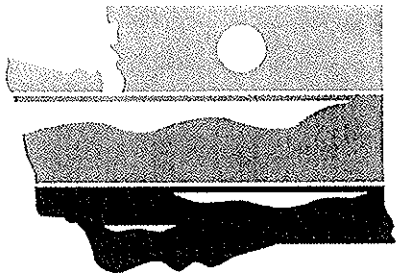

DEPARTMENT OF
ECOLOGY
State of Washington

North Lot Development Site

Cleanup ID#: 1966

Final Cleanup Action Plan

July 2011

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DECLARATIVE STATEMENT

Consistent with the Model Toxics Control Act, Chapter 70.105D RCW, as implemented by the Model Toxics Control Act Cleanup Regulation, Chapter 173-340 WAC, it is determined that the selected cleanup actions are protective of human health and the environment, attain federal and state requirements that are applicable or relevant and appropriate, comply with cleanup standards, provide for compliance monitoring, use permanent solutions to the maximum extent practicable, provide for a reasonable restoration time-frame, and consider public concerns raised during public comment.

Russell Olsen, MPA — Date: 7/21/11

Site Manager

Toxics Cleanup Program

Northwest Regional Office

Robert W. Warren, P.Hg., MBA — Date: 7/25/11

Regional Section Manager

Toxics Cleanup Program

Northwest Regional Office

LIST OF ABBREVIATIONS AND ACRONYMS

µg/kg	Micrograms per Kilogram
µg/L	Micrograms per Liter
µg/L	Micrograms per Liter
ARAR	Applicable or Relevant and Appropriate Requirement
BGS	Below Ground Surface
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CAP	Cleanup Action Plan
cPAH	Carcinogenic Polycyclic Aromatic Hydrocarbon
DCA	Disproportionate Cost Analysis
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
FS	Feasibility Study
ft	Feet
ft^2	Square Feet
MCL	Maximum Contaminant Level
MDL	Method Detection Limit
mg/L	Milligrams per Liter
MTCA	Washington State Model Toxics Control Act
MUP	Master Use Permit
NLD	North Lot Development
NPDES	National Pollutant Discharge Elimination System
O&M	Operation and Maintenance
ORC	Oxygen Release Compound
PAH	Polycyclic Aromatic Hydrocarbon
pg/L	Picograms per Liter
PPCD	Prospective Purchaser Consent Decree
PQL	Practical Quantitation Limit
Property	North Lot Property
RCW	Revised Code of Washington
RI	Remedial Investigation
SIM	Selected Ion Monitoring
SWPPP	Stormwater Pollution Prevention Plan
TEF	Toxicity Equivalency Factor
TEQ	Toxicity Equivalency Quotient
TOD	Transit-Oriented Development
TPH	Total Petroleum Hydrocarbons
TPH-D	Diesel-Range Total Petroleum Hydrocarbons
TPH-G	Gasoline-Range Total Petroleum Hydrocarbons
TPH-O	Motor Oil-Range Total Petroleum Hydrocarbons
VCP	Voluntary Cleanup Program
WAC	Washington Administrative Code
yd^3	Cubic Yards

1.0 INTRODUCTION

This cleanup action plan (CAP) describes the proposed cleanup action at the North Lot Property (Property) located in the south end Central Business District, southeast of the intersection of South King Street and Occidental Avenue South in Seattle, Washington (Figure 1). North Lot Development (NLD), as prospective purchaser of the Property, has conducted several investigations to characterize soil and groundwater conditions at the Property, as documented in the Remedial Investigation (RI) report (Landau Associates 2011a) and the Feasibility Study (FS) report (Landau Associates 2011b). The Property is being proposed for commercial and residential development. Cleanup of the Property will be conducted as part of the development project. The purposes of this CAP are to describe the history and physical conditions at the Property, identify the Property-specific cleanup standards, and identify the selected cleanup action and monitoring to be conducted at the Property to document that cleanup has been completed. The following sections present a summary of the information specified by the Model Toxics Control Act (MTCA) [Washington Administrative Code (WAC) 173-340-380] to be included in the CAP. The information presented in this CAP is based on the evaluations and analyses developed and presented in the RI and FS reports. As documented in the FS report, the proposed cleanup action will comply with WAC 173-340-360.

Property cleanup, including the RI and FS, is being accomplished under MTCA. NLD, as the prospective purchaser of the Property, has been in communication with the Washington State Department of Ecology (Ecology) since April 2008 regarding a suitable regulatory mechanism to facilitate Ecology's review of and concurrence on the RI, FS, and CAP. NLD submitted a proposal for a Prospective Purchaser Consent Decree (PPCD) to Ecology in May 2008. Pursuant to the letter dated April 22, 2009 from then-Ecology Director Jay Manning, Ecology has proceeded with temporary use of Voluntary Cleanup Program (VCP) staff to complete the RI, FS, and this CAP, pending transition to the formal cleanup program and negotiation of the PPCD (Ecology 2009a).

As noted above, cleanup of the Property will be accomplished pursuant to a PPCD. The planned cleanup includes hotspot excavation of contaminated soil from the northwestern portion of the Property (former gasoline station area) to the elevation of the groundwater table, enhanced bioremediation for soil and groundwater impacted by residual gasoline and benzene near the elevation of the water table in the area of hotspot excavation, a surface cap over the entire Property, added measures to prevent contact with shallow contaminated soil outside the footprints of the building foundations, institutional controls, groundwater monitoring, and contingent groundwater treatment.

1.1 SUMMARY OF DEVELOPMENT PROJECT

The Property will be developed by NLD as part of Transit-Oriented Development (TOD) and will encompass two full city blocks, with approximately 1.5 million gross square feet (ft^2) of buildable area. The planned development will include two podiums (east and west blocks) that will contain first- and second-floor parking and retail space; third- and fourth-floor parking and residential space; and parking/office/residential space above the fourth floor. The east block will be a single office tower and the west block will include three high-rise structures with more than 400 units of new housing (including 100 affordable units directly related to the development, at least 30 of which will be constructed at the Property).

The planned development project, as outlined in the approved Seattle Master Use Permit (MUP) and related State Environmental Policy Act (SEPA) documentation, does not include below-grade construction or features such as a basement or an underground garage. Construction for Property development will include removal of the existing surface material to a depth of approximately 1.5 feet (ft) below ground surface (BGS) across the entire Property, including the existing asphalt surface, associated subgrade, and shallow soil/fill, to prepare the Property for construction of the impervious surfaces and high-rise buildings associated with Property development. Below-grade excavation will be strategic and limited to utilities, piles, grade beams, and elevator pits, and will be primarily within the footprints of the two proposed podium buildings. A foundation plan for the buildings including the locations of the pile caps, elevator pits, and grade beams is shown on Figure 2. Profiles/cross sections showing the approximate depths for the piles, pile caps, elevator pits, and grade beams are shown on Figure 3. Based on current construction estimates, about 16,500 cubic yards (yd^3) (measured in place) of existing surface material will be excavated as part of the proposed construction. Excavated material, including shallow contaminated soil, removed during construction will be disposed of off-Property consistent with MTCA and other applicable regulations.

As discussed above, the cleanup will be conducted as part of the planned development that will be constructed consistent with the MUP in accordance with market conditions. The west block will be constructed first. The four-story podium structure on the west block will support three high-rise buildings. The three high-rises will sit on top of the podium approximately 40 ft above the existing ground elevation and extend to a maximum of 25 stories. The podium will be designed and constructed in anticipation of the future high-rise buildings; therefore, all physical underground requirements for the high-rise buildings will be built during the initial construction to avoid future disturbance of the podium foundation. The construction elements for the podium include underground and ground-level items such as piles, pile caps, elevator pits, grade beams, slab-on-grade foundations, and underground utilities. Once the podium is constructed, there will be no need to penetrate below the ground level.

The east block will be developed as market conditions allow and in accordance with the requirements of the MUP. The construction plan will account for all elements of the preferred alternative discussed in this CAP, and will ensure protection of human health and the environment in accordance with MTCA. During construction on the west block, the asphalt on the east block will be cleaned, replaced (if necessary), and repaired. The asphalt will be maintained as a protective cap over the underlying soil until development of the east block occurs. The groundwater compliance monitoring plan (Appendix A) will be implemented Property-wide following cleanup and development of the west block.

The Property development team is aware of the soil contamination at the Property and the associated constraints on construction. Therefore, as discussed above, the development approach is to eliminate underground uses such as parking garages and basements to minimize grading and excavation.

1.2 PROPERTY DESCRIPTION AND HISTORY

The Property is known as the "North Lot Development" (King County parcel numbers 7666204878, 7666206780, and 7666206790) and is located in Seattle, Washington's south end Central Business District adjacent to CenturyLink Field and Event Center, as shown on Figure 1. The Property consists of 3.85 acres currently owned by King County, and is located southeast of the intersection of South King Street and Occidental Avenue South in Seattle, Washington (Figure 4). The Property consists of a paved parking lot, which is used for commuter parking and parking for events at CenturyLink Field and Event Center.

Based on a Phase I Environmental Site Assessment (ESA) completed by Landau Associates (2007), the Property was originally undeveloped tideflats of Elliott Bay. The Property was filled in the late 1890s and early 1900s and was operated as a rail yard from the late 1800s until the late 1960s. The fill material underlying the Property is composed of remnants of the former rail yard operations and construction debris (i.e., brick, metal, and concrete). Prior to filling, the area that includes the Property was initially developed with streets, buildings, and railroad tracks elevated on and supported by pilings. Several sets of railroad tracks were formerly present on the Property. Structures associated with the rail yard included engine maintenance buildings, paint shops, track switching areas, and materials storage areas. In addition, two gasoline stations were formerly located in the northwestern portion of the Property at different times between the late 1930s and approximately 1966. King County purchased the Property in the 1970s to facilitate construction of the Kingdome stadium to the south of the Property, which was later demolished and replaced with the current CenturyLink Field and Event Center development.

The Property has been used as a parking lot since the 1970s (Landau Associates 2007). The Property is served by various utilities including a stormwater drainage system that consists of a series of four storm drain pipelines running north to south across the Property. A fifth storm drain pipeline runs

approximately northwest to southeast in the eastern half of the Property. The King County main storm drain runs along King Street to the north of the Property, and the King County combined sewer main runs along Occidental Avenue to the west of the Property. Relevant historical Property features are shown on Figure 5. Existing Property features include asphalt paving, a stormwater drainage system, site lighting, and below-grade utilities on and adjacent to the Property (Figure 6).

1.3 PROPERTY CHARACTERIZATION

The environmental investigations conducted at the Property from 2008 through 2010 are summarized in the RI and FS reports. The investigations conducted to date to characterize soil and groundwater conditions at the Property include the Phase II investigation, the RI field investigation, the supplemental investigation, and the data gaps investigation. Sampling locations are presented on Figure 7. An investigation of soil vapor in the northwestern portion of the Property was also conducted as part of the FS (Landau Associates 2011b). The investigations of the Property have included a review of the Property's industrial history to confirm that the investigations included all areas likely to have contamination; an evaluation of soil and groundwater conditions; and laboratory analysis of soil, groundwater, and soil vapor samples to document the nature and extent of contamination.

The investigations included the sampling of soil, soil vapor, and/or groundwater from more than 70 borings and the installation and sampling of 20 groundwater monitoring wells. The soil, groundwater, and soil vapor samples collected during the various investigations were submitted for selected laboratory analysis for a comprehensive list of analytical parameters including:

- Total petroleum hydrocarbons (TPH)
- Gasoline-range total petroleum hydrocarbons (TPH-G)
- Diesel-range total petroleum hydrocarbons (TPH-D)
- Motor oil-range total petroleum hydrocarbons (TPH-O)
- Metals (including arsenic, cadmium, chromium, copper, lead, mercury, and zinc)
- Benzene, toluene, ethylbenzene, and xylenes (BTEX)
- Polycyclic aromatic hydrocarbons (PAHs)
- Semivolatile organic compounds (SVOCs)
- Volatile organic compounds (VOCs)
- Polychlorinated biphenyls (PCBs)
- Dioxins/Furans.

Soil quality was evaluated in the RI based on three general Property areas: the northwestern portion of the Property, the northeastern portion of the Property, and Property-wide based on the operational history and the findings of the various investigations. Constituents of concern identified in

the RI include TPH, BTEX, PAHs, dioxins/furans, and metals. A summary of the detections of these constituents in soil at the three identified areas of the Property is provided below:

- Northwestern Portion of the Property: The laboratory analytical and field-screening data indicate that shallow soil (less than 15 ft BGS) has been impacted by releases resulting from the former gasoline station operations. The soil contamination appears to be primarily near the top of the groundwater table, but extends to a depth of at least 17 ft BGS locally. Due to the presence of benzene in shallow soil in the northwestern portion of the Property, the potential for vapor intrusion was evaluated during the soil vapor investigation.
- Northeastern Portion of the Property: Deeper soil (greater than 15 ft BGS) has been impacted by petroleum hydrocarbons and PAHs. Based on field screening, observations during drilling, and analytical data, the soil contamination appears to be primarily associated with creosote-like material observed at the base of the fill. Based on the occurrence of the creosote-like material at the base of the fill material, and the lack of evidence of contamination within the fill at shallower depths, the creosote-like material appears to be from a distinct source and likely predates placement of the overlying fill.
- Property-wide: PAHs, primarily cPAHs, were detected at concentrations greater than the cleanup levels in most of the soil samples collected across the southern portion of the Property. Arsenic and TPH-O were also detected at concentrations greater than the cleanup levels in soil samples collected in the west-central portion of the Property. Dioxins/furans were detected at concentrations greater than the laboratory reporting limit in both of the samples analyzed and one of the detected concentrations was greater than the cleanup level. The occurrence of these analytes in shallow surface soil suggests a source within the fill material placed over the native marine sediment layer. Off-Property borings to the northwest of the Property were clean and bounded the extent of the constituents of concern in soil.

Groundwater quality was evaluated in the RI based on the three general Property areas described above, the northwestern portion of the Property, the northeastern portion of the Property, and Property-wide. The evaluation of impacts to groundwater at the Property is based on a comparison of analytical results for groundwater samples collected from the 17 monitoring wells located on the Property and the 3 wells installed off-Property (MW-16D, MW-17D, and MW-18D) to the cleanup levels.

Overall, only arsenic was detected in groundwater at concentrations greater than the cleanup level(s), and these are in the eastern portion of the Property, are upgradient of much of the Property, and are the result of migration from off-Property sources. Arsenic concentrations in the samples from wells in the eastern portion of the Property have been greater than the cleanup levels [i.e., 5 micrograms per liter (µg/L) established for the western portion of the Property and 21.3 µg/L established for the eastern portion of the Property due to the effect of off-Property sources]. In addition, there have been localized detections of analytes at concentrations greater than the cleanup levels (i.e., TPH-G, TPH-D, TPH-O, BTEX, and PAHs) in the former gasoline station and creosote areas of the Property. However, there is no evidence of migration of any analytes at concentrations greater than the cleanup levels across, or off, the Property.

In summary, the nature and extent of contamination at the Property are discussed in the RI and FS reports by area, based on the operational history of the Property and the analytical results for the soil, groundwater, and soil vapor samples collected, as follows:

- Northwestern Portion of the Property, which is the former location of the historical gasoline stations and where gasoline-related constituents have been detected
- Northeastern Portion of the Property, which is where the creosote-like material was encountered at the base of the fill material, and where creosote-related constituents have been detected
- Property-Wide, where various constituents have been detected that are interpreted to be related to the presence of the fill placed over the native tideflat surface during the development of the area or that may be related to activities that occurred Property-wide, such as the rail yard operations.

Groundwater elevations have been measured Property-wide six times (November 24, 2008; January 16, 2009; June 3, 2009; August 25, 2009; February 24, 2010; and April 22, 2010). Groundwater elevations at wells located at the Union Station site, which is located to the east and hydraulically upgradient of the Property, were also collected during the June 3, 2009; February 24, 2010; and April 22, 2010 monitoring events. In February 2010, information from the King Street Center building located at 201 South Jackson Street (immediately to the north of the Property) verified the presence of a foundation drain system at the building. The drain system passively collects groundwater along the building foundation. The water that collects in the drain system is pumped to the sanitary sewer system for disposal. Based on the information confirming the presence of the foundation drain system that is collecting groundwater, the groundwater elevation contours for all six monitoring events were redrawn. The revised groundwater contours, which account for the withdrawal of groundwater at King Street Center, are presented on Figures 8 through 13.

2.0 CLEANUP ACTION SELECTION

The RI findings were used in the FS to develop and evaluate remedial alternatives for cleanup of the Property. The FS defines cleanup standards, identifies and evaluates six cleanup action alternatives, and identifies a preferred cleanup action alternative that is protective of human health and the environment per MTCA requirements. The following sections describe the cleanup levels, points of compliance, and cleanup action alternatives developed and evaluated in the FS.

2.1 PROPERTY CLEANUP LEVELS

The current conditions at the Property present a limited risk to users of the Property because contaminated soil is capped by the existing asphalt pavement, and groundwater in the Property area is not used as a potable water source. However, as discussed in the RI report, preliminary soil cleanup levels were identified for the detected constituents. For all constituents except lead and TPH, MTCA Method B soil cleanup levels were developed based on the most stringent of the constituent concentrations in soil protective of groundwater as drinking water and marine surface water, and protective of human health based on direct contact (Method B standard formula values for carcinogens and non-carcinogens). In accordance with MTCA, the MTCA Method A soil cleanup levels were used for lead, TPH-G, TPH-D, and TPH-O. Cleanup levels for arsenic, copper, and mercury were adjusted upward to the natural background concentration in soil. Cleanup levels for noncarcinogens were evaluated based on total Property risk and were adjusted downward, where necessary, to achieve a hazard index for the Property equal to or less than 1. Cleanup levels for carcinogens were also evaluated based on total Property risk; adjustment of the cleanup levels for carcinogens for total Property risk was not necessary. Table 1 summarizes cleanup levels for soil. The remediation level for benzene in soil, which is based on the potential for vapor intrusion, is provided in Table 2. Additional information regarding cleanup levels development is provided in Appendix F of the FS report (Landau Associates 2011b).

The Property is located within 1,100 ft of Elliott Bay and groundwater at the Property, where not affected by the King Street Station foundation drains, generally flows toward Elliott Bay. As noted above, groundwater in the Property area is not used as a potable water source and the City of Seattle will require connection to the city water system as part of Property development. However, the MTCA Method B groundwater cleanup levels based on drinking water use and discharge to marine surface water, or the MTCA Method A groundwater cleanup levels for petroleum hydrocarbons, were used to identify groundwater cleanup levels for constituents detected at the Property. The MTCA Method B groundwater cleanup levels were developed based on the most stringent of the federal or state maximum contaminant levels (MCLs), state primary and secondary MCLs, protection of marine surface water, and the MTCA

Method B standard formula values. The MTCA Method A groundwater cleanup levels were used for TPH-G, TPH-D, and TPH-O. Cleanup levels for non-carcinogens were evaluated based on total Property risk and were adjusted downward, where necessary, to achieve a hazard index for the Property equal to or less than 1. Adjustment of cleanup levels for carcinogens for total Property risk was not necessary. Total risk adjustment tables are provided in Appendix F of the FS report (Landau Associates 2011b). Table 3 summarizes the groundwater cleanup levels developed for constituents detected at the Property.

2.2 POINT OF COMPLIANCE

Under MTCA, the point of compliance is the point or points where the cleanup levels must be attained. The standard point of compliance where soil cleanup levels protective of direct human contact must be met is throughout a site from the ground surface to 15 ft below the ground surface, in accordance with WAC 173-340-740(6)(d). The standard point of compliance where soil cleanup levels protective of groundwater must be met is throughout the soil column, in accordance with WAC 173-340-740(6)(b). For the Property, the proposed soil point of compliance will be throughout the soil column throughout the Property.

The standard point of compliance for groundwater is throughout groundwater at the Property. The proposed conditional point of compliance for groundwater is the Property boundary or as close to the Property boundary as practicable. For a conditional point of compliance [in accordance with WAC 173-340-720(8)(c, d)], there must be a demonstration that it is not practicable to meet the cleanup levels throughout the site in a reasonable restoration timeframe and that all practicable methods of treatment are to be used in the site cleanup. The planned cleanup action for the Property is permanent to the maximum extent practicable, and meets these two criteria. Therefore, the proposed conditional point of compliance for groundwater is the Property boundary for most of the Property and as close to the Property boundary as practicable in the northeastern portion of the Property where the creosote-like material is present along the Property boundary, because it is not feasible to install a compliance monitoring well in the creosote-like material. The compliance monitoring plan (Appendix A) identifies the approach to document groundwater quality at the conditional point of compliance.

2.3 EVALUATED ALTERNATIVE CLEANUP ACTIONS

The development of cleanup alternatives included analysis of technologies and process options potentially applicable to conditions at the Property. Potential general response actions and remedial technologies were identified based on the known site conditions, media impacted, contaminant types, and best professional judgment regarding applicable remedial technologies. The identified remedial

technologies were screened in the FS on the basis of effectiveness, implementability, and cost. Screened technologies included institutional controls, containment, removal/excavation, and treatment.

Each of the cleanup action alternatives developed for the Property was developed to be protective of human health and the environment, consistent with the MTCA regulations, and suitable for integration into the proposed development plan for the Property. Each alternative is comprehensive and considers the Property and its future use as a whole, but may include the use of separate cleanup action technologies for the different areas of concern. The six alternatives incorporate the most viable cleanup action technologies within the general response action categories of containment, source removal (i.e., excavation), treatment, and institutional controls. The six alternatives developed and evaluated in the FS are:

- Alternative 1: Containment including a Vapor Barrier
- Alternative 2: Hotspot Excavation and Containment
- Alternative 3: Hotspot Excavation, Focused Treatment of Residual Gasoline/Benzene, Containment, and Added Measures to Prevent Contact with Shallow Contaminated Soil Outside the Footprints of the Building Foundations
- Alternative 4: Hotspot Excavation, Focused Treatment of Residual Gasoline/Benzene, Focused Treatment of Creosote Area, and Containment
- Alternative 5: Hotspot Excavation, Focused Treatment of Residual Gasoline/Benzene, Excavation of Fill Material across the Property to 5 ft BGS, and Containment
- Alternative 6: Complete Excavation of Fill Material.

