

To: RTW Associates  
1752 NW Market Street, #419  
Seattle, Washington 98107  
Attention: Mr. Rob Wyman

Date: 20 June 2008

ZZA-Terracon Project No.: 81085165

From: Cut Thompson / Dave Williams

Subject: Revised Preliminary Geotechnical Engineering Evaluation  
Proposed Jennifer Dunn Memorial Park  
King County, Washington

Transmitted via:  U. S. Mail    Overnight (UPS, DHL, FedEx)    Courier    Hand Delivered

Enclosed please find the following items:

Copies	Title	Date
3	Revised Preliminary Geotechnical Engineering Evaluation Proposed Jennifer Dunn Memorial Park King County, Washington	28 May 2008

If items are not as shown, please notify us at once.

Comments:


Rob:

The enclosed reports include the revised Figure 1, Site and Exploration Plan, that shows the approximate limits of the regulated steep slope area and the standard 50 foot buffer described in the King County Code. The report text has not changes. We will forward a copy of the report as a pdf and also a copy of the base plan as a CAD file, as per your request.

cc: Central Filing

Signed: 

14405 SE 36<sup>th</sup> St., ste.210  
Bellevue, WA 98006  
T: 425-746-1889  
F: 425-746-1296

  18905 33<sup>rd</sup> Ave. W. #117  
Lynnwood, WA 98036  
T: 425-771-3304  
F: 425-771-3549

2115 S. 56<sup>th</sup> Street, #405  
Tacoma, WA 98409  
T: 253-573-9939  
F: 253-573-9959

 **ZZA-Terracon**  
Consulting Engineers & Scientists  
18905 – 33<sup>rd</sup> Avenue West, Suite 117  
Lynnwood, Washington 98036  
Phone: 425.771.3304  
Fax :425.771.3549  
www.terracon.com

28 May 2008  
Project No. 81085165

RTW Associates  
1752 NW Market Street, #419  
Seattle, Washington 98107

Attention: Mr. Robert Wyman, AICP

Subject: Preliminary Geotechnical Engineering Evaluation  
Proposed Jennifer Dunn Memorial Park  
King County, Washington

Dear Mr. Wyman:

ZZA-Terracon is pleased to present herein a copy of the above-referenced report. This report presents the results of our literature and data review and site reconnaissance observations at the proposed Jennifer Dunn Memorial Park site in King County, Washington. Written authorization to proceed with this study was provided by Mr. Robert Wyman of RTW Associates by acceptance of our 4 March 2008 proposal (P-4199). This report has been prepared in general accordance with the scope of services described in the referenced proposal.

The purpose of this study was to provide preliminary geotechnical engineering conclusions and recommendations regarding the feasibility of site development. The scope of our services consisted of a literature and data review, site reconnaissance and preparation of this report.

The project was in the preliminary design stages when this report was prepared. We request that ZZA-Terracon be provided the opportunity to review the plans as they develop and to amend our conclusions and recommendations, if necessary, to reflect the design. This report is an instrument of service and has been prepared in accordance with generally accepted geotechnical practices for the exclusive use of RTW Associates, and its agents, for specific application to this project and the stated purpose.

## **SITE AND PROJECT DESCRIPTION**

The project site is an irregularly-shaped 54-acre parcel located south of SE Renton-Issaquah Road (SR 900) between 148<sup>th</sup> Avenue SE and the 156<sup>th</sup> Avenue SE right-of-way in King County, Washington. The site is part of the King County Parks system and was formerly named May Valley Park. The site location is depicted on the Site Plan, Figure 1.

We understand that preliminary planning efforts for the property are considering establishing multiple athletic fields and associated support structures. The purpose of this study was to evaluate site conditions and to provide preliminary geotechnical engineering conclusions and recommendations regarding the feasibility of site development.

For this preliminary geotechnical evaluation we reviewed available geologic maps, publications, and in-house files to identify local geologic conditions. Specifically, we reviewed the May Valley Park Master Plan Report, prepared in September 1990 by Jongejan, Gerrard, McNeal. We also reviewed the May Creek Current and Future Conditions Report prepared by Foster Wheeler Environmental Corporation in August 1995. We also reviewed LiDAR imagery to evaluate surficial landforms.

