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October 5, 2022

Molly McGuire
Assistant Planner
Community Planning & Development
City of Mercer Island
9611 SE 36th Street
Mercer Island, WA 98040
Molly.McGuire@mercerisland.gov

VIA EMAIL AND MAIL

Re: Comment Letter for Proposed Redevelopment of 6950 SE Maker Street
Permit No. 2207-019

Dear Ms. McGuire,

On behalf of our client, Dan Grove, we submit these comments on the permit application for the proposed demolition and rebuild of the home located at 6950 SE Maker Street (the "Strand Property") pending under Permit No. 2207-019 (the "Permit"). Mr. Grove owns the house immediately adjacent to the east of the Strand Property and is acutely familiar with the issues discussed in this letter. Mr. Grove respectfully requests notice and a copy of the permit decision once made by the City.

Mr. Grove reviewed the permit application materials and design plans and identified several problems that need addressing before any permit can be issued in compliance with Mercer Island Development Code. These include the miscalculation of elevation and existing grade, gross floor area, and building and facade height. Additionally, an "Exceptional Tree" was severely damaged to enable the proposed demolition and rebuild of the Strand Property home.[1] The following paragraphs address each of these issues in turn.

[1] The project also raises significant safety concerns, which will be further detailed in an additional comment letter to be submitted by Mr. Grove.

1. The Permit Application Miscalculates Existing Grade

First, the existing grade and elevations of the lot were incorrectly identified in the permit materials.

Mercer Island City Code defines "existing grade" as the surface level at any point on the lot prior to alteration of the ground surface.[2] MICC 19.02.020(E). "Alteration" is any human-induced action which impacts the existing condition of the area, including but not limited to grading, filling, dredging, draining, channeling, and paving (including construction and application of gravel). MICC 19.02.020(A). Thus, existing grade is the grade prior to any development.

Existing grade is calculated in one of two ways: first, "[w]ithout concrete evidence or verification from a previous survey document, as accepted by the City Code Official, the existing grade underlying the existing structure will be used as the elevation for the proposed development."[3] Under this first method, which assumes calculations must proceed "without a survey of the pre-development conditions," existing grade "shall be interpreted as the elevation of a point on the surface of the earth immediately adjacent to or touching a point on the exterior wall of a proposed structure."[4]

Second, "[i]f a current survey document is available, the applicant may establish existing grade by interpolating elevations within the proposed footprint from existing elevations outside of the proposed footprint."[5] Here, ample "concrete evidence" and "verification from a previous survey document" are available. This information enables interpolation and clarifies the actual existing grade at the Strand Property. Regardless, it appears the Plan Set calculations follow neither of these two approved methods.

At the Strand Property, pre-development surveys of the properties to the north and south make it possible "to interpolate the approximate topographic elevations of the lot previous to the most recent development".[6] It does not appear that the Permit applicant considered this data, which destroys the accuracy of various calculations within the Permit application, including average building elevation, maximum building height, and gross floor area. Each of these calculations necessarily rely on the existing and finished grade being accurately identified. The topographic and boundary survey included in the Plan Set for this Permit application identifies the existing

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[2] "Finished grade" is the surface level at any point on the lot at the conclusion of development. MICC 19.16.010(F). Note, the project plans identify that a 4" concrete slab will be on grade (Sheet S.20).
[3] DSG Policy Memorandum, Administrative Interpretation #DCI12-004. *See also* DSG Policy Memorandum, Administrative Interpretation #DCI04-04 regarding determinations of existing grade for average building elevation.
[4] *Id.*
[5] *Id.*
[6] *Id.*

finished floor elevation of the basement as 228.7' (Sheet 1), the proposed finished floor elevation as 227.72' (Sheet C-2), and the existing grade as 235.24' (Sheet A3.1).

For context, the Strand property was developed in the early 1950's. The existing home is surrounded by large retaining walls and rockeries to the south, west and east, each of which contain large amounts of fill that altered the grade. Further, the lot has been modified extensively from its original grade. Data, including surveys and geotechnical studies, from the time period of development show the existing grade of the north and south boundaries of the property. Specifically, the following pertinent data is enclosed with this comment letter:

- Attached as **Exhibit A** is a survey of the property to the north of the Strand Property, located at 7145 SE 35th Street, dated May 1989 ("7145 Survey"). It includes the grade of the basement of what is now the Strand Property. This survey shows the basement floor elevation as 227.6' and includes the existing grade adjacent to the 6950 home as ranging from 227.7' to the east, to 233.9' to the west.

- Attached as **Exhibit B** is the geotechnical report that was conducted at the same time as the survey of 7145 SE 35th Street ("7145 Geotechnical Report"). It shows no fill in three boreholes north of 6950, and several large trees across 7145. This can be compared to the geotechnical report submitted with this Permit application ("6950 Geotechnical Study"), which shows large amounts of fill in four of the five bore/test holes.

- Attached as **Exhibit C** is a larger scale survey ("1961 Survey") from no later than mid-1961. Based on Mr. Grove's discussions with Mercer Island Public Works and documents from the City of Mercer Island, Maker Street was a gravel road until at least 1963. As a result, this survey represents the original grade of SE Maker Street. This Survey shows the property roughly seven years after its initial development and aligns with the 7145 Survey.

- Attached as **Exhibit D** is an overlay of this survey showing five-foot contours (shown in green) from the edges of the 6950 property and the proposed structure (shown in yellow).

- Attached as **Exhibit E** is a depiction of the topographic data and bore/test hole data overlaid upon the 6950 Geotechnical Study for reference.

The existing grade of the lot slopes down primarily from east to west in line with the slopes shown in the 7145 Survey (Exhibit A). The corner elevations below are the result of using the interpolated contours from Exhibit D and Exhibit E. The table below compares data from Exhibits A through E, and shows that the existing elevation of the proposed structure is closer to 226.6'–226.75'.

Structure Corner	7145 Survey	1961 Survey	Difference Between Surveys
NW	223’	225’	-2.0’
NE	231’	231’	0.0’
SE	230’	229’	+1.0’
SW	223’	222’	+1.0’

Mr. Grove respectfully requests that the City incorporate this data into its review of the Permit application, along with the data he offers in his own letter that he will be submitting separately.

2. The Permit Application Miscalculates Gross Floor Area

Second, the permit materials incorrectly exclude the basement area (and garage) from the gross floor area calculation.

Gross Floor Area (“GFA”) is the total square footage of floor area bounded by the exterior faces of the building. MICC 19.16.010(G). For single family homes, GFA encompasses the main building including any attached accessory buildings, all garages and covered parking, and that portion of the basement which projects above the lower of existing grade or finished grade. *Id.* For the Strand Property (located in zone R-8.4), the gross floor area cannot exceed 5,000 square feet or 40% of the lot area, whichever is less. MICC 19.02.020(D)(1)–(2). Here, the Permit application materials identify the lot area as 8,750 square feet. Forty percent of the lot area equals 3,500 square feet.[7] Therefore, the GFA for this rebuild cannot exceed 3,500 square feet.

