LAND USE PRE-APPLICATION CONFERENCE

Thursday, February 5, 2015

City Hall
22500 Salamo Road

Willamette Conference Room

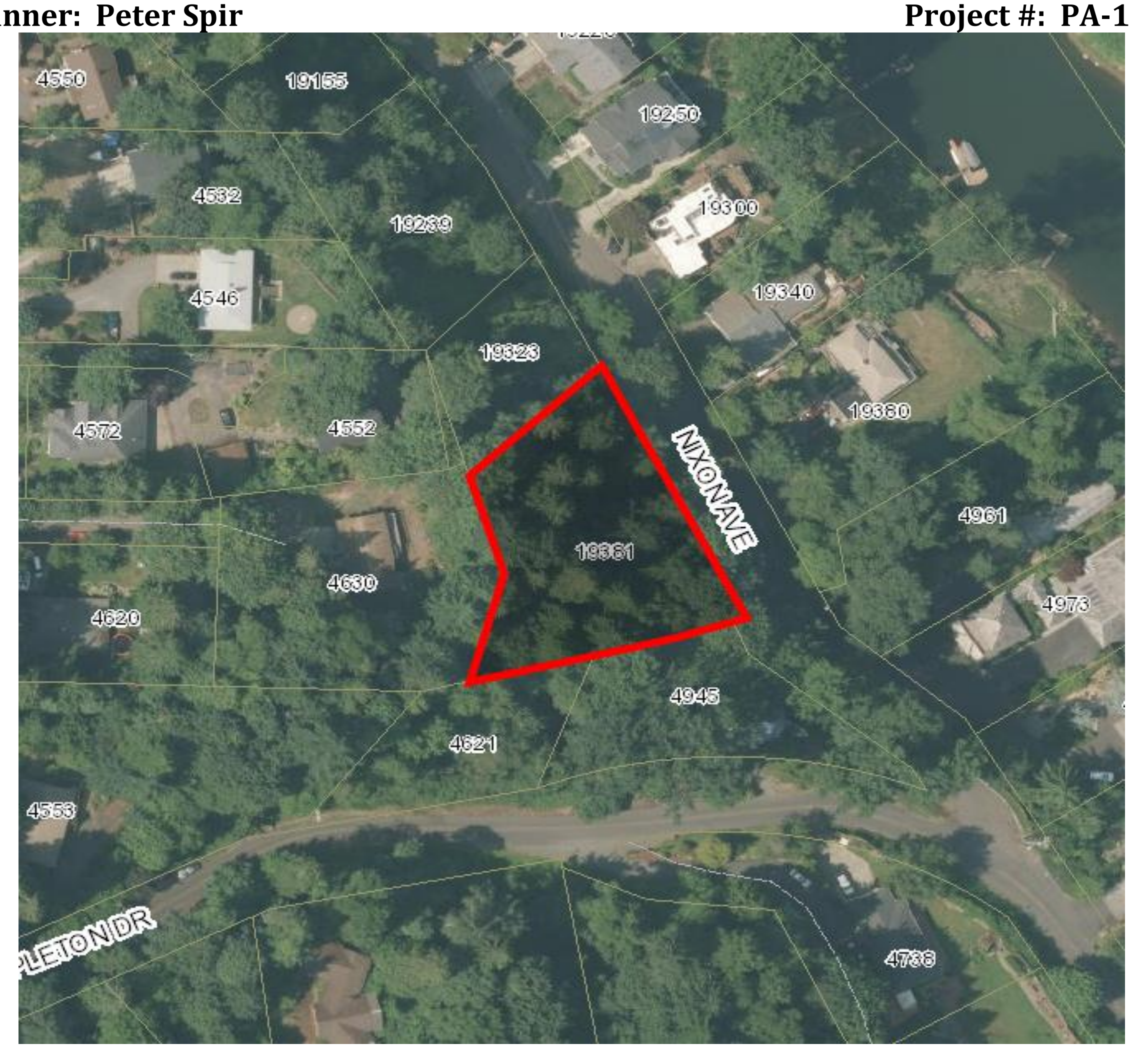
11:00 am **Proposed new home construction. Verify home placement and street improvements.**

Applicant: **Steve Omner**

Subject Property Address: 19381 Nixon Avenue

Neighborhood Assn: Robinwood

Planner: Peter Spir **Project #: PA-15-06**



City of West Linn Planning & Development • 22500 Salamo Rd #1000 • West Linn, Oregon 97068
Telephone 503.656.4211 • Fax 503.656.4106 • westlinnoregon.gov

PRE-APPLICATION CONFERENCE

THIS SECTION FOR STAFF COMPLETION		
CONFERENCE DATE: 2/5/15	TIME: 11AM	PROJECT #: PA-15-06
STAFF CONTACT: PETER SPIR		FEE: 1000.00

Pre-application conferences occur on the first and third Thursdays of each month. In order to be scheduled for a conference, this form including property owner's signature, the pre-application fee, and accompanying materials must be submitted at least 14 days in advance of the conference date. Twenty-four hour notice is required to reschedule.

Address of Subject Property (or map/tax lot): 19381 Nixon Ave.

Brief Description of Proposal: See if house placement meets cities requirements. Find out what type of street improvements will be required in un-improved neighborhood. Disturb as little soil as possible.

Applicant's Name: Steve Omner

Mailing Address: 11400 NW Plainview Rd Ptld, OR 97231

Phone No: (503) 309-3210 Email Address: steve.omner@gmail.com

Please attach additional materials relating to your proposal including a site plan on paper up to 11 x 17 inches in size depicting the following items:

- North arrow
- Scale
- Property dimensions
- Streets abutting the property
- Conceptual layout, design and/or building elevations
- Access to and from the site, if applicable
- General location of existing trees
- Location of creeks and/or wetlands
- Location of existing utilities (water, sewer, etc.)
- Easements (access, utility, all others)

Please list any questions or issues that you may have for city staff regarding your proposal:
Are set backs and placement okay?
What is required for street / side walk?

By my signature below, I grant city staff right of entry onto the subject property in order to prepare for the pre-application conference.

Separate form from property — 22-Jan. 2015

Property owner's signature — Date

owner should be on file soon.

Property owner's mailing address (if different from above)

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PRE-APPLICATION CONFERENCE

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CONFERENCE DATE:	TIME:	PROJECT #:
STAFF CONTACT:		FEE:

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Address of Subject Property (or map/tax lot): 21E24AC01703 Parcel 00371332

Brief Description of Proposal: __________

Applicant's Name: __________

Mailing Address: __________

Phone No: ( ) __________ Email Address: __________

Please attach additional materials relating to your proposal including a site plan on paper up to 11 x 17 inches in size depicting the following items:

- North arrow
- Scale
- Property dimensions
- Streets abutting the property
- Conceptual layout, design and/or building elevations
- Easements (access, utility, all others)
- Access to and from the site, if applicable
- Location of existing trees, highly recommend a tree survey
- Location of creeks and/or wetlands, highly recommend a wetland delineation
- Location of existing utilities (water, sewer, etc.)

Please list any questions or issues that you may have for city staff regarding your proposal:

____

By my signature below, I grant city staff right of entry onto the subject property in order to prepare for the pre-application conference.

DocuSigned by: David Jon Froode TE
B027C9A7159F424...

DocuSigned by: Dianne S Froode TE
B027C9A7159F424...

January 22, 2015 | 12:48 PM PT

Property owner's signature — Date

____

Property owner's mailing address (if different from above)

Real-World Geotechnical Solutions
Investigation • Design • Construction Support

April 16, 2013
Project No. 13-2934

David Froode
19340 Nixon Avenue
West Linn, Oregon 97068
Via email: dfroode@comcast.net

**SUBJECT: PRELIMINARY GEOTECHNICAL ENGINEERING REPORT
NIXON AVENUE
TAX LOT 1701
WEST LINN, OREGON**

This report presents the results of a geotechnical engineering study conducted by GeoPacific Engineering, Inc. (GeoPacific) for the above-referenced project. The purpose of our investigation was to evaluate subsurface conditions at the site and to provide geotechnical recommendations for site development. This geotechnical study was performed in accordance with GeoPacific Proposal No. P-4440, dated March 18, 2013, and your subsequent authorization of our proposal and *General Conditions for Geotechnical Services*.

SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The subject site is approximately 0.5 acres in size located on the west side of Nixon Avenue in West Linn, Oregon. The property is situated on a moderate to steep, east facing slope that inclines upward from Nixon Avenue. An incised drainage is located in the southern portion of the site. Vegetation consists of native vegetation, brambles and mature trees.

The slope on the property is approximately 45 feet high and inclines at grades of 10 to 100 percent (Figure 2). The elevation of the property ranges from 50 feet to 95 feet above mean sea level. Grading previously performed has created a level pad and driveway. The cut has never been supported by a retaining wall and some erosion and minor slope raveling has occurred at the base of the cut. One spring emanates from the hillside above the level pad.

