

# **REMEDIAL ACTION WORK PLAN**

**PROPOSED NORTH STAR DEVELOPMENT  
TAX LOTS 200, 701, 800, 900 AND 1000  
MAP 062W32C  
SALEM, OREGON  
DEQ ECSI #6036**

Prepared for

**GRANADA LAND Co., L.L.C.**

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Project #1503.00  
March 28, 2017

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Tax Lots 200, 701, 800, 900 and 1000  
Map 062W32C  
Salem, Oregon

Prepared for

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## 1.0 INTRODUCTION

Anderson Geological, Inc. (AGI) was authorized by Granada Land Co. L.L.C., to complete this work plan detailing the removal and off-site disposal of shallow soils on tax lots 200, 701, 800, 900 and 1000, Map 062W32C, Salem, Oregon (Subject Property). Areas of the site include soils with dieldrin concentrations that exceed risk-based levels for residential and urban residential (multi-family) property use. A residential development consisting mainly of single-family homes with some multi-family housing is planned for future development of the property.

The site is located within the Salem city limits and domestic water will be supplied to the new development by the City of Salem. No water wells will be in use within the North Star development.

A remedial investigation/feasibility study was completed and approved by the Oregon Department of Environmental Quality (DEQ) that evaluated the risk posed to current and future occupants of the property and proposed a remedial action involving the removal of the dieldrin-impacted soil from portions of the site. The RI/FIS had proposed that the excavated soils be disposed of in a dedicated, engineered containment cell adjacent to the North Star development that would prevent human contact with the soil.

It was later determined that re-use of the soils at an off-site location (6848 Windsor Island Rd N., Keizer, Oregon) would be a more economical and practical alternative. The soils will be used to fill two former gravel pits, and the resulting area will be put into active farmland production by the property owner, who also farms the adjacent land. The off-site disposal of the soils is being completed under a Solid Waste Permit Exemption through Oregon DEQ.

### 1.1 Site Location and Setting

The Subject Property is located within the city limits of Salem, Oregon (Figure 1). The property is bounded to the north by Alpha Nursery and single-family homes (across Hazelgreen Road NE), to the south by single-family homes (across Kale Street NE), to the east by orchards operated by Alpha Nursery, and to the west by Copper Creek Estates mobile home park. Properties to the north of Hazelgreen Road are in unincorporated Marion County and properties south of Kale Street are located within the Salem city limits. The Subject Property and adjacent properties are shown on Figure 2.

The Subject Property consists of four contiguous tax lots totaling 148.74 acres that was leased, through the last season, as farm land for dry wheat farming. The property was not replanted for the current season. A single-family home is located on tax lot 1000 that is occupied by a renter.

## 2.0 BACKGROUND

### 2.1 Site History

The five tax lots that comprise the subject property have been farmed by the Zielinski family and others since the 1890's. According to Doug Zielinski, owner of Alpha Nursery and current lessee of the subject property, his family has been farming parts of the subject property since the 1890's. His family grew row crops (beans, corn) in the earlier years and grass and grain crops in recent years. DDT was used on the site for pest control in the 1950's.

A previous owner of tax lot 900 grew strawberries on the lot in the late 1950's and early 1960's. According to Doug Zielinski, the pesticide aldrin, which naturally breaks down to dieldrin, was used on the strawberry crop. Other row crops grown on tax lot 900 and 600 included green beans and cauliflower. Two areas on the north half of tax lot 200 and one area on the west half of tax lot 1000 were planted in filberts beginning in the 1940's until the trees were removed in the 1980's.

Mr. Zielinski's family sold the land to Granada Land Company in 2005 and has leased the land for farming grass and grain crops since that time. Granada Land Company plans to develop the site into a residential housing development known as North Star. The current development plan consists primarily of single-family home sites with a small area reserved for multi-family residences (apartments).