The Site Development Information worksheet and Plan Sheet A1.0 identify the following:

Area	Square Footage
Upper Floor	1,686 sq. ft.
Main Floor	1,750 sq. ft.
Decks	62 sq. ft.
Basement and Garage Area (excluded)	1,575 sq. ft.
Total GFA (w/exclusions)	3,498 sq. ft. (39.9%)

This information incorrectly excludes the full basement area. The Mercer Island Development Code does not allow the total basement area to be excluded out-right, as the Permit applicant did

[7] *See* Site Development Information Worksheet at page 4 to 5.

here. *See* MICC 19.02.020(D). Instead, only that "portion of the basement floor area from the gross floor area which is below the existing or finished grade, whichever is lower" may be excluded. MICC 19.16.010(G).

To calculate the basement floor area that may be excluded, as described in Appendix B of the Code, one must (1) review a topographic map of the existing grades and the proposed finished grades, (2) review the building plans showing dimensions of all exterior wall segments and floor areas, and review the building elevations showing the location of existing and proposed finished grades in relation to basement level, (3) determine the number and lengths of the Wall Segments, (4) determine the Wall Segment Coverage (in %) for each Wall Segment, (5) multiply each Wall Segment Length by the percentage of each Wall Segment Coverage and add these results together, and (6) divide that number by the sum of all Wall Segment Lengths.

The applicant does not appear to have provided such calculation in the Permit materials. As a result, the proposed elevation and grade for this development are not accurate, and the GFA contribution from the basement is actually higher than described. We calculate the GFA contribution is roughly 1,293 square feet, making the correct Gross Floor Area closer to 4,791 square feet. This exceeds the 3,500 square feet permitted by the Code.

As shown in the table below, this is in large part due to the correctly computed existing grade's being lower than provided in the permit Plan Set.

Wall Segment	Existing Grade (per surveys)	Existing Grade (per plan set)	FF Elevation (per plan set)[8]	Actual Coverage %
West Wall	223'	not shown	227.4'	0 %
North Wall	223'- 231'	not shown	227.4'	9.4 %[9]
East Wall	230'- 231'	235.4'	227.4'	40.75 %
South Wall	227'	not shown	227.4'	0 %

[8] Plan Set V2 Sheet C-2, Sheet A3.1 (FF refers to finished floor).

[9] Based on our review, approximately 15' of the east end of the north wall has a finished floor below existing grade, ranging from 0' near the midpoint of the wall to roughly 3.5'.

Basement Area (to be included)	1,293 sq. ft.
Estimated Total GFA (w/correct exclusions)	4,791 sq. ft.

3. The Permit Application Miscalculates Average Building Elevation and Building Height

Third, the Permit applicant appears to have miscalculated the "Average Building Elevation" ("ABE") for this project, which also led to an inaccurate maximum building height calculation. ABE is the reference point on the surface topography of a lot from which building height is measured. The elevation in this zone (R-8.4), is established by averaging the elevation at existing grade or finished grade, whichever is lower. MICC 19.16.010(A). The formula is as follows (MICC 19.02.020(E):

> Average Building Elevation = (Weighted Sum of the Mid-point Elevations) ÷ (Total Length of Wall Segments)

Evidence from pre-development survey documents shows the existing grade as several feet lower than the existing grade as calculated in the design plans. This translates to an ABE closer to 227.0', not 233.06' as identified in the Plan Set (Sheet A3.1).

Wall	End 1 Elevation	End 1 Elevation Type	End 2 Elevation	End 2 Elevation Type	Midpoint Elevation	Midpoint Elevation Type	Length
West	223'	Existing	223'	Existing	223'	Existing	45'
North	223'	Existing	231'	Existing	227.3'	Existing	35'
East	230'	Existing	231'	Existing	230.5'	Existing	45'
South	223'	Existing	227.74'	Finished	227.5'	Finished	45'

Because the ABE was incorrectly calculated, the maximum building height of the proposed structure was also miscalculated. As designed, the proposed structure exceeds the building height limit set by the Mercer Island Development Code.

Buildings cannot exceed 30 feet in height above the ABE to the highest point of the roof. MICC 19.02.020(E). ABE is established by averaging the elevation at existing grade or finished grade, whichever is lower. MICC 19.16.010(A). "Building height" is the vertical distance measured from the average building elevation to the highest point of the roof structure excluding appurtenances, but including railings.[10] MICC 19.16.010(B). As a result, the height of the proposed structure is at least 4 feet above the maximum allowed by the Mercer Island Development Code.

The plan set for the proposed development identifies the following:[11]

Summary of Permit's Incorrect Calculations	
(Inaccurate) ABE	233.06'
Height Limit	30'
(Inaccurate) Maximum Allowable Building Height	263.06'
Proposed Height	261.43'

[10] "Appurtenances" are defined as a structure which is necessarily connected to the use and enjoyment of a single-family dwelling. An appurtenance includes but is not limited to antennas, lightning rods, plumbing stacks, flagpoles, electrical service leads, chimneys and fireplaces, garages, decks, driveways, utilities, fences, swimming pools, hot tubs, landscaping, irrigation, grading outside the building footprint which does not exceed 250 cubic yards and other similar minor construction. MICC 19.16.010(A).

[11] *See* Sheet A3.1

But, instead of 263.06', the correct maximum allowable height is closer to 257.0' because the ABE is more accurately 227.0.' The relevant surveys and design plans show the correct calculations for this project are as follows:

Summary of the Correct Calculations	
(Corrected) ABE	**227.0'**
Height Limit	30'
(Corrected) Maximum Height	**257.0'**
Proposed Height	261.43'

4. The Design Improperly Exceeds Maximum Building Height on Downhill Building Façade

Further, the design plans exceed the maximum building height limit by at least an additional four feet when measured on the downhill side of the sloping lot. MICC 19.02.020(E)(2) states that a "maximum building facade height on the downhill side of a sloping lot shall not exceed 30 feet in height." Building facade height is "measured from the existing grade or finished grade, whichever is lower, at the furthest downhill extent of the proposed building, to the top of the exterior wall facade supporting the roof framing, rafters, trusses, etc." *Id.* Rooftop railings may not extend above the maximum allowed height for the main structure. MICC 19.02.020(E)(3).

