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Via Hand Delivery and First Class Mail

August 13, 2019

Springfield Planning Commission
Springfield Hearings Official
City of Springfield
Development Services Department
225 Fifth Street
Springfield, OR 97477

Re: *Re-Opened Record (Tree Felling Permit)*
Applicant: Springfield Utility Board
City File No. 811-19-000016-TYP 2
Project Name: SUB Glenwood Substation and Transmission Line Tree
Felling Permit
Our File No.: 13538/12953

Dear Planning Commissioners and Hearings Official:

On behalf of our client, Royal Blue Organics, and in accordance with the open-record period specified via at the meeting on August 6, 2019, we hereby provide the following evidence in response to the materials provided by the applicant on or before July 2nd.

Please include this letter and its attachments in the record of this application.

The applicant submitted with its materials a "Planting Plan – Transmission Line." To the extent that this submission is intended to demonstrate compliance with 5.19-125D or E, this submission fails as it does not provide any information concerning trees to be retained on the property, does not identify individual trees to be retained outside of tax lot 101, and provides no plans for replanting of new trees to offset the loss of trees on the subject property. Accordingly, these materials do not support approval of the proposed development.

The applicant also submits two sheets from a Grading and Paving Plan, three sheets of an Erosion Control Plan & Details and a Proposed Contours Exhibit for a portion of the road.

To the extent that these documents are intended to demonstrate compliance with 5.19-

125A or 5.19-125C, these documents fail as they do not provide sufficient information to demonstrate conflicts between several trees that would make removal of the same necessary. These include trees that are entirely outside of the development footprint and clear area, as well as trees for which no information is provided concerning height, hazard or condition.

To the extent that these materials are intended to establish that the proposed felling is consistent with “State standards, Metro Plan policies and City Ordinances affecting environmental quality in the area, including but not limited to, the protection of nearby trees and windbreaks; wildlife; erosion; soil retention and stability; volume of surface runoff and water quality of streams; scenic quality; and geological sites,” these plans also come up short.

The plans also fail to identify trees to be retained on site or to evaluate their height, condition or critical root zone, or the impact of tree removal on “nearby trees and windbreaks.”

Likewise, although the property contains two watercourses identified on the City’s water quality limited waterways map (see enclosed) – including the wetland on tax lot 101 and tributary to the water quality limited watercourse on tax lot 1100, these materials do not identify these watercourse on the plans, limit use of these areas to the permitted uses in riparian areas identified in 4.3-115B or make provisions to avoid development impacts, preserve these areas during road or line construction or restore and enhance riparian these riparian areas as required by 4.3-115C.

In addition, as reflected in these materials, the applicant is proposing to use a probable carcinogen as its exclusive chemical defoliant on the subject property. Page C1, note 4, states:

“Glyphosate is the only approved herbicide for use on property owned by Springfield Utility Board.”

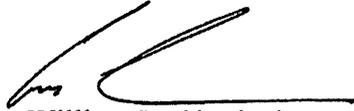
A study published this year by a team from the University of Washington in Mutation Research/Reviews in Mutation Research found a “compelling link” between the herbicide and a 41% increase in the risk of non-Hodgkin lymphoma. This follows a 2015 assessment from the International Agency for Research on Cancer which determined the glyphosate is a “probably human carcinogen.” Juries have awarded hundreds of millions of dollars against the maker of glyphosate – Monsanto – since mid-2018. The applicant has failed to establish that the proposed use of this probable carcinogen on the subject property is consistent with preserving air, land and water quality standards under the Metro Plan or state or local law.

Furthermore, the applicant has failed to establish that its proposed erosion prevention measures will actually preserve “soil retention and stability” particularly in view of the old slope failure located on portions of tax lots 300 and 1000. As reflected in the attached report from Dr. Gunnar Schlieder of Geoscience, this slope failure occurs below and is loaded by a portion of the embankment of Interstate 5. The applicant erosion plan does not account for this deep-seated slope movement or establish that the proposed tree removal can be accomplished without impacting this latent defect of the property.

As the applicant has failed to establish compliance with the applicable standards in its July 2nd submission, we respectfully request that the tree felling permit be denied on appeal.

Sincerely,

HUTCHINSON COX

A handwritten signature in black ink, appearing to read 'William H. Sherlock', with a long horizontal stroke extending to the right.

William H. Sherlock

WHS/jm

cc: clients

Gunnar Schlieder

Enclosures and Attachments:

City of Springfield's Water Quality Limited Waterways Map

Holtz, J. "UW Study: Exposure to Chemical in Roundup Increases Risk for Cancer"

Gonzales, R. "California Jury Awards \$2 Billion to Couple in Roundup Weed Killer
Cancer Trial"

Geoscience Report, Dr. Gunnar Schlieder

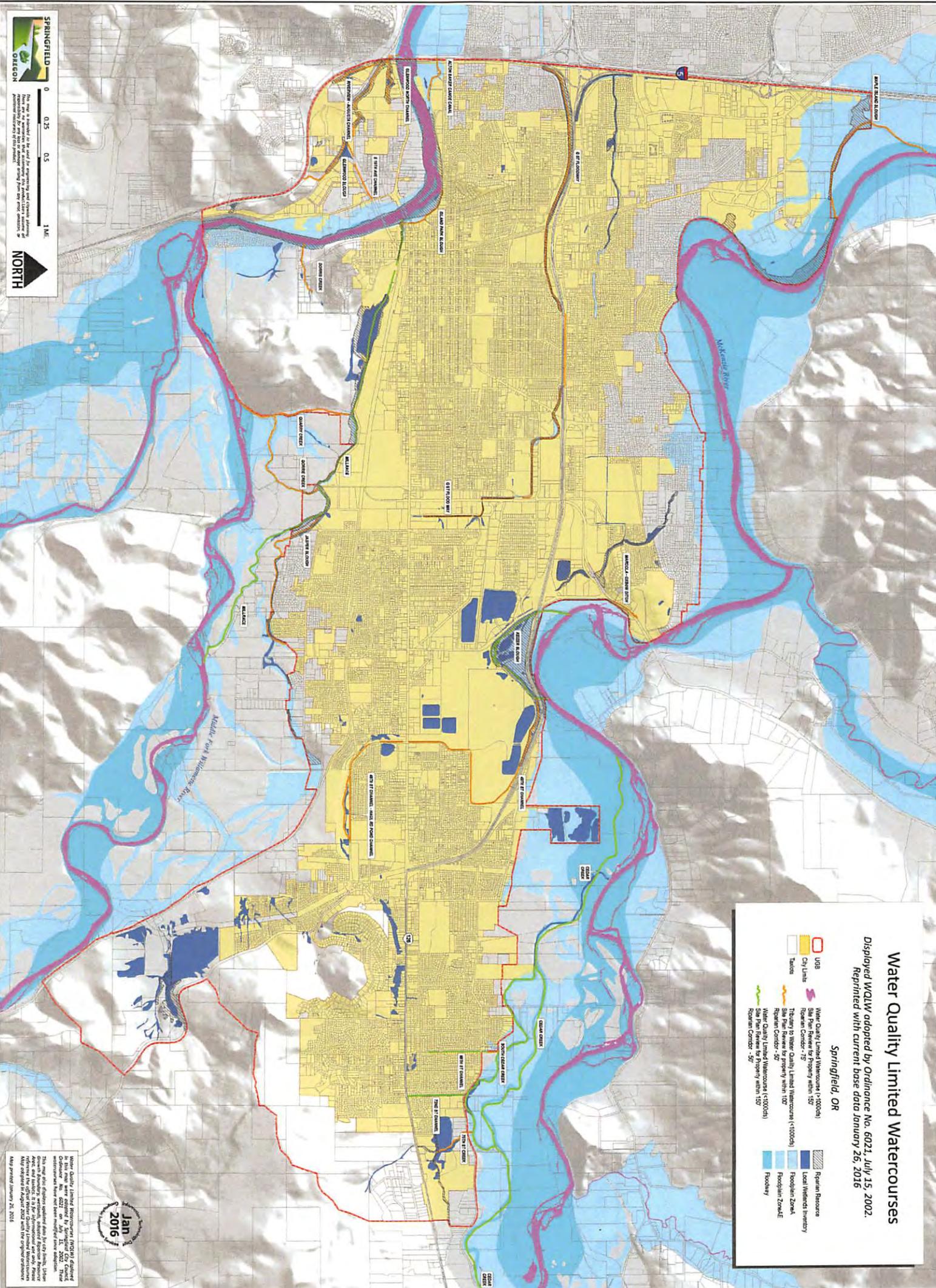
Water Quality Limited Watercourses

Displayed WQLW adopted by Ordinance No. 6023, July 15, 2002.
 Reprinted with current base data January 26, 2016

Springfield, OR

Legend:

- UBB (Urban Base Boundary)
- City Limits
- Taxlots
- Water Quality Limited Watercourse (>1000cfs) - Review Center - 75'
- Slack Flow Review for Property within 100'
- Slack Flow Review for Property within 100'
- Review Center - 50'
- Water Quality Limited Watercourse (<1000cfs) - Review Center - 50'
- Review Center - 50'
- Return Resource
- Local Watershed Boundary
- Foodplain ZoneA
- Foodplain ZoneB
- Foodplain ZoneC
- Foodplain ZoneD
- Foodplain ZoneE
- Foodplain ZoneF
- Foodplain ZoneG
- Foodplain ZoneH
- Foodplain ZoneI
- Foodplain ZoneJ
- Foodplain ZoneK
- Foodplain ZoneL
- Foodplain ZoneM
- Foodplain ZoneN
- Foodplain ZoneO
- Foodplain ZoneP
- Foodplain ZoneQ
- Foodplain ZoneR
- Foodplain ZoneS
- Foodplain ZoneT
- Foodplain ZoneU
- Foodplain ZoneV
- Foodplain ZoneW
- Foodplain ZoneX
- Foodplain ZoneY
- Foodplain ZoneZ



SPRINGFIELD OREGON

0 0.25 0.5 1 MI.