### 2.2 Previous Investigations

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North Star Development  
Preliminary Soil Analysis  
Multi/Tech Engineering Services, Inc.  
August 17, 2015

In July 2015, Multi/Tech collected soil samples from locations across the subject property for analysis for residual pesticides. The samples were collected from a depth of approximately 6 inches below ground surface (bgs). The samples were analyzed for organochlorine pesticides (EPA Method 8081B), organophosphorous pesticides (EPA Method 8270D) and heavy metals (RCRA 8 metals). No organophosphorous pesticides were reported above the laboratory reporting limits. The metals were reported at concentrations within natural background levels.

Organochlorine pesticides reported in the samples included 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, dieldrin and endosulfan sulfate. Of these compounds, only dieldrin was present above Oregon risk-based concentrations (RBCs) for residential properties.

Dieldrin was detected in seven of the ten soil samples at concentrations ranging from 0.0266 and 0.196 milligrams per kilogram (mg/kg). The dieldrin concentrations exceeded RBCs for the residential ingestion/inhalation/dermal contact exposure pathway in six of these samples (0.029 mg/kg).

North Star Development  
Assessment of Pesticides in Shallow Soil  
Anderson Geological, Inc.  
December 22, 2105

In September 2015, Anderson Geological, Inc. (AGI) collected soil samples from locations across the subject property for analysis for residual pesticides. Samples were collected from depth intervals of 0-6 inches and 6-12 inches below ground surface.

The residual impacts from historical agricultural use of pesticides were evaluated by collecting shallow soil samples on across the site. The pesticides aldrin, 4,4'-DDD, 4,4'-DDE, 4,4'-DDT, endosulfan sulfate, endrin ketone and dieldrin were detected in composite samples collected from a depth of 0-6 inches. Based on the initial sampling, dieldrin was identified as the only contaminant of concern (COC). Further analysis of the samples showed dieldrin at concentrations above residential screening levels for the *dermal contact, ingestion, inhalation* pathway in several areas to depths of at least 12 inches. The maximum depth of the impacted soil was not determined in many areas. Additional characterization of the dieldrin-impacted soils was recommended to identify the depth of soils contaminated above RBCs.

North Star Development  
Remedial Investigation/Feasibility Study  
Anderson Geological, Inc.  
August 9, 2016

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Additional soil sampling ruled out other potential pesticides and metals as contaminants of concern, and further defined the approximate depth of dieldrin-contaminated soil above residential and urban residential screening levels. It was determined that dieldrin-contaminated soil would need to be removed, primarily from locations on the west portion and north extension of the subject property, generally to depths of up to 18 inches.

It was concluded that the most appropriate remedial option for the site was removal of soil that exceed risk-based concentrations and placing the excavated soil in an engineered containment cell that removes the soil from human contact.

It was later decided that re-use of the soils at an off-site location would be a more economical and practical alternative. The off-site disposal of the soils is being done under a Solid Waste Permit Exemption through Oregon DEQ.

### 3.0 PURPOSE AND SCOPE

The purpose of the proposed soil removal is to reduce the risk of human contact with dieldrin-impacted soil for future residential receptors. The objective is to remove the shallow soil, ranging in depth between 6 and 30 inches below ground surface, so that the dieldrin concentration in the remaining soil is below residential risk-based concentrations (RBCs). After the successful completion of the removal of the affected topsoil, the site will be re-graded and developed with single-family homes.

Based on the results of the previous investigations, there are approximately 81 acres of the site that will require remediation, involving the removal of approximately 150,000 cubic yards of topsoil.

### 4.0 SOIL REMOVAL PLAN

The only contaminant of concern on the subject property is dieldrin, resulting from the degradation of the pesticide aldrin, which is believed to have been applied to some of the crops on the site in the 1950's and 1960's. The purpose of the proposed soil removal is to reduce the risk to direct contact with the impacted soils by future residential receptors on the site.

Based on the conceptual site model, the only exposure pathway of concern is ingestion/dermal contact/inhalation of contaminants in the soil by occupants of the residential units. The proposed remediation of the site involves the removal of all soil exceeding risk-based concentrations from areas of proposed residential development and relocating the soils off-site on a property that will be used for farming.