The Strand Property slopes down primarily from east to west. The existing grade at the furthest downhill extent of the proposed building ranges from 223' to 261.43'.[12] And, the rooftop railings described in the Plan Set add approximately 3 feet to the structure (Sheet A3.1). Measuring from the existing grade at the furthest downhill extent to the top of the exterior wall façade equals roughly 8 feet above the allowable 30-foot limit. The table below provides this comparison:

[12] *See* Section 1 (regarding Existing Grade) and Section 3 (regarding ABE and Building Height). *See also* the Geotechnical Report submitted with the Permit application which also describes the slope areas on the Strand Property and identifies it as a "steep slope hazard area." Report at 2.

Comparison of Exceedances: Max. Building Height & Max. Height on Downhill Facade	
Height Limit Exceeded by: (w/railings)	4.43’
Height Limit of Downhill Facade Exceeded by: (w/railings)	8.43’
Height Limit of Downhill Facade Exceeded by: (w/o railings)	5.43’

5. The Permit Applicant Violated Critical Tree Protection Regulations

Finally, the applicant severely damaged an “Exceptional Tree” as defined by the Mercer Island Tree Code (MICC 19.10) prior to and in anticipation of the rebuild on the Strand Property.[13] The purpose of the Tree Code is “to encourage building and site design to minimize tree removal, and to establish standards and procedures that will result in the retention of trees on Mercer Island.” The City has recognized that trees are beneficial to our community in various ways. Trees:

- Contribute to the residential character;
- Provide a public health benefit;
- Provide wind protection, ecological benefits to wetlands and watercourses, and aid in the stabilization of geologically hazardous areas;
- Improve surface water quality and control and benefit Lake Washington;
- Reduce noise and air pollution;
- Enhance the reasonable enjoyment and use of private property by the property owner; and
- Provide delivery of reliable utility service.

[13] “Tree, exceptional” is defined as a tree or group of trees that because of its unique historical, ecological, or aesthetic value constitutes an important community resource. An exceptional tree is a tree that is rare or exceptional by virtue of its size, species, condition, cultural/historic importance, age, and/or contribution as part of a tree grove. Trees with a diameter of more than 36 inches, or with a diameter that is equal to or greater than the diameter listed in the Exceptional Tree Table, are considered exceptional trees. MICC 19.16.010(T). The red oak on Mr. Grove’s property fits this definition.

For these reasons, a permit is required to remove any tree with a diameter greater than 10 inches. MICC 19.10.010(A). If the tree is being removed as part of a development (for example, to allow for construction of a new home) then a full Permit application is required, and other retention and replacement requirements apply. *See* MICC 19.10.010(C); MICC 19.10.060. Some actions, like pruning, can be exempt from permitting requirements.[14] MICC 19.10.030. But this exemption only applies if the act will not significantly damage the tree.

Prior to this development, on or around November 9, 2021, Mr. Grove's oak tree, which is an "Exceptional Tree", was sharply cut back and significantly damaged. The arborist that conducted the work severed two 24" trunks, which significantly damaged the tree, altered the view from Mr. Grove's property, and left large stumps and unnatural gaps in the skyline.[15] The arborist, Enterprises Superior NW—who prepared the "Pre-Construction Assessment for lot re-development at 6950 SE Maker Street," (the "Assessment") submitted with the Permit—application acknowledged this damage. The Assessment states that the oak tree, roughly nine months after the initial cutting, is "exhibiting signs of stress in the upper canopy" and a "heavy epicormic response growth" in the lower canopy.[16]

At the time of the cutting, the Permit Applicant represented to Mr. Grove that no tree retention development permit was necessary because the Permit Applicant had no plans to develop the property.[17] Shortly after the cutting however, Mr. Grove learned that the Permit applicant did, in fact, intend to demolish her existing home and to rebuild another. Mr. Grove is aware from a conversation with Tim McHarg (Community Planning and Development Department) on November 23, 2021, that the City also learned of these development plans in a meeting just seven days after the cutting, on November 16, 2021. The Permit applicant submitted the following statement to the City in preparation of a November 16, 2021 meeting with the City regarding construction plans:[18]

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[14] Mercer Island's Tree Code defines pruning of a tree as "crown thinning, crown cleaning, windowing or crown raising but not including crown topping of trees or any other practice or act which is likely to result in the death of or significant damage to the tree." MICC 19.10.030.

[15] It is important to note that the MICC 19.10.060(A)(3) requires that exceptional trees with a diameter of 24 inches or more be retrained, and removal of an exceptional tree with a diameter of 24 inches or more "will limit the constructable gross floor area to less than 85 percent of the maximum gross floor area allowed under chapter 19.02 MICC." Thus, the gross floor area calculation, as described in Section 2 of this comment letter, should be further limited as a result of this tree removal. If reduced to 85 percent, the Permit applicant's gross floor area calculation is exceeded to an even greater degree than described in Section 2 of this letter.

[16] Assessment at page 2.

[17] Under normal circumstances, a permit is required if development plans are known. MICC 19.10.010.

[18] This information is available at the following link and was provided by the City in response to a Public Records Act request. *See* Request 21-714.

> "I have included my recent survey for you to see where and how my footprint sits on my parcel. It also shows all the impervious surfaces. My house is a tri level design with no crawlspace and built entirely at grade, on slab, on all levels. I fully expect to meet again with the city for a design review before moving forward, but I need this initial meeting regarding my existing footprint placement on my parcel."

Soon after these conversations, the Permit applicant also began submitting various pre-construction reports associated with this permit application. At this time, the Permit applicant still represented to Mr. Grove that there were no development plans for this property.

The following excerpt from the Assessment shows the Red Oak Tree on Mr. Grove's property as Tree #5:

The Assessment states: "[The] Red oak (Quercus rubra) easily 40" DSH, 50' tall in the highest reaches, spreads as much as 45' north and south, around 35' east, but was cut back quite hard on the west and extends no more than 18' to that side (Figure 6). The base of the tree is 25' south of the northeast corner and 10' on center east of the east line. It sits on top of a large stone retaining wall that is near 5' tall and fully on the neighbor's lot (Figure 7)."[19] The Assessment further states that "[i]f grade changes due to landscaping are proposed later in the project they should be analyzed for potential impact prior to implementation."[20]

[19] Assessment at 2.
[20] Assessment at 3.

The bottom line is that this tree was cut without proper planning and permitting, even as Ms. Strand represented that she had no plans to develop the property. Mr. Grove requests the City closely review any permit plans that would impact this tree, or other important trees near this property.

