Adapt Engineering
615 8th Avenue South
Seattle, Washington 98104

Tel (206) 654-7045
Fax (206) 654-7048
www.adaptengr.com

May 21, 2014
Adapt Job No. WA14-19280-SRT

Verizon Wireless
c/o Cascadia PM, LLC
5501 NE 109th Ct, Suite A2
Vancouver, WA 98662

Attention: Scott Emerson

Subject: **Summary of Soil Resistivity Testing**
SPO Balmer
904 S Hayford Rd
Spokane, WA 99001

Dear Mr. Emerson:

Adapt Engineering (Adapt) is pleased to present the results of our Soil Resistivity Testing for the above-referenced property. This soil resistivity testing was performed in general accordance with ASTM Method G-57 (IEEE Standard 81). Authorization to perform this project was given by Scott Emerson of Cascadia PM, LLC; on behalf of Verizon Wireless.

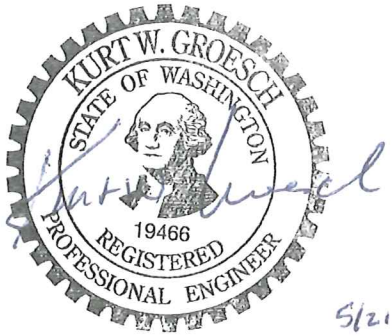
On May 16, 2014, Adapt conducted soil resistivity testing at the above referenced site. Figure 1 shows the general location of the host parcel. The soil resistivity testing was conducted on an approximate north/south, and an approximate west/east line using the Nilsson meter. Figure 2 depicts the locations of Testlines 1 & 2.

The soil resistivity testing was conducted using an analog Nilsson Ground Resistance Meter Model 400. Adapt followed the operating procedures described in the Manufacturer's operation manual for the four point Werner array soil resistivity method. Meter specifications and operating procedures are enclosed with this letter in Attachment A. Soil resistivity readings from the two test lines were obtained for five different electrode spacing distances including 40 foot, 30 foot, 20 foot, 10 foot, and 5 foot. Meter readings were recorded on a field soil resistivity test form after each reading. The field readings were then entered into a spreadsheet to calculate the resistance at each spacing. These resistivity test results are presented in Attachment B of this letter.

Adapt appreciates the opportunity to be of service to you on this project. Should you have any questions concerning this report, or if we can assist you in any way, please contact us at (206) 654-7045.