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The proposed soil removal will proceed as follows:

- A City of Salem grading permit and a DEQ 1200C storm water permit will be obtained before beginning soil removal activities.
- The corners of the sampling cell grids, shown in Figure 3, will be marked in the field with surveyor's stakes to guide the soil removal.
- The topsoil will be removed with earth-moving scrapers and excavation equipment from areas shown on Figure 3. The depth of the removed soil will vary from 6 to 18 inches with the exception of the 1-acre area in sub-cell 3A which will be excavated to a depth of 30 inches below ground surface (bgs). The scraped soils will be placed in trucks and trailers which will deliver the soils to the off-site disposal location on Windsor Island Road, Salem (Zielinski farm).

To assure that the proper depth of soil is removed in all areas, global positioning system (GPS) technology will be used on the excavation equipment. As the soil removal progresses, confirmation soil samples will be collected as described in section 5.0 of this work plan. The locations of the individual confirmation sampling points will be marked in the field.

#### 4.1 Worker Safety

The contractor (currently undetermined) will prepare and implement a site-specific Health and Safety Plan in accordance with OSHA requirements to insure adequate protection for their workers while on North Star site and at the disposal site and to control off-site impacts from hazardous substances.

#### 4.2 Loading and Hauling

Material intended for off-site disposal will be loaded directly onto trucks for transport to the disposal facility located at 6848 Windsor Island Rd. N., Keizer, Oregon. All truck loads will be securely covered before leaving the project site and remained covered during transport of the soil to the disposal area.

#### 4.3 Site Control and Equipment Decontamination

Heavy equipment, including excavators and haul trucks, will arrive at the site free of debris and contamination. Prior to soil removal work, an NPDES Permit will be obtained from DEQ for the total site. The permit application will note the proposed construction entrance for the work.

A staging area will be developed near the point where the trucks will enter the public roadway system. Prior to leaving the construction site, all heavy equipment will have visible soil removed from the wheels, wheel wells, and other exterior areas of the vehicle. Dust and other fine surface residue will not be removed. The same decontamination process will be employed for heavy equipment moving from contaminated cells to non-contaminated cells to avoid cross contamination between cells.

The tracking of soil onto public roadways will be minimized by using standard construction practices, including the use of a trackout pad composed of washed gravel or crushed rock. Trackout will be cleaned up from roadways as needed by using a street sweeper, wet broom or by manual sweeping. Dust generation will be minimized from the construction site by watering of soils as needed during excavation and grading.

The contractor will obtain all necessary permits, including storm water control permits, and follow best management practices to minimize migration of contaminated soils and runoff into sensitive environments.

## 5.0 POST-REMOVAL SOIL CONFIRMATION SAMPLING

It is expected that approximately 81 acres of land will undergo excavation of dieldrin-contaminated soil and a minimum of 162 composite samples will be collected and analyzed.

Confirmation soil samples will be collected from all areas where dieldrin-contaminated soil was removed to verify the effectiveness of the soil removal. The location of each discrete sample will be recorded using global positioning technology.

The soil removal will be completed within sub-cells with an approximate area of one acre each. In each sub-cell from which contaminated soil has been removed, eight discrete soil samples will be collected to create two composite confirmation samples (four discrete samples per composite sample). This methodology will result in an average of one discrete soil sample per 5,500 square-foot residential lot. The discrete samples will be collected from evenly-distributed locations within each sub-cell (Figure 3). No attempt will be made to locate samples within specific residential lots.

Each discrete sample will be collected from a depth of 0-3 inches using a shovel or hand trowel and homogenized in a resalable plastic bag. Composite samples will be created from four adjacent discrete samples by placing equal volumes of homogenized discrete samples into the plastic bag and thoroughly blending the sample with a clean, nitrile-gloved hand. The resulting composite sample will be placed into a labeled 4-ounce glass sample jar which will be placed in a chilled cooler and hand-delivered to the project laboratory (Apex Labs, Tigard, Oregon). Portions of each discrete sample will be placed in separate 4-ounce glass sample jars and held for possible analysis in the event that the composite sample exceeds  $\frac{1}{4}$  of the RBC (see discussion below). The samples will be analyzed for dieldrin by EPA Method 8081B, with a minimum reporting limit of 0.007 mg/kg.