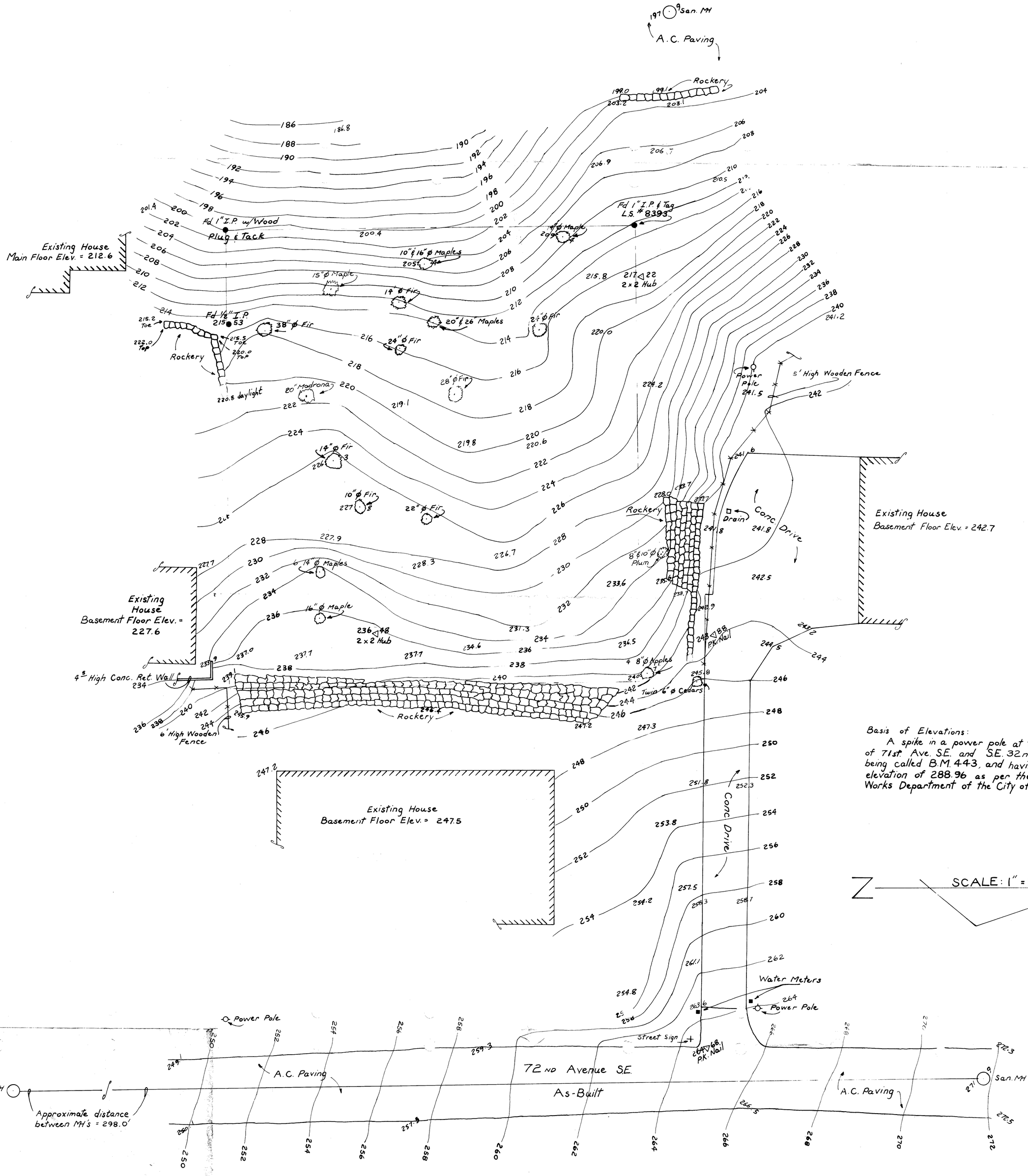
Mr. Grove greatly appreciates the City's attention to these matters. We would be happy to provide any additional information or answer any of the City's questions. Please feel free to contact me at ZDavison@perkinscoie.com.

Sincerely,

Zachary E. Davison

ZED:glg

EXHIBIT A



Basis of Elevations:
A spike in a power pole at the intersection of 71st Ave. S.E. and S.E. 32nd Street, being called B.M. 443, and having an elevation of 288.96 as per the Public Works Department of the City of Mercer Island.

SCALE: 1" = 10'

Topographic Survey	CLIENT: Myrvang Architects	PROJECT: Pederson Residence	Gerald S. Strong	D.R. STRONG Consulting Engineers Inc. 10602 N.E. 38th PLACE, SUITE 101 • KIRKLAND, WA. 98033 (206) 827-3063 ENGINEERS • PLANNERS • SURVEYORS (206) 652-9331 DRAWN J.M.R. DATE May 1989 DRAWING NO. 89-848 CHECKED GES SCALE 1" = 10' SHEET

EXHIBIT B

REPORT

GEOTECHNICAL CONSULTATION

PROPOSED RESIDENCE

7100 BLOCK, SOUTHEAST 35TH STREET

MERCER ISLAND, WASHINGTON

FOR

MR. ART PEDERSON

GeoEngineers

May 9, 1989

Consulting Geotechnical
Engineers and Geologists

Mr. Art Pederson
4735 West Mercer Way
Mercer Island, Washington 98040

Dear Mr. Pederson:

Report
Geotechnical Consultation
Proposed Residence
7100 Block, Southeast 35th Street
Mercer Island, Washington
File No. 1700-01-6

INTRODUCTION

This report presents the results of our geotechnical consultation at the site of your proposed residence on Southeast 35th Street on Mercer Island. The scope of our services was based on discussions with your architect, Mr. Steve Myrvang, and a surface reconnaissance of the site. Written authorization for our services was provided by you on April 26, 1989. No plan of the site has been provided. The location and dimensions of the site were provided verbally by Mr. Myrvang.

We understand that you are planning to construct a two- or three-story residence to be supported by a combination of piles and spread footings. We further understand that the City of Mercer Island requires that a geotechnical study be completed in order to satisfy the Department of Community Development Guideline No. 22.

The purpose of our work is to provide you with recommendations and design criteria for the geotechnical aspects of the new residence and to address the City's requirements for a geotechnical study. Our specific scope of services includes:

GeoEngineers, Inc.
2405 140th Ave. NE, Suite 105
Bellevue, WA 98005
Telephone (206) 746-5200
Fax. (206) 746-5068

1. Review currently available information regarding soil and ground water conditions in the vicinity of the site.
2. Perform a geologic reconnaissance of the site and adjacent areas.
3. Explore subsurface conditions at the site by means of hand-dug test pits and auger holes.
4. Develop recommendations for foundation support of the structure, including shallow and deep foundation support as appropriate.
5. Provide design parameters for the lateral resistance of the structure, including lateral earth pressures for use in the design of walls or piles, as required.
6. Provide recommendations for site grading and earthwork, including compaction and fill material requirements.
7. Provide recommendations for surface and subsurface drainage requirements, including erosion control.

SITE CONDITIONS

The site is located immediately south of Southeast 35th Street (extended) and immediately west of the existing residence at 3507 - 72nd Avenue Southeast, as shown on the Site Plan, Figure 1. The site is rectangular in shape, and measures 112.5 feet east-west by 100 feet north-south. Existing residential housing borders the site on all sides.