NORTH

This map is intended to be used in conjunction with the City of Springfield, Oregon, and is not intended to be used for any other purpose. The City of Springfield, Oregon, is not responsible for any errors or omissions in this map. The City of Springfield, Oregon, is not responsible for any errors or omissions in this map.

Jan 2016

This map and its contents were prepared by the City of Springfield, Oregon, and are not intended to be used for any other purpose. The City of Springfield, Oregon, is not responsible for any errors or omissions in this map. The City of Springfield, Oregon, is not responsible for any errors or omissions in this map.

Water Quality Limited Watercourses

*Displayed WQLW adopted by Ordinance No. 6021, July 15, 2002.
Reprinted with current base data January 26, 2016*

Springfield, OR

	UGB		Water Quality Limited Watercourse (>1000cfs) Site Plan Review for Property within 150' Riparian Corridor - 75'		Riparian Resource
	City Limits		Tributary to Water Quality Limited Watercourse (<1000cfs) Site Plan Review for property within 100' Riparian Corridor - 50'		Local Wetlands Inventory
	Taxlots		Water Quality Limited Watercourse (<1000cfs) Site Plan Review for Property within 150' Riparian Corridor - 50'		Floodplain ZoneA
					Floodplain ZoneAE
					Floodway



February 13, 2019

UW study: Exposure to chemical in Roundup increases risk for cancer

Jackson Holtz

UW News

Exposure to glyphosate — the world’s most widely used, broad-spectrum herbicide and the primary ingredient in the weedkiller Roundup — increases the risk of some cancers by more than 40 percent, according to [new research](#) from the University of Washington.

Various reviews and international assessments have come to different conclusions about whether glyphosate leads to cancer in humans.

The research team conducted an updated meta-analysis — a comprehensive review of existing literature — and focused on the most highly exposed groups in each study. They found that the link between glyphosate and Non-Hodgkin Lymphoma is stronger than previously reported.

Their findings were published this month in the online journal [Mutation Research/Reviews in Mutation Research](#).

“Our analysis focused on providing the best possible answer to the question of whether or not glyphosate is carcinogenic,” said senior author [Lianne Sheppard](#), a professor in the UW departments of Environmental & Occupational Health Sciences and Biostatistics. “As a result of this research, I am even more convinced that it is.”

By examining epidemiologic studies published between 2001 and 2018, the team determined that exposure to glyphosate may increase the risk of Non-Hodgkin Lymphoma by as much as 41 percent. The authors focused their review on epidemiological research in humans but also considered the evidence from laboratory animals.

“This research provides the most up-to-date analysis of glyphosate and its link with Non-Hodgkin Lymphoma, incorporating a 2018 study of more than 54,000 people who work as licensed pesticide applicators,” said co-author Rachel Shaffer, a UW doctoral student in the Department of Environmental & Occupational Health Sciences.

“These findings are aligned with a prior assessment from the International Agency for Research on Cancer, which classified glyphosate as a ‘probable human carcinogen’ in 2015,” Shaffer said.

Glyphosate first was introduced as an herbicide in 1974. Usage in the agricultural industry has soared, particularly since the mid-2000s when the practice of “green burndown” was introduced, in which glyphosate-based herbicides are applied to crops shortly before harvest. As a consequence, crops now are likely to have higher residues of glyphosate.

Researchers say more studies are needed to account for the effects of increased exposures from green burndown, which may not be fully captured in the existing studies reviewed in this new publication.

Co-authors include Luoping Zhang and Imaan Rana in the Division of Environmental Health Sciences at the University of California, Berkeley, and Emanuela Taioli in the Icahn School of Medicine at Mount Sinai, New York.

Funding was provided by the National Institutes of Environmental Health Sciences award [T32ES015459](#) and the University of Washington Retirement Association Aging Fellowship.

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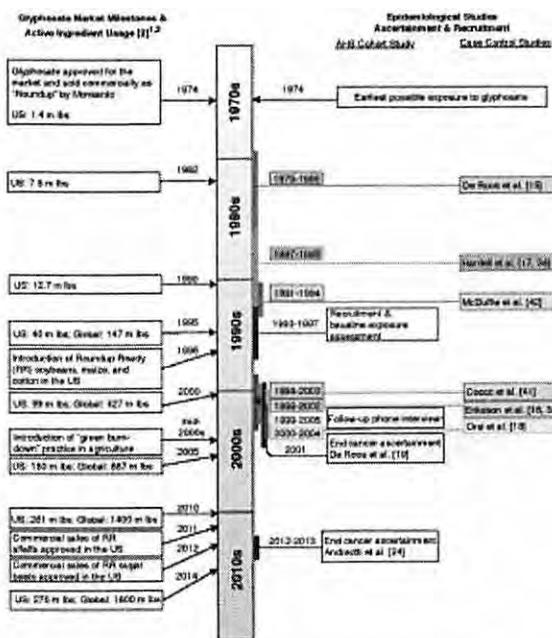


Figure 3: Timeline of glyphosate use milestones in relation to cohort and case-control study events

¹ Glyphosate active ingredient usage includes agricultural and non-agricultural applications.
² = worldwide, in 4 persons.
³ Limited by 60% of ARS participants.

A timeline that shows the growth in glyphosate usage worldwide (left) and key human epidemiological studies on the herbicide (right).

For more information, contact Sheppard at 206-616-2722 or sheppard@uw.edu.

1,613

1,016



BUSINESS

California Jury Awards \$2 Billion To Couple In Roundup Weed Killer Cancer Trial

May 13, 2019 · 10:07 PM ET



RICHARD GONZALES



Containers of Roundup are displayed on a store shelf in San Francisco. The verdict is the third recent court decision in California involving the glyphosate-based Roundup weed killer.

Haven Daley/AP

A California jury has awarded a couple more than \$2 billion in a verdict against Monsanto, a subsidiary of Bayer. This is the third recent court decision involving claims that the company's Roundup weed killer caused cancer.

The jury in Alameda County, just east of San Francisco, ruled that the couple, Alva and Alberta Pilliod of Livermore, Calif., contracted non-Hodgkin's lymphoma because of their use of the glyphosate-based herbicide. They were each awarded \$1 billion in punitive damages and an additional \$55 million in collective compensatory damages.

Many legal experts believe the damages will be drastically reduced on appeal.

The verdict represents the third such legal setback for the company in California since mid-2018. In March, a San Francisco jury awarded \$80 million to a man who blamed his cancer on his extensive use of Roundup. In August 2018, another San Francisco jury awarded \$289 million to a fourth plaintiff. On appeal a judge later slashed that payout to \$78 million. Bayer is appealing each of these verdicts. The company insists there is no link between Roundup and non-Hodgkin's lymphoma.

"Bayer is disappointed with the jury's decision and will appeal the verdict in this case, which conflicts directly with the U.S. Environmental Protection Agency's interim registration review decision released just last month, the consensus among leading health regulators worldwide that glyphosate-based products can be used safely and that glyphosate is not carcinogenic, and the 40 years of extensive scientific research on which their favorable conclusions are based," the company said in a statement.

At least one environmental group praised the verdict.

Ken Cook, president of the Environmental Working Group, said: "The cloud hanging over Bayer will only grow bigger and darker, as more juries hear how Monsanto manipulated its own research, colluded with regulators and intimidated scientists to keep secret the cancer risks from glyphosate."

Four years ago, a United Nations-sponsored scientific agency declared that Roundup probably causes cancer. As NPR's Dan Charles reported, the finding from the International Agency for Research on Cancer caused Monsanto to launch a fierce campaign to discredit the IARC's conclusions.

"Internal company emails, released as part of a lawsuit against the company, show how Monsanto recruited outside scientists to co-author reports defending the safety of glyphosate, sold under the brand name Roundup. Monsanto executive William Heydens proposed that the company 'ghost-write' one paper. In an email, Heydens wrote that 'we would be keeping the cost down by us doing the writing and they would just edit & sign their names so to speak.' Heydens wrote that this is how Monsanto had 'handled' an earlier paper on glyphosate's safety."

More than 13,000 other lawsuits have been filed against its subsidiary, Monsanto, the maker of Roundup.

After three jury verdicts in California, a trial is scheduled for August in St. Louis County in Missouri, the site of Monsanto's former headquarters.

roundup weed killer monsanto bayer

More Stories From NPR





GeoScience, Inc.

August 6, 2019

Mr. Zack Mittge
via E-mail: zmittge@eugenelaw.com

RE: REVIEW OF FEI 7/24/19 SUBMISSION, SUB POWER LINE, E 22ND AVENUE.