It is our understanding that the proposed improvements will likely consist of the construction of one single family home up to three stories in height, driveway, and associated underground utilities. Below grade retaining walls may be incorporated into the design. Due to the sloping topography, we anticipate cuts and fills will be on the order of 10 feet or less.

REGIONAL AND LOCAL GEOLOGIC SETTING

Regionally, the subject site lies within the Willamette Valley/Puget Sound lowland, a broad structural depression situated between the Coast Range on the west and the Cascade Range on the east. A series of discontinuous faults subdivide the Willamette Valley into a mosaic of fault-bounded, structural blocks (Yeats et al., 1996). Uplifted structural blocks form bedrock highlands, while down-warped structural blocks form sedimentary basins.

The site is underlain by the Quaternary age (last 1.6 million years) Willamette Formation, a catastrophic flood deposit associated with repeated glacial outburst flooding of the Willamette Valley (Madin, 1990; Yeats et al., 1996). The last of these outburst floods occurred about 10,000 years ago. These deposits typically consist of horizontally layered, micaceous, silt to coarse sand forming poorly-defined to distinct beds less than 3 feet thick.

Underlying the catastrophic flood deposits is the Miocene age (about 14.5 to 16.5 million years ago) Columbia River Basalt, a thick sequence of lava flows which forms the crystalline basement of the Willamette Valley (Beeson et al., 1989; Yeats et al., 1996). These basalts are a dense, finely crystalline rock that is commonly fractured along blocky and columnar vertical joints. Individual basalt flow units typically range from 25 to 125 feet thick and interflow zones are typically vesicular, scoriaceous, and brecciated, and sometimes include sedimentary rocks. Where highly weathered, the upper portion of the basalt is altered to a distinctive red-brown clayey silt known as laterite or residual soil.

SUBSURFACE CONDITIONS

On March 27, 2013, GeoPacific explored subsurface conditions in the vicinity of the proposed home by excavating three exploratory test pits to depths of 5 to 8 feet with a small trackhoe operated by Dan Fischer Excavating of Banks, Oregon. The approximate test pit locations are shown on Figure 2. It should be noted that test pit locations were located in the field by pacing or taping distances from apparent property corners and other site features shown on the plans provided. As such, the locations of the explorations should be considered approximate.

A GeoPacific geologist continuously monitored the field exploration program and logged the borings. Soils observed in the explorations were classified in general accordance with the Unified Soil Classification System. Rock hardness was classified in accordance with Table 1, modified from the ODOT Rock Hardness Classification Chart. During exploration, our geologist also noted geotechnical conditions such as soil consistency, moisture and groundwater conditions. Logs of test pits are attached to this report. The following report sections are based on the exploration program and summarize subsurface conditions encountered at the site.

Table 1. Rock Hardness Classification Chart

ODOT Rock Hardness Rating	Field Criteria	Unconfined Compressive Strength	Typical Equipment Needed For Excavation
Extremely Soft (R0)	Indented by thumbnail	<100 psi	Small excavator
Very Soft (R1)	Scratched by thumbnail, crumbled by rock hammer	100-1,000 psi	Small excavator
Soft (R2)	Not scratched by thumbnail, indented by rock hammer	1,000-4,000 psi	Medium excavator (slow digging with small excavator)
Medium Hard (R3)	Scratched or fractured by rock hammer	4,000-8,000 psi	Medium to large excavator (slow to very slow digging), typically requires chipping with hydraulic hammer or mass excavation)
Hard (R4)	Scratched or fractured w/ difficulty	8,000-16,000 psi	Slow chipping with hydraulic hammer and/or blasting
Very Hard (R5)	Not scratched or fractured after many blows, hammer rebounds	>16,000 psi	Blasting

Fill: Approximately 6 inches of fill placed for the existing driveway was encountered in test pit TP-1. Other areas of fill may be present in the vicinity of the existing driveway area.

Topsoil: Topsoil was encountered directly at the ground surface in test pits TP-2 and TP-3. The topsoil horizon was moderately organic with trace roots throughout. The dark brown topsoil extended to approximately 1 to 1.5 feet below the ground surface.

Willamette Formation: Underlying the fill in test pit TP-1 and the topsoil horizon in test pits TP-2 and TP-3 was Quaternary aged catastrophic flood deposits known as the Willamette Formation. In test pits TP-1 through TP-3, this material consists of stiff sandy SILT (ML) to dense silty SAND (SM). The light brown sand to silt extended to a depth of 2.5 to 4 feet below the ground surface.

Columbia River Basalt: Underlying the Willamette Formation in test pits was brown to gray weathered basalt belonging to the Columbia River Basalt Formation. In test pits, this basalt was vesicular and extremely soft (R0) to medium hard (R3). Practical refusal was encountered with a small trackhoe on medium hard basalt at a depth of 8 feet in test pit TP-1.

Soil Moisture and Groundwater

On March 27, 2013, soil moisture conditions observed in test pits were generally moist. No groundwater was encountered to a maximum exploration depth of 8 feet below the ground surface. One spring is located in the central portion of the site. It is our understanding that the spring flows year round. Discharge is on the order of 5 gallons per minute or less. The groundwater conditions reported above are for the specific date and locations indicated, and therefore may not necessarily be indicative of other times and/or locations. Furthermore, it is anticipated that groundwater conditions will vary depending on the season, local subsurface conditions, changes in land use and other factors.

SLOPE STABILITY

For the purpose of evaluating slope stability, we: (1) reviewed published geologic mapping, (2) performed field reconnaissance, and (3) explored subsurface conditions in three exploratory test pits with a small trackhoe. Burns and Duplantis (2010) and the DOGAMI online landslide database identifies three landslides and/or slope instability features to the northwest of the subject site that consist of earthflows, rotational slides, or a combination thereof (SLIDO, 2013). Our review of lidar imagery (DOGAMI, 2013) indicates that the vicinity topography is smooth and uniform, consistent with relatively stable slope conditions.

The subject site is situated on a moderately-steep to steep slope inclining at grades of 10 to 100% grade. Steeper areas are present in the vicinity of the incised drainage to the south of the proposed homesite. Our reconnaissance observations indicate that slope geomorphology at the site is smooth and uniform consistent with relatively stable slope conditions. No geomorphic evidence of prior, deep-seated slope instability (such as natural benches, scarps, groundcracks, etc.) was observed. Subsurface exploration indicates that the slope is underlain by stiff to dense flood deposits and weathered basalt bedrock. These materials are considered to have a moderate to high shear strength and are generally resistant to deep-seated slope instability.

CONCLUSIONS AND RECOMMENDATIONS

Our geotechnical investigation indicates that the subject site is suitable for construction of the proposed residential structure provided that the following recommendations are incorporated into the design and construction phases of the project. In our opinion, the potential for deep-seated slope failure is low. The potential for damage to the proposed building resulting from slope movement is considered to be low provided that our recommendations are incorporated in the project's design and construction. The building pad will likely be enlarged, requiring further cut into the slope. We recommend the cut slope be reinforced by installation of a retaining wall and that the water from the spring is collected and discharged in a controlled manner.

We recommend that GeoPacific review the finalized foundation and grading plan in order to verify that our recommendations are properly incorporated into the foundation design. GeoPacific should observe the foundation construction to verify construction in accordance with our recommendations, adequate subgrade strength and fill compaction. As with all hillside homesites, we recommend that the owner maintain this property in a manner appropriate to hillside development per the attached "Maintenance of Hillside Homesites".

Anticipated Foundations

The proposed residential structure may be supported on shallow foundations bearing on competent undisturbed, native soils and/or engineered fill, appropriately designed and constructed as recommended in this report. Foundation design, construction, and setback requirements should conform to the applicable building code at the time of construction. For maximization of bearing strength and protection against frost heave, spread footings should be embedded at a minimum depth of 18 inches below exterior grade. The recommended minimum widths for continuous footings supporting wood-framed walls without masonry are 12 inches for single-story, 15 inches for two-story, and 18 inches for three-story homes. Minimum foundation reinforcement should consist of two No. 4 bars at the tops of stem walls, and two No. 4 bars at the bottom of footings. Concrete slab-on-grade reinforcement should consist of No. 4 bars placed on 24-inch centers in a grid pattern.

The anticipated allowable soil bearing pressure is 1,500 lbs/ft^2 for footings bearing on shallow native soil. A maximum chimney and column load of 30 kips is recommended for the site. The recommended maximum allowable bearing pressure may be increased by 1/3 for short-term transient conditions such as wind and seismic loading. For heavier loads, the geotechnical engineer should be consulted. The coefficient of friction between on-site soil and poured-in-place concrete may be taken as 0.45, which includes no factor of safety. The maximum anticipated total and differential footing movements (generally from soil expansion and/or settlement) are 1 inch and ¾ inch over a span of 20 feet, respectively. We anticipate that the majority of the estimated settlement will occur during construction, as loads are applied. Excavations near structural footings should not extend within a 1H:1V plane projected downward from the bottom edge of footings.

