

Planning Memorandum

To: Sunfish Lake Planning Commission

From: Ryan Krzos, AICP, City Planner

Date: June 9, 2020
City Planning Commission Meeting June 17, 2020

Re: 39 Windy Hill Road – Major Site Plan Review and CUP
WSB Project No. 14912-000

GENERAL INFORMATION

Applicant:	Joe Crowley, Streeter Homes		
Property Owner:	Amanda Henke		
Project Location:	39 Windy Hill Road, PID# 38-73202-01-030		
Existing Land Use / Zoning:	Undeveloped; Zoned Single-Family Residential District, R-1 with Shoreland Overlay		
Surrounding Land Use Zoning	North:	Residential and Sunfish Lake; Zoned Single-Family Residential District, R-1 with Shoreland Overlay	
	East:	Residential; Zoned Single-Family Residential District, R-1 with Shoreland Overlay	
	South:	Residential; Zoned Single-Family Residential District, R-1 with Shoreland Overlay	
	West:	Residential; Zoned Single-Family Residential District, R-1 with Shoreland Overlay	
Comprehensive Plan:	The City of Sunfish Lake (2008) Comprehensive Plan guides this property for Rural Residential land use.		
Deadline for Agency Action:	Application Date:	03-10-2020	
	Additional Information Requested:	05-26-2020	
	Additional Information Received:	05-12-2020	
	60 Days:	07-11-2020	
	Extension Letter Mailed:	N/A	
	120 Days:	09-09-2020	

CONSIDERATIONS RELATED TO THE REQUEST

1. Overview.

Joe Crowley, Streeter Homes (the applicant), has applied on behalf of the property owner, for a major site plan review and conditional use permits to facilitate the development of a single-family residence on the property located at 39 Windy Hill Road.

New structures require the review and approval of a major site and building plan. Additionally, the subject site is considered a non-conforming lot as it lacks the requisite 2.5 acres in net buildable area and 150-foot minimum lot width at the Ordinary High-Water Mark. The Zoning Ordinance states that legal, non-conforming, vacant, or redeveloped substandard sized lots of record may be developed for single family detached uses upon approval of a conditional use permit. Additionally, the project includes a proposed eight-foot by 18-foot patio in the area between the building and the lakeshore. Low-profile structures including patios require the approval of a conditional use permit, if proposed between the principal building and the lakeshore within the Shoreland Overlay District.

Site and Building Plan Review, and conditional use requests require a public hearing, and review and recommendation by the Planning Commission, followed by review and consideration by the City Council.

2. General Zoning Review

The proposed structure would be located in the central portion of the subject site. The grade changes significantly from Windy Hill Road to the lakeshore with the steeper portions closer to the lake edge. Grading of the site is proposed to accommodate the residence, which includes a lower level walkout design oriented towards the lake. Stormwater management facilities are proposed along the driveway and to the northwest of the building. The City engineer has reviewed the stormwater management, erosion control, and site grading plan and found that said plans conform to ordinance requirements.

Below is a summary table of the dimensional requirements for lots and structures in the R-1 and Shoreland Overlay District. The existing lot would not comply with the 2.5-acre net buildable area requirement as well as the lot width requirement as measured at the Ordinary High Water Mark (OHWM). The Ordinance allows the development of vacant lots not meeting the Zoning Ordinance size requirements through the issuance of a Conditional Use Permit. The project would comply with all other applicable requirements.

	R-1 Minimum Requirement	Shoreland Overlay Requirement	Proposed
Net Buildable Lot Area	2.5 acres	2.5 acres	2.96 ac gross (existing) Less than 1 ac buildable*
Lot Width at Building Setback	200 feet	200 feet	268 feet
Lot Width at OHWM		150 feet	93.6 feet*
Minimum Building Setback: Front	100 feet		228 feet
Minimum Building Setback: Side	50 feet		North: 54 ft. South: 50 ft.
Minimum Building Setback: Rear	50 feet		256 feet
Building setback from OHWM		200 feet	256 feet
Maximum Building Height	30 feet or 2.5 Stories		29'- 8" 2 Stories
Maximum Building Area	10% of lot area		1.8%
Lot Coverage		30% maximum	6.76%
Septic setback from OHWM		150 feet	429 feet

The proposed structure is designed in a traditional residential form with a pitched roof. Exterior materials consist of dark-colored fiber cement siding and with light trim and asphalt

roof shingles. These materials are consistent with the surrounding residential context and are allowed by the Zoning Ordinance.

Vehicular access to the site is provided via a driveway from Windy Hill Road to a proposed attached garage. The driveway area will be graded such that slopes do not exceed 12%.

The applicant has provided an existing tree inventory as well as a landscaping plan. Plans include the removal of 67 trees in the area of the proposed building, driveway and septic area. The landscaping depicts 38 new trees within the site to include Norway Spruce, Eastern White Pine, and Quaking Aspen. Several plantings of native perennial and grasses are proposed within the stormwater facilities. The City Forester has reviewed the proposed plans and tree inventory.

An existing line of evergreen trees would provide screening of the structure for the residence to the south. New evergreen plantings noted above would provide screening to the adjoining residence to the north.

Well and septic locations are identified on the development plans in the area to the southeast of the proposed residence. Staff anticipates that these sites are adequate. No comment on the plans were provided by the City's septic inspector.

3. Ordinance Authority

SECTION 1204.02 CONDITIONAL USE PERMIT PROCEDURES provides the process for review of a conditional use permit which requires public notice and notification, a public hearing, and review and recommendation by the Planning Commission, followed by review and consideration by the City Council.

SECTION 1208.03.B. MAJOR SITE PLAN APPROVAL PROCEDURES provides the process for review of a major site and building plan which requires public notice and notification, a public hearing, and review and recommendation by the Planning Commission, followed by review and consideration by the City Council.

SECTION 1215.02 NON-CONFORMING BUILDINGS STRCUTURE USES AND LOTS PROVISIONS. L. Legal Non-Conforming Lots states; Legal, non-conforming, vacant, or redeveloped substandard sized lots of record may be developed for single family detached uses upon approval of a conditional use permit, provided that:

- a. The lot in question was legally established in accordance with Ordinance requirements existing at the time of its creation and is a separate, distinct tax parcel.
- b. The lot in question is similar in size and characteristics to and not highly divergent from other lots immediately abutting or in the adjacent area.
- c. The lot in question has frontage on a public or private street.
- d. Public health concerns (potable water and sanitary sewer) can be adequately addressed.
- e. The setback and yard requirements as determined by the City Council to be either:
 - (1) those established as part of the applicable Zoning District; or
 - (2) those measurements which are common to immediately abutting properties and can be achieved while simultaneously resulting in development which complies with the

character and quality of the immediate area and the objectives of the City's Comprehensive Plan and Zoning Ordinance.

f. The lot in question and related potential development is evaluated based upon criteria outlined in Section 1204, Subd. 2.F. (Conditional Use Criteria) and is found to be acceptable per these standards.

Staff Comment: The lot in question was legally established in accordance with Ordinance requirements existing at the time of its creation; is similar in size and characteristics to neighboring lots; has frontage on a private street; can be provided with water and sanitary sewage treatment; can accommodate setback and yard requirements of the R-1 Zoning District; and as noted in section 5 below is consistent the conditional use standards.

SECTION 1243.03 SHORELAND OVERLAY DISTRICT GENERAL PROVISIONS. C. provides the Accessory Structure Requirements within the Shoreland District. Specifically stating; for each buildable parcel meeting minimum lot standards or legal non-conforming lot in the City having lake frontage and containing a principal building, one (1) accessory structure may be allowed between the principal building and the building setback line from the Ordinary High Water Mark as provided for below:

1. An allowable accessory structure with a height of eighteen (18) inches or less, such as fountains, wading or fish pools, swimming pools, patios, surfaced play areas, and the like and associated landscape features such as retaining walls may be allowed as a conditional use and consistent with the following:

- a. The accessory structures are located a minimum of twenty-five (25) feet from all lot lines, six (6) feet or more from any other on-site structure (excluding low-profile features).
- b. The accessory structures are not limited to a percentage of yard area, but are required to be in conformance with the thirty (30) percent over all impervious surface requirement for lots and shall not exceed one thousand (1,000) square feet, except as herein provided by the Ordinance.
- c. Screening of low-profile accessory structures from neighboring properties and the lake shall be completed wherever possible and may be required by the City Council.

Staff Comment: The request includes an 8-foot by 18-foot (144 square foot) patio between the structure and the shoreline. The patio would comply with the setback requirement noted above, would not exceed 1,000 square feet, and would not conflict with the 30% impervious area requirement. The patio would be screened from view from neighboring properties and the lake through a combination of existing and proposed plantings, and topographical changes.

4. Site Plan Review Criteria

The Planning Commission, as its basis of recommendation, and the City Council, as its basis for decision on major projects, shall evaluate the effects of the proposed site and building plans. This review shall include, but is not limited to the following, with staff's comments provided in *italics*:

A. Whether the proposed improvements are compatible and in harmony with the existing structures in the surrounding community.

The project proposes the construction of a detached single-family structure. The architectural design and placement of the structure is compatible with surrounding residences. The improvements comply with the applicable setback, yard, building height and lot coverage requirements.

B. Whether the proposed improvements preserve the character and nature of the surrounding community, including the natural landscape and woodland characteristics of the community.

The placement of the structure is proposed in the central portion of the site, roughly 250 feet from the lakeshore. Five existing White Pine trees to the south of the proposed home site are to be preserved for screening and aesthetic purposes. Additional plantings will also screen the residence from surrounding property. Vegetation in the area between the shoreline and the building site will remain, with the exception of the area containing a stormwater facility; however native perennials and grasses would be planted in this area. A tree inventory of this site was submitted and reviewed by the City Forester.

C. Whether the proposed improvements are not constructed of unsightly, improper or unsuitable materials.

The proposed building will be finished with dark-colored fiber cement siding and with light trim and will have an asphalt roof. These materials are allowable by section 1219.03 of the Zoning Ordinance.

D. Whether the proposed improvements will not materially adversely affect any natural resources in the community, except when there is no feasible and prudent alternative to the proposed location of the improvements. For purposes of this clause, "natural resources" shall include, but not be limited to, all mineral, animal, botanical, air, water, land, timber, soil, quietude, recreational, historical, scenic and aesthetic resources.

The project is not expected to adversely impact any of the above noted natural resources.

E. Whether the proposed site and improvements shall have an appearance that will not have an adverse effect upon adjacent residential properties.

The proposed residence is a traditional residential style with regard to architecture. The building complies with the applicable building height, exterior material, and setback requirements. Accordingly, the appearance is not likely to have an adverse effect on adjacent properties.

F. Whether the proposed site improvement complies with drainage requirements, as provided in Section 1216.04 of this Ordinance.

Drainage plans were reviewed by the City Engineer. The proposed improvements would comply with requirements regarding engineering, stormwater management and site grading.

G. Whether the proposed site and improvements are consistent with the purposes of this Ordinance and the Property Owner Reference & Development Guide Manual, as established by City Council resolution.

The proposed improvements comply with the general provisions of the R-1 District, Shoreland Overlay District, and other applicable design and performance standards.

5. Conditional Use Criteria

The Planning Commission, as its basis of recommendation, and the City Council, as its basis for decision on conditional use permits, shall evaluate the effects of the proposed conditional use. This review shall include, but is not limited to the following, with staff's comments provided in *italics*:

1. The proposed action in relation to the specific policies and provisions of the official City Comprehensive Plan.

The Comprehensive Plan guides the site for Rural Residential land use. The proposed single-family detached dwelling and related improvements are consistent with the types of land uses envisioned by this future land use category.

2. The proposed use's compatibility with present and future uses of the area.

Surrounding properties are developed with similarly situated detached single-family residences, which are guided to remain rural residential.

3. The proposed use's conformity with all performance standards contained herein.

The proposed use is anticipated to comply with the applicable performance standards contained in the Zoning Ordinance including provisions related to noise, refuse, and light.

The subject lot complies with the requirements of Section 1215.02(L) relating to the development of vacant nonconforming lots. The lot in question was legally established in accordance with Ordinance requirements existing at the time of its creation; is similar in size and characteristics to neighboring lots; has frontage on a private street; can be provided with water and sanitary sewage treatment; can accommodate setback and yard requirements of the R-1 Zoning District; and is consistent with this and the other conditional use standards.

4. The proposed use's effect on the area in which it is proposed.

The proposed use is consistent and compatible with neighboring single-family residential land uses.

5. The proposed use's impact upon property values in the area in which it is developed.

The use is not anticipated to have negative impacts on surrounding property values.

6. Traffic generated by the proposed use is in relation to capabilities of streets serving the property.

The proposed use will not produce traffic in excess of the capability of the public and private roadways serving the site.

7. The proposed use's impact upon existing public services and facilities including parks, schools, streets and utilities, and the City's service capacity.

The proposed use is anticipated to marginally increase demand on parks, schools, streets, utilities, and City services. These facilities and services have capacity to serve this increased demand.

Additional Shoreland Overlay evaluation criteria: A thorough evaluation of the water body and the topographic, vegetation, and soils conditions on the site shall be made to ensure:

1. The prevention of soil erosion or other possible pollution of public waters, both during and after construction.

The City Engineer has reviewed the stormwater management and site grading plan and is recommending approval.

2. The visibility of structures and other facilities as viewed from public waters is limited.

The proposed structure is set back more than 250 feet from the lakeshore. Much of the vegetation in the shoreland area will be maintained save for the area where the stormwater facility is to be located, limiting the visibility of the structure from the lake.

3. The site is adequate for water supply and on-site sewage treatment.

Well and septic locations are identified on the development plans in the area to the southeast of the proposed residence. Staff anticipates that these sites are adequate. No comment on the plans were provided by the City's septic inspector.

4. The types, uses, and numbers of watercraft that the project will generate are compatible in relation to the suitability of public waters to safely accommodate these watercraft.

The proposed detached single-family use is not likely to generate watercraft incompatible with Sunfish Lake.

RECOMMENDATION

Based on the foregoing considerations and applicable ordinances, staff recommends conditional approval of the site and building plan and conditional use permits subject to the following findings of fact and conditions of approval:

Findings of Fact:

1. The address of the subject property is as follows:

39 WINDY HILL ROAD SUNFISH LAKE, MN 55077
2. The planning report dated June 9, 2020 prepared by WSB is incorporated herein by reference.
3. Requests for major site and building plan review and conditional use permits require Planning Commission review and City Council approval.
4. The Sunfish Lake Planning Commission reviewed the applicant's request for major site and building plan and conditional use permit approval at the June 17, 2020 Planning Commission meeting.
5. Upon review of the planning report and application information, the Planning Commission found that the proposed site and building plan request and proposed conditional uses meet Ordinance requirements. The following findings support the Planning Commission's recommendation for approval:
 - a. The subject lot complies with the criteria listed in Section 1215.02(L) of the City Code as it relates to development of vacant legal non-conforming lots.
 - b. The proposed improvements meet R-1 and Shoreland Overlay District requirements and standards.
 - c. The proposed development addresses Ordinance requirements pertaining to grading, drainage and stormwater management, landscaping, and screening.
 - d. The development meets other applicable Zoning Ordinance criteria.

Conditions of Approval:

1. Construction shall occur in substantial conformance with the plans presented at the June 17, 2020 Planning Commission meeting.
2. Compliance with the City Engineer's report dated May 12, 2020.
3. The applicant must obtain all other permits as may be required.
4. The applicant shall comply with all applicable federal, state, and local laws, rules and ordinances.
5. The applicant must adhere to and remain in compliance with the requirements of this Resolution, applicable performance standards, and such other requirements as may apply.
6. All conditions of the site plan review must be complied with, shall run with the land, and shall not in any way be affected by the subsequent sale, lease or other change from current ownership of the Property.
7. This Resolution is subject to the condition that all representations, written and oral, made by the Applicant and its agents and representatives to the City contained in and concerning the Applicant's application for the site plan review must have been true, complete and accurate at the time they were made, and that they remain true and accurate for the duration of the development.
8. By undertaking the activities approved by the requests, the applicant agrees to all conditions.

Subject Site



Memorandum

To: Ryan Krzos, AICP – City Planner

From: Jeff Sandberg, PE – City Engineer
Brandon Movall, EIT – Graduate Engineer
Kendra Fallon, EIT – Graduate Engineer

Date: May 12, 2020

Re: Major Site and Building Plan Review, Resubmittal 05/11/20
39 Windy Hill Rd
City of Sunfish Lake, MN
WSB Project No. 014912-000

Project Background

The Applicant is proposing to construct a new house along with the necessary grading and stormwater improvements on a currently undeveloped parcel of land. The following review is only for the engineering, stormwater management, and site grading issues. The building compliance will be handled by the City planners and building inspectors.

The following requirements and comments need to be addressed as the project moves forward:

Stormwater Management

1. An as-built of the critical pond elevations and dimensions will be required upon completion.
2. Soil borings were not taken in the proposed location of infiltration basin 2. Without soil borings the applicant assumes the risk of finding soils unsuitable for infiltration during construction which would require redesigning the basin.

Site Grading

1. Staff has requested that disturbance and site grading on the lake side of the home be minimized to the extent possible. The infiltration basin size has been reduced to an acceptable extent.

Erosion Control and Restoration

1. Staff has no additional erosion control comments at this time. Erosion control may be revised in the field per staff direction in order to accommodate for unforeseen circumstances.

Site Access

1. The applicant has been advised that they are responsible for any damage caused to the public streets as a result of the proposed construction.

Conclusion and Recommendations

Based upon our review of the engineering, stormwater management and site grading for 39 Windy Hill Rd, we have determined that the proposed site and grading plans dated May 11, 2020 are in accordance with City requirements and recommend approval from an engineering standpoint for this project.

CITY OF *Sunfish Lake* MINNESOTA

**Planning Commission
Findings of Fact &
Recommendation
(Approval)**

Applicant's Name: Joe Crowley, Streeter Homes, on behalf of owner, Amanda Henke

Request: The applicants request City approval of a major site and building plan and conditional use permits at 39 Windy Hill Road.

Planning Commission Meeting Date: June 17, 2020

Findings of Fact: Based on review of the application and evidence received, the Sunfish Lake Planning Commission now makes the following findings of fact and recommendation:

1. The address of the subject property is as follows:

39 WINDY HILL ROAD
SUNFISH LAKE, MN 55077
2. The planning report dated June 9, 2020 prepared by WSB is incorporated herein by reference.
3. Requests for major site and building plan review and conditional use permits require Planning Commission review and City Council approval.
4. The Sunfish Lake Planning Commission reviewed the applicant's request for major site and building plan and conditional use permits approval at the June 17, 2020 Planning Commission meeting.
5. Upon review of the planning report and application information, the Planning Commission found that the proposed site and building plan request and proposed conditional uses meet Ordinance requirements. The following findings support the Planning Commission's recommendation for approval:
 - a. The subject lot complies with the criteria listed in Section 1215.02(L) of the City Code as it relates to development of vacant legal non-conforming lots.

- b. The proposed improvements meet R-1 and Shoreland Overlay District requirements and standards.
- c. The proposed development addresses Ordinance requirements pertaining to grading, drainage and stormwater management, landscaping, and screening.
- d. The development meets other applicable Zoning Ordinance criteria.

Recommendation:

Based on the foregoing considerations and applicable ordinances, the Planning Commission recommends approval of the requested major site and building plan and conditional use permits, subject to the following conditions:

1. Construction shall occur in substantial conformance with the plans presented at the June 17, 2020 Planning Commission meeting.
2. Compliance with the City Engineer's report dated May 12, 2020.
3. The applicant must obtain all other permits as may be required.
4. The applicant shall comply with all applicable federal, state, and local laws, rules and ordinances.
5. The applicant must adhere to and remain in compliance with the requirements of this Resolution, applicable performance standards, and such other requirements as may apply.
6. All conditions of the site plan review must be complied with, shall run with the land, and shall not in any way be affected by the subsequent sale, lease or other change from current ownership of the Property.
7. This Resolution is subject to the condition that all representations, written and oral, made by the Applicant and its agents and representatives to the City contained in and concerning the Applicant's application for the site plan review must have been true, complete and accurate at the time they were made, and that they remain true and accurate for the duration of the development.
8. By undertaking the activities approved by the requests, the applicant agrees to all conditions.

Adopted by the Sunfish Lake Planning Commission this 17th day of June 2020.

City of Sunfish Lake

By: _____
Tom Hendrickson
Planning Commission Chair

ATTEST

Catherine Iago, City Clerk

DRAFT

Henke Residence

35 Windy Hill Road
Sunfish Lake, Minnesota

Application for Major Site Plan Review



Submitted on:
March 9, 2020

Resubmitted on:
May 1, 2020

Submitted to:
City of Sunfish Lake

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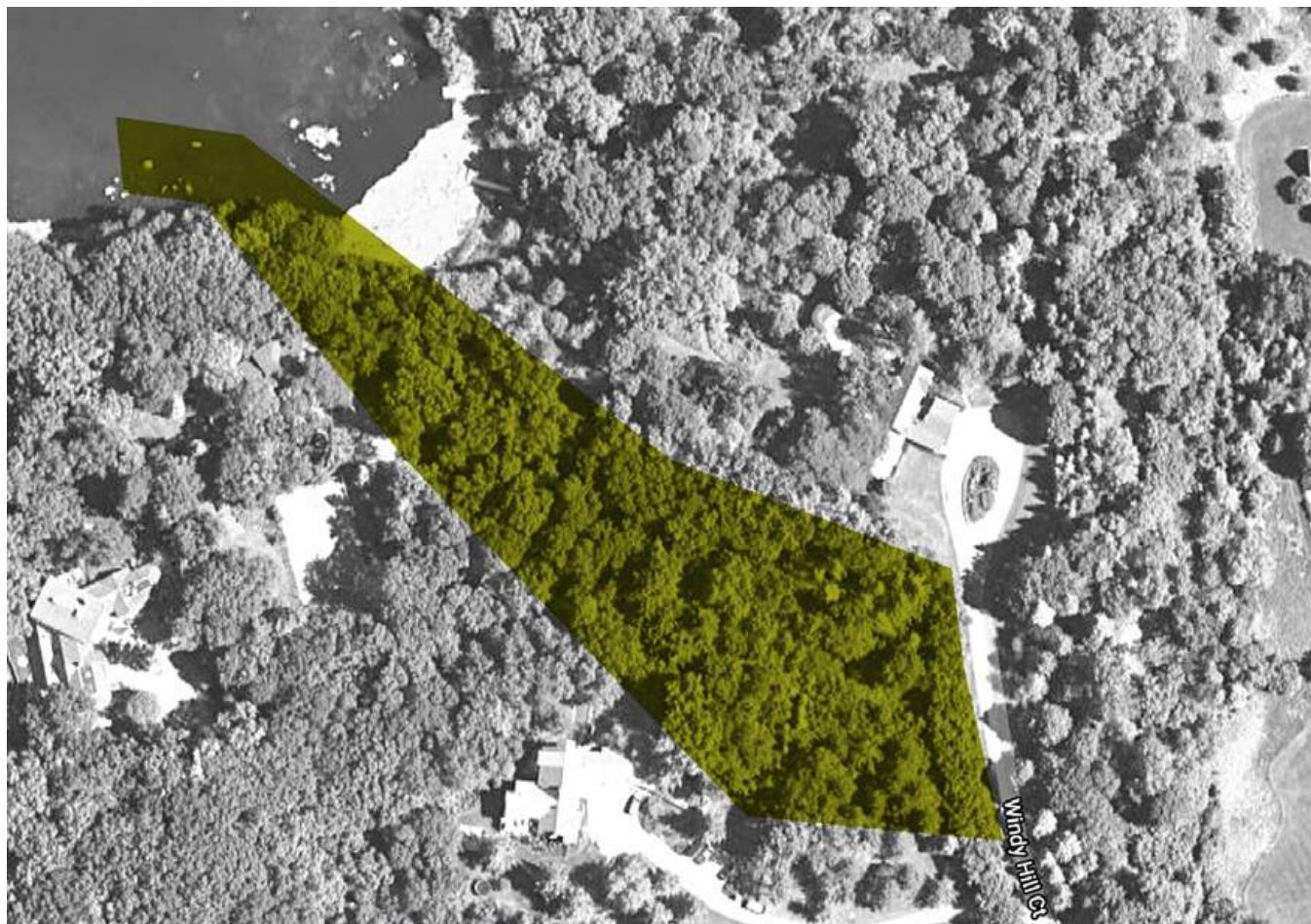
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Architectural Renderings	Attachment F
Exterior Lighting Plan and Fixtures	Attachment G
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Proposed Septic System Documentation	Attachment J

PROJECT TEAM

Owner:	Amanda Henke 39 Windy Hill Road Sunfish Lake, Minnesota 55118 612.214.3826 amandajhenke@gmail.com
Architect:	PLAAD, LLC Mark D. Stankey, AIA P.O. Box 184 Stillwater, MN 55082 612.388.6588 mark@plaadoffice.com
Civil Engineering:	Pierce Pini & Associates, Inc. Kevin Gardner 9298 Central Avenue NE, Suite 312 Blaine, MN 55434 763.537.1311 Kevin@piercepini.com
Suveyor	Cornerstone Land Surveying Connie Villari, L.S. 6750 Stillwater Boulevard N, Suit 1 Stillwater, MN 55082 connie@cssurvey.net 651-275-8969
Interior Designer	Anne McDonald Design 651.248.6368 annemcdonald@gmail.com
Builder	Streeter Custom Builders 18312 Minnetonka Boulevard Wayzata, MN 55391 612.805.1385 JCCrowley@streeterhomes.com



PROJECT DESCRIPTION

March 9, 2020
Revised April 10, 2020
Revised May 1, 2020

Dear City of Sunfish Lake Planning and Engineering,

Thank you for the opportunity to submit our application to you for a major site plan review of a new home design for Amanda Henke at 39 Windy Hill Road in Sunfish Lake.

The enclosed documents described a thoughtfully designed home in the traditional Norwegian vernacular that preserves to the greatest extent possible the natural beauty of the site. Ms. Henke is truly excited to join the Sunfish Lake community and appreciates the dedication of the City to the preservation of the lake and surrounding environs.