The site is situated within a westward sloping swale. The physical control for developing the Site Plan was based on two property corner stakes in the northwest and southwest corners and the site dimensions provided. The accuracy of the site features as shown on our Site Plan should be regarded accordingly.

The site slopes steeply downward at about 45 degrees for about 8 to 15 feet from the east property line to a moderately sloping area at about 15 degrees that comprises the main portion of the site. About 30 feet from the west property line, the slope steepens to about 35 degrees

through a vertical height of 30 feet to a 20-foot-wide nearly level bench west of the site. The total relief from the east property line to the bench west of the site is approximately 70 feet, yielding an overall slope of 2H:1V (horizontal to vertical). The north property line is bordered by a rockery and fill embankment varying in height from 5 to 10 feet. The topography of the property to the south is similar.

The site is vegetated with scattered deciduous trees, primarily maple and five relatively large and straight-trunked Douglas fir trees. The understory consists of moderately dense brush.

Shallow subsurface soil and ground water conditions were evaluated by excavating three test holes using hand tools at the locations shown on our Site Plan, Figure 1. Test holes were excavated by a geological engineer from our firm who selected the exploration locations, identified the soils encountered, observed ground water conditions and maintained a detailed log of each exploration. Soils encountered were classified in general accordance with the Unified Soil Classification System described in Figure 2. Logs of the test holes are presented in Figure 3.

The test holes indicate that the near-surface soils across the site consist of 4 to 6 inches of forest duff and topsoil underlain by a loose to medium dense silty sand or sand with silt with variable amounts of gravel to the maximum depth of 42 inches of the test holes. The soils appeared to grade to dense at the maximum depth of the explorations. Based on our previous experience and geologic mapping in the site area, we expect that the soil deposits described above are underlain by glacially consolidated soil.

Based on our observations of the surface topography, the 45-degree sloping embankment bordering the east side of the site probably is fill. No other fill is expected on the remainder of the site.

No surface water or ground water was observed during our site reconnaissance or in the test holes.

CONCLUSIONS AND RECOMMENDATIONS

It is our opinion that the proposed residence may be satisfactorily supported using spread footing and/or pile support, provided that the footings and/or piles are supported on dense to very dense glacially consolidated soil. It must be understood that there is an inherent stability risk associated with any hillside construction; however, it is our opinion that the risk is small for the design life of the residence provided the recommendations in this report are followed.

The on-site soils are moisture sensitive with regard to earthwork performed during wet weather. We recommend that foundation construction be performed only during periods of prolonged dry weather.

SPREAD FOOTINGS

Spread footings should be founded on the dense to very dense or hard glacially consolidated soil. This should typically require the excavation depth for the footings to range up to 3-1/2 feet deep. In the event the footing excavations do not encounter glacially consolidated soil, the footing may be overexcavated and replaced with structural fill, or the allowable bearing pressure should be reduced. We recommend that all footing excavations be examined by a representative of our firm to determine that suitable bearing soils have been exposed. Any unsatisfactory material encountered in these excavations should be overexcavated to the depth determined by our representative.

We recommend that all exterior spread footings be set back at least 5 feet from the top of the steep slope along the west property line and have a minimum depth of embedment below lowest adjacent finished grade of 18 inches. Interior spread footings should also be set back as previously described and have a minimum embedment of 12 inches below lowest adjacent finished grade. Individual column footings and continuous wall footings should have minimum widths of 18 and 15 inches, respectively. Spread footings designed and constructed as recommended above may be designed using an allowable bearing value of 2000 pounds per square foot (psf).

This bearing value applies to the total of all dead plus long-term live loads exclusive of the weight of the footing and any overlying backfill. An increase in this value of up to one-third may be made when considering wind or seismic loading.

We expect that spread footings will experience less than a 1/2-inch settlement for the allowable design loads and will occur essentially immediately on their application. This magnitude of settlement can normally be accommodated by residential structures.

PILE FOUNDATIONS

The building or a portion thereof may also be supported on concrete piles that are drilled down into dense to very dense or hard glacially consolidated soils. The piles may be located on the steep slope along the west property line if required. The following design criteria are based on our experience with using piles at similar sites. We expect a zone of up to 3-1/2 feet of weathered soil that is subject to movement down-slope. For design of piles within this upper 3-1/2-foot zone, we recommend an active lateral load equivalent to a fluid weighing 50 pcf applied over two pile diameters. Passive resistance below the 3-1/2-foot depth may be designed using an equivalent fluid density of 200 pcf. Providing that the pile tip is embedded in dense to very dense or hard glacially consolidated soil and has a minimum embedment depth of 5 feet, an end bearing capacity of 8000 psf is recommended for downward acting loads. The end bearing capacity may be increased to 10,000 psf for a minimum embedment depth of 8 feet.

LATERAL SOIL PRESSURES

Lateral soil pressures which act on subsurface walls will be a function of the nature and compaction of the backfill. In addition, hydrostatic pressure from ground water must be considered.

Assuming the soil behind the wall is drained and the backfill surface is inclined at 15 degrees or less, we recommend a design active lateral earth pressure equivalent to a fluid weighing 40 pcf. We recommend this value be increased to 60 pcf for walls constructed closer than a distance

0.5H from the toe of steeper than 15-degree slopes or rockeries. The value H corresponds to the height of the excavation.

For lateral soil resistance we recommend a passive earth pressure equivalent to 300 pcf where the ground is relatively level. Where the ground surface slopes down at approximately 15 degrees, we recommend this value be reduced to 200 pcf. For conventional walls, a coefficient of friction of 0.4 can be used between the base of the wall and the soil to provide additional lateral resistance.

SITE GRADING AND EARTHWORK

We recommend the building site be stripped of vegetation and significant organic material including tree roots greater than 4 inches in diameter. We expect that the stripping depths will be quite variable, although it appears that up to about 4 to 6 inches will be necessary in most areas. Greater depths will be necessary in areas with thick vegetation and trees. This material should be wasted off site.

As mentioned previously, the prevailing on-site soil is moisture sensitive, difficult to operate on and very difficult to compact during wet weather. Rubber-tired vehicles and even foot traffic disturb this type of soil when it is above optimum moisture. It also has a moderate erosion potential in place but is easily transported by running water. Therefore, silt fences and other measures will be necessary to control erosion and sediment transport during construction. The forest duff acts as a protective layer to the surficial soil and should be removed only where and when necessary.

Those areas which are stripped or excavated to design subgrade elevations or are to receive structural fill should be probed with a steel rod. Any soft, loose or otherwise unsuitable areas identified during probing should be recompacted if practical or removed and replaced with structural fill. We recommend the probing of the subgrade be observed by a representative from our firm to assess the adequacy of the subgrade conditions and to identify areas needing remedial work.