Footing excavations should penetrate through topsoil and any loose soil to competent subgrade that is suitable for bearing support. All footing excavations should be trimmed neat, and all loose or softened soil should be removed from the excavation bottom prior to placing reinforcing steel bars. Due to the moisture sensitivity of on-site native soils, foundations constructed during the wet weather season may require overexcavation of footings and backfill with compacted, crushed aggregate.

Groundwater Control

A spring emanates upslope from the proposed home site. We recommend that water from the spring be captured with a drain installed behind the retaining wall and discharged in a controlled manner.

Retaining Walls

Lateral earth pressures against below-grade retaining walls will depend upon the inclination of any adjacent slopes, type of backfill, degree of wall restraint, method of backfill placement, degree of backfill compaction, drainage provisions, and magnitude and location of any adjacent surcharge loads. At-rest soil pressure is exerted on a retaining wall when it is restrained against rotation. In contrast, active soil pressure will be exerted on a wall if its top is allowed to rotate or yield a distance of roughly 0.001 times its height or greater.

If the subject retaining walls will be free to rotate at the top, they should be designed for an active earth pressure equivalent to that generated by a fluid weighing 35 pcf for level backfill against the wall. For restrained wall, an at-rest equivalent fluid pressure of 55 pcf should be used in design, again assuming level backfill against the wall. These values assume that the recommended drainage provisions are incorporated, and hydrostatic pressures are not allowed to develop against the wall.

During a seismic event, lateral earth pressures acting on below-grade structural walls will increase by an incremental amount that corresponds to the earthquake loading. Based on the Mononobe-Okabe equation and peak horizontal accelerations appropriate for the site location, seismic loading should be modeled using the active or at-rest earth pressures recommended above, plus an incremental rectangular-shaped seismic load of magnitude 5.5H, where H is the total height of the wall.

We assume relatively level ground surface below the base of the walls. As such, we recommend passive earth pressure of 390 pcf for use in design, assuming wall footings are cast against competent native soils or engineered fill. If the ground surface slopes down and away from the base of any of the walls, a lower passive earth pressure should be used and GeoPacific should be contacted for additional recommendations.

A coefficient of friction of 0.45 may be assumed along the interface between the base of the wall footing and subgrade soils. The recommended coefficient of friction and passive earth pressure values do not include a safety factor, and an appropriate safety factor should be included in design. The upper 12 inches of soil should be neglected in passive pressure computations unless it is protected by pavement or slabs on grade.

The above recommendations for lateral earth pressures assume that the backfill behind the subsurface walls will consist of properly compacted structural fill, and no adjacent surcharge loading. If the walls will be subjected to the influence of surcharge loading within a horizontal distance equal to or less than the height of the wall, the walls should be designed for the additional horizontal pressure. For uniform surcharge pressures, a uniformly distributed lateral pressure of 0.3 times the surcharge pressure should be added. Traffic surcharges may be estimated using an additional vertical load of 250 psf (2 feet of additional fill), in accordance with local practice.

The recommended equivalent fluid densities assume a free-draining condition behind the walls so that hydrostatic pressures do not build-up. This can be accomplished by placing a 12- to 18-inch wide zone of sand and gravel containing less than 5 percent fines against the walls. A 3-inch minimum diameter perforated, plastic drain pipe should be installed at the base of the walls and connected to a suitable discharge point to remove water in this zone of sand and gravel. The drain pipe should be wrapped in filter fabric (Mirafi 140N or other as approved by the geotechnical engineer) to minimize clogging.

GeoPacific should be contacted during construction to verify subgrade strength in wall keyway excavations, to verify that backslope soils are in accordance with our assumptions, and to take density tests on the wall backfill materials.

Structures should be located a horizontal distance of at least 1.5H away from the back of the retaining wall, where H is the total height of the wall. GeoPacific should be contacted for additional foundation recommendations where structures are located closer than 1.5H to the top of any wall.

Concrete Slabs-On-Grade

Preparation of areas beneath concrete slab-on-grade floors should be performed as recommended in the *Site Preparation* section. Care should be taken during excavation for foundations and floor slabs, to avoid disturbing subgrade soils. If subgrade soils have been adversely impacted by wet weather or otherwise disturbed, the surficial soils should be scarified to a minimum depth of 8 inches, moisture conditioned to within about 3 percent of optimum moisture content, and compacted to engineered fill specifications. Alternatively, disturbed soils may be removed and the removal zone backfilled with additional crushed rock.

For evaluation of the concrete slab-on-grade floors using the beam on elastic foundation method, a modulus of subgrade reaction of 150 kcf (87 pci) should be assumed for the medium stiff native silt soils anticipated at subgrade depth. This value assumes the concrete slab system is designed and constructed as recommended herein, with a minimum thickness of crushed rock of 8 inches beneath the slab.

Interior slab-on-grade floors should be provided with an adequate moisture break. The capillary break material should consist of ODOT open graded aggregate per ODOT Standard Specifications Table 02630-2. The minimum recommended thickness of capillary break materials on re-compacted soil subgrade is 8 inches. The total thickness of crushed aggregate will be dependent on the subgrade conditions at the time of construction, and should be verified visually by proof-rolling. Under-slab aggregate should be compacted to at least 90% of its maximum dry density as determined by ASTM D1557 or equivalent.

In areas where moisture will be detrimental to floor coverings or equipment inside the proposed structure, appropriate vapor barrier and damp-proofing measures should be implemented. A commonly applied vapor barrier system consists of a 10-mil polyethylene vapor barrier placed directly over the capillary break material. With this type of system, an approximately 2-inch thick layer of sand is often placed over the vapor barrier to protect it from damage, to aid in curing of the concrete, and also to help prevent cement from bleeding down into the underlying capillary break materials. Other damp/vapor barrier systems may also be feasible. Appropriate design professionals should be consulted regarding vapor barrier and damp proofing systems, ventilation, building material selection and mold prevention issues, which are outside GeoPacific's area of expertise.

Grading and Erosion Control

In general, we anticipate that soils from planned cuts and utility trench excavations will be suitable for use as engineered fill provided they are adequately moisture conditioned prior to compacting. Imported fill material should be reviewed by GeoPacific prior to being imported to the site. Oversize material greater than 6 inches in size should not be used within 3 feet of foundation footings, and material greater than 12 inches in diameter should not be used in engineered fill.

Engineered fill should be compacted in horizontal lifts not exceeding 8 inches using standard compaction equipment. We recommend that engineered fill be compacted to at least 90 percent of the maximum dry density determined by ASTM D1557 (Modified Proctor). On-site soils may be wet or dry of optimum; therefore, we anticipate that moisture conditioning of native soil will be necessary for compaction operations.

Proper test frequency and earthwork documentation usually requires daily observation and testing during stripping, rough grading, and placement of engineered fill. Field density testing should generally conform to ASTM D2922 and D3017, or D1556. Engineered fill should be periodically observed and tested by the project geotechnical engineer or his representative. Typically, one density test is performed for at least every 2 vertical feet of fill placed or every 500 cubic yards, whichever requires more testing. Because testing is performed on an on-call basis, we recommend that the earthwork contractor be held contractually responsible for test scheduling and frequency.

Permanent cut slopes should be constructed no steeper than 2H:1V (50% grade). Due to the presence of moderately sloping gradients, we consider the potential for adverse erosion during construction to be moderate. Erosion at the site during construction can be minimized by implementing the project erosion control plan specified by the project designer, which typically includes the use of straw bales, bio-bags, and silt fences. If used, these erosion control devices should be in place and remain in place throughout site preparation and construction. Due to the fine-grained nature of on-site soils, once particles become suspended by disturbance in ponded water they will precipitate slowly.

Areas of exposed soil requiring immediate and/or temporary protection against exposure should be covered with either mulch or erosion control netting/blankets. Areas of exposed soil requiring permanent stabilization should be seeded with an approved grass seed mixture, or hydroseeded with an approved seed-mulch-fertilizer mixture. Cut and fill slopes should be seeded or planted as soon as possible after construction, so that vegetation has time to become established before the onset of the next wet-weather season.

Seismic Design

Structures should be designed to resist earthquake loading in accordance with the methodology described in the 2009 International Residential Code (IRC) for One- and Two-Family Dwellings, with applicable Oregon Structural Specialty Code (OSSC) revisions. We recommend Site Class D be used for design per the OSSC, Table 1613.5.2. Design values determined for the site using the USGS (United States Geological Survey) *Earthquake Ground Motion Parameters* utility are summarized below.

Table 2. Recommended Earthquake Ground Motion Parameters (2009 IRC)

Parameter	Value
Location (Lat, Long), degrees	45.386, -122.639
Mapped Spectral Acceleration Values (MCE):	
Short Period, S_s	0.94 g
1.0 Sec Period, S_1	0.33 g
Soil Factors for Site Class D:	
F_a	1.13
F_v	1.74
Residential Site Value = 2/3 x F_a x S_s	0.70 g
Residential Seismic Design Category	D_1

Soil liquefaction is a phenomenon wherein saturated soil deposits temporarily lose strength and behave as a liquid in response to earthquake shaking. Soil liquefaction is generally limited to loose, granular soils located below the water table. Following development, on-site soils will consist predominantly of engineered fill or native fine-grained soils and weathered basalt bedrock, which are not considered susceptible to liquefaction. Therefore, it is our opinion that special design or construction measures are not required to mitigate the effects of liquefaction.