Alternatives 1 through 5 each include groundwater compliance monitoring (Appendix A) and contingencies for groundwater treatment. Groundwater monitoring and contingent groundwater treatment was not included as part of Alternative 6 because the source of the groundwater contamination would be eliminated through the complete excavation of the fill material.

3.0 PLANNED CLEANUP ACTION

Based on the results of the evaluation of alternatives conducted for the FS, including the disproportionate cost analysis (DCA), which compares the overall benefit of the alternative to the estimated cost, Alternative 3 was selected as the preferred cleanup action for the Property. Alternative 3 consists of hotspot excavation of contaminated soil from the northwestern portion of the Property (former gasoline station area) to the elevation of the groundwater table, enhanced bioremediation for soil/groundwater impacted by residual gasoline and benzene near the elevation of the water table in the area of hotspot excavation, a surface cap over the entire Property, added measures to prevent contact with shallow contaminated soil outside the footprints of the building foundations within the Property boundary, institutional controls, groundwater monitoring, and contingent groundwater treatment.

3.1 COMPONENTS OF THE PLANNED CLEANUP ACTION

The components of the selected alternative are discussed in the following sections. The conceptual model for the planned cleanup action is shown on Figure 14.

3.1.1 HOTSPOT EXCAVATION OF CONTAMINATED SOIL FROM THE FORMER GASOLINE STATION AREA

Based on the results of the evaluation of the potential for vapor intrusion discussed in Sections 3.0 and 4.2.1 of the FS report, soil with benzene concentrations greater than the remediation level of 780 micrograms per kilogram (µg/kg) will be removed to mitigate the potential for vapor intrusion. The hotspot soil excavation will be conducted in the northwestern portion of the Property within the area of the former gasoline stations. Soil in this area with benzene concentrations greater than the remediation level will be excavated to the elevation of the groundwater table (a depth of approximately 8 ft BGS) and disposed of off-Property at a permitted solid waste Subtitle D landfill. The hotspot excavation will also include soil removal at the location where the highest concentrations of carcinogenic PAHs (cPAHs) were detected in the shallow soil (the sample from 4.6 ft BGS at boring B-23). The approximate limits of the hotspot excavation are presented on Figure 14. The amount of soil excavated for off-Property disposal will be approximately 720 yd^3 after the Property-wide excavation to approximately 1.5 ft BGS and excavation for the pile caps, elevator pits, utilities, and grade beams that are planned as part of Property development. The final lateral limits of the hotspot excavation area will be determined in the field based on the results of field screening and the laboratory analysis of confirmation samples collected at the limits of the excavation.

3.1.2 Enhanced Bioremediation for Soil/Groundwater Impacted in the Hotspot Excavation Area

A bioremediation technology such as Oxygen Release Compound (ORC) will be applied to the hotspot excavation near the depth of the water table. The ORC will be placed at the bottom of the excavated area, prior to backfilling, to enhance bioremediation of residual gasoline and benzene contamination at the elevation of the groundwater table. Following placement of the ORC, the hotspot excavation will be backfilled with clean imported fill.

3.1.3 Construction Soil Excavation

As discussed in Section 1.1, project construction will include removal and off-Property disposal of soil across the Property to a depth of approximately 1.5 ft BGS (including existing asphalt, associated subgrade, and shallow soil/fill) to prepare the Property for development. Additional below-grade excavation will include excavation in the areas of utilities, piles, grade beams, and elevator pits, and will primarily be within the footprints of the building foundations. Based on current construction estimates, approximately 16,500 yd^3 (measured in place) of existing surface material will be excavated as part of the proposed construction. Excavated material, including shallow contaminated soil, removed during construction will be disposed of off- Property consistent with MTCA and other applicable regulations.

3.1.4 Surface Cap and Added Measures to Prevent Contact with Contaminated Soil Outside the Building Foundations

The contaminated soils remaining in place at the Property following cleanup and development will primarily be contained beneath the building foundations that will be completed as part of Property development. The areas of shallow contaminated soil within the Property boundary outside of the footprints of the building foundations will be addressed by added measures that are considered to be equally effective in containing the contaminated soil and preventing potential human contact with shallow soil. As shown on Figure 15, the landscaped areas outside of the building foundation footprint within the Property boundary will be excavated to 5 ft BGS and backfilled with clean soil, and all other areas outside of the building foundation footprint within the Property boundary will be capped with concrete.

For purposes of estimating costs, the measure to prevent contact with shallow soil in all areas outside the footprints of the building foundations within the Property boundary was assumed to be additional soil excavation to 5 ft BGS. The costs for soil excavation and off-Property disposal were used for the planned cleanup action because they are considered to be roughly equivalent to, or greater than, the costs for a concrete barrier.

3.1.5 Required Institutional Controls

Institutional controls will be implemented to assure the continued protection of human health and the environment. Institutional controls include restrictions on disturbance of the surface cap and on the installation of wells at the Property except as part of the cleanup action and a restriction on the use of site groundwater as drinking water. A deed restriction documenting these limitations will be used for the Property acquired by North Lot Development.

Institutional controls will also include periodic reviews of Property conditions and preparation of status reports on the effectiveness of the Property cleanup action over time. This periodic review and reporting is a requirement of MTCA (WAC 173-340-420). Periodic reviews are planned to occur every 5 years after the initiation of the cleanup action per MTCA.

3.1.6 Groundwater Compliance Monitoring

As required by the MTCA regulations, monitoring is included in the planned cleanup action to assess contaminant concentrations in groundwater and document groundwater flow direction. A groundwater compliance monitoring plan is provided in Appendix A. The groundwater compliance monitoring will include the installation of additional groundwater monitoring wells, groundwater monitoring and sample collection at the new wells and existing wells, and laboratory analysis of groundwater samples.

Groundwater sample analytical parameters and laboratory methods will consist of the following:

- BTEX by U.S. Environmental Protection Agency (EPA) Method 8021
- TPH-G and TPH-D by Ecology-approved Methods NWTPH-Gx and NWTPH-Dx
- PAHs by EPA Method 8270 Selected Ion Monitoring (SIM)
- Dissolved metals (i.e., arsenic, cadmium, chromium, lead, mercury, copper, and zinc) by EPA Method 200.8 except mercury, which will be analyzed by EPA Method 7471.

The list of analytical parameters and laboratory methods for groundwater sample analysis are provided in Tables 1 and 2 of Appendix A, respectively.

The proposed installation and development of the new monitoring wells will take place in conjunction with Property development. All wells will be installed during construction on the west block of the Property and any wells that are damaged or destroyed as part of the subsequent construction on the east block of the Property will be replaced. Compliance reports will be submitted to Ecology approximately 6 to 8 weeks following receipt of the final analytical data, according to the schedule presented below.

During the first 5 years, sampling and analysis of monitoring wells will occur quarterly for Year 1 and then annually for the next 4 years of monitoring; however, the frequency of monitoring may be

adjusted based on the groundwater analytical results and whether analytes are detected at concentrations greater than the cleanup levels. If the detected concentration of one or more constituents is greater than the cleanup level, the well will be re-sampled and the data re-evaluated. If the re-sampling indicates one or more constituents at a concentration greater than the cleanup level, then a remediation contingency plan will be developed, approved by Ecology, and implemented. After 5 consecutive years with no exceedances, both the monitoring frequency and the number of sampling locations will be reduced, as appropriate, based on site conditions at the time and upon approval from Ecology. Groundwater compliance monitoring will conclude after 30 years with no exceedances of the cleanup levels. All changes to the groundwater compliance monitoring schedule will be approved in advance by Ecology based on the evaluation of site conditions at the time.

3.1.7 Groundwater Treatment Contingency

A contingency for groundwater treatment is included in the planned cleanup action. Under current Property conditions, contamination in groundwater does not pose a threat to human health or the environment; therefore, groundwater treatment options were not evaluated in the cleanup alternatives. In the event that compliance groundwater monitoring shows a significant increase in contaminant concentrations in groundwater and evidence of off-Property migration of groundwater with contaminant concentrations greater than the cleanup levels or a significant change in site conditions, groundwater treatment options will be evaluated to prevent contaminated groundwater from migrating beyond the conditional point of compliance. One potential treatment option that could be evaluated as part of the contingency plan is the installation of extraction wells along the Property boundary to collect groundwater before it flows off the Property. Collected groundwater could be treated using a granulated activated carbon treatment system and pumped into the sanitary sewer system for further treatment and disposal. Groundwater treatment is included only as a contingency; as noted above, under current conditions groundwater does not pose a threat to human health or the environment. A concept-level contingency plan will be prepared along with the other plans developed for implementation of the cleanup action, as described in Section 6.0.

3.1.8 Hazardous Substances Remaining at Property

Following implementation of the planned cleanup action, hazardous substances will remain on the Property and will include the following:

- Low concentrations of arsenic and PAHs will remain in soil (fill material) Property-wide, from a depth of a minimum of 1.5 ft BGS to the contact with the native soils at approximately 23 ft BGS; however, the soil will be contained beneath the improvements placed as part of development, preventing direct contact with the contamination. The volume of soil

remaining with low concentrations of arsenic and PAHs will be further reduced by the excavation for the installation of utilities, pile caps, grade beams, and elevator shafts that will be conducted as part of Property development.

- Approximately 1,000 yd^3 of creosote-like material will remain in place in the northeastern portion of the Property. Contact with the creosote-like material is not likely because the material is located beneath more than 20 ft of fill. There is no evidence of migration of the creosote-like material, and none is expected in the future.
- Residual gasoline/benzene contamination will remain in shallow soils following the hotspot excavation in the northwestern portion of the Property. However, the highest remaining concentrations in this area will be treated by the bioremediation substrate that will be placed at the bottom of the hotspot excavation prior to backfilling.
- Localized deeper (i.e., about 20 ft BGS) groundwater contamination by PAHs and petroleum hydrocarbons due to the presence of the creosote-like material will remain in the northeastern portion of the Property. However, as discussed above, there is no evidence of off-Property migration of contaminated groundwater and there is no risk of contact with the contaminated groundwater due to use restrictions.
- The planned cleanup action includes the measures described in the preceding sections to prevent direct contact with contaminated soils remaining in place, and limit the potential for off-Property migration of contaminants in groundwater. These measures include a surface cap and additional measures to prevent contact with contaminated soil outside the footprints of the building foundations within the Property boundary (including additional excavation to 5 ft BGS or installation of impervious concrete surface), institutional controls, groundwater compliance monitoring, and contingent groundwater treatment.

3.2 COMPLIANCE WITH MODEL TOXICS CONTROL ACT THRESHOLD REQUIREMENTS

The planned cleanup action complies with MTCA threshold requirements, including protection of human health and the environment, compliance with cleanup standards associated with a property cleanup, compliance with applicable state and federal laws, and inclusion of a provision for compliance monitoring. The planned cleanup action will protect human health and the environment through permanent measures to control potential exposure to contaminated soil as part of Property development. The planned cleanup action and development at the Property includes hotspot excavation of contaminated soil from the northwestern portion of the Property (former gasoline station area) to the elevation of the groundwater table, enhanced bioremediation for soil/groundwater impacted by residual gasoline and benzene near the elevation of the water table in the area of hotspot excavation, a surface cap over the entire Property, added measures to prevent contact with shallow contaminated soil outside the footprints of the building foundations within the Property boundary, institutional controls, groundwater monitoring, and contingent groundwater treatment. Cleanup levels will be achieved at the points of compliance upon completion of the cleanup action. The cleanup action will be conducted in compliance with applicable local, state, and federal laws. Protection, performance, and confirmational monitoring programs will be

implemented to verify adequate protection of human health and the environment during and after Property development to confirm compliance with the cleanup standards.

3.3 COST

The estimated cost of the planned cleanup action is approximately $3,840,000. The cost estimate for the planned cleanup action is presented in Table 4. This is a feasibility study level estimate and the actual costs may be as much as 30 percent less or 50 percent greater than the estimate.

4.0 JUSTIFICATION FOR SELECTING THE CLEANUP ACTION

The planned cleanup action for the Property effectively and permanently protects human health and the environment by:

- Protecting human health by preventing direct contact with contaminated soil
- Excavating hotspot soil in the northwestern corner of the Property and the upper 1.5 ft of soil Property-wide to reduce the amount of contaminated soil at the Property and disposing of it off site in accordance with applicable regulatory requirements
- Providing measures for treatment (in the hotspot excavation area)
- Providing for enhanced containment measures (via additional excavation to 5 ft BGS or concrete capping) in areas outside of footprints of the building foundations within the Property boundary
- Providing for groundwater compliance monitoring
- Providing for contingent groundwater treatment
- Providing for institutional controls.

The primary risk associated with the Property (direct exposure to contaminated soils) will be effectively controlled through the hotspot excavation, Property development (Property-wide excavation of shallow contaminated soil to approximately 1.5 ft BGS and construction of building foundations), added protective containment measures (additional excavation to 5 ft BGS in landscaped areas or concrete capping in areas outside the building foundations), and institutional controls. There is no evidence of off-Property migration of contaminants in groundwater and Property groundwater will not be used as a drinking water source, given the availability of a municipal water supply and regulations prohibiting development of water supply wells in this area.

The planned cleanup action is also compatible with the development planned for the Property. Figure 16 shows the conceptual model for the Property prior to incorporation of the planned cleanup action; Figure 17 shows the conceptual model for the Property following incorporation of the remedial action elements included in the planned cleanup action and the planned construction elements associated with Property development (i.e., removal of the existing surface material to approximately 1.5 ft BGS and construction of the planned buildings and physical improvements).

The planned cleanup action will effectively achieve the Property remedial action objectives and cleanup standards, further limit the potential for exposure to contaminated soil and groundwater, and provide permanent protection of human health and the environment from potential risks posed by the Property.

5.0 APPLICABLE STATE AND FEDERAL LAWS

In accordance with MTCA, all cleanup actions must comply with applicable state and federal laws [WAC 173-340-710(1)]. MTCA defines applicable state and federal laws to include legally applicable requirements and those requirements that are relevant and appropriate. Collectively, these requirements are referred to as applicable or relevant and appropriate requirements (ARARs). This section provides a brief overview of potential ARARs for the Property cleanup. The primary ARAR is the MTCA cleanup regulation (Chapter 173-340 WAC), which outlines requirements for the development of cleanup standards, and procedures for development and implementation of a cleanup under MTCA. The other ARARs that may be applicable to the cleanup action include the following:

- Washington Hazardous Waste Management Act [Chapter 70.105 Revised Code of Washington (RCW)] and its implementing regulations, Dangerous Waste Regulations (Chapter 173-303 WAC). These regulations establish a comprehensive statewide framework for the planning, regulation, control, and management of dangerous waste. The regulations designate those solid wastes that are dangerous or extremely hazardous to human health and the environment. The management of excavated contaminated soil from the Property would be conducted in accordance with these regulations to the extent that any dangerous wastes are discovered or generated during the cleanup action.
- Washington Solid Waste Management Act (Chapter 70.95 RCW) and its implementing regulation, Criteria for Municipal Solid Waste Landfills (Chapter 173-351 WAC). These regulations establish a comprehensive statewide program for solid waste management including proper handling and disposal. The management of any contaminated soil removed from the Property would be conducted in accordance with these regulations to the extent that this soil could be managed as solid waste instead of dangerous waste.
- Hazardous Waste Operations (Chapter 296-843 WAC). These requirements establish safety requirements for workers conducting investigation and cleanup operations at sites containing hazardous materials. These requirements would be applicable to onsite cleanup activities and would be addressed in a site health and safety plan prepared specifically for these activities.
- Federal Clean Water Act National Pollutant Discharge Elimination System (NPDES) Permit and State Construction Stormwater General Permit. Construction activities that disturb one or more acres of land typically need to obtain an NPDES Construction Stormwater General Permit from Ecology. A substantive requirement would be to prepare a stormwater pollution prevention plan (SWPPP) prior to the earthwork activities. The SWPPP would document planned procedures designed to prevent stormwater pollution by controlling erosion of exposed soil and by containing soil stockpiles and other materials that could contribute pollutants to stormwater.

6.0 IMPLEMENTATION SCHEDULE AND RESTORATION TIMEFRAME

The planned cleanup action will be implemented following the effective date of the PPCD and will be conducted as part of construction for Property development. The cleanup activities will begin with the removal and off-Property disposal of the approximately 1.5 ft of surface material from the west block of the Property that will be excavated as part of site preparation. The hotspot excavation will be conducted following removal of the surface material. The remaining cleanup action elements will be implemented as appropriate, as development construction progresses and as outlined in the schedule provided in Appendix B.

Construction design and engineering plans will be prepared to support implementation of the cleanup action. These plans will include: a soil and water handling and disposal plan, a stormwater pollution prevention plan (SWPPP), a dust suppression plan, a sampling and analysis plan for the hotspot excavation area, a health and safety plan for construction workers, and engineering plans for the application of the bioremediation amendment and the protective cap. Plans will also be developed to manage long-term operation and maintenance (O&M) of the protective cap, and to provide a conceptual-level outline of contingent groundwater treatment. The O&M plans will include routine evaluation of the storm drain pipes and other underground conduits associated with the Property to ensure the structure integrity as the subsurface piping ages. These plans will be completed prior to implementation of the cleanup action.

The restoration timeframe is expected to be the time at which development of the Property is complete. At this time, excavation and treatment of the hotspot excavation soil as described in Sections 3.1.1 and 3.1.2, excavation of construction soils across the west and east blocks as described in Section 3.1.3, and the surface cap or additional excavation/capping measures as described in Section 3.1.4 will be completed. The development will be implemented in phases, with construction on the west block of the Property completed first (Phase I). As noted above, the completion of construction on the west block will include the hotspot excavation and treatment in the former gasoline station area, and the paving on the east block of the Property will be repaired, replaced (as necessary), and maintained as an effective cap until construction is completed on the east block (Phase II). Institutional controls and groundwater compliance monitoring will go into effect following the completion of construction on the west block of the Property.

Groundwater compliance monitoring as mentioned above and described in Appendix A will begin following completion of construction on the west block of the Property, which includes the installation of the additional compliance groundwater monitoring wells. Any wells that are damaged or destroyed as part of construction on the east block of the Property will be replaced. Capping (via installation of

building foundations and added concrete in areas outside of the building foundation footprints), will be accomplished in conjunction with the construction for Property development. The contingency for groundwater treatment will remain in effect for the duration of the groundwater compliance monitoring.

7.0 REFERENCES

Ecology. 2009a. Letter: *Prospective Purchaser Agreement/Consent Decree – Qwest Field – North Lot, Seattle.* From Jay J. Manning, Director, Washington State Department of Ecology, to Kevin Daniels, Present, Daniels Development Co., LLC. April 22.

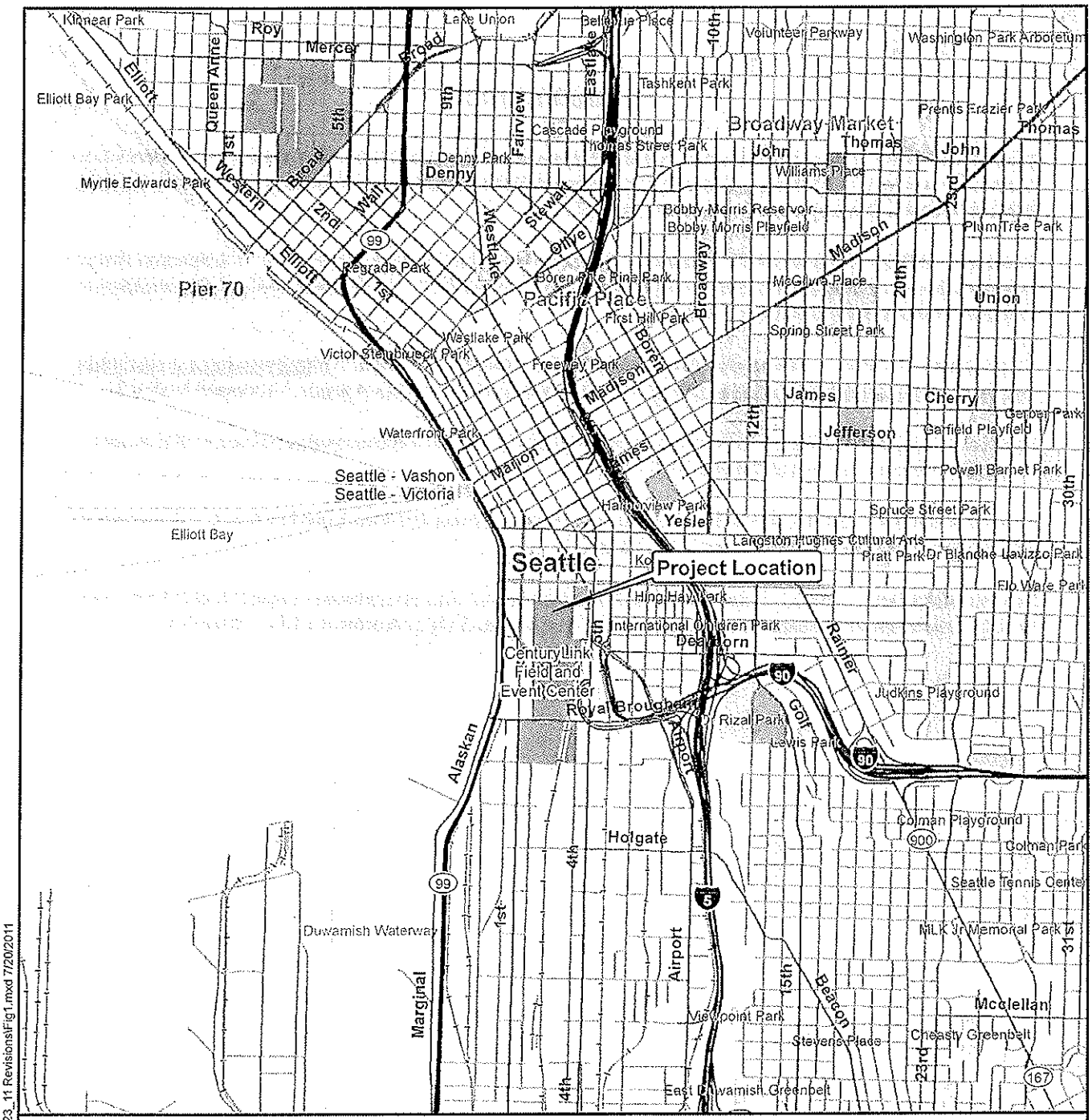
Ecology. 2009b. Review Draft: *Guidance for Evaluating Soil Vapor Intrusion in Washington State: Investigation and Remedial Action.* Publication No. 09-09-047. Washington State Department of Ecology Toxics Cleanup Program. October.