Structural Fill and Fill Placement: We recommend that fills at the site be kept to a minimum height of 5 feet and no additional soil be imported to the site. All fill necessary in the building area and on slopes should be placed as compacted structural fill subsequent to probing and remedial work as appropriate. The fill should be placed in horizontal lifts not exceeding 10 inches in loose thickness. Each lift must be conditioned to the proper moisture content and then uniformly compacted. Fill placed in the building area should be compacted to at least 95 percent of the maximum dry density as determined by the ASTM D-1557 test procedure.

Fill placed on slopes steeper than 4H:1V should be appropriately benched and keyed into dense native soils. We recommend permanent structural fill slopes be no steeper than 2H:1V. The compaction equipment should be run over the edge of the fill to provide good compaction or the fill can be overbuilt by several feet and cut back to the required slope. Hydroseeding or other erosion protection should be applied immediately.

All structural fill material should be free of organics, debris and other deleterious material with no individual particles larger than 5 inches in diameter. As the amount of fines (that portion passing the No. 200 sieve) increases, the soil becomes increasingly sensitive to small changes in moisture content and adequate compaction becomes more difficult or impossible to achieve, particularly during wet weather. Generally, soils containing more than about 5 percent fines by weight cannot be properly compacted when the moisture content is more than a few percent from optimum.

Most of the on-site soils that are expected to be available for fill possess a fines content greater than 5 percent such that this material could not be used for structural fill except during periods of extended dry weather. It may be necessary to moisture condition this soil by adding water or drying out as appropriate to reach optimum moisture content for compaction.

DRAINAGE

Runoff from the roof of the planned residence or from other impermeable areas such as patios and driveways should not be allowed to discharge on the site. Runoff must be properly collected and tightlined away from the site to a suitable discharge point. We also recommend that irrigation systems be carefully controlled to avoid excessive amounts of water entering the soil.

EROSION

The soils underlying the site have a high potential for erosion during construction. Temporary erosion control will be necessary and should include the proper control of surface water runoff, minimizing the time of exposure in the area stripped during site preparation, and prompt revegetation.

USE OF THIS REPORT

We have prepared this report for use by Mr. Art Pederson and your architect and engineer for developing a portion of this project. GeoEngineers should be retained to review design plans when developed to see that our conclusions and recommendations have been interpreted as intended and also to examine the subgrade before pouring the concrete footings.

The scope of this investigation does not include services related to construction safety precautions and our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described herein.

The hand-dug explorations are considered limited in evaluating subsurface conditions. The glacially consolidated soils were not actually penetrated by our explorations, but were interpreted to exist at a depth where hand digging became difficult due to the apparent dense conditions of the soils encountered.

We strongly recommend that our firm be retained to provide monitoring and consultation during construction to confirm that the conditions

encountered are consistent with those indicated by the explorations and provide recommendations for changes should the conditions revealed during construction differ from those anticipated.

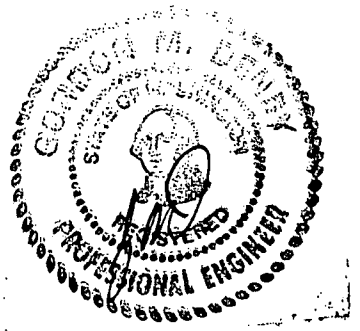
Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in this area at the time the report was prepared. No other conditions, express or implied, should be understood.

- o O o -

If there are any questions concerning this report or if we can provide additional services, please call.

Yours very truly,

GeoEngineers, Inc.