UNCERTAINTIES AND LIMITATIONS

We have prepared this report for the owner and their consultants for use in design of this project only. This report should be provided in its entirety to prospective contractors for bidding and estimating purposes; however, the conclusions and interpretations presented in this report should not be construed as a warranty of the subsurface conditions. Experience has shown that soil and groundwater conditions can vary significantly over small distances. Inconsistent conditions can occur between explorations that may not be detected by a geotechnical study. If, during future site operations, subsurface conditions are encountered which vary appreciably from those described herein, GeoPacific should be notified for review of the recommendations of this report, and revision of such if necessary.

Sufficient geotechnical monitoring, testing and consultation should be provided during construction to confirm that the conditions encountered are consistent with those indicated by explorations. The checklist attached to this report outlines recommended geotechnical observations and testing for the project. Recommendations for design changes will be provided should conditions revealed during construction differ from those anticipated, and to verify that the geotechnical aspects of construction comply with the contract plans and specifications.

Within the limitations of scope, schedule and budget, GeoPacific attempted to execute these services in accordance with generally accepted professional principles and practices in the fields of geotechnical engineering and engineering geology at the time the report was prepared. No warranty, expressed or implied, is made. The scope of our work did not include environmental assessments or evaluations regarding the presence or absence of wetlands or hazardous or toxic substances in the soil, surface water, or groundwater at this site.

We appreciate this opportunity to be of service.

Sincerely,

GEOPACIFIC ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER
14743PE
OREGON
JAN. 23, 1990
JAMES D. IMBRIE

EXPIRES: 06/30/2013

Beth K. Rapp, R.G.
Senior Geologist

James D. Imbrie, G.E., C.E.G.
Principal Geotechnical Engineer

Attachments: References
Maintenance of Hillside Homesites
Figure 1 – Vicinity Map
Figure 2 – Site and Exploration Plan
Figure 3 – Geologic Section
Test Pit Logs (TP-1 – TP -3)

REFERENCES

Beeson, M.H., Tolan, T.L., and Madin, I.P., 1989, Geologic map of the Lake Oswego Quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon: Oregon Department of Geology and Mineral Industries Geological Map Series GMS-59, scale 1:24,000.

Burns, W.J. and Duplantis, S., 2010, Overview of the Landslide Inventory of the Lake Oswego Quadrangle, Clackamas, Multnomah, and Washington Counties, Oregon: Oregon Department of Geology and Mineral Industries Geological Map Series IMS-32, scale 1:8,000.

Madin, I.P., 1990, Earthquake hazard geology maps of the Portland metropolitan area, Oregon: Oregon Department of Geology and Mineral Industries Open-File Report 0-90-2, scale 1:24,000, 22 p.

Oregon Department of Geology and Mineral Industries, 2013, Statewide Landslide Information Database for Oregon (SLIDO): http://www.oregongeology.org/slido/index.html

Oregon Department of Geology and Mineral Industries, 2013, Unpublished lidar imagery, Lidar Pilot Project-Portland Metro Area, in co-operation with Portland State University, (http://lidar.geos.pdx.edu).

Yeats, R.S., Graven, E.P., Werner, K.S., Goldfinger, C., and Popowski, T., 1996, Tectonics of the Willamette Valley, Oregon: in Assessing earthquake hazards and reducing risk in the Pacific Northwest, v. 1: U.S. Geological Survey Professional Paper 1560, P. 183-222, 5 plates, scale 1:100,000.

GeoPacific Engineering, Inc.
14835 SW 72nd Avenue
Portland, Oregon 97224 • Tel (503) 598-8445

MAINTENANCE OF HILLSIDE HOMESITES

All homes require a certain level of maintenance for general upkeep and to preserve the overall integrity of structures and land. Hillside homesites require some additional maintenance because they are subject to natural slope processes, such as runoff, erosion, shallow soil sloughing, soil creep, perched groundwater, etc. If not properly controlled, these processes could adversely affect your or neighboring properties. Although surface processes are usually only capable of causing minor damage, if left unattended, they could possibly lead to more serious instability problems.

The primary source of problems on hillsides is uncontrolled surface water runoff and blocked groundwater seepage which can erode, saturate and weaken soil. Therefore, it is important that drainage and erosion control features be implemented on the property, and that these features be maintained in operative condition (unless changed on the basis of qualified professional advice). By employing simple precautions, you can help properly maintain your hillside site and avoid most potential problems. The following is an abbreviated list of common Do's and Don'ts recommended for maintaining hillside homesites.

Do List

1. Make sure that roof rain drains are connected to the street, local storm drain system, or transported via enclosed conduits or lined ditches to suitable discharge points away from structures and improvements. In no case, should rain drain water be discharged onto slopes or in an uncontrolled manner. Energy dissipation devices should be employed at discharge points to help prevent erosion.

2. Check your roof drains, gutters and spouts to make sure that they are clear. Roofs are capable of producing a substantial flow of water. Blocked gutters, etc., can cause water to pond or run off in such a way that erosion or adverse oversaturation of soil can occur.

3. Make sure that drainage ditches and/or berms are kept clear throughout the rainy season. If you notice that a neighbor's ditches are blocked such that water is directed onto your property or in an uncontrolled manner, politely inform them of this condition.

4. Locate and check all drain inlets, outlets and weep holes from foundation footings, retaining walls, driveways, etc. on a regular basis. Clean out any of these that have become clogged with debris.

5. Watch for wet spots on the property. These may be caused by natural seepage or indicate a broken or leaking water or sewer line. In either event, professional advice regarding the problem should be obtained followed by corrective action, if necessary.

6. Do maintain the ground surface adjacent to lined ditches so that surface water is collected in the ditch. Water should not be allowed to collect behind or flow under the lining.

Don't List

1. Do not change the grading or drainage ditches on the property without professional advice. You could adversely alter the drainage pattern across the site and cause erosion or soil movement.

2. Do not allow water to pond on the property. Such water will seep into the ground causing unwanted saturation of soil.

3. Do not allow water to flow onto slopes in an uncontrolled manner. Once erosion or oversaturation occurs, damage can result quickly or without warning.

4. Do not let water pond against foundations, retaining walls or basements. Such walls are typically designed for fully-drained conditions.

5. Do not connect roof drainage to subsurface disposal systems unless approved by a geotechnical engineer.

6. Do not irrigate in an unreasonable or excessive manner. Regularly check irrigation systems for leaks. Drip systems are preferred on hillsides.

GeoPacific Engineering, Inc.
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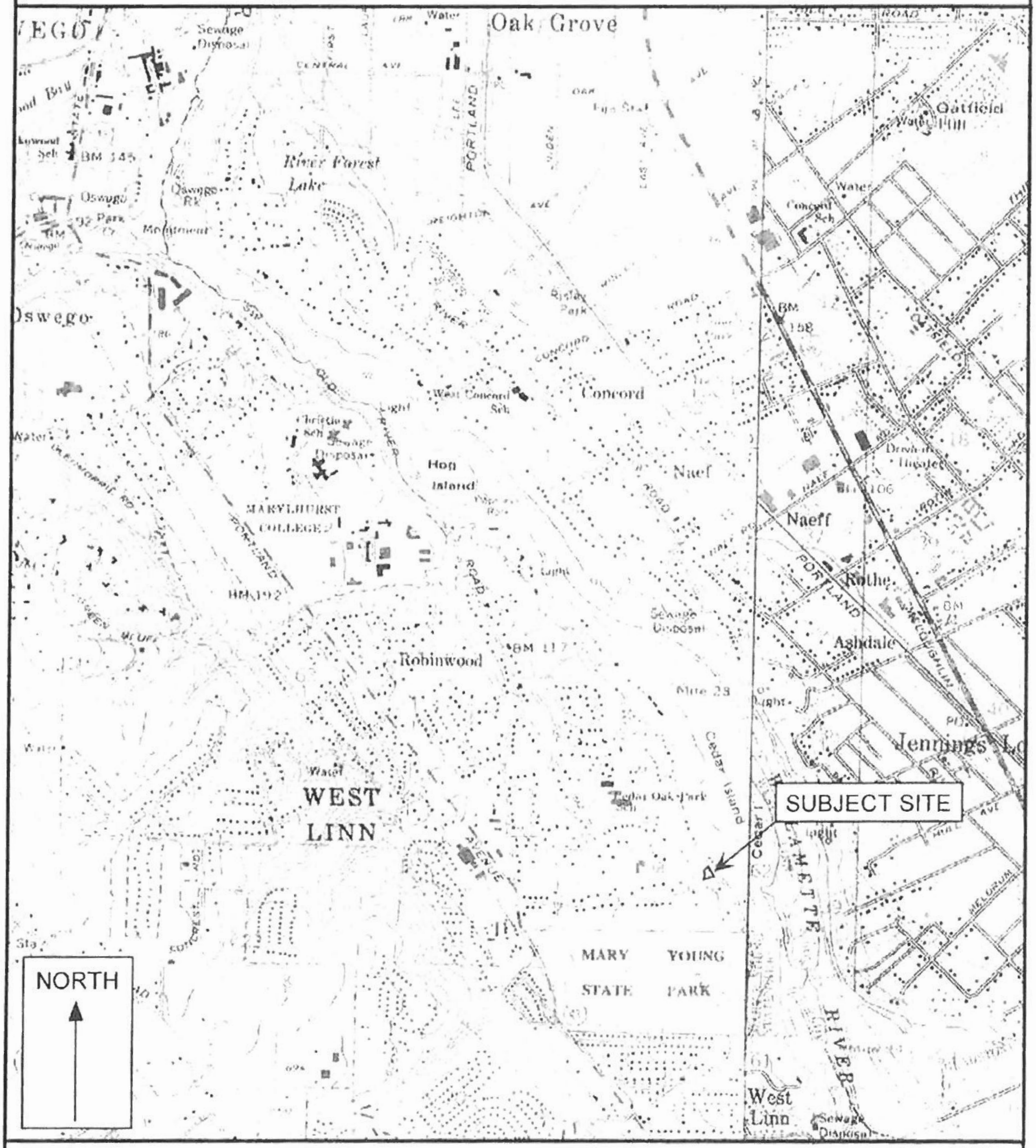
Tel: (503) 598-8445 Fax: (503) 941-9281