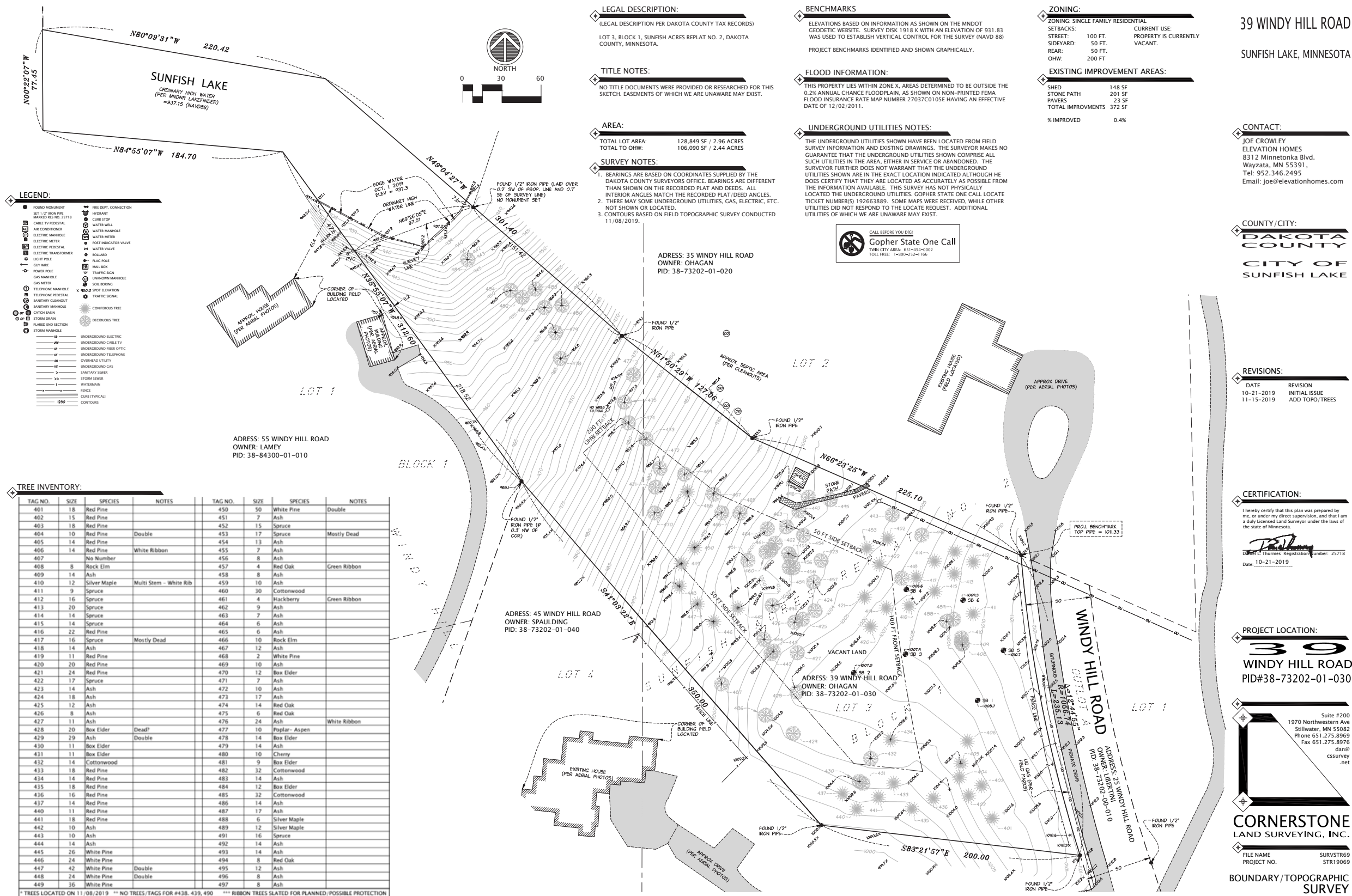
Included in this resubmittal are revised documents that respond to the most recent memos provided by WSB regarding our original submittal.

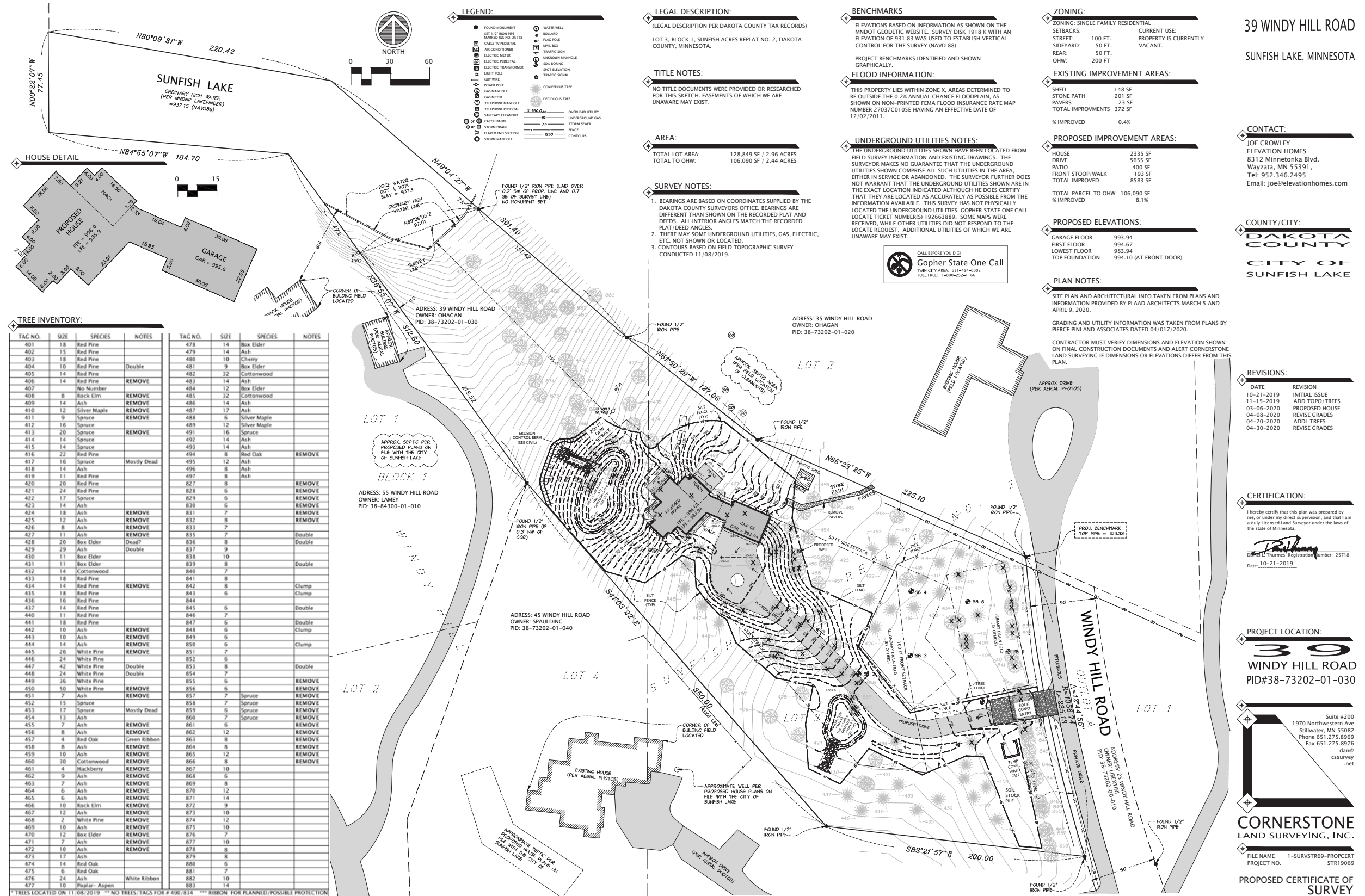
The design team has worked to preserve a number of significant trees on the site, specifically five white pines directly to the south of the proposed home, as well as limiting the proposed height of the home through the use of room-in-attic truss configurations. New proposed evergreen plantings are strategically placed along the entry drive to limit car headlight pollution to the neighboring property to the southwest, and a mixture of native plantings are proposed to help reestablish the understory in the location of the proposed catchment basin to the northwest of the new proposed home.

We sincerely thank you for your time and consideration, and look forward to answering any additional questions that you may have. You may reach me directly at 651.336.1393 or matt@plaadoffice.com.

Sincerely,

Matthew M. Byers, AIA
Principal, PLAAD, LLC





BUILDING AREA CALCULATIONS		
LOCATION/ELEMENT		AREA
PROPOSED HOUSE		1,673 SF
PROPOSED GARAGE		662 SF
PROPOSED FRONT STOOP/WALK		193 SF
PROPOSED PATIO		400 SF
PROPOSED DRIVEWAY		5,655 SF
TOTAL		8,583 SF
EXISTING LOT AREA		128,849 SF
IMPERVIOUS SURFACE % (HOUSE + OTHERS)		6.7%

AVERAGE EXISTING GRADE CALCULATION		
	SPOT LOCATION	NATURAL GRADE ELEVATION (APPROX)
	A	100'-0"
	B	999'-6"
	C	996'-0"
	D	998'-0"
	E	993'-6"
	F	993'-0"
	G	990'-0"
	H	990'-0"
	I	989'-6"
	J	989'-0"
	K	987'-6"
	L	988'-0"
	M	987'-6"
	N	987'-6"
	O	987'-6"
	P	987'-6"
	Q	987'-6"
	R	987'-6"
	S	990'-0"
	T	990'-6"
	U	990'-6"
	V	991'-0"
	W	992'-6"
	X	994'-0"
	Y	996'-0"
	Z	996'-0"
AVERAGE ELEVATION OF ALL SPOT GRADES		991'-4"
HEIGHT LIMITATION (30' + AVERAGE OF EXISTING GRADES)		1021'-4"
PROPOSED HEIGHT AT GABLE PEAKS, GIVEN FFE OF 994'-8"		1021'-0"

FINISHED FLOOR ELEVATIONS		
LOCATION	U.S.G.S.	ARCHITECTURAL
T/C/ONC AT LOWER LEVEL PATIO	983'-5 1/4"	88'-9 1/4"
T/C/ONC AT LOWER LEVEL	983'-11 1/4"	89'-3 1/4"
T/SUBFLOOR AT MAIN LEVEL	994'-8"	100'-0"
T/C/ONC AT UPPER LEVEL PATIO	993'-8"	99'-0"
T/SUBFLOOR AT UPPER LEVEL		110'-9 7/8"



Consultants

Civil
PIERCE PINTI &
ASSOCIATES, INC.
Consulting Civil Engineers
Pierce Pinti & Associates
9296 Central Avenue NE
Suite 312
Blaine, MN 55434

Structural



The Hanson Group, LLC
3407 Kilmer Lane North
Plymouth, MN 55445

Interior Design



Anne McDonald Design
4325 Chown Avenue South
Minneapolis, MN 55410

Contractor

Streeter
Streeter Custom Builders
18312 Minnesota Blvd
Wayzata, MN 55391

Owner

Amanda Henke
39 Windy Hill Road
Sunfish Lake, MN 55118

Certification

I hereby certify that this plan, specification, or report, was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.
Signature: [Signature]
Typed or Printed Name: Marc D. Berkey
Date: 05/01/2020 License Number: 36273

Project
Henke Residence

39 Windy Hill Road
Sunfish Lake, MN 55118

Issue Name
Major Site Plan Review
Revisions

Issue Date
May 1, 2020

Issue Chart

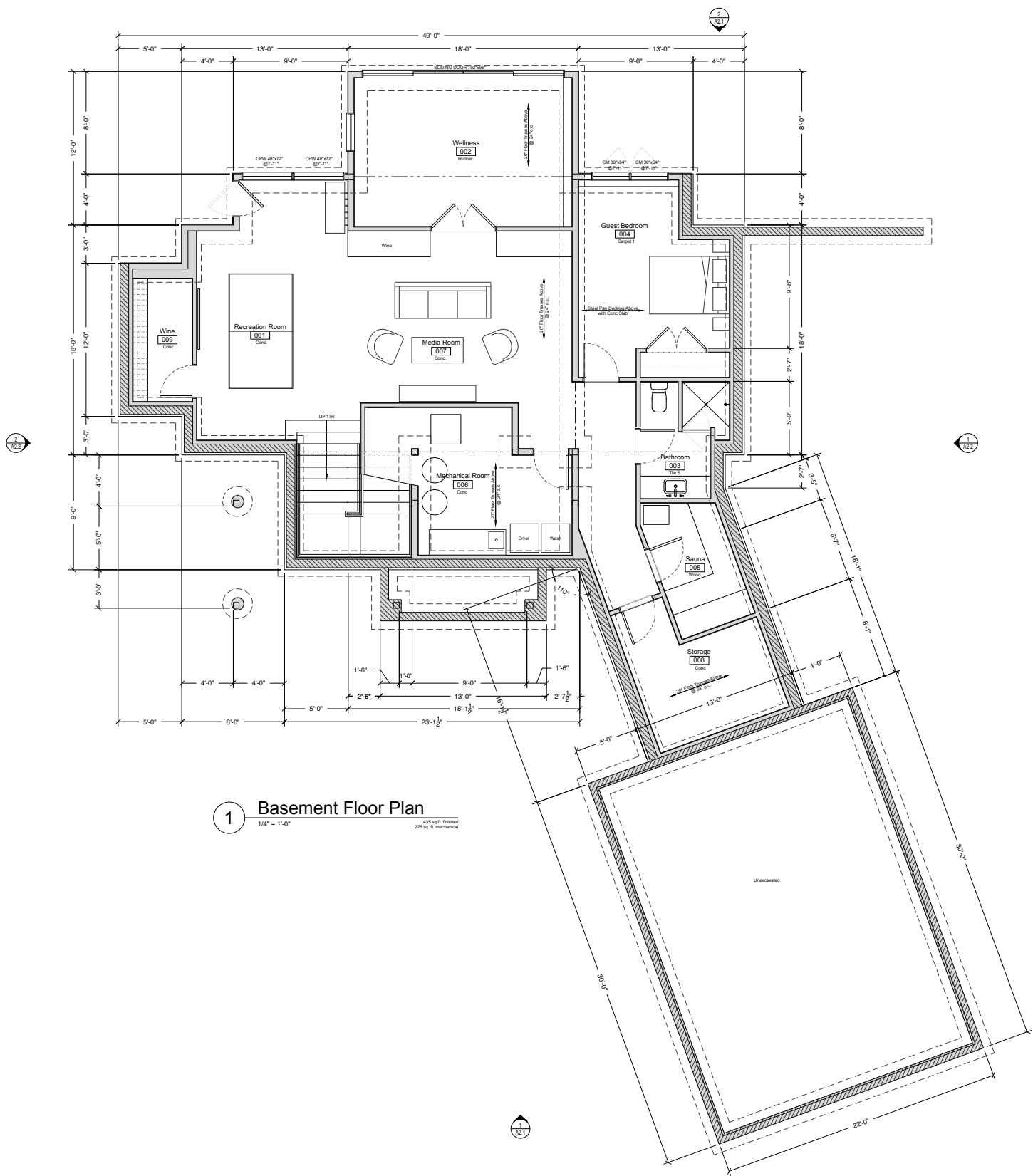
No.	Date	Description
1	03/10/2020	Major Site Plan Review
2	03/26/2020	Major Site Plan Review Revisions
3	05/01/2020	Major Site Plan Review Revisions

Sheet Title
Architectural
Site Plan

Sheet Number

G0.3





1 Basement Floor Plan
1/4" = 1'-0"
1435 sq. ft. finished
225 sq. ft. mechanical



Consultants
Civil
Pierce Pini & Associates
9298 Central Avenue NE
Suite 312
Blaine, MN 55434

Contractor
Streeker Custom Builders
18312 Minnesota Blvd
Wayzata, MN 55391

I hereby certify that this plan
was prepared by me or under my direct supervision
and that I am a duly Licensed
Professional Engineer in the State of
Minnesota.
Signature: *Mark O. Jansky*
Typed or Printed Name: Mark O. Jansky
Date: 03/09/2020 License Number: 53221

Project
Henke Residence
39 Windy Hill Road
Sunfish Lake, MN 55118
Issue Name
Major Site Plan Review

Issue Date
March 9, 2020

Issue Chart

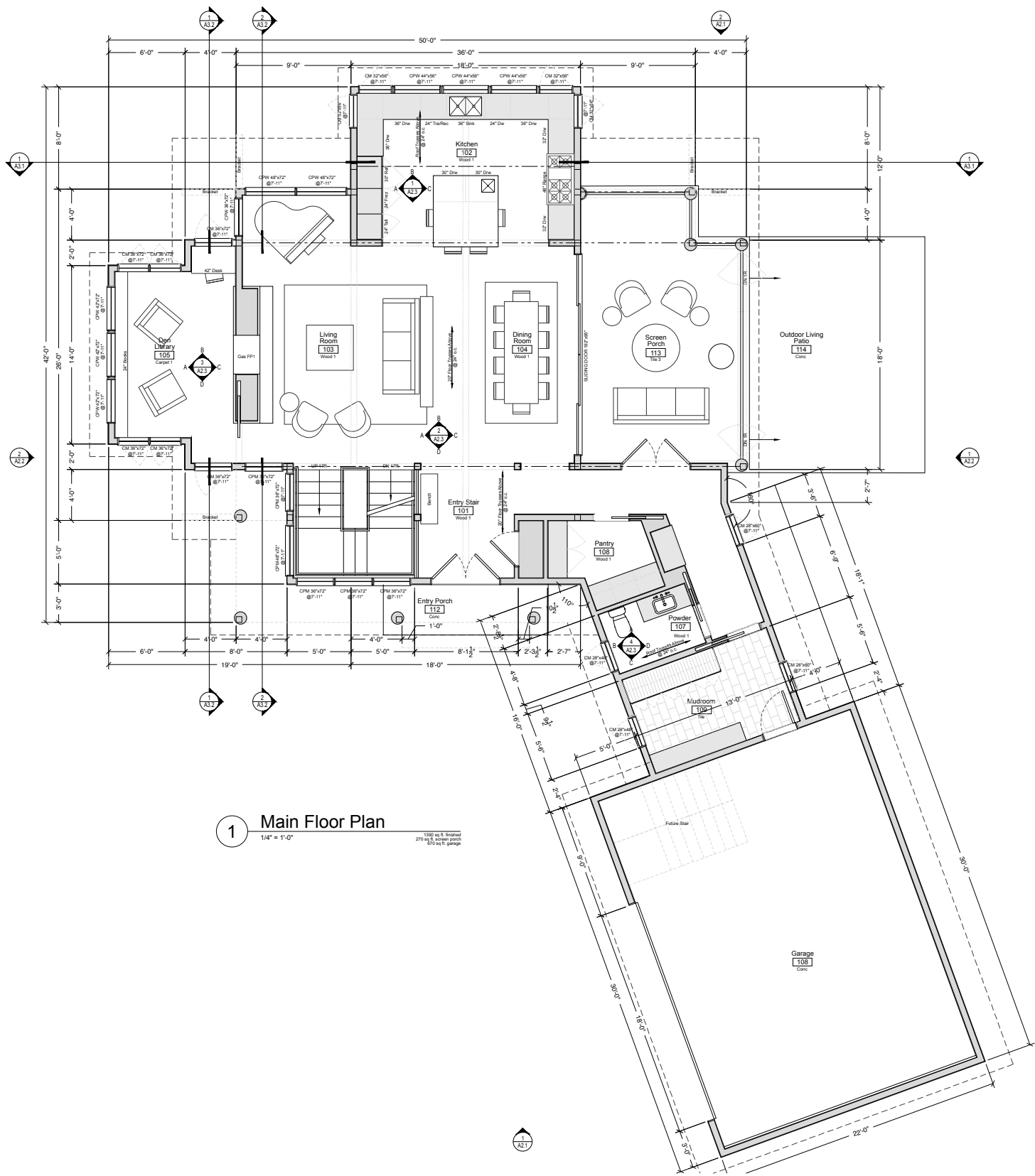
No.	Date	Description
1	03/09/2020	Major Site Plan Review

Sheet Title
Basement Floor Plan

Sheet Number
A1.0

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Consultants
Civil
Pierce Pini & Associates
9298 Central Avenue NE
Suite 312
Blaine, MN 55434

Contractor
Streeter Custom Builders
18312 Minnetonka Blvd
Wayzata, MN 55391

I hereby certify that this plan
has been prepared by me or under
my direct supervision and that I am
an Architect under the laws of the State of
Minnesota.
Date: 03/09/2020 License Number: 51271

Project
Henke Residence

39 Windy Hill Road
Sunfish Lake, MN 55118

Issue Name
Major Site Plan Review

Issue Date
March 9, 2020

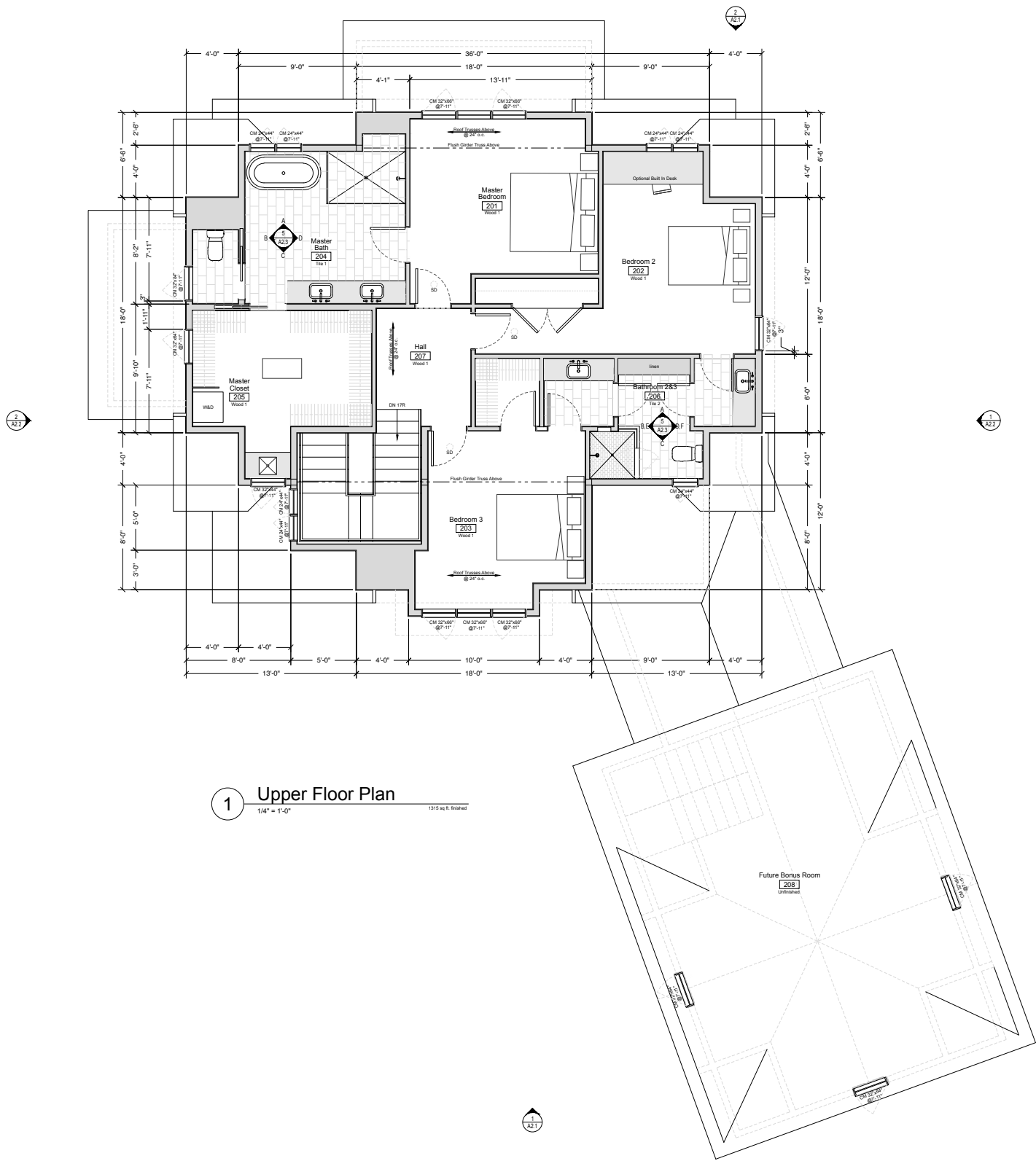
Issue Chart	
No.	Description
1	03/09/2020 Major Site Plan Review

Sheet Title
Main Floor Plan

Sheet Number
A1.1

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1 Upper Floor Plan
1/4" = 1'-0"



Consultants
Civil
Pierce Pini & Associates
9298 Central Avenue NE
Suite 312
Blaine, MN 55434

Contractor
Streeter Custom Builders
18312 Minnetonka Blvd
Wayzata, MN 55391

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Date: 03/09/2020 License Number: 51271

Project
Henke Residence
39 Windy Hill Road
Sunfish Lake, MN 55118
Issue Name
Major Site Plan Review

Issue Date
March 9, 2020

Issue Chart	
No.	Description
1	03/09/2020 Major Site Plan Review

Sheet Title
Upper Floor Plan

Sheet Number
A1.2

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Consultants

Civil
erice Pini & Associates
98 Central Avenue NE
Suite 312
Blaine, MN 55434

Contractor

Streeter Custom Builders
18312 Minnetonka Blvd
Wayzata, MN 55391

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I hereby certify that this plan, social action, or report, was prepared by me or under my direct supervision and that I am a duly licensed Architect under the laws of the State of Minnesota.