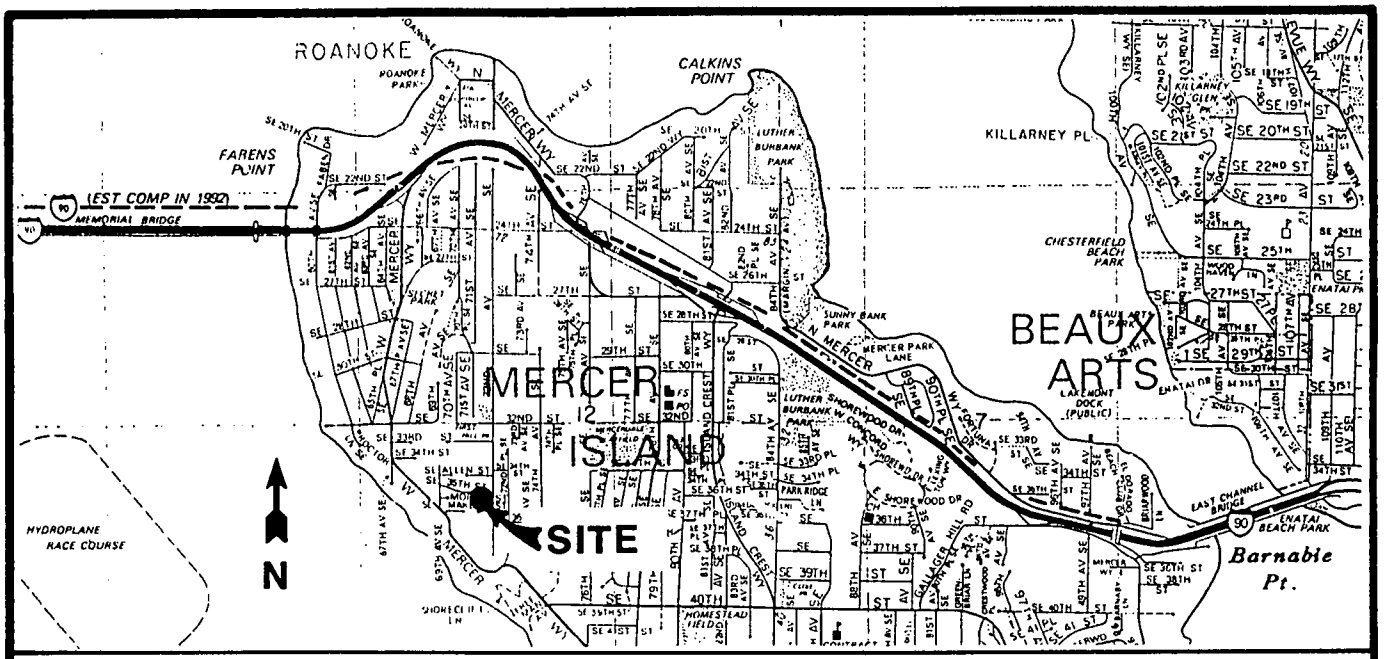
Brian R. Beaman
Geological Engineer

Gordon M. Denby, P.E.
Associate

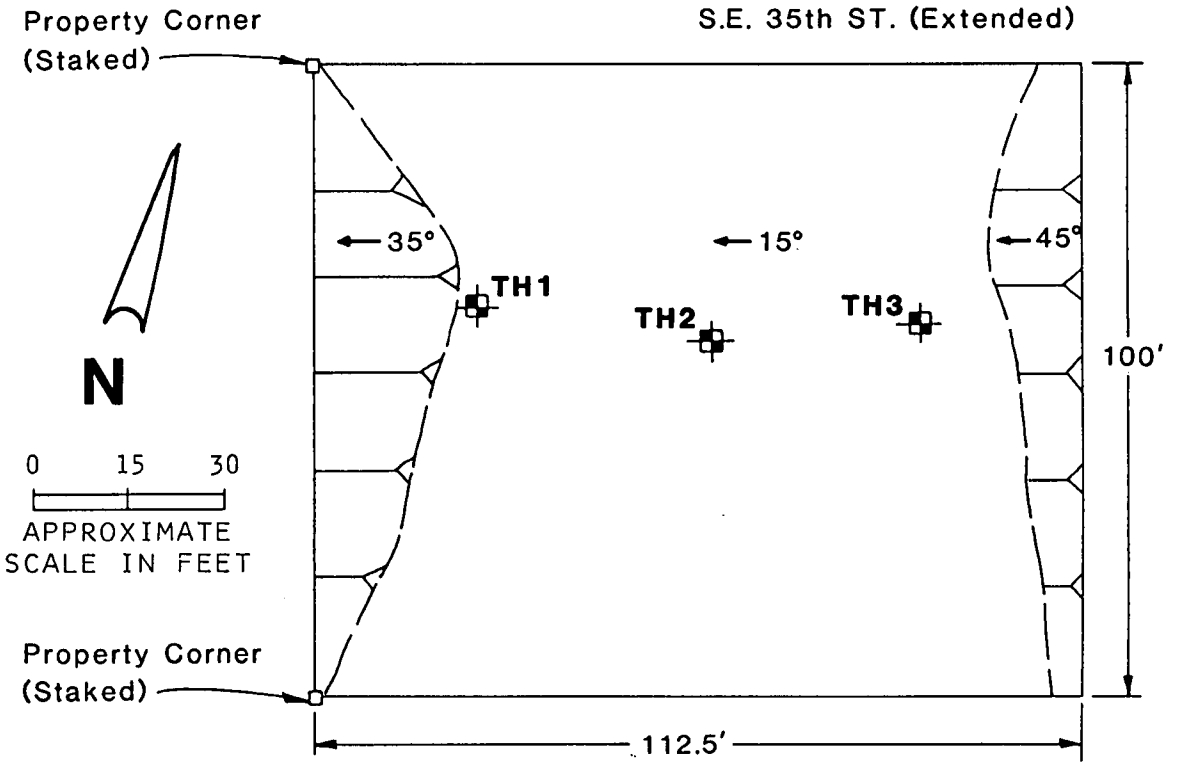
BRB:GMD:cs

Three copies submitted

Attachments



VICINITY MAP No Scale



NOTE: SITE DIMENSIONS ARE BASED ON LIMITED FIELD CONTROL AND ROUGH SURVEYING TECHNIQUES.

EXPLANATION:

TH1 TEST PIT LOCATION AND NUMBER

←15° DOWN SLOPE INCLINATION AND DIRECTION

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SITE PLAN

FIGURE 1

1700-01-6 BRB:KKT 5-5-89

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS MORE THAN 50% RETAINED ON NO. 200 SIEVE	GRAVEL MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND MORE THAN 50% OF COARSE FRACTION PASSES NO. 4 SIEVE	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS MORE THAN 50% PASSES NO. 200 SIEVE	SILT AND CLAY LIQUID LIMIT LESS THAN 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY LIQUID LIMIT 50 OR MORE	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-83.
2. Soil classification using laboratory tests is based on ASTM D2487-83.
3. Descriptions of soil density or consistency are based on interpretation of blowcount data, visual appearance of soils, and/or test data.

SOIL MOISTURE MODIFIERS:

Dry - Absence of moisture, dusty, dry to the touch

Moist - Damp, but no visible water

Wet - Visible free water or saturated, usually soil is obtained from below water table

GEI 85-88

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SOIL CLASSIFICATION SYSTEM

FIGURE 2

LOG OF TEST HOLE

DEPTH BELOW GROUND SURFACE (INCHES)	GROUP SOIL CLASSIFICATION SYMBOL	DESCRIPTION
		TEST HOLE 1
0 - 4"		FOREST DUFF AND TOPSOIL
4" - 18"	SM	BROWN SILTY FINE SAND WITH A TRACE OF GRAVEL (MEDIUM DENSE, MOIST)
18" - 30"	SP-SM	BROWN FINE TO MEDIUM SAND WITH SILT AND GRAVEL (MEDIUM DENSE, MOIST)
		GRADES TO DENSE AT 30 INCHES
		TEST HOLE COMPLETED AT 30 INCHES ON 4/27/89
		OCCASIONAL ROOTS TO 18 INCHES
		NO FREE GROUND WATER OBSERVED
		TEST HOLE 2
0 - 4"		FOREST DUFF AND TOPSOIL
4" - 18"	SM	BROWN SILTY FINE SAND WITH A TRACE OF GRAVEL (MEDIUM DENSE, MOIST)
18" - 36"	SP-SM	BROWN FINE TO MEDIUM SAND WITH SILT AND GRAVEL (MEDIUM DENSE, MOIST)
		GRADES TO DENSE AT 36 INCHES
		TEST HOLE COMPLETED AT 36 INCHES ON 4/27/89
		OCCASIONAL ROOTS TO 24 INCHES
		NO FREE GROUND WATER OBSERVED
		TEST HOLE 3
0 - 6"		FOREST DUFF AND TOPSOIL
6" - 42"	SM	BROWN SILTY SAND WITH GRAVEL (LOOSE, MOIST)
		GRADES TO GRAY AND MEDIUM DENSE AT 24 INCHES
		GRADES TO DENSE AT 42 INCHES
		TEST HOLE COMPLETED AT 42 INCHES ON 4/27/89
		OCCASIONAL ROOTS TO 18 INCHES
		NO FREE GROUND WATER OBSERVED

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LOG OF TEST HOLE

FIGURE 3

EXHIBIT C


Property lines in red
Interpolated Contours in Green
Proposed Structure and Interpolated Elevations in Yellow
Rockery in Cyan
225
230
235
231
225
220
229
222
ROCKERY
ROCKERY

EXHIBIT D

* TWO 12'-0" FRONT YARD VARIANCES

7' FENCE HIEBERT JONGEJAN

10' REAR ROMEY

39' FRONT ROMEY MAZZA

18' REAR YARD

10' FRONT 7 YEAR BALLARD

10' FRONT

20' FRONT 18' REAR TATTEL

SVIGER HOME

10'-0" VARIANCE FOR COVERED DECK

SVIGER VARIANCE APPL. MAY 21, 1975

NORTH

LAKE WASHINGTON

W.S. El. 13.1 I-1963

S.E. 32nd ST.