Dear Mr. Mittge:

Introduction

This letter presents a review of additional evidence submitted by FEI on July 24, 2019, and entered into the record on 7/30/19 in support of the application for the SUB substation proposed for several tax lots south of the east end of E. 22nd Avenue in Glenwood. On July 30, 2019, GeoScience had submitted a letter presenting geomorphic and geologic evidence of a probable slope stability issue along the proposed power line alignment. The conclusion was that the geotechnical assessment conducted up that time by FEI failed to adequately assess both the probable head scarp area and slide deposit located in an amphitheater-shaped concave slope area located on TL 300 and 1000, Lane Co. Map 18-03-03-14.

Additional FEI Evidence

The FEI letter of 7/24/19 describes the results of four additional mud-rotary borings and one test pit installed along the transmission line corridor from the proposed substation on TL 101 to the EWEB transmission line on TL 300.

The borings were installed in the area where GeoScience had indicated the presence of some fill placed onto and adjacent to a cut performed on the southern spur of TL 3701 and in the western portion TL 1001 (BH-3) and in an area where in-place rock was expected at relatively shallow depths (BH-4 through - 6). The depth of fill and soft clayey material in BH-3 (14') is somewhat surprising and may indicate that this valley is filled with an earthflow type deposit. However, the slope in that vicinity is relatively gentle (nearly flat) and the area has been without trees for quite some time. As a result, the risk of adverse impacts on slope stability from installation of the power line at this location appears small.

Mr. Zack Mittge
August 6, 2019
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TP-1 was excavated in the central portion of the amphitheater-shaped land form identified by GeoScience as a probable deep-seated slope movement. This was one of the locations identified by GeoScience as important for either proving or disproving the slope movement origin of the land form.

According to FEI's log, the "test pit" encountered 1.2' (14 inches) of "stiff silt (ML)..." over 0.3' (3.6 inches) of "moderately to slightly weathered sand". It is possible that the "sand" should be "sandstone".

Discussion

If the interpretation presented in the log for TP-1 is correct and in-place sandstone is present at this location, a slope movement origin for the amphitheater-shaped land form would be less likely.

However, the "test pit" was excavated using a post-hole digger and the excavation was stopped after less than 4 inches of sandstone had been penetrated. Given the size of the rock fragments observed in the cut bank of the road located about 130' feet upslope of the "test pit" (see GeoScience Site Photos), and in the soil in the immediate vicinity of the test pit location, it is actually much more likely that the test pit was terminated in a sandstone fragment "floating" in otherwise transported soil. This would be difficult to ascertain in an approximately 6- to 8-inch diameter hole created with a post-hole digger.

Therefore, the evidence produced by FEI TP-1 is judged to be extremely "shaky", both for a determination of the foundation conditions for proposed utility poles and also for purposes of an assessment of the global stability of the slope in this vicinity.

Recommendations

Given the proximity and potential risk to Interstate Highway 5 from a deep-seated slope movement, it is recommended to conduct further subsurface exploration in the area of the amphitheater-shaped land form, using more appropriate equipment which would not be stopped by a single rock fragment. This might initially be an excavator, although in the case that this is indeed a slope movement deposit, the depth of a test pit might be insufficient to fully define the feature.

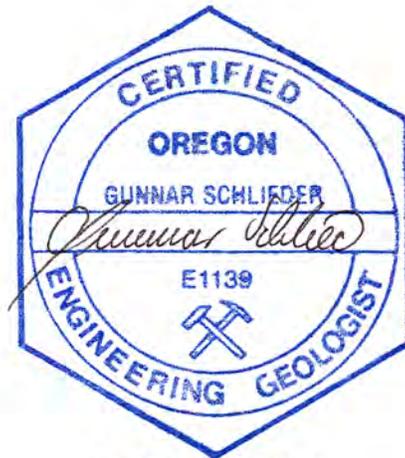
Moreover, the additional assessment conducted by FEI has not shed any further light on the possibility that shallow-rapid slope movements (debris flows) have originated, or could do so, on the steep southern slope of the amphitheater-shaped land form as a response to the removal of several hundred trees.

Mr. Zack Mittge
August 6, 2019
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If you have any questions concerning this matter, please do not hesitate to contact me at (541) 607-5702.

Sincerely,
GeoScience, Inc.

Gunnar Schlieder
Gunnar Schlieder, Ph.D., CEG



Expires 12/31/2019



GeoScience, Inc.

July 30, 2019

Mr. Zack Mittge

via E-mail: zmittge@eugenelaw.com

RE: SLOPE STABILITY CONCERNS, SUB POWER LINE, VICINITY OF E 22ND AVENUE

Dear Mr. Mittge:

I am writing this letter to present evidence of a probable slope stability issue along the power line alignment extending to the southeast and south-southeast of the electrical substation proposed by the Springfield Utility Board (SUB) immediately south of the east end of E. 22nd Ave. in Glenwood (Figures 1 and 2). The power line is proposed to run between the McVay Highway/UPRR tracks and Interstate Highway I-5. As is customary for power line rights-of-way (R-o-W), the installation will require removal of several hundred trees in the hills lining the west side of the valley near the confluence of the Coast and Middle Forks of the Willamette River. As part of the planning documents, a tree felling plan has been prepared and submitted by Schirmer-Satre of Eugene, and a geotechnical assessment and seismic hazard study including subsurface exploration was performed by FEI of Corvallis (report dated September 19, 2018). At the request of SUB, FEI also prepared a "Slope Stability Review in Tree Felling Areas" dated December 27, 2018. That review was based entirely on surface observations without additional subsurface exploration and verification.

Geology and Soils (Published Information)

The *Preliminary Geologic Map of the Eugene East and West Quadrangles, Lane County, Oregon* (Madin and Murray, DOGAMI, 2005) indicates that the area is underlain by the late Eocene - early Oligocene *Eugene Formation*, which consists of shallow marine sandstone and siltstone with local/minor conglomerate beds. In the vicinity of the site, the map shows generally northeasterly to southeasterly dips ranging from 9 to 15° with a dip of 13° to the ENE directly at the site (Figure 3). A basalt body is shown to be present not far south of the project area.

The *Soil Survey of Lane County Area, Oregon* (USDA Soil Conservation Service, 1987) indicates that the portion of the site containing TF3 and TF 4 (Schirmer-Satre designations) is underlain by *Bellpine silty clay loam*. The soil is reportedly located on foothills and uplands adjacent to the Willamette Valley and formed in colluvium and residuum derived from sandstone, siltstone, and volcanic tuff and breccia.. The typical stratigraphy of the *Bellpine soil* is described as:

Mr. Zack Mittge
July 30, 2019
Page 2

“Typically, the surface layer is dark reddish brown silty clay loam about 13 inches thick. The subsoil is dark reddish brown and dark red silty clay about 21 inches thick. Weathered tuffaceous sandstone is at a depth of 34 inches. Depth to bedrock ranges from 20 to 40 inches.”

The Unified Soil Classification System (USCS) group names are reported as: 0 - 13": CL; and 13 - 34": MH.

Observations on 1936 Aerial Photographs

The aerial photos taken by the US Army Corps of Engineers for the Willamette Valley Project in 1936 cover the substation and power line alignments in stereo, meaning that the pre-Interstate topography can be observed in three dimensional view.

At the time, the entire northern portion of the project site was without tree cover, and appears to have been used to grow hay or grain (Figure 4a). The western portion of the southern extension of the power line had been recently logged. A relatively dense fir forest covered the lower slopes of the amphitheater-shaped slope in the southern portion, and the hill on which the EWEB power line has now been constructed.

Soil disturbance is evident along the central (westernmost) upper edges of the amphitheater-shaped slope which is proposed to be clear-cut and then traversed by the southern portion of the power line (Figure 4b). Two further lines of soil disturbance extend from that area towards the east-northeast. Apparent raveling of the cut bank on the west side of the railroad tracks is discernible where these lines of soil disturbance would “exit” the toe of the slope. Tree cover obscures much of the ground in the southern and eastern portion of the area of interest and the area upslope (W) from the current location of I-5.

These observations show that the concave, amphitheater-shaped slope in the southern portion of the proposed project is a natural feature, as opposed to having a man-made origin. Given the geomorphology of this feature, with an arcuate steeper slope segment as its upslope boundary, lacking a well-defined creek channel, and having a gently sloping depressed central area is typical of deep-seated slope movements in this area.

By contrast, the lower-lying area directly east of the proposed substation was created by excavation after 1936. Interstate Highway I-5 had not been constructed, and none of the area along the highway alignment or right-of-way had been graded, except for occasional dirt roads.

Observations on LiDAR

The LiDAR (Light Detection and Ranging) DEM (Digital Elevation Model) for the area was downloaded from the DOGAMI website. A hill-shade image of the site was created with the virtual illumination placed at an azimuth of 300° and an inclination of 30°. The resulting image is shown on Figure 5. For orientation, the same area is shown on a Google Earth image on Figure 6. A contour map derived from the LiDAR DEM is shown on Figure 7.

The hillshade image shows a significant cut which has been made a short distance east of the currently proposed substation pad. The contour map indicates that the cut bank is up to 35 feet tall. To the east of the cut bank is a relatively gently sloping area approximately 150 to 200' wide (E-W) and 200 to 300' long (N-S). The east margin of this pad consists of a steeper (approximately 2H : 1V) slope ranging from 5 to 12' tall. This slope extends to the channel of a small creek. The southeastern side of the creek consists of a relatively uniform, gentle slope (around 15 to 20%) extending approximately 370' to a broad ridge trending SSW to NNE.