EPA website. 2011. *National Recommended Water Quality Criteria.* http://water.epa.gov/scitech/swguidance/standards/current/index.cfm. U.S. Environmental Protection Agency. Accessed March 21.

Landau Associates. 2011a. Report: *Feasibility Study, North Lot Development, Seattle, Washington.* Prepared for North Lot Development, LLC. May 23.

Landau Associates. 2011b. *Remedial Investigation Report, North Lot Development, Seattle, Washington.* Prepared for North Lot Development, LLC. May 23.

Landau Associates. 2007. Report: *Phase I Environmental Site Assessment, Qwest Field North Lot, Seattle, Washington.* Prepared for Nitze Stagen & Co., Inc. and Opus Northwest LLC. March 28.

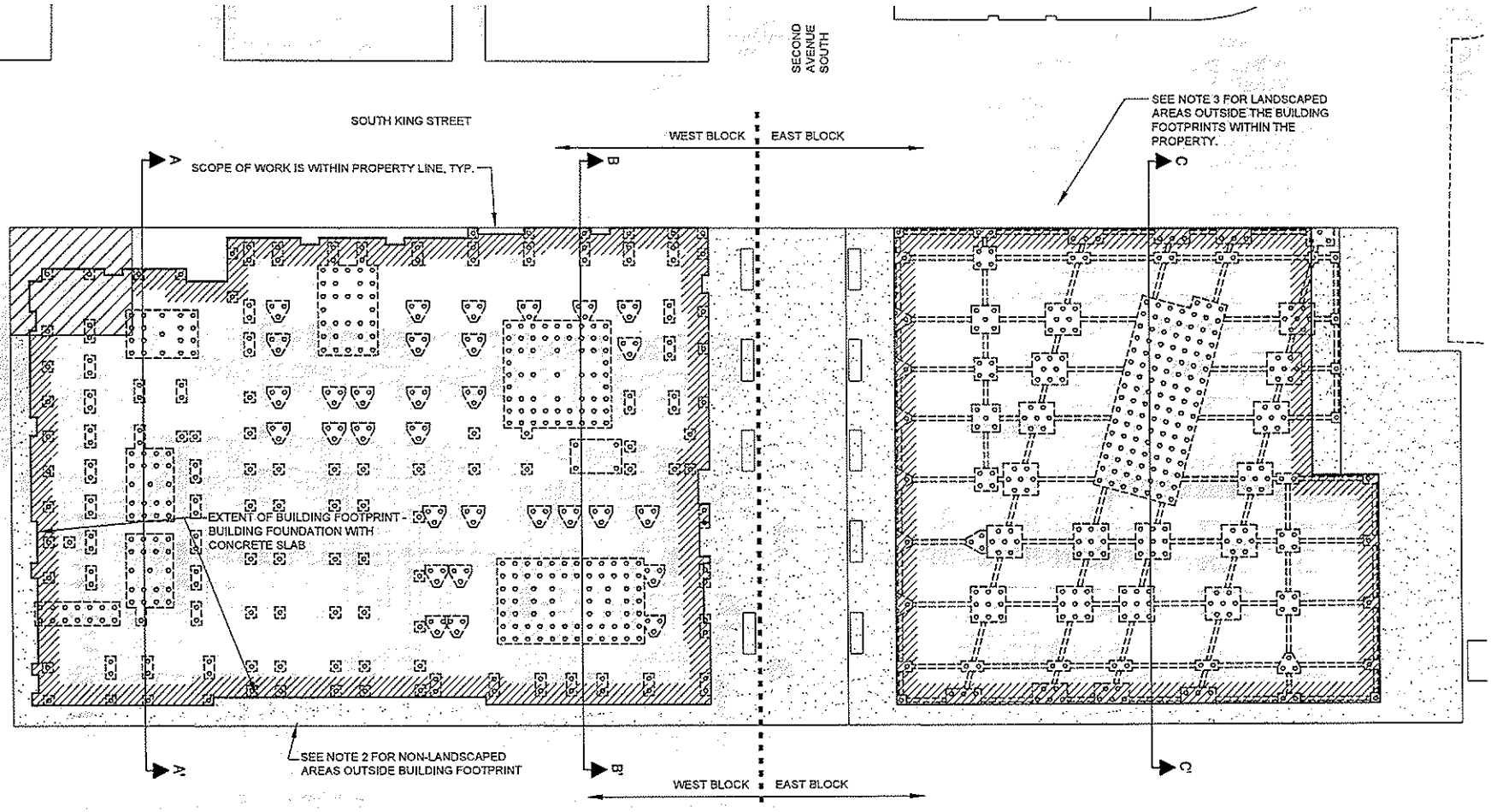


Data Source: ESRI 2008

Y:\Projects\10140001\Mapdocs\North Lot RI\Revised\3_23_11 Revisions\Fig1.mxd 7/20/2011

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Vicinity Map**	Figure **1**



NOTES

1. APPROXIMATELY 18" OF MATERIAL TO BE REMOVED ACROSS ENTIRE SITE, PER PHASE, WITHIN PROPERTY BOUNDARIES.
2. CAP NON-LANDSCAPED AREAS OUTSIDE OF BUILDING FOOTPRINT WITH CONCRETE.
3. LANDSCAPED AREAS - EXCAVATE 5'-0" BGS AND PROVIDE MEMBRANE, FILL WITH CLEAN SOIL.
4. UNTIL COMPLETION OF EAST BLOCK EXISTING ASPHALT PAVING WILL BE MAINTAINED.
5. SCOPE OF WORK IS WITHIN PROPERTY LINE.

LEGEND

ASSUMED AREA OF EXCAVATION TO APPROXIMATELY 8 FT BGS (OR GROUNDWATER ELEVATION)- THE LATERAL EXTENT OF THE EXCAVATION WILL BE DETERMINED IN THE FIELD BASED ON FIELD SCREENING AND THE LABORATORY RESULTS FOR CONFIRMATION SAMPLES COLLECTED AT THE LIMITS OF THE EXCAVATION.

A A' CROSS-SECTION LOCATION AND DESIGNATION, SEE FIGURES 3A, 3B, AND 3C.

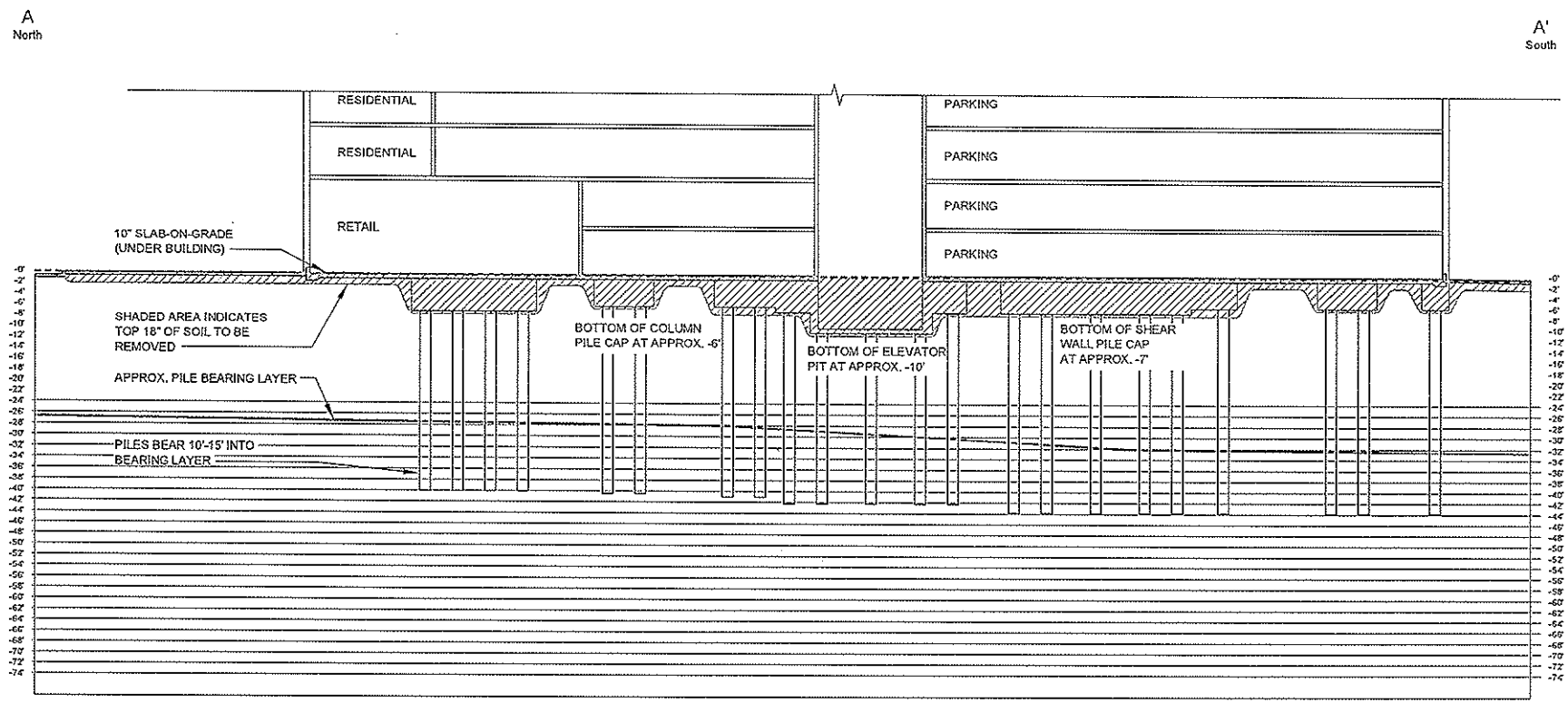
0 50 100
Scale in Feet

Base map source: North Lot Development Team (March 15, 2011)

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Conceptual Property Development Plan**	Figure **2**

North Lot | V:\101\405\050\053\2011-3-15\Figure 2_3ABC.dwg (A) Figure 2* 5/19/2011



Base map source: North Lot Development Team (March 15, 2011)

0 20 40
Scale in Feet

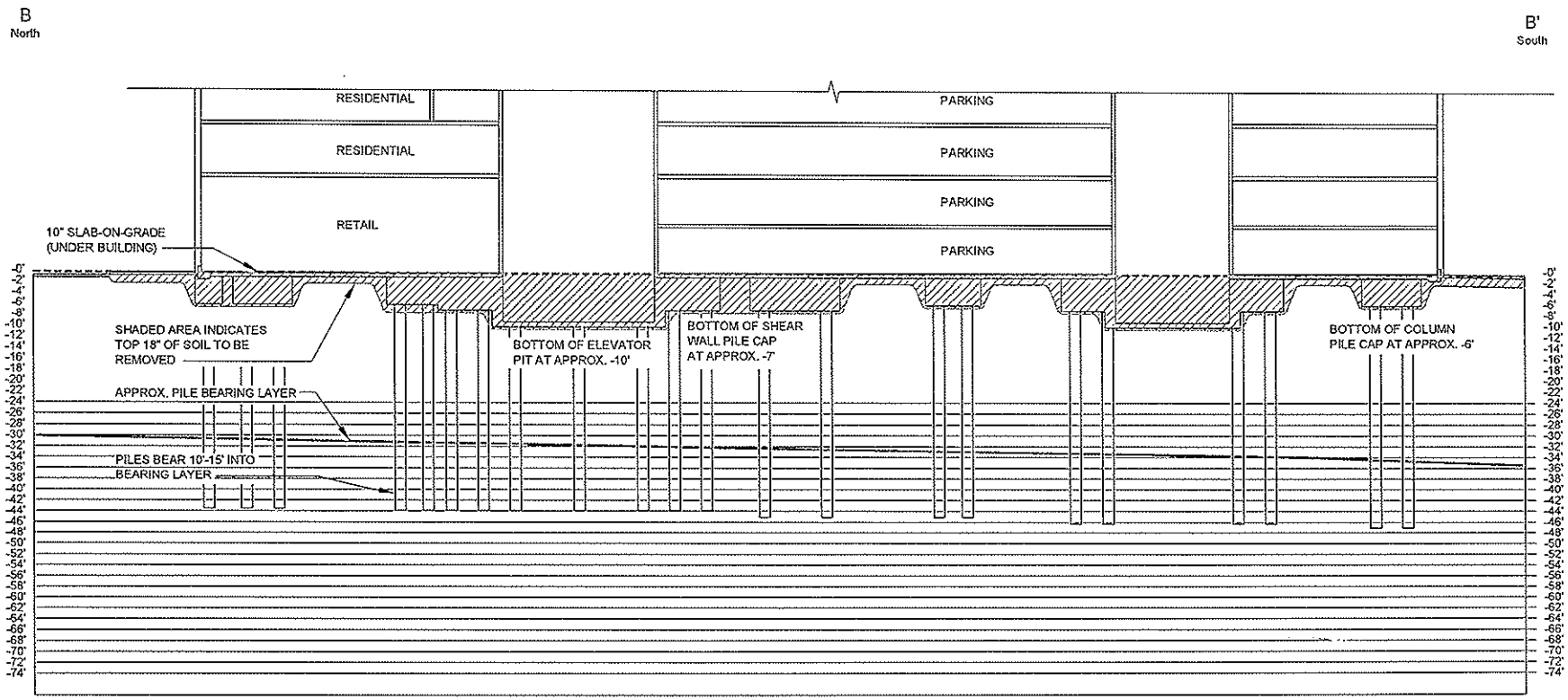
LANDAU ASSOCIATES

North Lot Development
Seattle, Washington

Conceptual Property Cross Section A-A'

Figure
3A

North Lot | V:\1014\001\050.05\3\2011-3-15\Figure 2_3ABC.dwg (A) 'Figure 3A' 3/22/2011



Base map source: North Lot Development Team (March 15, 2011)

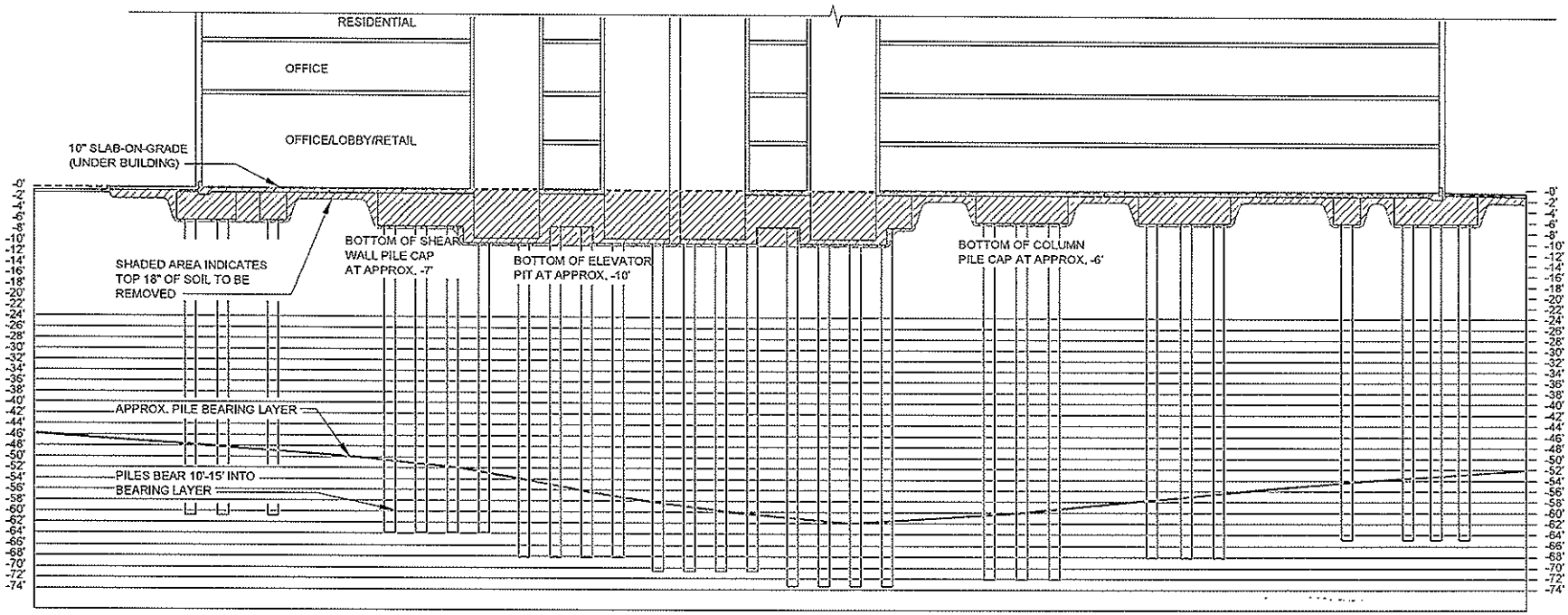
0 20 40
Scale in Feet

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Conceptual Property Cross Section B-B'**	Figure 3B

C
North

C'
South



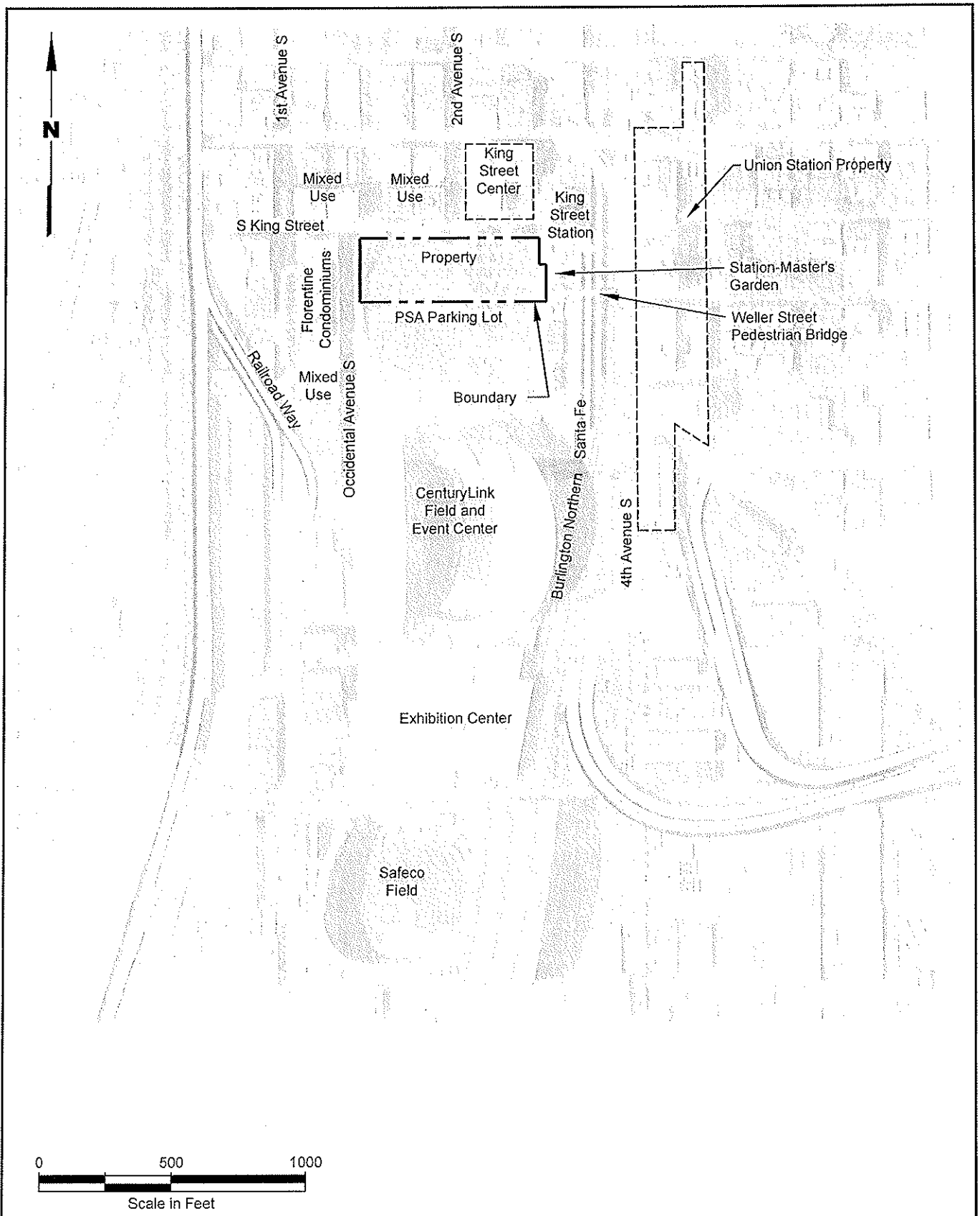
Base map source: North Lot Development Team (March 15, 2011)

0 20 40
Scale in Feet

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	Conceptual Property Cross Section C-C'	Figure 3C

North Lot | V:\0104\001\050.03\20011-3-15\Figure 2_3ABC.dwg (A) *Figure 3C* 3/23/2011