S.E. 33rd ST.

S.E. 34th ST.

S.E. ALLEN ST.

S.E. MOORE ST.

S.E. 36th ST.

S.E. 38th ST.

S/E. 40th ST.

W. MERCER WAY

Summit Ave.

72nd PL. S.E.

72nd AVE. S.E.

73rd AVE. S.E.

74th AVE. S.E.

75th Ave. S.E.

MAGNOLIA PLACE

CALKINS

CEDAR PLAZA

MADRONA COURT

GOODFELLOWS TRAIL

GOVT. LOT. NO. 3

PARK

ISLAND

NOBLE & WHITE ADD

J.F. FORREST ADD

REPLAT OF 1ST ADD

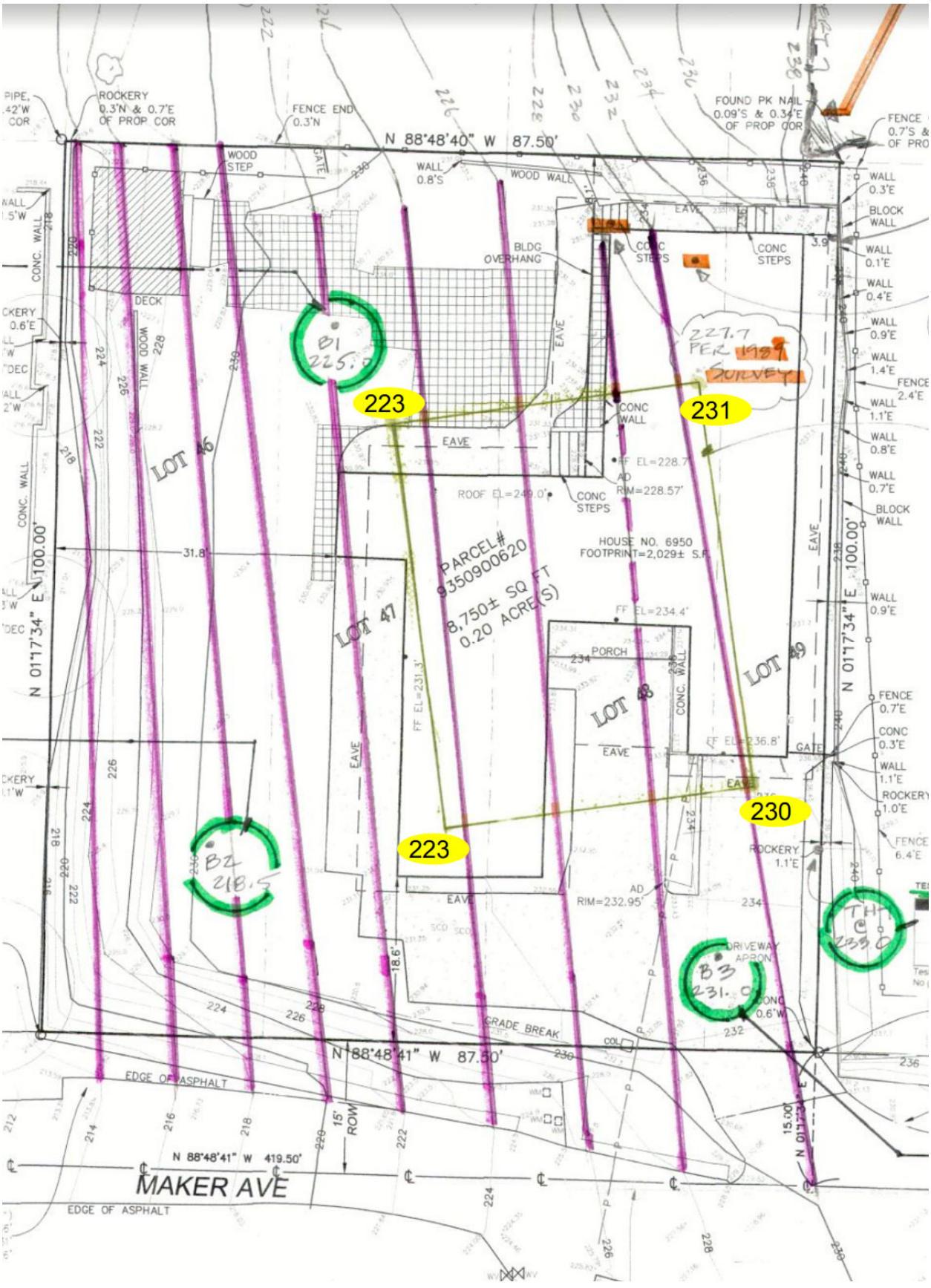
REPLAT OF 1ST ADD

1ST ADD

2ND ADD

5 ADD.

EXHIBIT E


N 88°48'40" W 87.50'
N 88°48'41" W 87.50'
N 01°17'34" E 100.00'
N 01°17'34" E 100.00'
N 88°48'41" W 419.50'
MAKER AVE
EDGE OF ASPHALT
EDGE OF ASPHALT
ROCKERY 0.3'N & 0.7'E OF PROP COR
FENCE END 0.3'N
FOUND PK NAIL 0.09'S & 0.34'E OF PROP COR
WOOD STEP
WALL 0.8'S
WOOD WALL
BLDG OVERHANG
CONC STEPS
CONC STEPS
DECK
CONC. WALL
WOOD WALL
LOT 46
LOT 47
LOT 48
LOT 49
EAVE
CONC WALL
FF EL=228.7'
AD RIM=228.57'
ROOF EL=249.0'
CONC STEPS
PARCEL# 9350900620
8,750± SQ FT
0.20 ACRE(S)
HOUSE NO. 6950
FOOTPRINT=2,029± S.F.
FF EL=231.3'
FF EL=234.4'
PORCH
FF EL=236.8'
GATE
AD RIM=232.95'
DRIVEWAY APRON
CONC 0.6'W
GRADE BREAK
15' ROW
18.6'
31.8'
223
231
223
230
227.7 PER 1989 SURVEY
B1 225.5
B2 218.5
B3 231.
TH @ 239.0
WALL 0.3'E
BLOCK WALL
WALL 0.1'E
WALL 0.4'E
WALL 0.9'E
WALL 1.4'E
FENCE 2.4'E
WALL 1.1'E
WALL 0.8'E
WALL 0.7'E
BLOCK WALL
WALL 0.9'E
FENCE 0.7'E
CONC 0.3'E
WALL 1.1'E
ROCKERY 1.0'E
FENCE 6.4'E
ROCKERY 1.1'E
FENCE 0.7'S & OF PRO