## **SITE CONDITIONS**

We performed a site reconnaissance of the project area on 14 May 2008. The surface features noted during our site reconnaissance are described below. Our preliminary geotechnical evaluation did not include subsurface explorations. The existing site features are shown on the Site Plan, Figure 1.

### **Surface Conditions**

The approximate 54-acre site is covered with brush, small to moderate size trees, and is crossed with a network of walking/equestrian trails. Limited stands of large trees were also observed on site. We performed our reconnaissance entering the site from trails at the south along SE 112<sup>th</sup> Street. The trails are generally well-maintained with brush and fallen trees removed for trail access. We noted that the site had been logged sometime in the past with scattered old-growth stumps across the parcel. Scattered blown down trees with exposed root balls were observed across the site. The probable second or third growth forest includes fir, hemlock, cedar, maple and alder trees. Brush includes ferns, salal, mahonia and huckleberry.

Our observations of the existing slopes noted no unusual features such as slumps or indications of slope movement. We would expect limited cuts and/or fills were performed for the previous logging operations, but no visual indications of significant grading were observed during our reconnaissance. We noted scattered areas of refuse/landscape debris dumped on site at the margins of the property. We observed a tent and camp site at the far northeast property corner

with considerable garbage around the camp site. It appears the camp site was moved several times with garbage left at each location. The camp site was occupied during our site reconnaissance.

The site slopes from south to north and from west to east with an approximate high elevation of 540 feet at the south-central site area and a low of 415 feet at the north-east site area. A small ridge bisects the central site area from the south high of 540 feet to the north low of 440 feet. The site has moderate to steep slopes varying from approximately 5 percent to 40 percent with the steepest slopes (25 percent to 40 percent) along the north and east flank of the central ridge area. As noted, no unusual slope features indicative of slope movement were observed. During our site visit, we observed weathered glacial till soils in exposures in the area of blown-down tree root balls, exposed trail areas and along the soil exposures on the south side of SE Renton-Issaquah Road.

Our reconnaissance noted areas of limited surficial wet/muddy areas at low points of the trails. We observed thicker surficial organic soils (up to about 30 inches) at hand probe locations in the low-lying areas at the north-central and northeast site areas, but standing water was not observed. We hand probed through the soft organic soils at several locations; the probe locations are shown on Figure 1, the Site Plan.

At the far southeast site area, a culvert below the access drive from the adjoining junkyard property to the south discharged at the southeast corner of the parcel. The observed slow flow from the culvert appeared to flow downslope to the east towards May Creek. Our reconnaissance noted that potential runoff from the upland project site area at the south and west would be to the north and would encounter roadside ditches along SE Renton-Issaquah Road (SR 900) and flow to the east and north towards May Creek. A culvert crossing was observed from the south roadside ditch which directs flow to the north below SE Renton-Issaquah Road. No flow was noted into the culvert along SR 900 during our site reconnaissance.

#### LiDAR Imagery Review

Review of LiDAR imagery of the site disclosed no unusual landforms with the exception of an area along the west flank of the central ridge. During our reconnaissance we observed this area and no landslide or slump features were noted. The area is at the base of the slope and includes a draw to the north. Surficial wet/muddy conditions were observed in the low draw area.

#### **Geologic Conditions**

Site geology was obtained from the Geologic Map of King County, March 2007, by Booth, Troost and Wisher and correlated with additional reference sources. The near-surface soils across the site and upland area to the south are mapped as Vashon lodgement till. We concur with the mapped site geology based on the limited soil exposures we observed. Regionally, the glacial till is described as forming an undulating surface and ranging from 3 to 33 feet thick. The glacial till is

generally very well compacted with a relatively low permeability and relatively high runoff rate. The geologic maps disclose Vashon advance outwash deposits mapped to the north of the site below the glacial till. Vashon recessional outwash has been mapped adjacent to May Creek to the north and east of the site; the recessional outwash is located stratigraphically above the till.

### **S.C.S. Soil Mapping**

Review of the *Soil Survey of King County Area, Washington* (U.S.D.A., Soil Conservation Service, November 1973) identified the site as underlain by Alderwood gravelly sandy loam. The Alderwood soils are mapped with 6 percent to 15 percent slopes with the exception of the northeast site area where 15 percent to 30 percent slopes are mapped. The Alderwood soils are described as having a moderately rapid permeability in the surface layer and very slow in the substratum, surface runoff is slow to medium, and the erosion hazard is moderate for slopes less than 15 percent. For the Alderwood soils with the 15 percent to 30 percent slopes, the hazard of erosion is severe and the slippage potential is moderate. In general, the Alderwood gravelly sandy loam site soils can be classified as Hydrologic Soil Group C.