On the other side (SE) of the ridge, a broad, roughly semi-circular, concave or amphitheater-shaped topographic feature is present, which is open to the valley below. I-5 is tangential to the central portion of the up-slope margin of the feature. The southern border of this feature consists of a NE- to N-facing slope which is 100 to 120' tall at an overall slope of up to 100% (45°).

Interstate 5 has been constructed by making significant cuts adjacent to the southern and northern portions of the site, and crosses the creek valley bisecting the site on a substantial fill embankment (Figure 7). Another embankment is present west of the site, adjacent to the Peterson Caterpillar machinery dealership and service facility.

Significant cuts have also been made along the eastern margin of the subject property in order to construct the railroad grade along the base of the slope. These cuts are present mostly where the railroad crosses the ends of ridges extending to the floor of the Willamette Valley. In the intervening stretches, the railroad appears to cross the low-lying erosional scars made by the river on fill embankments. At one area in the curve of the railroad around the central ridge, the LiDAR shows an "indentation" of the cut bank slope into the ridge. The cut bank is shown to step back to the SW into the slope by approximately 30'.

A total of three roads can be distinguished on the LiDAR hillshade on the property slated for the power line R-o-W. A single road enters the property from the end of E. 22nd Avenue, heading initially to the south-southeast and curving to the southeast after approximately 100 feet. The road continues in that direction for about 1,100' and then appears to have either ended in a loop turn-round, or have initially extended into the east-facing slope of the ridge. The road appears to then be either disrupted or over-grown with brush. Additional road segments appear to be present on the slope below, but the quality of the LiDAR is poor, probably due to the presence of blackberries.

A second road branches off from the main road on the downslope (NE) side approximately 400' from the end of 22nd Avenue. This road becomes indistinct on LiDAR approximately 300' east of its intersection with the main road.

The third road branches off the main road immediately E of the creek crossing, heading initially south and turning SE after approximately 100 feet. It then heads nearly straight SE for more than 1,000 feet, turning only slightly east where it reaches the base of the steep slope at the S edge of the "amphitheater". At that location a road also heads northward into the central area of the amphitheater and from there on contour northward to the top of the railroad cut. The LiDAR indicates areas of disruption of the road, but this may be a result of the presence of brush.

Site Observations

The site was visited on July 15 and 28, 2019. During the first site visit, the area of the proposed substation facility was viewed from E 22nd Avenue and the rest of the site was viewed from the east. The site was not accessed at that time due to construction activity. The site was accessed on July 28 when no construction was occurring.

During the site visit, features observed on LiDAR were verified. These include:

1. The high cut bank immediately east of the proposed substation pad.
2. The presence of a substantial embankment for Interstate Hwy 5 S and SE of the cut bank.
3. The presence of the cut-fill pad east of the cut bank mentioned under 1.
4. The gentle, uniform, northwest-facing slope in the central portion of the site.
5. The cut performed at the top of the ridge near I-5 in the central part of the project.
6. The presence of the amphitheater and its features.
7. The configuration of the railroad cuts.

Of note are the following items, (letters corresponding to the location of these features have been annotated on Figure 8 and site photos of pertinent features have been labeled with the same letters):

- A. The presence of an apparent "deposit" of soil material in the SW corner of the cut/fill pad located east of the cut adjacent to the proposed substation site. The origin of the feature could not be ascertained due to the presence of brush. It may have originated at the interface between the cut bank and the fill embankment for I-5 or have been imported as fill.
- B. The excavation performed at the top of the NW divide of the amphitheater. This excavation is performed in in-place, fossiliferous sandstone consistent with *Eugene Formation*.
- C. A road cut at the base of the steep slope forming the southern boundary of the amphitheater. The cut exposes a layer of forest duff (approximately 0.5 to 1' thick) over a tan sandy clay

which contains isolated small sandstone fragments which are edge-rounded to rounded. This soil unit has been designated SU-C for purposes of this report. SU-C is approximately 2 to 3 feet thick. At the center of the cut, SU-C overlies a deposit of essentially fresh state dark gray, angular igneous (?) rock fragments all of which appear to be on the order of 3 to 6 inches in large diameter. The fragments appear to have no particular preferred orientation and there does not appear to be a significant content of fines associated with SU-D. This unit was designated SU-D for purposes of this report. The exposed thickness of SU-D ranges from 1 to 2 feet.

- D. A fill embankment present at the “Y” between the NW-SE trending road and the road heading NNE downslope into the central portion of the amphitheater. The embankment may consist of material excavated at the top of the slope at Location B. Burlap coffee sacks have been placed either as reinforcement or, more likely, as erosion control.
- E. The soil exposed along the footpath skirting the southern boundary of the gentle slope in the lower portion of the amphitheater consists of a dark brown sandy clay or clayey sand with angular igneous (?) rock fragments.
- F. Erosional (natural) cliffs are present higher on the steep NW-facing slope of the SE portion of the amphitheater. Fir trees on the slopes of the amphitheater commonly exhibit “pistol-butted” or “swept” (slightly bent) lower trunk segments.
- G. The cut performed for the railroad at the curve in the line is of significant height (estimated at 25 to 35') and is partly over-hanging, especially in the area of the small “embayment” to the SW. The rock appears to consist of a tan sedimentary rock which is quite massive in the lower portions of the cut and appears fractured in some of the upper portions. The fractures appear to be preferentially dipping to the east at shallow angles (10 - 20°). The railroad cuts are raveling, as evidenced by the presence of numerous rock fragments by the side of the tracks.

Discussion

The most recent DOGAMI assessment of the risk of deep-seated failures in the area (Calhoun et al, DOGAMI IMS-60, 2018, as also shown in the 12/27/2018 FEI memo regarding *Slope Stability Review In Tree Felling Areas*) indicates that there is an elevated risk of such failures in the southern portion of the “amphitheater”. However, the DOGAMI publication is based nearly entirely on “remote sensing” combined with slope angles derived from LiDAR DEMS. As such, the publication cannot be expected to be very useful at a tax-lot-specific scale. It is, however, interesting to note in this context that DOGAMI has mapped an existing, historic “landslide” in the valley of the creek crossing the project site upstream of I-5.

Other known deep-seated landslides have occurred historically in the StoneCrest Subdivision (2012), located less than a half-mile to the SE of the project site, and there is ubiquitous geomorphic evidence of large-scale slow slope movement (earthflows) in the next drainage south of the project.

The amphitheater-shaped geomorphic feature in the southern part of the proposed project is a classic geomorphic feature indicating a strong possibility of a deep-seated slope movement origin. The stereo-graphic review of the 1936 air photos indicates that movement had occurred shortly prior to the overflight. At the time, it appears that a portion of the slope had moved shortly prior, exposing bare soil in the scarp area.

The presence of a long-active deep-seated slope movement in that area is further supported by the observations in the cut bank at location C. The stratigraphy found in the road cut at the site indicates that clayey SU-C, derived from weathering of sandstone, has covered what is either an older road bed, or, more likely, talus generated from collapse of a cliff underlain by highly competent rock ("basalt"?). A non-slope-movement origin of the observed stratigraphy is essentially impossible to imagine. A clayey soil with sedimentary rock fragments covers a pile of near-fresh state (unweathered) igneous rock fragments and a thick forest soil has developed over the whole deposit.

Downslope from this exposure, the gently sloping portion of the amphitheater-shaped feature is underlain by unweathered angular fragments of igneous(?) rock floating in a sandy clay matrix.

Moreover, the presence of cliffs in the steep slope forming the southern margin of the amphitheater-shaped feature implies that the steep slope is underlain by a competent rock unit, but that there is a "weak" layer at the base. In the Eugene-Springfield area, such weak layers are generally present at the interface of igneous rock bodies and the sedimentary rocks onto which the magma was extruded, or especially into which it was intruded. The hot ground water circulating in the vicinity of the igneous rock body as it cooled tended to rapidly weather and hydrothermally alter the sedimentary rocks, creating clayey contact-metamorphic zones.

In this case, the outcrop pattern clearly shows that an igneous rock body (basalt) underlies the ridge on the south side of the "amphitheater", whereas the ridge to the north is underlain by sedimentary rock. The contact zone must be located within the confines of the amphitheater and this is where one finds the mixture of clayey soil with igneous rock fragments.

If the igneous rock body is intrusive, meaning that the liquid magma was injected into the surrounding sedimentary rock from below but did not reach the surface, it is likely that the shape of the rock body is either a dike or a sill, or both. The dike would be a cross-cutting feature whereas a sill would be parallel or subparallel to the stratification or bedding in the sedimentary rocks. Given that these are dipping eastward, it is probable that a sill and the associated hydrothermal contact zone would also be dipping eastward. This configuration would be conducive to eastward-moving deep-seated landslides.

In the absence of Interstate Highway 5 and the rail line immediately adjacent to the probable landslide feature, all these considerations would not generate much concern. However, given that the Interstate is located just a few feet up the steep slope which is interpreted as the head scarp of the slope movement, and that the rail line is located directly at the toe of the movement, there should at least be sufficient concern about potential impacts to these important transportation routes to warrant a less speculative assessment than provided by FEI.