Signature: Mark King

Typed or Printed Name: Mark O. King

Date: 01/20/20 License Number: 52171

Project

Henke Residence

39 Windy Hill Road
Sunfish Lake, MN 55118

Issue Name

Major Site Plan Review

Issue Date

March 9, 2020

Issue Chart

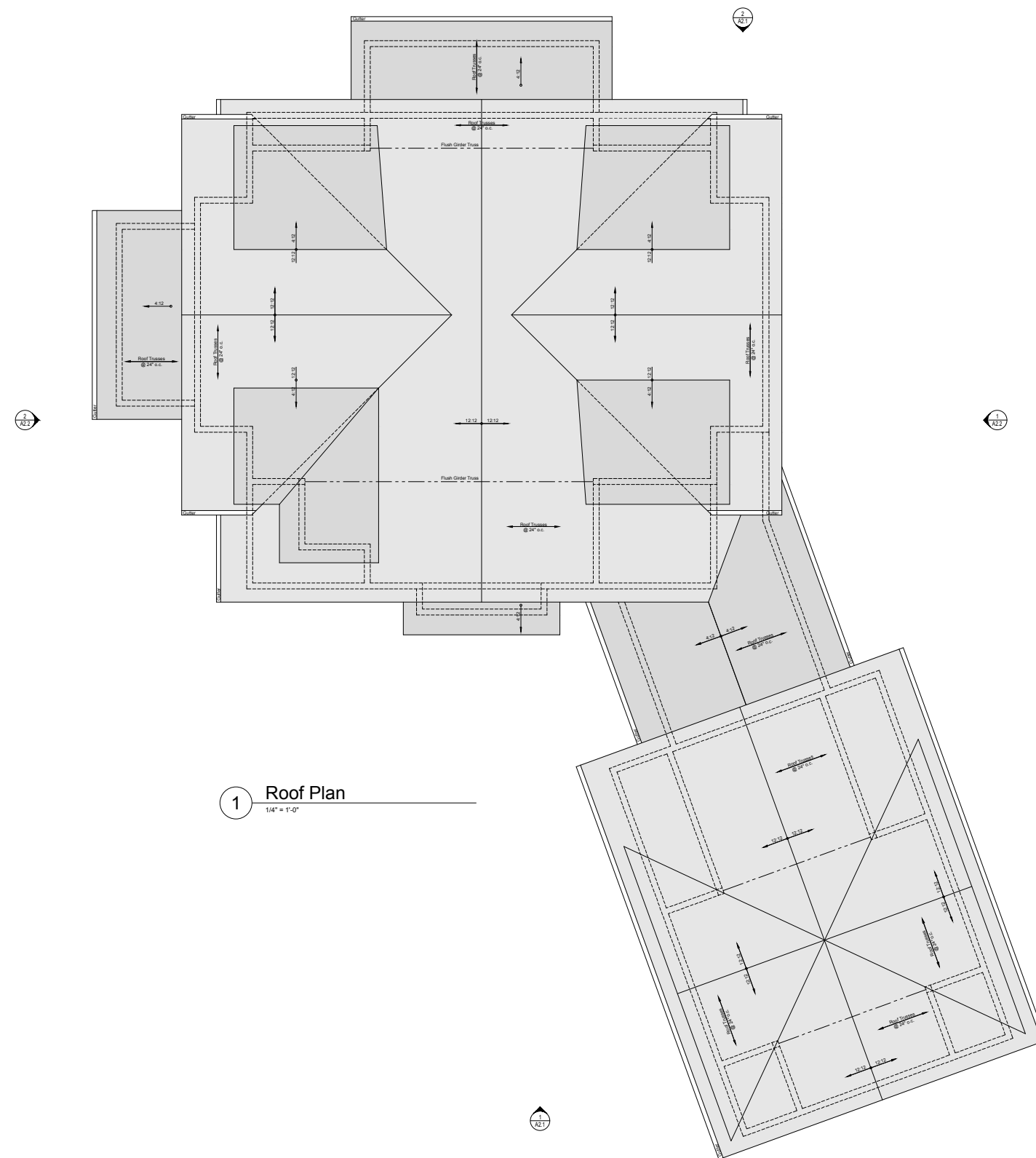
No.	Date	Description
1	03/09/2020	Major Site Plan Review

Sheet Title

Roof Plan

Sheet Number

A1.3



NOT ALL NOTES OCCUR ON THIS SHEET

- 1 GAS METER
- 2 ELECTRIC METER
- 3 DRYER VENT
- 4 GAS FIREPLACE TERMINATION CAP
- 5 FURNACE EXHAUST CAP
- 6 FURNACE INTAKE CAP
- 7 KITCHEN RANGE HOOD VENT CAP
- 8 DRYER VENT CAP
- 9 BATH VENT
- 10 HOSE BIB
- 11 DOWNSPOUT
- 12 GUTTER

NOT ALL NOTES OCCUR ON THIS SHEET

- | | |
|-------|--|
| ASR-1 | <p>ASPHALT SHINGLE ROOF</p> <p>BASIS OF DESIGN</p> <p>MANF: CERTAINTED</p> <p>STYLE: GRAND MANOR</p> <p>COLOR: GEORGIAN BRICK</p> <p>INSTALLATION: PROVIDE GRACE ICE & WATER (OR EQUIVALENT)</p> <p>UNDER ENTIRE ROOF</p> |
| FCB-1 | <p>FIBER CEMENT SIDING</p> <p>BASIS OF DESIGN: HARDIEPLANK LAP SIDING</p> <p>DIMENSION: 4" EXPOSURE</p> <p>STYLE: SMOOTH</p> <p>INSTALL: ON RV5-1</p> |
| FCP-1 | <p>FIBER CEMENT PANEL</p> <p>BASIS OF DESIGN: HARDIEPANEL</p> <p>INSTALL: ON RV5-1</p> |
| ECT-1 | <p>EXTERIOR COMPOSITE TRIM</p> <p>BASIS OF DESIGN: WINDSOR ONE</p> <p>DIMENSION: VARIES</p> <p>STYLE: SMOOTH</p> |
| EWF-1 | <p>EXTERIOR WOOD FABRICATIONS</p> <p>CUSTOM TURNED WOOD COLUMNS, PAINTED FINISH</p> |



1 East Elevation
1/4" = 1'-0"



2 West Elevation
1/4" = 1'-0"

NOT FOR CONSTRUCTION

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Signature Mark D. Starnay
Typed or Printed Name: Mark D. Starnay
Date: 3/26/2020 License Number: 32171

39 Windy Hill Road
Sunfish Lake, MN 55118

Issue Name

Major Site Plan Review
Revisions

March 26, 2020

No.	Date	Description
1	03/10/2020	Major Site Plan

Review	
2	03/26/2020 Major Site Plan Review - Revisions

Exterior Elevations

A2.0

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KEYED NOTES - EXTERIOR ELEVATIONS

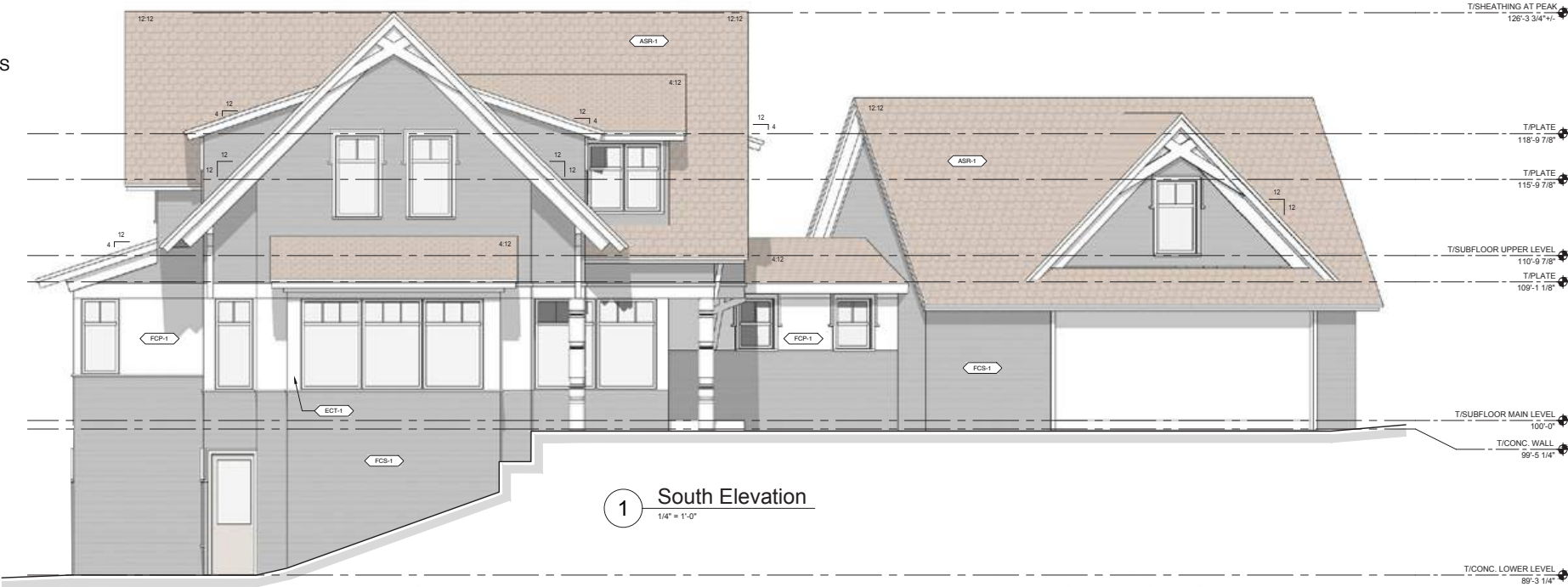
NOT ALL NOTES OCCUR ON THIS SHEET

- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- GAS METER
- ELECTRIC METER
- DRYER VENT
- GAS FIREPLACE TERMINATION CAP
- FURNACE EXHAUST CAP
- FURNACE INTAKE CAP
- KITCHEN RANGE HOOD VENT CAP
- DRYER VENT CAP
- BATH VENT
- HOSE BIB
- DOWNSPOUT
- GUTTER

MATERIAL IDENTIFICATION

NOT ALL NOTES OCCUR ON THIS SHEET

- ASR-1
- FCS-1
- FCP-1
- ECT-1
- EW-1
- ASPHALT SHINGLE ROOF
- BASIS OF DESIGN
- MANF: CERTANTEED
- STYLE: GRAND MANOR
- COLOR: GEORGIAN BRICK
- INSTALLATION: PROVIDE GRACE ICE & WATER (OR EQUIVALENT)
- UNDER ENTIRE ROOF
- FIBER CEMENT SIDING
- BASIS OF DESIGN: HARDIEPLANK LAP SIDING
- DIMENSION: 4" EXPOSURE
- STYLE: SMOOTH
- INSTALL: ON RVS-1
- FIBER CEMENT PANEL
- BASIS OF DESIGN: HARDIEPANEL
- INSTALL: ON RVS-1
- EXTERIOR COMPOSITE TRIM
- BASIS OF DESIGN: WINDSOR ONE
- DIMENSION: VARIES
- STYLE: SMOOTH
- EXTERIOR WOOD FABRICATIONS
- CUSTOM TURNED WOOD COLUMNS, PAINTED FINISH



1 South Elevation

1/4" = 1'-0"



2 North Elevation

1/4" = 1'-0"



Consultants

Civil

Pierre Pini & Associates
9288 Central Avenue NE
Suite 312
Blaine, MN 55424

Contractor

Strehler Custom Builders
18312 Minnetonka Blvd
Wayzata, MN 55391

Certification

I hereby certify that this plan, specification, or report, was prepared by me or under my direct supervision and that I am a duly Licensed Architect under the laws of the State of Minnesota.
Signature:
Typed or Printed Name: Matt D. Bennett
Date: 3/26/2020 License Number: 307171

Project

Henke Residence

39 Windy Hill Road
Sunfish Lake, MN 55118

Issue Name

Major Site Plan Review

Issue Date

March 28, 2020

Issue Chart

No.	Date	Description
1	03/10/2020	Major Site Plan Review
2	03/26/2020	Major Site Plan Review

Sheet Title

Exterior Elevations

Sheet Number

A2.1

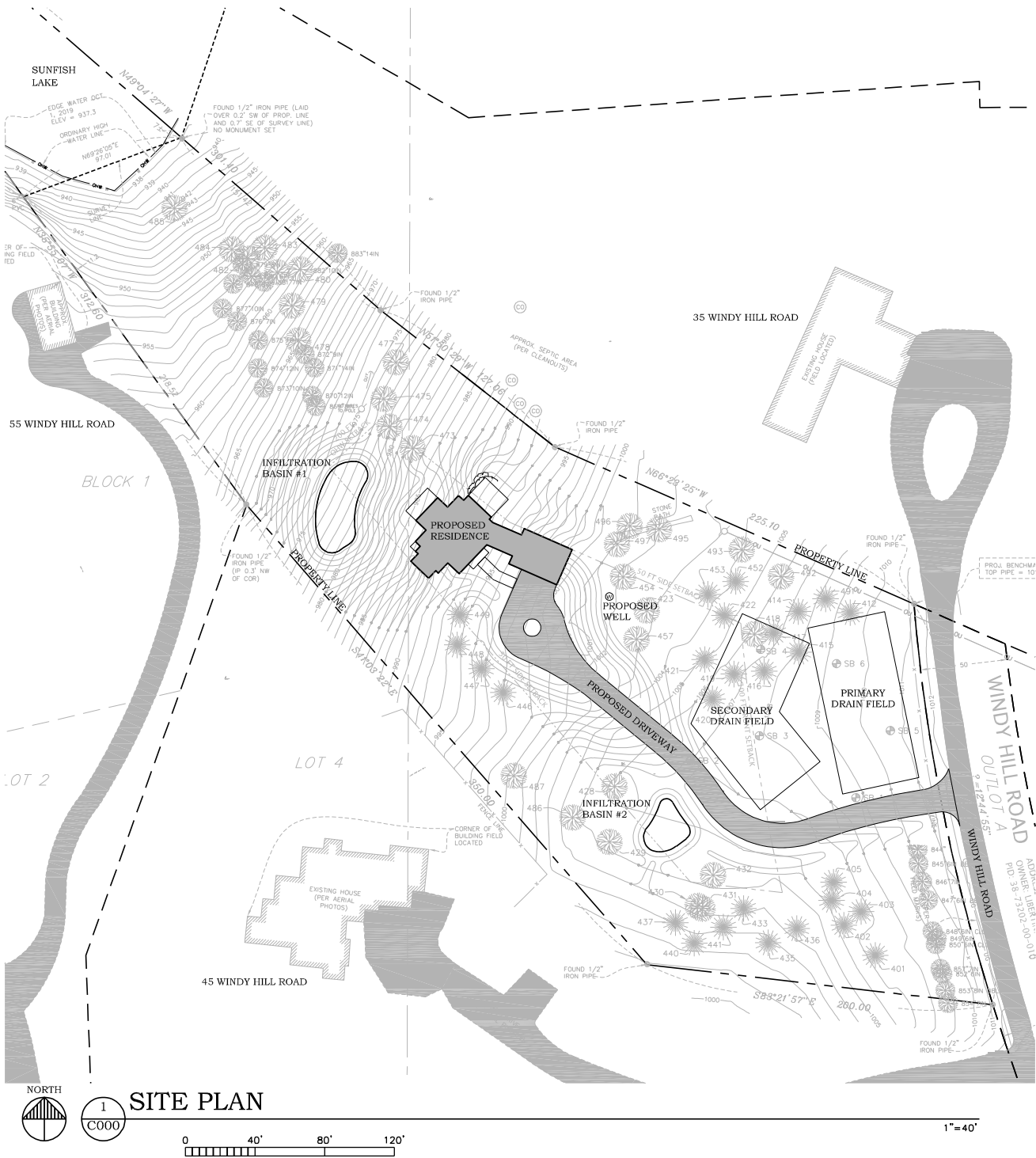
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WINDY HILL ROAD RESIDENCE

39 WINDY HILL ROAD
SUNFISH LAKE, MINNESOTA

GRADING, STORMWATER MANAGEMENT AND EROSION CONTROL PLANS



CONTACT INFORMATION

CIVIL ENGINEER
PIERCE PINI & ASSOCIATES, INC.
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BLAINE, MN 55434
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TEL: 763.537.1311

SURVEYOR
CORNERSTONE LAND SURVEYING
6750 STILLWATER BOULEVARD N, SUITE 1
STILLWATER, MN 55082
CONTACT: Connie Villari
TEL: 651-275-8969

ARCHITECT
PLAAD
P.O. BOX 184
STILLWATER, MN 55082
CONTACT: Matt Byers
TEL: 651-336-1393

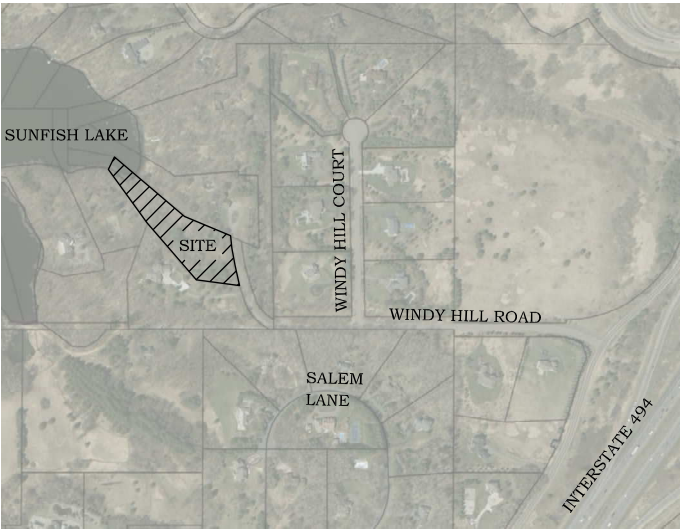
BUILDER
STREETER CUSTOM BUILDERS
18312 MINNETONKA BOULEVARD
WAYZATA, MN 55391
CONTACT: Joe Crowley
TEL: 952-346-2495

PROPERTY INFORMATION

ADDRESS: 39 WINDY HILL ROAD, SUNFISH LAKE, MN
PARCEL ID: 387320201030
LOT AREA: 106,090 SQ. FT. (2.44 ACRES) TO OHW
WATERSHED: LOWER MISSISSIPPI RIVER

CONSTRUCTION NOTES

- ALL EXISTING INFORMATION AND PROPOSED GRADING TAKEN FROM DRAWINGS BY CORNERSTONE LAND SURVEYING, DATED OCTOBER 21, 2019.
- CONTRACTOR TO FIELD VERIFY ALL EXISTING CONDITIONS INCLUDING LOCATIONS OF EXISTING UTILITIES, AND NOTIFY ENGINEER OF ANY DISCREPANCIES PRIOR TO STARTING CONSTRUCTION.
- CONTRACTOR TO PREVENT DIRT AND/OR DEBRIS FROM BEING TRANSPORTED OFF-SITE IN AN UNCONTROLLED MANNER. SEDIMENT DISCOVERED SHALL BE REMOVED BY CONTRACTOR WITHIN 7 DAYS OF DISCOVERY.
- ALL WORK TO BE PERFORMED IN ACCORDANCE WITH CITY OF SUNFISH LAKE AND STATE OF MINNESOTA REGULATIONS AND STANDARDS.
- EXISTING UTILITIES ARE SHOWN IN THEIR APPROXIMATE LOCATIONS. CONTRACTOR TO FIELD VERIFY THE LOCATION OF ALL EXISTING UTILITIES WHICH MAY INCLUDE BUT IS NOT LIMITED TO: ELECTRIC, TELEPHONE, GAS, CABLE TV, COMPUTER CABLE, FIBER OPTIC CABLE, SANITARY SEWER, STORM SEWER AND WATER MAIN. CONTRACTOR TO CONTACT THE GOPHER STATE ONE CALL BEFORE EXCAVATING.
- CONTRACTOR TO PROTECT FROM DAMAGE ALL EXISTING IMPROVEMENTS, LANDSCAPING, STRUCTURES AND UTILITIES THAT ARE TO REMAIN. CONTRACTOR TO STORE AND PROTECT EXISTING SITE FEATURES WHICH NEED TO BE REMOVED AND REPLACED. CONTRACTOR TO PREVENT DAMAGE OR THEFT OF THESE ITEMS AND TO REPAIR AND REPLACE AT OWN EXPENSE.
- ALL EXCAVATIONS MUST COMPLY WITH THE REQUIREMENTS OF OSHA 29 CFR, PART 1926, SUBPART P "EXCAVATIONS AND TRENCHES". THIS DOCUMENT STATES THAT EXCAVATION SAFETY IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR.
- CONTRACTOR SHALL COORDINATE WITH ARCHITECT'S DRAWINGS TO VERIFY LOCATION, SIZE AND QUANTITY OF ALL ROOF DRAINS AND UTILITY CONNECTIONS.
- PROVIDE TRAFFIC CONTROL IN ACCORDANCE WITH MMUTCD, INCLUDING "FIELD MANUAL FOR TEMPORARY TRAFFIC CONTROL ZONE LAYOUTS", CURRENT EDITION.
- DRAWINGS DO NOT INDICATE AREAS OF TEMPORARY SUPPORT SYSTEMS. THE CONTRACTOR IS RESPONSIBLE FOR ALL MEANS AND METHODS AND WILL HAVE TOTAL CONTROL OVER THE TYPES AND DESIGN OF ALL SHORING, SHEETING, BRACING, ANCHORAGES, EXCAVATION SUPPORT WALLS, DIRECTIONAL BORING, AUGER JACKING, SOIL STABILIZATION AND OTHER METHODS OF PROTECTING EXISTING IMPROVEMENTS. SEE SPECIFICATIONS FOR SUBMITTAL REQUIREMENTS.
- CONTRACTOR SHALL OBTAIN ALL REQUIRED PERMITS PRIOR TO STARTING CONSTRUCTION.
- ALL MATERIALS FOR PROPOSED CONSTRUCTION OR REPAIR OF EXISTING FACILITIES SHALL BE NEW PRODUCTS DIRECT FROM THE FACTORY AND FREE FROM DEFECTS.
- WHEN WORKING AROUND EXISTING UTILITIES, LIGHT POLES, TRAFFIC SIGNALS, TELEPHONE OR POWER POLES, THE CONTRACTOR SHALL PROVIDE SUFFICIENT SUPPORT OR BRACING TO PREVENT EXCESSIVE STRESS ON THE PIPING. THE CONTRACTOR IS FULLY RESPONSIBLE FOR ANY DAMAGES CAUSED BY FAILURE TO EXACTLY LOCATE AND PRESERVE THESE UNDERGROUND FACILITIES.
- CARE MUST BE TAKEN DURING CONSTRUCTION AND EXCAVATION TO PROTECT ANY SURVEY MONUMENTS AND/OR PROPERTY IRONS. MONUMENTS DAMAGED OR DISPLACED DUE TO CONTRACTOR NEGLIGENCE SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
- CONTRACTOR SHALL NOT BLOCK DRAINAGE FROM OR DIRECT EXCESS DRAINAGE ONTO ADJACENT PROPERTY.
- ADEQUATE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION AND ANY DRAINAGE STRUCTURE DISTURBED DURING CONSTRUCTION SHALL BE RESTORED TO THE SATISFACTION OF THE OWNING AUTHORITY.
- CONTRACTOR MUST ADHERE TO AXLE LOAD LIMITS WHEN DELIVERING MATERIALS AND EQUIPMENT TO THE SITE. ANY DAMAGE TO THE ROADWAY AND THE CITY RIGHT-OF-WAY SHALL BE REPAIRED TO THE CITY'S SATISFACTION AT THE COST OF THE CONTRACTOR.
- CONTRACTOR SHALL TAKE PHOTOGRAPHS AND DOCUMENT THE CONDITION OF THE EXISTING ROADWAY PRIOR TO CONSTRUCTION.



LOCATION MAP

DRAWING INDEX

C000 - COVER SHEET
C100 - SITE REMOVALS PLAN
C200 - STORMWATER POLLUTION PREVENTION NOTES
C300 - STORMWATER POLLUTION PREVENTION DETAILS
C400 - GRADING, DRAINAGE AND EROSION CONTROL PLAN
C500 - STORMWATER MANAGEMENT PLAN
C600 - STORMWATER MANAGEMENT DETAILS

PIERCE PINI &
ASSOCIATES, INC.
Consulting Civil Engineers

9298 CENTRAL AVENUE NE
SUITE 312
BLAINE, MN 55434
TEL 763-537-1311

WINDY HILL ROAD
RESIDENCE
39 WINDY HILL ROAD
SUNFISH LAKE, MINNESOTA

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Company: PIERCE PINI & ASSOCIATES

Signed:

Name: Kevin Gardner

Date: 05/11/2020 Reg. No: 45815

Issued for

Date

Permit Set

05/11/2020

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Comm. No.

20-006

Drawn

DM

Checked

KG

Date

05/11/2020

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Drawing Title

COVER SHEET

C000

WINDY HILL ROAD
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39 WINDY HILL ROAD
SUNFISH LAKE, MINNESOTA

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Checked

KG

Date

05/11/2020

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Drawing Title

SITE REMOVALS PLAN

C100

TREE REMOVALS

TREE ID	SPECIES	SIZE
406	RED PINE	14"
408	ROCK ELM	8"
409	ASH	12"
410	SILVER MAPLE	12"
411	SPRUCE	9"
413	SPRUCE	20"
424	ASH	18"
425	ASH	12"
426	ASH	8"
427	ASH	11"
434	RED PINE	14"
442	ASH	10"
443	ASH	10"
444	ASH	14"
445	WHITE PINE	26"
450	WHITE PINE	50"
451	ASH	7"
455	ASH	7"
456	ASH	8"
458	ASH	10"
459	ASH	10"
460	COTTONWOOD	30"
461	HACKBERRY	8"
462	ASH	9"
463	AS	7"
464	ASH	6"
465	ASH	6"
466	ROCK ELM	10"
467	ASH	12"
468	WHITE PINE	2"
469	ASH	10"
470	BOX ELDER	12"
471	ASH	7"
472	ASH	10"
488	SILVER MAPLE	6"
489	SILVER MAPLE	12"
494	RED OAK	8"

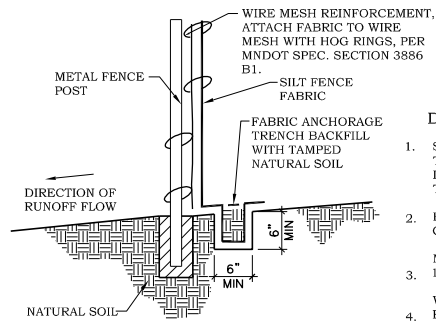
TREE ID	SPECIES	SIZE
827	UNKNOWN	8"
828	UNKNOWN	6"
829	UNKNOWN	6"
830	UNKNOWN	6"
831	UNKNOWN	7"
832	UNKNOWN	8"
833	UNKNOWN	7"
835	UNKNOWN	7"
836	UNKNOWN	8"
837	UNKNOWN	9"
838	UNKNOWN	10"
839	UNKNOWN	8"
840	UNKNOWN	7"
841	UNKNOWN	7"
842	UNKNOWN	8"
843	UNKNOWN	8"
855	UNKNOWN	6"
856	UNKNOWN	6"
857	SPRUCE	7"
858	SPRUCE	7"
859	SPRUCE	6"
860	SPRUCE	7"
861	UNKNOWN	6"
862	UNKNOWN	12"
863	UNKNOWN	8"
864	UNKNOWN	8"
865	UNKNOWN	12"
866	UNKNOWN	8"
867	UNKNOWN	10"
868	UNKNOWN	6"



SITE REMOVALS PLAN

1"=30'

WINDY HILL ROAD
RESIDENCE
39 WINDY HILL ROAD
SUNFISH LAKE, MINNESOTA



NOTE: SILT FENCE SHALL FOLLOW
MNDOT SPEC. SECTION 3886.