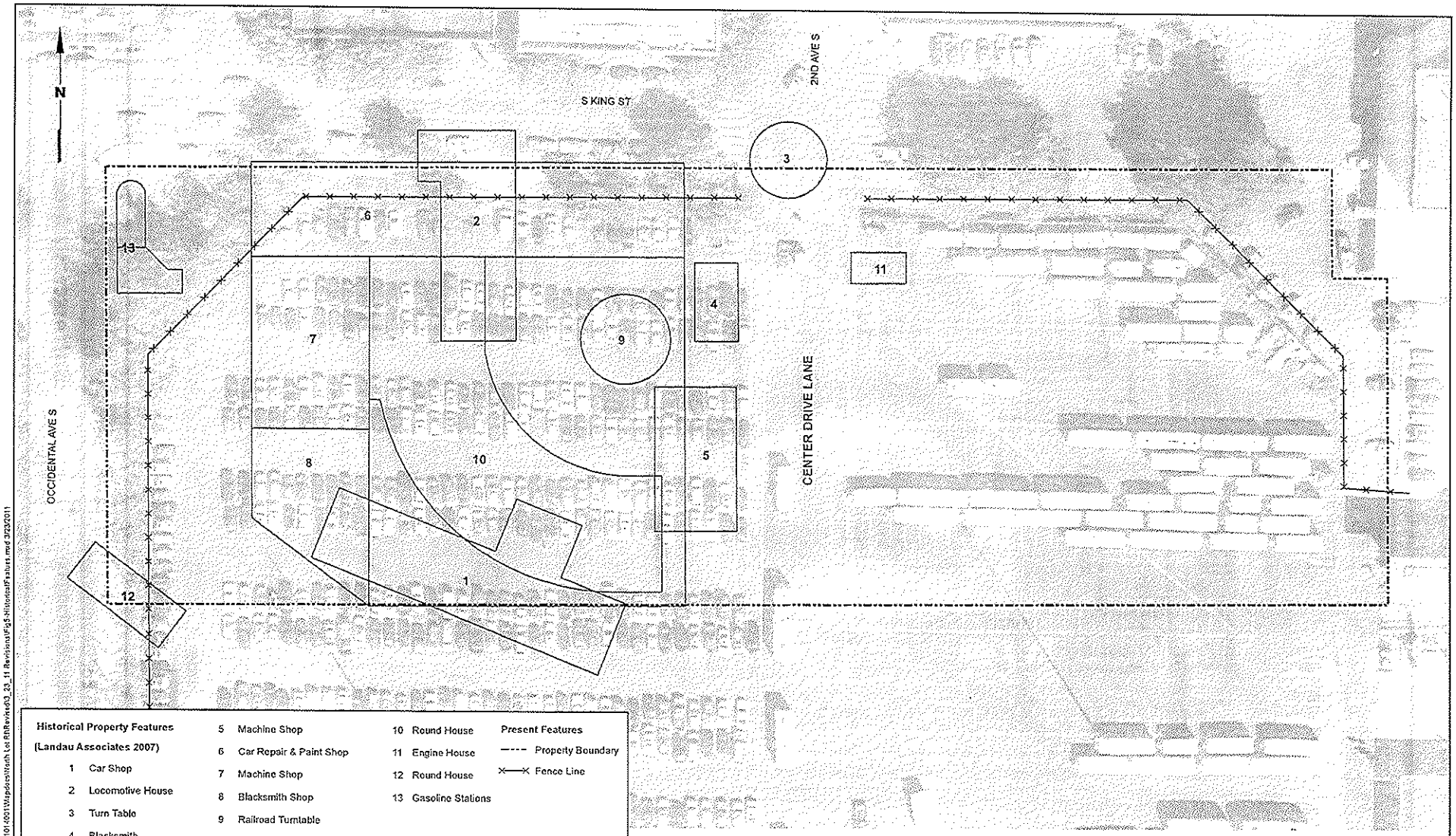
Qwest Field | V:\1014\050\Conceptual\Figure 4.dwg (A) "Figure 4" 7/20/2011

LANDAU ASSOCIATES

North Lot Development
Seattle, Washington

Property Plan and Surrounding Area

Figure
4



Historical Property Features
(Landau Associates 2007)

1 Car Shop
2 Locomotive House
3 Turn Table
4 Blacksmith
5 Machine Shop
6 Car Repair & Paint Shop
7 Machine Shop
8 Blacksmith Shop
9 Railroad Turntable
10 Round House
11 Engine House
12 Round House
13 Gasoline Stations

Present Features
Property Boundary
Fence Line

Data Source: Triad Boundary Survey, King County

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

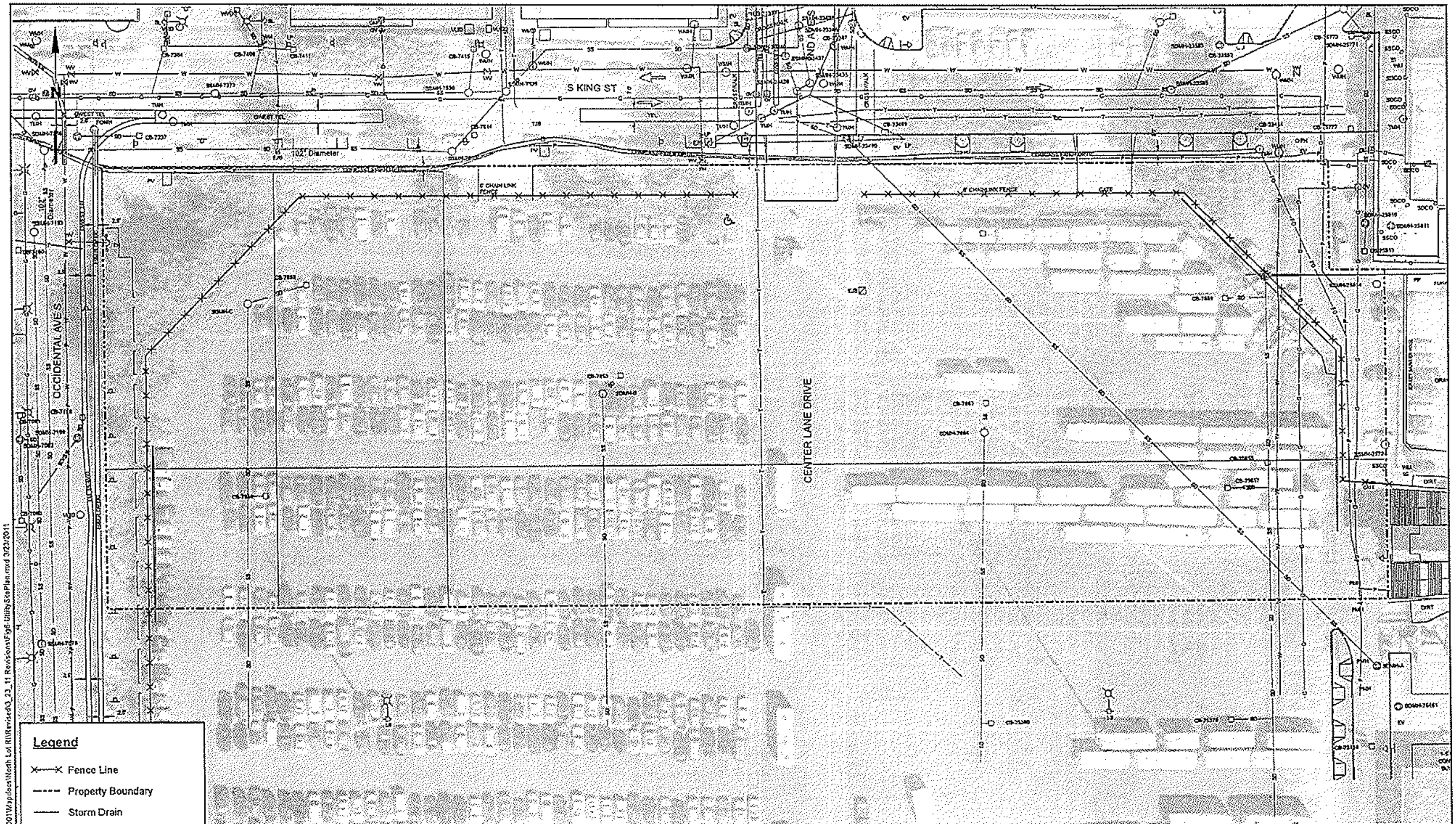
0 50 100
Scale in Feet

LANDAU ASSOCIATES

North Lot Development
Seattle, Washington

Historical Property Features

Figure 5



Data Source: Triad Boundary Survey, King County

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

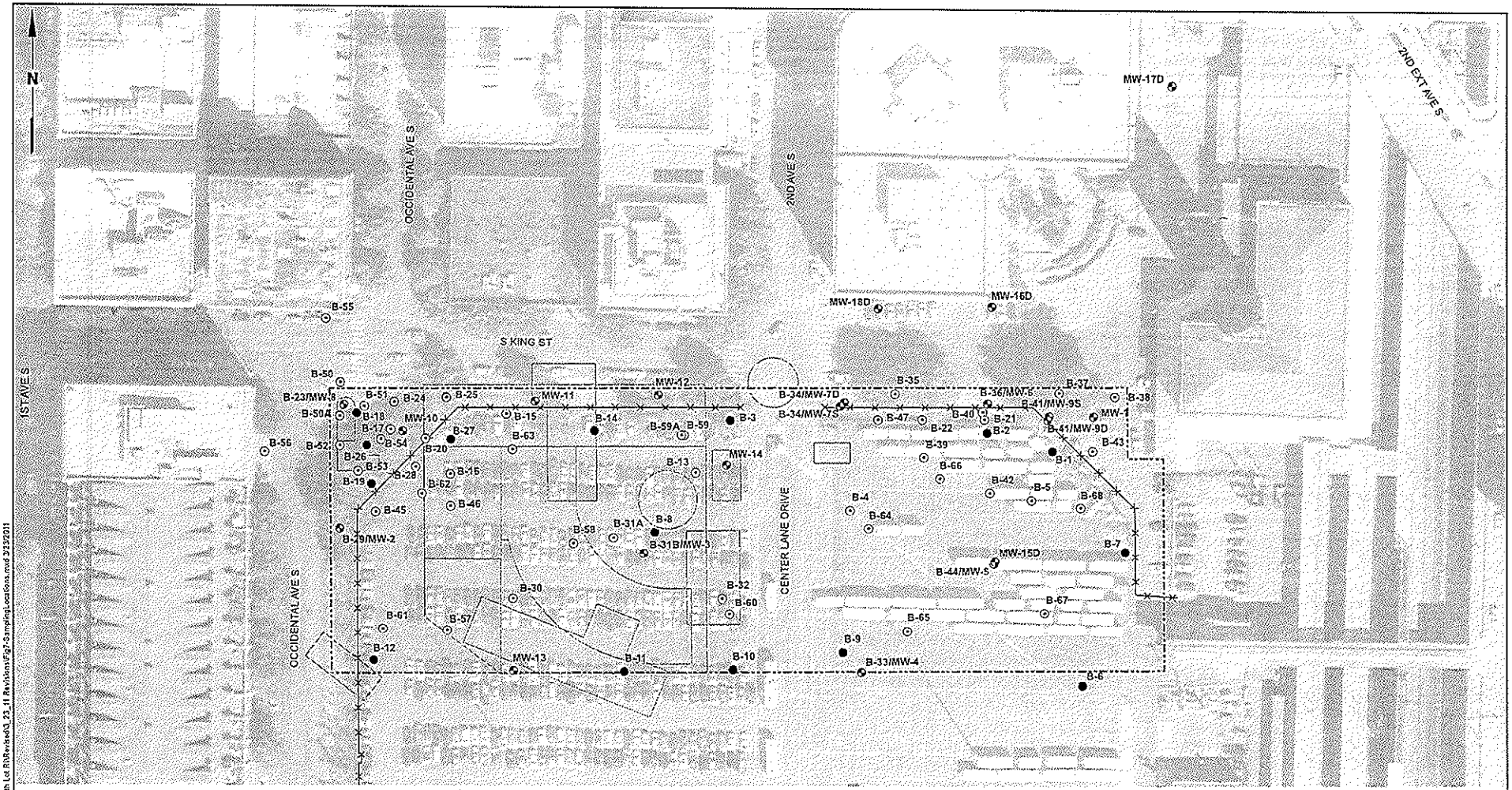
0 50 100
Scale in Feet

LANDAU ASSOCIATES

North Lot Development
Seattle, Washington

Property Plan and Existing Features

Figure 6



Legend

- Direct-Push Soil Boring and Monitoring Well Location
- Direct-Push Soil Boring Location
- Direct-Push Soil and Groundwater Sample Location
- Historical Building Outlines
- Fence Line
- Property Boundary

0 80 160

Scale in Feet

Data Source: Tried Boundary Survey, King County

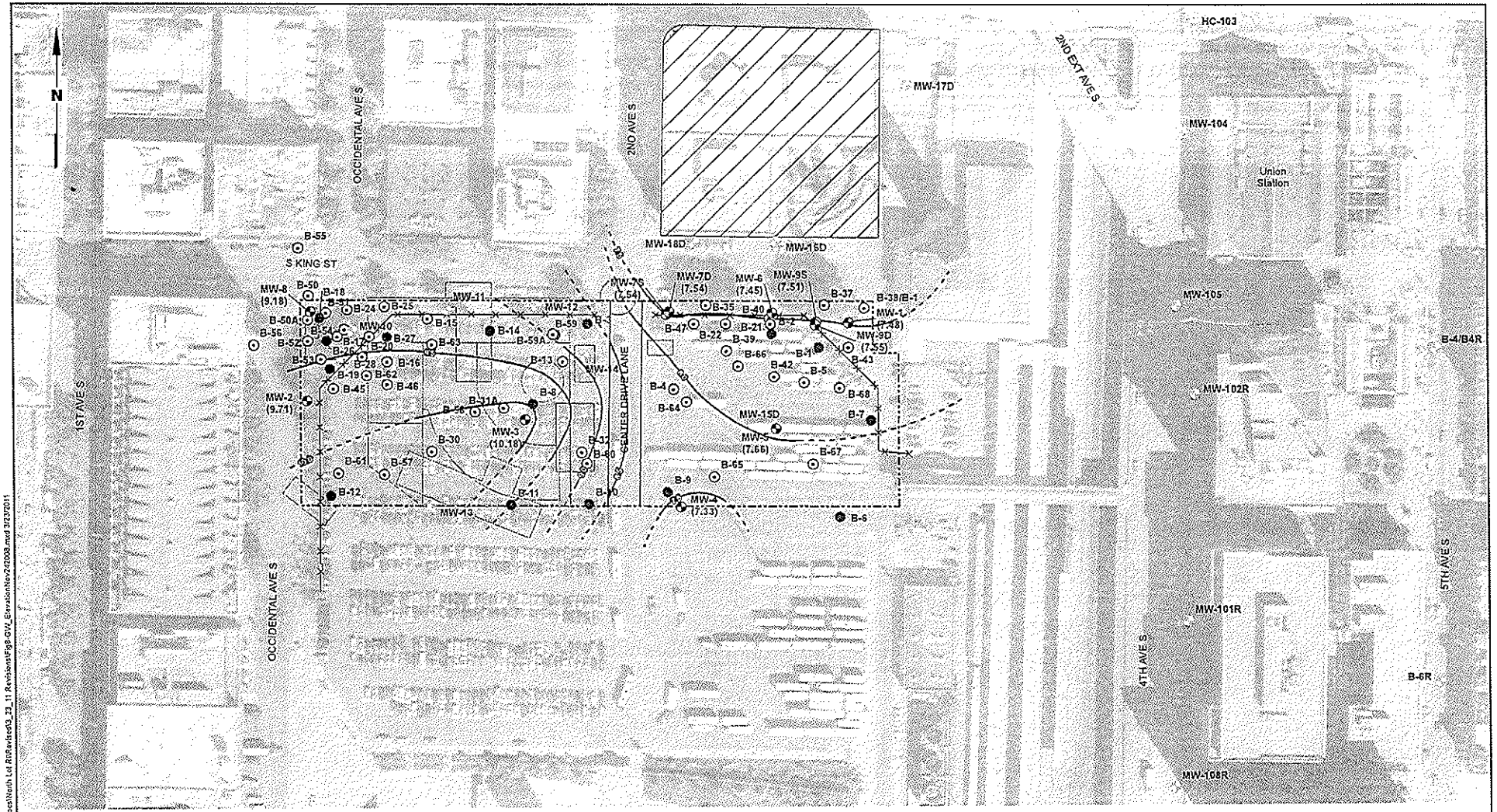
Note

1. Refer to Figure 3 for Historical Property Features Legend.
2. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Sampling Locations**	Figure 7

X:\Projects\101.4001\Graphics\North Lot RI\Revised\3_23_11 Revision\Fig7-SamplingLocations.mxd 3/23/2011



Legend

- MW-4 (7.33) — Direct-Push Soil Boring and Monitoring Well Location with Groundwater Elevation (ft)
- Direct-Push Soil Boring and Monitoring Well Location
- Direct-Push Soil Boring Location
- Direct-Push Soil and Groundwater Sample Location
- Historical Building Outlines
- Fence Line
- Property Boundary
- Groundwater Elevation Contour (ft)
- Area Bounded by Foundation Drain

Note

1. Includes groundwater elevation data from wells MW-1 through MW-9. Wells MW-10 through MW-18D not yet installed. Union Station wells to the east not measured for this round.
2. Refer to Figure 3 for Historical Property Features Legend.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

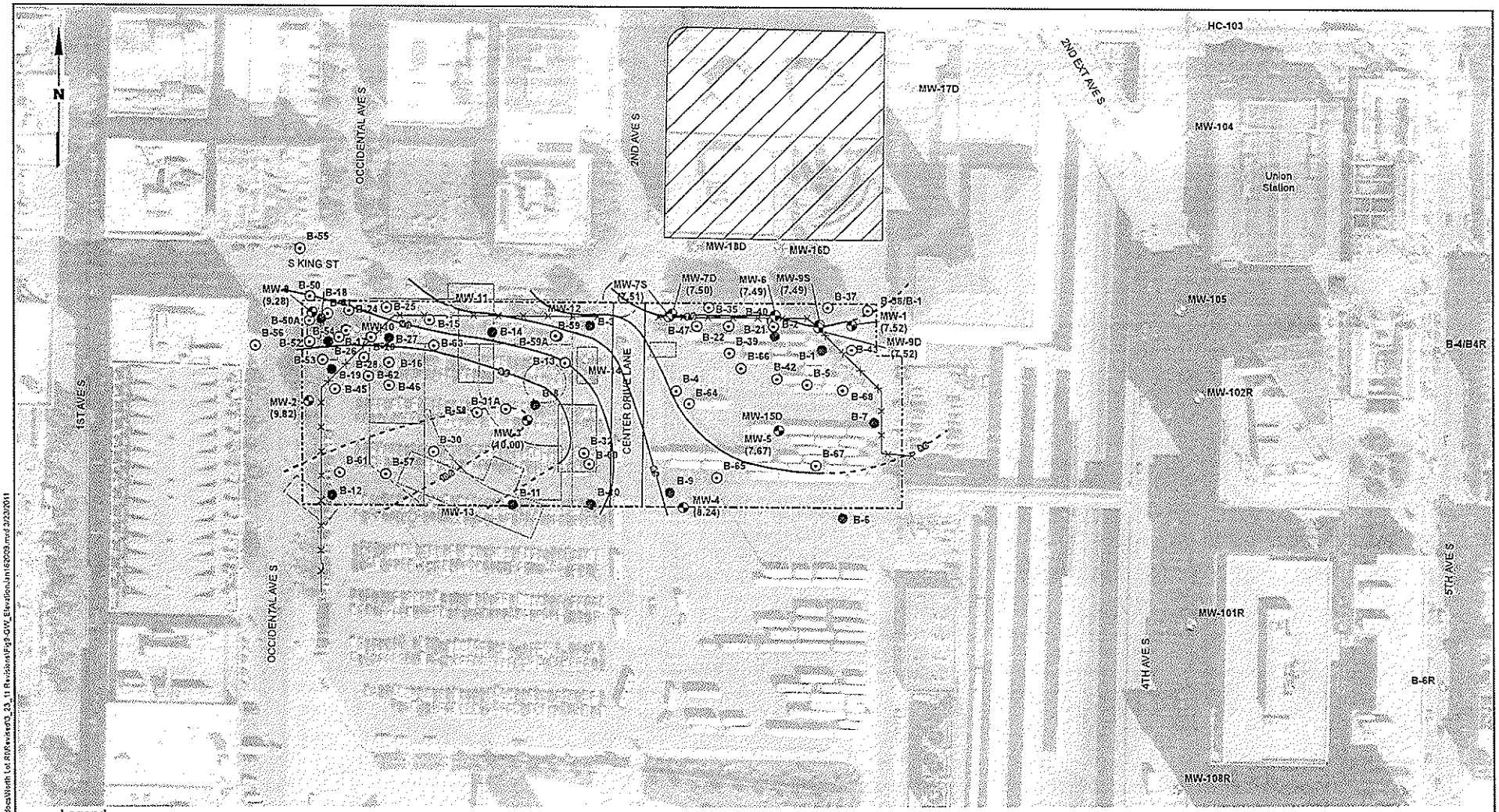
0 110 220
Scale in Feet

Data Source: Triad Boundary Survey, King County

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	Groundwater Elevation Contours for November 24, 2008	Figure 8

Y:\Projects\101400\Graphics\North Lot Re\Revised\3_23_11 Revisions\Fig8-GW_ElevationNov242008.mxd 3/23/2011



Legend

- MW-4 (8.24) — Direct-Push Soil Boring and Monitoring Well Location with Groundwater Elevation (ft)
- Direct-Push Soil Boring and Monitoring Well Location
- Direct-Push Soil Boring Location
- Direct-Push Soil and Groundwater Sample Location
- Historical Building Outlines
- Fence Line
- Property Boundary
- Groundwater Elevation Contour (ft)
- Area Bounded by Foundation Drain

Note

1. Includes groundwater elevation data from wells MW-1 through MW-9. Wells MW-10 through MW-18D not yet installed. Union Station wells to the east not measured for this round.
2. Refer to Figure 3 for Historical Property Features Legend.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