In particular, no subsurface investigation was performed at key locations which might shed light on this portion of the slope as part of either the geotechnical feasibility study for the substation or for the slope stability assessment. Subsurface exploration focused on the western and southern end points of the project, with borings installed on the proposed substation foot-print and test pits excavated on the ridge where the EWEB line currently runs.

In order to effectively assess the impact of the probable slope movement on the Interstate Highway, it would be necessary to conduct subsurface exploration in the area where the probable headscarp is located close to the highway. In particular, it would be important to determine the subsurface conditions (including groundwater pore pressures) in the vicinity of the exposure of the igneous rock fragments beneath the clayey soil deposit. Additional investigation is also warranted in the more gently sloping presumed slide deposit located in the central portion of the amphitheater-shaped feature. The conditions there are likely to have import for not only the rail line but also for the viability of the proposed access road which will need to be passable during inclement weather.

Of course, the foregoing discussion is entirely related to “deep-seated” slope movements. It does not include the possibility of “shallow-rapid landslides” or “debris flows” initiating on the steep slope forming the southern boundary of the amphitheater-shaped feature. Oregon Department of Forestry Technical Note 2 (Guidance related to OAR 629-623-0000 to 0800 - “Landslides and Public Safety Rules”) indicates that debris flow risk assessments are required on private forest land prior to timber management or harvest activities if certain slope thresholds are exceeded in the area. It could be argued that for this site the slope thresholds outside the “Tyee Core Area” are applicable, which place the thresholds at 80% for open slopes and 70% for headwalls and side-slopes of draws. The north-facing slopes bounding the amphitheater shaped feature exceed these slope thresholds.

There is no indication that FEI conducted any assessment for evidence of previous debris flow activity on the steep slope. Such activity might require investigation (possibly including subsurface exploration) of the deposits downslope from the steep face in the cut bank for the railroad line and likely extending into the shallow subsurface of the deposits east of the rail line. If deposits consistent with debris flow origin are found during such an investigation, it may be prudent to reconsider the timber harvest plans (“tree felling”) in light of the new evidence.

So far, the discussion has focused on the probable “pre-existing” (or natural) larger deep-seated slope movement and steep slopes located in the southernmost portion of the proposed project.

However, it may also be prudent to consider the conditions in the vicinity of the proposed substation, especially in light of the fact that the construction will involve placement of substantial fill (up to 8 feet?) on the downslope side of the pad. Although the FEI geotechnical report addresses foundation design for the structures planned for the substation, the slope stability report does not appear to address potential effects from the loading by the embankment despite the fact that clayey or silty residual soils are reported to be present to depths up to 10.5 feet. In addition, a wetland has been mapped in the central portion of the substation site, indicating that winter wet conditions prevail in the area slated for fill placement., which may result in an overall reduction in permeability and development of higher pore pressures than currently experienced in the vicinity.

Significant grading may have occurred in the area slated for construction of the substation in years past. It is possible that some of the grading was related to the construction of I-5. To the west of the site, the interstate is located on an extensive embankment which was likely derived from cuts made for the highway in the vicinity. It is possible that the cuts and fills did not entirely balance (or some of the material was deemed unsuitable as embankment fill) and some additional excavation was necessary on nearby properties to construct the embankments. The cut in the southern spur of TL 3701 may be one of those borrow sites and it is possible that the reported presence of "sandstone" at the surface on the property west of that cut indicates that the area was stripped of soil in preparation for additional excavation which then turned out not to be needed.

The southwest portion of TL 1100, adjacent to the cut in the southern spur of TL 3701, appears to have been filled over the course of many years. The fill depth appears to range from approximately 5 feet to possibly up to 12 feet. The source of the fill cannot be discerned from historic aerial photos available on Google Earth (1994 is the oldest photo available).

Recommendations

Based on geomorphic, geologic, and historic aerial photo evidence, it appears likely that a larger-scale slope movement is present in the southern portion of the project area where the removal of a significant number of trees is planned. The presence or absence of this "landslide" should be determined by subsurface exploration at critical locations such as near the base of the steep slope forming the presumed headscarp of the amphitheater-shaped land form and in the more gently sloping deposits in the central portion of the feature.

In addition, it is recommended to examine both the cut bank for the railroad and the valley floor east of the railroad grade downslope from the steep north-facing slope in the south portion of the amphitheater-shaped land form for geologic evidence of the past occurrence of debris flows. If such evidence is found, it may be prudent to re-consider the planned removal of numerous trees from the steep slope or determine how to mitigate the risk of such occurrences to both the railroad and other downslope properties.

Mr. Zack Mittge
July 30, 2019
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If you have any questions concerning this matter, please do not hesitate to contact me at (541) 607-5702.

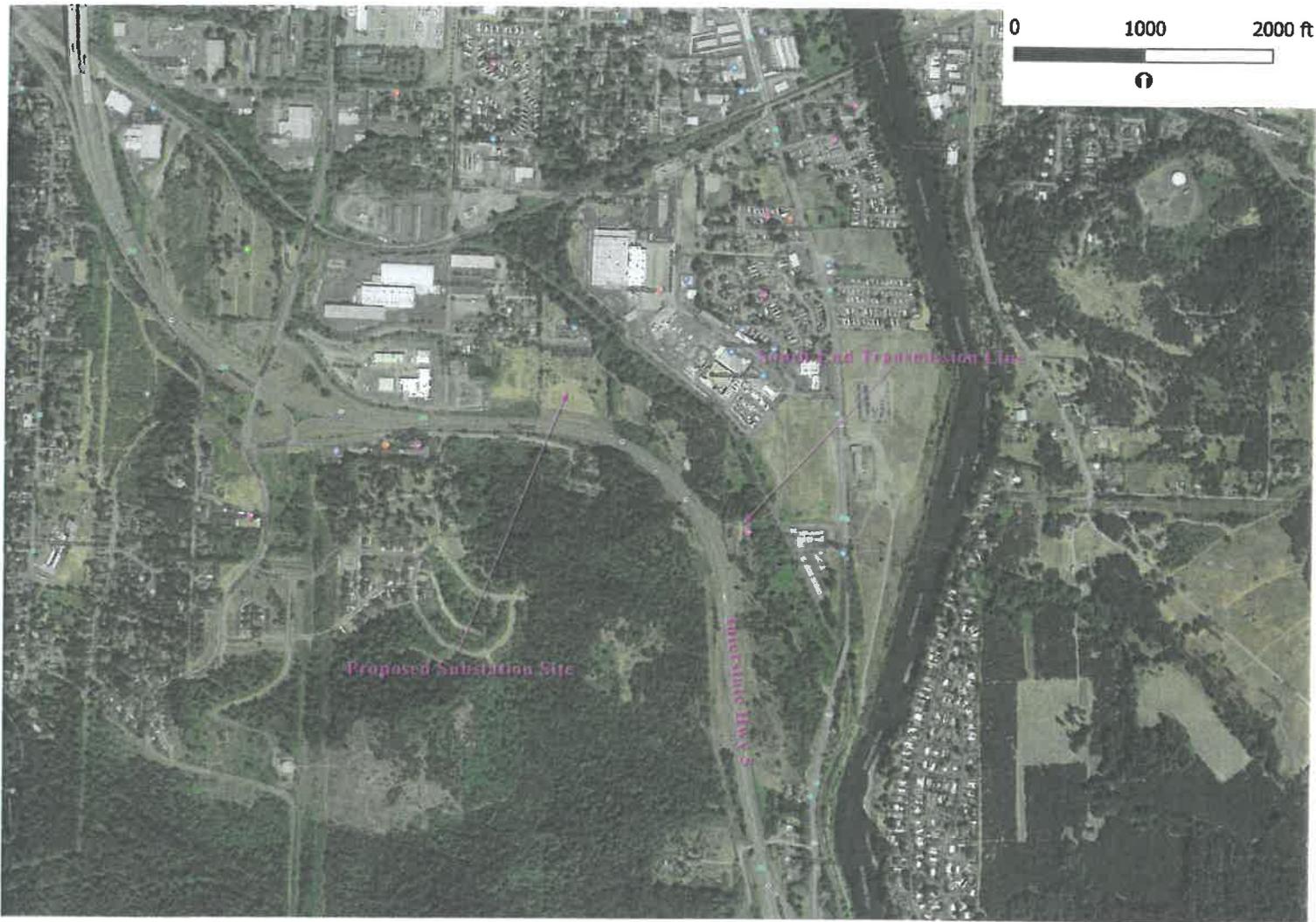
Sincerely,
GeoScience, Inc.