### **Regulated Geologic Hazard Critical Areas**

Section 21A.06.200 of the King County Code (KCC) describes regulated geologic hazard environmentally critical areas. These include erosion, landslide, seismic, coal mine, and steep slope hazards. Our conclusions regarding geologic hazard environmentally critical areas that are subject to regulation under the KCC are presented below.

#### Steep Slope Hazard

KCC 21A.06.1230 defines a regulated steep slope as one inclined at 40 percent or steeper and with 10 or more feet of relief. According to the topography developed during our review of LiDAR data and field measurements, the site does contain some areas of regulated steep slopes. These regulated steep slopes are located at the north and northeast side of the central ridge feature. The KCC calls for buffers around regulated steep slopes and the applicability of these will need to be addressed as the site development plans progress.

#### Erosion Hazard

The 1973 USDA Soil Conservation Service report indicates that the site is largely mantled by Alderwood gravelly sandy loam soils (AgC). Portions of the site with slopes exceeding 15 percent meet the criteria for an erosion hazard as described in KCC 21A.06.415. As such, a seasonal grading restriction will likely accompany grading approval for the site. We reviewed the King County GIS Development Conditions presented on the King County Assessor web site. The northeast site area has been mapped as an erosion hazard area. The mapped erosion hazard at the northeast corner generally correlates with information provided in the S.C.S. Soil Survey.

#### Landslide Hazard

The site appears to be underlain by Vashon lodgement glacial till and lacks surface expressions of previous or ongoing slope movement. Based upon our review of the referenced documents and our site observations, it is our opinion that the site does not contain areas that meet the definition of a landslide hazard area as described in KCC 21A.06.680.

#### Seismic Hazard

The widespread occurrence of Vashon lodgement glacial till and the lack of loose and saturated alluvial or fill soils is such that the risk of liquefaction impacting the site is very low. Based upon our review of the information sources described previously and our site observations, the site does not appear to meet the criteria for a seismic hazard area as described in KCC 21A.06.1045, in our opinion.

#### Coal Mine Hazard

Based upon available records and observed site conditions, the site does not meet the criteria for a coal mine hazard area as described in KCC 21A.06.200.

#### Critical Aquifer Recharge Area

The King County Assessor web site lists the northeast portion of the site as within a Class 2 Critical Aquifer Recharge Area (CARA). The CARA regulations are intended to reduce the potential for contamination of a sole source aquifer.

### **PRELIMINARY GEOTECHNICAL CONCLUSIONS AND RECOMMENDATIONS**

The development of the parcel for a park with associated structures is geotechnically feasible, in our opinion. A summary of geotechnical considerations relative to design and construction is presented below.

#### Regulated Geologic Hazard Areas

The site lacks most geologic hazard environmentally critical areas regulated under the KCC. It appears at this time that buffers and building setbacks in association with geologic hazards may be limited to those associated with regulated steep slopes, which appear relatively limited. A more detailed evaluation of the CARA categorization would be warranted as the project design progresses. However, based on our experience with other projects of a similar nature, we anticipate that development of the site as a park facility may not face particularly stringent restrictions relative to the CARA categorization.

### Topography

The south and west site areas have gentle to moderate slopes and would likely allow the most flexibility for development. Steeper slopes to the north and northeast will likely require more focused design and construction efforts.

### General Grading

Mapped and observed shallow soils consist of glacially consolidated silty, gravelly sand (glacial till) with local accumulations of soft organics in low-lying wet areas. General grading for site development could be performed with conventional earthmoving equipment. The very dense unweathered glacial till may require ripping with bulldozers and/or tracked excavators, but this is not considered an extraordinary measure for earthwork in the region. Cuts into the glacial till soils may encounter seepage zones within and/or perched atop the very dense soils.

Due to its silty nature the glacial till is moisture-sensitive relative to its use for structural fill. As such, the moisture content of the soils must be closely controlled during grading in order to achieve typical adequate compaction levels. The moisture-sensitivity of the site soils will limit grading of the silty soils to the relatively dry summer months. Imported "clean" structural fill with less than 5 percent fines may be required during wet-weather site earthwork.