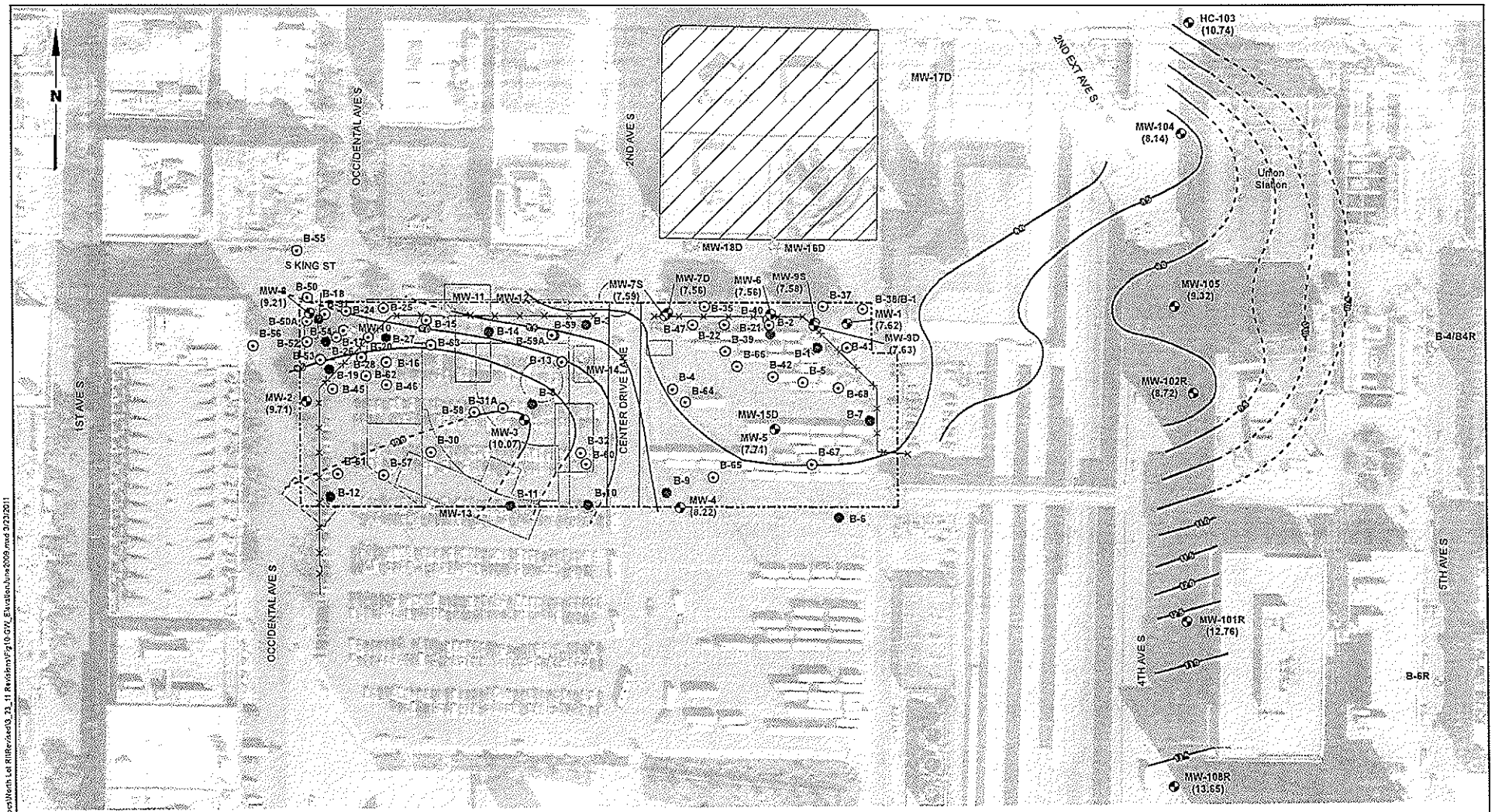
0 110 220
Scale in Feet

Data Source: Triad Boundary Survey, King County

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Groundwater Elevation Contours for January 16, 2009**	Figure 9

Y:\Projects\191400\Updates\North Lot RI\Revised\3_23_11 Revisions\Fig3-GW_Elevation Jan162009.mxd 3/23/2011



Legend

- MW-4 (8.22) — Direct-Push Soil Boring and Monitoring Well Location with Groundwater Elevation (ft)
- Direct-Push Soil Boring and Monitoring Well Location
- Direct-Push Soil Boring Location
- Direct-Push Soil and Groundwater Sample Location
- Historical Building Outlines
- Fence Line
- Property Boundary
- Groundwater Elevation Contour (ft)
- Area Bounded by Foundation Drain

Note

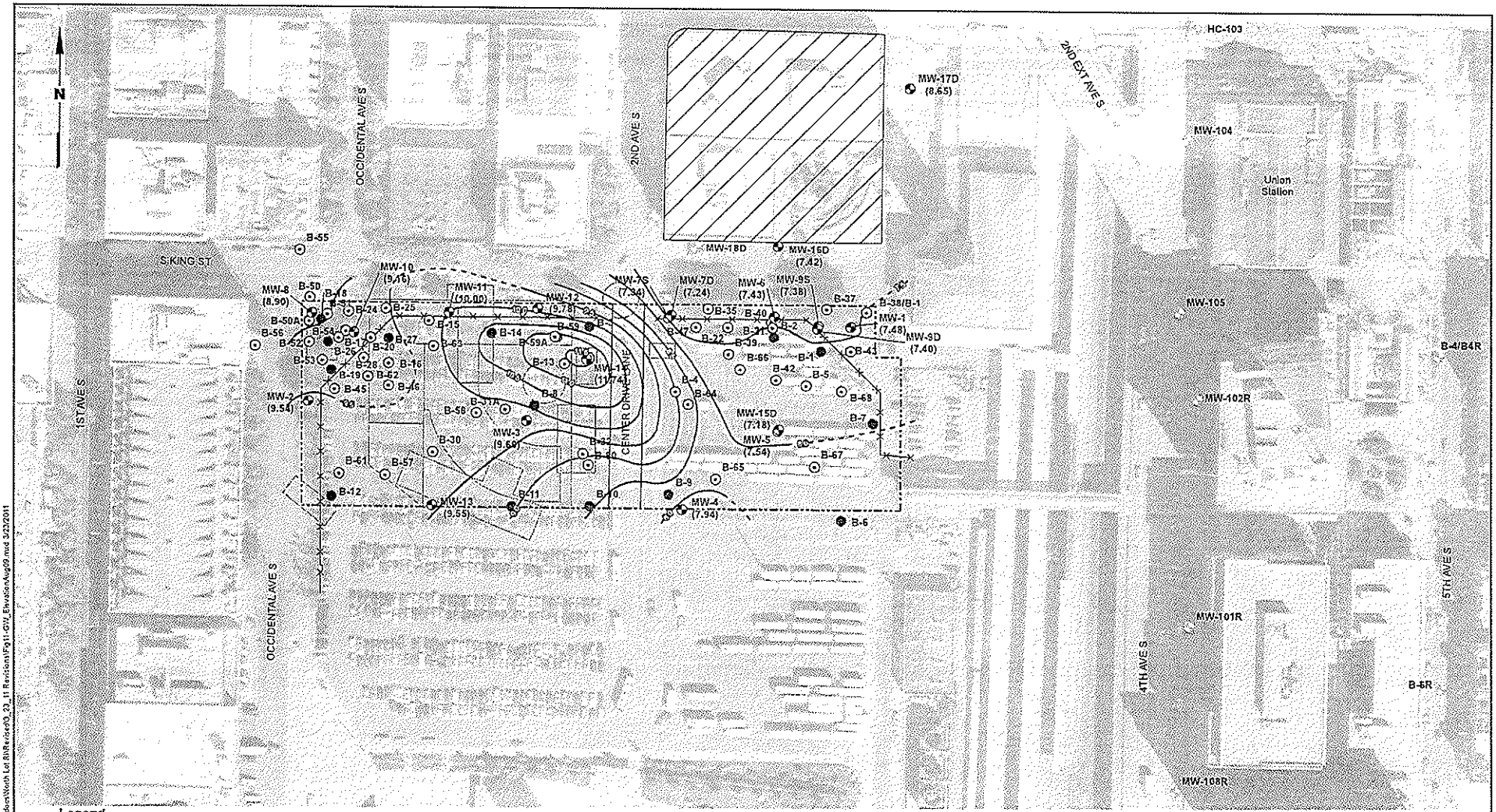
1. Includes groundwater elevation data from wells MW-1 through MW-9. Wells MW-10 through MW-18D not yet installed.
2. Refer to Figure 3 for Historical Property Features Legend.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

Data Source: Triad Boundary Survey, King County

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	Groundwater Elevation Contours for June 3, 2009	Figure 10

Y:\Projects\101409\Mapdocs\North Lot RI\Revised\3_23_11 Revisions\Fig10-GW_Elevation-June2009.mxd 3/23/2011



Legend

- MW-4 (7.94) — Direct-Push Soil Boring and Monitoring Well Location with Groundwater Elevation (ft)
- Direct-Push Soil Boring and Monitoring Well Location
- Direct-Push Soil Boring Location
- Direct-Push Soil and Groundwater Sample Location
- Historical Building Outlines
- Fence Line
- Property Boundary
- Groundwater Elevation Contour (ft)
- Area Bounded by Foundation Drain

Note

3. Includes groundwater elevation data from wells MW-1 through MW-17D. Union Station wells to the east were not measured for this round.
2. Refer to Figure 3 for Historical Property Features Legend.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

0 110 220
Scale in Feet

Data Source: Triad Boundary Survey, King County

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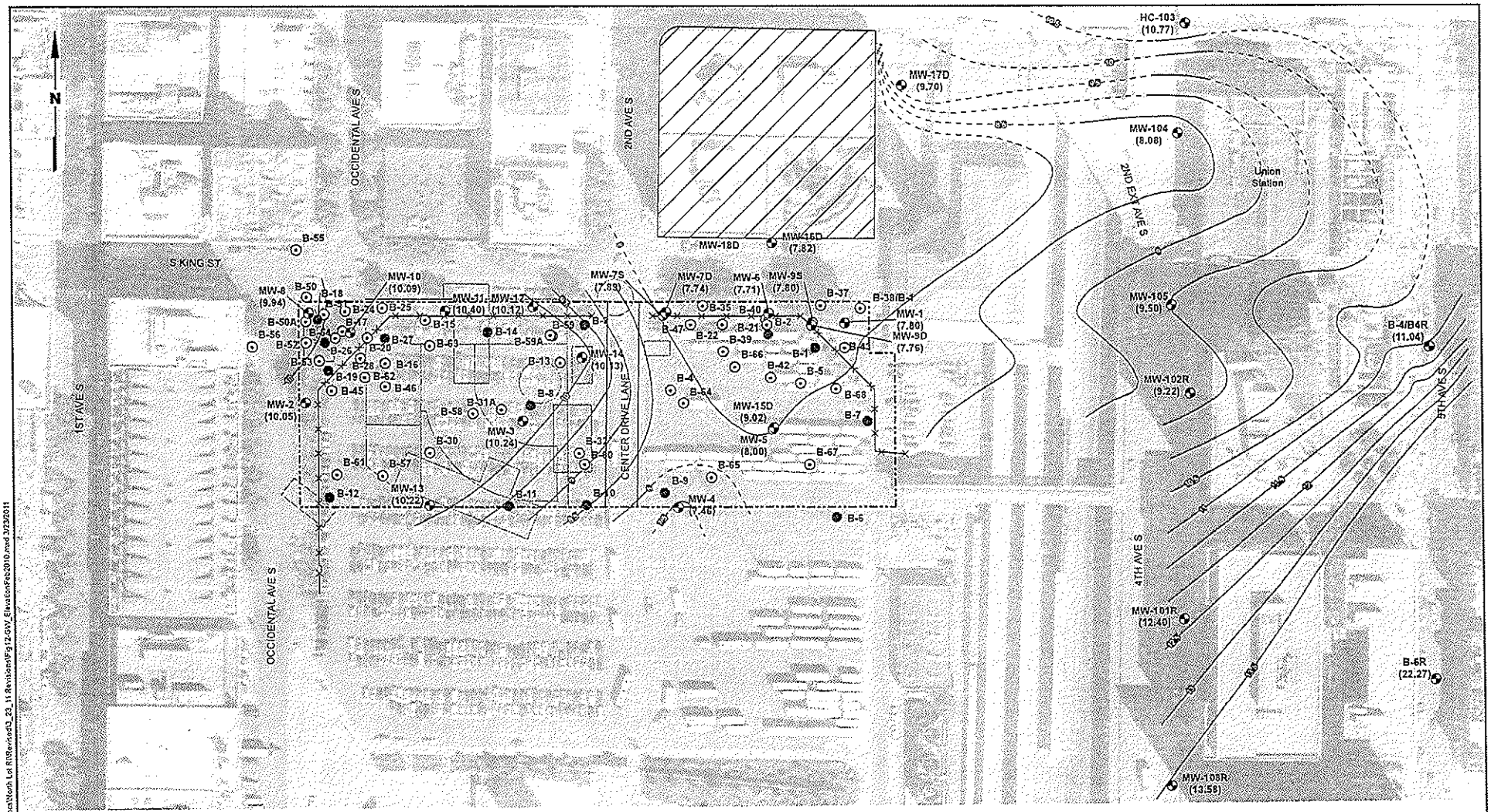
North Lot Development Seattle, Washington	**Groundwater Elevation Contours for August 25, 2009**	Figure 11

Y:\Projects\1010401\Maps\docs\North Lot 8\Revised\0_23_11 Revisions\Fig11-GW_ElevationAug09.mxd 3/23/2011



Legend

- MW-4 (7.46) — Direct-Push Soil Boring and Monitoring Well Location with Groundwater Elevation (ft)
- Direct-Push Soil Boring and Monitoring Well Location
- Direct-Push Soil Boring Location
- Direct-Push Soil and Groundwater Sample Location
- Historical Building Outlines
- Fence Line
- Property Boundary
- Groundwater Elevation Contour (ft)
- Area Bounded by Foundation Drain

Note

1. Includes groundwater elevation data from wells MW-1 through MW-17D and the Union Station wells to the east.
2. Refer to Figure 3 for Historical Property Features Legend.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

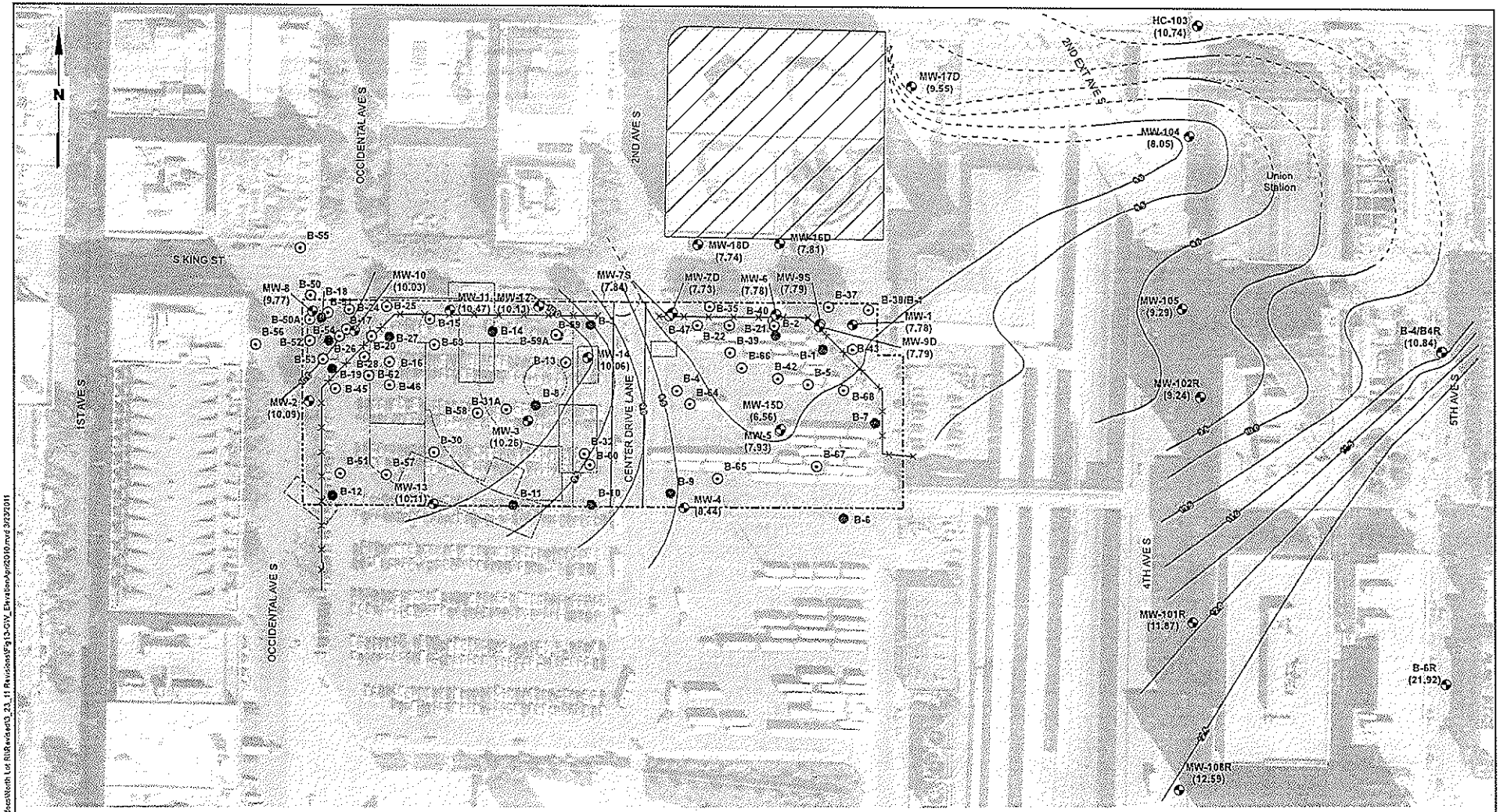
0 110 220
Scale in Feet

Data Source: Triad Boundary Survey, King County

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	Groundwater Elevation Contours for February 24, 2010	Figure 12

Y:\Projects\104001\Graphics\North Lot RI\Revised\3_23_11 Revisions\Fig12-GWE_ElevationFeb2010.mxd 3/23/2011



Legend

- MW-4 (7.46) — Direct-Push Soil Boring and Monitoring Well Location with Groundwater Elevation (ft)
- Direct-Push Soil Boring Location
- Direct-Push Soil and Groundwater Sample Location
- Historical Building Outlines
- Fence Line
- Property Boundary
- Groundwater Elevation Contour (ft)
- Area Bounded by Foundation Drain

Note

1. Includes groundwater elevation data from wells MW-1 through MW-18D and the Union Station wells to the east.
2. Refer to Figure 3 for Historical Property Features Legend.
3. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.

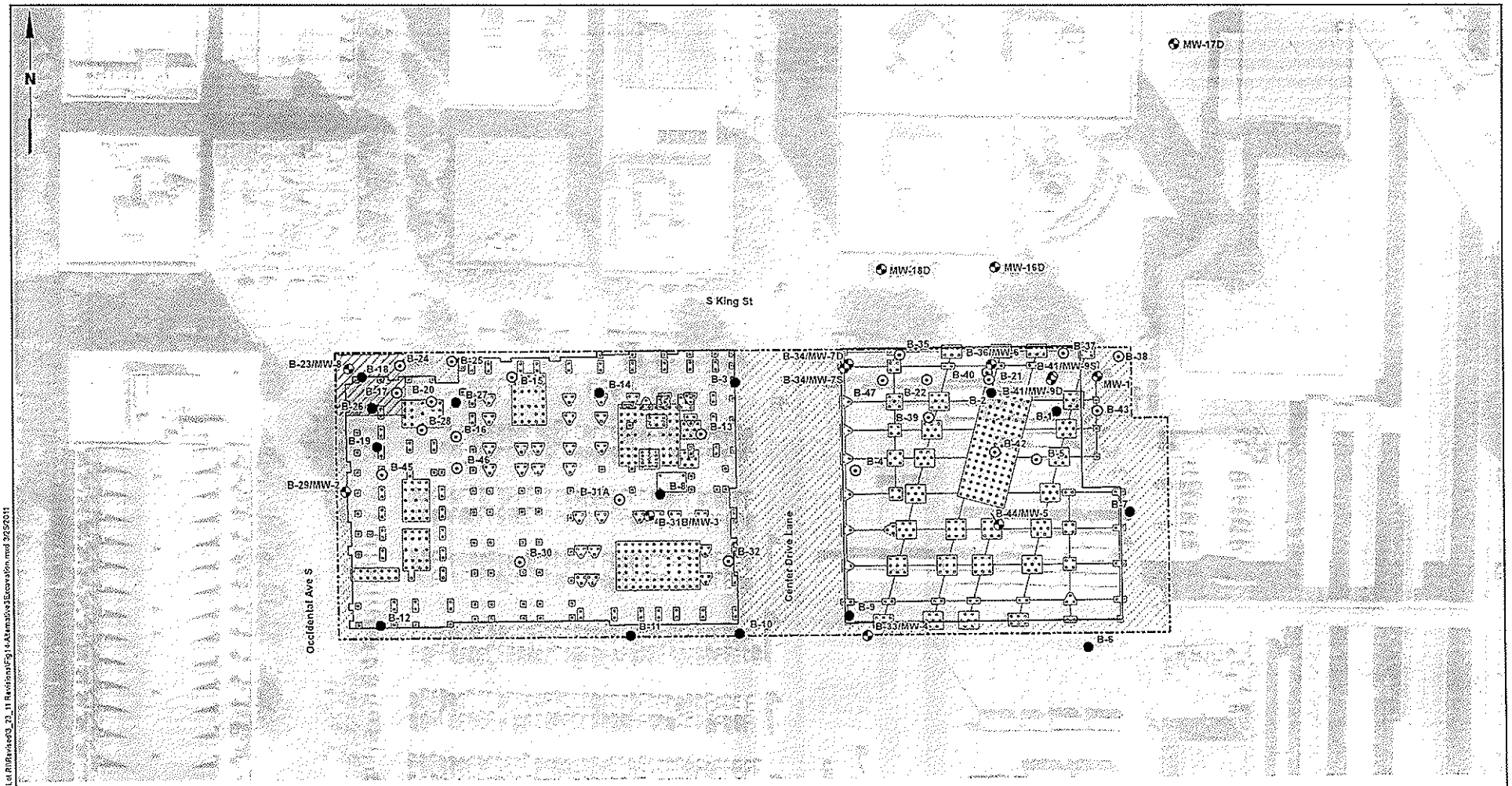
0 110 220
Scale in Feet

Data Source: Triad Boundary Survey, King County

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	Groundwater Elevation Contours for April 22, 2010	Figure 13

Y:\Projects\1610010\Updates\North Lot RI\Revised\3_23_11 Revisions\Fig13-GW_ElevationApril2010.mxd 3/23/2011



Legend

- Direct-Push Soil Boring and Monitoring Well Location
- Direct-Push Soil Boring Location
- Direct-Push Soil and Groundwater Sample Location
- Site Boundary
- Assumed Area of Excavation to Approximately 8 ft BGS (or groundwater elevation)- The lateral extent of the excavation will be determined in the field based on field screening and the laboratory results for confirmation samples collected at the limits of the excavation.
- Area of Excavation to Approximately 5 ft BGS (soil located outside the building footprint but within the property boundary). Concrete cap may be applied in lieu of excavation to 5 ft BGS as described in the FS text.