Gunnar Schlieder, Ph.D., CEG

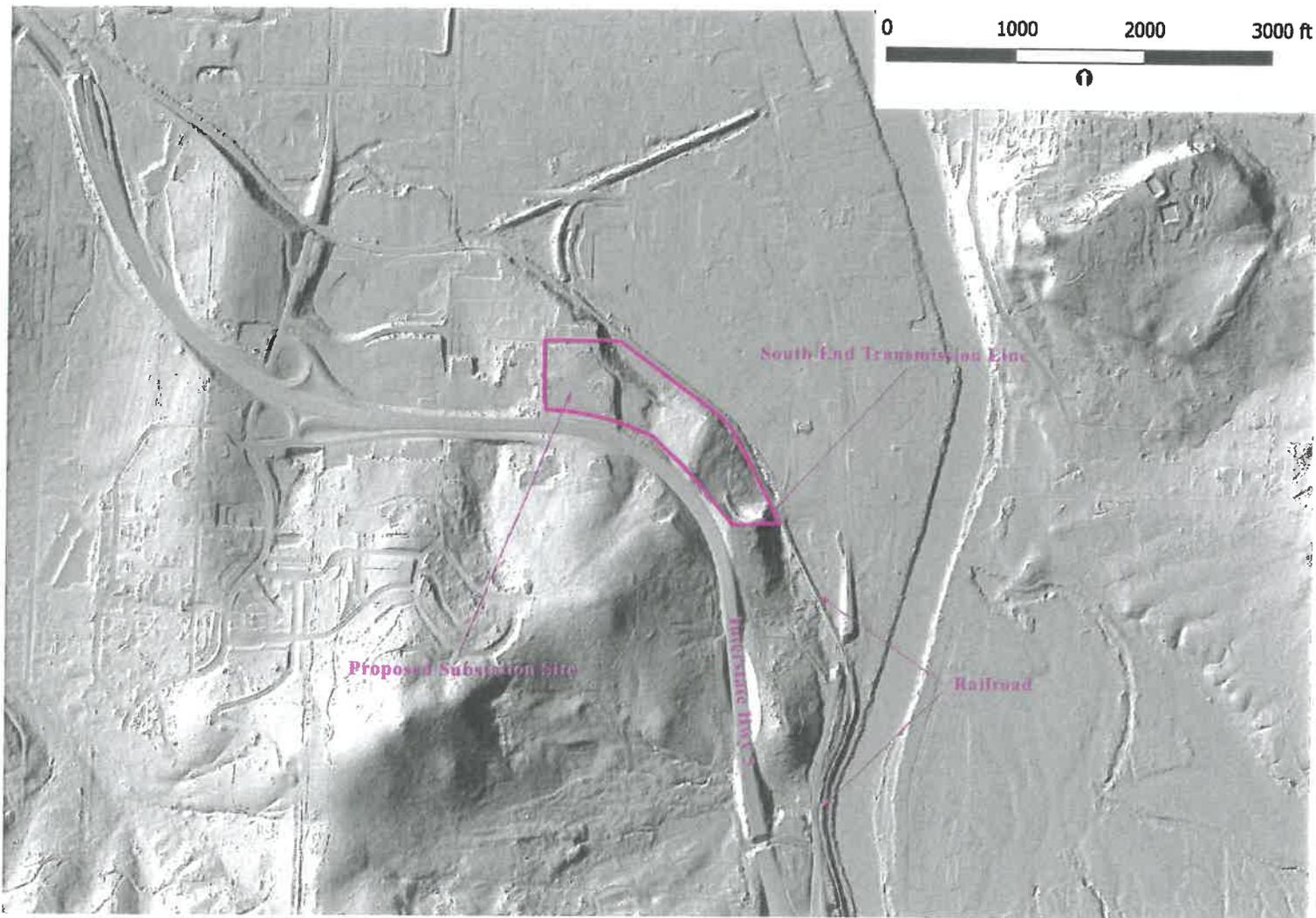
Att.: Site Photos



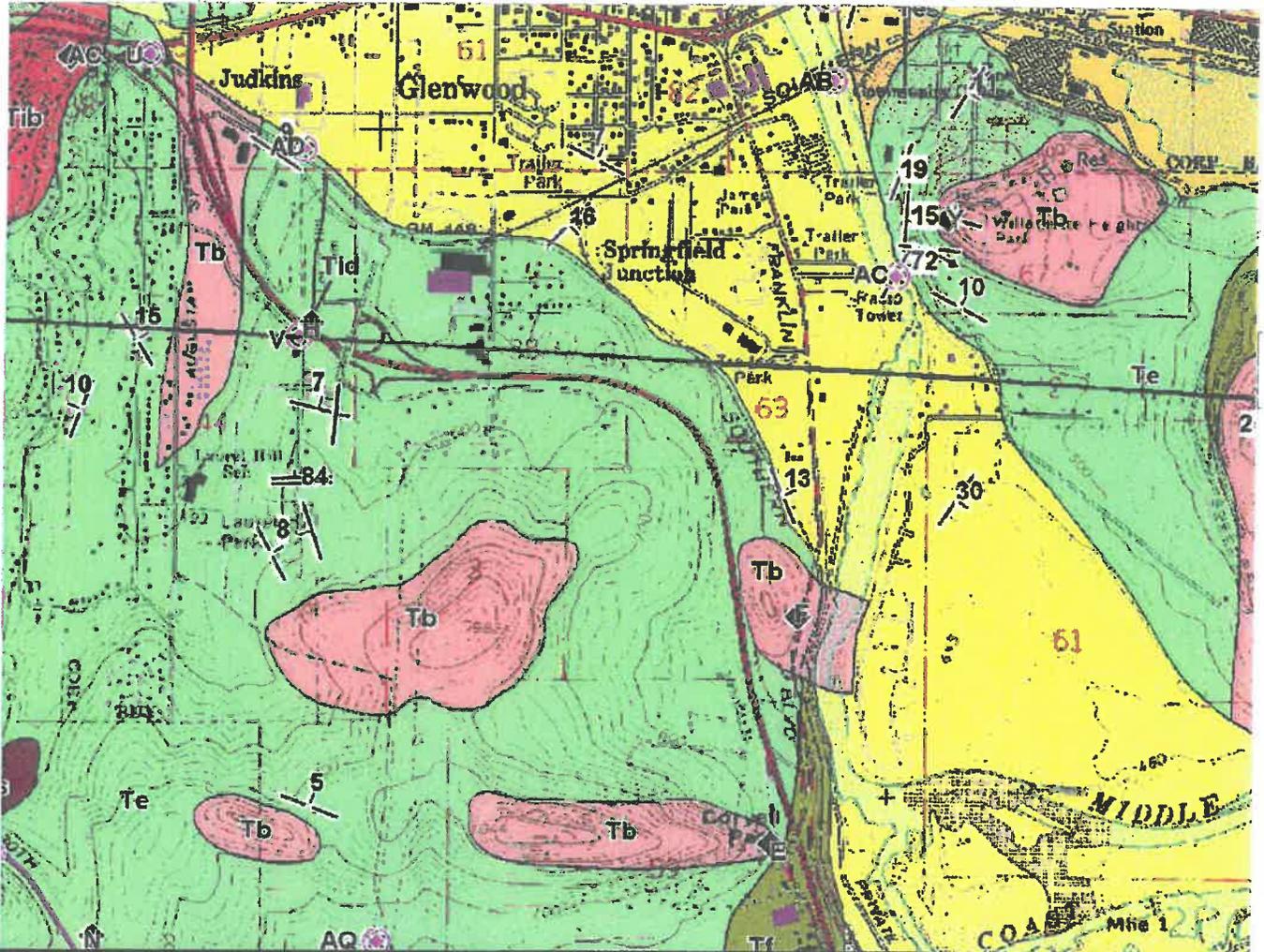
Expires 12/31/2019



SUB E. 22nd Avenue Substation Project Slope Stability Review
Figure 1: Project Location
Base from Google Earth and QGIS