FIGURE 1 TYPICAL INSTALLATION FOR SILT FENCE

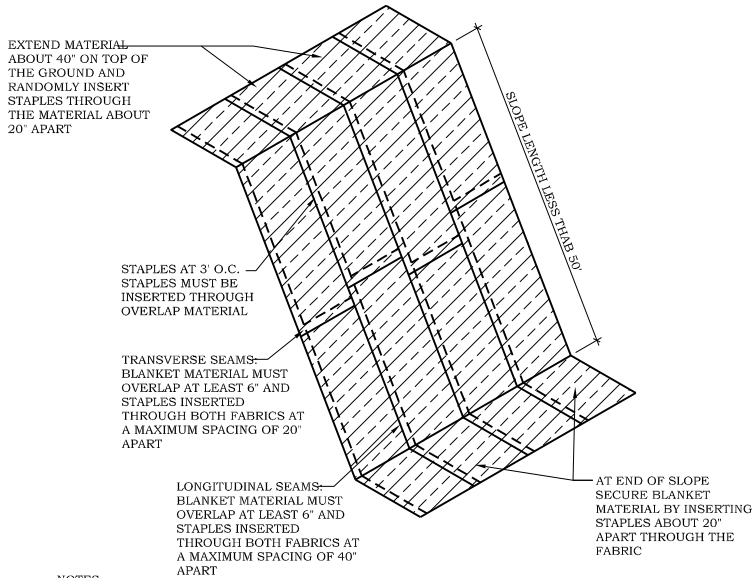
TABLE 1 MAXIMUM SLOPE LENGTH AND SLOPE FOR WHICH SILT FENCE IS APPLICABLE

SLOPE H:V	PERCENT	BY CALCULATION		BY ACCEPTED DESIGN PRACTICES
		SILT FENCE STORAGE EQUALES 2 FT FOR A 100-YEAR EVENT	SILT FENCE STORAGE EQUALS 2 FT FOR A 2-YEAR EVENT OR 3 FT FOR A 100-YEAR EVENT	
100:1	1%	400 FT	900 FT	100 FT
50:1	2%	200 FT	450 FT	75 FT
25:1	4%	100 FT	225 FT	75 FT
20:1	5%	80 FT	180 FT	75-50 FT
17:1	6%	67 FT	150 FT	50 FT
12.5:1	8%	50 FT	112 FT	50 FT
10:1	10%	40 FT	90 FT	50-25 FT
5:1	20%	20 FT	45 FT	25-15 FT
4:1	25%	16 FT	36 FT	15 FT
3:1	33%	12 FT	27 FT	15 FT
2:1	50%	8 FT	18 FT	15 FT

1
C300
HEAVY DUTY SILT FENCE
NO SCALE

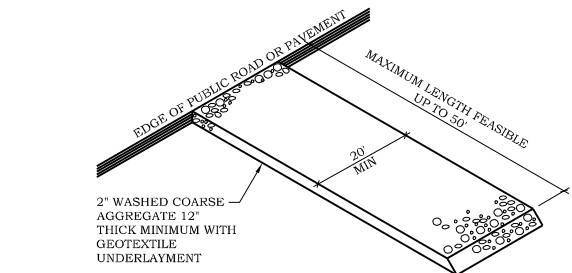
DESIGN RECOMMENDATIONS

- SILT FENCES SHOULD BE INSTALLED ON THE CONTOUR (AS OPPOSED TO UP AND DOWN A HILL) AND CONSTRUCTED SO THAT FLOW CANNOT BYPASS THE ENDS.
- ENSURE THAT THE DRAINAGE AREA IS NO GREATER THAN 1/4 ACRE PER 100 FT OF FENCE.
- MAKE THE FENCE STABLE FOR THE 10-YEAR PEAK STORM RUNOFF.
- WHERE ALL RUNOFF IS TO BE STORED BEHIND THE SILT FENCE, ENSURE THAT THE MAXIMUM SLOPE LENGTH BEHIND THE FENCE DOES NOT EXCEED THE SPECIFICATIONS SHOWN IN TABLE 1.

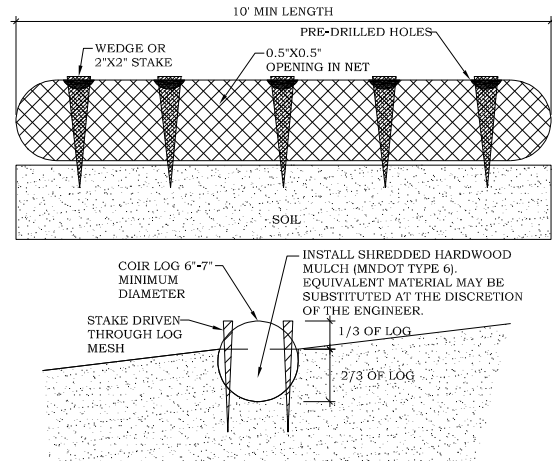


- NOTES:
- EROSION CONTROL BLANKET TO BE CATEGORY 4-COCONUT 2S FOR SLOPES GREATER THAN 5:1 AND SIDES AND BOTTOM OF ALL DRAINAGE SWALES AND PONDING AREAS AND CATEGORY 2-STRAW 2S FOR ALL SLOPES LESS THAN 5:1 PER MNDOT SPEC. SECTION 3885.
 - INSTALL PER MNDOT SPEC. SECTION 2575

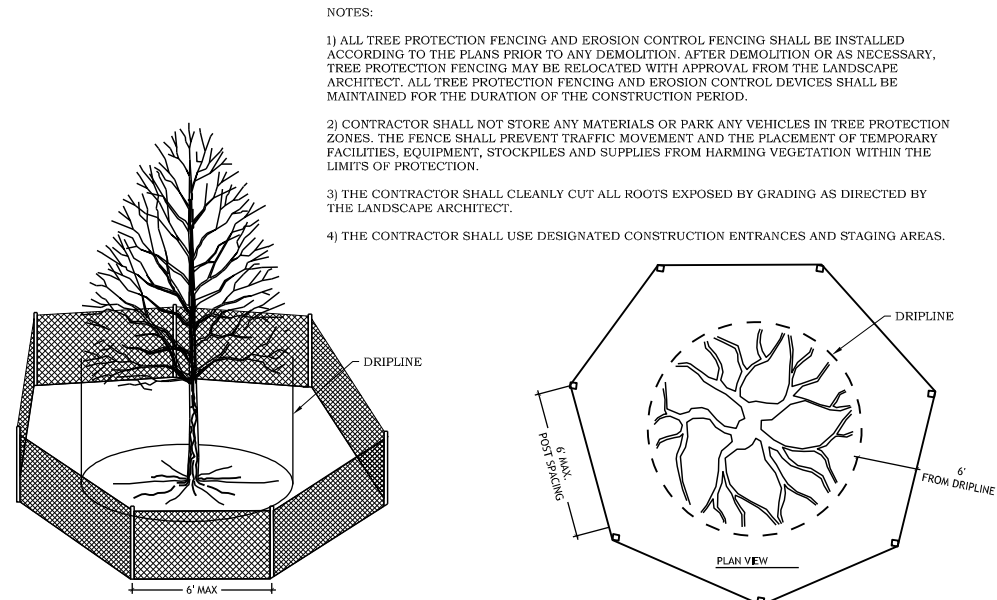
2
C300
EROSION CONTROL BLANKET
NO SCALE



3
C300
GRAVEL CONSTRUCTION ENTRANCE
NO SCALE



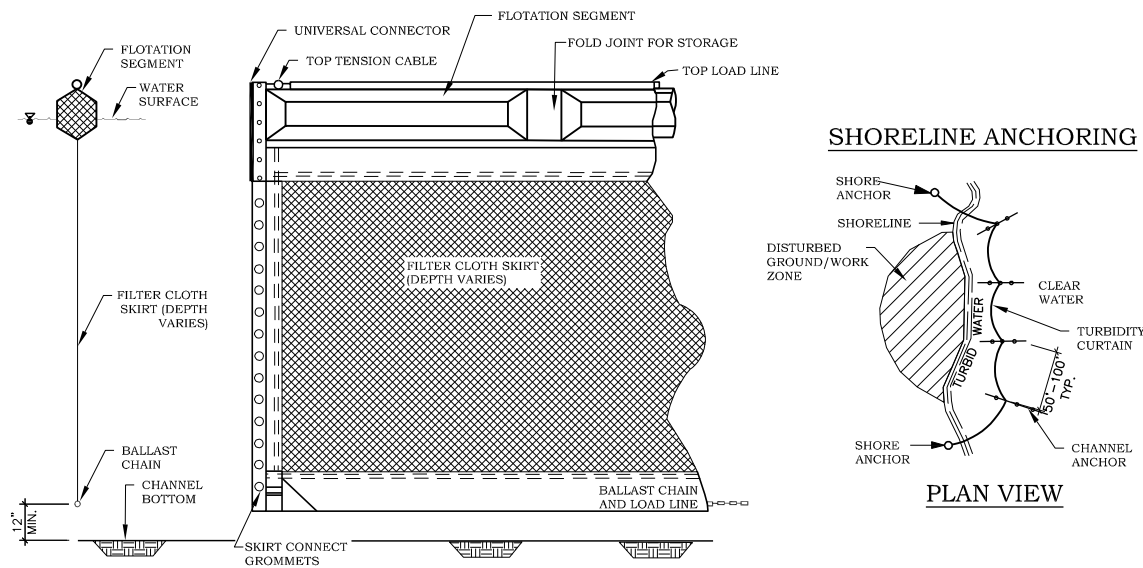
4
C300
COIR LOG
NO SCALE



5
C300
TREE PROTECTION FENCING
NO SCALE

NOTES:

- ALL TREE PROTECTION FENCING AND EROSION CONTROL FENCING SHALL BE INSTALLED ACCORDING TO THE PLANS PRIOR TO ANY DEMOLITION. AFTER DEMOLITION OR AS NECESSARY, TREE PROTECTION FENCING MAY BE RELOCATED WITH APPROVAL FROM THE LANDSCAPE ARCHITECT. ALL TREE PROTECTION FENCING AND EROSION CONTROL DEVICES SHALL BE MAINTAINED FOR THE DURATION OF THE CONSTRUCTION PERIOD.
- CONTRACTOR SHALL NOT STORE ANY MATERIALS OR PARK ANY VEHICLES IN TREE PROTECTION ZONES. THE FENCE SHALL PREVENT TRAFFIC MOVEMENT AND THE PLACEMENT OF TEMPORARY FACILITIES, EQUIPMENT, STOCKPILES AND SUPPLIES FROM HARMING VEGETATION WITHIN THE LIMITS OF PROTECTION.
- THE CONTRACTOR SHALL CLEANLY CUT ALL ROOTS EXPOSED BY GRADING AS DIRECTED BY THE LANDSCAPE ARCHITECT.
- THE CONTRACTOR SHALL USE DESIGNATED CONSTRUCTION ENTRANCES AND STAGING AREAS.



6
C300
FLOATING SILT CURTAIN
NO SCALE

I hereby certify that this plan or drawing was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Company: PIERCE PINI & ASSOCIATES

Signed:

Name: Kevin Gardner

Date: 05/11/2020 Reg. No: 45815

Issued for Date

Permit Set 05/11/2020

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Comm. No. 20-006

Drawn DM

Checked KG

Date 05/11/2020

Permit Set

Drawing Title

STORMWATER
POLLUTION
PREVENTION DETAILS

C300

WINDY HILL ROAD
RESIDENCE
39 WINDY HILL ROAD
SUNFISH LAKE, MINNESOTA

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Company: PIERCE PINI & ASSOCIATES

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Comm. No. 20-006

Drawn DM

Checked KG

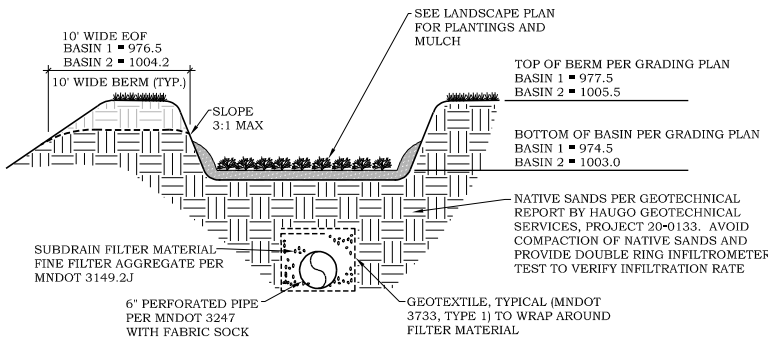
Date 05/11/2020

Permit Set

Drawing Title

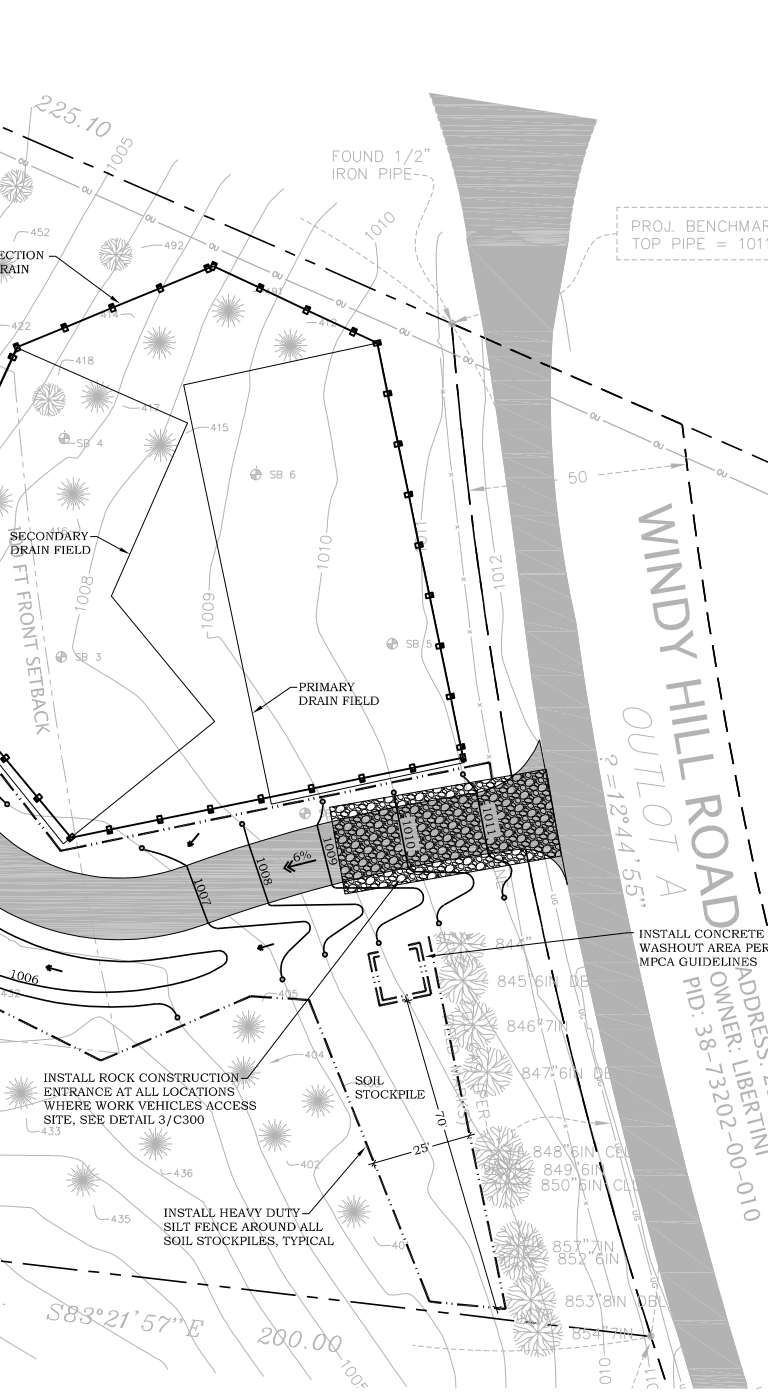
GRADING, DRAINAGE
AND EROSION
CONTROL PLAN

C400



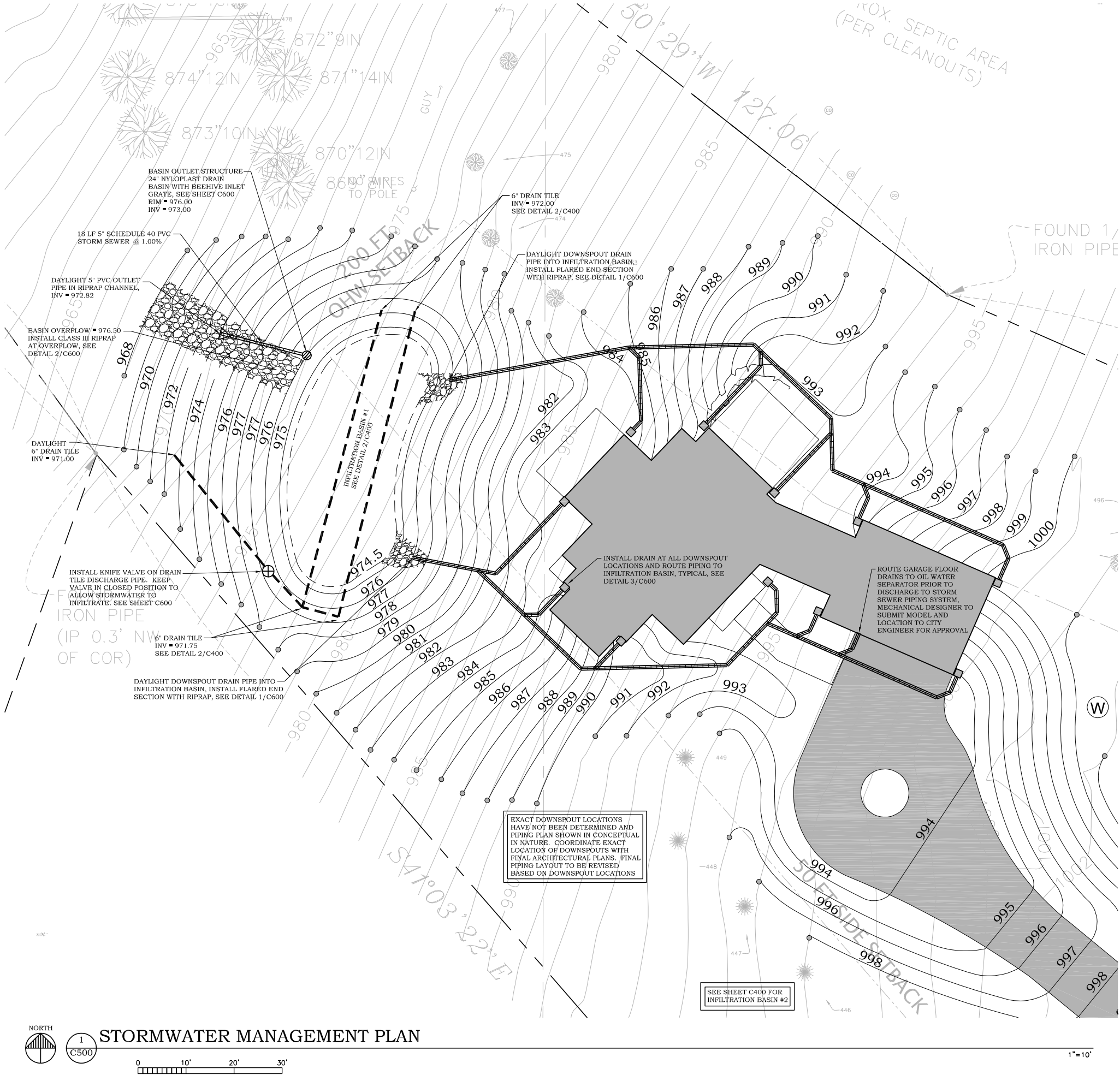
OVEREXCAVATE EXISTING NATIVE SOILS WITHIN FOOTPRINT OF BASIN. REMOVE ALL EXISTING SANDY LEAN CLAYS AND EXPOSE NATIVE SANDS. REFER TO GEOTECHNICAL REPORT BY HAUGO GEOTECHNICAL SERVICES, PROJECT 20-0133.

2 INFILTRATION BASIN
C400 NO SCALE



CONSTRUCTION SEQUENCING
AND INSPECTION OF EROSION
AND SEDIMENT CONTROL
PRACTICES FOR STORMWATER
MANAGEMENT SYSTEMS

- A. OBTAIN PERMITS FOR SITE WORK FROM CITY OF SUNFISH LAKE AND ALL GOVERNING AUTHORITIES WITH JURISDICTION IN THIS CONSTRUCTION AREA.
- B. INSTALL PERIMETER EROSION CONTROL AND TREE PROTECTION WITHIN AND ADJACENT TO LIMITS OF CONSTRUCTION. INSTALL EROSION CONTROL INSERTS AT ALL CATCH BASINS AND MANHOLES AND CONSTRUCT ROCK CONSTRUCTION ENTRANCE. SEE EROSION CONTROL PLANS FOR FURTHER INSTRUCTION.
- C. PROCEED WITH SITE DEMOLITION, GRADING AND CONSTRUCTION.
- D. MAINTAIN EROSION CONTROL BMP'S AND CONTROL RUNOFF REQUIREMENTS AS OUTLINED ON DRAWINGS AND SPECIFICATIONS.
- E. ALL SITE WORK SHOULD BE COMPLETE PRIOR TO WORK ON THE STORMWATER AREAS BEING STARTED TO THE EXTENT POSSIBLE. IF CONSTRUCTION OF THESE AREAS NEEDS TO OCCUR PRIOR TO FINAL SITE STABILIZATION, THEN THE CONSTRUCTED AREA MUST BE PROTECTED AND CONTRIBUTING FLOWS NEED TO BE FILTERED TO PREVENT SEDIMENT ACCUMULATION. THE STORMWATER MANAGEMENT SYSTEMS NEED TO BE PROTECTED FROM EROSION AND SEDIMENT. SILT FENCE WILL BE REQUIRED AROUND ITS PERIMETER TO KEEP THE AREA OF THE STORMWATER SYSTEMS PROTECTED.
- F. NOTIFY CIVIL ENGINEER AND CITY OF SUNFISH LAKE OF WORK BEING DONE ON STORMWATER SYSTEMS AND THE SCHEDULE OF CONSTRUCTION. ALLOW A MINIMUM OF FIVE WORKING DAYS FOR NOTIFICATION SO ENGINEER CAN CONDUCT SITE MEETING TO DISCUSS THE INTENT OF THE SYSTEM AND CONSTRUCTION OBSERVATION CAN BE SCHEDULED ACCORDINGLY. SITE MEETING TO REVIEW THE INTENT OF THE DESIGN AND THE CONSTRUCTION OF THE STORMWATER SYSTEM NEEDS TO OCCUR PRIOR TO STARTING CONSTRUCTION ON THE SYSTEM.
- G. MAINTAIN EROSION AND SEDIMENT CONTROL ON CONTRIBUTING AREAS TO AVOID SEDIMENTATION OF SYSTEM.
- H. CONSTRUCT STORMWATER SYSTEMS PER DRAWINGS AND SPECIFICATIONS.
- I. COMPLETE CONSTRUCTION OF PARKING AND SIDEWALKS AFTER STORMWATER SYSTEM IS INSTALLED. AFTER PAVEMENT IS INSTALLED, VERIFY THAT STORMWATER SYSTEMS ARE CLEAR AND FULLY FUNCTIONAL. EXCAVATE, DREDGE, OR CLEAN AS NEEDED SO THEY ARE FULLY FUNCTIONAL AT PROJECT CLOSEOUT.
- J. INSTALL LANDSCAPING AND PLANTING MATERIALS PER LANDSCAPE DRAWINGS AND SPECIFICATIONS.
- K. REMOVE ALL TEMPORARY EROSION CONTROL BMP'S AFTER PAVING AND STORMWATER AREAS ARE COMPLETE AND AFTER TURF HAS BEEN ESTABLISHED.
- L. CONTRACTOR SHALL TAKE PHOTOGRAPHS AND MEASUREMENTS OF ALL STORMWATER MANAGEMENT SYSTEMS THROUGHOUT CONSTRUCTION. DOCUMENTATION OF CONSTRUCTION SHALL BE SUBMITTED TO THE CIVIL ENGINEER AT THE CLOSEOUT OF THE PROJECT. CLOSEOUT DOCUMENTATION SHALL INCLUDE PHOTOGRAPHS AND MEASUREMENTS OF SYSTEM DURING CONSTRUCTION, TESTING REPORTS AND OBSERVATIONS AND REDLINE DRAWINGS OF ANY FIELD MODIFICATIONS MADE DURING CONSTRUCTION.
- M. A LETTER WRITTEN ON COMPANY LETTERHEAD THAT THE STORMWATER MANAGEMENT PRACTICES HAVE BEEN BUILT PER THE CIVIL PLANS, OR PER REDLINE FIELD DRAWINGS, SHALL BE SUBMITTED TO THE CIVIL ENGINEER AT THE CLOSEOUT OF THE PROJECT.
- N. THE CONTRACTOR SHALL SUBMIT AN AS-BUILT SURVEY OF THE COMPLETED SITE PREPARED AND SIGNED BY A LICENSED SURVEYOR TO THE CIVIL ENGINEER AT THE END OF THE PROJECT. AS-BUILT SURVEY SHALL INCLUDE ENOUGH INFORMATION TO VERIFY THE CONSTRUCTED TOPOGRAPHY, UTILITY AND SITE ELEMENTS. TOPOGRAPHY OF THE PONDS SHALL BE INCLUDED IN THE AS-BUILT SURVEY. COORDINATE WITH OWNER AND CIVIL ENGINEER FOR SCHEDULE FOR WHEN THIS SHALL BE COMPLETED.



PIERCE PINI &
ASSOCIATES, INC.
Consulting Civil Engineers

9298 CENTRAL AVENUE NE
SUITE 312
BLAINE, MN 55434
TEL 763-537-1311

WINDY HILL ROAD
RESIDENCE
39 WINDY HILL ROAD
SUNFISH LAKE, MINNESOTA

I hereby certify that this plan or drawing was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Company: PIERCE PINI & ASSOCIATES

Signed:

Name: Kevin Gardner

Date: 05/11/2020

Reg. No: 45815

Issued for

Date

Permit Set

05/11/2020

Copyright 2020 Pierce Pini & Associates, Inc.

Comm. No.