0 80 160
Scale in Feet

Data Source: Triad Boundary Survey, King County

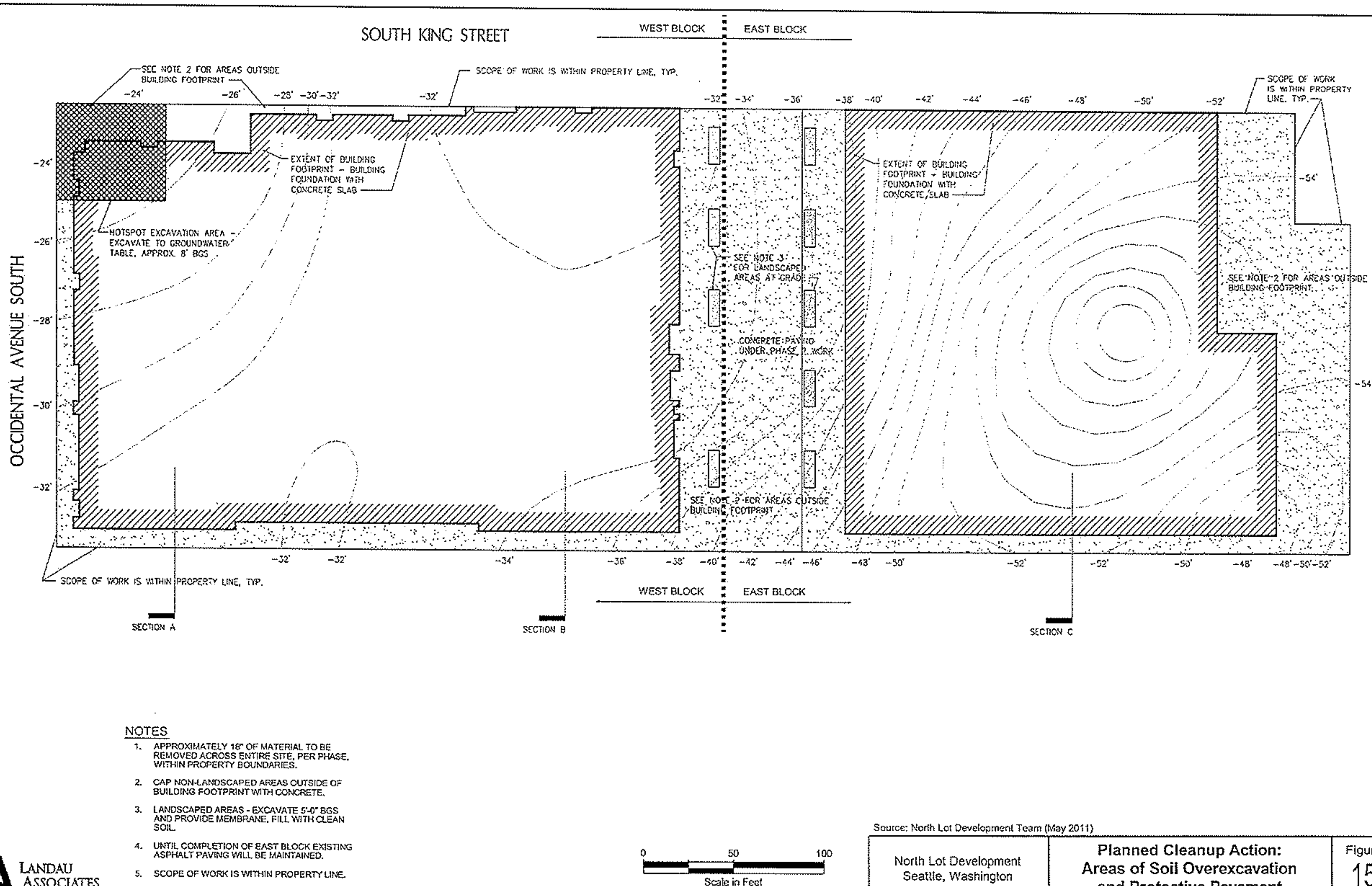
Note

1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
2. Building foundation plans from North Lot Development CAD files data February 25, 2011.

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Planned Cleanup Action Conceptual Excavation Plan**	Figure 14

y:\Projects\01-001\Maps\eis\North Lot RI\Revised\3_23_11 Revisions\Fig14-Alternative3Excavation.mxd 3/23/2011



NOTES

1. APPROXIMATELY 18" OF MATERIAL TO BE REMOVED ACROSS ENTIRE SITE, PER PHASE, WITHIN PROPERTY BOUNDARIES.
2. CAP NON-LANDSCAPED AREAS OUTSIDE OF BUILDING FOOTPRINT WITH CONCRETE.
3. LANDSCAPED AREAS - EXCAVATE 5'-0" BGS AND PROVIDE MEMBRANE, FILL WITH CLEAN SOIL.
4. UNTIL COMPLETION OF EAST BLOCK EXISTING ASPHALT PAVING WILL BE MAINTAINED.
5. SCOPE OF WORK IS WITHIN PROPERTY LINE.

Source: North Lot Development Team (May 2011)

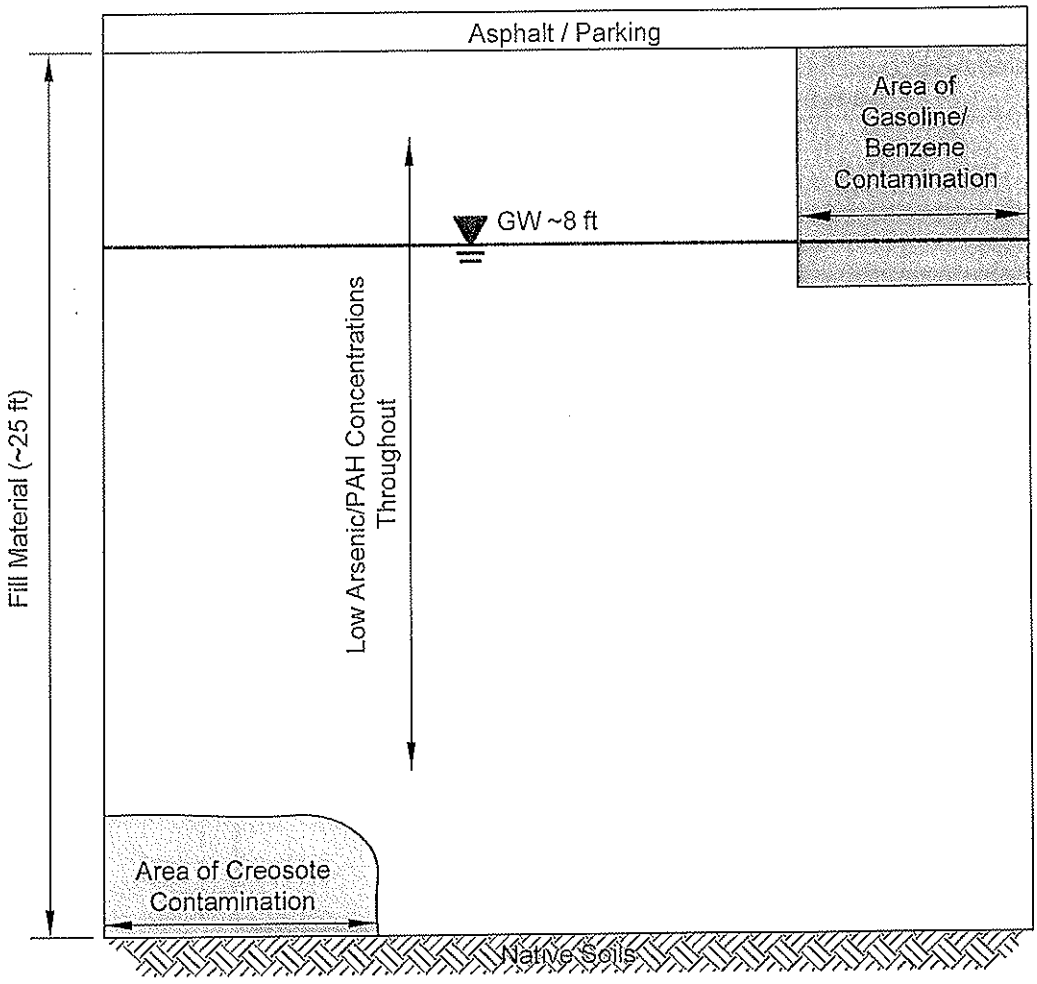
LANDAU ASSOCIATES

North Lot Development
Seattle, Washington

Planned Cleanup Action: Areas of Soil Overexcavation and Protective Pavement

Figure 15

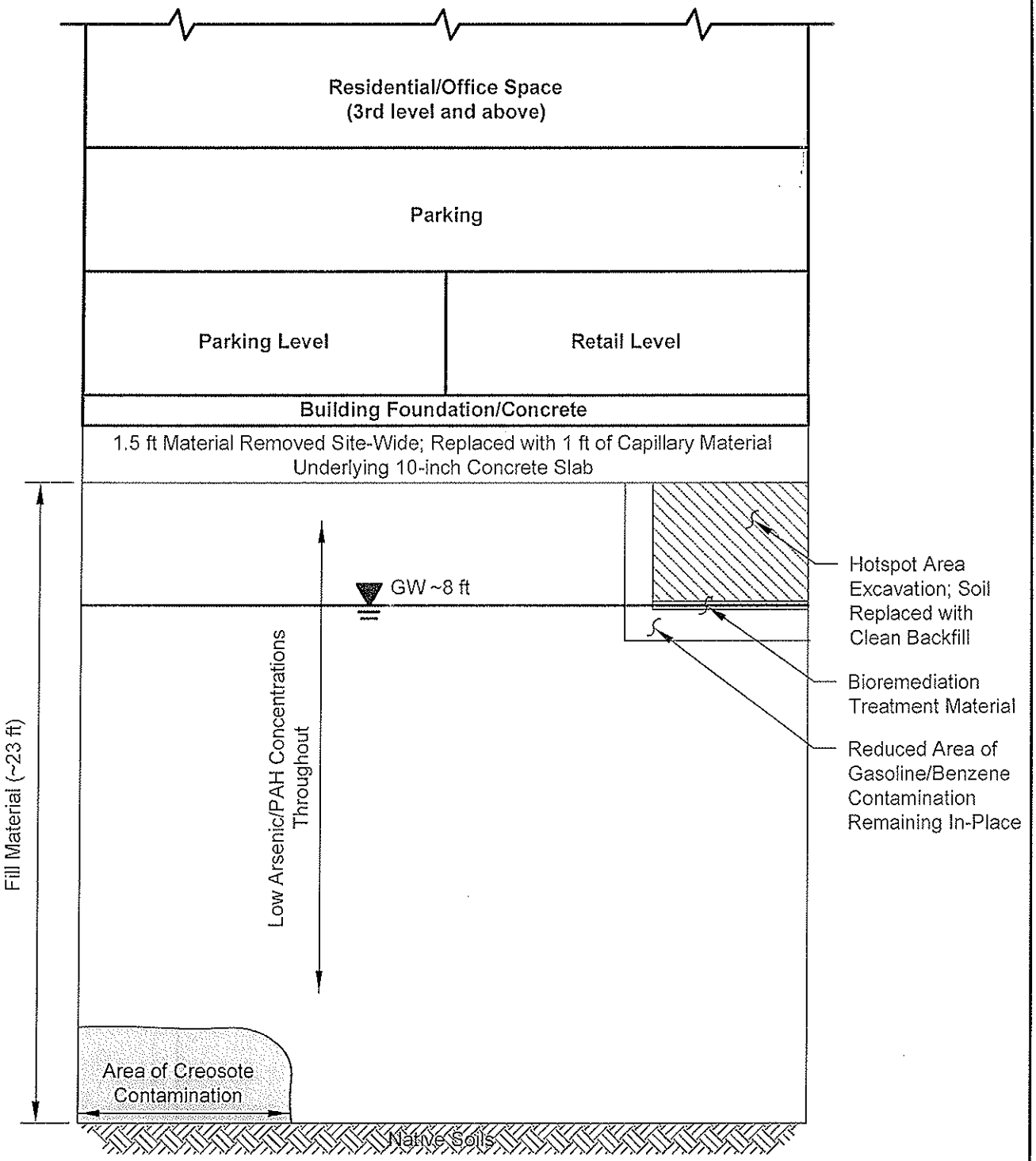
Qwest Field | V:\1014\050\Conceptual\Figure 15.dwg (A) "Figure 15" 5/19/2011



Qwest Field | V:\1014\050\Conceptual\Figure 16_17.dwg (A) "Figure 16" 5/17/2011

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Conceptual Site Cross Section: Current Property Conditions**	Figure 16



Qwest Field | V:\1014\050\Conceptual\Figure 16_17.dwg (A) 'Figure 17" 5/17/2011

LANDAU ASSOCIATES

North Lot Development Seattle, Washington	**Conceptual Site Cross Section: Post-Planned Cleanup Action**	Figure 17

TABLE 1
SOIL CLEANUP LEVELS FOR DETECTED CONSTITUENTS
NORTH LOT DEVELOPMENT
SEATTLE, WASHINGTON

Analyte	Protection of Groundwater and Marine Surface Water (Fixed Parameter 3-Phase Model) mg/kg	Direct Contact Pathway (Ingestion Only) Method B: Unrestricted Land Use For soil from 0 - 15 ft BGS Standard Formula Values		Preliminary Cleanup Levels (Before adjustment for background) mg/kg	Background Soil Metals Concentrations Puget Sound Region 90th Percentile mg/kg	Preliminary Cleanup Levels (After adjustment for background) mg/kg	Preliminary Cleanup Levels (After adjustment for total site risk) mg/kg	Final Cleanup Levels in Final Units	Units	Range of Laboratory Reporting Limits for Project Samples
		Carcinogen mg/kg	Non-carcinogen mg/kg							
TPH										
Gasoline-Range Petroleum Hydrocarbons	(b) (c)		30 (b,c)	30		30		30	mg/kg	5 mg/kg
Diesel-Range Petroleum Hydrocarbons	(b)		2,000 (b)	2,000		2,000		2,000	mg/kg	5 mg/kg
Motor Oil-Range Petroleum Hydrocarbons	(b)		2,000 (b)	2,000		2,000		2,000	mg/kg	10 mg/kg
TOTAL METALS										
Arsenic	0.034	0.67	24	0.034	7	7		7	mg/kg	5 mg/kg
Chromium	1,000,000		120,000 (d)	120,000	42 (e)	120,000		120,000	mg/kg	0.5 mg/kg
Lead	1,620		250 (b)	250	17	250		250	mg/kg	2 mg/kg
Cadmium	0.69		80	0.69	1	0.69		0.69	mg/kg	0.2 mg/kg
Zinc	100		24,000	100	86	100		100	mg/kg	1 mg/kg
Copper	1.07		3,000	1.07	36	36		36	mg/kg	0.2 mg/kg
Mercury	0.026		24	0.026	0.07	0.07		0.07	mg/kg	0.05 mg/kg
BTEX										
Benzene	0.0045	18.0	320	0.0045		0.0045		25 (h)	µg/kg	12.5 - 25 µg/kg
Toluene	4.60		6,400	4.6		4.6	0.58	580	µg/kg	12.5 - 25 µg/kg
Ethylbenzene	6.10		8,000	6.1		6.1	2.4	2,400	µg/kg	12.5 - 25 µg/kg
Total Xylenes	15.0		16,000	15		15		15,000	µg/kg	12.5 - 50 µg/kg
PAHs										
Naphthalene	4.5		1,600	4.5		4.5		4,500	µg/kg	58 - 64 µg/kg
2-Methylnaphthalene	(a)		320	320		320		320,000	µg/kg	58 - 64 µg/kg
1-Methylnaphthalene	(a)					---		---		58 - 64 µg/kg
Acenaphthylene	(a)					---		---		58 - 64 µg/kg
Acenaphthene	98		4,800	98		98	25	25,000	µg/kg	58 - 64 µg/kg
Fluorene	100		3,200	100		100	79	79,000	µg/kg	58 - 64 µg/kg
Phenanthrene	(a)					---		---	µg/kg	58 - 64 µg/kg
Anthracene	2,300		24,000	2,300		2,300		2,300,000	µg/kg	58 - 64 µg/kg
Fluoranthene	630		3,200	630		630	49	49,000	µg/kg	58 - 64 µg/kg
Pyrene	660		2,400	660		660	140	140,000	µg/kg	58 - 64 µg/kg

TABLE 1
SOIL CLEANUP LEVELS FOR DETECTED CONSTITUENTS
NORTH LOT DEVELOPMENT
SEATTLE, WASHINGTON

Analyte	Protection of Groundwater and Marine Surface Water (Fixed Parameter 3-Phase Model) mg/kg	Direct Contact Pathway (Ingestion Only) Method B: Unrestricted Land Use For soil from 0 - 15 ft BGS Standard Formula Values		Preliminary Cleanup Levels (Before adjustment for background) mg/kg	Background Soil Metals Concentrations Puget Sound Region 90th Percentile mg/kg	Preliminary Cleanup Levels (After adjustment for background) mg/kg	Preliminary Cleanup Levels (After adjustment for total site risk) mg/kg	Final Cleanup Levels in Final Units	Units	Range of Laboratory Reporting Limits for Project Samples
		Carcinogen mg/kg	Non-carcinogen mg/kg							
Benzo(a)anthracene	(f)	(g)		(g)		(g)		(g)	µg/kg	58 - 64 µg/kg
Chrysene	(f)	(g)		(g)		(g)		(g)	µg/kg	58 - 64 µg/kg
Benzo(b)fluoranthene	(f)	(g)		(g)		(g)		(g)	µg/kg	58 - 64 µg/kg
Benzo(k)fluoranthene	(f)	(g)		(g)		(g)		(g)	µg/kg	58 - 64 µg/kg
Benzo(a)pyrene	0.23	0.14		0.14		0.14		140	µg/kg	58 - 64 µg/kg
Indeno(1,2,3-cd)pyrene	(f)	(g)		(g)		(g)		(g)	µg/kg	58 - 64 µg/kg
Dibenz(a,h)anthracene	(f)	(g)		(g)		(g)		(g)	µg/kg	58 - 64 µg/kg
Benzo(g,h,i)perylene	(a)					---		---		58 - 64 µg/kg
Dibenzofuran	(a)		160	160		160		160,000	µg/kg	58 - 64 µg/kg
SVOCs										
Phenol	22		48,000	22		22		22,000	µg/kg	58 - 180 µg/kg
4-Methylphenol	(a)					---		---		58 - 180 µg/kg
Di-n-butylphthalate	57		8000	57		57		57,000	µg/kg	58 - 180 µg/kg
Carbazole	0.32	50		0.32		0.32		320	µg/kg	58 - 180 µg/kg
DIOXINS/FURANS										
2,3,7,8-TCDD	0.00000027	0.000011		0.00000027		0.00000027		0.27	ng/kg	

TABLE 1
SOIL CLEANUP LEVELS FOR DETECTED CONSTITUENTS
NORTH LOT DEVELOPMENT
SEATTLE, WASHINGTON

Notes:

Screening level based on lowest of soil concentrations for protection of groundwater and protection of human direct contact (Method B standard formula values for carcinogens and non-carcinogens).

Cleanup levels are developed for all constituents detected above laboratory reporting limits in soil.
Shading indicates basis for cleanup level.
— = No screening criteria available.
mg/kg = Milligrams per kilogram.
µg/kg = Micrograms per kilogram.
ng/kg = Nanograms per kilogram.

(a) Values for K_{oc} and Henry's Law Constant are not available; therefore, cleanup levels protective of groundwater can not be calculated using the three-phase partitioning model.
(b) MTCA Method A soil cleanup levels are used for gasoline-range, diesel-range, motor oil-range petroleum hydrocarbons, and lead.
(c) For gasoline-range petroleum hydrocarbons, if benzene is present. If benzene is not present, screening level is 100 mg/kg.
(d) Value is for chromium III. Based on site history, chormium VI is not expected to be present.
(e) Value is for total chromium.
(f) If toxicity equivalency factors (TEFs) are considered, cleanup levels protective of groundwater for other cPAHs are less than the value for benzo(a)pyrene.
(g) Evaluated using toxicity equivalency quotient (TEQ) based on benzo(a)pyrene.
(h) Final Cleanup Level adjusted upward to the Practical Quantitation Limit (PQL), equal to 10 times the Method Detection Limit (MDL).

TABLE 2
REMEDIATION LEVEL FOR BENZENE IN SOIL BASED ON POTENTIAL FOR VAPOR INTRUSION NORTH LOT DEVELOPMENT SEATTLE, WASHINGTON

Analyte	µg/kg
Benzene	780

µg/kg = Micrograms per kilogram.

Remediation level based on evaulation of soil vapor data and application of Ecology's guidance for evaluating soil vapor intrusion (Ecology 2009b).