VICINITY MAP



Legend

Approximate Scale 1 in = 2,000 ft

Date: 4/12/13

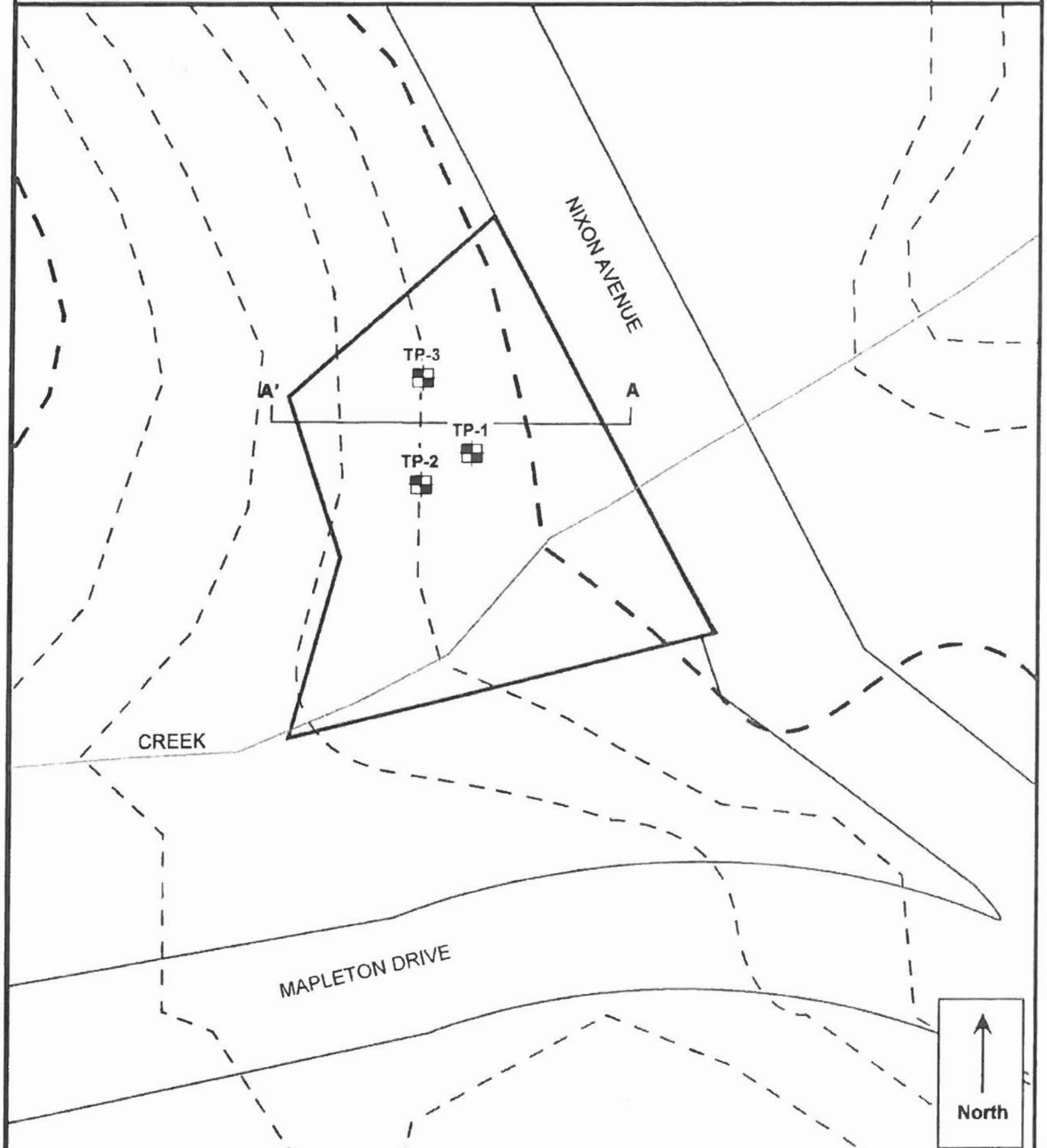
Drawn by: EKR

Base maps: U.S. Geological Survey 7.5 minute Topographic Map Series, Lake Oswego, Oregon Quadrangle, 1961 (Photorevised 1984) and Gladstone, Oregon Quadrangle, 1961 (Photorevised 1984)

Project: Nixon Avenue Property West Linn, Oregon	Project No. 13-2934	FIGURE 1

GeoPacific Engineering, Inc.
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

SITE PLAN AND EXPLORATION LOCATIONS



Legend

TP-1 Test Pit Designation and Approximate Location

A A' Section Designation and Approximate Location

0 50'
APPROXIMATE SCALE 1"=50'

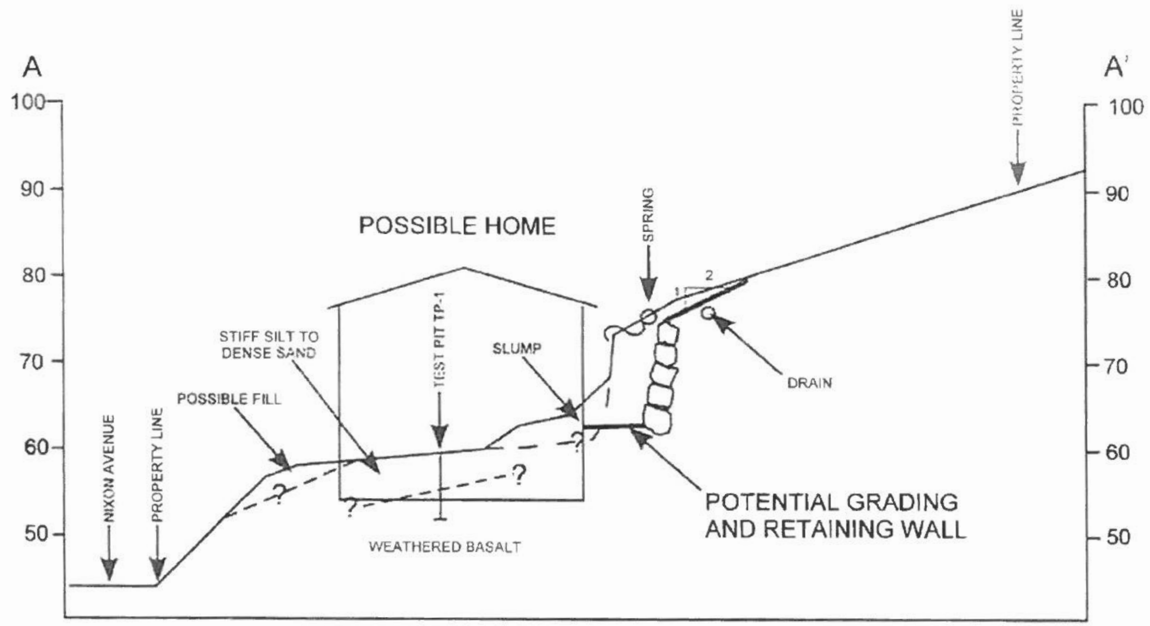
Date: 04/12/13
Drawn by: EKR

Topography from U.S. Geological Survey 7.5 minute Topographic Map Series, Lake Oswego, Oregon Quadrangle, 1961 (Photorevised 1984).