The holding time for test method EPA 8081B is 14 calendar days. The composite samples will be analyzed on a 5 business-day turnaround, giving enough time before the hold time expires to extract and analyze the corresponding discrete samples, as needed.

Any sub-cells in which the composite samples exceed  $\frac{1}{4}$  of the RBC (0.0085 mg/kg) will be further evaluated by analyzing the corresponding discrete samples to attempt to further define the location of the contaminated soil and reduce the volume of soil to be excavated. Any locations in which the discrete sample exceeds the residential RBC (0.034 mg/kg) will be further excavated and resampled (discrete analysis) to verify the effectiveness of the soil removal. Soil removal will continue until the residential RBC is achieved.

After completion of the remedial action, the site will be re-graded and clean fill will be imported as needed to restore the site for construction of the housing development.

**5.1 Decontamination of Sampling Equipment**

All sampling equipment will be decontaminated between composite sampling sub-cells by washing the equipment with a detergent wash and rinsing with de-ionized water. The wash water and rinsate is expected to involve a minimal volume of liquid and will be discarded onto the ground in the location of the last discrete sample. The decontamination will be performed before moving to the next sampling sub-cell. Alternatively, the use of dedicated, disposable sampling equipment may be used. All disposable sampling equipment (e.g. nitrile gloves, paper towels, empty plastic bags, etc.) will be disposed of as general construction waste.

**6.0 REPORTING**

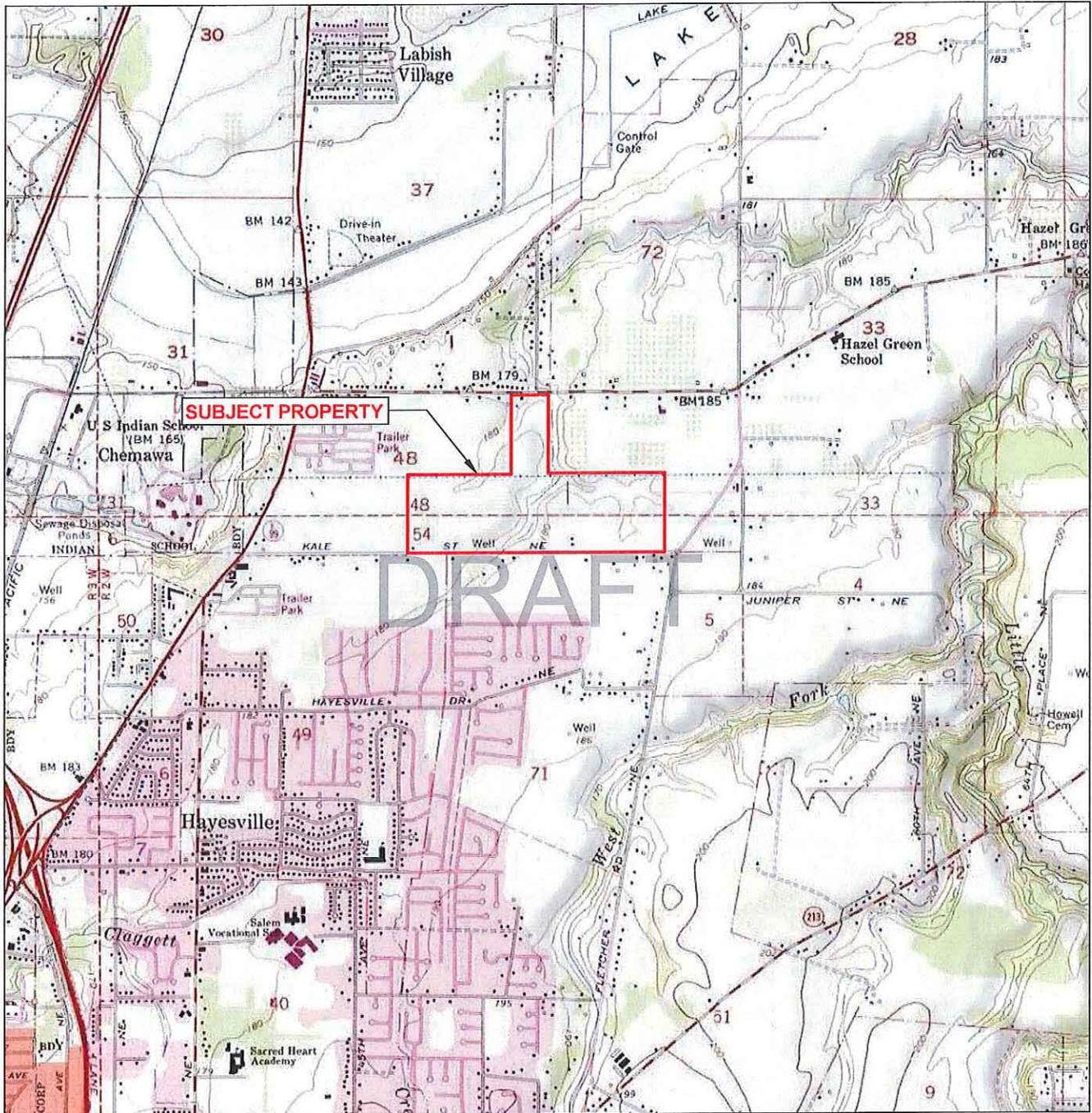
Upon completion of the soil removal and confirmation sampling, a project completion report will be prepared that documents the specific depths and locations of the excavated dieldrin-impacted soil, locations and results of all confirmation soil samples, and evaluation of the lab results with respect to cleanup levels.

**ANDERSON GEOLOGICAL, INC.**

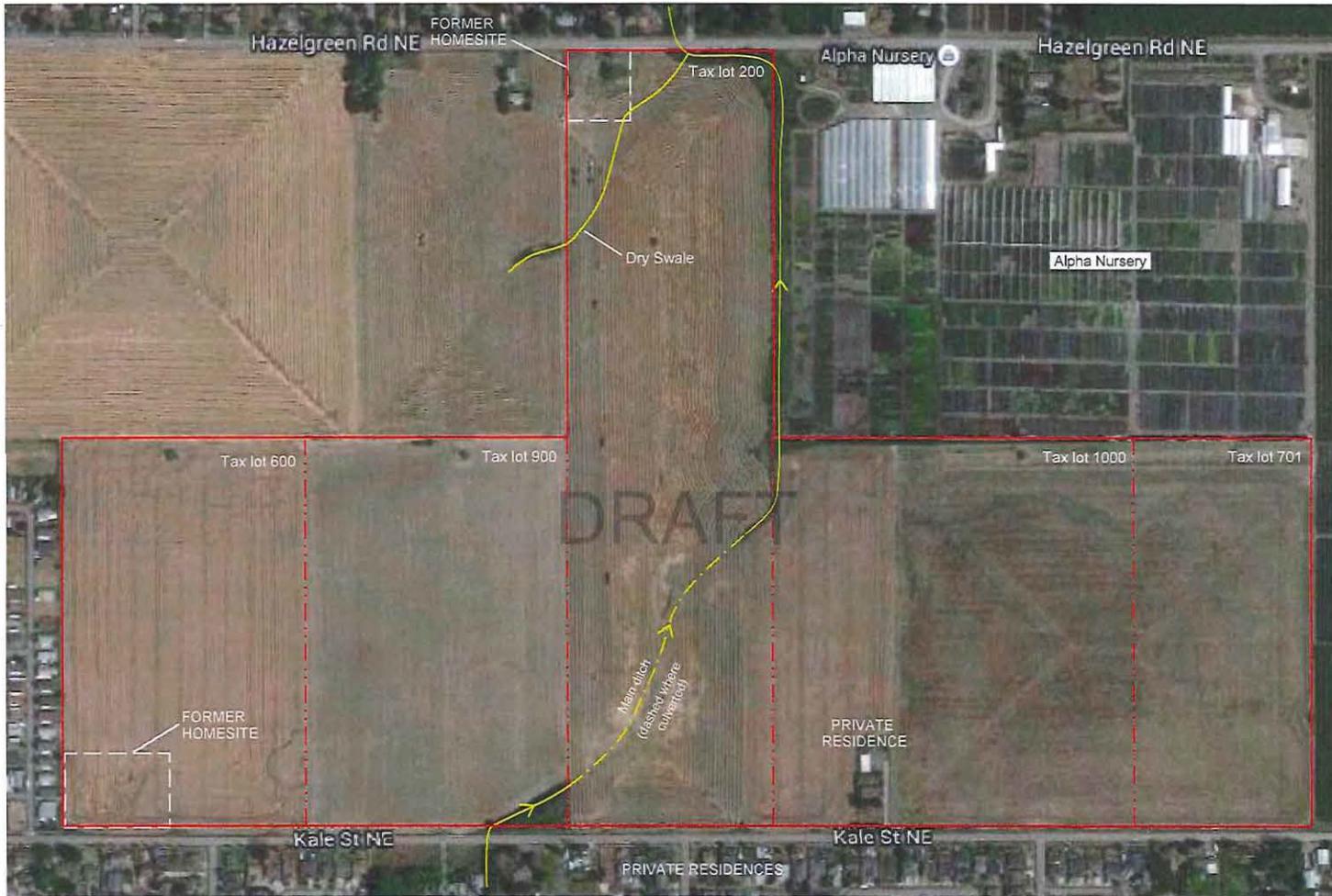
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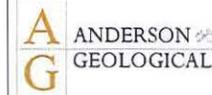
Erik Anderson, R.G.  
Registered Geologist