TABLE 3
GROUNDWATER CLEANUP LEVELS FOR DETECTED CONSTITUENTS
NORTH LOT DEVELOPMENT
SEATTLE, WASHINGTON

	Protective of Drinking Water						Protective of Marine Surface Water														
	MCL Treatment Technique		WA State Board of Health MCLs		Standard Formula Values		AWQC for Protection of Aquatic Life (a)		National Toxics Rule (b) AWQC for			National Recommended Water Quality Criteria (c)			Standard Formula Values		Preliminary Cleanup Levels (Before adjustment for background)	Background Groundwater	Preliminary Cleanup Levels (After adjustment for background)	Preliminary Cleanup Levels (After adjustment for total site risk)	Final Cleanup Levels in Final Units	Units	Range of Laboratory Reporting Limits for Project Samples
Analyte	MCL µg/L	Action Level µg/L	MCL Goal µg/L	Primary µg/L	Secondary µg/L	Carcinogen µg/L	Non-carcinogen µg/L	Acute µg/L	Chronic µg/L	Acute µg/L	Chronic µg/L	AWQC for Protection of Human Health µg/L	Protection of Aquatic Life - Acute µg/L	Protection of Aquatic Life - Chronic µg/L	Protection of Human Health µg/L	Carcinogen µg/L	Non Carcinogen µg/L							
TPH																							
Gasoline-Range Petroleum Hydrocarbons							800 (d,e)										800 (d,e)			800		0.8	mg/L	0.25 mg/L
Diesel-Range Petroleum Hydrocarbons							500 (d)										500 (d)			500		0.5	mg/L	0.25 mg/L
Oil-Range Petroleum Hydrocarbons							500 (d)										500 (d)			500		0.5	mg/L	0.5 mg/L
BTEX																								
Benzene	5		0	5		0.8	32					71			51	23	2,000	0.8		0.8		0.8	µg/L	1 µg/L
Toluene	1,000		1,000	1,000			640					200,000			15,000		19,000	640		640	80	80	µg/L	1 µg/L
Ethylbenzene	700		700	700			800					29,000			2,100		6,900	700		700	275	275	µg/L	1 µg/L
Total Xylenes	10,000		10,000	10,000			1,600 (f)											1,600 (f)		1,600 (f)		1,600 (f)	µg/L	1 µg/L
PAHs																								
Naphthalene							160										4,900	160		160		160	µg/L	0.10 - 1.4 µg/L
2-Methylnaphthalene							32											32		32		32	µg/L	0.10 - 1.4 µg/L
1-Methylnaphthalene																				—		—		0.10 - 1.4 µg/L
Acenaphthylene																				—		—		0.10 - 1.4 µg/L
Acenaphthene							990								990		640	640		640	250	250	µg/L	0.10 - 1.4 µg/L
Fluorene							640					14,000			5,300		3,500	640		640	500	500	µg/L	0.10 - 1.4 µg/L
Phenanthrene																				—		—		0.10 - 1.4 µg/L
Anthracene							4,800					110,000			40,000		26,000	4,800		4,800		4,800	µg/L	0.10 - 1.4 µg/L
Fluoranthene							640					370			140		90	90		90	50	50	µg/L	0.10 - 1.4 µg/L
Pyrene							480					11,000			4,000		2,600	480		480	100	100	µg/L	0.10 - 1.4 µg/L
Benzo(a)anthracene						(g)						0.031			0.018	(g)		(g)		(g)		(g)	µg/L	0.10 - 1.4 µg/L
Chrysene						(g)						0.031			0.018	(g)		(g)		(g)		(g)	µg/L	0.10 - 1.4 µg/L
Benzo(b)fluoranthene						(g)						0.031			0.018	(g)		(g)		(g)		(g)	µg/L	0.10 - 1.4 µg/L
Benzo(k)fluoranthene						(g)						0.031			0.018	(g)		(g)		(g)		(g)	µg/L	0.10 - 1.4 µg/L
Benzo(a)pyrene	0.2		0	0.2		0.012						0.031			0.018	0.030		0.012 (g)		0.012 (g)		0.012 (g)	µg/L	0.10 - 1.4 µg/L
Indeno(1,2,3-cd)pyrene						(g)						0.031			0.018	(g)		(g)		(g)		(g)	µg/L	0.10 - 1.4 µg/L
Dibenzo(a,h)anthracene						(g)						0.031			0.018	(g)		(g)		(g)		(g)	µg/L	0.10 - 1.4 µg/L
Benzo(g,h,i)perylene																				—		—		0.10 - 1.4 µg/L
Dibenzofuran							32											32		32		32	µg/L	0.10 - 1.4 µg/L
DISSOLVED METALS																								
Arsenic	10			10		0.058	4.8	69	36	69	36	0.14	69	36	0.14	0.10	18	0.058	5/21.3(i)	5/21.3(i)		5/21.3 (i)	µg/L	0.5 - 10 µg/L
Lead		15	0				15	210	8.1	210	8.1		210	8.1				8.1		8.1		8.1	µg/L	1 µg/L
Chromium	100		100	100			24,000 (h)										240,000	100		100		100	µg/L	5 µg/L
Cadmium	5		5	5			8.0	42	9.3	42	9.3		40	8.8			20	5		5		5	µg/L	2 µg/L
Zinc					5,000		4,800	90	81	90	81		90	81	26,000		17,000	81		81		81	µg/L	10 µg/L
Copper		1,300	1,300	1,300			590	4.8	3.1	2.4	2.4		4.8	3.1			2,700	2.4		2.4		2.4	µg/L	2 µg/L
Mercury	2		2	2			4.8	1.6	0.025	2.1	0.025	0.15	1.8	0.94	0.3			0.025		0.025		0.15 (k)	µg/L	0.1 µg/L
VOLATILES																								
Chloromethane						3.4										130		3		3		3	µg/L	0.2 µg/L
Methylene Chloride	5		0	5		5.8	480					1,600			590	950	170,000	5		5	3	3	µg/L	0.5 µg/L
Acetone							800											800		800	35	35	µg/L	3 µg/L
Carbon Disulfide							800											800		800	350	350	µg/L	0.2 µg/L
Chloroform	80			80		7.2	80					470			470	280	6,900	7.2		7.2		7.2	µg/L	0.2 µg/L
2-Butanone							4,800											4,800		4,800	2,400	2,400	µg/L	2.5 - 3.0 µg/L

TABLE 3
GROUNDWATER CLEANUP LEVELS FOR DETECTED CONSTITUENTS
NORTH LOT DEVELOPMENT
SEATTLE, WASHINGTON

	Protective of Drinking Water						Protective of Marine Surface Water													
	MCL Treatment Technique			WA State Board of Health MCLs		Standard Formula Values	AWQC for Protection of Aquatic Life (a)		National Toxics Rule (b) AWQC for			National Recommended Water Quality Criteria (c)			Standard Formula Values		Preliminary Cleanup Levels (Before adjustment for background)	Background Groundwater	Preliminary Cleanup Levels (After adjustment for background)	Preliminary Cleanup Levels (After adjustment for total site risk)	Final Cleanup Levels in Final Units	Units	Range of Laboratory Reporting Limits for Project Samples
Analyte	MCL µg/L	Action Level µg/L	MCL Goal µg/L	Primary µg/L	Secondary µg/L	Carcinogen µg/L	Non-carcinogen µg/L	Acute µg/L	Chronic µg/L	Acute µg/L	Chronic µg/L	AWQC for Protection of Human Health µg/L	Protection of Aquatic Life - Acute µg/L	Protection of Aquatic Life - Chronic µg/L	Protection of Human Health µg/L	Carcinogen µg/L	Non Carcinogen µg/L	µg/L	µg/L	µg/L	µg/L	µg/L		
Styrene	100		100	100		1.5	1,600														1.6			0.2 µg/L
1,3,5-Trimethylbenzene							400											400		400		400	µg/L	0.2 µg/L
1,2,4-Trimethylbenzene							400											400		400		400	µg/L	0.2 µg/L
Isopropylbenzene																				---		---		0.2 µg/L
n-Propylbenzene																				---		---		0.2 µg/L
tert-Butylbenzene																				---		---		0.2 µg/L
sec-Butylbenzene																				---		---		0.2 µg/L
4-Isopropyltoluene																				---		---		0.2 µg/L
n-Butylbenzene																				---		---		0.2 µg/L
SEMIVOLATILES																								
Phenol							4,800					4,600,000		1,700,000		1,100,000		4,800		4,800		4,800	µg/L	
4-Methylphenol																				---		---		
Di-n-butylphthalate							1,600					12,000		4,500		2,900		1,600		1,600		1,600	µg/L	
Carbazole						4.4												4.4		4.4		4.4	µg/L	
DIOXINS AND FURANS																				---		---		
2,3,7,8-TCDD	3.0E-05			3.0E-05								1.4E-08		5.1E-09				5.1E-09		5.1E-09		5.1E-03	pg/L	

Notes:
Preliminary cleanup level is based on lowest of federal or state MCL, state secondary MCL, and Method B standard formula values, for carcinogens without federal or state MCLs on the Method B standard formula value, and for carcinogens with federal or state MCLs.
Preliminary cleanup levels are developed for all constituents detected in groundwater or soil.
Shading indicates basis for preliminary cleanup level.
— = No cleanup level available.
mg/L = Milligrams per liter.
µg/L = Micrograms per liter.
pg/L = Picograms per liter.
(a) Ambient water quality criteria for protection of aquatic life from WAC 173-201A-240.
(b) Ambient water quality criteria for protection of human health from 40 CFR Part 131d (National Toxics Rule).
(c) National Recommended Water Quality Criteria (EPA website 2011).
(d) MTCA Method A groundwater cleanup levels are used for gasoline-range, diesel-range, oil-range petroleum hydrocarbons.
(e) For gasoline-range petroleum hydrocarbons, if benzene is present, if benzene is not present, screening level is 1,000 µg/L (1.0 mg/L).
(f) Screening level is for total xylenes.
(g) Evaluated using toxicity equivalency quotient (TEQ) based on benzo(a)pyrene.
(h) Value is for chromium III. Based on site history, chromium VI is not expected to be present.
(i) Calculated background concentration will be used as the preliminary cleanup level at MW-5 and MW-15D.
(j) A cleanup level of 5 ug/L was agreed upon by Ecology for the western portion of the Property. A background concentration of 21.3 will be used as the cleanup level for the eastern portion of the Property.
(k) The cleanup level for mercury in groundwater was adjusted upward to the practical quantitation limit (PQL). The PQL is equal to 10 times the method detection limit (MDL).

TABLE 4
PLANNED CLEANUP ACTION DETAILED COST ESTIMATE
NORTH LOT DEVELOPMENT
SEATTLE, WASHINGTON

PLANNED CLEANUP ACTION - HOT SPOT EXCAVATION, FOCUSED TREATMENT OF RESIDUAL GASOLINE/BENZENE, CONTAINMENT, AND ADDED MEASURES TO PREVENT CONTACT WITH SHALLOW CONTAMINATED SOIL OUTSIDE THE FOOTPRINT OF THE BUILDING FOUNDATIONS

ITEM	QUANTITY	UNIT	UNIT COST	TOTAL	NOTES/COMMENTS
Work Plans and Regulatory Review					
Negotiations with Ecology	1	LS	$ 10,000	$ 10,000	
Preparation of Work Plans	1	LS	$ 25,000	$ 30,000	Includes SAP, Removal Action, and Bioremediation Work Plan, HASP.
Develop Institutional Controls	1	LS	$ 5,000	$ 5,000	
Health and Safety Plan	1	LS	$ 5,000	$ 5,000	Plan for the protection of construction worker safety against exposure to impacted media.
Project Management	8%	pcnt	$ 50,000	$ 4,000	Assume 8% of task cost.
Ecology Oversight	1	LS	$ 5,000	$ 5,000	
Task Subtotal				*$ 59,000*	
Construction Oversight					
General Conditions	1	LS	$ 12,000	$ 14,000	Including fencing, cleanup, flagging, security, and safety.
Clearing/Grading Plan (Construction Drawings)	1	LS	$ 10,000	$ 10,000	
Construction Specs and Bid Documents	1	LS	$ 7,500	$ 7,500	Assume simple specifications in memo or letter format (not complete technical specifications).
Field Work and Oversight	20	day	$ 1,000	$ 20,000	
Confirmation Sampling Analysis	10	sample	$ 160	$ 1,600	Assume TPH/BTEX sampling only.
Compaction Testing for Backfill	1	LS	$ 5,000	$ 5,000	
Data Validation and Analysis	1	LS	$ 2,500	$ 2,500	
Project Management	8%	pcnt	$ 46,600	$ 3,700	
Task Subtotal				*$ 64,300*	
Site Development Excavation Management					
Excavate and Load Construction Prep Soil	16510	CY	$ 18	$ 297,180	Assume approximately 16,510 CY of soil removed for Property-wide development preparation, including Property-wide excavation to 1.5 ft BGS and excavation of pile caps, elevator pits, and grade beams.
Hauling of Soil	24765	tons	$ 5.00	$ 123,825	Assume 1.5 tons/CY. Estimated based on hauling soil to Alaska Street Transfer Station ($125/hr x 1 hr/trip / 25 tons/trip).
Disposal of Soil	24765	tons	$ 45.00	$ 1,114,425	Unit Cost for disposal at Alaska Street Transfer Station.
Project Management	8%	pcnt	$ 1,535,430	$ 122,800	
Task Subtotal				*$ 1,656,230*	
Remedial Excavation/Bioremediation/Construction/Site Restoration					
Contractor Mobilization	1	LS	$ 10,000	$ 10,000	
Excavate and Load Impacted Soil Outside the Building Footprints within the Property Boundary	5210	CY	$ 18	$ 93,800	Assumes excavation of soil outside the building foundations within the property boundary from 1.5 ft to 5 ft BGS
Excavate and Load Impacted Soil in NW corner of property	720	CY	$ 18	$ 13,000	Assume 3,000 square ft excavation around B-26, B-17, an additional 6.5 ft deep beyond 1.5 ft removed Property-wide (does not include volume of soil to be removed as part of planned development activities, approx 180 CY)
Hauling of Soil	8895	tons	$ 5	$ 44,475	Assume 1.5 tons/cy. Include volume of soil to be removed outside of building footprints but within property boundary and volume of soil to be removed in NW corner of property. Estimated based on hauling soil to Alaska Street Transfer Station ($125/hr x 1 hr/trip / 25 tons/trip).
Disposal of Soil	8895	tons	$ 45	$ 400,275	Unit Cost for disposal at Alaska Street Transfer Station.
Import, Place, and Compact Clean Fill	8895	tons	$ 29	$ 257,955	Includes additional $2 per ton to place and mix bioremediation substrate in excavation prior to backfill and compaction.
Dewatering and Groundwater Management	0	LS	$ 20,000	$ -	Assume no wastewater pumping and management is necessary during remedial excavation.
Shoring	1	LS	$ 30,000	$ 30,000	Shoring required at property boundary during construction to protect off-property features
Geomembrane	40190	SF	$ 3	$ 120,570	Assumes geomembrane placed in excavation areas located outside of the building footprint within the property boundary
Vapor Intrusion Barrier	0	sf	$ 3.00	$ -	Assume vapor intrusion barrier not necessary after soil removal.
Evaluation of Site Redox Conditions	1	LS	$ 8,000	$ 8,000	Includes additional sample collection and analysis to determine redox state of soil and groundwater in excavation vicinity.
Bioremediation Substrate	7000	pounds	$ 10	$ 70,000	Assume aerobic conditions and application of ORC to area of excavated soil in the NW corner of the property prior to backfilling with soil, cost will be less for anaerobic conditions.
Task Subtotal				*$ 1,048,075*	
Construction Report					
Meetings and Coordination with Ecology	1	LS	$ 5,000	$ 5,000	
Final Report Preparation	1	LS	$ 10,000	$ 10,000	
Project Management	8%	pcnt	$ 15,000	$ 1,000	Assume 8% of task cost.
Ecology Oversight	1	LS	$ 2,000	$ 2,000	
Task Subtotal				*$ 18,000*	
Long-Term Cap Maintenance and Groundwater Monitoring					Assume 30 years of cap maintenance and groundwater monitoring (soil vapor not required after excavation).
	Discount Rate		3% *		* The 3% discount rate represents an average return on investment of 6% minus an assumed inflation rate of 3%.
Cap Monitoring and Maintenance	30	yr	$ 1,000	$ 20,000	
Groundwater Sampling/Analysis (annually for 30 yrs)	30	yr	$ 8,500	$ 167,000	Assume 30-year monitoring schedule.
Prepare Groundwater Monitoring Work Plan/Schedule	1	LS	$ 8,000	$ 8,000	
Groundwater Treatment Contingency	1	LS	$ 650,000	$ 650,000	Assumes pump and treat groundwater granular activated carbon treatment system with treated groundwater disposed of to sanitary sewer, assumes 30 years of operation, maintenance, sampling, and permit compliance for groundwater treatment at 3% discount rate, contingent on the need for groundwater treatment based on the compliance monitoring results.
Reporting and Project Management	30	yrs	$ 7,500	$ 147,000	
Task Subtotal				*$ 992,000*	
			TOTAL	$ 3,840,000	Cost rounded to nearest $1,000.
Engineering Estimate Range			-30%	$ 2,688,000	
			50%	$ 5,760,000	

APPENDIX A

Groundwater Compliance Monitoring Plan

TABLE OF CONTENTS

FIGURES

TABLES

INTRODUCTION

This Compliance Monitoring Plan outlines the approach for follow-up groundwater monitoring as part of the implementation of the preferred remedial action alternative for cleanup of contamination at the North Lot Property (Property), located at the southeastern corner of the intersection of South King Street and Occidental Avenue South in Seattle, Washington (Figure 1). North Lot Development (NLD), as prospective purchaser of the Property, has conducted several investigations to characterize soil, soil vapor, and groundwater conditions at the Property as documented in the Remedial Investigation (RI) report (Landau Associates 2011a) and supplemented by the data gaps and soil vapor investigations, which are documented in the Feasibility Study (FS) report (Landau Associates 2011b). The FS report also develops and evaluates remedial action alternatives and identifies the preferred remedial action alternative that will address the contamination at the Property consistent with the requirements of the Washington State Model Toxics Control Act (MTCA; Chapter 173-340 WAC).

This monitoring plan was prepared by Landau Associates for NLD to provide the location of monitoring wells, the frequency of sampling, and the constituents for which samples will be analyzed. The results of groundwater monitoring will provide sufficient information to evaluate and document compliance with MTCA and the Property-specific cleanup levels identified in the FS.

SITE BACKGROUND

The 3.85-acre property is located in an area of municipal, commercial, and residential properties, as shown on Figure 2. Based on the Phase I Environmental Site Assessment (ESA) completed by Landau Associates (2007), a rail yard was operated at the Property from the late 1800s until the late 1960s and several sets of railroad tracks were present on the Property. Structures associated with the rail yard included engine maintenance buildings, paint shops, track switching areas, and materials storage areas. In addition, two gasoline stations were formerly located in the northwestern corner of the Property at different times between the late 1930s and approximately 1966. The current property owner, King County, purchased the Property in the 1970s to facilitate construction of the Kingdome stadium to the south of the Property. The Kingdome was later demolished and replaced with the current CenturyLink Field and Event Center development. The Property has been used as a parking lot since the 1970s.

SOIL AND GROUNDWATER INVESTIGATIONS

The investigations conducted to date to characterize soil, groundwater, and soil vapor at the Property include the Phase II investigation, the RI field investigation, the supplemental investigation, the data gaps investigation, and the soil vapor investigation. The findings of the Phase I, Phase II, and additional soil and groundwater investigations are included in the *Remedial Investigation Report* (RI;

Landau Associates 2011a). The results of the soil vapor investigation are presented in the *Focused Soil Vapor Investigation Report* (Landau Associates 2010). As noted above, the results of the data gaps and soil vapor investigations are included in the FS report.

Based on the investigations conducted for the RI/FS, the extent of impacts to groundwater from soil contamination at the Property appears to be limited. There is no evidence of soil contaminants leaching to groundwater or of contaminants in groundwater migrating off-Property at concentrations greater than the cleanup levels. Therefore, the alternatives that have been evaluated in the FS provide for the protection of groundwater through the cleanup of soils and/or through passive measures, such as a cap. Long-term groundwater compliance monitoring and contingent groundwater treatment (if the compliance monitoring indicates off-Property migration of contaminants in groundwater at concentrations greater than the cleanup levels) are included in five of the six remedial action alternatives described in the FS, including the preferred alternative.

GROUNDWATER COMPLIANCE MONITORING

The groundwater compliance monitoring will include the installation of additional groundwater monitoring wells, groundwater monitoring and sample collection at the new wells and at two existing wells, and laboratory analysis of groundwater samples. These elements are described in further detail below.

GROUNDWATER POINT OF COMPLIANCE

The standard point of compliance for groundwater is throughout groundwater at the Property. The proposed conditional point of compliance for groundwater for protection of surface water quality is the property boundary or as close to the property boundary as practicable. For a conditional point of compliance [in accordance with WAC 173-340-720(8)(c, d)], there must be a demonstration that it is not practicable to meet the cleanup levels throughout the site in a reasonable restoration timeframe and that all practicable methods of treatment are to be used in the site cleanup. As described in Section 8.2.2 of the FS report, the preferred remedial action alternative is permanent to the maximum extent practicable, and meets these two criteria. Therefore, the proposed conditional point of compliance for groundwater is the Property boundary for most of the Property and as close to the Property boundary as practicable in the northeastern portion of the Property where the creosote-like material is present along the Property boundary because it is not feasible to install a compliance monitoring well within the creosote-like material.

The attainment of cleanup levels in groundwater will be evaluated at the conditional point of compliance using a network of monitoring wells.

GROUNDWATER MONITORING WELLS

The compliance monitoring will be conducted using existing off-Property wells MW-16D and MW-18D, and up to four additional wells installed at selected locations based on the existing groundwater flow and analytical data with the screened intervals as shown in Table 1. The selected locations for the compliance monitoring wells are as follows:

- MW-16D and MW-18D: Two existing off-Property monitoring wells located to the north of the eastern half of the Property and hydraulically downgradient of where the creosote-like material is present at the base of the fill material in the northeastern corner of the Property.
- MW-19: A new monitoring well located along the north Property boundary near the eastern extent of the former gasoline station area.
- MW-20: A new monitoring well located along the north Property boundary, near the northwestern corner of the Property adjacent to the former gasoline station area.
- MW-21: A new monitoring well located along the east Property boundary near the southeastern corner of the Property, hydraulically upgradient of the Property and hydraulically downgradient of upgradient off-Property areas with elevated arsenic concentrations in groundwater.
- MW-22: A new monitoring well located along the east Property boundary near the northeastern corner of the Property, hydraulically upgradient of the Property and hydraulically downgradient of upgradient off-Property areas with elevated arsenic concentrations in groundwater.

The locations of off-Property wells MW-16D and MW-18D, and the four selected new monitoring well locations are shown on Figure 3.

The new monitoring wells will be constructed in accordance with Washington State Minimum Standards for Construction and Maintenance of Wells (WAC 173-160). Landau Associates field personnel will oversee the drilling and well installation activities, and maintain a detailed record of the well construction. The soil encountered during drilling will be field-screened for evidence of contamination, and soil samples will be collected and archived for possible laboratory analysis if evidence of contamination is encountered. All of the new wells will be shallow monitoring wells and will be constructed with 2-inch-diameter, flush-threaded, Schedule 40 polyvinyl chloride (PVC) pipe and 10-foot screens with 0.020-inch machine-slotted casing, and filter pack material consisting of pre-washed, pre-sized number 10/20 silica sand. The well screens will be placed from 5 to 15 feet (ft) below ground surface to intersect the water table. The filter pack will be placed from the bottom of the well to approximately 2 ft above the top of the screen. Filter pack material will be placed slowly and carefully to avoid bridging of material. A bentonite seal will be placed above the filter pack material to within about 3 ft of the ground surface. Grout will be used to backfill the boring to the subgrade for placement of the protective cover. The well installation depths, screen intervals, and sampling parameters are shown in Table 1.