### Surface Water Infiltration

The very dense nature of the glacial till soils limits surface water infiltration. The S.C.S. estimates permeability of the upper weathered horizon of the till as 2.0 – 6.3 inches per hour and the lower unweathered glacial till as less than 0.06 inches per hour. The low permeability of the till will likely preclude significant surface water infiltration. The permeability of the till will also likely influence the design of septic drainfields if they are required.

### Drainage

Drainage considerations for the very dense site soils may require the use of subdrains and/or the addition of drainage fill beneath playfields where the terrain is flat or where closed depressions exist. Subdrains should be considered in areas to be filled, over wet ground, and areas where existing drainage swales exist. Cuts into the glacial soils may encounter areas of groundwater seepage and moisture control measures should be anticipated.

### Foundations

The site-characteristic glacial till soils will be well suited for support of conventional shallow foundations and concrete slabs-on-grade for associated park structures and buildings, such as

seating stands and restroom buildings. All vegetation and organic topsoil should be removed from beneath the proposed structures during construction. The till will also provide a good base for pavements, although it should be recognized that the poor drainage characteristics of the till will need to be addressed in pavement design.

### RECOMMENDATIONS FOR FURTHER STUDY

The conclusions and recommendations presented in this preliminary report are based on the literature and data review and surface conditions observed during our reconnaissance; our approved scope of services did not include the completion of subsurface explorations such as borings or test pits. We recommend that design phase geotechnical services include the completion of subsurface explorations in areas that are slated for development with structures or where significant grading is planned. We would be pleased to prepare a scope of services and fee estimate for design phase geotechnical services if requested to do so.

Our conclusions regarding topography are based upon available LiDAR imagery and site observations. We recommend completing a survey of critical site locations where the locations of regulated steep slopes and code-required buffers may have an impact on design.

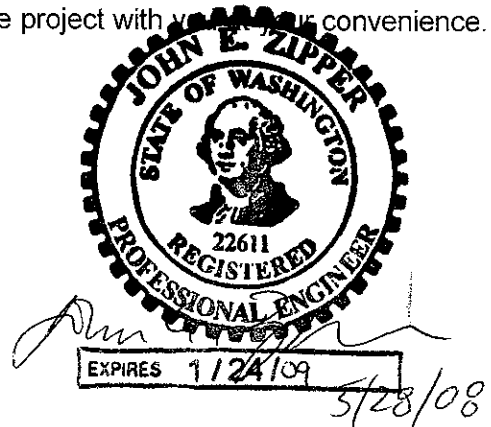
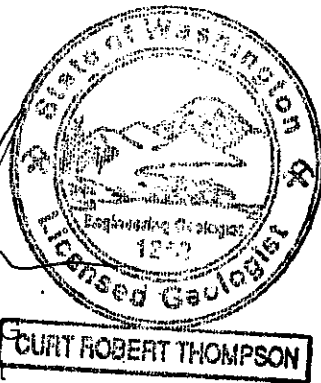
### CLOSURE

The preliminary study was completed within the site and scope constraints so as to yield the information necessary to formulate our conclusions and recommendations. As planning efforts advance and locations for the athletic fields and associated support structures are selected we look forward to the opportunity to be of continued assistance with the project.

We appreciate the opportunity to be of continued service to you, and would be pleased to discuss the contents of this preliminary report or other aspects of the project with you at your convenience. If you have any questions, please do not hesitate to call