20-006

Drawn

DM

Checked

KG

Date

05/11/2020

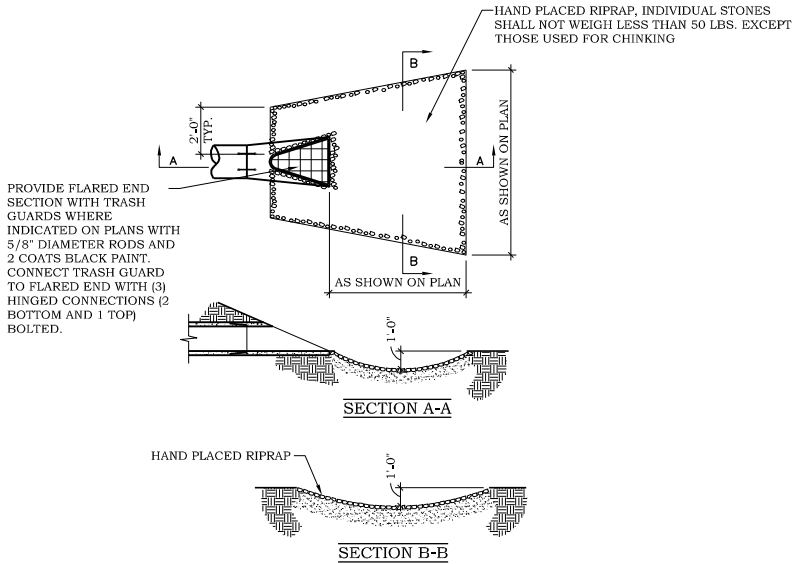
Permit Set

Drawing Title

STORMWATER
MANAGEMENT PLAN

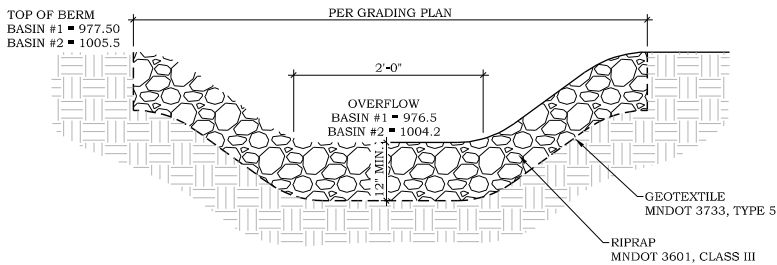
C500

WINDY HILL ROAD
RESIDENCE
39 WINDY HILL ROAD
SUNFISH LAKE, MINNESOTA



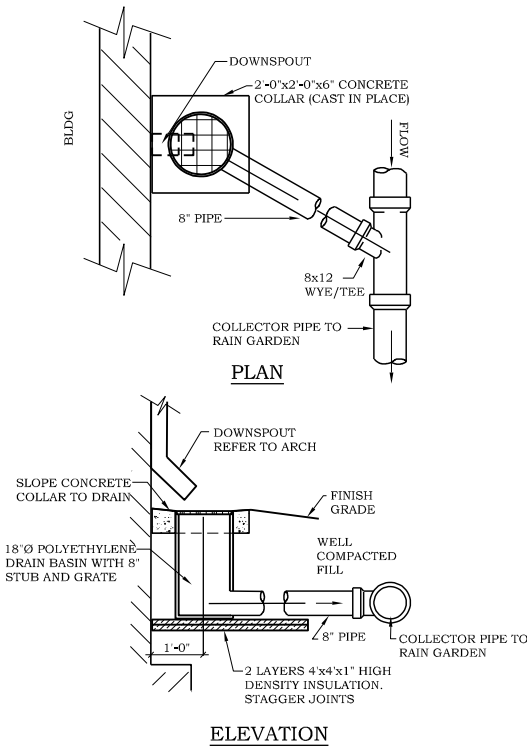
1 FLARED END SECTION WITH RIPRAP

NO SCALE



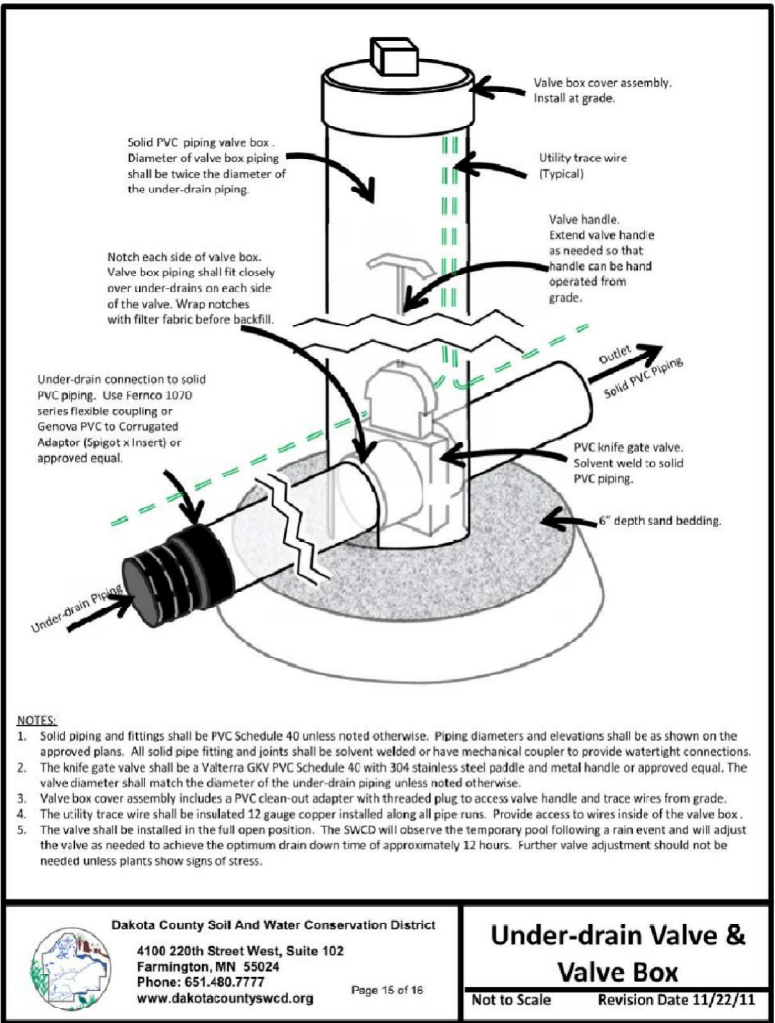
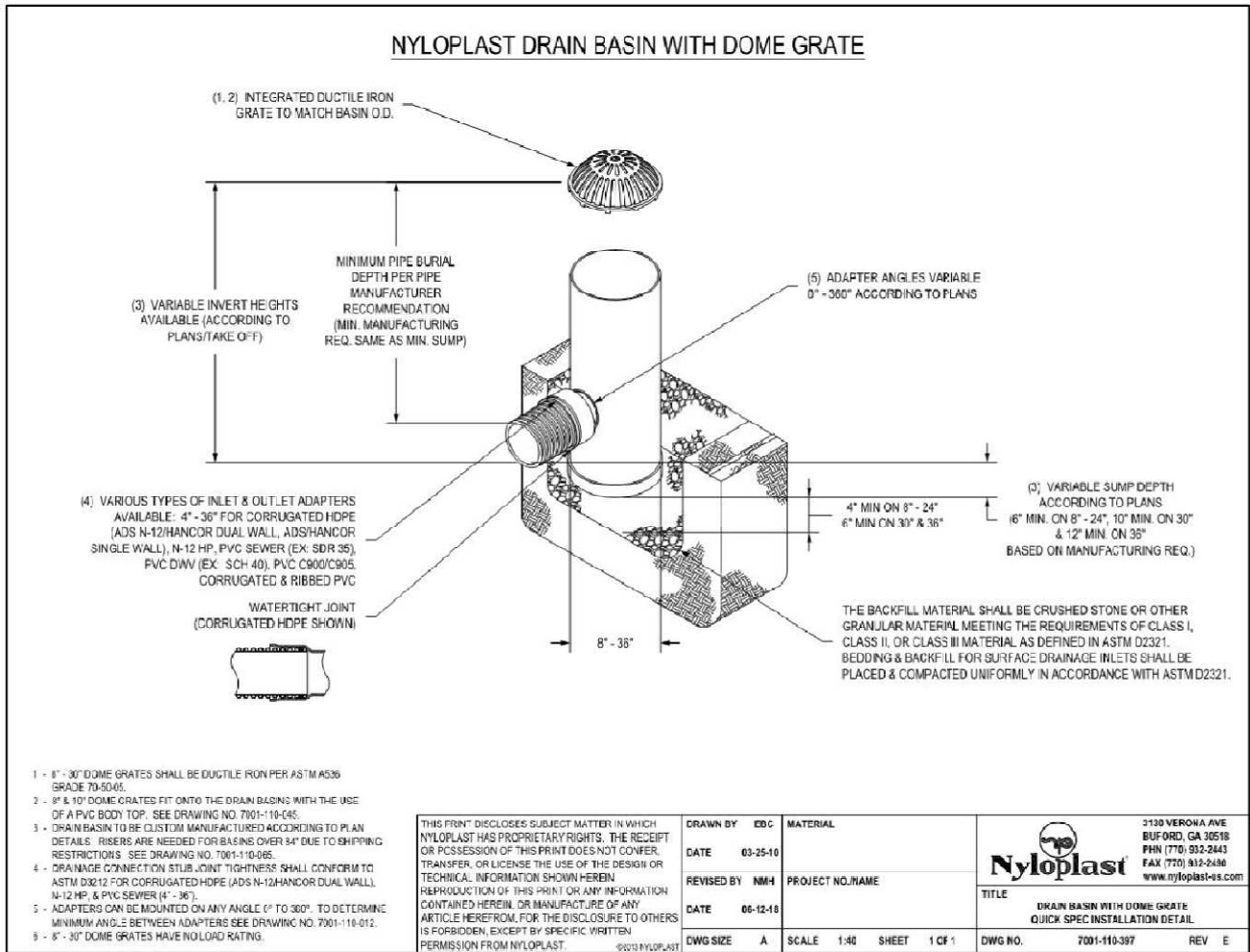
2 RIPRAP AT BASIN OVERFLOW

NO SCALE



3 DRAIN AT DOWNSPOUT

NO SCALE



I hereby certify that this plan or drawing was prepared by me or under my direct supervision and that I am a duly licensed Professional Engineer under the laws of the State of Minnesota.

Company: PIERCE PINI & ASSOCIATES

Signed:

Name: Kevin Gardner

Date: 05/11/2020

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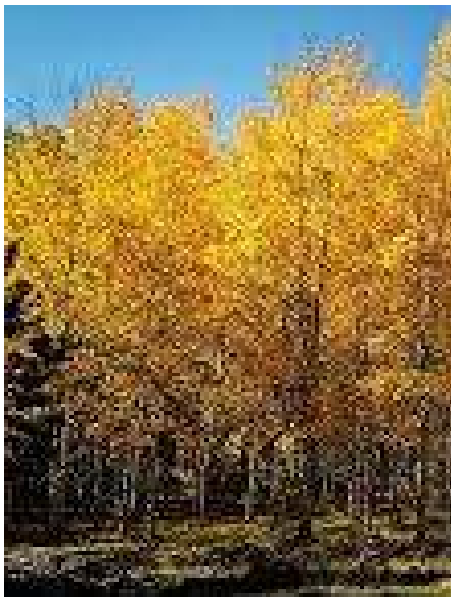
Permit Set

Drawing Title

STORMWATER
MANAGEMENT
DETAILS

C600





Quaking Aspen



Meadow Blazing Star



Big Bluestem



Eastern White Pine



Norway Spruce



Swamp Milkweed



Tufted Loosestrife



Proposed project, viewed from southwest, looking northeast from the entry driveway

12V LED Accent Light
with Variable Lumen Output (VLO)

16015-16017



OVERVIEW

The VLO Accent Light is unsurpassed in both style and performance. The VLO combines advanced LED, Driver & Optic technology with premium materials. A single fixture provides the installer the option to select three different lumen outputs reducing installation complexity and increasing infield versatility.

FEATURES

- High lumens in small body
- Variable lumen output
- Advanced optics provide superb center to edge uniformity
- Available beam angle: 10°, 35° & 60°
- Complete sealed system for improved reliability
- Advanced ESD protection (6 kV)
- IP66 rated

PERFORMANCE

Output Position	Level 1	Level 2	Level 3
Lumen output	100	200	300
Input voltage	9-15	9-15	9-15
Power (VA) @ 15VAC	3.5	5.5	8
Power (W) @ 15VDC	2	3.5	5.5
Efficacy (Lm/W @DC)	50	57	55
Halogen Replacements	10W	20W	30-35W

SPECIFICATIONS

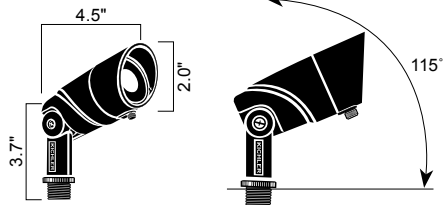
Fixtute	
Light Source	Integrated LED
Number of LEDs	1 High Output LED
Color Temperature	2700K, 3000K
Color Rendering Index	80
Beam Angles	10°, 35°, 60°
Binning	3 Step
Fixture can be used in UP or DOWN position	
Input	
Input Voltage Range	9 – 15V AC or DC with no loss in light output
Input Frequency	47 – 63Hz
Input Current	877mA max@15VAC
Inrush Current	9A Max
Efficiency	> 57L/W @ 12VDC
Power Factor	> 0.7 @ 15V
Output	
Lumen Level 3 (max)	300
Lumen Level 2 (mid)	200 (factory setting)
Lumen Level 1 (low)	100
Environmental	
Environmental Protection Rating	Wet, IP 66
Operation Ambient Temperature	-25°C - +40°C
Expected Life Time (L70)	50K Hours

Mechanical & Housing Specification

Length	4.5" / 114 mm
Width	2.0" / 50.5 mm
Height	3.7" / 94.5 mm
Housing Material	Aluminum, Brass
Housing Color & Surface	Black/AZT/ White/CBR Brass
Weight	Alum 13 oz/ 0.36Kg, Brass 30oz/ .9Kg

FIXTURE

Glass Lens
Tempered, shock resistance glass with high tolerance for thermal expansion and stress.
Body
A380 Aluminum, C360 Brass casting
Wire
18 AWG, SPT-1W, 105°C, 300V, 48" useable length
Optics
Custom reflector provides superior fixture beam angle. Available in 10°, 35° and 60°.
Included Accessories
Includes 8" slotted in-ground stake, 2 gel-filled wire nuts and lumen switching magnetic key.
Dimensions



AVAILABLE FINISHES

AZT Textured Architectural Bronze	BKT Textured Black	CBR Centennial Brass	WHT Textured White (35° only)
---	---------------------------------	-----------------------------------	---

KICHLER®

Type: SML-1
Source: LED

DESCRIPTION

Westwood 904 and 904-2 are small dimmable 50 MR16 or LED luminaires. Model 904 provides downlight or uplight. Model 904-2 provides combination uplight and downlight. A square shroud option (-SQS) is available in both models, offering rectilinear styling instead of cylindrical. Both models mount directly to any wall surface or over a standard 4-inch J-box and require a remote 12-volt step-down transformer (not included). Various lenses, louvers, and color or dichroic filters can be combined - up to three at once - to create multiple lighting effects.

SPECIFICATION FEATURES

Material

Housing and hood are precision-machined from corrosion-resistant 6061-T6 aluminum billet, brass, bronze* or stainless steel. Mounting canopy is constructed from corrosion-resistant silicone aluminum, brass, bronze* or stainless steel.

Finish Painted

Fixtures constructed from 6061-T6 aluminum are double protected by an ROHS* compliant chemical film undercoating and polyester powdercoat paint finish, surpassing the rigorous demands of the outdoor environment. A variety of standard colors are available. Brass, Bronze,* Copper or Stainless Steel fixtures are left unpainted to reveal the natural beauty of the material will patina naturally over time.

Hood

Hood is removable for easy relamping and accepts up to three internal accessories at once (lenses, louvers, filters) to achieve multiple lighting effects. Weep holes prevent water collection on the uplight position.

Gasket

Housing and hood are sealed with a high temperature silicone o-ring gasket to prevent water intrusion.

Lens

Tempered glass lens, factory sealed with high temperature adhesive to prevent water intrusion and breakage due to thermal shock.

Mounting

Both models mount directly to wall surface or over a standard 4" J-box and require remote 12V step-down transformer (not included). Model 904 provides downlight or uplight. Model 904-2 provides non-adjustable uplight and downlight. Lumière's exclusive Siphon Protection System (S.P.S.) prevents water from siphoning into the fixture through its own lead wires.

Hardware

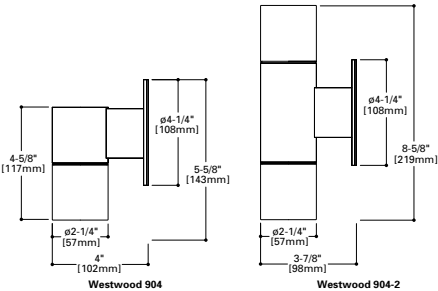
Stainless steel hardware is standard to provide maximum corrosion-resistance.

Socket

Ceramic socket with 250° C Teflon® coated lead wires and GU5.3 bi-pin base.

Electrical

Remote 12V transformer required (not included). Initial power draw on LED equipped fixtures is 12 watts. When sizing transformer use 12 watts per LED fixture. Nominal power draw after start up is 8 watts. Also, LEDs



ORDERING INFORMATION

Series	Source (for LED, select from each column and combine)	Voltage	Finish
904=LED Westwood Up or Down Wall Fixture Single 904-2=MR16 Westwood Up/Down Wall Fixture-Dual Head Round 904-UD=LED Westwood Up/Down Wall Fixture-Dual Head, Round 904-SQ-2=MR16 Westwood Up/Down Wall Fixture-Single Head, Square 904-SQ-UD=LED Westwood Up/Down Wall Fixture-Dual Head, Square	50MR16=50W max. Halogen MR16 (lamp not included)	12=12V	Painted BK=Black BZ=Bronze CS=City Silver VE=Verde WT=White Premium Finish NBR=Natural Brass NCP=Natural Copper NBZ=Natural Bronze* NSS=Natural Stainless Steel
	8LED=8W LED 27=2700K 30=3000K 40=4000K	10=10° Spot 25=25° Narrow 36=36° Wide	
	5LED=5W LED AM=Amber (585-595nm)	25=25° Narrow	

NOTES: *For natural bronze ROHS material consult factory.

Lumiere

Catalog #	Type
Project	
Comments	Date
Prepared by	

are more voltage sensitive than standard halogen MR16 lamps. The LED module is designed to operate within the range 12V +/- 1.2V. Any less or more voltage can cause premature failures.

Lamp

Halogen lamp not included. LED modules are included and are available in four color temperatures (2700, 3000, and 4000) and three distributions (spot, narrow, and flood). Both color temperature and distribution must be specified when ordering.

Labels & Approvals

UL and cUL listed, standard wet label. IP65 rated. Manufactured to ISO 9001-2000 Quality Systems Standard.

Warranty

Lumière warrants its fixtures against defects in materials & workmanship for three (3) years. Auxiliary equipment such as transformers, ballasts and lamps carry the original manufacturer's warranty.



904
904-2
WESTWOOD

8W LED
Wall
IP65
ROHS* Compliant



TECHNICAL Data
8W LED, L70/60,000 hours at 25°C
Low Voltage: 50W Halogen MR16

Type: CMDL-1/WMDL-1
Source: LED

DESCRIPTION

The following pages contain the soils report and boring logs, performed by Haugo Geotechnical Services on March 5, 2020.

Also included is an additional report requested by WSB for borings in the proposed detention basin, provided by Haugo on April 8, 2020.



March 5, 2020 HGTS Project Number: 20-0133

Mr. Joe Crowley
Elevation Homes
18312 Minnetonka Boulevard
Wayzata, MN 55391

Re: Soil Summary, 39 Windy Hill Road Sunfish Lake, Minnesota

Dear Mr. Crowley;

We have completed the soil borings at the above referenced address in Sunfish Lake, Minnesota. The purpose of the soil borings was to characterize soil and groundwater conditions within the footprint of the proposed home and evaluate their suitability for foundation support.

Documents Provided

To aid in our evaluation we were plan sheet A0.3 titled “Schematic Site Plan” which was prepared by PLAAD, LLC and dated January 10, 2020. The plan sheet showed a layout of the home on the property and provided topographic information as well as proposed floor grade(s).

Based on the Schematic Site Plan we anticipate that the main floor of the home will bear at or near elevation 996 with a walk-out elevation at or near elevation 985 ½.

Locations and Elevations

The soil boring locations were selected by HGTS based on the anticipated location of the proposed home and site access. The approximate locations of the soil borings are shown on Figure 1, “Soil Boring Location Sketch,” in the Appendix. The sketch was prepared by HGTS using the Schematic Site Plan as a base.

Ground surface elevations at the boring locations were estimated based on topographic information provided on the Schematic Site Plan. Therefore, the ground surface elevations presented on the boring logs should be considered approximate.

Procedures

Two (2) standard penetration test borings were advanced on February 28th, 2020 by HGTS with a rotary drilling rig, using continuous flight augers to advance the boreholes. Representative samples were obtained from the borings, using the split-barrel sampling procedures in general accordance with ASTM Specification D-1586. In the split-barrel sampling procedure, a 2-inch O.D. split-barrel spoon is driven into the ground with a 140-pound hammer falling 30 inches. The number of blows required to drive the sampling spoon the last 12 inches of an 18-inch penetration is recorded as the standard penetration resistance value, or "N" value. The results of the standard penetration tests are indicated on the boring log. The samples were sealed in containers and provided to HGTS for testing and soil classification.

A field log of each boring was prepared by HGTS. The logs contain visual classifications of the soil materials encountered during drilling, as well as the driller's interpretation of the subsurface conditions between samples and water observation notes. The final boring logs included with this report represent an interpretation of the field logs and include modifications based on visual/manual method observation of the samples.

The soil boring logs, general terminology for soil description and identification, and classification of soils for engineering purposes are also included in the appendix. The soil boring logs identify and describe the materials encountered, the relative density or consistency based on the Standard Penetration resistance (N-value, “blows per foot”) and groundwater observations.

The strata changes were inferred from the changes in the samples and auger cuttings. The depths shown as changes between strata are only approximate. The changes are likely transitions, variations can occur beyond the location of the boring.

Soil Conditions

The soil borings encountered about 1 foot of clayey topsoil at the surface that was dark brown or black and contained some roots.

Below the topsoil soil boring SB-1 encountered an approximate 3-foot layer of sandy lean clay glacial till that extended to a depth of about 4 feet below the ground surface.

Below the clay layer in soil boring SB-1 and below the topsoil in soil boring SB-2 the soil consisted of native sandy glacial till composed of poorly graded sand and poorly graded sand with silt that extended to the termination depths of the borings.

Penetration resistance values (N-Values), shown as blows per foot (bpf) on the boring logs, within the sandy lean clay glacial till was 10 bpf indicating a rather stiff consistency. N-Values in the sandy soils ranged from 6 to 14 bpf indicating a loose to medium dense relative density.

Water Conditions

Groundwater was not observed in the soil borings while drilling and sampling or after removing the augers from the boreholes

Water levels appear to be below the depths explored by our borings. Water levels were measured on the dates as noted on the boring logs and the period of water level observations was relatively short. Groundwater monitoring wells or piezometers would be required to more accurately determine water levels. Seasonal and annual fluctuations in the groundwater levels should be expected.

Based on information available on the Minnesota Department of Natural Resources website the Ordinary High-Water Level of nearby Sunfish Lake is 937 feet.

Discussion and Conclusions

The vegetation and topsoil encountered in the borings are not suitable for foundation, roadway or utility support and will need to be removed from below these areas and replaced with suitable compacted fill, as need, to attain design grades.

2825 Cedar Avenue S, Minneapolis, MN 55407

The underlying native clayey and sandy glacial till soils in our opinion are suitable for foundation support of the proposed home. Based on our borings we do not anticipate that soil corrections in excess of stripping the vegetation and topsoil will be required to provide adequate foundation support. However, loose soils and any soil disturbed during excavation and grading activities should be surface compacted prior to placing additional fill or foundations.

Groundwater was not encountered in the soil borings. We do not anticipate that groundwater will be encountered during construction and do not anticipate that dewatering will be required.

General

The analyses and recommendations presented in this report are based on data obtained from a limited number of soil borings. Variations can occur away from the borings, the nature of which may not become apparent until additional exploration work is completed, or construction is conducted. A reevaluation of the recommendations in this report should be made after performing on-site observations during construction to note the characteristics of any variations. The variations may result in additional construction costs and it is suggested that a contingency be provided for this purpose.

We made water level measurements in the soil borings at the times and under the conditions stated on the boring test pit logs. The data was interpreted in the text of this report. The period of observation was relatively short and fluctuations in the groundwater level may occur due to rainfall, flooding, irrigation, spring thaw, drainage, and other seasonal and annual factors not evident at the time the observations were made. Design drawings and specifications and construction planning should recognize the possibility of fluctuations.

Haugo GeoTechnical Services has used the degree of skill and care ordinarily exercised under similar circumstance by members of the profession currently practicing in this locality. No warranty expressed or implied is made.

Thank you for the opportunity to assist you on this project. If you have any questions or need additional information, please contact Paul Gionfriddo at 612-271-8185

Sincerely,

HAUGO GEOTECHNICAL SERVICES

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.

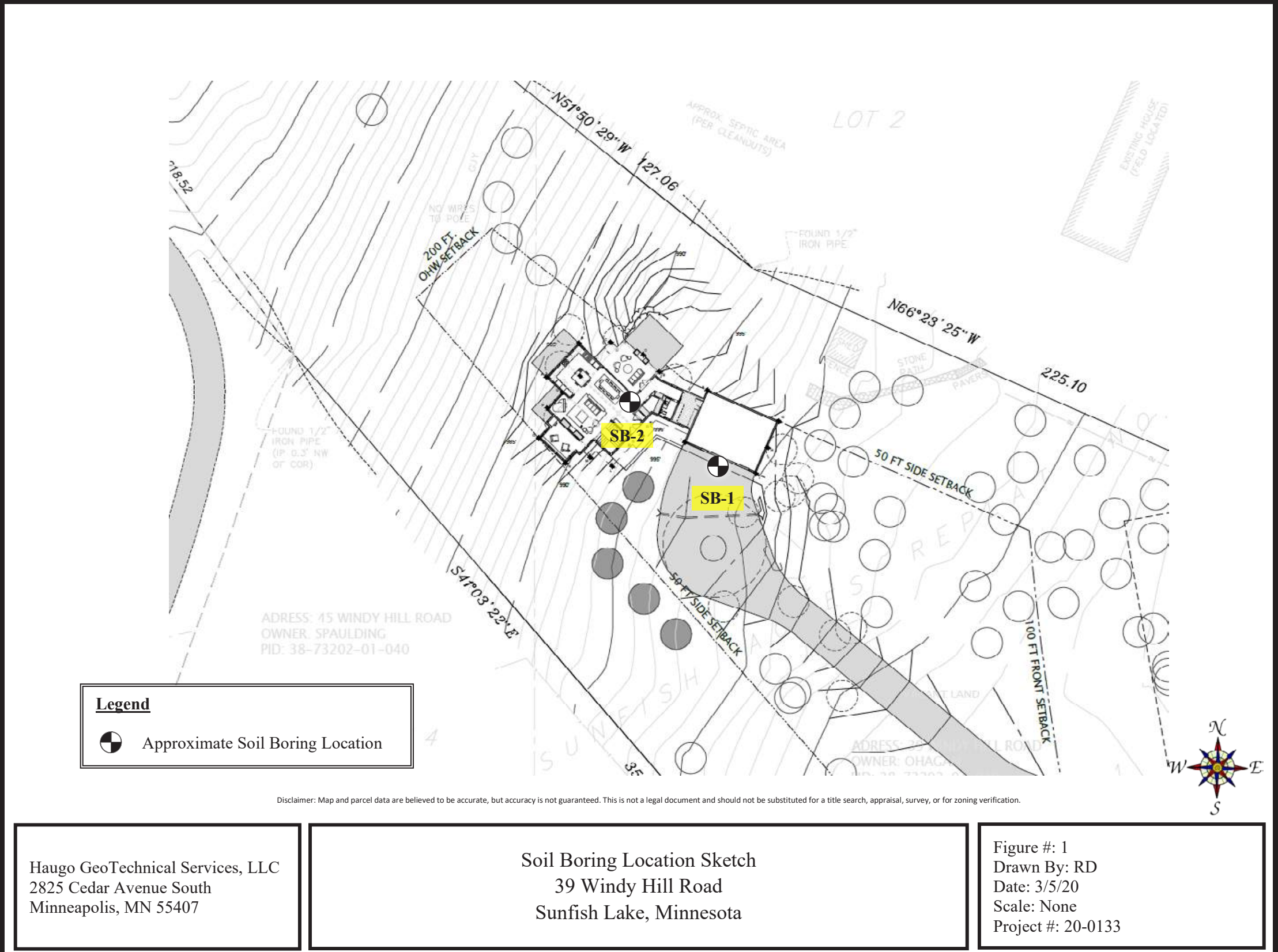

Paul Gionfriddo, P.E.
Senior Engineer
License Number 23093
Expires June 2020



2825 Cedar Avenue S, Minneapolis, MN 55407

Attachments: Soil Boring Location Sketch
Soil Boring Logs; SB-1 & SB-2
Descriptive Terminology

2825 Cedar Avenue S, Minneapolis, MN 55407



Haugo GTS
2825 Cedar Ave South
Minneapolis, MN 55407
Telephone: 612-729-2959

BORING NUMBER SB-1
PAGE 1 OF 1

CLIENT	Elevation Homes	PROJECT NAME	39 Windy Hill Road
PROJECT NUMBER	20-0133	PROJECT LOCATION	Sunfish Lake, MN
DATE STARTED	2/28/20	COMPLETED	2/28/20
DRILLING CONTRACTOR	HGTS - 750	GROUND ELEVATION	998 ft
		HOLE SIZE	3 1/4 inches
DRILLING METHOD	Hollow Stem Auger/Split Spoon	GROUND WATER LEVELS:	
LOGGED BY	CP	AT TIME OF DRILLING	--- Not Encountered
CHECKED BY	PG	AT END OF DRILLING	--- Not Encountered
NOTES	Borehole grouted. Ground surface elevation estimated.		
	AFTER DRILLING --- Not Encountered		

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲		
								20	40	60 80
								PL	MC	LL
								20	40	60 80
								☐ FINES CONTENT (%) ☐		
								20	40	60 80
0		Sandy Lean Clay, black and brown, frozen. (Topsoil)	AU 1							
		(CL) Sandy Lean Clay, trace Gravel, brown, moist, rather stiff. (Glacial Till)	SS 2		3-3-7 (10)					
		(SP-SM) Poorly Graded Sand with Silt, fine to medium grained, trace Gravel, brown, moist, medium dense. (Glacial Till)	SS 3		3-5-6 (11)					
			SS 4		6-7-7 (14)					
			SS 5		5-6-6 (12)					
		(SP) Poorly Graded Sand, fine to medium grained, trace Gravel, brown, moist, medium dense to loose. (Glacial Till)	SS 6		6-7-7 (14)					
			SS 7		5-5-5 (10)					
			SS 8		6-5-6 (11)					

Bottom of borehole at 21.0 feet.

Haugo GTS
2825 Cedar Ave South
Minneapolis, MN 55407
Telephone: 612-729-2959

BORING NUMBER SB-2

PAGE 1 OF 1

CLIENT Elevation Homes
PROJECT NUMBER 20-0133
DATE STARTED 2/28/20 COMPLETED 2/28/20
DRILLING CONTRACTOR HGTS - 750
DRILLING METHOD Hollow Stem Auger/Split Spoon
LOGGED BY CP CHECKED BY PG
NOTES Borehole grouted. Ground surface elevation estimated.

PROJECT NAME 39 Windy Hill Road
PROJECT LOCATION Sunfish Lake, MN
GROUND ELEVATION 993 ft HOLE SIZE 3 1/4 inches
GROUND WATER LEVELS:
AT TIME OF DRILLING --- Not Encountered
AT END OF DRILLING --- Not Encountered
AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲			
								20	40	60	80
								PL	MC	LL	
								20	40	60	80
								☐ FINES CONTENT (%) ☐			
								20	40	60	80
0		Silty Clay, trace Organics, dark brown, frozen. (Topsoil)									
		(SP-SM) Poorly Graded Sand with Silt, medium to coarse grained, with Gravel, brown, moist. (Glacial Till)	AU 9								
			SS 10		5-7-7 (14)						
			SS 11		4-6-7 (13)						
			SS 12		3-3-3 (6)						
			SS 13		5-10-8 (18)						
			SS 14		5-5-5 (10)						
			SS 15		5-4-5 (9)						
			SS 16		5-6-6 (12)						

Bottom of borehole at 21.0 feet.

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 3/5/20 11:38 - C:\USERS\PUBLIC\DOCUMENTS\BENTLEY\GINT\PROJECTS\20-0133 39 WINDY HILL - ROAD.GPJ



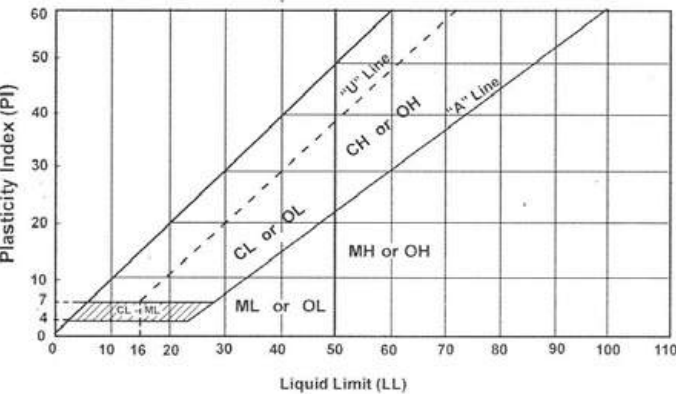
Descriptive Terminology of Soil



Standard D 2487 - 00
Classification of Soils for Engineering Purposes
(Unified Soil Classification System)

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests ^a					Soils Classification	
					Group Symbol	Group Name ^b
Coarse-grained Soils more than 50% retained on No. 200 sieve	Gravels More than 50% of coarse fraction retained on No. 4 sieve	Clean Gravels 5% or less fines ^e	$C_u \geq 4$ and $1 \leq C_c \leq 3$ ^c		GW	Well-graded gravel ^d
			$C_u < 4$ and/or $1 > C_c > 3$ ^c		GP	Poorly graded gravel ^d
	Sands 50% or more of coarse fraction passes No. 4 sieve	Gravels with Fines More than 12% fines ^e	Fines classify as ML or MH		GM	Silty gravel ^{d,f,g}
			Fines classify as CL or CH		GC	Clayey gravel ^{d,f,g}
		Clean Sands 5% or less fines ⁱ	$C_u \geq 6$ and $1 \leq C_c \leq 3$ ^c		SW	Well-graded sand ^h
			$C_u < 6$ and/or $1 > C_c > 3$ ^c		SP	Poorly graded sand ^h
Fine-grained Soils 50% or more passed the No. 200 sieve	Silt and clays Liquid limit less than 50	Inorganic	$PI > 7$ and plots on or above "A" line ^j		CL	Lean clay ^{k,l,m}
			$PI < 4$ or plots below "A" line ^j		ML	Silt ^{k,l,m}
		Organic	Liquid limit - oven dried	< 0.75	OL	Organic clay ^{k,l,m,n}
			Liquid limit - not dried		OL	Organic silt ^{k,l,m,o}
	Silt and clays Liquid limit 50 or more	Inorganic	PI plots on or above "A" line		CH	Fat clay ^{k,l,m}
			PI plots below "A" line		MH	Elastic silt ^{k,l,m}
Organic		Liquid limit - oven dried		OH	Organic clay ^{k,l,m,p}	
		Liquid limit - not dried	< 0.75	OH	Organic silt ^{k,l,m,q}	
Highly Organic Soils		Primarily organic matter, dark in color and organic odor			PT	Peat

- a. Based on the material passing the 3-in (75mm) sieve.
- b. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.
- c. $C_u = D_{60} / D_{10}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$
- d. If soil contains $\geq 15\%$ sand, add "with sand" to group name.
- e. Gravels with 5 to 12% fines require dual symbols:
- GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay
- f. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.
- g. If fines are organic, add "with organic fines" to group name.
- h. If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.
- i. Sands with 5 to 12% fines require dual symbols:
- SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay
- j. If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.
- k. If soil contains 10 to 29% plus No. 200, add "with sand" or "with gravel" whichever is predominant.
- l. If soil contains $\geq 30\%$ plus No. 200, predominantly sand, add "sandy" to group name.
- m. If soil contains $\geq 30\%$ plus No. 200 predominantly gravel, add "gravelly" to group name.
- n. $PI \geq 4$ and plots on or above "A" line.
- o. $PI < 4$ or plots below "A" line.
- p. PI plots on or above "A" line.
- q. PI plots below "A" line.



Laboratory Tests			
DD	Dry density, pcf	OC	Organic content, %
WD	Wet density, pcf	S	Percent of saturation, %
MC	Natural moisture content, %	SG	Specific gravity
LL	Liquid limit, %	C	Cohesion, psf
PL	Plastic limit, %	ϕ	Angle of internal friction
PI	Plasticity index, %	qu	Unconfined compressive strength, psf
P200	% passing 200 sieve	qp	Pocket penetrometer strength, tsf

Particle Size Identification	
Boulders	over 12"
Cobbles	3" to 12"
Gravel	
Coarse	3/4" to 3"
Fine	No. 4 to 3/4"
Sand	
Coarse	No. 4 to No. 10
Medium	No. 10 to No. 40
Fine	No. 40 to No. 200
Silt	< No. 200, $PI < 4$ or below "A" line
Clay	< No. 200, $PI \geq 4$ and on or above "A" line

Relative Density of Cohesionless Soils	
Very loose	0 to 4 BPF
Loose	5 to 10 BPF
Medium dense	11 to 30 BPF
Dense	31 to 50 BPF
Very dense	over 50 BPF

Consistency of Cohesive Soils	
Very soft	0 to 1 BPF
Soft	2 to 3 BPF
Rather soft	4 to 5 BPF
Medium	6 to 8 BPF
Rather stiff	9 to 12 BPF
Stiff	13 to 16 BPF
Very stiff	17 to 30 BPF
Hard	over 30 BPF

Drilling Notes

Standard penetration test borings were advanced by 3 1/4" or 6 1/4" ID hollow-stem augers unless noted otherwise. Jetting water was used to clean out auger prior to sampling only where indicated on logs. Standard penetration test borings are designated by the prefix "ST" (Split Tube). All samples were taken with the standard 2" OD split-tube sampler, except where noted.

Power auger borings were advanced by 4" or 6" diameter continuous-flight, solid-stem augers. Soil classifications and strata depths were inferred from disturbed samples augered to the surface and are, therefore, somewhat approximate. Power auger borings are designated by the prefix "B."

Hand auger borings were advanced manually with a 1 1/2" or 3 1/4" diameter auger and were limited to the depth from which the auger could be manually withdrawn. Hand auger borings are indicated by the prefix "H."

BPF: Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments and added to get BPF. Where they differed significantly, they are reported in the following form: 2/12 for the second and third 6" increments, respectively.

WH: WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WR: WR indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

TW indicates thin-walled (undisturbed) tube sample.

Note: All tests were run in general accordance with applicable ASTM standards.

Rev 7/07



April 8, 2020 HGTS Project Number: 20-0133A

Mr. Joe Crowley
Elevation Homes
18312 Minnetonka Boulevard
Wayzata, MN 55391

Re: Geotechnical Exploration, Proposed Infiltration Basin, 39 Windy Hill Road, Sunfish Lake, Minnesota

Dear Mr. Crowley:

We have completed the geotechnical exploration for the proposed infiltration basin at 39 Windy Hill Road in Sunfish Lake, Minnesota. This letter provides a summary of the soil and groundwater conditions encountered and provides estimated soil infiltration rates for use in infiltration basin design.

Project Description

Elevation Homes is preparing to construct a new home on the lot at 39 Windy Hill Road in Sunfish Lake, MN. Haugo Geotechnical Services (HGTS) completed a geotechnical exploration for the proposed home the result of which were presented in our letter/report dated March 5 2020. We understand that the project will also include constructing an infiltration basin which will be located approximately 40 feet northwest of the proposed home. We further understand that plans were submitted to the City of Sunfish Lake for review and permitting and prior to issuing construction permits the City required soil borings to be completed within the proposed infiltration basin. Because of that, Elevation Homes retained (HGTS) to advance soil borings within the proposed infiltration basin to characterize soil and groundwater conditions with respect to infiltration basin design and construction.

Documents Provided

To aid in our evaluation we were provided a 7-page plan set prepared by Pierce Pini & Associates, Inc., dated March 26, 2020. Plan Sheet C400 titled “Grading, Drainage and Erosion Control Plan” showed the location of the proposed house and infiltration basin along with the topographic contours. Plan Sheet C600 titled “Stormwater Management Details” provided infiltration basin details.

Procedures

Because the location of the infiltration basin was not accessible to our drill rig, we advanced 2 hand auger borings at the locations selected and staked in the filed by Elevation Homes. The hand auger borings were performed on April 2, 2020 using a 4-inch diameter bucket style hand auger. The hand auger was advanced in 3 to 6-inch increments to depths of about 6 and 7 feet below the ground surface. The hand auger was then withdrawn to obtain cuttings which were classified in general accordance with ASTM 2488, “Description and Identification of Soils (Visual/Manual Procedures)”. Soil boring logs identifying and describing the soil materials encountered in the hand augers are attached.

The ground surface elevations at the hand auger locations were estimated based on the topographic information provided on the Grading, Drainage and Erosion Control Plan. The approximate hand auger locations are shown on Figure 1, attached. The general terminology for soil description and identification and classification of soils for engineering purposes is also attached.

Results

At the surface, the hand auger borings encountered less than ½ foot of topsoil consisting of silty clay that was dark brown and black in color.

Below the topsoil, the borings encountered native glacial till soils that extended to the termination depths of the borings at about 6 and 7 feet below the ground surface. The glacial till soils consisted of sandy lean clay and silty sand meeting the ASTM Classifications of CL and SM, respectively.

Groundwater was not observed in the hand auger borings. It appears that groundwater was below the depths explored by our borings.

Laboratory Tests

Laboratory moisture content and percent passing the #200 sieve (P-200) and test were performed on selected samples recovered from the boring. Laboratory results are summarized in Table 1 below. Laboratory results are also shown on the boring log adjacent to the sample tested.

Table 1. Summary of Laboratory Tests

Soil Boring	Depth (feet)	Moisture Content (%)*	P-200 (%)*
HAP-1	½	29	72
HAP-1	5 ½	6 ½	13 ½
HAP-2	½	28	73
HAP-2	5	9 ½	14 ½

*Moisture content and P-200 values rounded to the nearest ½ percent.

Estimated Soil Infiltration Rates

As noted in the Results section, the soils encountered below the topsoil consisted of sandy lean clay and silty sand which generally correspond to the ASTM Classifications CL and SM, respectively.

We recommend using the infiltration rates presented in Table 2 below for rain garden design. These values were obtained from Table 12.BIO.8 of the “Minnesota Storm Water Manual”, Revised December 16, 2013, for infiltration basin design.

Table 2. Design Infiltration Rates

In-situ soils	Soil Description	Hydrologic Soil Group	Design Infiltration Rate (in/hr)
SM	Silty Sand	B	0.45
CL	Sandy Lean Clay	D	0.06

If required or requested double ring infiltrometer test(s) can be performed within the proposed rain garden to verify infiltration rates. We would be pleased to provide these services, if needed.

2825 Cedar Avenue S, Minneapolis, MN 55407



General

Haugo GeoTechnical Services has used the degree of skill and care ordinarily exercised under similar circumstance by members of the profession currently practicing in this locality. No warranty expressed or implied is made.

We attempted to obtain coordinates and ground surface elevations at the boring locations however due tree cover our GPS unit could not capture the satellite signal. As a result, we estimated the ground surface elevations at the boring location based on topographic information provide on the “Grading, Drainage and Erosion Control Plan”. The boring locations and ground surface elevations at the boring locations should therefore be considered approximate.

The analyses and recommendations presented in this report are based on data obtained from a limited number of hand auger borings. Variations can occur away from the borings, the nature of which may not become apparent until additional exploration work is completed or construction is conducted. A reevaluation of the recommendations in this report should be made after performing on-site observations during construction to note the characteristics of any variations. The variations may result in additional construction costs and it is suggested that a contingency be provided for this purpose.

We made water level measurements in the hand auger borings at the times and under the conditions stated on the boring logs. The data was interpreted in the text of this report. The period of observation was relatively short and fluctuations in the groundwater level may occur due to rainfall, flooding, irrigation, spring thaw, drainage, and other seasonal and annual factors not evident at the time the observations were made. Design drawings and specifications and construction planning should recognize the possibility of fluctuations.

Thank you for the opportunity to assist you on this project. If you have any questions or need additional information, please contact Paul Gionfriddo at 612-271-8185.

Sincerely,

Haugo GeoTechnical Services, LLC



Nic Alfonso, G.I.T.
Project Geologist

I hereby certify that this plan, specification, or report was prepared by me or under my direct supervision and that I am a duly Registered Professional Engineer under the laws of the State of Minnesota.



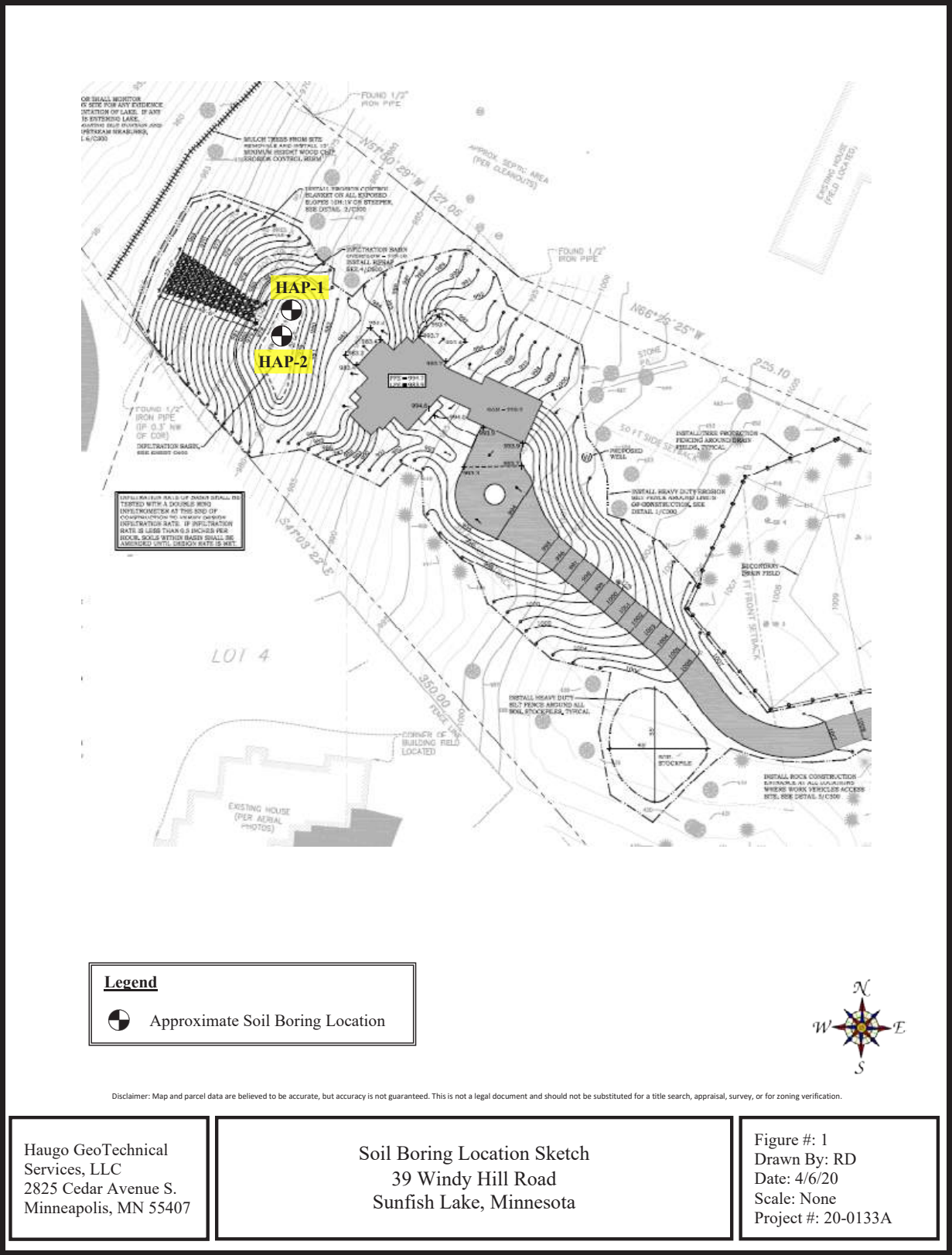
Paul Gionfriddo, P.E.
Senior Engineer
License Number: 23093
Expires June 2020



2825 Cedar Avenue S, Minneapolis, MN 55407

Attachments: Soil Boring Location Sketch
Soil Boring Logs, HAP-1 and HAP-2
Descriptive Terminology

2825 Cedar Avenue S, Minneapolis, MN 55407



HAUGO
GEO
TECHNICAL
SERVICES

Haugo Geotechnical Services
2825 Cedar Ave South
Minneapolis, MN 55407
Telephone: 612-729-2959
Fax: 763-445-2238

BORING NUMBER HAP-1

PAGE 1 OF 1

CLIENT Elevation Homes

PROJECT NUMBER 20-0133

DATE STARTED 4/2/20

DRILLING CONTRACTOR HGTS

DRILLING METHOD Hand Auger

LOGGED BY NA

NOTES Auger met refusal at 5.8 feet. Estimated ground surface elevation.

PROJECT NAME 39 Windy Hill Road

PROJECT LOCATION Sunfish Lake, MN

GROUND ELEVATION 979 ft

GROUND WATER LEVELS:

AT TIME OF DRILLING --- Not Encountered

AT END OF DRILLING --- Not Encountered

AFTER DRILLING --- Not Encountered

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (ROD)	BLOW COUNTS (N VALUE)	MOISTURE CONT. (%)	NOTES	▲ SPT N VALUE ▲										
								20	40	60	80							
								PL	MC	LL								
								20	40	60	80							
								□ FINES CONTENT (%) □										
								20	40	60	80							
0		Silty Clay, dark brown, wet. (Topsoil)																
		(CL) Sandy Lean Clay, brown, wet. (Glacial Till)				29%												
		P-200 = 72%																
		(SM) Silty Sand, fine grained, trace Gravel, with Cobbles, light brown, moist. (Glacial Till)				6.5%												
5		P-200 = 13.5%																
Bottom of borehole at 6.0 feet.																		

GEOTECH BH PLOTS - GINT STD US LAB GDT - 4/9/20 14:18 - E:\NEW FOLDER\20-0133 39 WINDY HILL ROAD.GPJ

GEOTECH BH PLOTS - GINT STD US LAB.GDT - 4/9/20 14:18 - E:\NEW FOLDER\20-0133 39 WINDY HILL ROAD.GPJ

**HAUGO
GEO TECHNICAL
SERVICES**

Standard D 2487 - 00
Classification of Soils for Engineering Purposes
(Unified Soil Classification System)

b. Based on the material passing the 3-in (75mm) sieve.

c. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.

c. $C_u = D_{60} / D_{10}$ $C_c = (D_{30})^2 / D_{10} \times D_{60}$

d. If soil contains $\geq 15\%$ sand, add "with sand" to group name.

e. Gravels with 5 to 12% fines require dual symbols:

GW-GM well-graded gravel with silt
GW-GC well-graded gravel with clay
GP-GM poorly graded gravel with silt
GP-GC poorly graded gravel with clay

f. If fines classify as CL-ML, use dual symbol GC-GM or SC-SM.

g. If fines are organic, add "with organic fines" to group name.

h. If soil contains $\geq 15\%$ gravel, add "with gravel" to group name.

i. Sands with 5 to 12% fines require dual symbols:

SW-SM well-graded sand with silt
SW-SC well-graded sand with clay
SP-SM poorly graded sand with silt
SP-SC poorly graded sand with clay

j. If Atterberg limits plot in hatched area, soil is a CL-ML, silty clay.

k. If soil contains 10 to 25% plus No. 200, add "with sand" or "with gravel" whichever is predominant.

l. If soil contains $\geq 30\%$ plus No. 200, predominantly sand, add "sandy" to group name.

m. If soil contains $\geq 30\%$ plus No. 200 predominantly gravel, add "gravelly" to group name.

n. $P_l \geq 4$ and plots on or above 'A' line.

o. $P_l < 4$ or plots below 'A' line.

p. Pl plots on or above 'A' line.

q. Pl plots below 'A' line.



Very soft	0 to 1 BPF
Soft	2 to 3 BPF
Rather soft	4 to 5 BPF
Medium	6 to 8 BPF
Rather stiff	9 to 12 BPF
Stiff	13 to 16 BPF
Very stiff	17 to 30 BPF
Hard	over 30 BPF

Standard penetration test borings were advanced by 3 1/4" or 6 1/4" ID hollow-stem augers unless noted otherwise. Jetting water was used to clean out auger prior to sampling only where indicated on logs. Standard penetration test borings are designated by the prefix "ST" (Split Tube). All samples were taken with the standard 2" OD split-tube sampler, except where noted.

Power auger borings were advanced by 4" or 6" diameter continuous-flight, solid-stem augers. Soil classifications and strata depths were inferred from disturbed samples augered to the surface and are, therefore, somewhat approximate. Power auger borings are designated by the prefix "B."

Hand auger borings were advanced manually with a 1 1/2" or 3 1/4" diameter auger and were limited to the depth from which the auger could be manually withdrawn. Hand auger borings are indicated by the prefix "H."

BPF: Numbers indicate blows per foot recorded in standard penetration test, also known as "N" value. The sampler was set 6" into undisturbed soil below the hollow-stem auger. Driving resistances were then counted for second and third 6" increments and added to get BPF. Where they differed significantly, they are reported in the following form: 2/12 for the second and third 6" increments, respectively.

WH: WH indicates the sampler penetrated soil under weight of hammer and rods alone; driving not required.

WR: WR indicates the sampler penetrated soil under weight of rods alone; hammer weight and driving not required.