Respectfully Submitted,

Adapt Engineering



5/21/14

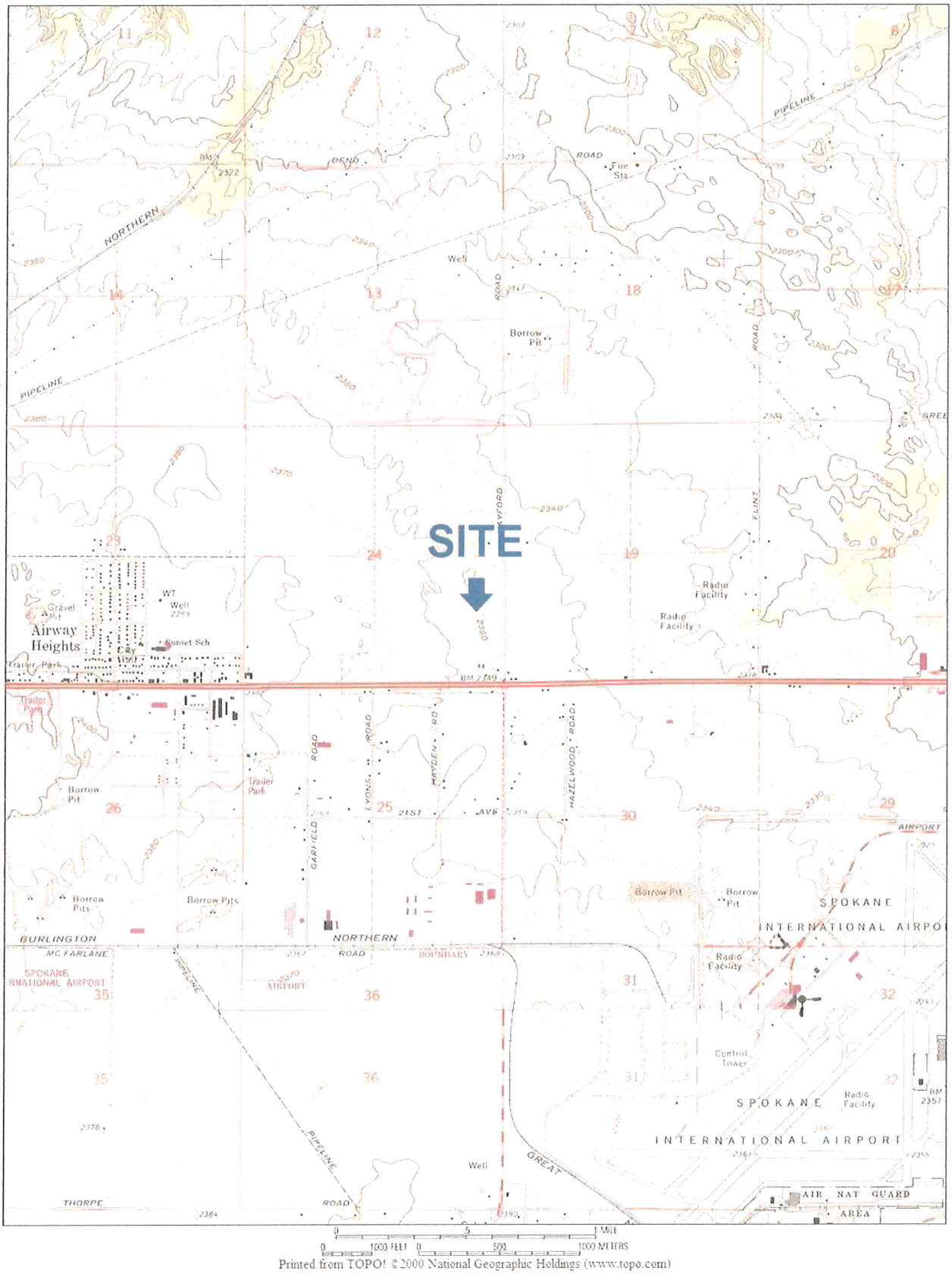
Sebastian Zi Hsien Lew
Geotechnical Representative

Kurt W. Groesch, P.E.
Senior Geotechnical Engineer
Senior Reviewer

Enclosures:

Figure 1: Location/Topographic Map
Figure 2: Site and Exploration Plan
Attachment A: Meter Operation Manual
Attachment B: Soil Resistivity Test Results

sl/kwg



Printed from TOPO! ©2000 National Geographic Holdings (www.topo.com)

ADAPT

Adapt Engineering
615 8th Avenue South
Seattle, Washington

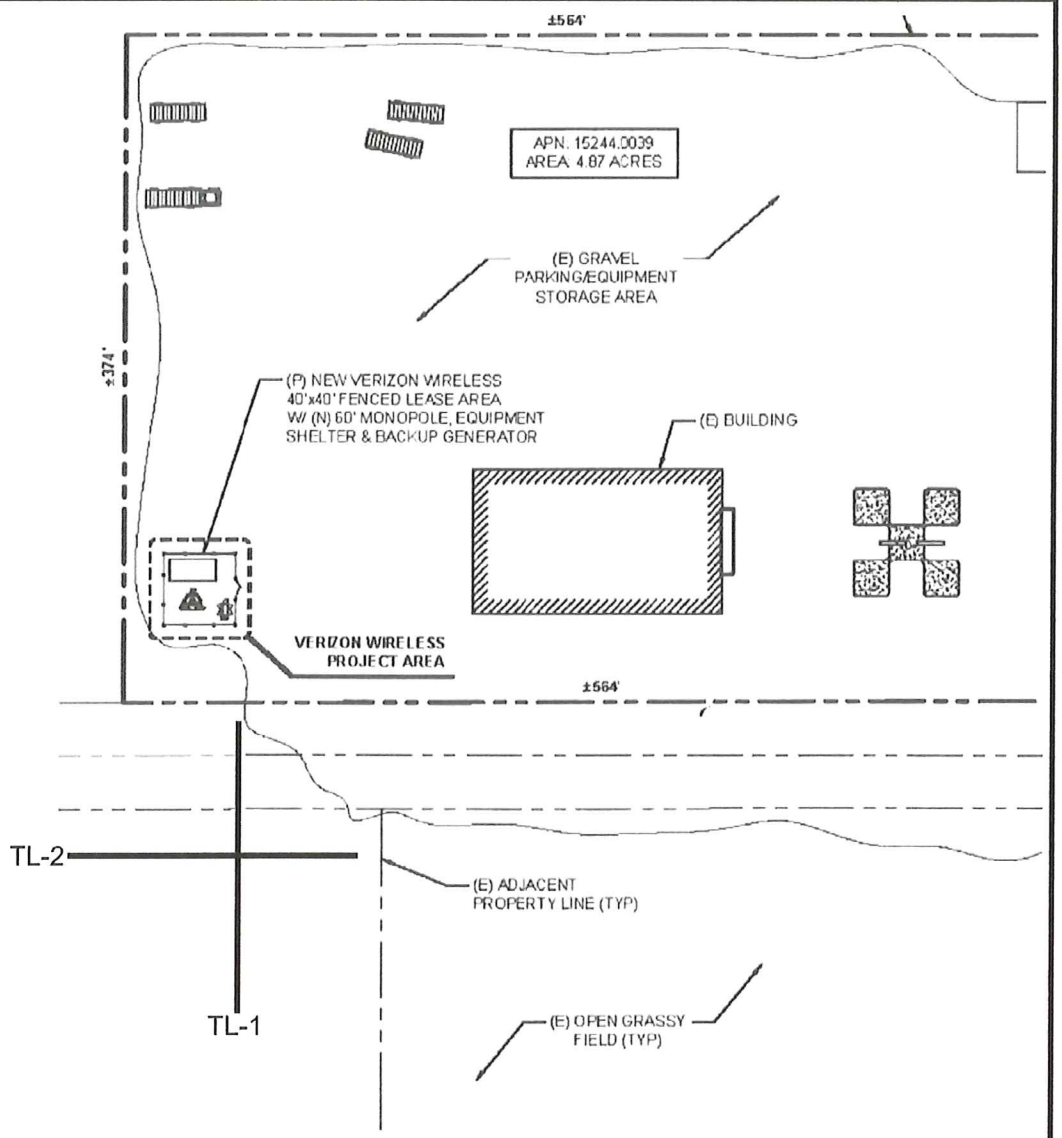
Tel (206) 654-7045
Fax (206) 654-7048

FIGURE 1 - Location & Topographic Map

Location : SPO Balmer
904 S Hayford Rd
Spokane, WA 99001

Client : Verizon Wireless c/o Cascadia PM, LLC

Date : 05/21/14 **Job # :** WA14-19280-SRT



LEGEND:

— - TL-1 - TEST LINE NUMBER AND APPROXIMATE LOCATION

NOTES:

DRAWINGS BASED ON "SITE SKETCH"
DRAWING PROVIDED BY CASCADIA PM, LLC (01/29/14)

NOT TO SCALE

N

ADAPT

Adapt Engineering
615 8th Avenue South
Seattle, Washington

Tel (206) 654-7045
Fax (206) 654-7048

FIGURE 2 - Site & Exploration Plan

Location : SPO Balmer
904 S Hayford Rd
Spokane, WA 99001

Client : Verizon Wireless c/o Cascadia PM, LLC

Date : 05/21/14 **Job # :** WA14-19280-SRT

ATTACHMENT A

Meter Operation Manual

NILSSON GROUND RESISTANCE TESTER
MODEL 400 4-PIN SOIL RESISTANCE METER

STANDARD OPERATING INSTRUCTIONS

DESCRIPTION OF MODEL 400

Model 400 Soil Resistance Meter is a 4 terminal, null balancing ohmmeter. It measures resistance from .01 ohm to 1.1 megohms. The Model 400 can be used as a 4, 3, or 2 pin device for soil resistance measurements, or can be used with a soil box or a single probe.