 <b>ANDERSON</b> <b>GEOLOGICAL</b>	<b>SITE LOCATION MAP</b>		
	Tax Lots 200, 701, 800, 900 and 1000, Map 062W32C Salem, Oregon		
SIZE <b>A</b>	PROJECT NO. 1503.00	REV	
	April 2017	FIGURE 1	



Scale: 1" = 400' (approximate)



SITE PLAN

Proposed North Star Development  
Salem, Oregon

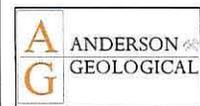
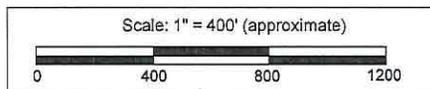
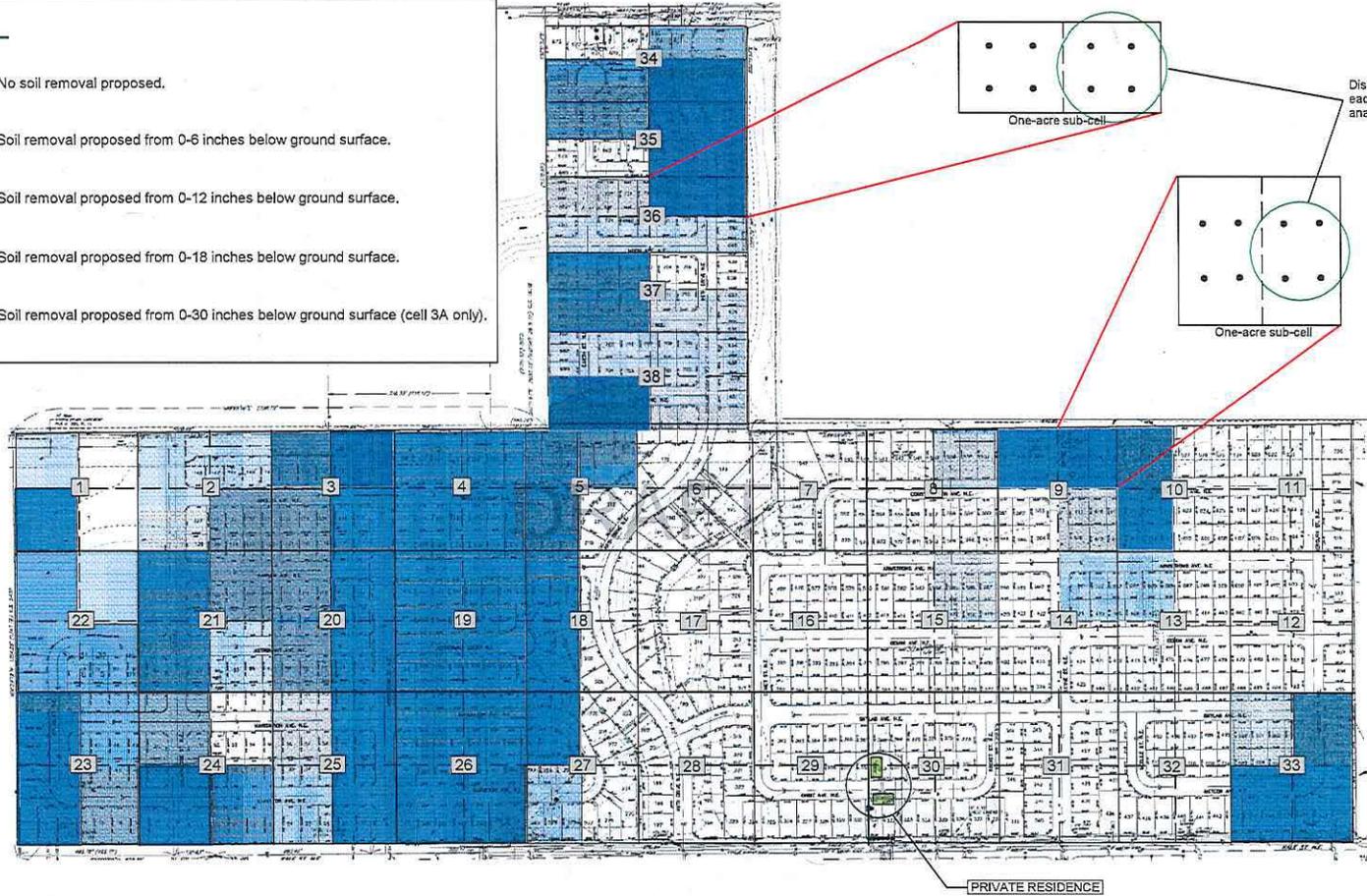
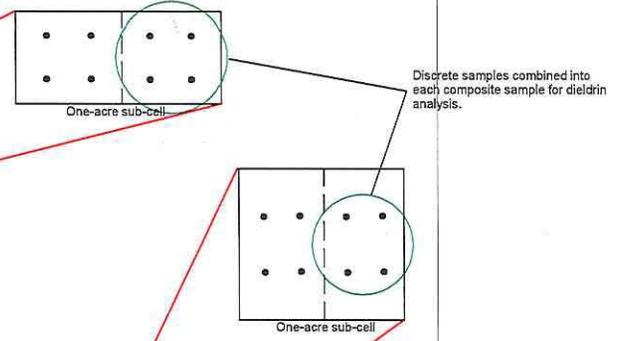
SIZE	CAGE CODE	DWG NO	PROJECT No.
B		April 2017	FIGURE 2



**LEGEND**

-  No soil removal proposed.
-  Soil removal proposed from 0-6 inches below ground surface.
-  Soil removal proposed from 0-12 inches below ground surface.
-  Soil removal proposed from 0-18 inches below ground surface.
-  Soil removal proposed from 0-30 inches below ground surface (cell 3A only).

