, adequate notice mailed to all persons who have made a timely request of Ecology and to persons residing in the potentially affected vicinity of the proposed action; mailed to appropriate news media; published in the local (city and county) newspaper of largest circulation; and the opportunity for the interested persons to comment.

Public Participation Plan: A plan prepared to encourage coordinated and effective public involvement designed to the public's needs at a particular site.

Responsiveness Summary: A summary of oral and/or written public comments received by Ecology during a comment period on key documents, and Ecology's responses to those comments. The responsiveness summary is especially valuable during the Cleanup Action Plan phase at a site when it highlights community concerns.

Risk: The probability that a hazardous substance, when released into the environment, will cause an adverse effect in the exposed humans or living organisms.

Toxicity: The degree to which a substance at a particular concentration is capable of causing harm to living organisms, including people, plants and animals.