The groundwater monitoring wells will be developed to improve their hydraulic connection with groundwater to obtain representative water samples and water elevations. The wells will be developed at least 24 hours after completion to avoid compromising the surface seal. The wells will be developed by appropriate combinations of surging, bailing, or pumping.

GROUNDWATER MONITORING WELL SAMPLING

The new monitoring wells and the existing wells MW-16D and MW-18D will be sampled using a peristaltic pump and single-use polyethylene tubing. Low-flow sampling techniques (EPA/540/S-95/504) will be used. Samples will be collected directly from the sampling equipment into laboratory-supplied containers and stored on ice in a cooler. Groundwater samples collected for metals analysis will be field-filtered using a 0.45-micron inline filter. Groundwater samples collected from monitoring wells will be designated with the well number (e.g., CMW-19) and the date the sample was collected in month day year format (e.g., CMW-19-072212). The samples will be logged on a chain-of-custody form and submitted to an Ecology-accredited laboratory following proper chain-of-custody protocols. The transportation and handling of samples will be accomplished in a manner that protects the integrity of the samples. Samples will be delivered or sent by courier to the laboratory within 24 hours of sample collection.

Groundwater samples will be submitted to the laboratory and analyzed for the list of parameters shown in Table 1, and by the analytical methods shown in Table 2. These consist of benzene, toluene, ethylbenzene, and xylenes (BTEX) by U.S. Environmental Protection Agency (EPA) Method 8021; gasoline-range total petroleum hydrocarbons (TPH-G) and diesel-range total petroleum hydrocarbons (TPH-D) by Ecology-approved Methods NWTPH-Gx and NWTPH-Dx; polycyclic aromatic hydrocarbons (PAHs) by EPA Method 8270 SIM; and dissolved metals (i.e., arsenic, cadmium, chromium, lead, mercury, copper, and zinc) by EPA Method 200.8 except mercury, which will be analyzed by EPA Method 7471.0.

EQUIPMENT DECONTAMINATION AND MANAGEMENT OF INVESTIGATION-DERIVED WASTE

All non-disposable sampling equipment will be decontaminated between uses. Downhole drilling and sampling equipment will be decontaminated between uses at each boring location. Any visible contamination will be removed with paper towels prior to decontamination. Soil and decontamination and purge water generated during the field activities will be contained in labeled drums for storage on site pending the results of the laboratory analysis of the groundwater samples. Soil and water will be disposed of appropriately at a permitted facility based on the analytical results for the groundwater samples and available soil analytical data from previous Property investigations. Disposable equipment and clothing will be disposed of as solid waste.

QUALITY ASSURANCE/QUALITY CONTROL

The accuracy of the data will be determined through recovery of spiked surrogates, matrix spikes, duplicates, and spiked laboratory control samples. Control limits for spike recovery will be laboratory acceptance limits generated according to EPA guidelines. Blind field duplicates will be collected at a frequency of 1 per 20 samples, so 1 blind duplicate sample will be submitted per groundwater sampling event. The duplicate will be collected by alternately filling sample containers for the original sample and the corresponding duplicate sample for every container filled to decrease the variability between duplicates. One laboratory-supplied trip blank will also be included with each cooler shipped to the laboratory.

REPORTING

Following completion of groundwater monitoring activities, and after receipt from the laboratory, the analytical results will be tabulated and subjected to a quality assurance/quality control review. The findings of the groundwater compliance monitoring will be incorporated into a compliance report for submittal to Ecology.

PROJECT SCHEDULE

The proposed installation and development of the prescribed number of new monitoring wells will take place in conjunction with the schedule for Property development. All wells will be installed during the west block construction (Phase I of Property development) and any wells that are damaged or destroyed as part of east block construction (Phase II of Property development) will be repaired or replaced, as appropriate. The initial well installation is anticipated to require about 3 to 4 days in the field. Sampling and analysis of the six monitoring wells is anticipated to require 2 days in the field for each sampling event. Receipt of the analytical results is anticipated approximately 2 weeks after sample submittal, based on a standard turnaround time from the laboratory. Compliance reports will be submitted to Ecology approximately 6 to 8 weeks following receipt of the final analytical data, according to the schedule presented below.

Sampling and analysis of monitoring wells during the first 5 years is anticipated to occur quarterly for the first year and then annually for the next 4 years of monitoring; however, the frequency of monitoring will be determined based on the groundwater analytical results and whether analytes are detected at concentrations greater than the cleanup levels. In the event that the detected concentration of one or more constituents is greater than the cleanup level, the well will be re-sampled and the data re-evaluated. If the re-sampling indicates one or more constituents at concentrations greater than the cleanup level, then a remediation contingency plan will be developed and implemented. After 5

consecutive years with no exceedances, both the monitoring frequency and the number of sampling locations will be reduced, as appropriate, based on site conditions at the time and upon approval from Ecology. Groundwater compliance monitoring will conclude after 30 years with no exceedances of the cleanup levels. All changes to the groundwater compliance monitoring schedule will be approved in advance by Ecology based on the evaluation of site conditions at the time.

* * * * *

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

LANDAU ASSOCIATES, INC.

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Staff Geologist

Timothy L. Syverson, L.G.
Senior Associate Geologist

SED/TLS/ccy

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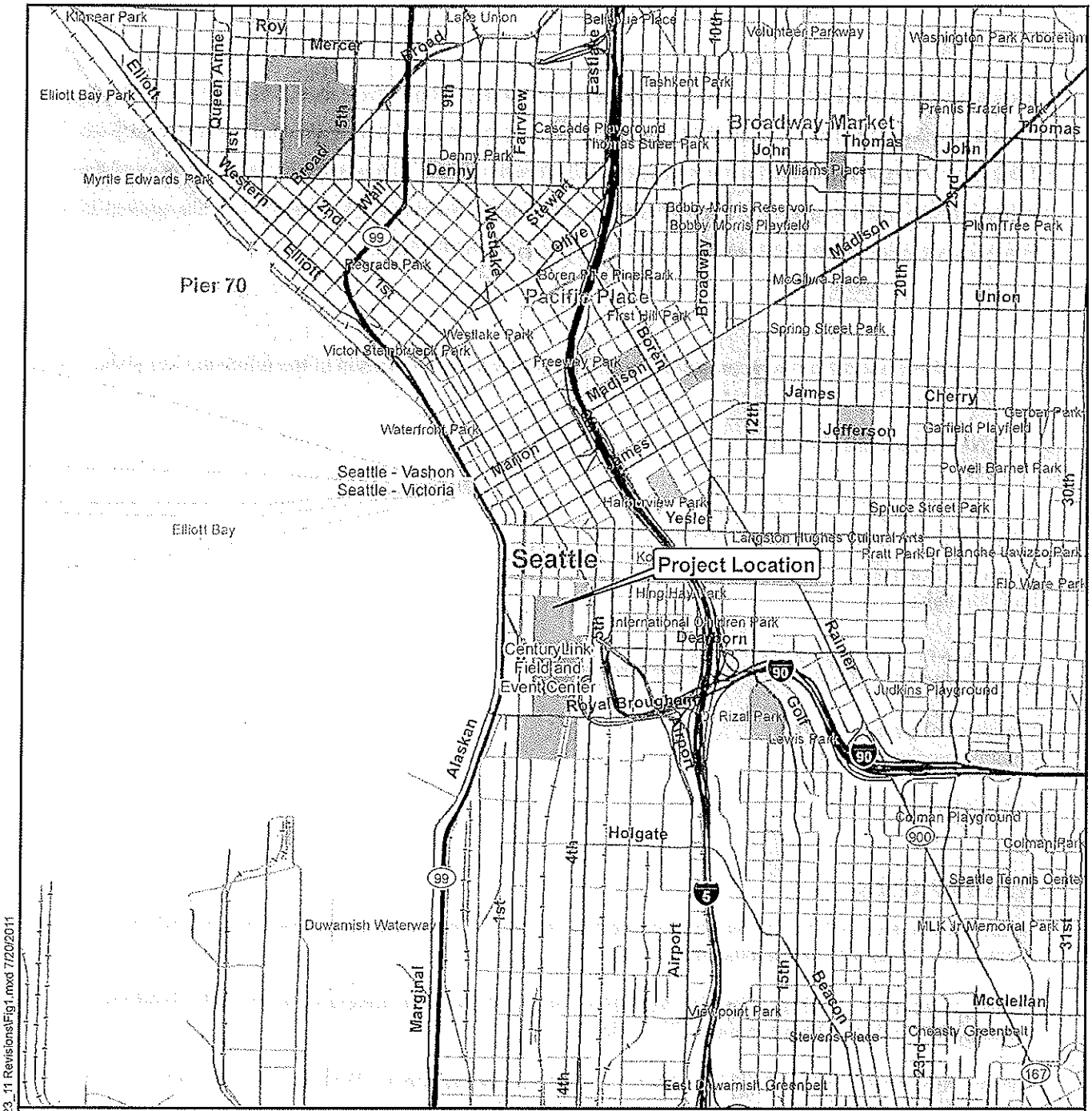

Data Source: ESRI 2008

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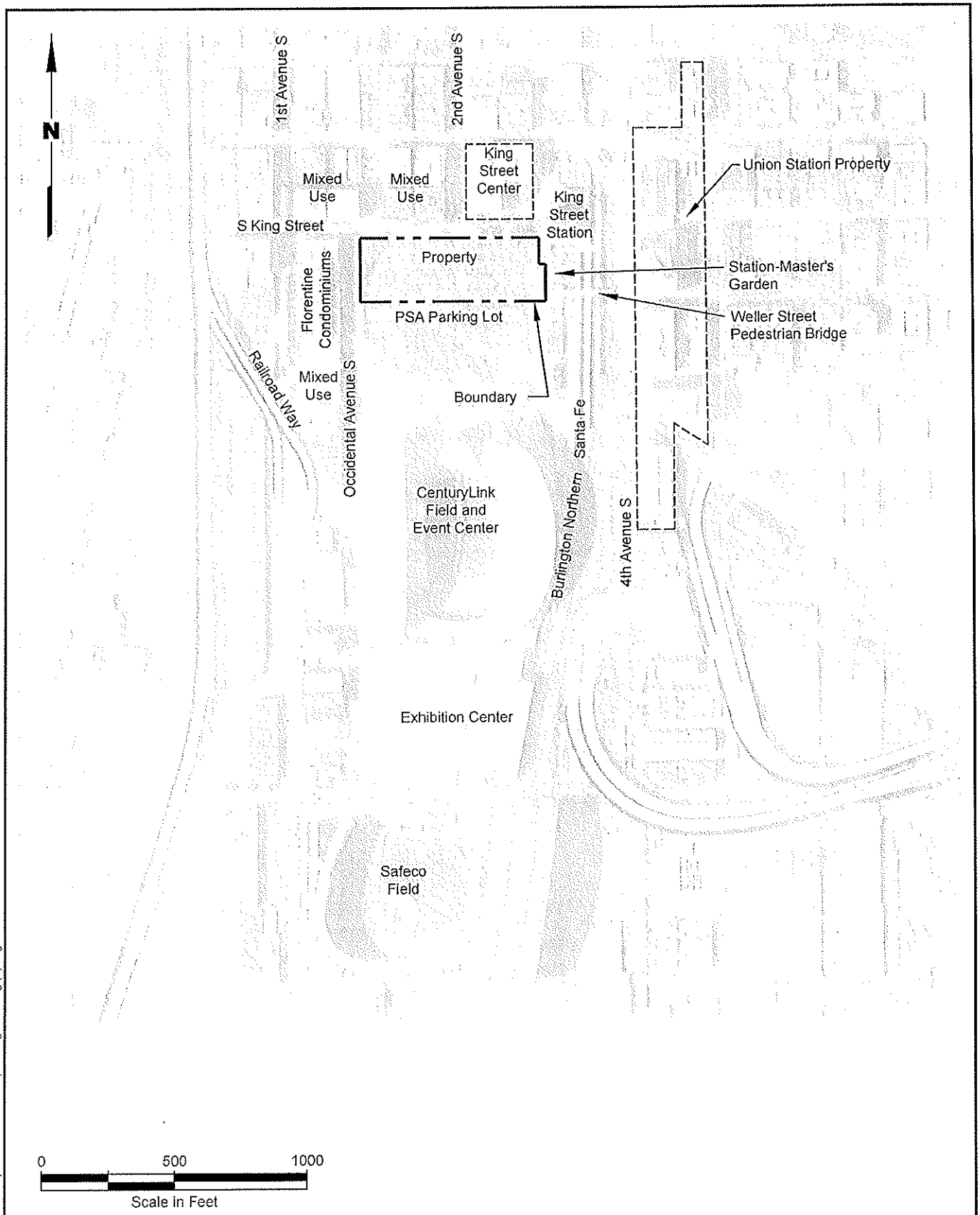
North Lot Development Seattle, Washington	**Vicinity Map**	Figure 1



Qwest Field | V:\1014\050\Conceptual\Figure 2.dwg (A) "Figure 2" 7/20/2011

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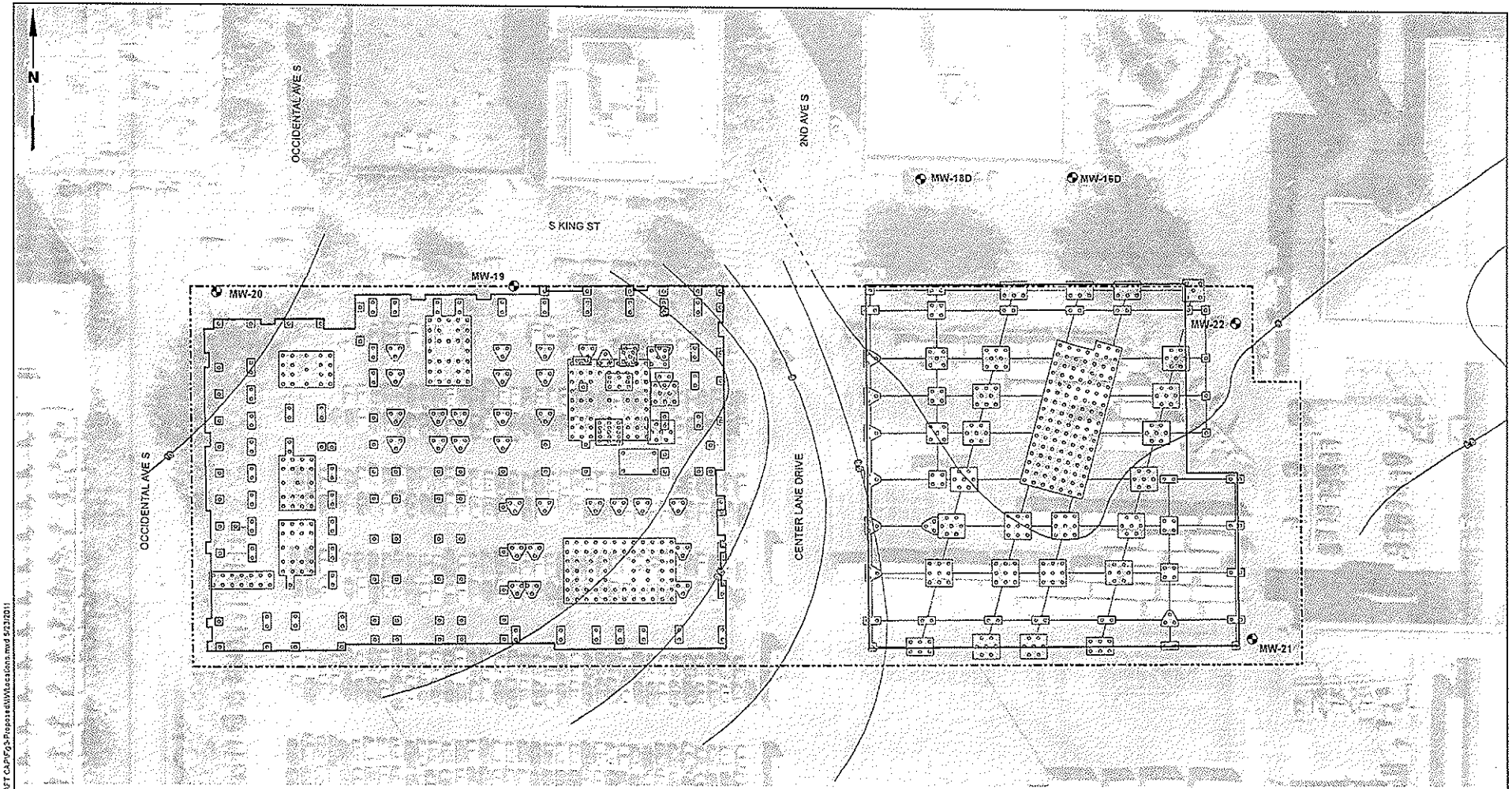
North Lot Development
Seattle, Washington

Property Plan and Surrounding Area

Figure
2



Legend

- Proposed Monitoring Well Location
- Property Boundary
- Groundwater Elevation Contour (ft)

0 60 120
Scale in Feet

Data Source: Triad Boundary Survey, King County

Note
1. Black and white reproduction of this color original may reduce its effectiveness and lead to incorrect interpretation.
2. Building foundation plans from North Lot Development CAD files, dated February 25, 2011.

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North Lot Development Seattle, Washington	**Proposed Compliance Monitoring Well Locations**	Figure 3

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TABLE 1
SAMPLING LOCATION AND ANALYSIS MATRIX
NORTH LOT DEVELOPMENT - SEATTLE, WASHINGTON

Sample Location	Sample Depth/ Screened Interval	Drilling Method for Well Installation	Parameters for Analysis				
			BTEX (a)	TPH-G (b)	TPH-D (c)	PAHs (d)	Metals (e)
MW-16D (f)	12 to 22 ft	N/A	✓	✓	✓	✓	✓
MW-18D (f)	12 to 22 ft	N/A	✓	✓	✓	✓	✓
MW-19, -20, -21, and -22	5 to 15 ft	HSA	✓	✓	✓	✓	✓

Notes:

(a) BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes
(b) TPH-G = Gasoline-range Petroleum Hydrocarbons
(c) TPH-D = Diesel-range Petroleum Hydrocarbons
(d) PAHs = Polycyclic Aromatic Hydrocarbons
(e) Metals = Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, and Zinc
(f) Existing off-Property monitoring well
HSA = Hollow-Stem Auger

TABLE 2
ANALYTICAL METHODS
NORTH LOT DEVELOPMENT - SEATTLE, WASHINGTON

Analysis	Medium	Analytical Method	Reporting Limits (a)
Metals (b)	Water	200.8/7471.0	0.02 to 20 µg/L
PAHs (c)	Water	8270D-SIM	1.0 µg/L
TPH-G (d)	Water	NWTPH-Gx	0.25 mg/L
TPH-D (e)	Water	NWTPH-Dx	0.25 mg/L
BTEX (f)	Water	8021	1 µg/L

Notes:

(a) Target reporting limits
(b) Metals = Arsenic, Cadmium, Chromium, Copper, Lead, Mercury, and Zinc
Metals analysis by EPA Method 200.8 except mercury by EPA Method 7471.0.
(c) PAHs = Polycyclic Aromatic Hydrocarbons
(d) TPH-G = Gasoline-range Petroleum Hydrocarbons
(e) TPH-D = Diesel-range Petroleum Hydrocarbons
(f) BTEX = Benzene, Toluene, Ethylbenzene, and Xylenes
µg/L = Micrograms per liter
mg/kg = Milligrams per kilogram

APPENDIX B

Cleanup Action Construction Schedule

TABLE B-1
CLEANUP ACTION CONSTRUCTION SCHEDULE
NORTH LOT DEVELOPMENT
SEATTLE, WASHINGTON

Activity/Area	Description	Duration
WEST BLOCK (PHASE I)		
Hotspot Removal	• Excavation in NW corner – Testing/excavation to south and east until standard met – Application of bioremediation technology [Oxygen Release Compound (ORC)] to the bottom of the excavated area near the depth of the water table – Fill with clean soil backfill	1 month after start of construction
Under Building Footprint	• West block building footprint – Remove approximately 18 inches of soil – Additional excavation for obstructions, utilities, piles, pile caps, elevator pits – Construct barrier (concrete slab on grade)	4 months after start of construction
Sidewalk Area Outside Building Footprint/ Landscape Scope	• West, North and East Sidewalk – Remove approximately 18 inches of soil under sidewalk – Remove 5 feet of soil in landscape/planter areas o Place barrier at bottom and back fill with clean soil – Construct concrete barrier	10 months after start of construction
Asphalt Repair or Replacement	• Access road and east block – Inspect and repair or replace as appropriate	13 months after start of construction
Monitoring Wells	• All monitoring wells to be installed and fully functional	13 months after start of construction
Sidewalk Area Outside Building Footprint/ Landscape Scope	• South Sidewalk – Remove approximately18 inches of soil under sidewalk – Remove 5 feet of soil in landscape/planter areas o Place barrier at bottom and backfill with clean soil – Construct concrete barrier	25 months after start of construction
EAST BLOCK (PHASE II)		
Under Building Footprint	• East block building footprint – Remove approximately 18 inches of soil – Additional excavation for obstructions, utilities, piles, pile caps, elevator pits – Construct barrier (concrete slab on grade)	4 months after start of east block construction
Sidewalk Area Outside Building Footprint/ Landscape Scope	• North, West, South Sidewalk – Remove approximately 18 inches of soil under sidewalk – Remove 5 feet of soil in landscape/planter areas o Place barrier at bottom and backfill with clean soil – Construct concrete barrier	13 months after start of construction
Monitoring Wells	• Any monitoring wells that were removed or damaged as a result of construction will be repaired and/or replaced and be fully functional.	13 months after start of construction
Sidewalk Area Outside Building Footprint/ Landscape Scope	• East Sidewalk – Remove approximately 18 inches of soil under sidewalk – Remove 5 feet of soil in landscape/planter areas o Place barrier at bottom and backfill with clean soil – Construct concrete barrier	25 months after start of construction
Private Drive	• East Sidewalk – Remove approximately 18 inches of soil under sidewalk – Remove 5 feet of soil in landscape/planter areas o Place barrier at bottom and backfill with clean soil – Construct concrete barrier	30 months after start of construction