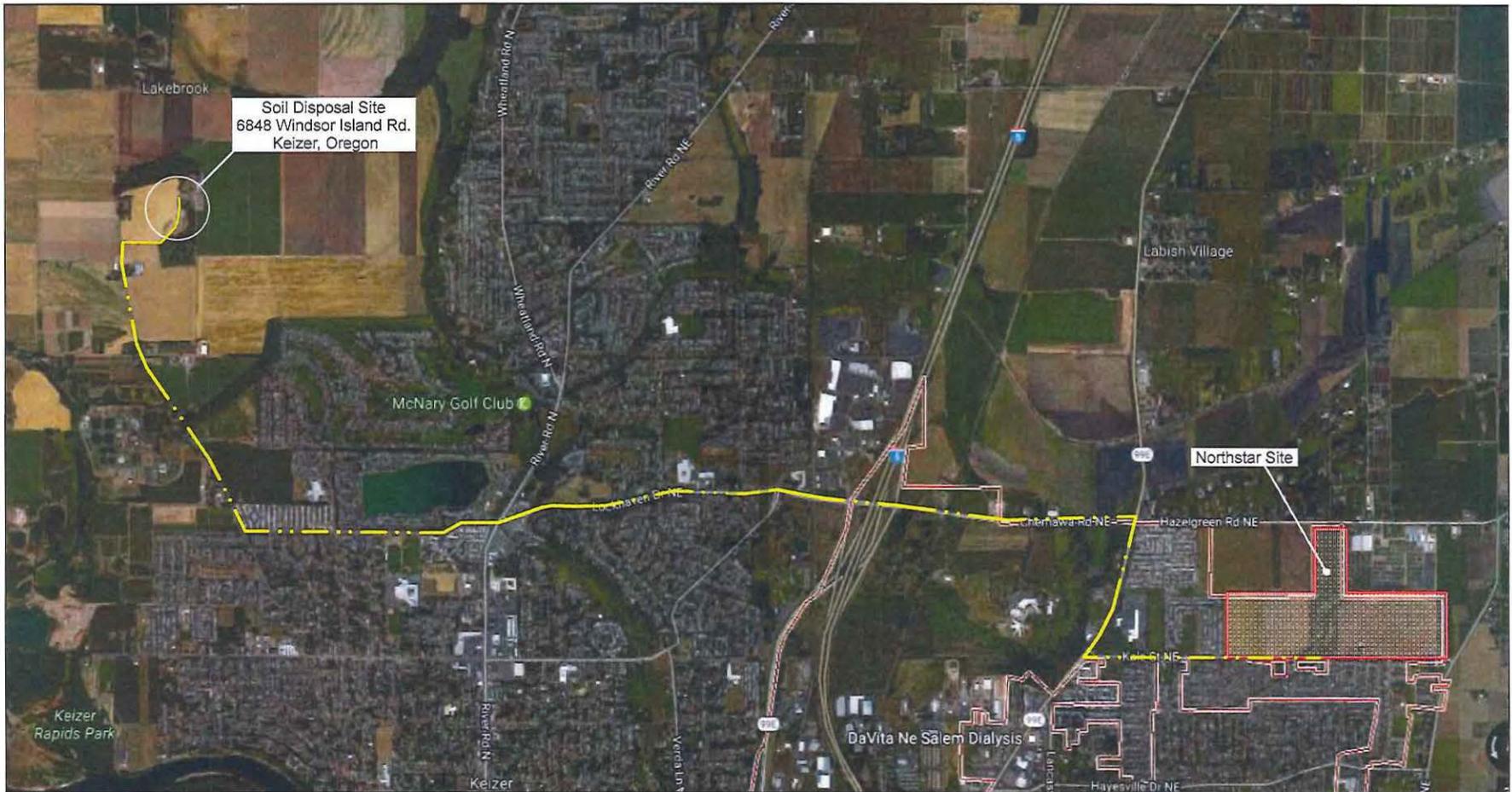
Example of 4-point composite sampling within 1-acre sub-cells



**PROPOSED DEPTHS OF SOIL REMOVAL AND CONFIRMATION SOIL SAMPLING STRATEGY**

Proposed North Star Development  
Salem, Oregon

SIZE B	CAGE CODE	DWG NO	PROJECT No.
		April 2017	FIGURE 3



 <b>ANDERSON GEOLOGICAL</b>	<b>PROPOSED TRUCK ROUTE BETWEEN NORTHSTAR SITE AND DISPOSAL SITE</b>		
	Proposed North Star Development, Salem, Oregon		
	SIZE <b>A</b>	PROJECT NO. 1503.00	REV
	April 2017	FIGURE 4	



NOTE: Tax lot 00100 is owned by Zielinski Limited Trust. Tax lot 00300 is owned by Windsor Island Company LLC

 <b>ANDERSON</b> <b>GEOLOGICAL</b>	<b>PROPOSED SOIL DISPOSAL SITE</b> 6848 Windsor Island Rd. N, Keizer, Oregon Proposed North Star Development, Salem, Oregon		
	SIZE <b>A</b>	PROJECT NO. 1503.00	REV
	April 2017		FIGURE 5