The unit generates a low voltage 97 Hz square wave current between the C1 and C2 binding posts. The detector, whose input is connected between the P1 and P2 binding posts is only sensitive to 97 Hz, and so is not affected by stray A.C. or D.C. currents. The detector senses the voltage drop between the P1 and P2 binding posts, compares it to internal standard resistors, and indicates a difference on the null detector. When the null detector is balanced, using the range switch and the dial, the resistance in ohms between P1 and P2 is the dial reading multiplied by the range switch position.

4 PIN METHOD

When using the 4 pin method to measure soil resistance, the 4 pins should be driven into the ground in a straight line at the desired spacing. Good contact with the soil is important. The two "C" binding posts are connected to the two end pins, and the two "P" binding posts are connected to the adjacent center pins.

If the approximate resistance is not known, place the range switch at the "X100K" position and the dial at 10. Pull the sensitivity key to the "LOW" position and note that the meter pointer moves to the right, indicating too high a setting. While holding the key in the "LOW" position step down thru the ranges until the pointer moves to the left of center. Then step back up one range and balance with the dial. For increased sensitivity and a finer balance, push the sensitivity key to the "HIGH" position and refine the balance. When a satisfactory balance has been achieved, multiply the indicated dial reading by the range switch setting to obtain the resistance in ohms. To calculate the resistivity in ohms/cm apply the proper pin spacing multiplier factor or formula. (See table)

SPACING EVEN FEET	MULTIPLIER	SPACING FEET—INCHES	MULTIPLIER
1	191.5	2'-7"	500
2	383.0	5'-3''	1000
3	574.5	7'-10"	1600
4	766.0	10'-5"	2000
5	957.5	13'-1"	2500
10	1915.0	15'-5"	3000
15	2872.5	18'-3"	3500
20	3830.0	20'-10"	4000
25	4787.5	23'-5"	4600

ohms/cm =6.28XSXR (S in centimeters) all spaces equal
ohms/cm =191.SXSXR (S in feet and tenths) all spaces equal

ATTACHMENT B

Soil Resistivity Test Results

Adapt Engineering
615 - 8th Avenue South
Seattle, Washington 98104

Tel (206) 654-7045
Fax (206) 654-7048
www.adaptengr.com

SOIL RESISTIVITY TEST RESULTS

SITE NAME: SPO Balmer

SITE NUMBER:

SITE LOCATION: 904 S Hayford Rd
Spokane, WA 99001

CLIENT: Verizon c/o Cascadia

ADAPT JOB NUMBER: WA14-19280

TEST DATE: 5/16/2014

TEST TIME: 5:30PM

WEATHER CONDITIONS: 60°F/Cloudy
3+ days no rain
Ground was dry

TEST 1

ELECTRODE DISTANCE (FEET)	RAW FIELD DATA READING (OHMS x MULTIPLIER)			OHMIC METER READING (OHMS)	CALCULATED RESISTANCE (OHM-CM)
5	6.50	x	10	65.00	62,238
10	3.00	x	10	30.00	57,450
20	1.05	x	10	10.50	40,215
30	0.75	x	10	7.50	43,088
40	8.85	x	1	8.85	67,791

TEST 2

ELECTRODE DISTANCE (FEET)	RAW FIELD DATA READING (OHMS x MULTIPLIER)			OHMIC METER READING (OHMS)	CALCULATED RESISTANCE (OHM-CM)
5	6.20	x	10	62.00	59,365
10	3.30	x	10	33.00	63,195
20	1.15	x	10	11.50	44,045
30	6.50	x	1	6.50	37,343
40	5.20	x	1	5.20	39,832

Notes:

1. The resistivity test was performed with a Nilsson ground resistance tester model 400, using the 4-pin Wenner array method in general accordance with ASTM Method G-57 (IEEE Standard 81).
2. Test 1 = N-S Direction; Test 2 = W-E Direction.
3. Based on measured resistivity values, a conventional grounding system may not readily achieve system grounding levels below 5 ohms, and a site specific grounding design may be required.