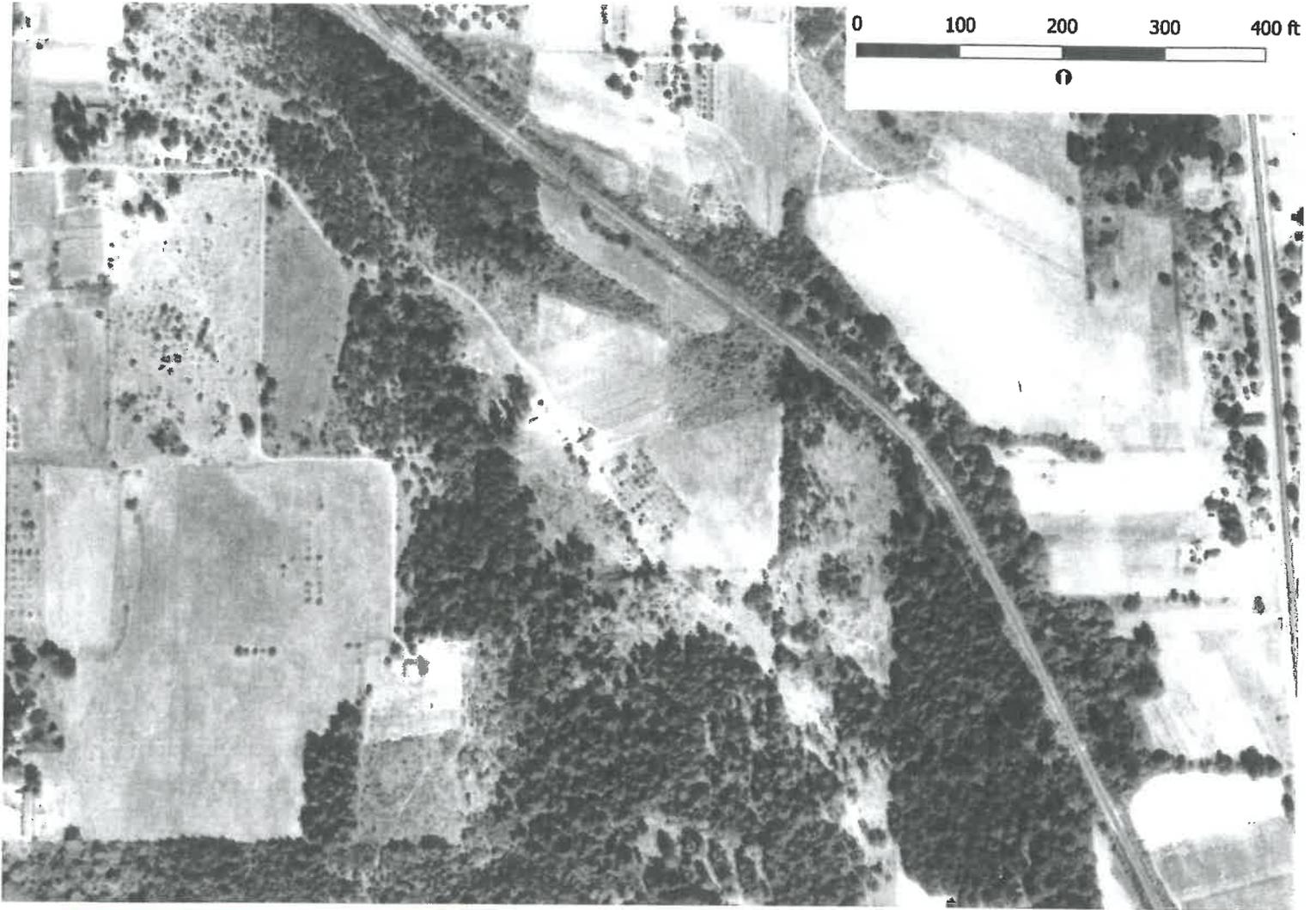


SUB E. 22nd Avenue Substation Project Slope Stability Review
Figure 2: Project Location on LiDAR Hillshade Image
Base from DOGAMI and QGIS

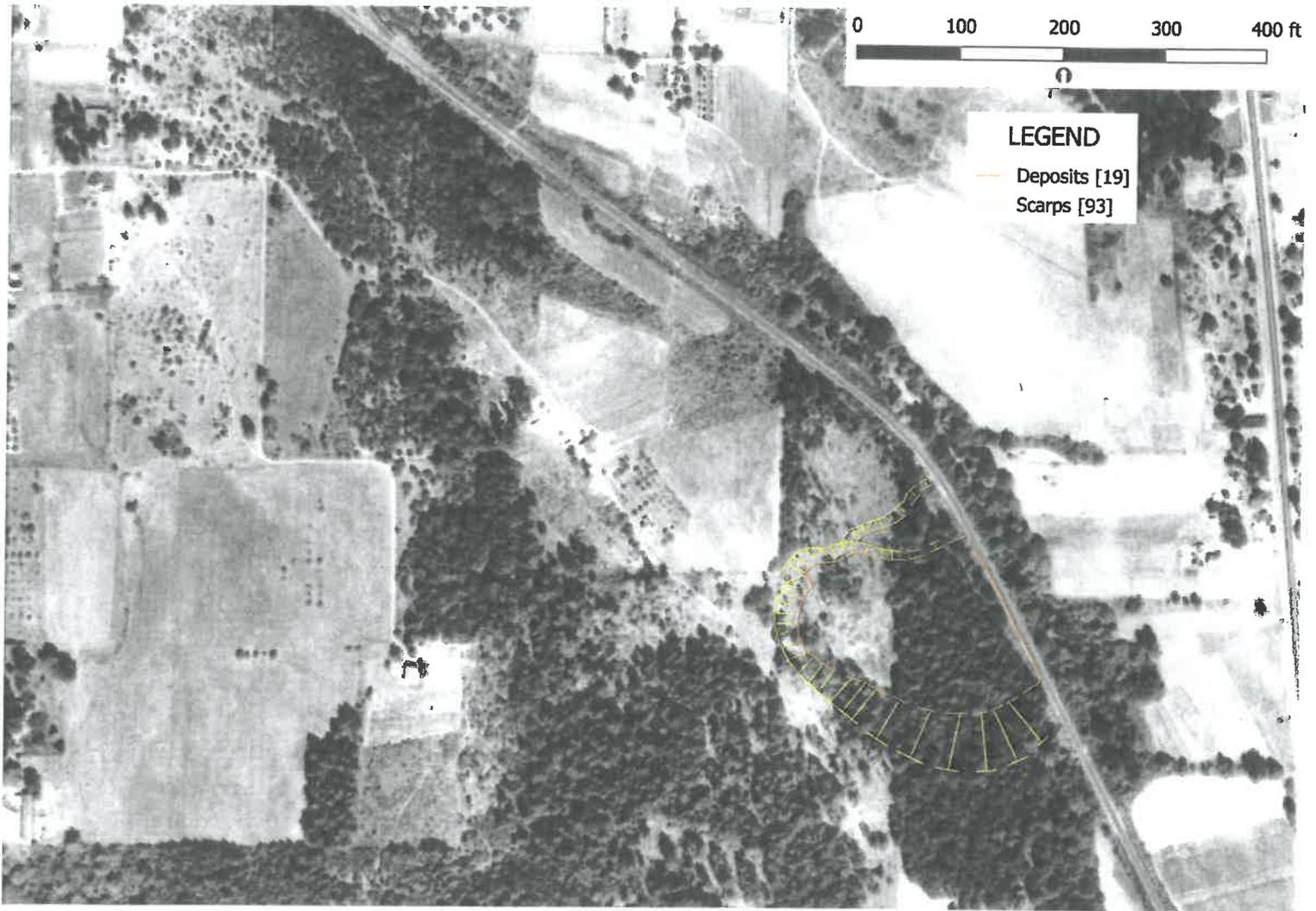


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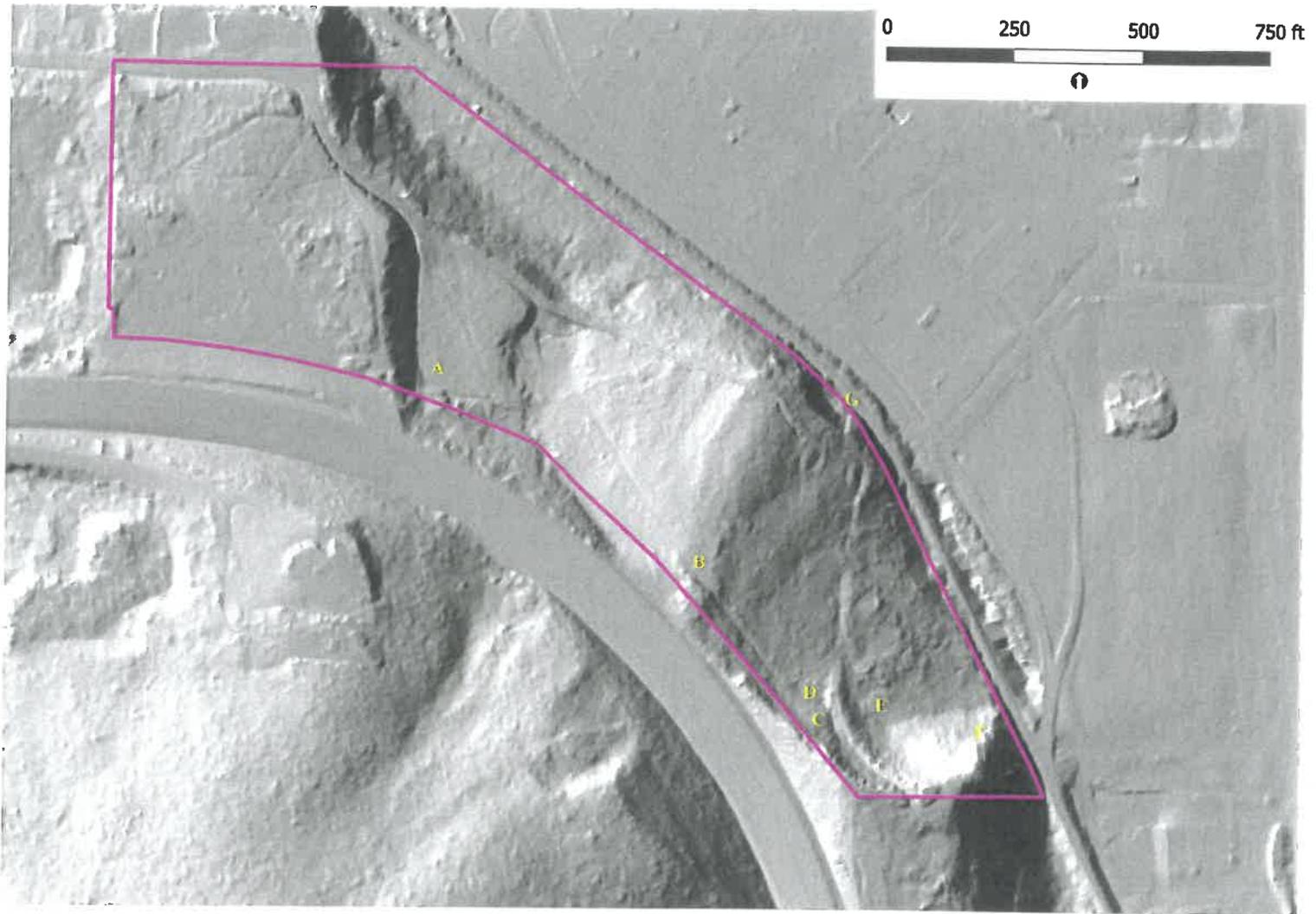
SUB E. 22nd Avenue Substation Project Slope Stability Review
Figure 3: Portion of Eugene East and West Quadrangles Geologic Map
 Base from Madin and Murray, DOGAMI, 2005.