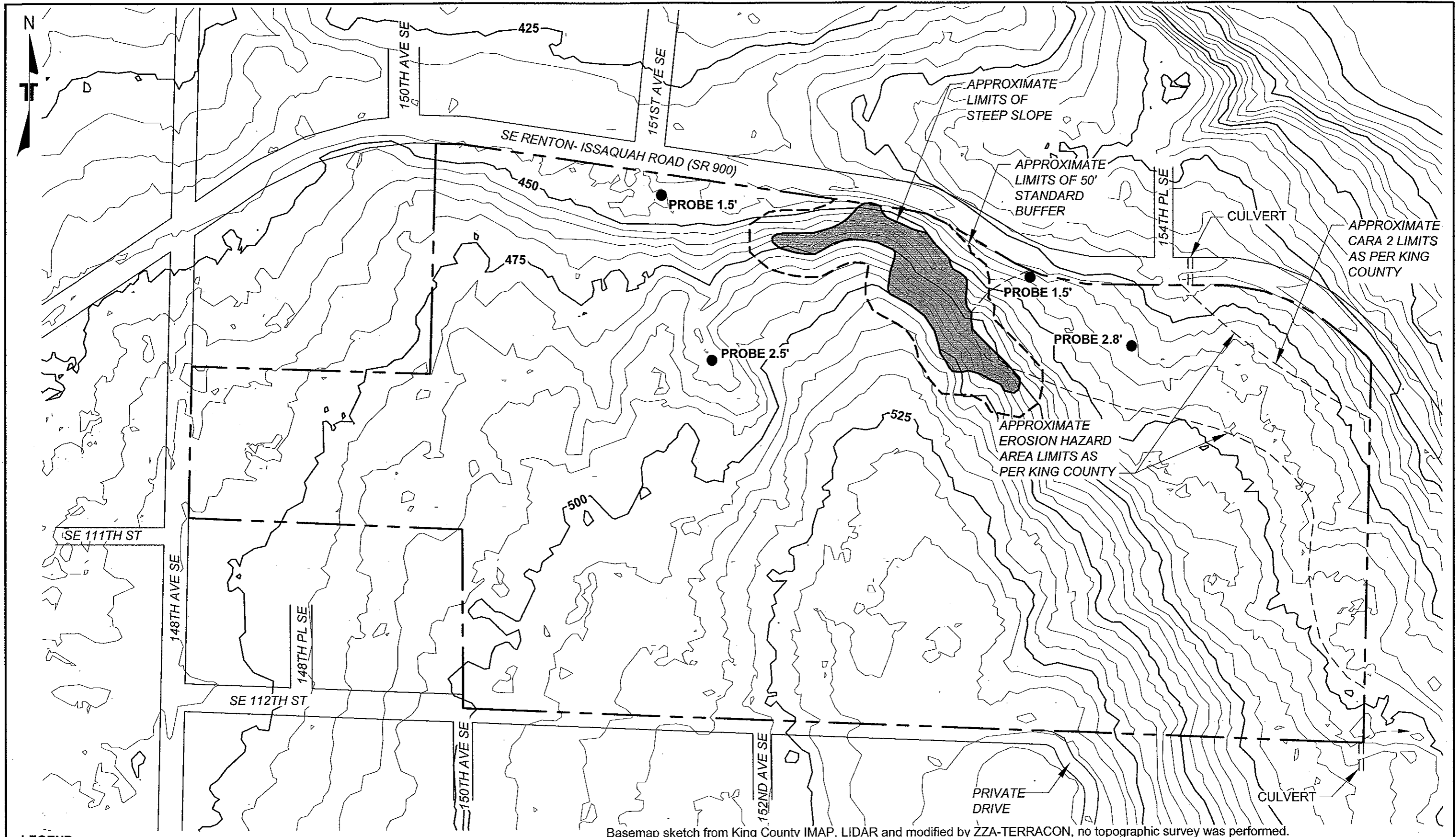
Respectfully submitted,  
ZZA-Terracon

Curt R. Thompson, L.E.  
Senior Project Geologist



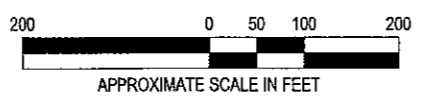
John E. Zipper, P.E.  
Senior Principal

Enclosure: Figure 1 – Site Plan



Basemap sketch from King County IMAP, LIDAR and modified by ZZA-TERRACON, no topographic survey was performed.

**LEGEND:**  
 ● PROBE 2.5' HAND PROBE NUMBER, APPROXIMATE LOCATION, AND APPROXIMATE DEPTH



Project Mngr:	CRT	Project No.	81085165
Drawn By:	JD	Scale:	AS SHOWN
Checked By:	CRT	File No.	Fig1.DWG
Approved By:	CRT	Date:	May, 2008

**ZZA-Terracon**  
 Consulting Engineers and Scientists  
 18905 33rd Avenue West, Suite 117 Lynnwood, WA 98036  
 PH: (425) 771-3304 FAX: (425) 771-3549

**SITE PLAN**  
 Jennifer Dunn Memorial Park  
 King County, Washington  
 Prepared for: RTW Associates

FIG. No.  
 1