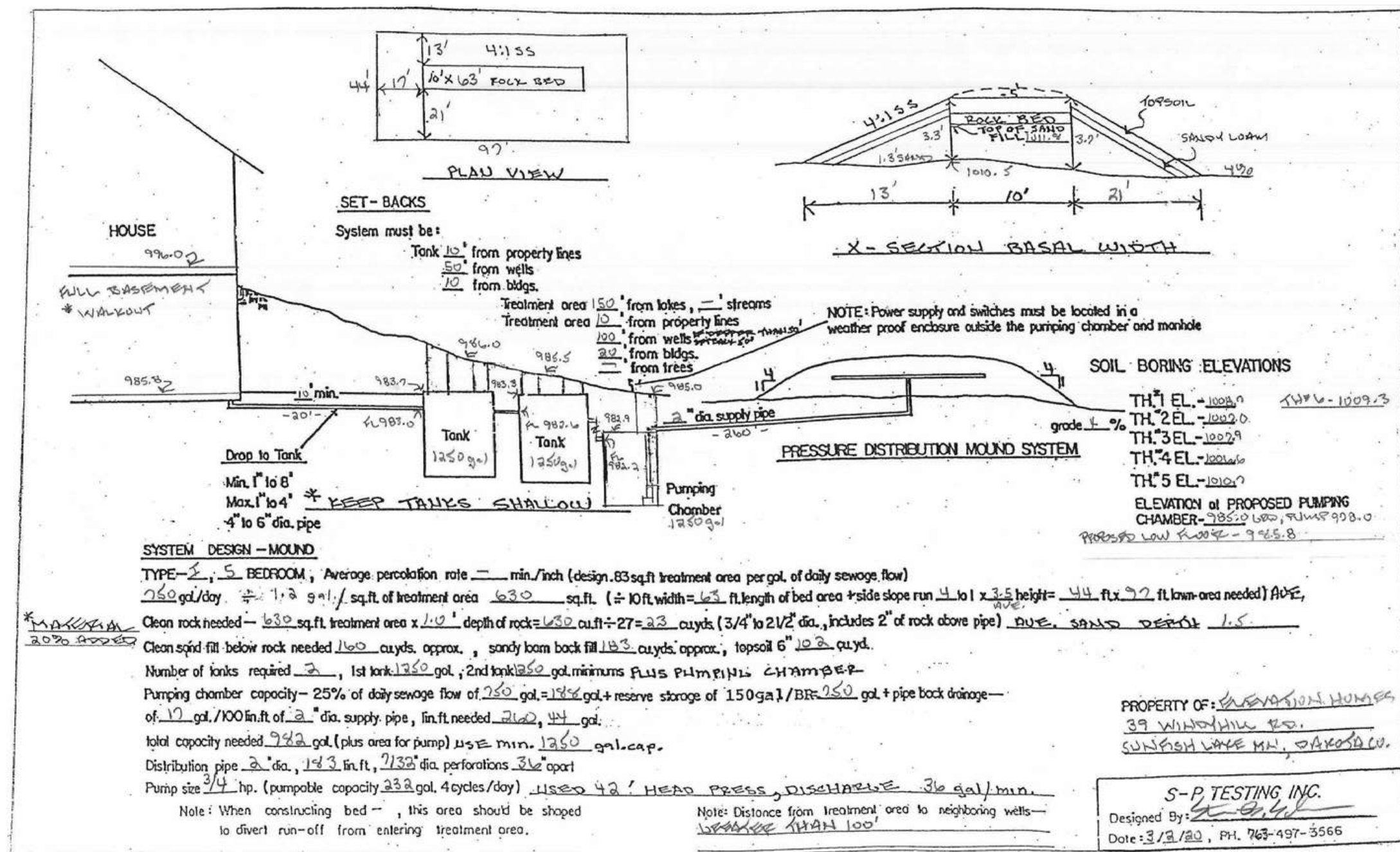
TW indicates thin-walled (undisturbed) tube sample

Note: All tests were run in general accordance with applicable ASTM standards.

As provided by:

SP Testing, Inc.
Steven B. Schirmers
951 Katydid Lane NE
Saint Michael, MN 55376
T: 763.497.3566

The sketch provided below is also shown on the architectural site plan (Sheet G0.3).



SP TESTING INC.

Steven B. Schirmers – 951 Katydid Lane NE – St. Michael, MN 55376
Cert. No 627 – State License #394 – Phone 763-497-3566 – Fax 763-497-5011
www.sptesting.wastewater@comcast.net – schirmerswastewater.com

March 3, 2020

Elevation Homes
39 Windy Hill Rd.
Sunfish Lake, MN

This onsite sewage treatment system is designed for a Type 1 system, Type 1, 5 bedroom home in accordance with the Minnesota Pollution Control Agency chapter 7080 & local ordinances.

The soils on this site are a clay loam. The seasonally saturated soil, mottled soil (redox features) were present at a depth of 20" to 36". A pressurized seepage bed system will be installed. The bottom of the treatment area must be located at least 3' above mottled soil.

A pumping chamber will need to be installed to lift the effluent to the treatment area. The power supply & switches must be located outside the manhole & pumping chamber in a weather proof enclosure. A warning device must be installed with a light & sound device, this is in case of a pump failure.

The manifold & supply line must have back drainage to the pumping chamber. Be sure the rock & sand fill material are clean. The sod layer below the entire mounded area must be turned over, just break up the sod.

All property lines must be located prior to installation.

If the tanks have less than 2' of cover, the lids, risers & maintenance hole covers must be insulated to a value of R10.

Cleanouts for each lateral with a sleeve must be insulated & be accessible from finished grade in an irrigation box with a ball valve.

All neighboring wells are located greater than 100' away from the proposed treatment area.

Keep all heavy equipment off of the proposed treatment area before and after construction. The treatment area should be marked off before construction. This design is not valid & the system will need to be relocated if failure to protect the sites for new on-site sewage systems.

MANAGEMENT PLAN:

The tanks need to be maintained at a minimum of 1 time every 2 years, check with your pumper to set up a schedule.

System inspected for areas by owner & or Inspector as determined by the local unit of Government.

Any other requirements as determined by the local unit of Government.

With proper installation & maintenance, this system should have no problem in treating septic effluent effectively.

Nothing other than human waste, toilet tissue, laundry, showers, water softners etc. should be disposed of into the system. Garbage disposals are not recommended. Excessive amounts of soaps, antibacterial soaps, cleaning agents, shower cleaners used every shower & chlorine agents may kill the bacteria needed to treat septic effluent. Additives are not recommended. Recommend laundering be limited to 3 to 4 loads per day.

Steven B. Schirmers

Preliminary Evaluation Worksheet



Preliminary Evaluation Worksheet



University of Minnesota

ON-SITE SEWAGE TREATMENT PROGRAM



Field Evaluation Worksheet

MINNESOTA POLLUTION CONTROL AGENCY

v 04.02.2019

1. Project Information

Property Owner/Client: Elevation HomesProject ID: Site Address: 39 Windy Hill Rd. sunfish LakeDate Completed: 3/3/2020

2. Utility and Structure Information

Utility Locations Identified ☐ Gopher State One Call # ☐ Any Private Utilities: Locate and Verify (see Site Evaluation map) ☐ Existing Buildings ☐ Improvements ☐ Easements ☐ Setbacks

3. Site Information

Vegetation type(s): ForestLandscape position: ShoulderPercent slope: 4%Slope shape: Linear, LinearSlope direction: westDescribe the flooding or run-on potential of site: noneDescribe the need for Type III or Type IV system: noneNote: Elevations and Benchmarks identified on map? (Y/N): yesIf yes, describe: Proposed soil treatment area protected? (Y/N): noIf yes, describe:

4. General Soils Information

Filled, Compacted, Disturbed areas (Y/N): NoIf yes, describe: Soil observations were conducted in the proposed system location (Y/N): yesA soil observation in the most limiting area of the proposed system (Y/N): yesNumber of soil observations: 6Soil observation logs attached (Y/N): yesPercolation tests performed & attached (Y/N): no

5. Phase I. Reporting Information

Periodically saturated soil:	Depth	Elevation	Soil Texture:
	20 in	1008.8 ft	clay loam
Standing water:	no in		Percolation Rate:
Bedrock:	no in		min/inch
Benchmark:			Soil Hyd Loading Rate:
			0.45 gpd/ft²
Benchmark Location:	survey		

Differences between soil survey and field evaluation: Site evaluation issues / comments: Anticipated construction issues:

University of Minnesota

ON-SITE SEWAGE TREATMENT PROGRAM



Design Summary Page

MINNESOTA POLLUTION CONTROL AGENCY

v 04.02.2019

1. PROJECT INFORMATION

Property Owner/Client: Elevation HomesProject ID: Site Address: 39 Windy Hill Rd. Sunfish LakeDate: 03/03/20Email Address: Phone:

2. DESIGN FLOW & WASTE STRENGTH

Attach data / estimate basis for Other EstablishmentsDesign Flow: 750 GPDAnticipated Waste Type: ResidentialBOD: mg/L TSS: mg/L Oil & Grease: mg/LTreatment Level: CSelect Treatment Level C for residential septic tank effluent

3. HOLDING TANK SIZING

Minimum Capacity: Residential =400 gal/bedroom, Other Establishment = Design Flow x 5.0, Minimum size 1000 gallonsCode Minimum Holding Tank Capacity: Gallons in Tanks or CompartmentsRecommended Holding Tank Capacity: Gallons in Tanks or CompartmentsType of High Level Alarm: (Set @ 75% tank capacity)Comments:

4. SEPTIC TANK SIZING

A. Residential dwellings:

Number of Bedrooms (Residential): 5Code Minimum Septic Tank Capacity: 2500 Gallons in 2 Tanks or CompartmentsRecommended Septic Tank Capacity: 2500 Gallons in 2 Tanks or CompartmentsEffluent Screen & Alarm (Y/N): NoModel/Type:

B. Other Establishments:

Waste received by: GPD x Days Hyd. Retention TimeCode Minimum Septic Tank Capacity: Gallons in Tanks or CompartmentsRecommended Septic Tank Capacity: Gallons in Tanks or CompartmentsEffluent Screen & Alarm (Y/N): Model/Type:

5. PUMP TANK SIZING

Pump Tank 1 Capacity (Minimum): 1250 Gal	Pump Tank 2 Capacity (Minimum): Gal
Pump Tank 1 Capacity (Recommended): 1250 Gal	Pump Tank 2 Capacity (Recommended): Gal
Pump 1 36.0 GPM Total Head 42.8 ft	Pump 2 GPM Total Head ft
Supply Pipe Dia. 2.00 in Dose Vol: 187.0 gal	Supply Pipe Dia. Dose Vol: Gal



Design Summary Page



6. SYSTEM AND DISTRIBUTION TYPE

Project ID:

Soil Treatment Type: Mound

Distribution Type: Pressure Distribution-Level

Elevation Benchmark: survey ft

Benchmark Location: survey

MPCA System Type: Type I

Distribution Media: Rock

Type III/IV Details:

7. SITE EVALUATION SUMMARY:

Describe Limiting Condition: Redoximorphic Features/Saturated Soils

Layers with >35% Rock Fragments? (yes/no) No If yes, describe below: % rock and layer thickness, amount of soil credit and any additional information for addressing the rock fragments in this design.

Note:

Limiting Condition: 20 inches 1.7 ft 1008.80 ft

Minimum Req'd Separation: 36 inches 3.0 ft

Code Max System Depth: Mound inches -1.3 ft 1011.80 ft

This is the maximum depth to the bottom of the distribution media. Negative Depth (ft) means it must be a mound.

Soil Texture: Clay Loam

Soil Hyd. Loading Rate: 0.45 GPD/ft² Percolation Rate: MPI

Contour Loading Rate: 5 Note:

Measured Land Slope: 4.0 % Note:

Comments:

8. SOIL TREATMENT AREA DESIGN SUMMARY

Trench:

Dispersal Area ft² Sidewall Depth in Trench Width ft

Total Lineal Feet ft No. of Trenches Code Max. Trench Depth in

Contour Loading Rate ft Min. Length ft Designed Trench Depth in

Bed:

Dispersal Area ft² Sidewall Depth in Maximum Bed Depth in

Bed Width ft Bed Length ft Designed Bed Depth in

Mound:

Dispersal Area 625.0 ft² Bed Length 62.5 ft Bed Width 10.0 ft

Absorption Width 26.0 ft Clean Sand Lift 1.3 ft Berm Width (0-1%) ft

Upslope Berm Width 13.4 ft Downslope Berm 20.4 ft Endslope Berm Width 17.1 ft

Total System Length 96.8 ft System Width 43.8 ft Contour Loading Rate 12.0 gal/ft

Design Summary Page

At-Grade:

Bed Width ft Bed Length ft Finished Height ft

Contour Loading Rate gal/ft Upslope Berm ft Downslope Berm ft

Endslope Berm ft System Length ft System Width ft

Level & Equal Pressure Distribution

No. of Laterals 3 Perforation Spacing 3 ft Perforation Diameter 7/32 in

Lateral Diameter 2.00 in Min Dose Volume 124 gal Max Dose Volume 188 gal

Non-Level and Unequal Pressure Distribution

	Elevation (ft)	Pipe Size (in)	Pipe Volume (gal/ft)	Pipe Length (ft)	Perf Size (in)	Spacing (ft)	Spacing (in)	Minimum Dose Volume
Lateral 1								
Lateral 2								gal
Lateral 3								
Lateral 4								
Lateral 5								Maximum Dose Volume
Lateral 6								gal

9. Additional Info for At-Risk, HSW or Type IV Design

A. Starting BOD Concentration = Design Flow X Starting BOD (mg/L) X 8.35 ÷ 1,000,000

gal X mg/L X 8.35 ÷ 1,000,000 = lbs. BOD/day

B. Target BOD Concentration = Design Flow X Target BOD (mg/L) X 8.35 ÷ 1,000,000

gal X mg/L X 8.35 ÷ 1,000,000 = lbs. BOD/day

Lbs. BOD To Be Removed:

PreTreatment Technology: *Must Meet or Exceed Target

Disinfection Technology: *Required for Levels A & B

C. Organic Loading to Soil Treatment Area:

mg/L X gal x 8.35 ÷ 1,000,000 ÷ ft² = lbs./day/ft²

10. Comments/Special Design Considerations:

I hereby certify that I have completed this work in accordance with all applicable ordinances, rules and laws.

Steven B. Schramm

Signature

394

License #

3-3-20

Date

Henke Residence

May 1, 2020

PLAAD, LLC | P.O. Box 184, Stillwater, MN 55082 | www.plaadoffice.com

plaad

ONSITE SEWAGE TREATMENT PROGRAM



Mound Design Worksheet
≥1% Slope

MINNESOTA POLLUTION CONTROL AGENCY

1. SYSTEM SIZING:Project ID: v 04.02.2019

A. Design Flow:750GPD

B. Soil Loading Rate:0.45GPD/ft²

C. Depth to Limiting Condition1.7ft

D. Percent Land Slope:4.0%

E. Design Media Loading Rate:1.2GPD/ft²

F. Mound Absorption Ratio:2.60

TABLE IXa

LOADING RATES FOR DETERMINING BOTTOM ABSORPTION AREA AND ABSORPTION RATIOS USING PERCOLATION TESTS

Percolation Rate (MPI)	Treatment Level C		Treatment Level A, A-2, B,	
	Absorption Area Loading Rate (gpd/ft²)	Mound Absorption Ratio	Absorption Area Loading Rate (gpd/ft²)	Mound Absorption Ratio
<0.1	-	1	-	1
0.1 to 0.5	1.2	1	1.6	1
0.1 to 0.5 (fine sand and loamy fine sand)	0.6	2	1	1.6
0.6 to 1.0	0.78	1.5	1	1.6
1.0 to 1.5	0.6	2	0.78	2
1.6 to 3.0	0.5	2.4	0.78	2
3.1 to 4.5	0.45	2.6	0.6	2.6
4.6 to 6.0	-	5	0.3	5.3
6.1 to 12.0	-	-	-	-
>12.0	-	-	-	-

*Systems with these values are not Type I systems. Contour Loading Rate (linear loading rate) is a recommended value.

2. DISPERSAL MEDIA SIZING

A. Calculate Dispersal Bed Area: Design Flow ÷ Design Media Loading Rate = ft²
750 GPD ÷ 1.2 GPD/ft² = 625 ft²
If a larger dispersal media area is desired, enter size: ft²

B. Enter Dispersal Bed Width: 10.0 ft Can not exceed 10 feet

C. Calculate Contour Loading Rate: Bed Width X Design Media Loading Rate
10 ft² X 1.2 GPD/ft² = 12.0 gal/ft Can not exceed Table 1

D. Calculate Minimum Dispersal Bed Length: Dispersal Bed Area ÷ Bed Width = Bed Length
625 ft² ÷ 10.0 ft = 62.5 ft

3. ABSORPTION AREA SIZING

A. Calculate Absorption Width: Bed Width X Mound Absorption Ratio = Absorption Width
10.0 ft X 2.6 = 26.0 ft

B. For slopes >1%, the Absorption Width is measured downhill from the upslope edge of the Bed.
Calculate Downslope Absorption Width: Absorption Width - Bed Width
26.0 ft - 10.0 ft = 16.0 ft

4. DISTRIBUTION MEDIA: ROCKProject ID:

A. Rock Depth Below Distribution Pipe
9 in 0.75 ft

5. DISTRIBUTION MEDIA: REGISTERED TREATMENT PRODUCTS: CHAMBERS AND EZFLOW

A. Enter Dispersal Media:

B. Enter the Component: Length: ft Width: ft Depth: ft

C. Number of Components per Row = Bed Length divided by Component Length (Round up)
ft ÷ ft = components/row Check registered product information for specific application details and design

D. Actual Bed Length = Number of Components/row X Component Length:
components X ft =

E. Number of Rows = Bed Width divided by Component Width (Round up)
ft ÷ ft = rows Adjust width so this is a whole number.

F. Total Number of Components = Number of Components per Row X Number of Rows
X = components

6. MOUND SIZING

A. Calculate Minimum Clean Sand Lift: 3 feet minus Depth to Limiting Condition = Clean Sand Lift
3.0 ft - 1.7 ft = 1.3 ft Design Sand Lift (optional): ft

B. Upslope Height: Clean Sand Lift + Depth of Media + Depth of Cover cover (1 ft.)
1.3 ft + 1.1 ft + 1.5 ft = 3.9 ft

Land Slope %	0	1	2	3	4	5	6	7	8	9	10	11	12	
Upslope Berm Ratio	3:1	3.00	2.91	2.83	2.75	2.68	2.61	2.54	2.48	2.42	2.36	2.31	2.26	2.21

C. Select Upslope Berm Multiplier (based on land slope): 3.45

D. Calculate Upslope Berm Width: Multiplier X Upslope Mound Height = Upslope Berm Width
3.45 ft X 3.9 ft = 13.4 ft

E. Calculate Drop in Elevation Under Bed: Bed Width X Land Slope ÷ 100 = Drop (ft)
10.0 ft X 4.0 % ÷ 100 = 0.40 ft

F. Calculate Downslope Mound Height: Upslope Height + Drop in Elevation = Downslope Height
3.9 ft + 0.40 ft = 4.3 ft

Land Slope %	0	1	2	3	4	5	6	7	8	9	10	11	12	
Downslope Berm Ratio	3:1	3.00	3.09	3.19	3.30	3.41	3.53	3.66	3.80	3.95	4.11	4.29	4.48	4.69

G. Select Downslope Berm Multiplier (based on land slope): 4.76

H. Calculate Downslope Berm Width: Multiplier X Downslope Height = Downslope Berm Width
4.76 x 4.3 ft = 20.4 ft

I. Calculate Minimum Berm to Cover Absorption Area: Downslope Absorption Width + 4 feet
16.0 ft + 4 ft = 20.0 ft

J. Design Downslope Berm = greater of 4H and 4I: 20.4 ft

K. Select Endslope Berm Multiplier: 4.00 (usually 3.0 or 4.0)

L. Calculate Endslope Berm X Downslope Mound Height = Endslope Berm Width
4.00 ft X 4.3 ft = 17.1 ft

M. Calculate Mound Width: Upslope Berm Width + Bed Width + Downslope Berm Width
13.4 ft + 10.0 ft + 20.4 ft = 43.8 ft

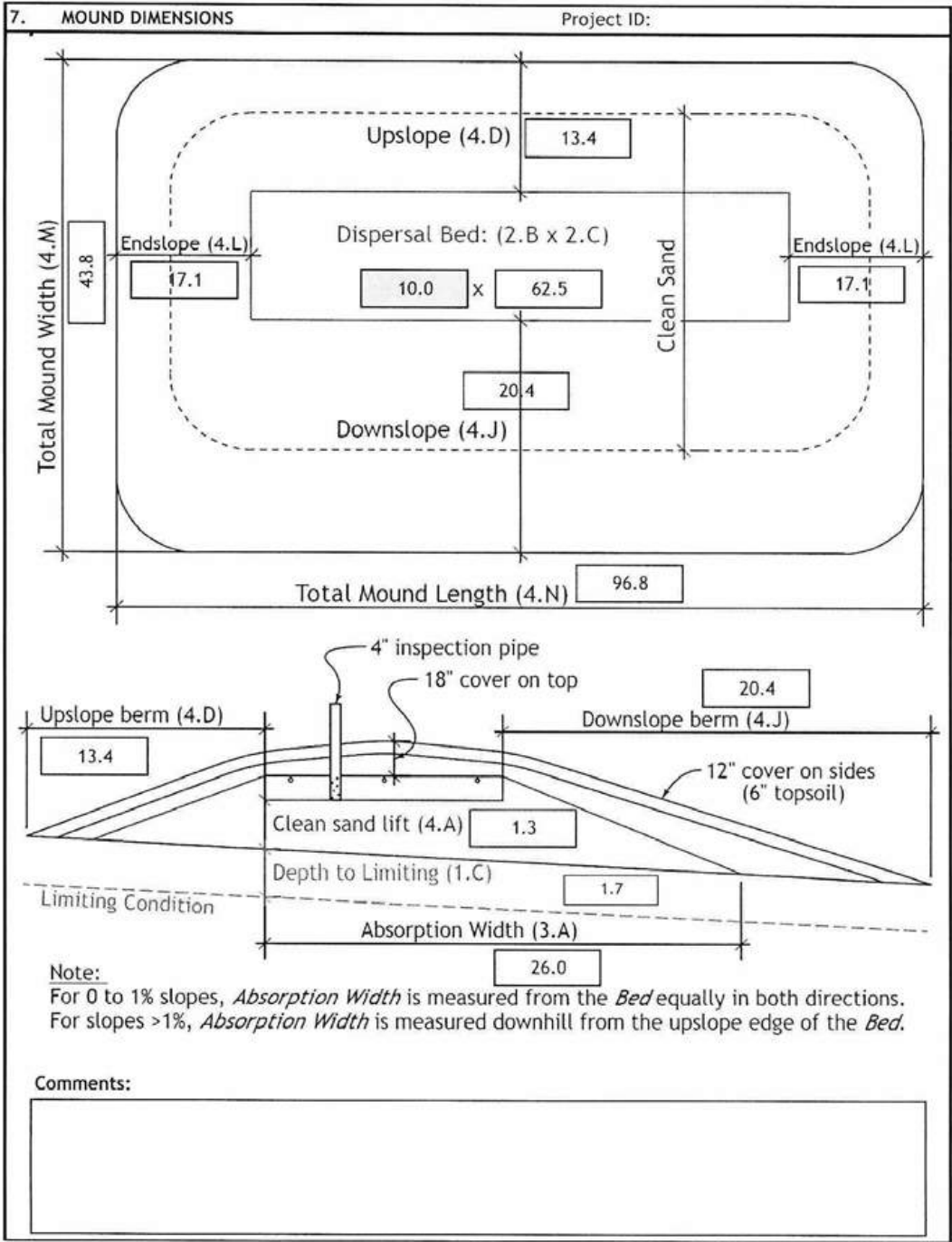
N. Calculate Mound Length: Endslope Berm Width + Bed Length + Endslope Berm Width
17.1 ft + 62.5 ft + 17.1 ft = 96.8 ft

Henke Residence

May 1, 2020

PLAAD, LLC | P.O. Box 184, Stillwater, MN 55082 | www.plaadoffice.com

plaad



Mound Materials Worksheet



Project ID: _____ v 04.02.2019

A. Rock Volume : (Rock Below Pipe + Rock to cover pipe (pipe outside dia + -2 inch)) X Bed Length X Bed Width = Volume

(9 in + 0.3) ÷ 12 62.5 ft X 10.0 ft = 484.4 ft³

Divide ft³ by 27 ft³/yd³ to calculate cubic yards: 484.4 ft³ ÷ 27 = 17.9 yd³

Add 30% for constructability: 17.9 yd³ X 1.3 = 23.3 yd³

B. Calculate Clean Sand Volume:

Volume Under Rock bed : Average Sand Depth x Media Width x Media Length = cubic feet

2.1 ft X 10.0 ft X 62.5 ft = 1302.1 ft³

For a Mound on a slope from 0-1%

Volume from Length = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Length)

ft - 1) X ft X ft =

Volume from Width = ((Upslope Mound Height - 1) X Absorption Width Beyond Bed X Media Bed Width)

ft - 1) X ft X ft =

Total Clean Sand Volume : Volume from Length + Volume from Width + Volume Under Media

ft³ + ft³ + ft³ = ft³

For a Mound on a slope greater than 1%

Upslope Volume : ((Upslope Mound Height - 1) x 3 x Bed Length) ÷ 2 = cubic feet

((3.9 ft - 1) X 3.0 ft X 62.5) ÷ 2 = 270.3 ft³

Downslope Volume : ((Downslope Height - 1) x Downslope Absorption Width x Media Length) ÷ 2 = cubic feet

((4.3 ft - 1) X 16.0 ft X 62.5) ÷ 2 = 1641.7 ft³

Endslope Volume : (Downslope Mound Height - 1) x 3 x Media Width = cubic feet

(4.3 ft - 1) X 3.0 ft X 10.0 ft = 98.5 ft³

Total Clean Sand Volume : Upslope Volume + Downslope Volume + Endslope Volume + Volume Under Media

270.3 ft³ + 1641.7 ft³ + 98.5 ft³ + 1302.1 ft³ = 3312.6 ft³

Divide ft³ by 27 ft³/yd³ to calculate cubic yards: 3312.6 ft³ ÷ 27 = 122.7 yd³

Add 30% for constructability: 122.7 yd³ X 1.3 = 159.5 yd³

C. Calculate Sandy Berm Volume:

Total Berm Volume (approx) : ((Avg. Mound Height - 0.5 ft topsoil) x Mound Width x Mound Length) ÷ 2

(4.1 - 0.5) ft X 43.8 ft X 96.8) ÷ 2 = 7591.4 ft³

Total Mound Volume - Clean Sand volume - Rock Volume = cubic feet

7591.4 ft³ - 3312.6 ft³ - 484.4 ft³ = 3794.4 ft³

Divide ft³ by 27 ft³/yd³ to calculate cubic yards: 3794.4 ft³ ÷ 27 = 140.5 yd³

Add 30% for constructability: 140.5 yd³ X 1.3 = 182.7 yd³

D. Calculate Topsoil Material Volume: Total Mound Width X Total Mound Length X .5 ft

43.8 ft X 96.8 ft X 0.5 ft = 2118.5 ft³

Divide ft³ by 27 ft³/yd³ to calculate cubic yards: 2118.5 ft³ ÷ 27 = 78.5 yd³

Add 30% for constructability: 78.5 yd³ X 1.3 = 102.0 yd³

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Pressure Distribution
Design Worksheet



MINNESOTA POLLUTION
CONTROL AGENCY

Project ID: v 04.02.2019

1. Media Bed Width: 10 ft

2. Minimum Number of Laterals in system/zone = Rounded up number of [(Media Bed Width - 4) ÷ 3] + 1.
[(10 - 4) ÷ 3] + 1 = 3 laterals Does not apply to at-grades

3. Designer Selected Number of Laterals: 3 laterals
Cannot be less than line 2 (Except in at-grades)

4. Select Perforation Spacing: 3.00 ft

5. Select Perforation Diameter Size: 7/32 in

6. Length of Laterals = Media Bed Length - 2 Feet.
63.0 - 2ft = 61.0 ft Perforation can not be closer then 1 foot from edge.

7. Determine the Number of Perforation Spaces. Divide the Length of Laterals by the Perforation Spacing and round down to the nearest whole number.
Number of Perforation Spaces = 61.0 ft ÷ 3.0 ft = 20 Spaces

8. Number of Perforations per Lateral is equal to 1.0 plus the Number of Perforation Spaces. Check table below to verify the number of perforations per lateral guarantees less than a 10% discharge variation. The value is double with a center manifold.
Perforations Per Lateral = 20 Spaces + 1 = 21 Perfs. Per Lateral

Maximum Number of Perforations Per Lateral to Guarantee <10% Discharge Variation

1/4 Inch Perforations						7/32 Inch Perforations					
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1 1/4	1 1/2	2	3		1	1 1/4	1 1/2	2	3
2	10	13	18	30	60	2	11	16	21	34	68
2 1/2	8	12	16	28	54	2 1/2	10	14	20	32	64
3	8	12	16	25	52	3	9	14	19	30	60

3/16 Inch Perforations

Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1 1/4	1 1/2	2	3		1	1 1/4	1 1/2	2	3
2	12	18	26	46	87	2	21	33	44	74	149
2 1/2	12	17	24	40	80	2 1/2	20	30	41	69	135
3	12	16	22	37	75	3	20	29	38	64	128

1/8 Inch Perforations

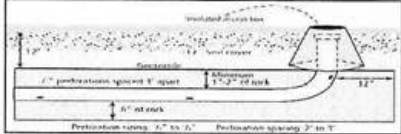
Perforation Spacing (Feet)	Pipe Diameter (Inches)					Perforation Spacing (Feet)	Pipe Diameter (Inches)				
	1	1 1/4	1 1/2	2	3		1	1 1/4	1 1/2	2	3
2	12	18	26	46	87	2	21	33	44	74	149
2 1/2	12	17	24	40	80	2 1/2	20	30	41	69	135
3	12	16	22	37	75	3	20	29	38	64	128

9. Total Number of Perforations equals the Number of Perforations per Lateral multiplied by the Number of Perforated Laterals.
21 Perf. Per Lat. X 3 Number of Perf. Lat. = 63 Total Number of Perf.

10. Spacing of laterals; Must be greater than 1 foot and no more than 3 feet: 3.0 ft

10. Select Type of Manifold Connection (End or Center): End

11. Select Lateral Diameter (See Table): 2.00 in



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Pressure Distribution
Design Worksheet



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12. Calculate the Square Feet per Perforation. Recommended value is 4-11 ft² per perforation.
Does not apply to At-Grades

a. Bed Area = Bed Width (ft) X Bed Length (ft)
10 ft X 63 ft = 630 ft²

b. Square Foot per Perforation = Bed Area divided by the Total Number of Perforations.
630 ft² ÷ 63 perforations = 10.0 ft²/perforations

13. Select Minimum Average Head: 1.0 ft

14. Select Perforation Discharge (GPM) based on Table: 0.56 GPM per Perforation

15. Determine required Flow Rate by multiplying the Total Number of Perfs. by the Perforation Discharge.
63 Perfs X 0.56 GPM per Perforation = 36 GPM

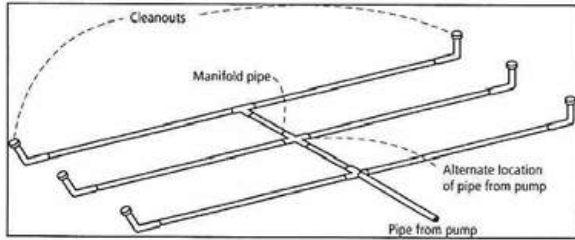
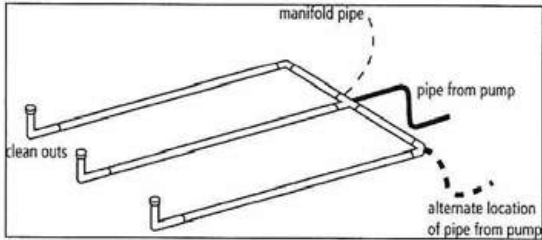
16. Volume of Liquid Per Foot of Distribution Piping (Table II): 0.170 Gallons/ft

17. Volume of Distribution Piping =
= [Number of Perforated Laterals X Length of Laterals X (Volume of Liquid Per Foot of Distribution Piping)]
3 X 61 ft X 0.170 gal/ft = 31.1 Gallons

18. Minimum Delivered Volume = Volume of Distribution Piping X 4
31.1 gals X 4 = 124.4 Gallons

Table II
Volume of Liquid in Pipe

Pipe Diameter (inches)	Liquid Per Foot (Gallons)
1	0.045
1.25	0.078
1.5	0.110
2	0.170
3	0.380
4	0.661



Comments/Special Design Considerations:

The diagram illustrates a soil treatment system. On the left, a rectangular tank is shown with an 'inlet pipe' entering from the left. Inside the tank, there is a vertical pipe with a float valve. A 'supply line' connects the tank to a 'point of discharge' on the right. The 'supply line length' is indicated by a dashed line. The 'Elevation difference' is shown as the vertical distance between the tank's base and the point of discharge. The point of discharge is labeled 'Soil treatment system & point of discharge' and shows a cross-section of the soil being treated.

A schematic diagram of a three-compartment tank. The tank is divided into three horizontal sections. The top section is labeled '50.0 Gal'. The middle section is labeled '231 Gal'. The bottom section is labeled 'Gal'. A vertical pipe or tube is shown on the right side of the tank, extending from the top section down into the bottom section.

Soil Observation Log

www.SepticResource.com vers 12.4

Owner Information	
Property Owner / project:	Elevation homes
Date	3/3/2020
Property Address / PID:	39 Windy Hill Rd.

Soil Survey Information	
☐ refer to attached soil survey	
Parent mat'l's:	☒ Till ☐ Outwash ☐ Lacustrine ☐ Alluvium ☐ Organic ☐ Bedrock
landscape position:	☐ Summit ☒ Shoulder ☐ Side slope ☐ Toe slope
soil survey map units:	slope 4 % direction- downhill

Soil Log #1							
PIT TO 18" ☐ Boring ☒ Pit Elevation 1008.7 Depth to SHWT 22"							
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 8	loam		10YR 3/2		Friable	Weak	Granular
8 - 22	Silty clay loam		10YR 4/3		Firm	Moderate	Blocky
22 - 30	Silty clay loam		10YR 5/3	10YR6/8	Firm	Moderate	Blocky
Comments:							

39 Windy Hill Rd. Soil Log #2							
PIT TO 18" ☐ Boring ☒ Pit Elevation 1007.6 Depth to SHWT 26"							
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 6	loam		10YR 3/2		Friable	Weak	Granular
6 - 18	clay loam		10YR 4.3		Firm	Moderate	Prismatic
18 - 22	Sandy clay loam		7.5YR 5/3		Firm	Moderate	Prismatic
22 - 26	Sandy loam		7.5YR 5/6		Friable	Weak	Granular
26 - 28	sandy loam		7.5YR 5/6	10YR 6/8	Friable	Weak	Granular

39 Windy Hill Rd. Soil Log #3							
☒ Boring ☐ Pit Elevation 1007.9 Depth to SHWT 20"							
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 10	Loam		10YR 3/2		Friable	Weak	Granular
10 - 20	Silty clay loam		10YR 4/3		Firm	Moderate	Blocky
20 - 28	Silty clay loam		10YR 5/3	10YR 6/8	Friable	Moderate	Blocky
28 - 32	sandy loam		7.5YR 5/4	10YR 6/8	Friable	Weak	Granular

I hereby certify this work was completed in accordance with MN 7080 and any local req's.

SPTesting, Inc.

394

Designer Signature

Company

License #

Soil Observation Log

www.SepticResource.com vers 12.4

Owner Information		
Property Owner / project:	Elevation homes	Date 3/3/2020
Property Address / PID:	39 Windy Hill Rd.	

Soil Survey Information		☐ refer to attached soil survey
Parent mat'l's:	☒ Till ☐ Outwash ☐ Lacustrine ☐ Alluvium ☐ Organic ☐ Bedrock	
landscape position:	☐ Summit ☒ Shoulder ☐ Side slope ☐ Toe slope	
soil survey map units:	411B	slope 4 % direction- downhill

Soil Log #4							
PIT TO 18"		☐ Boring ☒ Pit	Elevation 1006.6	Depth to SHWT 20"			
Depth (in)	Texture	fragment %	matrix color	consistence	grade	shape	
0 - 12	loam		10YR 3/2	Friable	Weak	Granular	
12 - 20	Silty clay loam		10YR 4/3	Firm	Moderate	Blocky	
20 - 24	Silty clay loam		10YR 5/3	10YR 6/8	Firm	Moderate	Blocky
Comments:							

39 Windy Hill Rd. Soil Log #5							
		☒ Boring ☐ Pit	Elevation 1010.7	Depth to SHWT 36"			
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 6	Loam		10YR 3/2		Friable	Weak	Granular
6 - 12	Loam		10YR 4/2		Friable	Weak	Granular
12 - 26	clay loam		10YR 5/3		Firm	Moderate	Prismatic
26 - 36	Sandy loam		10YR 5/4		Friable	Weak	Granular
36 - 42	Sandy loam		10YR 5/4	10YR 6/8	Friable	Weak	Granular

39 Windy Hill Rd. Soil Log #6							
PIT TO 18"		☐ Boring ☒ Pit	Elevation 1009.3	Depth to SHWT 20"			
Depth (in)	Texture	fragment %	matrix color	redox color	consistence	grade	shape
0 - 6	loam		10YR 3/2		Friable	Weak	Granular
6 - 12	Loam		10YR 4/2		Friable	Weak	Granular
12 - 20	Silty clay loam		10YR 5/3		Firm	Moderate	Blocky
20 - 30"	Silty clay loam		10YR 5/3	10YR6/8,10YR7/1	Firm	Moderate	Blocky

I hereby certify this work was completed in accordance with MN 7080 and any local req's.

SK B. Solin

SPTesting, Inc.

394

Designer Signature

Company

License #

13-76 ■ SECTION 13: Forms and Reference

UNIVERSITY
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Septic System Best
Management Practices



Septic systems protect human health and the environment by safely recycling wastewater and returning it to the natural environment. It is your job as the homeowner to be sure this happens effectively and safely. As with your car, regular maintenance and attention is needed to keep it operating efficiently in a cost effective manner.

Septic Tank

Functions:

- Separates into three layers: scum (stuff that floats), sludge (stuff that sinks), and the liquid.
- The solids and scum are held until removed by the maintainer. Anaerobic bacteria work to break down wastes, prepare the liquid for the drainfield.
- The liquid is delivered to the soil treatment area to complete the treatment process.
- If solids are not removed, they can end up in the soil treatment area, causing (often irreparable) damage.
- Factors that increase frequency of pumping: use of garbage disposal, water treatment unit that discharges into the septic system, in-home daycare or other reason a large number of people are present most of the time, laundry on the 2nd floor, excessive use of water and strong cleaning products.

Best management practices:

- Tanks need to be evaluated every two to three years and pumped if necessary. Some counties require pumping on a specified basis. New homes—pump within 3—12 months of occupancy the first time.
- Never allow a tank to be cleaned through the inspection pipe. This is not allowed by code, and it does not allow a good cleaning to occur. Scum can plug the baffle, baffles can be knocked off. Tanks should only be cleaned through the manhole or maintenance hole.
- Be sure baffles, effluent screen, pumps and other components are inspected when the tank is pumped.
- Install risers on the manhole covers to allow easier access. Insulate the cover and secure tightly.
- An effluent screen will prevent most solids from reaching the soil treatment area. Install and clean according to manufacturer recommendations.
- Never use additives. The cleaners are harmful to your system. They do not replace good management practices. Starters and feeders are not effective.
- **Warning:** NEVER go into a septic tank—there are dangerous gases and no oxygen!
- Do not ignore alarms—troubleshoot the problem.

Septage—the solids from the tank are usually land-applied. Lime is added in the truck to destroy pathogens and help control odors. Septic pumpers must follow strict guidelines to protect public safety and water quality. Septage disposal is managed by the MN Pollution Control Agency (MPCA) and the Environmental Protection Agency (EPA).

For more information: Order the Septic System Owner's Guide. Call 800-876-8636 or go to <http://shop.extension.umn.edu>. Onsite Sewage Treatment Program web site: <http://septic.umn.edu>. University of Minnesota Extension <http://www.extension.umn.edu>.

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Soil Treatment Area: Trench or Mound

Functions:

- Soil organisms destroy pathogens (bacteria, viruses).
- Remove phosphorus, reduce nitrogen content.
- Recycle clean water into the soil and ground water. Water and nutrients enter the ground water, evaporate through plants, and are used by plants.

Best management practices:

- Maintain vegetative cover (turf grass, native grasses, flowers). Mow, but do not fertilize, burn or over-water.
- Keep all vehicles, bikes, snowmobiles, etc. off.
- Do not plant trees or shrubs near drainfield.
- Inspect for cracked, missing inspection pipe covers.
- Follow practices to prevent freezing, including mulching the entire system if needed.

Household Best Management Practices

Manage water use:

- Repair all leaking faucets, toilets, fixtures.
- Change to low flow toilets, shower heads.
- Replace appliances with low water use models.
- Spread water uses evenly throughout the day and week.
- Re-route clean water sources: water softener, treatment unit recharge water, high efficiency furnace drip, sump pumps to separate drainage area.

Watch what goes down the drain:

- The toilet is not a garbage can—nothing should be flushed except human waste and toilet paper.
- Excess medications—return to pharmacy or land-fill.
- Limit or eliminate drain cleaner use.
- Do not use automatic toilet cleaners, disposable brushes.
- Do not use every-use or automatic shower cleaners.
- No hazardous waste, paints, solvents, chemicals. Use disposable paint brushes.
- Eliminate or limit use of garbage disposal.
- No chlorine treated water such as from hot tubs.

Manage product use:

- Minimize use of anti-bacterial soaps, cleansers.
- Detergents: measure accurately, use as little as possible.
- Limit use of bleach-based cleansers.

SECTION 13: Forms and Reference ■ 13-77

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Septic System Management Plan
for Below Grade Systems

The goal of a septic system is to protect human health and the environment by properly treating wastewater before returning it to the environment. Your septic system is designed to kill harmful organisms and remove pollutants before the water is recycled back into our lakes, streams and groundwater.

This management plan will identify the operation and maintenance activities necessary to ensure long-term performance of your septic system. Some of these activities must be performed by you, the homeowner. Other tasks must be performed by a licensed septic maintainer or service provider. However, it is YOUR responsibility to make sure all tasks get accomplished in a timely manner.

The University of Minnesota's *Septic System Owner's Guide* contains additional tips and recommendations designed to extend the effective life of your system and save you money over time.

Proper septic system design, installation, operation and maintenance means safe and clean water!

Property Owner

Property Address 39 WINDY HILL RD Property ID

System Designer S-PRAXIS INC. Phone 763-497-3566

System Installer Phone

Service Provider/Maintainer Phone

Permitting Authority CITY OF SUNFISH LAKE Phone 651-328-6626

Permit # Date Inspected

Keep this Management Plan with your Septic System Owner's Guide. The Septic System Owner's Guide includes a folder to hold maintenance records including pumping, inspection and evaluation reports. Ask your septic professional to also:

- Attach permit information, designer drawings and as-builts of your system, if they are available.
- Keep copies of all pumping records and other maintenance and repair invoices with this document.
- Review this document with your maintenance professional at each visit; discuss any changes in product use, activities, or water-use appliances.

For a copy of the *Septic System Owner's Guide*, call 1-800-876-8636 or go to <http://shop.extension.umn.edu/>

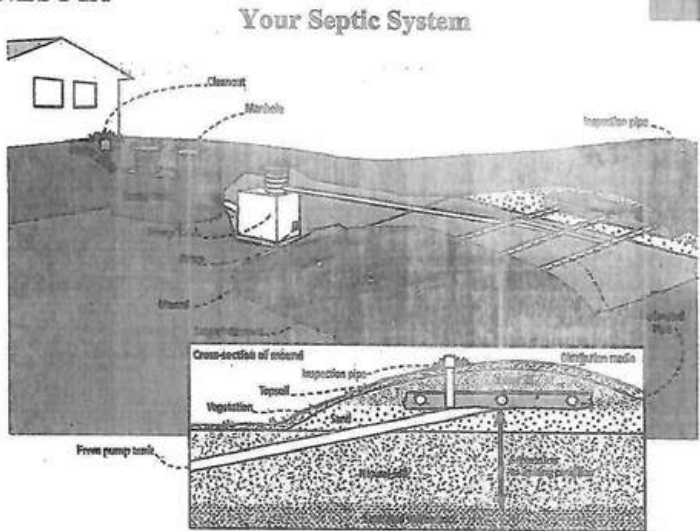
<http://septic.umn.edu>

Version 6/10/2010

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Septic System Management Plan
for Above Grade Systems



Septic System Specifics	
System Type: ☒ I ☐ II ☐ III ☐ IV* ☐ V* (Based on MN Rules Chapter 7080.2200 – 2400)	☐ System is subject to operating permit* ☐ System uses UV disinfection unit* Type of advanced treatment unit _____ *Additional Management Plan required
Dwelling Type	Well Construction
Number of bedrooms: <u>5</u>	Well depth (ft): _____
System capacity/ design flow (gpd): <u>750</u>	☐ Cased well Casing depth: _____
Anticipated average daily flow (gpd): <u>525</u>	☐ Other (specify): _____
Comments _____	Distance from septic (ft): _____
Business? ☐ What type? _____	Is the well on the design drawing? ☐ Y ☐ N
Septic Tank	
☐ One tank Tank volume: _____ gallons	☒ Pump Tank <u>1250</u> gallons
Does tank have two compartments? ☐ Y ☒ N	☐ Effluent Pump make/model: <u>314 HP</u>
☒ Two tanks Tank volume: <u>1250</u> gallons	Pump capacity <u>30</u> GPM
☐ Tank is constructed of <u>concrete</u>	TDH <u>42</u> Feet of head
☐ Effluent Screen type: _____	☐ Alarm location <u>HOUSE</u>
Soil Treatment Area (STA)	
Mound/At-Grade area (width x length): <u>44 ft x 97 ft</u>	☒ Cleanouts or inspection ports
Rock bed size (width x length): <u>10 ft x 63 ft</u>	☒ Surface water diversions
Location of additional STA: <u>WEST</u>	☐ Additional STA not available

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Septic System Management Plan
for Below Grade Systems



Homeowner Management Tasks

These operation and maintenance activities are your responsibility. Use the chart on page 6 to track your activities.

Identify the service intervals recommended by your system designer and your local government. The tank assessment for your system will be the shortest interval of these three intervals. Your pumper/maintainer will determine if your tank needs to be pumped.

System Designer: check every 24 months
Local Government: check every _____ months
State Requirement: check every 36 months

My tank needs to be checked
every 24 months

Seasonally or several times per year

- Leaks. Check (listen, look) for leaks in toilets and dripping faucets. Repair leaks promptly.
- Surfacing sewage. Regularly check for wet or spongy soil around your soil treatment area. If surfaced sewage or strong odors are not corrected by pumping the tank or fixing broken caps and leaks, call your service professional. Untreated sewage may make humans and animals sick.
- Alarms. Alarms signal when there is a problem; contact your maintainer any time the alarm signals.
- Lint filter. If you have a lint filter, check for lint buildup and clean when necessary. Consider adding one after washing machine.
- Effluent screen. If you do not have one, consider having one installed the next time the tank is cleaned.

Annually

- Water usage rate. A water meter can be used to monitor your average daily water use. Compare your water usage rate to the design flow of your system (listed on the next page). Contact your septic professional if your average daily flow over the course of a month exceeds 70% of the design flow for your system.
- Caps. Make sure that all caps and lids are intact and in place. Inspect for damaged caps at least every fall. Fix or replace damaged caps before winter to help prevent freezing issues.
- Water conditioning devices. See Page 5 for a list of devices. When possible, program the recharge frequency based on water demand (gallons) rather than time (days). Recharging too frequently may negatively impact your septic system.
- Review your water usage rate. Review the Water Use Appliance chart on Page 5. Discuss any major changes with your pumper/maintainer.

During each visit by a pumper/maintainer

- Ask if your pumper/maintainer is licensed in Minnesota.
- Make sure that your pumper/maintainer services the tank through the manhole. (NOT through a 4" or 6" diameter inspection port.)
- Ask your pumper/maintainer to accomplish the tasks listed on the Professional Tasks on Page 4.



Professional Management Tasks

These are the operation and maintenance activities that a pumper/maintainer performs to help ensure long-term performance of your system. Professionals should refer to the O/M Manual for detailed checklists for tanks, pumps, alarms and other components. Call 800-322-8642 for more details.

- Written record provided to homeowner after each visit.

Plumbing/Source of Wastewater

- Review the Water Use Appliance Chart on Page 5 with homeowner. Discuss any changes in water use and the impact those changes may have on the septic system.
- Review water usage rates (if available) with homeowner.

Septic Tank/Pump Tanks

- **Manhole lid.** A riser is recommended if the lid is not accessible from the ground surface. Insulate the riser cover for frost protection.
- **Liquid level.** Check to make sure the tank is not leaking. The liquid level should be level with the bottom of the outlet pipe. (If the water level is below the bottom of the outlet pipe, the tank may not be watertight. If the water level is higher than the bottom of the outlet pipe of the tank, the effluent screen may need cleaning, or there may be ponding in the drainfield.)
- **Inspection pipes.** Replace damaged caps.
- **Baffles.** Check to make sure they are in place and attached, and that inlet/outlet baffles are clear of buildup or obstructions.
- **Effluent screen.** Check to make sure it is in place; clean per manufacturer recommendation. Recommend retrofitted installation if one is not present.
- **Alarm.** Verify that the alarm works.
- **Scum and sludge.** Measure scum and sludge in each compartment of each septic and pump tank, pump if needed.

Pump

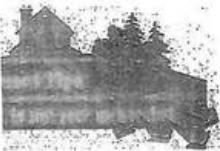
- **Pump and controls.** Check to make sure the pump and controls are operating correctly.
- **Pump vault.** Check to make sure it is in place; clean per manufacturer recommendations.
- **Alarm.** Verify that the alarm works.
- **Drainback.** Check to make sure it is operating properly.
- **Event counter or run time.** Check to see if there is an event counter or run time log for the pump. If there is one, calculate the water usage rate and compare to the anticipated average daily flow listed on Page 2.

Soil Treatment Area

- **Inspection pipes.** Check to make sure they are properly capped. Replace caps that are damaged.
- **Surfacing of effluent.** Check for surfaced effluent or other signs of problems.
- **Gravity trenches and beds.** Check the number of gravity trenches with ponded effluent. Identify the percentage of the system in use. Determine if action is needed.
- **Pressure trenches and beds - Lateral flushing.** Check lateral distribution; if cleanouts exist, flush and clean as needed.

All other components – inspect as listed here:

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Water-Use Appliances and
Equipment in the Home

Appliance	Impacts on System	Management Tips
Garbage disposal	• Uses additional water. • Adds solids to the tank. • Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Use of a garbage disposal is not recommended. • Minimize garbage disposal use. Compost instead. • To prevent solids from exiting the tank, have your tank pumped more frequently. • Add an effluent screen to your tank.
Washing machine	• Washing several loads on one day uses a lot of water and may overload your system. • Overloading your system may prevent solids from settling out in the tank. Unsettled solids can exit the tank and enter the soil treatment area.	• Choose a front-loader or water-saving top-loader, these units use less water than older models. • Limit the addition of extra solids to your tank by using liquid or easily biodegradable detergents. • Install a lint filter after the washer and an effluent screen to your tank. • Wash only full loads. • Limit use of bleach-based detergents. • Think even – spread your laundry loads throughout the week.
2 nd floor laundry	• The rapid speed of water entering the tank may reduce performance.	• Install an effluent screen in the septic tank to prevent the release of excessive solids to the soil treatment area. • Be sure that you have adequate tank capacity.
Dishwasher	• Powdered and/or high-phosphorus detergents can negatively impact the performance of your tank and soil treatment area. • New models promote “no scraping”. They have a garbage disposal inside.	• Use gel detergents. Powdered detergents may add solids to the tank. • Use detergents that are low or no-phosphorus. • Wash only full loads. • Scrape your dishes anyways to keep undigested solids out of your septic system.
Grinder pump (in home)	• Finely-ground solids may not settle. Unsettled solids can exit the tank and enter the soil treatment area.	• Expand septic tank capacity by a factor of 1.5. • Include pump monitoring in your maintenance schedule to ensure that it is working properly. • Add an effluent screen.
Large bathtub (whirlpool)	• Large volume of water may overload your system. • Heavy use of bath oils and soaps can impact biological activity in your tank and soil treatment area.	• Avoid using other water-use appliances at the same time. For example, don’t wash clothes and take a bath at the same time. • Use oils, soaps, and cleaners in the bath or shower sparingly.
Clean Water Uses	Impacts on System	Management Tips
High-efficiency furnace	• Drip may result in frozen pipes during cold weather.	• Re-route water into a sump pump or directly out of the house. Do not route furnace recharge to your septic system.
Water softener Iron filter Reverse osmosis	• Salt in recharge water may affect system performance. • Recharge water may hydraulically overload the system.	• These sources produce water that is not sewage and should not go into your septic system. • Reroute water from these sources to another outlet, such as a dry well, drain tile or old drainfield.
Surface drainage Footings drains	• Water from these sources will likely overload the system.	• When replacing, consider using a demand-based recharge vs. a time-based recharge. • Check valves to ensure proper operation; have unit serviced per manufacturer directions

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Septic System Management Plan
for Above Grade Systems



Maintenance Log

Track maintenance activities here for easy reference. See list of management tasks on pages 3 and 4.

Activity	Date accomplished											
<i>Check frequently:</i>												
Leaks: check for plumbing leaks												
Soil treatment area check for surfacing												
Lint filter: check, clean if needed												
Effluent screen: if owner-maintained												
<i>Check annually:</i>												
Water usage rate (monitor frequency ____)												
Caps: inspect, replace if needed												
Water use appliances – review use												
Other:												

Notes: _____

Mitigation/corrective action plan: _____

"As the owner of this SSTS, I understand it is my responsibility to properly operate and maintain the sewage treatment system on this property, utilizing the Management Plan. If requirements in this Management Plan are not met, I will promptly notify the permitting authority and take necessary corrective actions. If I have a new system, I agree to adequately protect the reserve area for future use as a soil treatment system."

Property Owner Signature: _____ Date: _____

Management Plan Prepared By: S-P Testing Inc. Certification # 620 WUM 394
STEVEN R. SOJAK MERS

Permitting Authority: _____

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