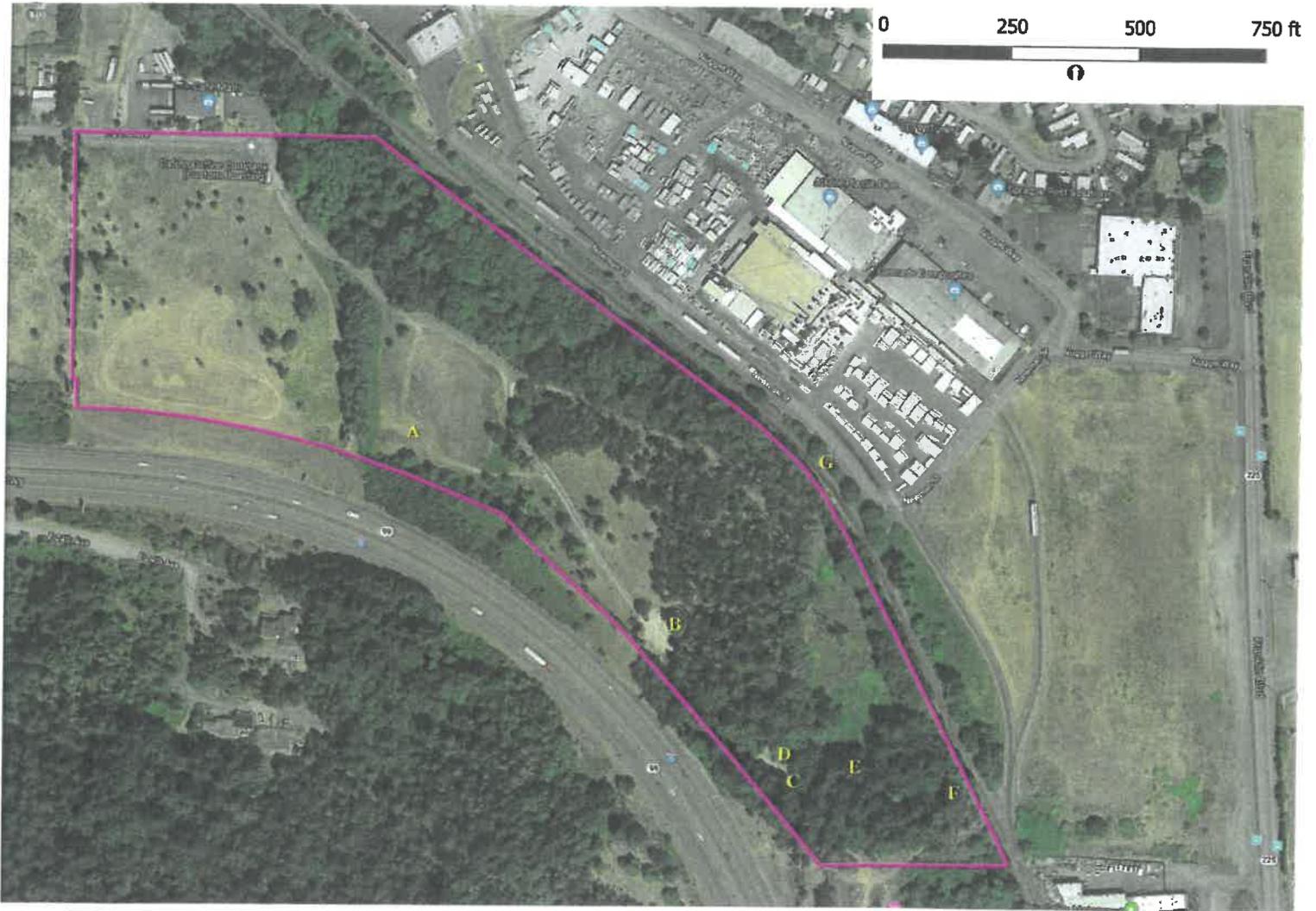
SUB E. 22nd Avenue Substation Project Slope Stability Review
Figure 4: 1936 Air Photo w/o Annotations
Base from 1936 Willamette Valley Project, Photo 3888.



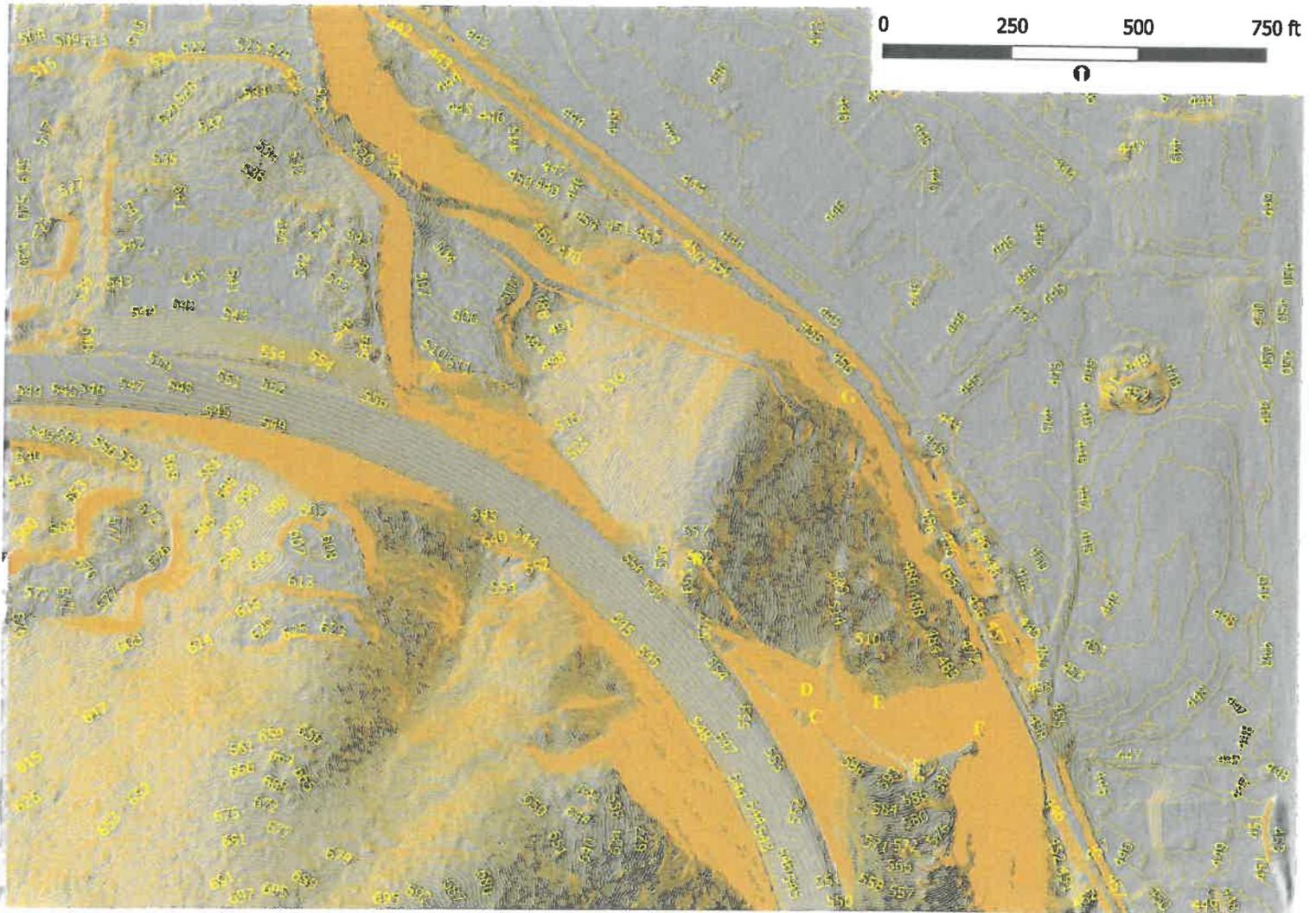
SUB E. 22nd Avenue Substation Project Slope Stability Review
Figure 4b: Portion of 1936 Aerial Photo Showing Probable Landslide Feature
Base from 1936 Willamette Valley Project, Photo 3888.



SUB E. 22nd Avenue Substation Project Slope Stability Review
Figure 5: LiDAR Hillshade Image of Project Area w/Feature Location Points
Base from DOGAMI DEM and QGIS



SUB E. 22nd Avenue Substation Project Slope Stability Review
Figure 6: Aerial Photo with feature Locations
Base from Google Earth and QGIS



SUB E. 22nd Avenue Substation Project Slope Stability Review
Figure 7: LiDAR Hillshade Image with 1-ft. Contour Lines
Base from DOGAMI DEM and QGIS





















SUB E. 22nd Avenue Substation Project Slope Stability Review

Cut in likely slope movement at Location C. View S to W.

Generated from GeoScience Site Photos 7/28/19







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SUB E. 22nd Avenue Substation Project Slope Stability Review
Steep N-facing slope on S side of amphitheater-shaped landform. View E to S
Generated from GeoScience Site Photos 7/28/19