Project: Nixon Avenue Property West Linn, Oregon	Project No. 13-2934	FIGURE 2

GeoPacific Engineering, Inc.
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

GEOLOGIC SECTION



ELEVATION IN FEET

NO VERTICAL EXAGGERATION

SLOPE PROFILE IS APPROXIMATE. CONSTRUCTED USING HAND HELD CLINOMETER AND CLOTH TAPE.

Legend

APPROXIMATE SCALE 1 IN = 20 FT

Note: Location of all geotechnical information is approximate.

Project: Nixon Avenue Property, West Linn, Oregon	Project No. 13-2934	FIGURE 3	Date: 04/14/2013 Drawn by: EKR

GeoPacific Engineering, Inc.

14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Nixon Avenue Property, West Linn, Oregon	Project No. 13-2934	Test Pit No. TP- 1

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
						Medium dense silty GRAVEL (GM), gray, moist (Driveway)
1	2.5					Very stiff to dense, sandy SILT (ML) to silty SAND (SM), trace clay, light brown, micaceous, trace roots throughout, strong orange and gray mottling, moist (Willamette Formation)
2	4.5					
3	4.5					
4	4.5					Extremely soft (R0) to very soft (R1) BASALT, reddish brown to gray, highly weathered, trace yellow secondary mineralization, vesicular, moist (Columbia River Basalt)
5						
6						
7						
8						Practical Refusal on Medium Hard (R3) Basalt at 8 Feet.
9						
10						Note: No groundwater or seepage encountered.
11						
12						

LEGEND

Bag Sample (100 to 1,000 g) | Bucket Sample (5 Gal Bucket) | Shelby Tube Sample | Seepage | Water Bearing Zone | Water Level at Abandonment

Date Excavated: 4/12/2013
Logged By: B. Rapp
Surface Elevation:

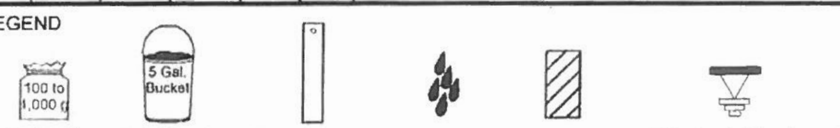
GeoPacific Engineering, Inc.
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

Project: Nixon Avenue Property, West Linn, Oregon	Project No. 13-2934	Test Pit No. **TP-2**

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
0–1						Moderately organic SILT (OL-ML), brown, roots throughout, loose, moist (Topsoil)
1	1.0					Stiff to dense, sandy SILT (ML) to silty SAND (SM), trace clay, light brown, micaceous, trace roots throughout, strong orange and gray mottling, moist (Willamette Formation)
2	1.5					
3	4.5					Extremely soft (R0) to very soft (R1) BASALT, reddish brown to gray, highly weathered, trace yellow secondary mineralization, vesicular, moist (Columbia River Basalt)
4	4.5					
5						Test Pit Terminated at 5 Feet.
6						
7						Note: No groundwater or seepage encountered.
8						
9						
10						
11						
12						

LEGEND



Bag Sample · Bucket Sample · Shelby Tube Sample · Seepage · Water Bearing Zone · Water Level at Abandonment

Date Excavated: 4/12/2013
Logged By: B. Rapp
Surface Elevation:

GeoPacific Engineering, Inc.
14835 SW 72nd Avenue
Portland, Oregon 97224
Tel: (503) 598-8445 Fax: (503) 941-9281

TEST PIT LOG

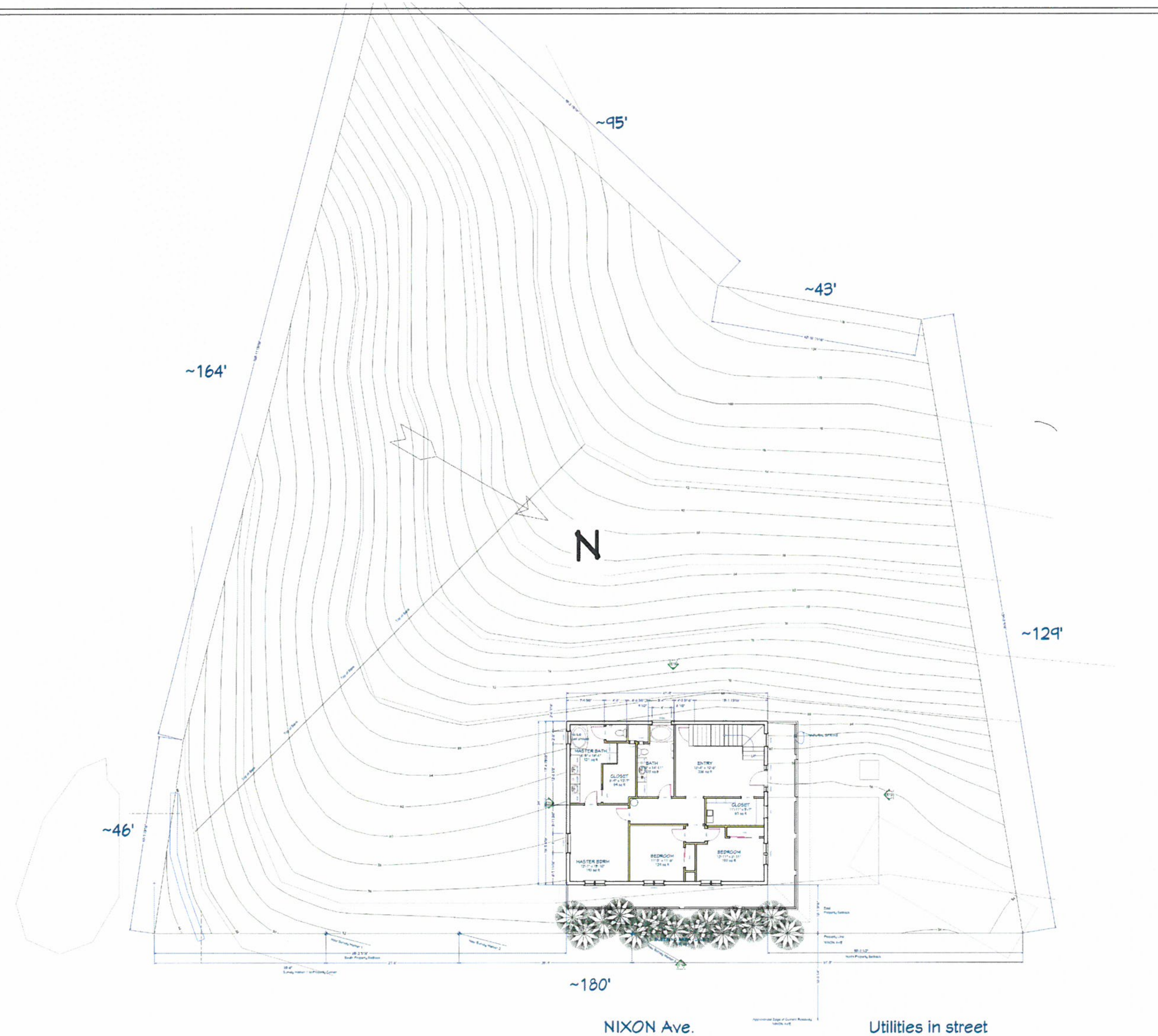
Project: Nixon Avenue Property, West Linn, Oregon | Project No. 13-2934 | Test Pit No. TP-3

Depth (ft)	Pocket Penetrometer (tons/ft²)	Sample Type	In-Situ Dry Density (lb/ft³)	Moisture Content (%)	Water Bearing Zone	Material Description
						Moderately organic SILT (OL-ML), trace fine sand, brown, roots throughout, loose, moist (Topsoil)
1	0.5					
2	1.0					Stiff to dense, sandy SILT (ML) to silty SAND (SM), trace clay, light brown, micaceous, trace roots throughout, strong orange and gray mottling, moist (Willamette Formation)
3	4.5					
4	4.5					Extremely soft (R0) to very soft (R1) BASALT, reddish brown to gray, highly weathered, trace yellow secondary mineralization, vesicular, moist (Columbia River Basalt)
5						Test Pit Terminated at 5 Feet.
6						
7						Note: No groundwater or seepage encountered.
8						
9						
10						
11						
12						

LEGEND

Bag Sample (100 to 1,000 g) · Bucket Sample (5 Gal. Bucket) · Shelby Tube Sample · Seepage · Water Bearing Zone · Water Level at Abandonment

Date Excavated: 4/12/2013
Logged By: B. Rapp
Surface Elevation:



REVISION TABLE

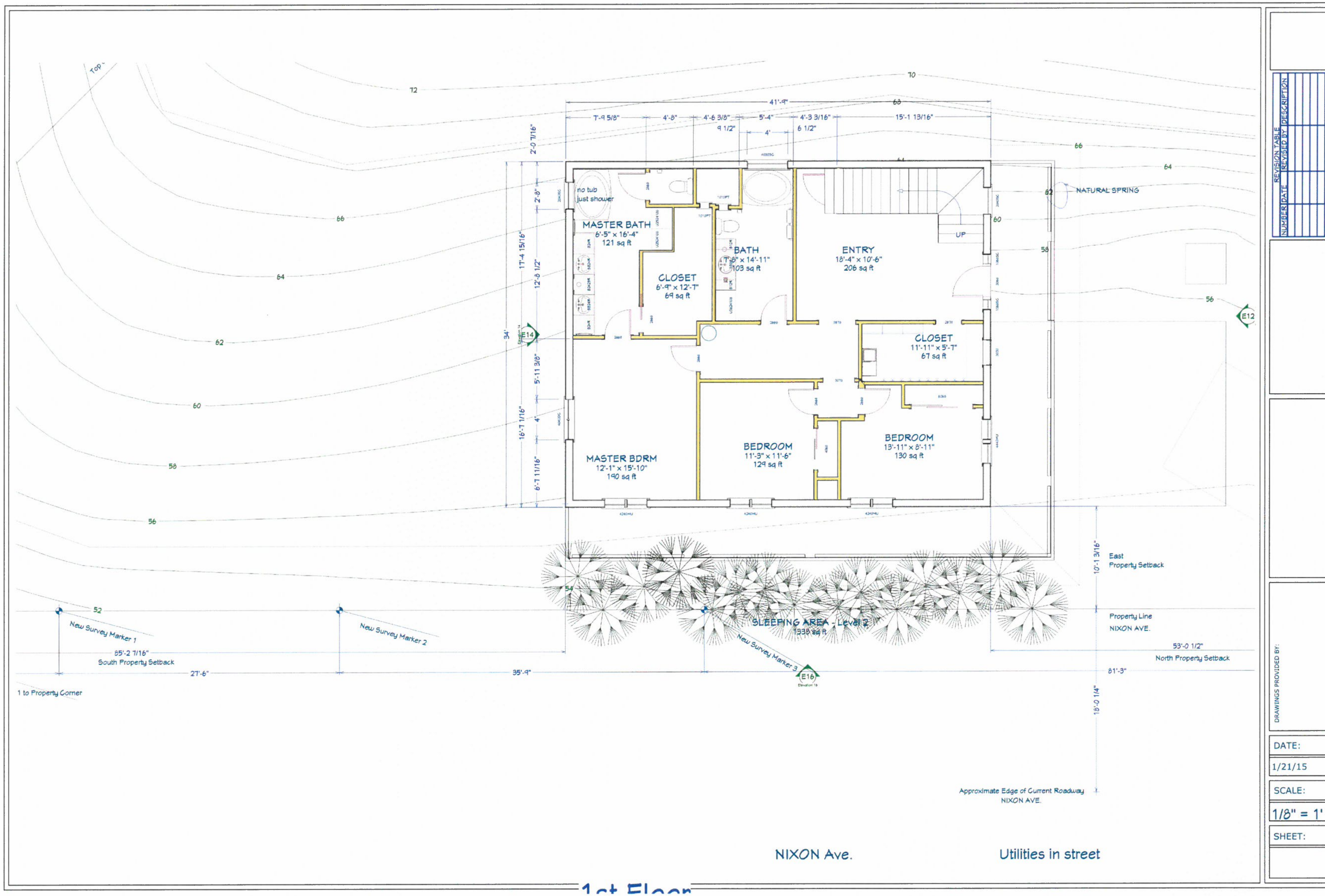
NUMBER	DATE	REVISED BY	DESCRIPTION

DRAWINGS PROVIDED BY:

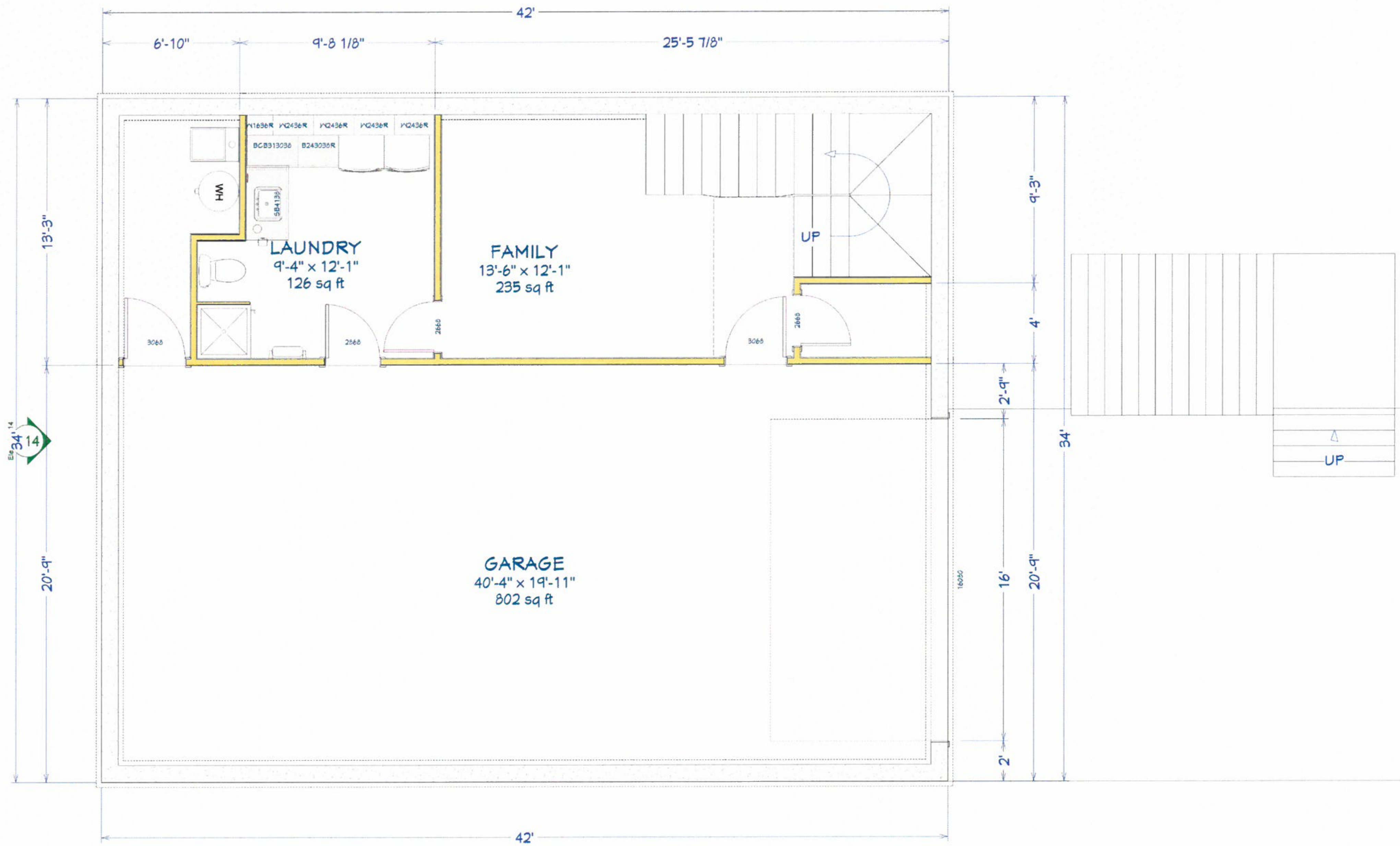
DATE:
1/21/15

SCALE:
1" = 20'

SHEET:



MASTER BATH
6'-5" x 16'-4"
121 sq ft
no tub
just shower
CLOSET
6'-9" x 12'-7"
69 sq ft
BATH
7'-6" x 14'-11"
103 sq ft
ENTRY
18'-4" x 10'-6"
206 sq ft
UP
CLOSET
11'-11" x 5'-7"
67 sq ft
MASTER BDRM
12'-1" x 15'-10"
190 sq ft
BEDROOM
11'-3" x 11'-6"
129 sq ft
BEDROOM
13'-11" x 8'-11"
130 sq ft
41'-9"
NATURAL SPRING
SLEEPING AREA - Level 2
1336 sq ft
New Survey Marker 1
New Survey Marker 2
New Survey Marker 3
85'-2 7/16"
South Property Setback
27'-6"
35'-9"
1 to Property Corner
East
Property Setback
Property Line
NIXON AVE.
53'-0 1/2"
North Property Setback
81'-3"
Approximate Edge of Current Roadway
NIXON AVE.
NIXON Ave.
Utilities in street
1st Floor
REVISION TABLE
NUMBER DATE REVISED BY DESCRIPTION
DRAWINGS PROVIDED BY:
DATE:
1/21/15
SCALE:
1/8" = 1'
SHEET:



FOUNDATION - Level 1
550 sq ft

Foundation

REVISION TABLE

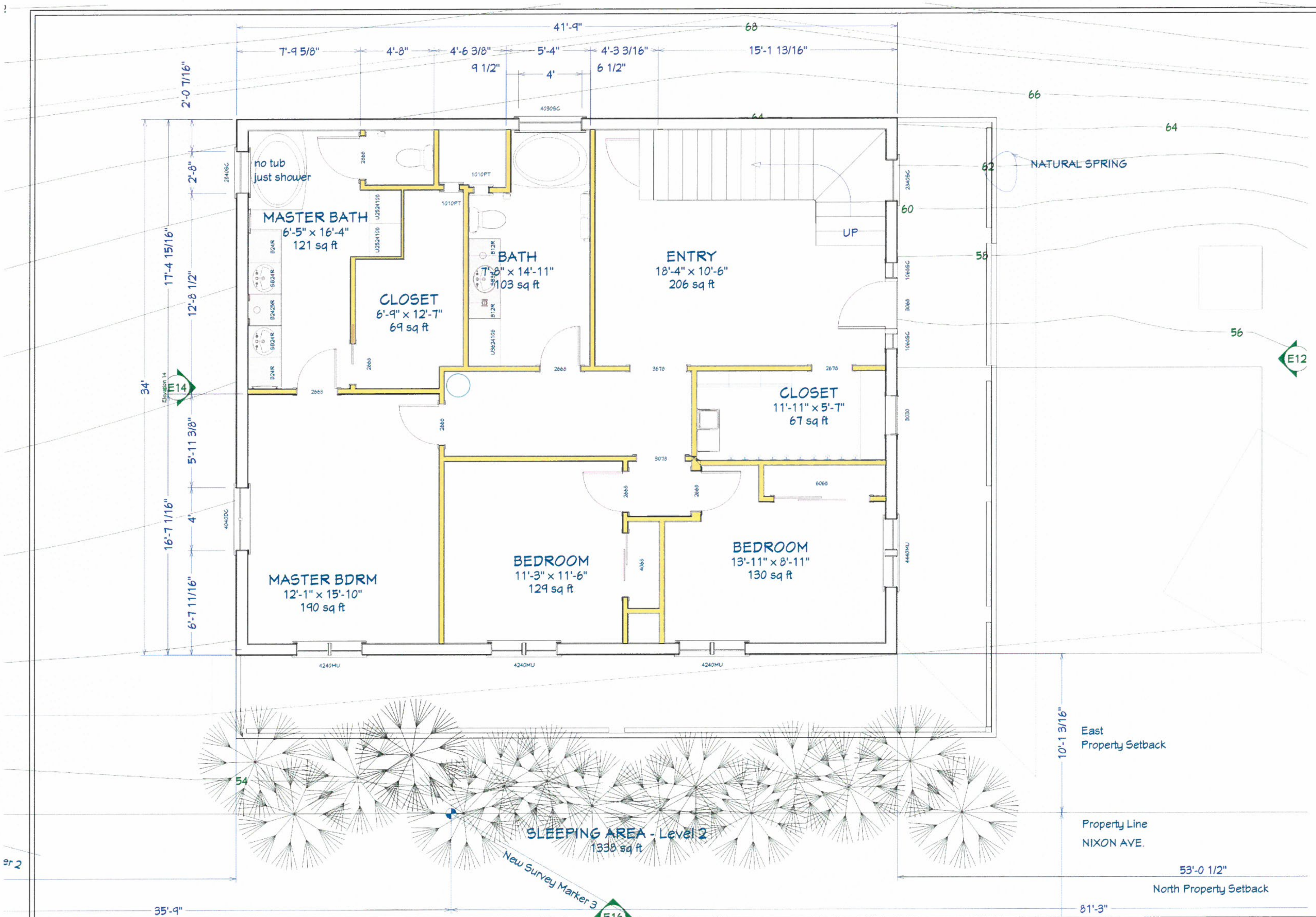
NUMBER	DATE	REVISED BY	DESCRIPTION

DRAWINGS PROVIDED BY:

DATE:
1/21/15

SCALE:
3/16" = 1'

SHEET:



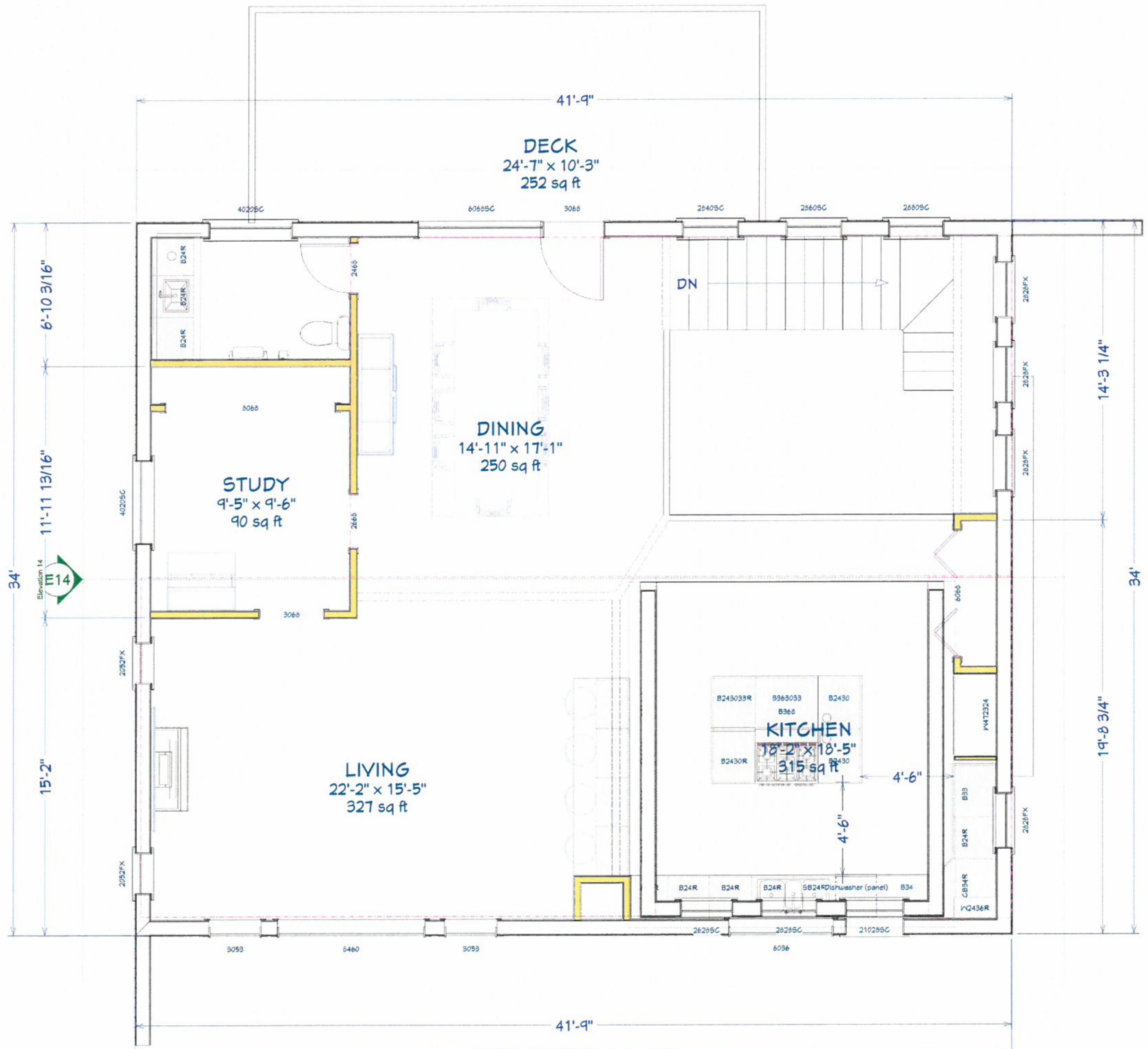
REVISION TABLE			
NUMBER	DATE	REVISED BY	DESCRIPTION

DRAWINGS PROVIDED BY:

DATE:
1/21/15

SCALE:
3/16" = 1'

SHEET:



MAIN FLOOR - Level 3
1231 sq ft

NUMBER	DATE	REVISED BY	DESCRIPTION

REVISION TABLE

DRAWINGS PROVIDED BY:

DATE:
1/21/15

SCALE:
3/16" = 1'

SHEET:

REVISION TABLE

NUMBER	DATE	REVISED BY	DESCRIPTION

DRAWINGS PROVIDED BY:

DATE:

1/21/15

SCALE:

3/16" = 1

SHEET:

REVISION TABLE

NUMBER	DATE	REVISED BY	DESCRIPTION

DRAWINGS PROVIDED BY:

DATE:

1/21/15

SCALE:

3/16" = 1'

SHEET:

REVISION TABLE

NUMBER	DATE	REVISED BY	DESCRIPTION

DRAWINGS PROVIDED BY:

DATE:

1/21/15

SCALE:

3/16" = 1

SHEET:

REVISION TABLE

NUMBER	DATE	REVISED BY	DESCRIPTION

DRAWINGS PROVIDED BY:

DATE:

1/21/15

SCALE:

3/16" = 1'

SHEET: