Le Sueur County, MN

Thursday, May 11, 2017

Regular session

Item 4

Item #4: Thomas Tree & Landscape, Jacobson, Skillman and Kuiper Enterprises

Staff Contact: Kathy Brockway or Michelle Mettler

STAFF REPORT

GENERAL INFORMATION

APPLICANT: Thomas Tree and Landscape

OWNER: Lyle Jacobson, Roselyn Skillman, and Shoshanna Kroeger

911 ADDRESS: 2200 Evergreen Dr. Kasota MN 56050

PROJECT DESCRIPTION: To allow grading, excavating and filling of 302 cubic yards of material for a bluff restoration project in a Recreational Residential "RR" District on a Recreational Development "RD" lake, Lake Washington

ZONING ORDINANCE SECTIONS: 13.2, 18

DISTRICT PURPOSE:
The intent of the **Recreational Residential (RR) District** is to preserve areas which have natural characteristics suitable for both passive and active recreational usage. Also, it is the intent of this district to manage areas suitable for residential development of varying types, including permanent and seasonal housing. Some non-residential uses with minimal impacts on residential uses are allowed if properly managed under conditional use procedures.

GOALS AND POLICIES: The current Land Use Plan as adopted in 2007 references shoreland development.

Goal 2: **Le Sueur County should adopt and enforce land use goals and policies that conserve and restore its natural resources, bring protections to the ecological systems of the natural environment, and prevent the premature development of natural resource areas.**

Policy: Utilize shorelands on Recreational Development Lakes (RD) for housing, but with a focus on development design that protects the resource.

DEFINITIONS:

Bluff - A topographic feature such as a hill, cliff, or embankment in which the slope rises at least fifteen (15) feet from the toe of the bluff to the top of the bluff and the grade of the slope from the toe of the bluff to the top of the bluff averages 18 percent or greater. The percent of the slope is defined as the change in elevation (rise) over a distance (run).

Bluff, Toe - The toe of the bluff shall be determined to be the lower end of the lowest ten (10) foot segment that exceeds eighteen (18) percent slope.

Bluff, Top - The top of the bluff shall be determined to the upper end of the highest ten (10) foot segment that exceeds eighteen (18) percent.

Bluff Impact Zone (BIZ) - Land located within 30 feet from the top or toe of a bluff.

SITE INFORMATION

LOCATION: Tracts A & B, Registered Land Survey #17, & Lots 8, 9, 10, part of Lots 1 & 7, Replat of Sportsmen Haven, Section 18, Kasota Township.

ZONING: Recreational Residential "RR"

GENERAL SITE DESCRIPTION: Shoreland, residential platted subdivision

ACCESS: Existing access off Evergreen Dr

EXISTING LAND USE WITHIN ¼ MILE:

North: Residential
South: Residential/Ag
East: Lake Washington
West: Residential

TOWNSHIP BOARD NOTIFICATION

The applicants contacted Daren Barfknecht, Township Board member on December 13, 2017.

NATURAL RESOURCES INFORMATION

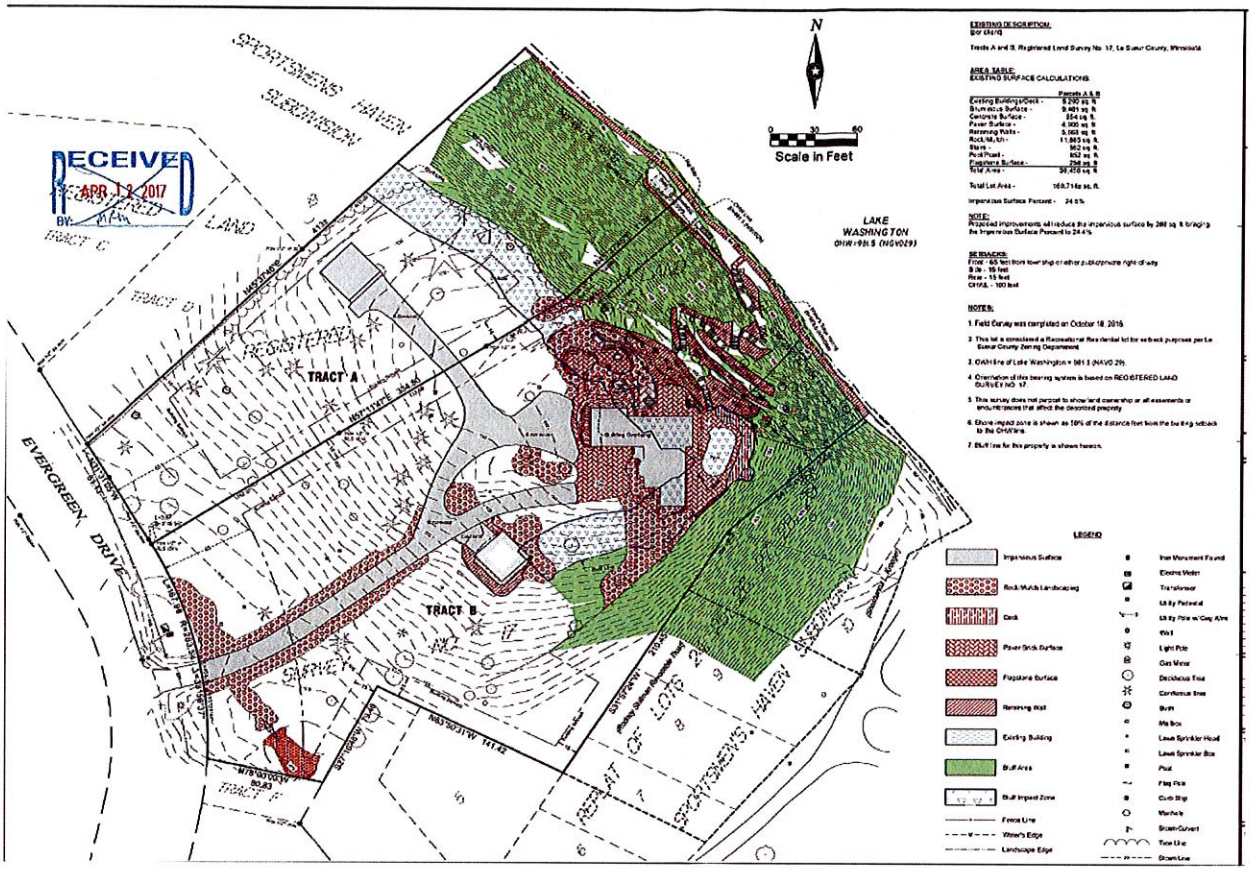
SHORELAND: The proposal is located within the Shoreland District.
WETLANDS: According to the National Wetlands Inventory, No wetlands located in the quarter-quarter section where the project is proposed.

ATTACHMENTS

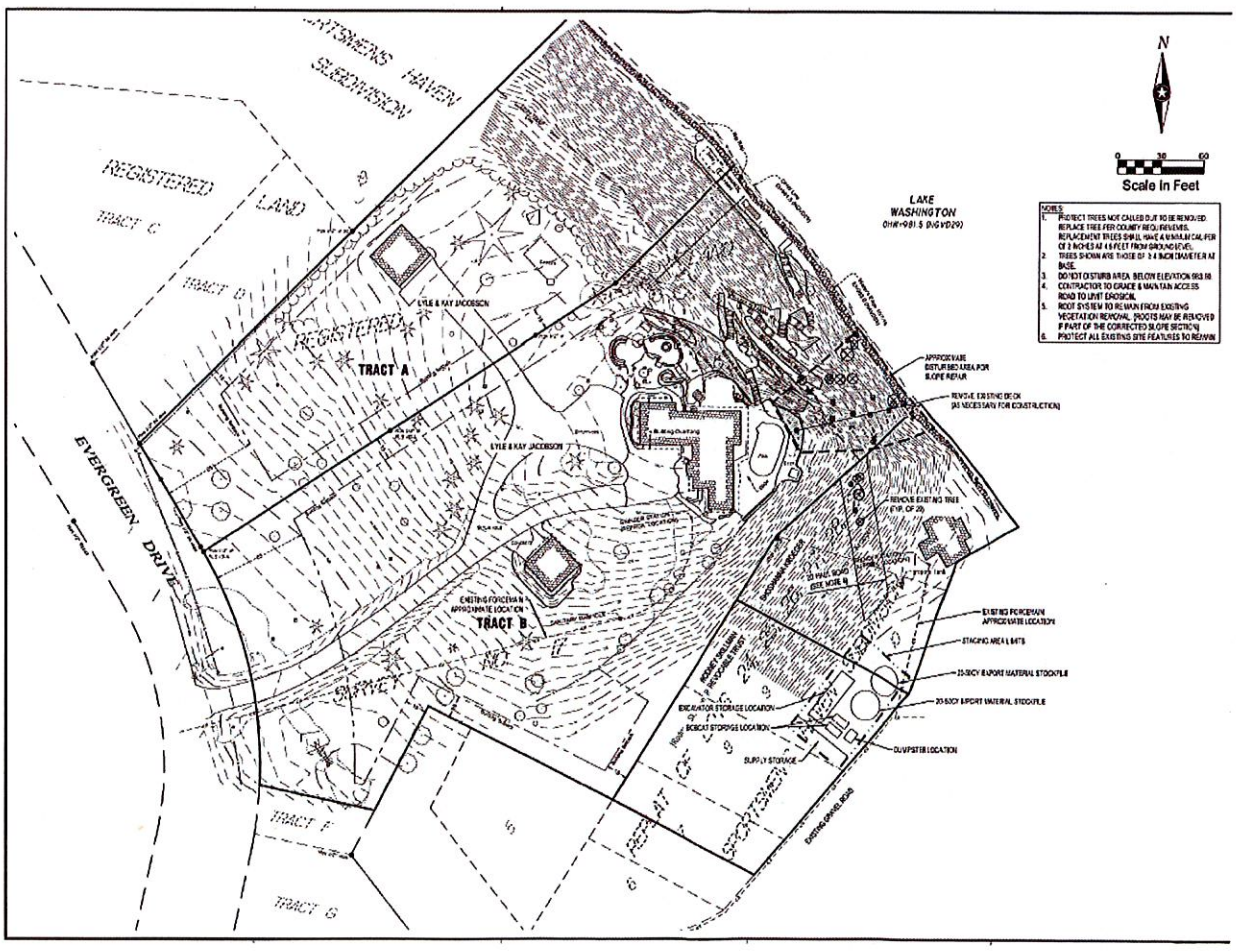
Application, Narrative, Survey, Criteria Form, Letter from Joshua Mankowski, LSC Resource Specialist

AERIAL PHOTO/SITE PLANS

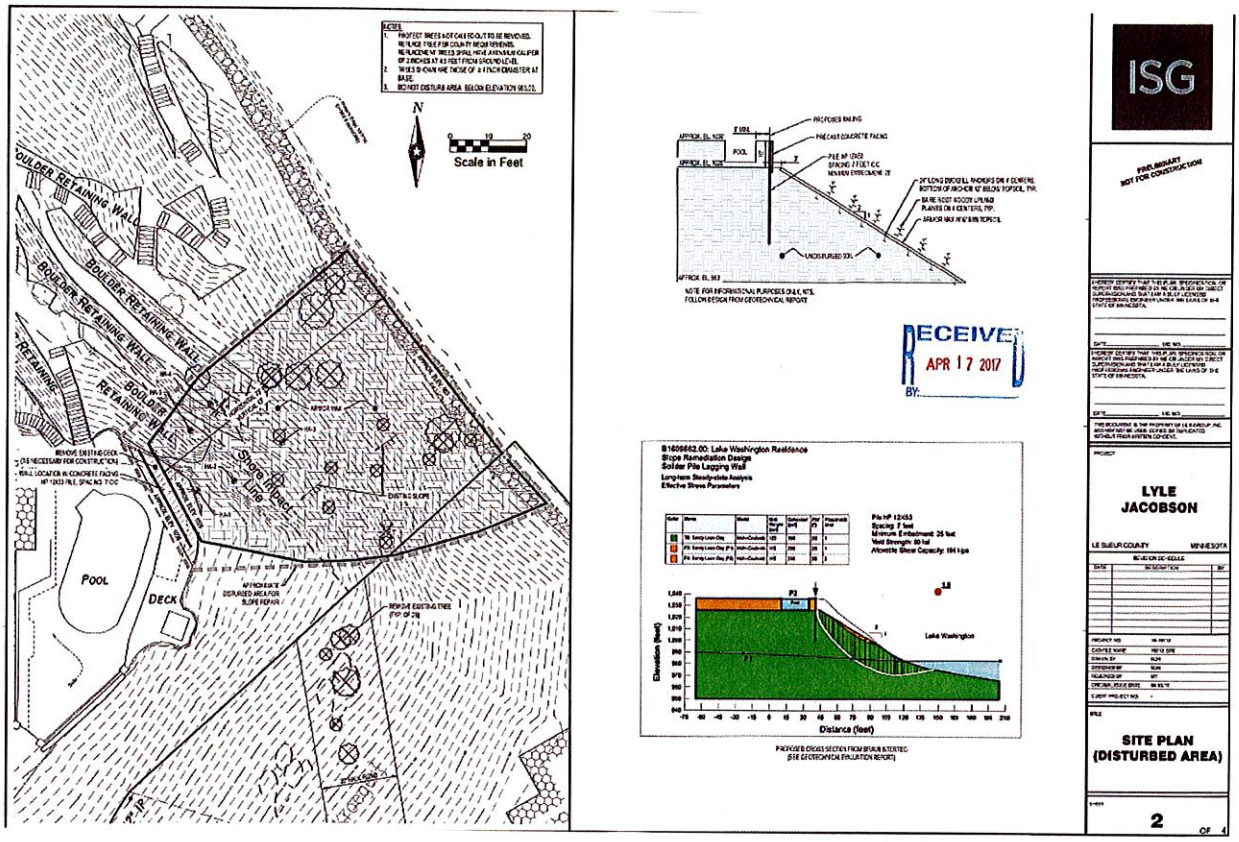
Certificate of Survey:



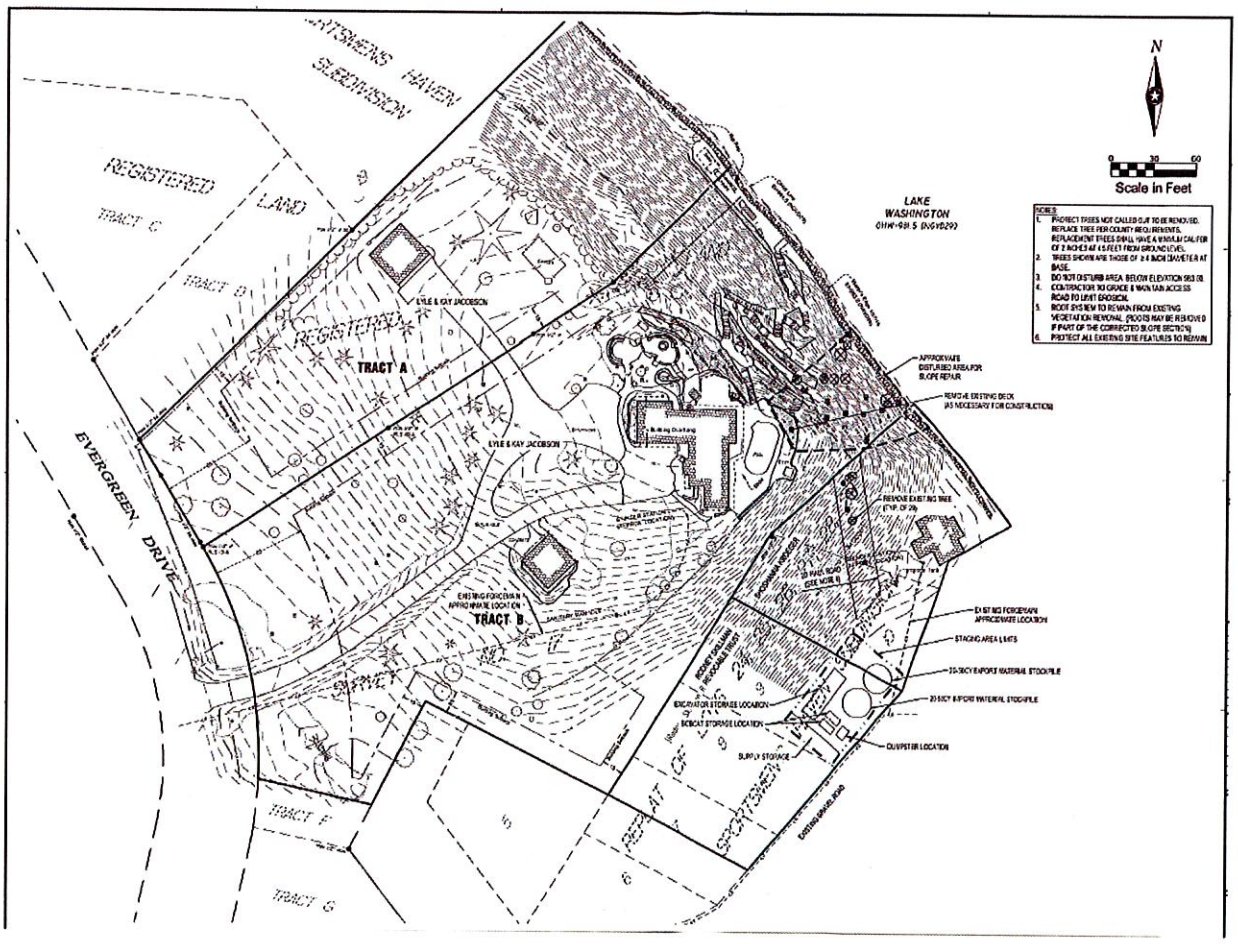
Site Plan:



Disturbed area:



Stormwater Plan:



PLANNING AND ZONING COMMISSION CONSIDERATIONS

The Planning Commission and staff shall consider possible adverse effects of the proposed conditional use and what additional requirements may be necessary to reduce such adverse effects. Its judgment shall be based upon the following factors to include, but not limited to:

1. Relationship to County plans.
2. The geographical area involved.
3. Whether such use will negatively affect surrounding properties in the area in which it is proposed.
4. The character of the surrounding area.
5. The demonstrated need for such use.
6. Whether the proposed use would cause odors, dust, flies, vermin, smoke, gas, noise, or vibration or would impose hazards to life or property in the neighborhood.
7. Whether such use would inherently lead to or encourage disturbing influences in the neighborhood.
8. Whether stored equipment or materials would be screened and whether there would be continuous operation within the visible range of surrounding residences.
9. Abatement of Environmental Hazards as regulated in this Ordinance
10. Other factors impacting the public health, safety and welfare.

PLANNING AND ZONING COMMISSION CONDITIONS

The Planning Commission shall recommend such conditions relating to the granting of said Conditional Use Permit, as they deem necessary to carry out the intent and purpose of this Ordinance or recommend that the request be denied. Such recommendation shall be in writing. The conditions may include, but are not limited to the following:

1. Increasing the required lot size or yard dimension.
2. Limiting the height, size, or location of the structures.
3. Controlling the location, size, and number of vehicle access points.
4. Increasing the street width.
5. Increasing the number of required off-street parking space.
6. Limiting the number, size, location, or lighting of signs.
7. Requiring diking, fencing, screening, landscaping or other facilities to protect adjacent or nearby property.
8. Designating sites for open space.

PLANNING AND ZONING COMMISSION FINDINGS

Based on the information submitted by the applicant, contained in this report, and as required by the Le Sueur County Zoning Ordinance, the following findings have been developed for this request:
*(Please circle one for each item: Agree, **Disagree**, Not Applicable.)*

1. *The conditional use will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted, nor substantially diminishes and impairs property values within the immediate vicinity.*

2. *The establishment of the conditional use will not impede the normal and orderly development and improvement of surrounding vacant property for uses predominant in the area.*

3. *Adequate utilities, access roads, drainage and other facilities have been or are being provided.*

4. *Adequate measures have been or will be taken to provide sufficient off-street parking and loading space to serve the proposed use.*

5. *Adequate measures have been or will be taken to prevent and control offensive odor, fumes, dust, noise and vibration, so that none of these will constitute a nuisance, and to control lighted signs and other lights in such a manner that no disturbance to neighboring properties will result.*

6. *Is the Conditional Use Permit consistent with and supported by the statement of purposes, policies, goals and objectives in the Ordinance?*

7. *Is the Conditional Use Permit consistent with the Comprehensive Land Use Plan?*

Recommend (circle one) approval / denial / table / of Conditional Use Permit.

LE SUEUR COUNTY
CONDITIONAL USE PERMIT CRITERIA

Conditional Use Permit #: 17070

Applicant: THOMAS TREE & LANDSCAPE **Land Owner:** LYLE JACOBSEN

Conditional Use Permit Request: TO ALLOW THE APPLICANT 302 CUBIC YARDS OF GRADING EXCAVATING AND FILLING FOR A BLUFF RESTORATION PROJECT. (INCLUDES SHOSHANNA KROEGER & ROSELYN SKILLMAN PROPERTIES)

1. The conditional use will not be injurious to the use and enjoyment of other property in the immediate vicinity for the purposes already permitted, nor substantially diminishes and impairs property values within the immediate vicinity.

Al	Don Rk	Don Ry	Jeanne	Doug	Shirley	Pam	TOTAL

Explain _____

2. The establishment of the conditional use will not impede the normal and orderly development and improvement of surrounding vacant property for uses predominant in the area.

Al	Don Rk	Don Ry	Jeanne	Doug	Shirley	Pam	TOTAL

Explain _____

3. Adequate utilities, access roads, drainage and other facilities have been or are being provided.

Al	Don Rk	Don Ry	Jeanne	Doug	Shirley	Pam	TOTAL

Explain _____

4. Adequate measures have been or will be taken to provide sufficient off-street parking and loading space to service the proposed use.

Al	Don Rk	Don Ry	Jeanne	Doug	Shirley	Pam	TOTAL

Explain _____

5. Adequate measures have been or will be taken to prevent and control offensive odor, fumes, dust, noise and vibration, so that none of these will constitute a nuisance, and to control lighted signs and other lights in such a manner that no disturbance to neighboring properties will result.

Al	Don Rk	Don Ry	Jeanne	Doug	Shirley	Pam	TOTAL

Explain _____

6. The conditional use is consistent with and supported by the statement of purposes, policies, goals and objectives in the Ordinance.

Al	Don Rk	Don Ry	Jeanne	Doug	Shirley	Pam	TOTAL

Explain _____

7. The conditional use is consistent with the Comprehensive Land Use Plan.

Al	Don Rk	Don Ry	Jeanne	Doug	Shirley	Pam	TOTAL

Explain _____

If all answers are "YES" by a majority of the Planning Commission, the criteria for granting of the Conditional Use Permit request have been met. The Conditional Use Permit will meet the goals of safety, health and the general welfare of the public.

Date: _____ **APPROVED** ____ **DENIED** ____ **PZ Chairperson** _____

COUNTY BOARD MEETING DATE _____

LE SUEUR COUNTY ENVIRONMENTAL SERVICES
88 SOUTH PARK AVE.
LE CENTER, MINNESOTA 56057-1600

Phone (507) 357-8540 (direct line) Fax (507) 357-8541

Date: 04/24/2017

To: Le Sueur County Planning and Zoning Board of Adjustment

From: Joshua Mankowski, Environmental Resources Specialist

Applicant:
Thomas Tree & Landscape

Property owner:
Lyle Jacobsen

Property:
05.610.0010 & 05.610.0020

Description:
Application for a Condition Use Permit to allow the applicant 302 Cubic Yards of Grading, Excavating, and Filling for a bluff restoration project.

Recommendation:
It would be my recommendation to approve the application with the condition(s) listed below. Without conducting work on this bluff, there is a serious possibility of failure at the site. The proposed work has been designed and approved by an engineering firm to better ensure that there is no future failure.

Condition(s):

- Utilize native vegetation in planting on the bluff to provide both screening and assist in stabilization.

Sincerely,

Joshua Mankowski
Le Sueur County
Environmental Resources Specialist

Le Sueur County

Conditional Use Application-Grading, Excavating & Filling

Activities that involve topographic alterations in all districts shall conform to the standards in Section 18 of the Le Sueur County Zoning Ordinance. Activities within a shoreland district shall conform to the standards in Section 13 of the Le Sueur County Zoning Ordinance.

In addition any activities in any type wetland shall be evaluated in accordance with the Wetland Conservation Act (WCA) regulations, as administered by the Le Sueur County Soil & Water Conservation District (SWCD).

I. Applicant:

Name THOMAS TREE & LANDSCAPE
Mailing Address 19922 STATE HIGHWAY 22
City MANKATO State MN Zip 56001
Phone # 507-625-4960 Phone #

II. Landowner:

Name LYLE G. & KAY JACOBSEN
Mailing Address 2200 EVERGREEN DRIVE
City KASOTA State MN Zip 56050

Property Address 2200 EVERGREEN DRIVE
City KASOTA State MN Zip 56050
Phone # Phone #

III. Parcel Information:

Parcel Number 05.619.0020 & 05.610.0010 Parcel Acreage 2.5 & 1.3
Attach Full Legal Description (**NOT** *abbreviated description from tax statement*)
Township KASOTA T109N R25W Section 18
Subdivision RLS No. 17 ~~Lot~~ TRACT A & B Block

IV. Township Notification: Township must be notified of proposed use prior to application.

KASOTA TOWNSHIP (Township Name) Township notified on 12/13/2016 (Date)

Board Member DAREN BARFKNECHT (Name) regarding the proposed use.

V. Quantities and Submittal Formats:

a. One (1) reproducible 8.5" x 11" copy of the request and all other supporting documents.

b. Twenty Three (23) copies must be submitted, if any documents are in color, an aerial, or larger than 8.5" x 11" in size.

c. Electronic version of any supporting documents *if available.*

c. Additional copies may be requested as deemed necessary by the Department.

d. **Application must be made in person** by the applicant and/or landowner no later than 12 P.M. on the date of application deadline.

e. **Appointment is necessary.**

f. **Applications will not be accepted by mail.**

VI. Fees: Must be paid at the time of application.

Conditional Use Permit	$ 750 After-The-Fact fee is **doubled.**
Filing Fee	$ 46

Additional Fees:

Special Meeting	$ 2,000
After-The-Fact Penalty	$ 1,500 OR 10% of improvement, whichever is greater

VII. Type of Request: Grading, Excavating or Filling.

❒ **Non-Shoreland**
- ❒ Within Bluff Impact Zone
- ❒ Within Bluff

Cubic yards of material movement: _____
Cubic yards of material movement: _____
Cubic yards of material movement: _____
TOTAL cubic yards of material movement: _____

❒ **Shoreland-** Outside Shore Impact Zone
- ❒ Within Shore Impact Zone
- ❒ Within Bluff Impact Zone
- ❒ Within Bluff

Cubic yards of material movement: 209
Cubic yards of material movement: 93
Cubic yards of material movement: 55
Cubic yards of material movement: 247
TOTAL cubic yards of material movement: 302

❒ Assurance security shall be required for projects that are >1500 cubic yards.

VIII. Description of Request:

a. A full description of request with detailed information including what operations are to occur and what general types of equipment may be used in the operation must be attached.

b. Complete the following in relationship to the proposed Conditional Use Permit.

1. **ENVIRONMENTAL IMPACT:** SEE MEMO
2. **ADVERSE IMPACT ON SURROUNDING AREAS:** SEE MEMO
3. **STORMWATER RUNOFF:** SEE MEMO
4. **DOES ANY PART OF THE PROJECT EXTEND BELOW OHWL:** SEE MEMO
5. **WETLAND IMPACT:** SEE MEMO
6. **SLOPE STABILITY:** SEE MEMO
7. **CERTIFICATE OF INSURANCE:** SEE MEMO
8. **MEET ALL APPLICABLE COUNTY STATE & FEDERAL REGULATIONS:**
   (*For example additional licensing and/or permitting*) SEE MEMO

IX. Site Plan: Shall include but not limited to the following:

- **Parcels < 5 AC =** 2-foot contours depicting existing and proposed topography.
- **Parcels 5-20 AC =** 5-foot contours depicting existing and proposed topography.
- **Parcels >20 AC =** 10-foot contours depicting existing and proposed topography.
- Location of grading, excavating, and/or filling sites.
- Location of areas for obtaining fill or disposing of excavated materials.
- Tree inventory of all trees, indicating trees to be cut or removed.
  (Caliper of 6 inches or greater measured 4.5 feet from ground level).

- North point
- Setbacks
- Property Lines
- Road Right-Of-Way
- Landscape, screening and buffering
- Lake
- River
- Wetland
- Stream
- Existing Structures
- Proposed Structures
- Lot Dimensions
- Ponds
- Septic system
- Well
- Access (size & location)
- Easements
- Drainage

• Site plan & As-Built must be completed by a surveyor or professional engineer.

X. Restoration Plan: Shall include but not limited to the following:

- Areas of restoration shall include the application of a minimum of 4 inches of topsoil or similar material that will support plant growth. *(Must be included in cubic yards calculation of material.)*
- Reseeded areas indicated with type of vegetation. *(Shall meet minimum standards by the SWCD))*
- Tree replacement plan. *(Areas located within the Bluff Impact Zone, Bluff, Shoreland & Conservancy Districts)*
  - Root zone of existing trees shall be preserved and protected during development.
  - Replace one tree for every tree that is removed.
  - Replacement trees shall have a minimum caliper of 2 inches at 4.5 feet from ground level.

XI. Attachments: Shall include but not limited to:

- [x] a. **Description of Request**-*See Part VIII for full details and requirements.*
- [x] b. **Site Plan**-*See Part IX for full details and requirements.*
- [x] c. **Full Legal Description**-*Not abbreviated description from tax statement.*
- [ ] d. **Access approval**-*Attach approval in writing from proper road authority.*
- [x] e. **Township Notification**-*See Part IV for details and requirements.*
- [ ] f. **Septic System Compliance Inspection**
- [x] g. **Erosion Control Plan**-*Attach completed and signed plan including map.*
- [x] h. **Restoration Plan**-*See Part X for full details and requirements.*
- [x] i. **Approved Stormwater Pollution Prevention Plan**
  -Must meet NPDES requirements and prepared by a licensed professional engineer.

XII. Procedure:

The Planning & Zoning Commission shall hold a public hearing on the proposed Conditional Use Permit at a scheduled Planning and Zoning Commission meeting.

The Planning and Zoning Commission is an advisory board to the County Board of Commissioners and will make a recommendation to the County Board.

The Department shall report the finings and recommendations of the Planning Commission to the County Board for final decision.

Action by the County Board shall be a majority vote of its members.

The Department shall notify the applicant and/or landowner in writing of the County Board decision.

A certified copy of the Conditional Use Permit shall be filed with the Le Sueur County Recorder by the Department.

XIII. Signatures:

I hereby certify with my signature that all data contained herein as well as all supporting data are true and correct to the best of my knowledge.

Applicant signature _____ Date 1/9/17

I hereby certify with my signature that all data contained herein as well as all supporting data are true and correct to the best of my knowledge.

Property Owner signature _____ Date 1/5/2017

JACOBSEN

3

OFFICE USE ONLY

Request: GRADING, EXCAVATING & FILLING

☐ **Non-Shoreland**	Cubic yards of material movement: _____
☐ Within Bluff Impact Zone	Cubic yards of material movement: _____
☐ Within Bluff	Cubic yards of material movement: _____
TOTAL cubic yards of material movement:	_____
☐ **Shoreland** - Outside Shore Impact Zone	Cubic yards of material movement: 209
☐ Within Shore Impact Zone	Cubic yards of material movement: 93
☐ Within Bluff Impact Zone	Cubic yards of material movement: 55
☐ Within Bluff	Cubic yards of material movement: 247
TOTAL cubic yards of material movement:	302

Pre-App Date 4-10-17	Lake Classification RD		Feedlot	500' 1000'	N
Meeting Date 5-11-14	Lake Unnamed		Wetland Type	1-2 3-8	N
60 Day 6-9-17	FEMA Panel # 27079C0 300 D		Water courses		Y N
Zoning District RR	Flood Zone X-outside		Bluff		Y N

☑ Request Description	☐ Access Approval	☐ Septic	Comp Insp / Design Lake WA SD
☑ Site Plan	☑ Erosion Control Plan	☑ Meeting	Reg / ATF / Spec
☑ Full Legal	☐	☑ Fee	$ 790
☑ Ordinance	☐ Other _____	☐ Penalty	$ _____

☑ Application Complete	Michelle R Metz	4-10-17	17070
	Planning & Zoning Department Signature	Date	Permit #

Le Sueur County

Conditional Use Application-Grading, Excavating & Filling

Activities that involve topographic alterations in all districts shall conform to the standards in Section 18 of the Le Sueur County Zoning Ordinance. Activities within a shoreland district shall conform to the standards in Section 13 of the Le Sueur County Zoning Ordinance.

In addition any activities in any type wetland shall be evaluated in accordance with the Wetland Conservation Act (WCA) regulations, as administered by the Le Sueur County Soil & Water Conservation District (SWCD).

I. Applicant:

Name THOMAS TREE + LANDSCAPE
Mailing Address 19922 STATE HIGHWAY 22
City MANKATO State MN Zip 56001
Phone # 507-625-4960 Phone # _____

II. Landowner:

Name ROSELYN SKILLMAN
Mailing Address 38706 N. 104TH ST.
City SCOTTSDALE State AZ Zip 85262

Property Address _____
City _____ State _____ Zip _____
Phone # _____ Phone # _____

III. Parcel Information:

Parcel Number 05.710.0030 Parcel Acreage 0.45
Attach Full Legal Description (***NOT*** *abbreviated description from tax statement)*
Township KASOTA T109N R25W Section 18
Subdivision REPLAT OF LOTS 24-29 SPORTSMENS HAVEN SUBD. Lot A OF 7 & 8+9 Block _____

IV. Township Notification: Township must be notified of proposed use prior to application.

_____ Township notified on _____
(Township Name) *(Date)*

Board Member _____ regarding the proposed use.
(Name)

V. Quantities and Submittal Formats:

a. One (1) reproducible 8.5" x 11" copy of the request and all other supporting documents.

b. Twenty Three (23) copies must be submitted, if any documents are in color, an aerial, or larger than 8.5" x 11" in size.

c. Electronic version of any supporting documents *if available.*

c. Additional copies may be requested as deemed necessary by the Department.

d. **Application must be made in person** by the applicant and/or landowner no later than 12 P.M. on the date of application deadline.

e. **Appointment is necessary.**

f. **Applications will not be accepted by mail.**

X. Restoration Plan: Shall include but not limited to the following:

- Areas of restoration shall include the application of a minimum of 4 inches of topsoil or similar material that will support plant growth. *(Must be included in cubic yards calculation of material.)*
- Reseeded areas indicated with type of vegetation. *(Shall meet minimum standards by the SWCD))*
- Tree replacement plan. *(Areas located within the Bluff Impact Zone, Bluff, Shoreland & Conservancy Districts)*
  - Root zone of existing trees shall be preserved and protected during development.
  - Replace one tree for every tree that is removed.
  - Replacement trees shall have a minimum caliper of 2 inches at 4.5 feet from ground level.

XI. Attachments: Shall include but not limited to:

- ☐ a. **Description of Request**-*See Part VIII for full details and requirements.*
- ☐ b. **Site Plan**-*See Part IX for full details and requirements.*
- ☐ c. **Full Legal Description**-*Not abbreviated description from tax statement.*
- ☐ d. **Access approval**-*Attach approval in writing from proper road authority.*
- ☐ e. **Township Notification**-*See Part IV for details and requirements.*
- ☐ f. **Septic System Compliance Inspection**
- ☐ g. **Erosion Control Plan**-*Attach completed and signed plan including map.*
- ☐ h. **Restoration Plan**-*See Part X for full details and requirements.*
- ☐ i. **Approved Stormwater Pollution Prevention Plan**
  -Must meet NPDES requirements and prepared by a licensed professional engineer.

XII. Procedure:

The Planning & Zoning Commission shall hold a public hearing on the proposed Conditional Use Permit at a scheduled Planning and Zoning Commission meeting.

The Planning and Zoning Commission is an advisory board to the County Board of Commissioners and will make a recommendation to the County Board.

The Department shall report the findings and recommendations of the Planning Commission to the County Board for final decision.

Action by the County Board shall be a majority vote of its members.

The Department shall notify the applicant and/or landowner in writing of the County Board decision.

A certified copy of the Conditional Use Permit shall be filed with the Le Sueur County Recorder by the Department.

XIII. Signatures:

I hereby certify with my signature that all data contained herein as well as all supporting data are true and correct to the best of my knowledge.

Applicant signature _____ Date 1/9/17

I hereby certify with my signature that all data contained herein as well as all supporting data are true and correct to the best of my knowledge.

Property Owner signature _____ Date 01/06/2017

SKILLMAN

Le Sueur County

Conditional Use Application-Grading, Excavating & Filling

Activities that involve topographic alterations in all districts shall conform to the standards in Section 18 of the Le Sueur County Zoning Ordinance. Activities within a shoreland district shall conform to the standards in Section 13 of the Le Sueur County Zoning Ordinance.

In addition any activities in any type wetland shall be evaluated in accordance with the Wetland Conservation Act (WCA) regulations, as administered by the Le Sueur County Soil & Water Conservation District (SWCD).

I. Applicant:

Name THOMAS TREE & LANDSCAPE
Mailing Address 19922 STATE HIGHWAY 22
City MANKATO State MN Zip 56001
Phone # 507-625-4960 Phone # _____

II. Landowner:

Name SHOSHANNA KROEGER
Mailing Address 9426 N. 3RD AVE
City PHOENIX State AZ Zip 85021

Property Address 2300 SPORTSMENS HAVEN CT.
City KASOTA State MN Zip 56050
Phone # _____ Phone # _____

III. Parcel Information:

Parcel Number 05.710.0100 Parcel Acreage 0.42
Attach Full Legal Description (***NOT*** *abbreviated description from tax statement)*
Township KASOTA T109N R25W Section 18
Subdivision REPLAT OF L 24-29 OF SPORTSMENS HAVEN SUBD. Lot 10 & PT. 1 Block _____

IV. Township Notification: Township must be notified of proposed use prior to application.

_____ Township notified on _____
(Township Name) *(Date)*

Board Member _____ regarding the proposed use.
(Name)

V. Quantities and Submittal Formats:

a. One (1) reproducible 8.5" x 11" copy of the request and all other supporting documents.

b. Twenty Three (23) copies must be submitted, if any documents are in color, an aerial, or larger than 8.5" x 11" in size.

c. Electronic version of any supporting documents *if available.*

c. Additional copies may be requested as deemed necessary by the Department.

d. **Application must be made in person** by the applicant and/or landowner no later than 12 P.M. on the date of application deadline.

e. **Appointment is necessary.**

f. **Applications will not be accepted by mail.**

X. Restoration Plan: Shall include but not limited to the following:

- Areas of restoration shall include the application of a minimum of 4 inches of topsoil or similar material that will support plant growth. *(Must be included in cubic yards calculation of material.)*
- Reseeded areas indicated with type of vegetation. *(Shall meet minimum standards by the SWCD))*
- Tree replacement plan. *(Areas located within the Bluff Impact Zone, Bluff, Shoreland & Conservancy Distircts)*
  - Root zone of existing trees shall be preserved and protected during development.
  - Replace one tree for every tree that is removed.
  - Replacement trees shall have a minimum caliper of 2 inches at 4.5 feet from ground level.

XI. Attachments: Shall include but not limited to:

- ☐ a. **Description of Request**-*See Part VIII for full details and requirements.*
- ☐ b. **Site Plan**-*See Part IX for full details and requirements.*
- ☐ c. **Full Legal Description**-*Not abbreviated description from tax statement.*
- ☐ d. **Access approval**-*Attach approval in writing from proper road authority.*
- ☐ e. **Township Notification**-*See Part IV for details and requirements.*
- ☐ f. **Septic System Compliance Inspection**
- ☐ g. **Erosion Control Plan**-*Attach completed and signed plan including map.*
- ☐ h. **Restoration Plan**-*See Part X for full details and requirements.*
- ☐ i. **Approved Stormwater Pollution Prevention Plan**
  -Must meet NPDES requirements and prepared by a licensed professional engineer.

XII. Procedure:

The Planning & Zoning Commission shall hold a public hearing on the proposed Conditional Use Permit at a scheduled Planning and Zoning Commission meeting.

The Planning and Zoning Commission is an advisory board to the County Board of Commissioners and will make a recommendation to the County Board.

The Department shall report the finings and recommendations of the Planning Commission to the County Board for final decision.

Action by the County Board shall be a majority vote of its members.

The Department shall notify the applicant and/or landowner in writing of the County Board decision.

A certified copy of the Conditional Use Permit shall be filed with the Le Sueur County Recorder by the Department.

XIII. Signatures:

I hereby certify with my signature that all data contained herein as well as all supporting data are true and correct to the best of my knowledge.

_____ _____

Applicant signature Date

I hereby certify with my signature that all data contained herein as well as all supporting data are true and correct to the best of my knowledge.

_____ _____

Property Owner signature Date

KROGER

ISG

MEMORANDUM

DATE: April 17, 2017

TO: Kathy Brockway - Le Sueur County Environmental Services

CC: Jim Thomas – Thomas Tree & Landscape, Inc.

FROM: ISG

SUBJECT: Jacobson Property Slope Repair

The following is a Description of Request per Section VIII of the Le Sueur County Conditional Use Application – Grading Excavation & Filling:

a) Description of Request

In the fall of 2016 a slope failure occurred along the bluff adjacent to Lake Washington on the Jacobson property due to significant rainfall. The property owner is working with Thomas Tree and Landscape to repair the failed slope as rapidly as possible to prevent additional slope failure. The project has been reviewed with LeSueur County Planning and Zoning staff who identified the steps necessary to remedy the failed slope. Part of the necessary steps included obtaining a Conditional Use Permit and an engineer designed solution to repair the failed slope. Braun Intertec has been hired as the Geotechnical Engineer to evaluate the failure and develop a solution to stabilize the slope. More detail about the proposed solution can be found below as well as within the attached copy of the Braun Intertec report detailing the solution.

After review and analysis of existing conditions Braun Intertec developed a solution consisting of a Solider Pile Wall at the top of the slope; the next section below the wall (heading down the slope) will be stabilized and protected by ArmorMax (a geosynthetic product used to stabilize vegetated slopes). This area is planned to be seeded with a woodland mix with plantings of bare root woody upland plants on 4-foot centers. No work will be performed below elevation 983.0 (OHW Line Elevation 981.5).

To complete the necessary work, material will need to be excavated from the existing slope and moved around to stabilize existing conditions in accordance with the design. Due to the developed state of the area immediately adjacent to the failed slope, construction staging and access route is planned from the south crossing the Skillman and Kroeger properties. Existing tree vegetation in the construction access route will be removed leaving the root system intact to reduce erosion during construction. Silt fencing will also be placed down gradient with regular best management practices maintenance of the erosion control methods. The construction excavation work will be conducted using a tracked excavator, two (2) smaller bobcat skid steer style loader vehicles, and haul trucks that will be stored off site, but will transport products to and from the site. Specialized equipment will be mobilized for construction of the Solider Pile wall.

The project will be constructed by Thomas Tree and Landscape and Veit Construction with periodic oversight by Braun Intertec. It is anticipated the sequence of construction activity will be:

- Install erosion control, clear vegetation and set up haul road and staging area
- Install erosion control, clear vegetation in slope correction area
- Construction activity is planned to start at the top of slope to construct the Solider Pile Wall. Partial removal of deck as needed to facilitate construction activity.
- Construct Solider Pile Wall at top of slope.
- ArmorMax area will be constructed after Solider Pile Wall has been
- t on slope disturbed areas.
- ute and staging areas, turf establishment

Partial ↑ Removal of deck ??? !

During construction activity erosion control measures will be monitored and maintained as needed using best management practices.

Upright evergreen screening will be placed at the base of the Solider Pile wall to assist with screening the wall from view. A safety railing will be constructed at the top to protect occupants of the patio area from potential falls. Construction of the Solider Pile wall will result in a reduction of impervious area within the bluff impact zone.

b) Other Conditional Use Permit Items

1. Environmental Impact
   - To complete this project the existing vegetation along the slope will need to be removed to allow for slope stabilization measures. The site plan depicts trees that are 4 inch diameter or greater at the base within the repair area, along with trees that will need to be removed along the access route for the repair equipment. Trees removed within the access route will be replaced at a ratio exceeding minimum County requirements of 1:1 for trees 4 inch diameter and larger.
   - When the repair has been completed along the failed slope, bare root woody upland plants will be planted in the ArmorMax slope protection area.
   - Construction staging and construction access route is planned from the south crossing the Skillman and Kroeger properties. Silt fencing will also be placed down gradient of disturbed areas and will be maintained with regular best management practices for the erosion control methods. Additional erosion control details may be found in the project SWPPP. Existing tree vegetation in the construction access route will be removed leaving the root system intact to reduce erosion during construction.

2. Adverse Impact on Surrounding Areas
   - Access to the repair site will come from the adjacent properties to the southeast. As noted in the site plan, existing tree vegetation in the construction access route will be removed leaving the root system intact to reduce erosion during construction activity. Wood mulch will be placed over the construction access route haul route. The trees removed will be replaced per County Requirements. Best Management Practices will be implemented to control construction stormwater runoff from the repair area.

3. Stormwater Runoff
   - General stormwater patterns will remain the same. Slope and surfacing will change in the failure area as part of the repair. Erosion control measures will be installed during construction and the turf establishment period.

4. Does Any Part of The Project Extend Below OHWL
   - The slope corrections will end at an elevation of 983.0 and OHWL is 981.5.

5. Wetland Impact
   - No Wetlands noted to be impacted on this project.

6. Slope Stability
   - Stability of slope was evaluated by Braun Intertec Corporation.

7. Certificate of Insurance
   - Will Be Submitted by Thomas Tree and Landscape, Inc.

8. Meet All Applicable County State & Federal Regulations
   - SWPPP was prepared as part of this project and DNR was contacted and Township was notified of project.

Thomas Tree & Landscape, Inc.
MANKATO, MN

Mailing Address:
58192 191st LN.
Mankato, MN 56001

Retail Store:
19922 State Hwy 22
Mankato, MN 56001

Phone: (507) 625-4960
Fax: (507) 625-5043

December 8, 2016

I authorize Thomas Tree & Landscape, Inc. to access our property for equipment and materials to repair failing hillside of Lyle and Kay Jacobson at 2200 Evergreen Dr, Kasota, MN 56050.

Signed _____

Sho Kroeger

Thomas Tree & Landscape, Inc.
MANKATO, MN

Mailing Address:
58192 191st LN.
Mankato, MN 56001

Retail Store:
19922 State Hwy 22
Mankato, MN 56001

Phone: (507) 625-4960
Fax: (507) 625-5043

December 8, 2016

I authorize Thomas Tree & Landscape, Inc. to access our property for equipment and materials to repair failing hillside of Lyle and Kay Jacobson at 2200 Evergreen Dr, Kasota, MN 56050.

Signed Roselyn J Skillman

Roselyn Skillman

Revision 2 - Geotechnical Evaluation Report

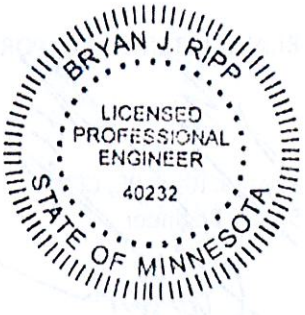
Lake Washington Residence Slope Remediation
2200 Evergreen Drive
Mankato, Minnesota

Prepared for

Thomas Tree and Landscape, Inc.

Professional 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 Professional Engineer under the laws of the State of Minnesota.

Bryan J. Ripp, PE, CFM
Senior Engineer
License Number: 40232
April 7, 2016



Projects B1609662.00/B1702162

Braun Intertec Corporation

BRAUN INTERTEC
The Science You Build On.

BRAUN INTERTEC
The Science You Build On.

Braun Intertec Corporation
526 10th Street NE, Suite 300
P.O. Box 485
West Fargo, ND 58078

Phone: 701.232.8701
Fax: 701.232.7817
Web: braunintertec.com

April 7, 2016

Projects B1609662.00/B1702162

Mr. Jim Thomas
Thomas Tree and Landscape, Inc.
58192 191st Lane
Mankato, MN 56001

Re: Revision 2 - Geotechnical Evaluation
Lake Washington Residence Slope Remediation
Evergreen Drive and Limberdink Road
Mankato, Minnesota

Dear Mr. Thomas:

Braun Intertec Corporation is pleased to present this Revision 2 - Geotechnical Evaluation Report for slope remediation at 2200 Evergreen Drive in Kasota, Minnesota.

This Revision 2 - Geotechnical Evaluation Report addresses the geotechnical assessment of existing slope and provided recommendations for remediation to improve the stability of a failed slope located on the northwest of the house.

Thank you for making Braun Intertec your geotechnical consultant for this project. If you have questions about this report, or if there are other services that we can provide in support of our work to date, please call Bryan Ripp at 952.995.2236.

Sincerely,

BRAUN INTERTEC CORPORATION

Bryan J. Ripp, PE, CEM
Senior Engineer

Mohd F. Rahman, PE
Senior Geotechnical Engineer

AA/EOE

Table of Contents

BRAUN INTERTEC

Table of Contents (continued)

Appendix

BRAUN INTERTEC

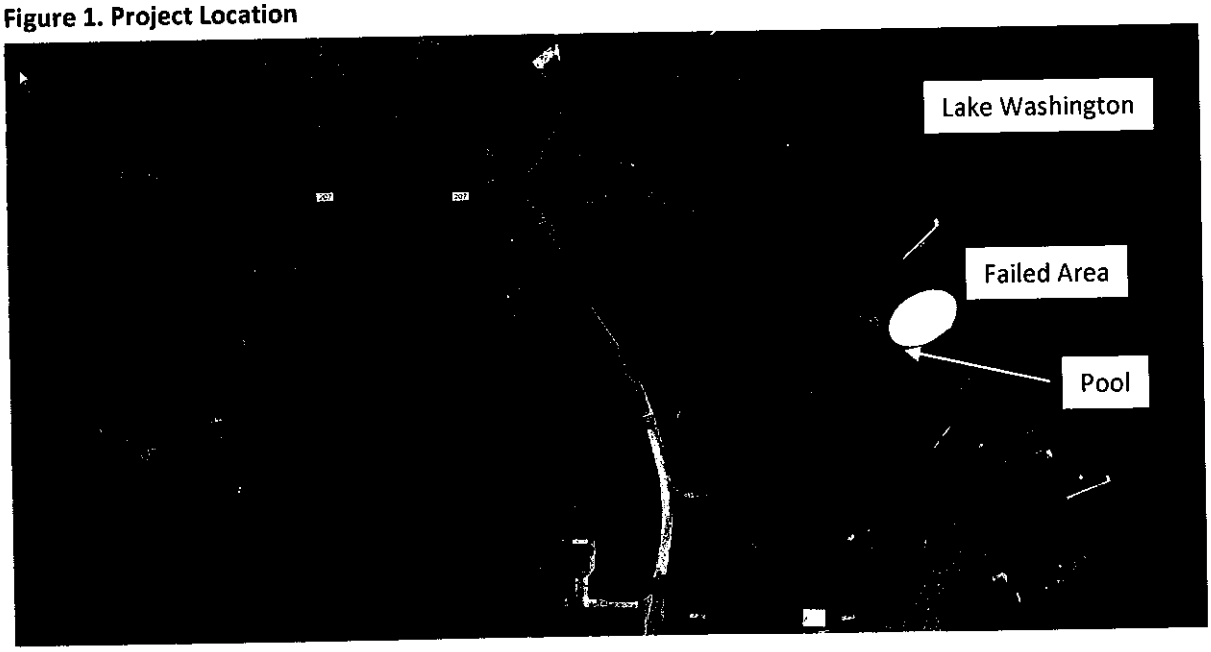
A. Introduction

A.1. Project Description

Per our conversations with Mr. Jim Thomas with the Thomas Tree and Landscape, Inc., we understood that after a recent rainfall event, several boulder walls located downslope of a pool and upslope of Lake Washington have failed. Some separation between pavers surrounding the pool and at the top of the boulder wall slope was observed, potentially indicating movement of the slope. The slope movement was primarily limited on the northwest side of the swimming pool where pavers are closest to the pool and a plastic plank with wood substructure deck extends out over the slope. The relief between the deck and the lake level was approximately 45 to 53 feet with an overall slope gradient of approximately 1.5 horizontal to 1 vertical (1.5:1).

The project location is shown on the following figure. The extent of slope failure is outlined in between the pool area and the edge of the lake. We initially analyzed stabilizing the slope with a geogrid reinforced embankment with a slope. However, upon further discussions with I+S Group (I+S) and Veit & Company, Inc. (Veit), the mitigation selected was soldier pile and lagging with a graded slope.

Figure 1. Project Location



BRAUN INTERTEC

A.2. Purpose

The purpose of our geotechnical evaluation was to characterize subsurface geological conditions at the site and evaluate their impact on the stability of the slope and to provide geotechnical recommendations for slope remediation.

A.3. Site Reconnaissance

We performed a site reconnaissance and a follow-up site visit on October 4, 2016 and October 6, 2016, respectively, to evaluate the nature and extent of slope failure. A detailed discussion and interpretation of the site conditions based on our reconnaissance were presented in our earlier report titled "Preliminary Geotechnical Consultation" submitted to Thomas Tree and Landscaping, Inc. on October 12, 2016 (Braun Project Number B1609662).

A.4. Reference Documents

To facilitate our evaluation, we reviewed the following information or documents:

- Preliminary Geotechnical Consultation letter report by Braun Intertec, dated October 12, 2016.
- Lake Water Level Report for Lake Washington, Minnesota Department of Natural Resources (MNDNR).
- Discussion with Mr. Jim Thomas with Thomas Tree and Landscape, Inc.
- Aerial image of the site from Google Earth™.
- Discussions with Matthew Thibert, PE of I+S.
- Discussion with Nathans Iverson, PE of Veit.

A.5. Scope of Services

Tasks performed in accordance with our October 12, 2016, Preliminary Geotechnical Consultation report included.

BRAUN INTERTEC

- Staked and cleared the soil boring location of underground utilities and determining ground surface elevations at the boring locations. The Soil Boring Location and Cross Section Sketch included in the Appendix shows the approximate locations of the borings.
- Performed 1 standard penetration test (SPT) boring to a nominal depth 41 feet below grade.
- Performed 5 hand auger borings in the bare slide and boulder wall bench area to nominal depths of 5 to 7 feet below grade.
- Classified the recovered jar and hand auger boring samples and prepared logs.
- Performed laboratory testing on selected jar and hand auger samples to aid in soil classification and engineering analysis.
- Performed engineering analysis to identify the causes of failure and remediation design.
- Prepared this report containing a boring location sketch, logs of soil boring and hand auger borings, a summary of the soils encountered, results of laboratory tests, and recommendations for slope remediation.

B. Results

B.1. Geological Profile

B.1.a. Soil Borings

Log of Boring sheets for our penetration test boring are included in the Appendix. The boring performed at the top of the crest (ST-1) encountered fill materials at the surface consisting of sandy lean clay to a depth of 10 feet which is likely the backfill around the pool. Below the fill, the boring encountered sandy lean clay glacial till to the termination depth of the boring.

Penetration resistance values recorded in the lean clay fill deposits ranged from 5 to 10 blows per foot (BPF), indicating that the soils were rather soft to rather stiff consistency. Penetration resistance values recorded in the sandy lean clay glacial till ranged from 6 to 12 BPF, indicating the soils were medium to rather stiff in consistency.

The boring location is shown on the Soil Boring Location and Cross Section Sketch in the appendix.

B.1.b. Hand Auger Borings

The Appendix also includes logs of hand auger boring sheets. We performed a total of 5 hand auger borings, designated as HA-1 through HA-5, at the locations shown on the attached Soil Boring Location and Cross Section Sketch. The hand auger borings were intended to explore the failed soil and possibly determine the slip surfaces.

The hand auger borings encountered about 4 to 12 inches of topsoil below the surficial slope deposits. Below the topsoil, the borings encountered soft to medium, wet sandy lean clay soils of colluvium origin to depths ranging from 2 1/3 to 3 1/3 feet deep. Below the colluvium, the borings encountered medium to stiff, moist sandy lean clay glacial till to the termination depths of the borings.

The hand auger boring locations are shown on the Soil Boring Location Sketch and Cross Section in the appendix.

B.2. Groundwater

B.2.a. Groundwater Observed in the Borings

Groundwater was not observed in the SPT or the hand auger borings. However, perched groundwater conditions could occur in the colluvium after periods of seasonal precipitation or particularly heavy rainfall events.

B.2.b. Historic Water Level in the Washington Lake

We reviewed historic water level readings in the Washington Lake from MNDNR website. The readings were recorded from 1950 to 2016. The maximum and minimum water level elevations recorded were 983.86 feet on 1993 and El. 978.51 feet on 1990.

B.3. Laboratory Test Results

B.3.a. Moisture Contents

Moisture content (MC) tests (per ASTM D2216) were performed on selected penetration test and hand auger boring samples. The moisture contents for the samples tested ranged from 4 to 28 percent in fill, 27 to 42 percent in colluvium and 21 to 26 percent in glacial till. The results of the moisture content tests indicate that the natural moisture content are near to above the optimum moisture content of the respective materials. The results are listed in the "MC" column of the borings attached in Appendix A.

B.3.b. Atterberg Limits

Atterberg limits tests were performed on selected samples for classification, evaluation of the soils' plasticity, and estimation of engineering parameters. The test results indicated the fill and till soils tested had liquid limits (LL) ranging from 37 to 40 percent, plastic limits (PL) ranging from 17 to 18 percent, and plastic indices (PI) ranging from 20 to 22. These tests indicate that the samples tested classify as lean clay and likely have a low to moderate potential for shrinking/swelling with changes in their moisture content.

C. Engineering Assessment of Slope

C.1. Selection of Design Section

Based on the results of our site reconnaissance and exploration, we selected a design section as shown on the Soil Boring Location and Cross Section sketch in the appendix. This section represents the steeper slope within the failure zone for back analysis and slope remediation design.

C.2. Slope Stability Criteria

Considering the proximity of structures (pool, deck and paving area) to the slope crest, we adopted a long-term factor of safety of 1.5 for global stability for the soil slope as well as the stabilized system analyzed.

C.3. Material Properties

C.3.a. Design Soil parameters

Based on observed overall performance of the existing slope, we anticipated that the shear strengths of the fill and glacial till soils below the anticipated failure zone were at or near the peak strength. Accordingly, we estimated peak strength parameters for fill and glacial till soils based on SPT blow counts, index properties and our experience with similar soils. However, for back analysis, we anticipated loss of strengths, sometimes referred to as softened strength, for the surficial clays within or immediately below the shallow failure zone due to weathering and surface water infiltration. We performed back analyses to estimate the softened strength of clays within the shallow failure zone.

The shear strength properties used in the back analyses and remediation design are presented in the table below.

Table 1. Shear Strength Parameters

Formation	Unit Weight (pcf)	Effective Stress Analyses		Basis of Selecting Strength Parameters
		Ø (deg)	C (psf)	
Fill: Sandy Lean Clay	115	28	200	SPT blow counts and experience.
Fill: Sandy Lean Clay (Softened)	115	28	50	Softened strength based on experience.
Till: Sandy Lean Clay	125	28	300	SPT blow counts and experience.
Till: Sandy Lean Clay (Softened)	125	28	100	Softened strength based on experience.
Fill: Wall Backfill	120	34	0	Gradation and compaction density of the proposed incidental backfill.
Fill: Rock Fill	135	45	0	Generally accepted for crushed rock fill.
Fill: Boulder Facing	135	40	0	Assumed for boulder facing.

C.3.b. Compressibility of Soils

We did not expect further settlement of the remediated slope since it is primarily pre-consolidated glacial till and little to no additional loading was expected by the slope mitigation.

C.4. Design Groundwater

Based on the absence of free groundwater observed in the borings and historical Lake Washington water level record data, we assumed groundwater at El. 983, which is 53 feet below the crest.

C.5. Back Analyses

We analyzed the existing stability of the slope using computer program Slope/W, Version 8.15.5.11777, by Geo-Slope International. We developed a back analysis model based on existing slope profile, softened shear strengths for near surface soils within the anticipated failure zone, peak shear strengths for the foundation soils and design groundwater data. The analyses indicated a factor of safety of 1.0 for surficial failure, as expected, and a factor of safety of 1.3 for deeper global failure. Graphic results of the back analyses showing soil profile and water level are included in the appendix.

As indicated in the back analyses, the existing factor of safeties are less than our recommended factor of safety of 1.5, considering the proximity of the pool and house. Therefore, slope remediation is required to achieve the target factor of safety of 1.5.

BRAUN INTERTEC

C.6. Slope Remediation Options Explored

We investigated several slope remediation options as listed below to select a technically viable, constructible and cost effective solution.

- Gravity Wall
- Mechanically Stabilized Earth (MSE) Wall
- Slope Flattening
- Geosynthetically Reinforced Soil (GRS) Slope
- Rock fill Slope
- Soldier Pile Lagging (SPL) Wall

In our earlier report, we recommended a combination of a GRS slope with a flattened downslope. However, through refinement of the existing slope geometry model, this option no longer was feasible, especially for leaving the pool in place. Therefore, though discussion with Thomas Tree and Landscaping, Inc. and Veit, the SPL option was analyzed.

C.7. Slope Remediation Area

Based on the results of our site reconnaissance and exploration, we outlined approximate zone of slope remediation as indicated on the Slope Remediation Area sketch included in the appendix.

C.8. SPL Slope Remediation Design

Design and construction recommendations provided below are based on our discussions with Veit, subsurface exploration information, and understanding of the project.

C.8.a. SPL Wall Data Used for Analyses

C.8.a.1. Wall and Slope Geometry

The effective wall height will be up to 10 feet and the downslope will be graded to a 2:1 slope or flatter. The wall will be at least 6 feet away from the pool, which will remain in place.

C.8.a.2. Wall Lagging

We understand that a structurally designed concrete lagging with a textured facing will be installed for the SPL wall. The lagging should be embedded at least 12 inches into the ground below the final grade in front of the wall.

C.8.b. SPL Wall Global Stability

We analyzed global stability at critical cross section using computer program Slope/W, Version 8.15.5.11777, by Geo-Slope International. For this analyses, we modeled and HP12X53 with a yield strength of 50 ksi. The modeled wall height was 10 feet with an embedment depth of 25 feet. The analyses indicated that the factor of safeties exceeded the required minimum value of 1.5, Graphical representation of our results is presented in the appendix.

C.8.c. SPL Cantilever Analyses

We performed solider pile design using computer program Shoring Suit, Version 8, by CivilTech Software. For a HP12X53 pile spaced 7 feet on-center, we recommend an embedment depth of 25 feet for a total pile length 35 feet. For this pile and embedment, we estimate a lateral deflection at the top of the pile of 1.5 inches. The analyses is presented in the appendix.

C.8.d. Solider Pile Settlement

We anticipate total settlement of pile head to be less than ½ inch for the expected loading condition.

D. SPL Wall Design and Construction Recommendations

D.1. SPL Wall Backfill

We suggest wall construction start immediately upon initiating excavation. All excavations should be backfilled behind the concrete lagging to its final grade as soon as practicable after top tier of lagging are placed. The backfill behind the lagging should be MnDOT 3149.2.J Fine Filter Aggregate and should be compacted to the degree of showing now appreciable movement.

D.2. Solider Pile Installation Method

Piles used for the SPL wall are to be pre-drilled and grouted in place.

D.3. Utilities

We recommend that the contractor locate and identify existing utilities and other possible obstructions prior to pile installation. The contractor should contact site owners, and city utility departments to verify the location and type of services at the site.

BRAUN INTERTEC

D.4. SPL Wall Drainage Control

We recommend that surface water be diverted from the top of the retaining wall.

D.5. SPL Wall Corrosion Considerations

We recommend assigning 1/16-inch of the pile wall as sacrificial steel that is not attributed to the pile's structural capacity anticipating that the soil will be moderately corrosive.

D.6. SPL Downslope

We recommend that all loose or soft surface soils within the sliding zone be removed. Once the soft or loose soils have been removed, we recommend a minimum slope face cover of 6 inches of topsoil, seeded with MnDOT 36-211 woodland mix and covered with ArmorMax or equivalent. We recommend securing the turf reinforcement mat with minimum 24-inch long duckbill anchors driven on 4-foot centers as well as anchor trenches to secure the outer extent of the turf reinforcement according to manufacturer's guidelines. The bottom of the anchors should extend at least 12-inches below the placed topsoil and into undisturbed ground.

Once the turf reinforcement mat has been secured, we recommend planting bare root woody upland plants on 4-foot centers. These plants should be installed by slitting the turf reinforcement mat sufficiently to allow placing the plant into the topsoil along with plant nutrition and rooting hormone packet(s). Once the plant is in place, the slit should be secured on each side of the plant with an 8-inch steel staple. Planting of the bare roots should coincide with seasonal planting periods for east-central Minnesota.

We recommend that overland flow from direct rainfall be directed away from the slope treatments until the turf reinforcement has been secured.

E. Construction Quality Control

E.1.a. Excavation Observations

We recommend having a geotechnical engineer observe all excavations related to slope remediation and subgrade preparation for the proposed GRS. The purpose of the observations is to evaluate the competence of the geologic materials exposed in the excavations and the adequacy of required excavation oversizing.

BRAUN INTERTEC

E.1.b. Materials Testing

Where applicable, we recommend performing density tests in fill to evaluate if the contractors are effectively compacting the soil and meeting project requirements.

E.1.c. Cold Weather Precautions

If site grading and construction is anticipated during cold weather, all snow and ice should be removed from cut and fill areas prior to additional grading. No fill should be placed on frozen subgrades. No frozen soils should be used as fill.

F. Procedures

F.1. Penetration Test Borings

The penetration test borings performed by Braun Intertec were drilled with a truck-mounted or flotation tired drilling rig. Each drill was equipped with hollow-stem auger. The borings were performed in accordance with ASTM D 1586. Penetration test samples were taken continuously or at 2 1/2- and 5-foot intervals. Actual sample intervals and corresponding depths are shown on the boring logs.

F.2. Exploratory Hand Auger Borings

We performed the hand auger borings in general accordance with ASTM D1452. We inferred the soil classifications and strata depths from the cuttings brought to the surface by pulling the auger after screwing it to selected depths in the ground. At desired depths, we placed auger cuttings in bags and jars.

F.3. Exploration Logs

F.3.a. Log of Boring Sheets

Log of Boring sheets for our penetration test borings are included in Appendix A. The logs identify and describe the geologic materials that were penetrated, and present the results of penetration resistance tests performed within them, laboratory tests performed on penetration test samples retrieved from them, and groundwater measurements.

Strata boundaries were inferred from changes in the penetration test samples and the auger cuttings. Because sampling was not always performed continuously, the strata boundary depths are only approximate. The boundary depths likely vary away from the boring locations, and the boundaries themselves may also occur as gradual rather than abrupt transitions.

F.3.b. Log of Hand Auger Borings

We drilled hand auger borings with a 2-inch-diameter screw auger. We advanced the borings to depths of 5 to 7 feet below subgrade elevations. We then withdrew the auger from the borehole to obtain cuttings. We classified the soils encountered in the borings in general accordance with ASTM D2488. We also made preliminary estimates of soil consistency and density based on resistance to penetration of the hand auger and the turning resistance.

F.4. Material Classification and Testing

F.4.a. Visual and Manual Classification

The geologic materials encountered were visually and manually classified in accordance with ASTM Test Method D 2488. A chart explaining the classification system is attached. Samples were sealed in jars, tubes and bags and returned to our facility for review and storage.

F.4.b. Laboratory Testing

The results of the laboratory tests performed on geologic material samples are noted on or follow the appropriate attached exploration logs. The tests were performed in accordance with ASTM or AASHTO procedures.

F.5. Groundwater Measurements

The drillers checked for groundwater as the penetration test borings were advanced, and again after auger withdrawal. The boreholes were then backfilled as noted on the boring logs.

Our field personnel observed the sides and bottoms of test pits as they were being advanced, and after they reached their termination depths, for evidence of groundwater seepage and accumulation.

G. Qualifications

G.1. Variations in Subsurface Conditions

G.1.a. Material Strata

Our evaluation, analyses, and recommendations were developed from a limited amount of site and subsurface information. It is not standard engineering practice to retrieve material samples from exploration locations continuously with depth, and therefore strata boundaries and thicknesses must be inferred to some extent. Strata boundaries may also be gradual transitions, and can be expected to vary in depth, elevation and thickness away from the exploration locations.

Variations in subsurface conditions present between exploration locations may not be revealed until additional exploration work is completed, or construction commences. If any such variations are revealed, our recommendations should be re-evaluated. Such variations could increase construction costs, and a contingency should be provided to accommodate them.

G.1.b. Groundwater Levels

Groundwater measurements were made under the conditions reported herein and shown on the exploration logs, and interpreted in the text of this report. It should be noted that the observation period was relatively short, and groundwater can be expected to fluctuate in response to rainfall, flooding, irrigation, seasonal freezing and thawing, surface drainage modifications and other seasonal and annual factors.

G.2. Continuity of Professional Responsibility

G.2.a. Plan Review

This report is based on a limited amount of information, and a number of assumptions were necessary to help us develop our recommendations. It is recommended that our firm review the geotechnical aspects of the designs and specifications, and evaluate whether the design is as expected, if any design changes have affected the validity of our recommendations, and if our recommendations have been correctly interpreted and implemented in the designs and specifications.

BRAUN INTERTEC

G.2.b. Construction Observations and Testing

It is recommended that we be retained to perform observations and tests during construction. This will allow correlation of the subsurface conditions encountered during construction with those encountered by the borings, and provide continuity of professional responsibility.

G.3. Use of Report

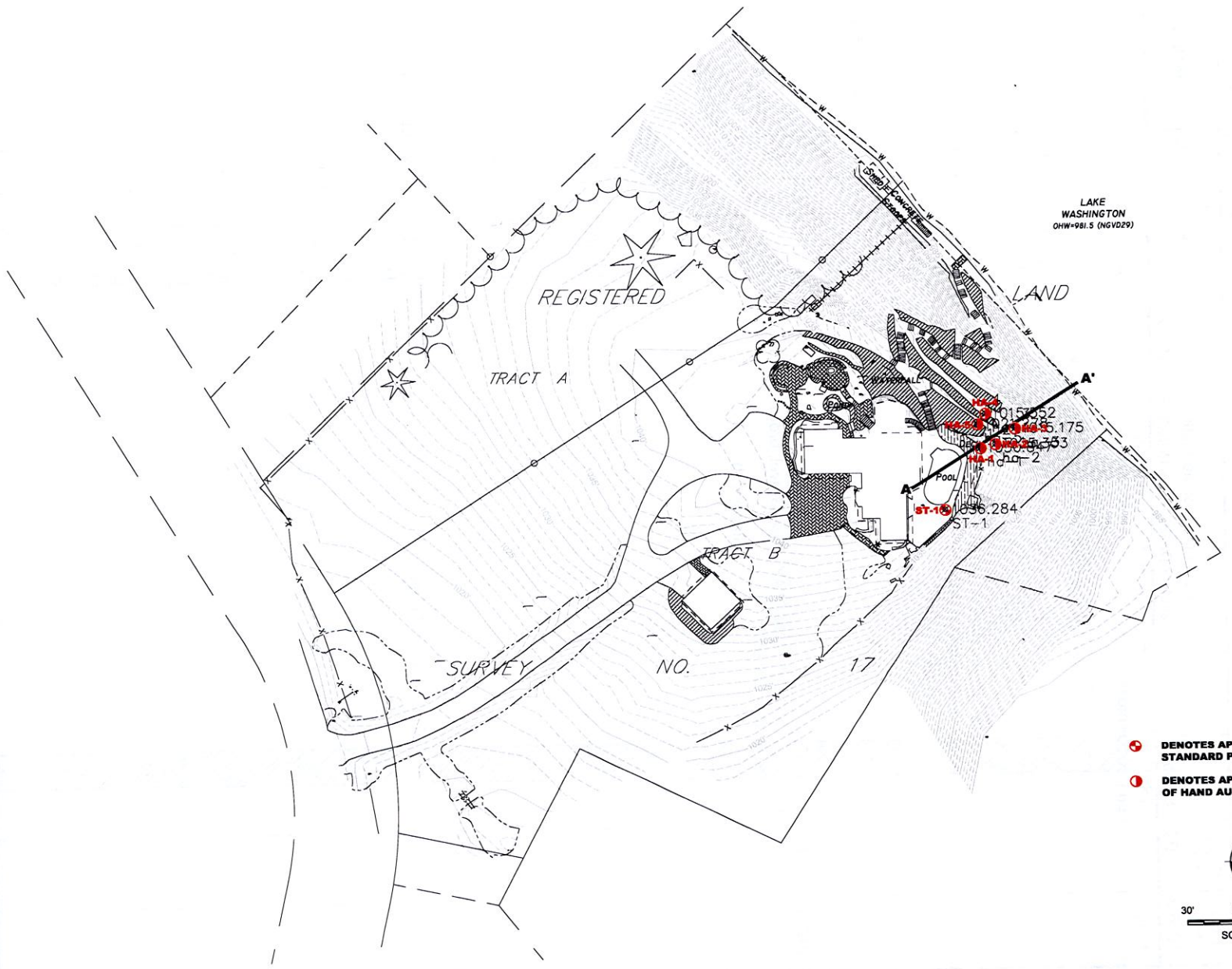
This report is for the exclusive use of the parties to which it has been addressed. Without written approval, we assume no responsibility to other parties regarding this report. Our evaluation, analyses, and recommendations may not be appropriate for other parties or projects.

G.4. Standard of Care

In performing its services, Braun Intertec used that degree of care and skill ordinarily exercised under similar circumstances by reputable members of its profession currently practicing in the same locality. No warranty, express or implied, is made.

BRAUN
INTERTEC

Appendix



DENOTES APPROXIMATE LOCATION OF STANDARD PENETRATION TEST BORING

DENOTES APPROXIMATE LOCATION OF HAND AUGER BORING

30' 0 60'

SCALE: 1" = 60'

F:\2016\B1609662-00.dwg\OVERVIEW, 12/6/2016 2:21:14 PM

BRAUN INTERTEC
The Science You Build On.
11001 Hampshire Avenue S
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020

SOIL BORING LOCATION SKETCH AND CROSS SECTION
PHASE 2 GEOTECHNICAL EVALUATION
LAKE WASHINGTON RESIDENCE
EVERGREEN DRIVE AND LIMBERDINK ROAD
MANKATO, MINNESOTA

Project No:	B1609662.00
Drawing No:	B1609662-00
Scale:	1" = 60'
Drawn By:	BJB
Date Drawn:	10/30/16
Checked By:	BR
Last Modified:	12/5/16
Sheet:	Fig:
of	

BRAUN INTERTEC

LOG OF BORING

Braun Project B1609662.00
GEOTECHNICAL EVALUATION
Lake Washington Residence
Evergreen Drive and Limberink Road
Mankato, Minnesota

BORING: **ST-1**

LOCATION: See attached sketch.

DRILLER: M. Barber | METHOD: 3 1/4" HSA, Autohammer | DATE: **10/28/16** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Elev. feet	Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	Tests or Notes
1036.3	0.0						
1035.6	0.8	TS	Poorly Graded Sand, fine- to medium-grained, brown, moist. (Topsoil)			4	
		FILL	FILL: Sandy Lean Clay, trace Gravel, brown, wet.	5		28	
				8		21	
				10		22	LL=37; PL=17; PI=20
1026.3	10.0	CL	SANDY LEAN CLAY, trace Gravel, brown, wet, medium to rather stiff. (Glacial Till)	8		22	
				10		22	
				10		22	
				11		22	
			Trace roots at 20 feet.	12		22	LL=40; PL=18; PI=22
				12		23	
				12		21	
				11		22	
				11		23	

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2016\09662.00.GPJ BRAUN_V8_CURRENT.GDT 12/7/16 09:51

BRAUN INTERTEC

LOG OF BORING

Braun Project B1609662.00
GEOTECHNICAL EVALUATION
Lake Washington Residence
Evergreen Drive and Limberink Road
Mankato, Minnesota

BORING: **ST-1 (cont.)**
LOCATION: See attached sketch.

DRILLER: M. Barber | METHOD: 3 1/4" HSA, Autohammer | DATE: **10/28/16** | SCALE: **1" = 4'**

(See Descriptive Terminology sheet for explanation of abbreviations)

Elev. feet	Depth feet	Symbol	Description of Materials (Soil-ASTM D2488 or D2487, Rock-USACE EM1110-1-2908)	BPF	WL	MC %	Tests or Notes
1004.3	32.0		SANDY LEAN CLAY, trace Gravel, brown, wet, medium to rather stiff. (Glacial Till) *(continued)*				
				12		22	
				6		23	
995.3	41.0		END OF BORING. Water not observed with 40 feet of hollow-stem auger in the ground. Boring then backfilled with bentonite grout.				

LOG OF BORING N:\GINT\PROJECTS\AX PROJECTS\2016\09662.00.GPJ BRAUN_V8_CURRENT.GDT 12/7/16 09:52

BRAUN℠ INTERTEC

HAND AUGER BORING

Braun Project B1609662.00 **GEOTECHNICAL EVALUATION** **Lake Washington Residence** **Evergreen Drive and Limberink Road** **Mankato, Minnesota**	HAND AUGER: **HA-1** LOCATION: N: 119892.0; E: 302840.7. See attached sketch.
DRILLER: / METHOD: Hand Auger	DATE: 10/28/16 / SCALE: 1" = 4'

Elev. feet 1030.8	Depth feet 0.0	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1030.2	0.7	TS	8 inches of Topsoil, black, wet.			42	
1028.3	2.5	CL	SANDY LEAN CLAY, brown, wet, soft. (Colluvial)			32	
1026.8	4.0	CL	SANDY LEAN CLAY, occasional Silt lenses, wet, brown to light brown, soft. (Colluvial)			27	
1023.8	7.0	CL	SANDY LEAN CLAY, brown, moist, medium to stiff. (Glacial Till)			26	
			END OF HAND AUGER AT 7 FEET. Water not observed immediately after completion of the hand auger. Boring then backfilled.				

HAND AUGER BORING N:\GINT\PROJECTS\AX PROJECTS\2016\09662.00-HAND AUGER.GPJ BRAUN_V8_CURRENT.GDT 12/5/16 09:49 (See Descriptive Terminology sheet for explanation of abbreviations)

B1609662.00 Braun Intertec Corporation, Bloomington MN 55438 HA-1 page 1 of 1

BRAUN INTERTEC

HAND AUGER BORING

Braun Project B1609662.00
GEOTECHNICAL EVALUATION
Lake Washingon Residence
Evergreen Drive and Limberink Road
Mankato, Minnesota

HAND AUGER: **HA-2**

LOCATION: N: 119894.4; E: 302850.2. See attached sketch.

DRILLER: | METHOD: Hand Auger | DATE: **10/28/16** | SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1025.4	0.0	TS	10 inches of Topsoil, black, wet.				
1024.4	1.0	CL	SANDY LEAN CLAY, brown, moist to wet, rather soft to medium. (Collivial)			28	
1021.4	4.0	CL	SANDY LEAN CLAY, brown, moist, medium to stiff. (Glacial Till)			25	
1019.4	6.0		END OF HAND AUGER AT 6 FEET. Water not observed immediately after completion of the hand auger. Boring then backfilled.				

(See Description and Terminology Sheet for explanation of abbreviations)

HAND AUGER BORING N:\GINT\PROJECTS\AX PROJECTS\2016\09662.00-HAND AUGER.GPJ DEFAULT.GDT 12/7/16

HAND AUGER BORING

BRAUN INTERTEC

Braun Project B1609662.00 GEOTECHNICAL EVALUATION Lake Washingon Residence Evergreen Drive and Limberink Road Mankato, Minnesota	HAND AUGER: HA-3 LOCATION: N: 119904.2; E: 302862.7. See attached sketch.
DRILLER: / METHOD: Hand Auger	DATE: 10/28/16 / SCALE: 1" = 4'

Elev. feet 1015.2	Depth feet 0.0	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes
1014.3	0.8	TS	10 inches of Topsoil, black, wet.				
		CL	SANDY LEAN CLAY, brown, moist to wet, rather soft to medium. (Colluvial)			27	
1011.2	4.0		Iron staining at 3 feet.				
1009.7	5.5	CL	SANDY LEAN CLAY, brown, moist, medium to stiff. (Glacial Till)			25	
			END OF HAND AUGER AT 5 1/2 FEET. Water not observed immediately after completion of the hand auger. Boring then backfilled.				

(See Descriptive Terminology sheet for explanation of abbreviations)

HAND AUGER BORING N:\GINT\PROJECTS\AX PROJECTS\2016\09662.00-HAND AUGER.GPJ BRAUN_V8_CURRENT.GDT 12/5/16 13:10

B1609662.00 Braun Intertec Corporation, Bloomington MN 55438 HA-3 page 1 of 1

BRAUN INTERTEC

HAND AUGER BORING

Braun Project B1609662.00 **GEOTECHNICAL EVALUATION** **Lake Washingon Residence** **Evergreen Drive and Limberink Road** **Mankato, Minnesota**				HAND AUGER: **HA-4**				
				LOCATION: N: 119913.8; E: 302844.0. See attached sketch.				
DRILLER:		METHOD: Hand Auger		DATE: **10/28/16**			SCALE: **1" = 4'**	
Elev. feet 1015.6	Depth feet 0.0	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	MC %	Tests or Notes	
1015.2	0.3	TS	4 inches of Topsoil, black, wet.					
		CL	SANDY LEAN CLAY, brown, wet, soft. (Colluvial)			27		
1013.1	2.5	CL	SANDY LEAN CLAY, brown, iron staining, moist, medium to stiff. (Glacial Till) Iron staining at 3 feet.			25		
1010.6	5.0		END OF HAND AUGER AT 5 FEET. Water not observed immediately after completion of the hand auger. Boring then backfilled.					

HAND AUGER BORING N:\GINT\PROJECTS\AX PROJECTS\2016\09662.00-HAND AUGERS.GPJ BRAUN_V8_CURRENT.GDT 12/7/16 09:59 (See Descriptive Terminology sheet for explanation of abbreviations)

B1609662.00 Braun Intertec Corporation, Bloomington MN 55438 HA-4 page 1 of 1

BRAUN INTERTEC

HAND AUGER BORING

Braun Project B1609662.00
GEOTECHNICAL EVALUATION
Lake Washingon Residence
Evergreen Drive and Limberink Road
Mankato, Minnesota

HAND AUGER: **HA-5**

LOCATION: N: 119907.1; E: 302839.0. See attached sketch.

DRILLER:

METHOD: Hand Auger

DATE: **10/28/16**

SCALE: **1" = 4'**

Elev. feet	Depth feet	ASTM Symbol	Description of Materials (ASTM D2488 or D2487)	BPF	WL	Tests or Notes
1021.3	0.0					
1020.9	0.3	TS	4 inches of Topsoil, black, wet.			
		CL	SANDY LEAN CLAY, brown, wet, soft. (Colluvial)			
1018.8	2.5	CL	SANDY LEAN CLAY, brown, moist, medium to stiff. (Glacial Till)			
1015.8	5.5		END OF HAND AUGER AT 5 1/2 FEET. Water not observed immediately after completion of the hand auger. Boring then backfilled.			

(See Description of Procedures and Explanation of abbreviations)

HAND AUGER BORING N:\GINT\PROJECTS\AX PROJECTS\2016\09662.00-HAND AUGER BORING.GPJ DEFAULT.GDT 12/15/16

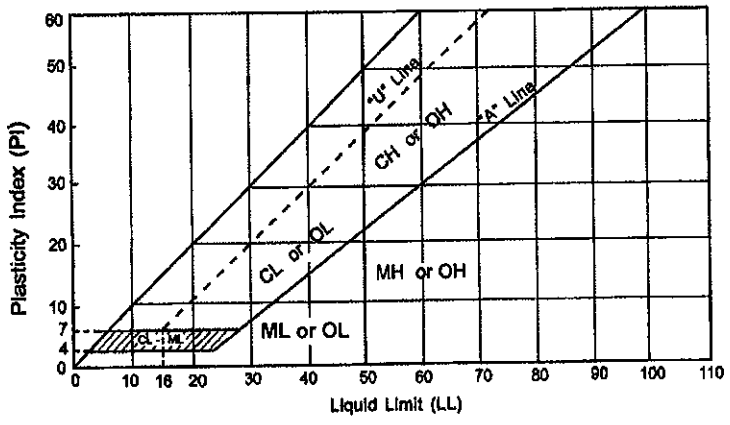
BRAUN INTERTEC

Descriptive Terminology of Soil

Standard D 2487
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 Less than 5% 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]
		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]
	Sands 50% or more of coarse fraction passes No. 4 sieve	Clean Sands Less than 5% 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]
		Sands with Fines More than 12% [i]	Fines classify as ML or MH	SM	Silty sand [f g h]
			Fines classify as CL or CH	SC	Clayey sand [f g h]
Fine-grained Soils 50% or more passed the No. 200 sieve	Silts 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 / Liquid limit - not dried < 0.75	OL	Organic clay [k l m n]
				OL	Organic silt [k l m o]
	Silts 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 / Liquid limit - not dried < 0.75	OH	Organic clay [k l m p]
				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-inch (75mm) sieve.
b. If field sample contained cobbles or boulders, or both, add "with cobbles or boulders or both" to group name.
c. $C_u = D_{60}/D_{10}$ $C_c = \frac{(D30)^2}{D_{10} \times D_{60}}$
d. If soil contains ≥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 ≥15% gravel, add "with gravel" to group name.
i. Sand 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 ≥ 30% plus No. 200, predominantly sand, add "sandy" to group name.
m. If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.
n. PI ≥ 4 and plots on or above "A" line.
o. PI < 4 or plots below "A" line.
p. PI plots on or above "A" lines.
q. PI plots below "A" line.



Laboratory Tests

DD	Dry density, pcf	OC	Organic content, %
WD	Wet density, pcg	S	Percent of saturation, %
MC	Natural moisture content, %	SG	Specific gravity
LL	Liquid limit, %	C	Cohesion, psf
PL	Plastic limits, %	Ø	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 ≥ 4 and on or about "A" line

Relative Density of Cohesionless Soils

Very Loose	0 to 4 BPF
Loose	5 to 10 BPF
Medium dense	11 to 30 PPF
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. All samples were taken with the standard 2" OD split-tube samples, except where noted.

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

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.

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: TW indicates thin-walled (undisturbed) tube sample.

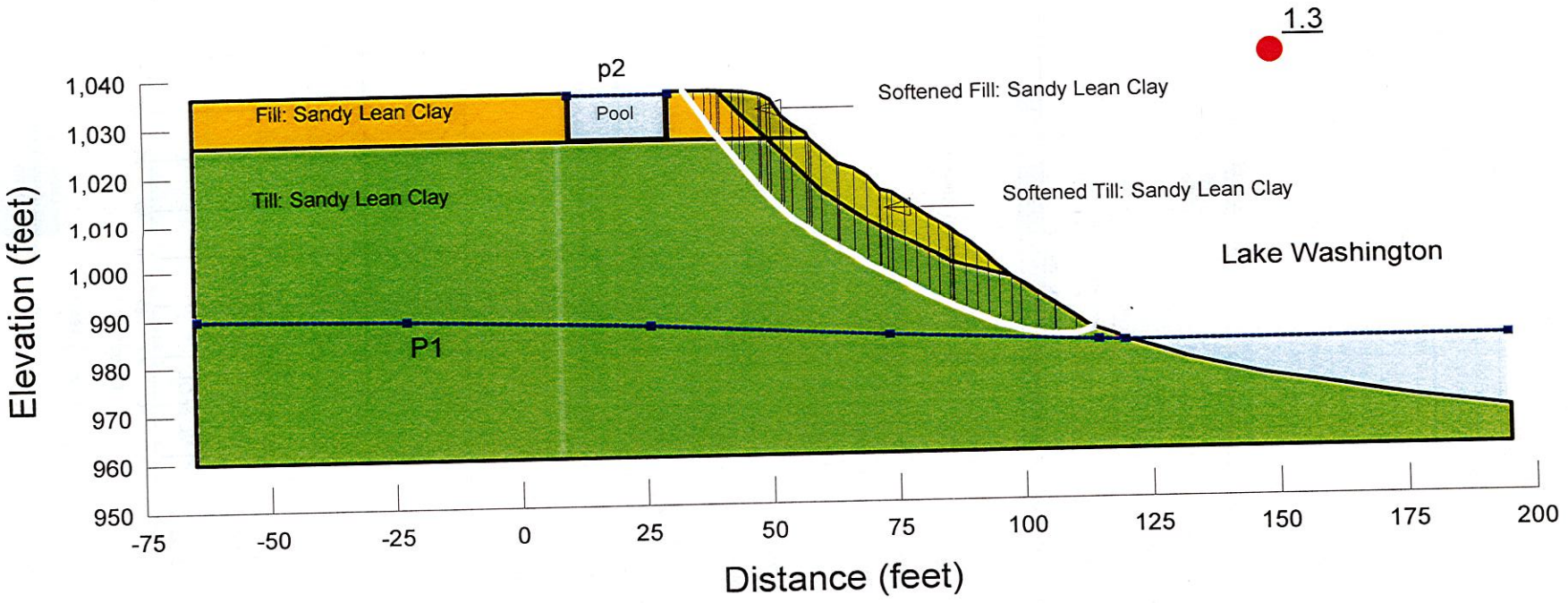
Note: All tests were run in general accordance with applicable ASTM standards.

Rev. 9-15

B1609662.00: Lake Washington Residence
Back Analyses of Existing Slope

Back Analysis within Intact Slope
Effective Stress Parameters

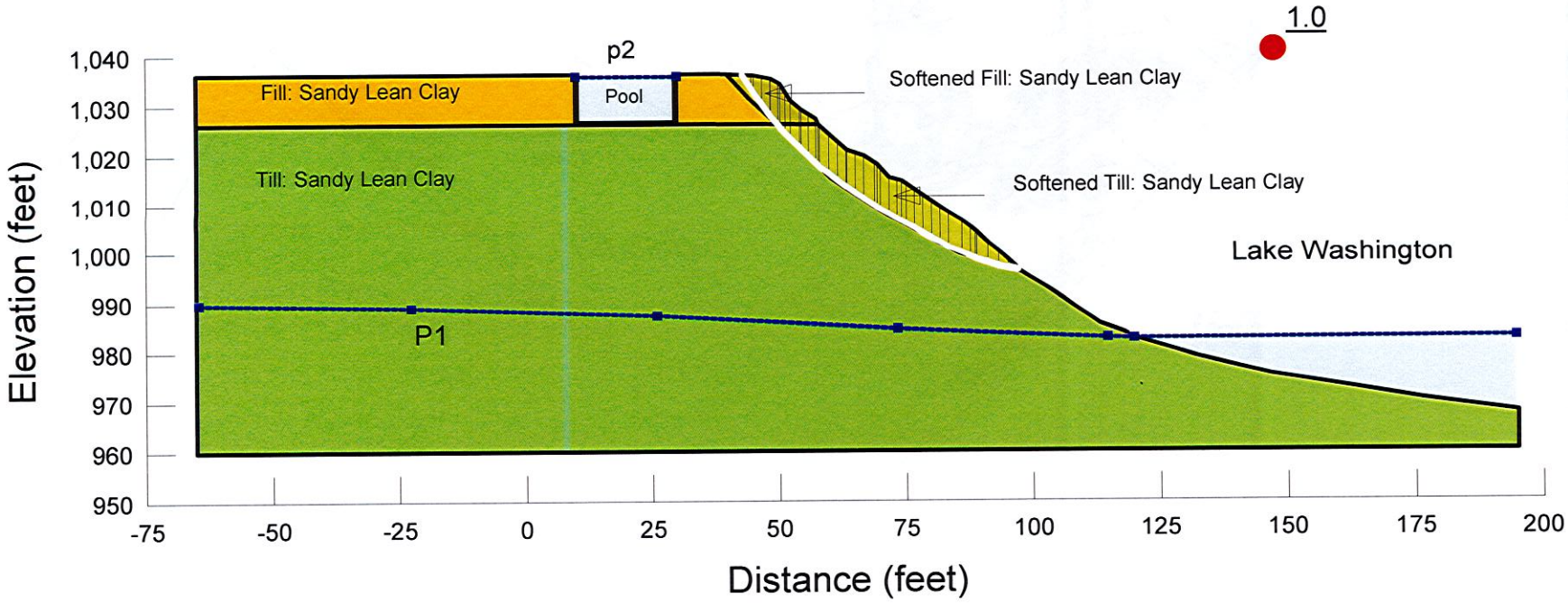
Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Piezometric Line
	Till: Sandy Lean Clay	Mohr-Coulomb	125	300	28	1
	Fill: Sandy Lean Clay (P1)	Mohr-Coulomb	115	200	28	1
	Softened Till: Sandy Lean Clay	Mohr-Coulomb	125	100	28	1
	Softened Fill: Sandy Lean Clay	Mohr-Coulomb	115	50	28	1
	Fill: Sandy Lean Clay (P2)	Mohr-Coulomb	115	200	28	2

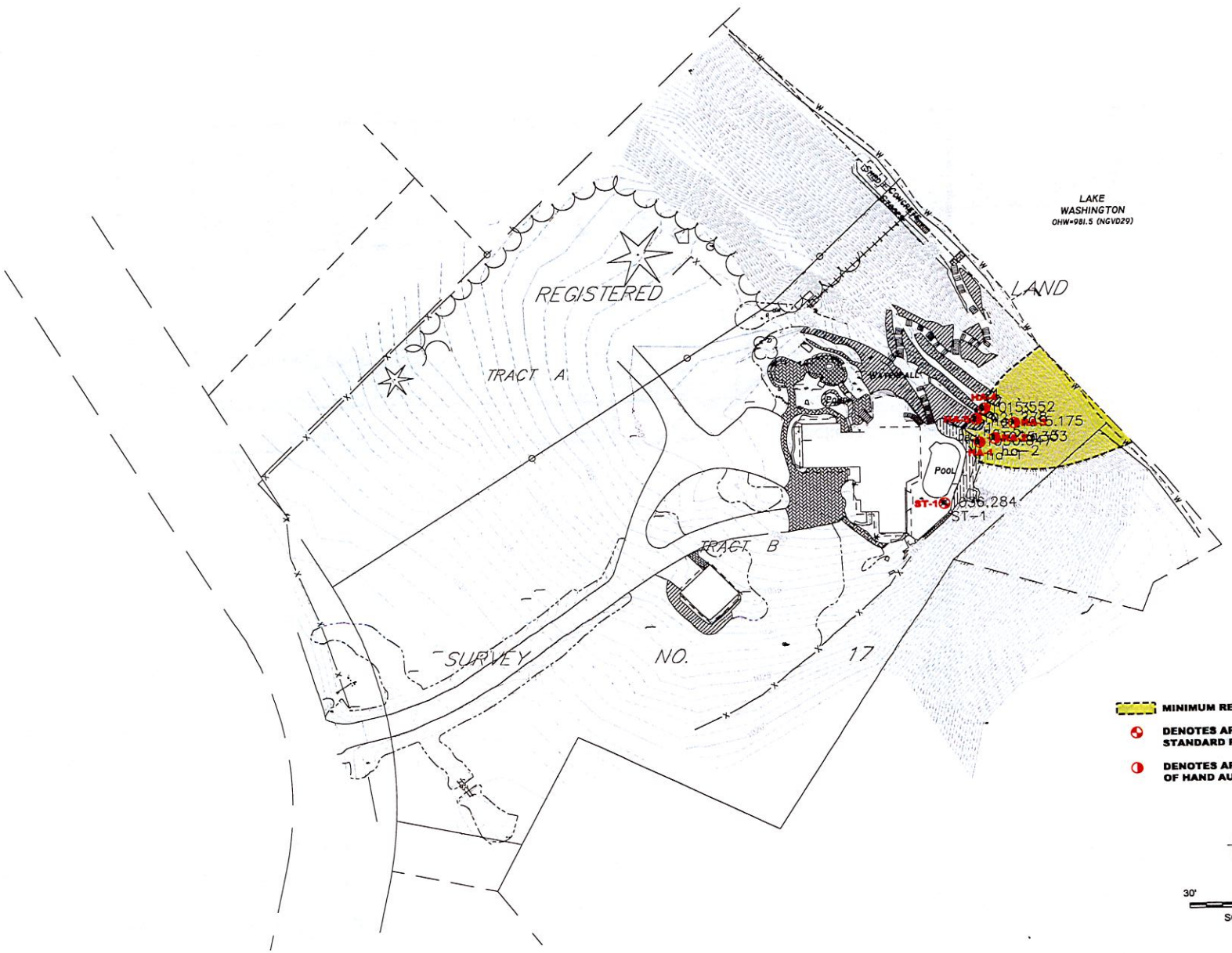


B1609662.00: Lake Washington Residence
Back Analyses of Existing Slope

Back Analysis of Surficial Failure
Effective Stress Parameters

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Piezometric Line
	Till: Sandy Lean Clay	Mohr-Coulomb	125	300	28	1
	Fill: Sandy Lean Clay (P1)	Mohr-Coulomb	115	200	28	1
	Softened Till: Sandy Lean Clay	Mohr-Coulomb	125	100	28	1
	Softened Fill: Sandy Lean Clay	Mohr-Coulomb	115	50	28	1
	Fill: Sandy Lean Clay (P2)	Mohr-Coulomb	115	200	28	2





F:\2016\B1609662-00.dwg SLIDE REPAIR 12/5/2016 12:42:44 PM

BRAUN INTERTEC
The Science You Build On.
11001 Hampshire Avenue S
Minneapolis, MN 55438
PH. (952) 995-2000
FAX (952) 995-2020

SLIDE REPAIR AREA
PHASE 2 GEOTECHNICAL EVALUATION
LAKE WASHINGTON RESIDENCE
EVERGREEN DRIVE AND LIMBERDINK ROAD
MANKATO, MINNESOTA

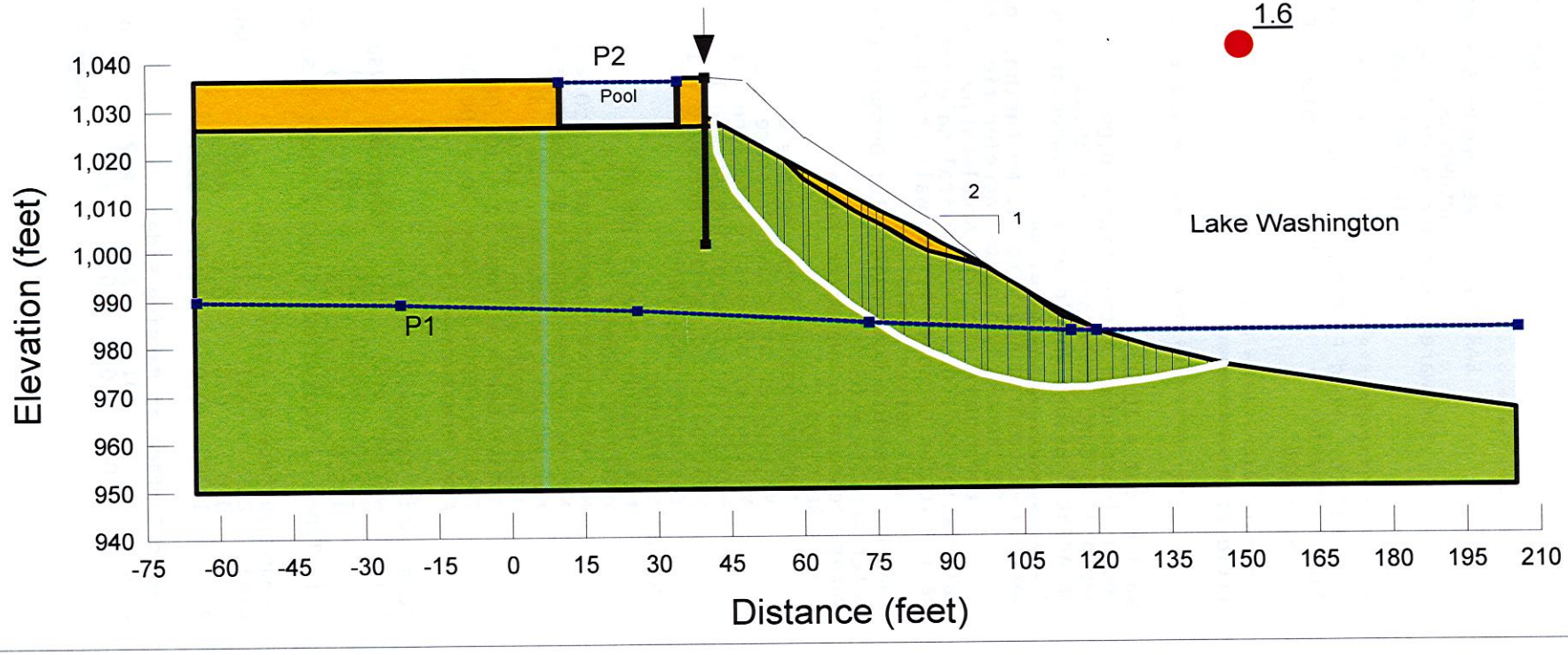
Project No:	B1609662.00
Drawing No:	B1609662-00
Scale:	1" = 60'
Drawn By:	BJB
Date Drawn:	10/30/16
Checked By:	BR
Last Modified:	11/28/16
Sheet:	of
Fig:	

B1609662.00: Lake Washington Residence
Slope Remediation Design
Soilder Pile Lagging Wall

Long-term Steady-state Analysis
Effective Stress Parameters

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Piezometric Line
	Till: Sandy Lean Clay	Mohr-Coulomb	125	300	28	1
	Fill: Sandy Lean Clay (P1)	Mohr-Coulomb	115	200	28	1
	Fill: Sandy Lean Clay (P2)	Mohr-Coulomb	115	200	28	2

Pile:HP 12X53
Spacing: 7 feet
Minimum Embedment: 25 feet
Yield Strength: 50 ksi
Allowable Shear Capacity: 194 kips



```
**************************************************************
                EARTH PRESSURE ANALYSIS SUMMARY
                        <EarthPres>
            Software Copyright by CivilTech Software
                      www.civiltech.com

**************************************************************
Licensed to   Mohd F. Rahman      Braun Intertec Co.
Date: 3/8/2017          File: E:\Projects\B1609662.00\Analyses\SPLW\Washington Lake
Pressure.ep8

Title 1: Washington Lake Wall
Title 2:

Input data: ************************************************

Wall Height = 10.00
Depth of Ground at Active Side = 0.00
Depth of Ground at Passive Side = 10.00
Apparent Pressure Envelope: 2. Triangular Envelope (No-braced, all soils)
Pressure Type: 1.* Active, Ka
Earthquake Loading Apply to: 1. No Earthq. Loads
        Earthquake Horizontal Acceleration, Kh = 0
        Earthquake Vertical Acceleration, Kv = 0
Calculation Methods: 1.* Numerical Solution (Wedge Analysis)
Wall Friction Options: 1.* No wall friction
        Wall Batter Angle = 0
Apparent Pressure Conversion: 1.* Default (Terzaghi and Peck)*
Water Density = 62.4
Water Pressure: 6. No Water Table
User's Settings
        Ignore Passive from Depth = 0
        Multiplier of Active Pressure = 1
        Multiplier of Passive Pressure = 1
        Multiplier of Water Pressure = 1
        Multiplier of Earthq. Pressure = 1
        Estimated Embedment:
Program's Settings
        Max. Height, Hmax = 100.00
        Analysis Segment, dz = 0.25
        No. of Active Segment at H, nz0 = 1
        No. of Active Segment at Hmax, nz = 2
        No. of Passive Segment, nzp = 30
        Active Depth at H, Zh = 10.00
        Active Depth at Hmax, Z = 100.00
        Passive Depth at Hmax, Zp = 100.00
        Max. Pressure = 15.84

Total Soil Types= 2
Soil    Weight  W(S)    Phi    Cohesion    Nspt    Type    Description
1       115.0   115.0   28       0         0        2       Clay
2       125.0   125.0   28       0         0        2       Clay
Soil Type:  1 Equivalent Clay; 2 Clay; 3 Silt; 4 Sand; 5 Gravel

Ground Surface at Active Side:
Line    Z1      Xa1     Z2      Xa2         Soil No.
1       0.0     0.0     0.0     800.0           1
2       10.0    0.0     10.0    800.0           2

Ground Surface at Passive Side:
Line    Z1      Xp1     Z2      Xp2         Soil No.
1       10.0    0.0     10.0    3.7             2
```

D2 - EXCAVATION BASE
D3 - PILE TIP (20% increased, see EMBEDMENT Notes below)

MOMENT BALANCE: M=0.00 AT DEPTH=27.49 WITH EMBEDMENT OF 17.49
FORCE BALANCE: F=0.00 AT DEPTH=30.99 WITH EMBEDMENT OF 20.99

The program calculates an embedment for moment equilibrium, then increase the embedment by 20% to reach force equilibrium.
A Balance Force=34.69 is developed from depth=27.49 to depth=30.99
Total Passive Pressure = Total Active Pressure, OK!

**********RESULTS**********

* EMBEDMENT Notes *
Based on USS Design Manual, first calculate embedment for moment equilibrium, then increased by 20 to 40 % to get the total design depth.
The embedment for moment equilibrium is 17.49
* The 20% increased the total design depth is 20.99 (Used by Program)
The 30% increased the total design depth is 22.74
The 40% increased the total design depth is 24.49

Based on AASHTO 2002 Standard Specifications, first calculate embedment for moment equilibrium, then add safety factor of 30% for temporary shoring; add safety factor of 50% for permanent shoring.
The embedment for moment equilibrium is 17.49
Add 30% embedment for temporary shoring is 22.74
Add 50% embedment for permanent shoring is 26.24

* BASED ON USS DESIGN MANUAL (20% increased), PROGRAM CALCULATED MINIMUM EMBEDMENT = 20.99
TOTAL MINIMUM PILE LENGTH = 30.99

* MOMENT IN PILE (per pile spacing)*
Pile Spacing: sheet piles are one foot or one meter; soldier piles are one pile.
Overall Maximum Moment = 132.16 at 19.02
Maximum Shear = 34.51
Moment and Shear are per pile spacing: 7.0 foot or meter

* VERTICAL LOADING *
Vertical Loading from Braces = 0.00
Vertical Loading from External Load = 0.00
Total Vertical Loading = 0.00

**********SPECIFIED PILE **********

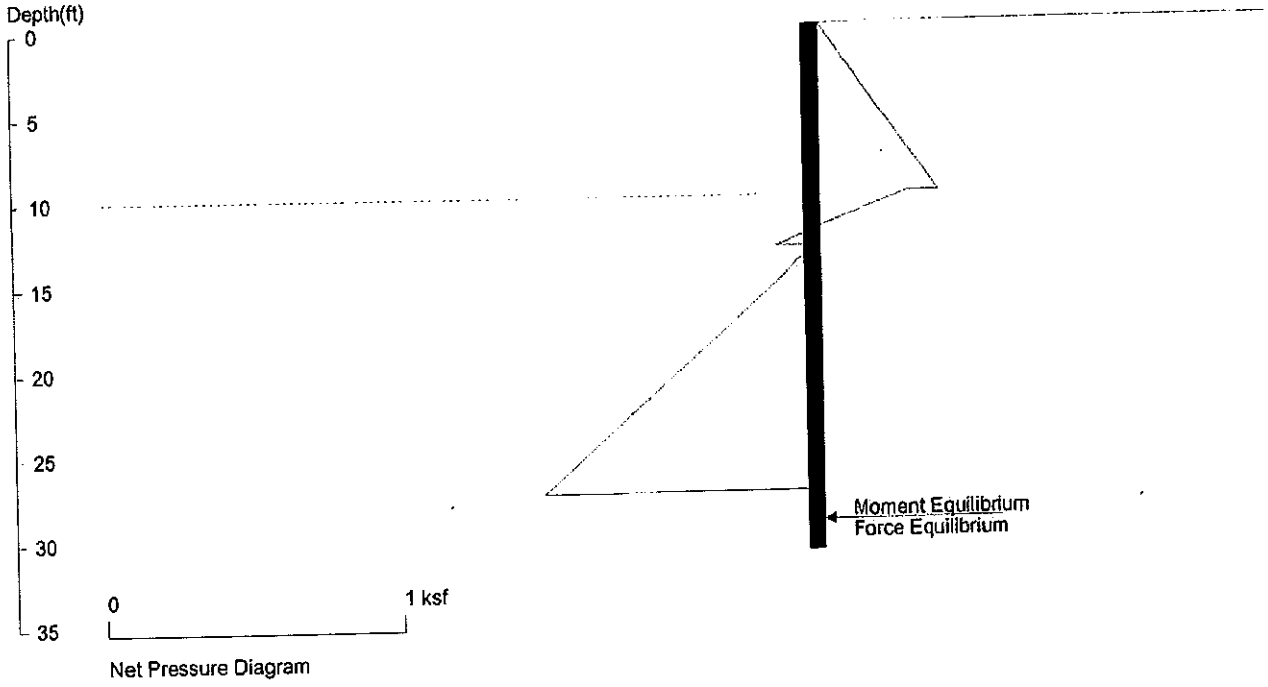
Overall Maximum Moment = 132.16 at 19.02
The pile selection is based on the magnitude of the moment only. Axial force is neglected.

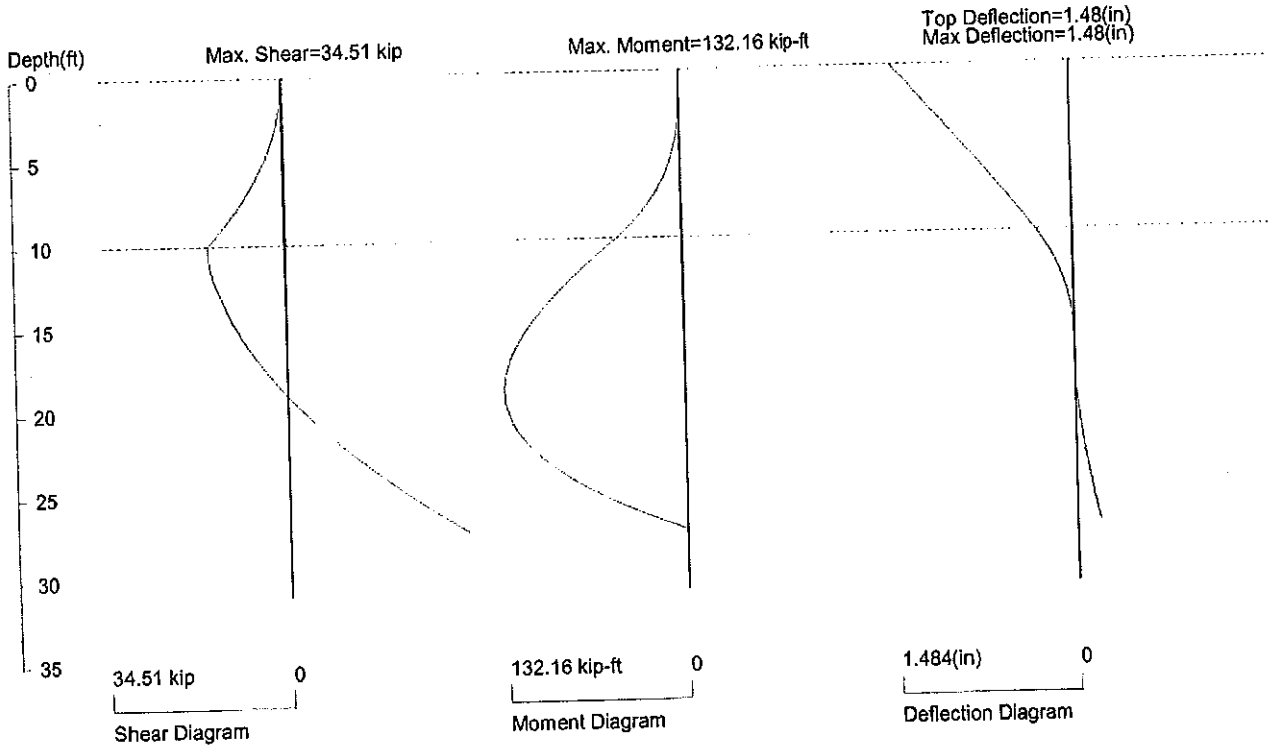
Request Min. Section Modulus = 48.06 in3/pile = 787.53 cm3/pile, Fy= 50 ksi = 345 MPa, Fb/Fy=0.66

HP12X53 has been found in Soldier Pile list!
(English Units):
Area= 15.5 in. Depth= 11.8 in. Width= 12 in. Height= 12 in.
Flange thickness= 0.435 in. Web thickness= 0.435 in.
Ix= 393 in4/pile Sx= 66.7 in3/pile Iy= 127 in4/pile Sy= 21.1 in3/pile
(Metric Units):
Ix= 163.57 x100cm4/pile Sx= 1093.01 cm3/pile Iy= 52.86 x100cm4/pile Sy= 345.77 cm3/pile

Z1, P1, Z2, P2 - Four values to define a pressure diagram
Z1- Top depth of the diagram
P1- Top pressure of the diagram
Z2- Bottom depth of the diagram
P2- Bottom pressure of the diagram
Slope - (P2-P1)/(Z2-Z1), Slope of the diagram. It also called
Equivalent fluid density.
Coef. - Pressure Coefficient = Slope/Unit We9ight
Ka - Active Earth Pressure Coefficient
Ko - At-Rest Earth Pressure Coefficient
Kp - Passive Earth Pressure Coefficient

Washington Lake Wall
7 feet Spacing





PRESSURE, SHEAR, MOMENT, AND DEFLECTION DIAGRAMS

Based on pile spacing: 7.0 foot or meter

User Input Pile, HP12X53: E (ksi)=29000.0, I (in4)/pile=393.0

File: E:\Projects\B1609662.00\Analyses\SPLW\Washington Lake Wall.sh8

<ShoringSuite> CIVILTECH SOFTWARE USA www.civiltech.com

Licensed to Mohd F. Rahman Braun Intertec Co.

****

SHORING WALL CALCULATION SUMMARY
The leading shoring design and calculation software
Software Copyright by CivilTech Software
www.civiltech.com

****

ShoringSuite Software is developed by CivilTech Software, Bellevue, WA, USA.
The calculation method is based on the following references:

1. FHWA 98-011, FHWA-RD-97-130, FHWA SA 96-069, FHWA-IF-99-015
2. STEEL SHEET PILING DESIGN MANUAL by Pile Buck Inc., 1987
3. DESIGN MANUAL DM-7 (NAVFAC), Department of the Navy, May 1982
4. TRENCHING AND SHORING MANUAL Revision 12, California Department of Transportation, January 2000
6. EARTH SUPPORT SYSTEM & RETAINING STRUCTURES, Pile Buck Inc. 2002
5. DESIGN OF SHEET PILE WALLS, EM 1110-2-2504, U.S. Army Corps of Engineers, 31 March 1994
7. EARTH RETENTION SYSTEMS HANDBOOK, Alan Macnab, McGraw-Hill. 2002
8. AASHTO HB-17, American Association of State and Highway Transportation Officials, 2 September 2002

UNITS: Width/Spacing/Diameter/Length/Depth - ft, Force - kip, Moment - kip-ft, Friction/Bearing/Pressure - ksf, Pres. Slope - kip/ft3, Deflection - in

---

Licensed to Mohd F. Rahman Braun Intertec Co.
Date: 3/8/2017 File: E:\Projects\B1609662.00\Analyses\SPLW\Washington Lake Wall.sh8

Title: Washington Lake Wall
Subtitle: 7 feet Spacing

**********INPUT DATA**********

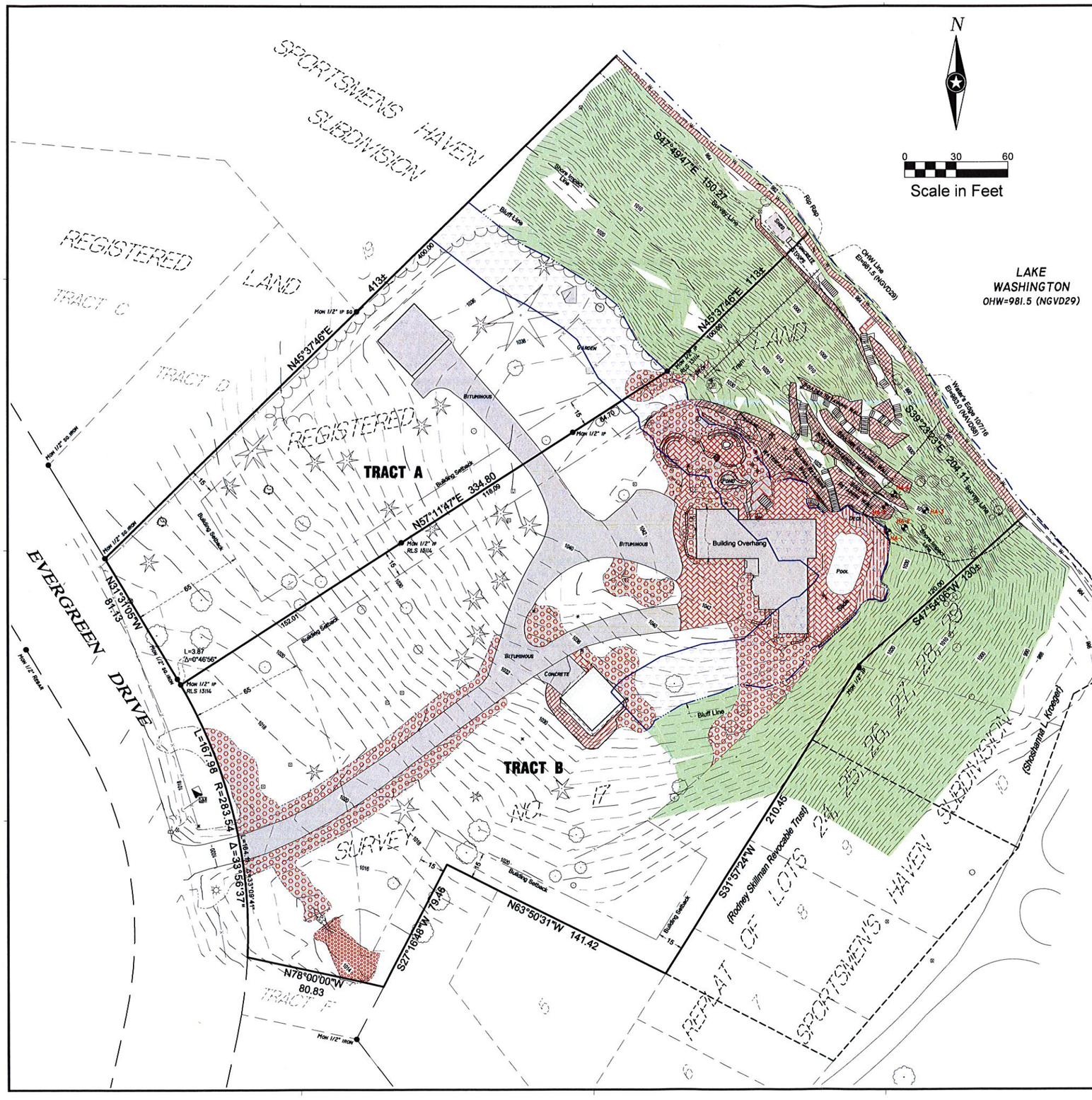
Wall Type: 2. Soldier Pile, Drilled
Wall Height: 10.00
Pile Diameter: 1.00
Pile Spacing: 7.00
Factor of Safety (F.S.): 1.00
Lateral Support Type (Braces): 1. No
Top Brace Increase (Multi-Bracing): No
Embedment Option: 1. Yes
Friction at Pile Tip: No
Pile Properties:
Steel Strength, Fy: 50 ksi = 345 MPa
Allowable Fb/Fy: 0.66
Elastic Module, E: 29000.00
Moment of Inertia, I: 393.00
User Input Pile: HP12X53

* DRIVING PRESSURE (ACTIVE, WATER, & SURCHARGE) *

No.	Z1 top	Top Pres.	Z2 bottom	Bottom Pres.	Slope
1	*	Above	Base		
2	0.000	0.000	10.00	0.415	0.041519
3	*	Below	Base		
4	10.00	0.415	90.00	4.026	0.045129

* PASSIVE PRESSURE *

No.	Z1 top	Top Pres.	Z2 bottom	Bottom Pres.	Slope
1	*	Below	Base		
2	10.00	0.109	13.00	0.713	0.201438
3	13.00	0.576	16.00	0.905	0.109889



EXISTING DESCRIPTION:
(per client)

Tracts A and B, Registered Land Survey No. 17, Le Sueur County, Minnesota.

AREA TABLE:
EXISTING SURFACE CALCULATIONS:

	Parcels A & B
Existing Buildings/Deck -	5,290 sq. ft.
Bituminous Surface -	9,481 sq. ft.
Concrete Surface -	554 sq. ft.
Paver Surface -	4,906 sq. ft.
Retaining Walls -	5,868 sq. ft.
Rock/Mulch -	11,885 sq. ft.
Stairs -	562 sq. ft.
Pool/Pond -	652 sq. ft.
Flagstone Surface -	258 sq. ft
Total Area -	39,456 sq. ft.
Total Lot Area -	160,714± sq. ft.
Impervious Surface Percent -	24.6%

NOTE:
Proposed improvements will reduce the impervious surface by 208 sq. ft. bringing the Impervious Surface Percent to 24.4%.

SETBACKS:
Front - 65 feet from township or other public/private right-of-way
Side - 15 feet
Rear - 15 feet
OHWL - 100 feet

NOTES:

1. Field Survey was completed on October 18, 2016.
2. This lot is considered a Recreational Residential lot for setback purposes per Le Sueur County Zoning Department.
3. OWH line of Lake Washington = 981.5 (NAVD 29).
4. Orientation of this bearing system is based on REGISTERED LAND SURVEY NO. 17.
5. This survey does not purport to show land ownership or all easements or encumbrances that affect the described property.
6. Shore impact zone is shown as 50% of the distance feet from the building setback to the OHW line.
7. Bluff line for this property is shown hereon.

ISG

KEY PLAN

I HEREBY CERTIFY THAT THIS SURVEY, PLAN, OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED LAND SURVEYOR UNDER THE LAWS OF THE STATE OF MINNESOTA.

DANIEL L. STUEBER

DATE 04/11/17 LIC. NO 43110

PROJECT

LYLE JACOBSON

Tract B, Registered Land Survey No. 17, Le Sueur County, Minnesota.

REVISION SCHEDULE

NO	DATE	DESCRIPTION
1	04/11/17	Revised area table

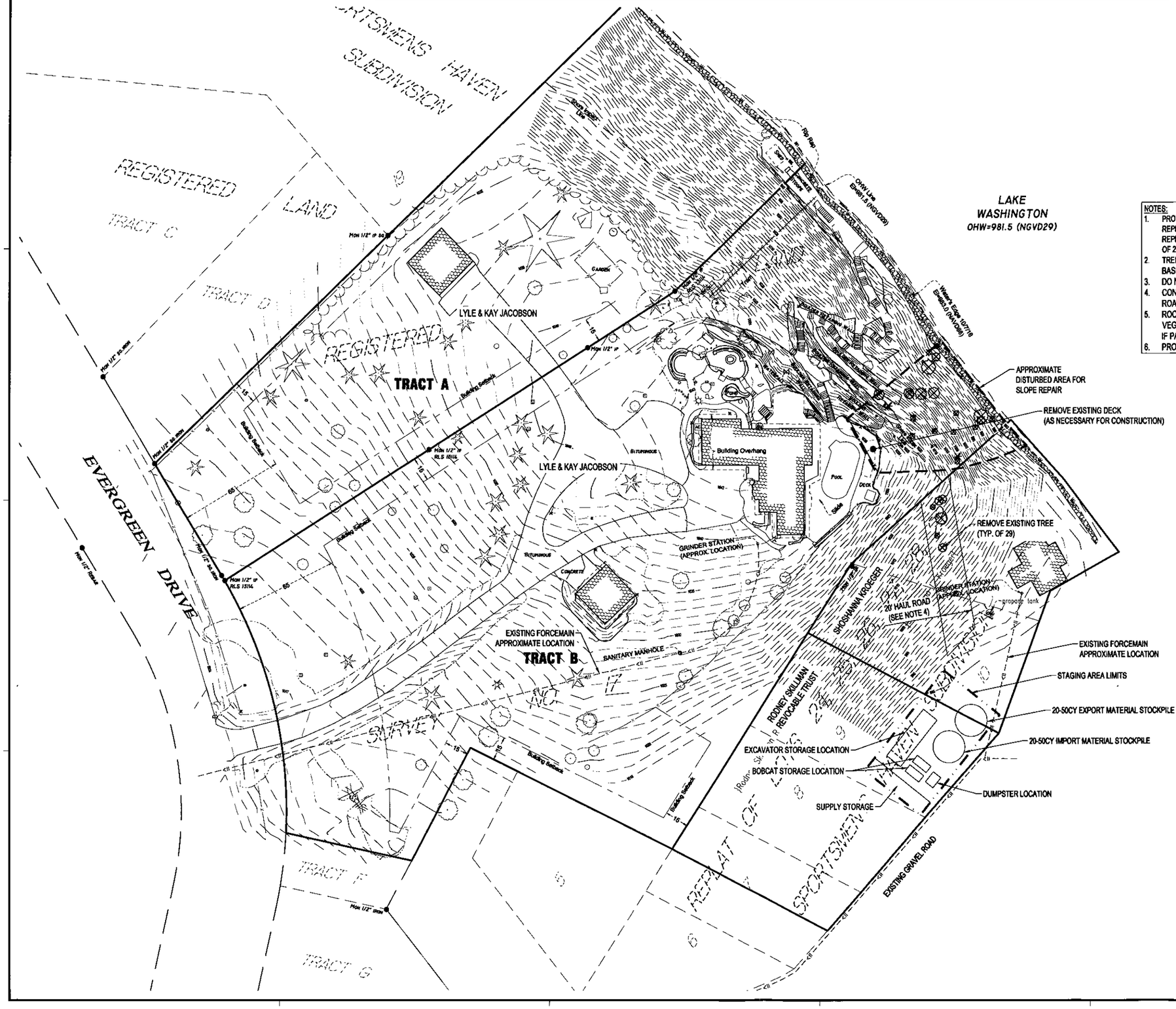
PROJECT NO.	16-19712
FILE NAME	19712 CERT
DRAWN BY	KH
DESIGNED BY	-
REVIEWED BY	-
ORIGINAL ISSUE DATE	12/13/16
CLIENT PROJECT NO.	-

TITLE

CERTIFICATE OF SURVEY

SHEET

1 OF 1



NOTES:
1. PROTECT TREES NOT CALLED OUT TO BE REMOVED. REPLACE TREE PER COUNTY REQUIREMENTS. REPLACEMENT TREES SHALL HAVE A MINIMUM CALIPER OF 2 INCHES AT 4.5 FEET FROM GROUND LEVEL.
2. TREES SHOWN ARE THOSE OF ≥ 4 INCH DIAMETER AT BASE.
3. DO NOT DISTURB AREA BELOW ELEVATION 983.00.
4. CONTRACTOR TO GRADE & MAINTAIN ACCESS ROAD TO LIMIT EROSION.
5. ROOT SYSTEM TO REMAIN FROM EXISTING VEGETATION REMOVAL. (ROOTS MAY BE REMOVED IF PART OF THE CORRECTED SLOPE SECTION)
6. PROTECT ALL EXISTING SITE FEATURES TO REMAIN

ISG

PRELIMINARY
NOT FOR CONSTRUCTION

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ LIC. NO. _____

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ LIC. NO. _____

PROJECT

LYLE JACOBSON

LE SUEUR COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	16-19712
CAD FILE NAME	19712 SITE
DRAWN BY	NJH
DESIGNED BY	NJH
REVIEWED BY	MT
ORIGINAL ISSUE DATE	04/10/17
CLIENT PROJECT NO.	-

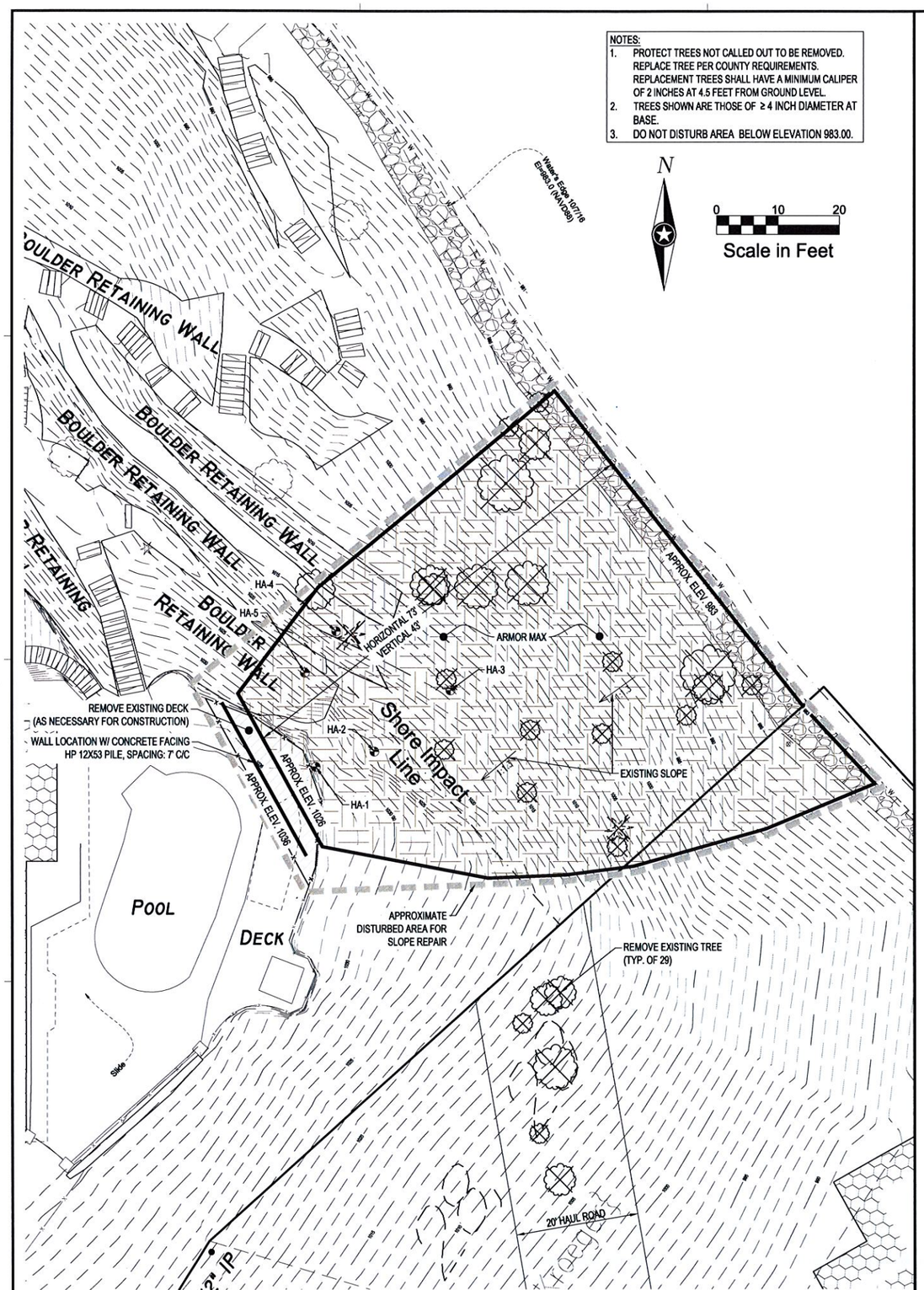
TITLE

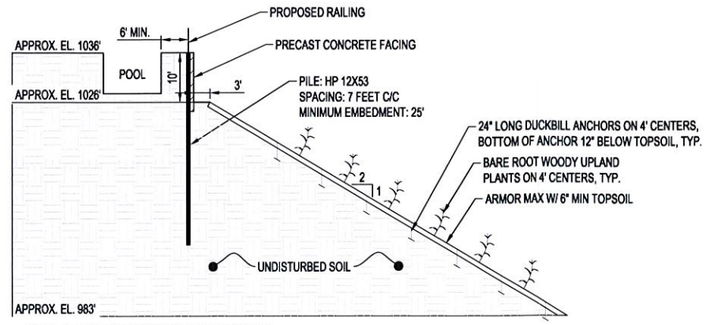
SITE PLAN

SHEET

1 OF 4

NOTES:
1. PROTECT TREES NOT CALLED OUT TO BE REMOVED. REPLACE TREE PER COUNTY REQUIREMENTS. REPLACEMENT TREES SHALL HAVE A MINIMUM CALIPER OF 2 INCHES AT 4.5 FEET FROM GROUND LEVEL.
2. TREES SHOWN ARE THOSE OF ≥ 4 INCH DIAMETER AT BASE.
3. DO NOT DISTURB AREA BELOW ELEVATION 983.00.





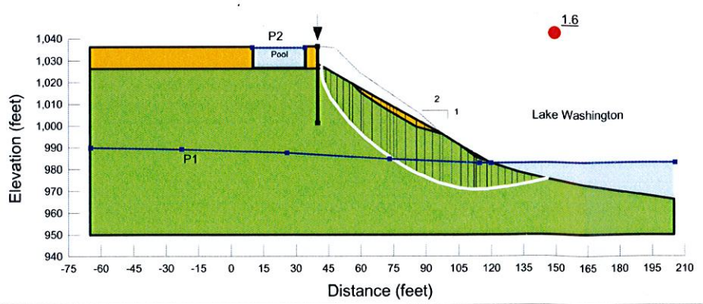
NOTE: FOR INFORMATIONAL PURPOSES ONLY, NTS.
FOLLOW DESIGN FROM GEOTECHNICAL REPORT

B1609662.00: Lake Washington Residence
Slope Remediation Design
Soilder Pile Lagging Wall

Long-term Steady-state Analysis
Effective Stress Parameters

Color	Name	Model	Unit Weight (pcf)	Cohesion' (psf)	Phi' (°)	Piezometric Line
	Till: Sandy Lean Clay	Mohr-Coulomb	125	300	28	1
	Fill: Sandy Lean Clay (P1)	Mohr-Coulomb	115	200	28	1
	Fill: Sandy Lean Clay (P2)	Mohr-Coulomb	115	200	28	2

Pile:HP 12X53
Spacing: 7 feet
Minimum Embedment: 25 feet
Yield Strength: 50 ksi
Allowable Shear Capacity: 194 kips



PROPOSED CROSS SECTION FROM BRAUN INTERTEC
(SEE GEOTECHNICAL EVALUATION REPORT)

ISG

PRELIMINARY
NOT FOR CONSTRUCTION

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ LIC. NO. _____

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ LIC. NO. _____

PROJECT

LYLE JACOBSON

LE SUEUR COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	16-19712
CAD FILE NAME	19712 SITE
DRAWN BY	NJH
DESIGNED BY	NJH
REVIEWED BY	MT
ORIGINAL ISSUE DATE	04/10/17
CLIENT PROJECT NO.	-

TITLE

SITE PLAN (DISTURBED AREA)

SHEET

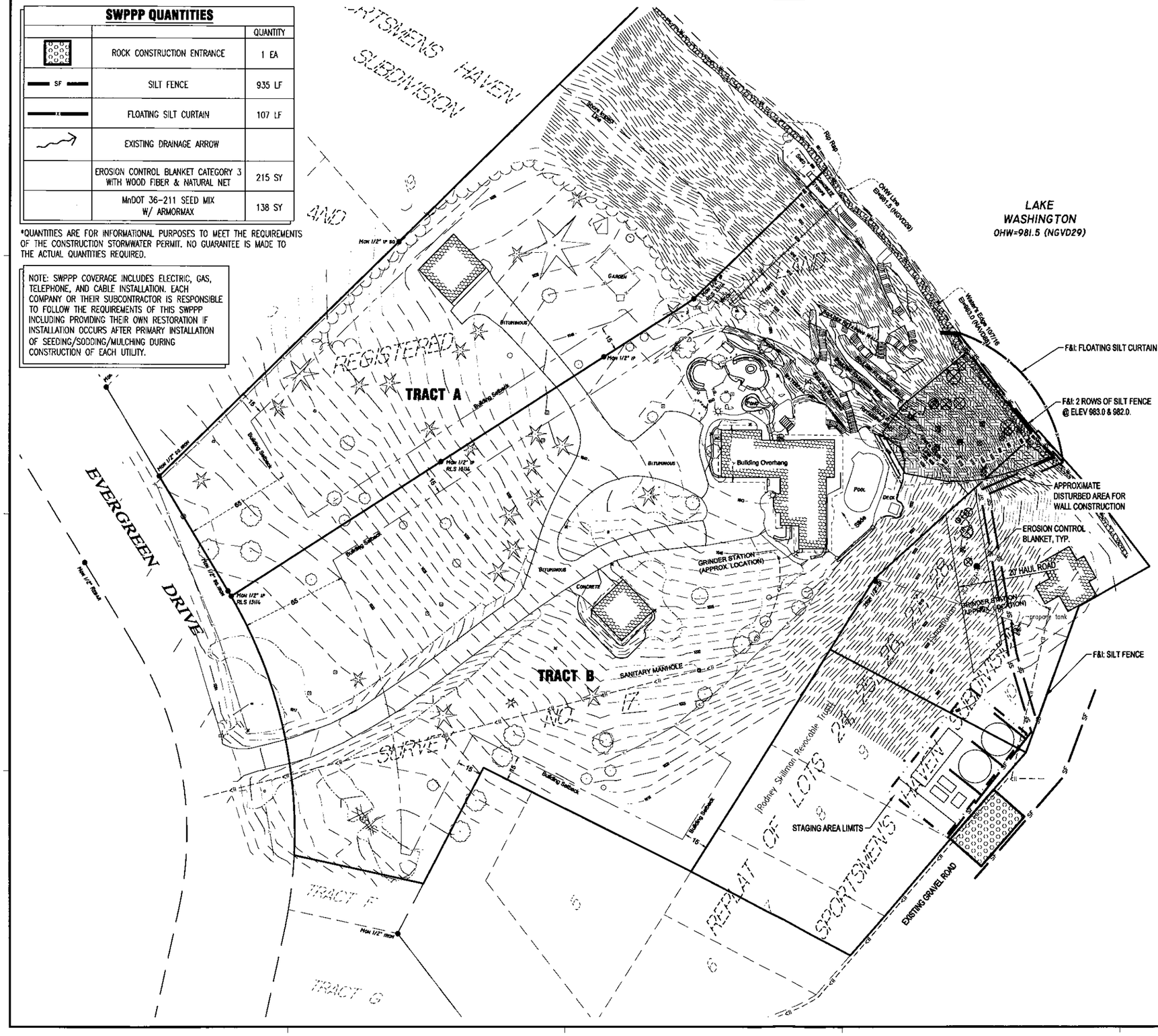
2 OF 4

SWPPP QUANTITIES

		QUANTITY
	ROCK CONSTRUCTION ENTRANCE	1 EA
SF	SILT FENCE	935 LF
	FLOATING SILT CURTAIN	107 LF
	EXISTING DRAINAGE ARROW	
	EROSION CONTROL BLANKET CATEGORY 3 WITH WOOD FIBER & NATURAL NET	215 SY
	MnDOT 36-211 SEED MIX W/ ARMORMAX	138 SY

*QUANTITIES ARE FOR INFORMATIONAL PURPOSES TO MEET THE REQUIREMENTS OF THE CONSTRUCTION STORMWATER PERMIT. NO GUARANTEE IS MADE TO THE ACTUAL QUANTITIES REQUIRED.

NOTE: SWPPP COVERAGE INCLUDES ELECTRIC, GAS, TELEPHONE, AND CABLE INSTALLATION. EACH COMPANY OR THEIR SUBCONTRACTOR IS RESPONSIBLE TO FOLLOW THE REQUIREMENTS OF THIS SWPPP INCLUDING PROVIDING THEIR OWN RESTORATION IF INSTALLATION OCCURS AFTER PRIMARY INSTALLATION OF SEEDING/SODDING/MULCHING DURING CONSTRUCTION OF EACH UTILITY.



N

0 30 60

Scale in Feet

NOTES:
1. PROTECT TREES NOT CALLED OUT TO BE REMOVED. REPLACE TREE PER COUNTY REQUIREMENTS. REPLACEMENT TREES SHALL HAVE A MINIMUM CALIPER OF 2 INCHES AT 4.5 FEET FROM GROUND LEVEL.
2. WITHIN THE HAUL ROAD DO NOT REMOVE ROOT SYSTEM FROM EXISTING VEGETATION. WOOD MULCH SHALL BE PLACED OVER HAUL ROAD.
3. ALL DISTURBED AREAS SHALL BE SEEDED WITH MnDOT MIX DESIGN 36-211.
4. ALL REMOVED MATERIAL WILL BE SENT TO "SMC COMPOST SITE".
5. STOCKPILES TO BE TARPED OR TEMPORARILY STABILIZED WHEN NOT IN USE.
6. FOLLOW MANUFACTURES RECOMMENDATIONS FOR SEED ESTABLISHMENT WITH 50% BELOW ARMORMAX AND 50% ABOVE. INSTALL A LANDLOCK EROSION CONTROL BLANKET ABOVE THE SOIL-FILLED ARMORMAX PER MANUFACTURERS RECOMMENDATIONS.

ISG

PRELIMINARY
NOT FOR CONSTRUCTION

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ LIC. NO. _____

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE _____ LIC. NO. _____

PROJECT

LYLE JACOBSON

LE SUEUR COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	16-19712
CAD FILE NAME	19712 SITE
DRAWN BY	NJH
DESIGNED BY	NJH
REVIEWED BY	MT
ORIGINAL ISSUE DATE	04/10/17
CLIENT PROJECT NO.	-

TITLE

STORMWATER POLLUTION PREVENTION PLAN

SHEET

3 OF 4

STORM WATER POLLUTION PREVENTION PLAN NOTES:

GENERAL PROJECT INFORMATION:

PROJECT NARRATIVE:
This project consists of the construction of a slope repair to fix slope stability problems.
PROJECT PHASING:
An access route will be constructed first. The top GRS section will be constructed, and then the rock fill slope will be corrected and installed. The project will be finished with the center soil slope section.
RESPONSIBLE PARTIES:
Contractor and Owner are required to apply for and receive a National Pollution Discharge Elimination System (NPDES) Stormwater Construction Permit from the MPCA at least 7 days prior to beginning work, if applicable.

Contractor and owner shall identify a person knowledgeable and experienced in the application of erosion prevention and sediment control BMP's who will oversee the implementation of the SWPPP.

Company: Contact Person: Phone:

Company: Contact Person: Phone:

Owner shall identify the entity responsible for the long term Operation and Maintenance of the storm water management system.

Company: Contact Person: Phone:

PROJECT AREAS:
Total project size (disturbed area) = 0.30 acres
Minimum area requiring MPCA permit = 1.00 acres
****PROJECT DOES NOT REQUIRE AN MPCA NPDES PERMIT****
Existing area of impervious surface (disturbed area) = 0.01 acres
Post construction area of impervious surface (disturbed area) = 0.01 acres

Total new impervious surface area created = 0.00 acres

Minimum area of new impervious surface created requiring permanent storm water management = 1.00 acres

STORM WATER MANAGEMENT:
Types of permanent storm water management that will be used if more than one acre of new impervious surface is created are checked below:
[ ] Wet sedimentation basin [ ] Infiltration / Filtration
[ ] Regional Pond [X] Alternative methods – Lake Washington

RECEIVING WATERS:
Surface waters which will receive storm water from the site within 1 mile (aerial radius measurement) of project boundary. Include waters shown on USGS 7.5 minute quad and all waters identified in Appendix A of the permit.

Name of Water Body	Type (ditch, pond, wetland, lake, etc.)	Appendix A Special or Impaired Water?
LAKE WASHINGTON	LAKE	YES
GEORGE LAKE	LAKE	YES
WITA LAKE	LAKE	NO

Additional BMPs together with enhanced runoff controls are required for discharges to Special or Impaired waters within 1 mile of the site. (See Appendix A)

CONSTRUCTION ACTIVITY NOTES:

EROSION PREVENTION:

Construction of silt fence and all other erosion control measures shall be complete before other construction activity occurs. Use phased construction wherever practical and establish turf as soon as possible to minimize sediment transport.

Turf establishment or temporary seeding or mulching of all exposed soil not being actively worked should be practiced following the table below:

Type of Slope or Disturbance Area	Time Area can Remain Open Without Being Actively Worked
Steeper than 3:1	7 days
10:1 to 3:1	7 days
Flatter 10:1	7 days
Ditches	1 day
Pipe Ends	1 day
Within 200 Feet of Surface Water	1 day

Temporary cover during construction is incidental.

Pipe outlets must be provided with temporary or permanent energy dissipation within 24 hours after connection to a surface water.

All exposed soils shall be seeded or sodded at the earliest possible time to prevent/reduce erosion.

A. Commercial Seed Mix 36-211 @ 34.5 lbs/ac (Fertilizer Type 4, 18-1-8 @ 100 lbs/acre with Category 3 wood fiber blanket, natural net).

B. Temporary mulching shall be applied at a rate of 2 tons/acre. Mulch shall be disc anchored.

Additional erosion prevention measures may be found in the permit and MPCA's Best Management Practices.

SEDIMENT CONTROL PRACTICES:

Construction of silt fence and all other erosion control measures shall be complete prior to land disturbing activities occur.

A rock construction entrance or other approved alternative must be constructed at the entry point to the project site. Rock construction entrance must be 40'x25' (min.) of washed MnDOT Class I riprap, 8" deep.

Perimeter erosion protection shall be installed and maintained until turf has been established.

The contractor shall be responsible to control erosion from leaving the construction zone. All eroded material that leaves the construction zone shall be collected by the contractor and returned to the site at the contractor's expense.

Contractor shall maintain a 50-foot natural buffer or use redundant sediment controls near surface waters if a buffer is not feasible.

Contractor shall take the necessary steps to minimize soil compaction and preserve topsoil on site.

All streets must be swept within 24 hours when any tracking occurs.

Silt fence or other effective erosion control measures must be installed around the perimeter of any soil stockpiled, including temporary stockpiles, at this location or any other on the project site. Stockpiles cannot be placed in surface waters, including storm water conveyances such as curb and gutter systems, or conduits and ditches.

Perimeter control shall be installed at all locations with positive drainage to parking lot and/or streets, and remaining until stabilization is achieved. This shall be accomplished through the use of silt fence. (Biorolls, Rock logs, or other methods approved by the engineer prior to installation shall also be placed acceptable)

DEWATERING AND BASIN DRAINING:

Dewater sediment-laden water to temporary sedimentation basins if possible, or use other BMP's to prevent erosion when discharging to surface waters. Use appropriate energy dissipation measures on all discharges.

Dewatering practices cannot cause nuisance conditions, erosion or in receiving channels or inundation of wetlands resulting in adverse impacts.

POLLUTION PREVENTION:

All solid waste collected from the construction site must be disposed in accordance with all applicable regulations.

All hazardous materials (oil, gasoline, fuel, paint, etc) must be properly stored to prevent spills, leaks, or other discharge. Storage areas shall provide secondary containment and a hazardous materials spill kit. Equipment fueling and maintenance shall occur in a designated, contained area. Storage and disposal of hazardous waste must be in compliance with all applicable regulations. All runoff containing any hazardous material must be properly collected and disposed. No engine degreasing shall be allowed on site.

All sanitary wastes must be collected from portable units on site by a licensed sanitary waste management contractor. The units must be secured and shall be maintained on a regular basis as needed to prevent overfilling.

Emergency Spill Plan – The Contractor is responsible for all construction personnel to be informed of the manufacturers' recommended spill cleanup methods, and the location of that information and cleanup supplies. The Contractor shall modify the SWPPP as required within seven calendar days of knowledge of the release to: provide a description of the release, the circumstances leading to the release, and the date of the release. Plans must identify measures to prevent the reoccurrence of such releases. If a spill occurs, the following steps shall be followed:

1. Observe the safety precautions associated with the spilled material. Stop the source of the spill, if you can do so safely. Call 911 if fire or public safety hazards are created.
2. Contain the spilled material. Dirt, sand, or any semi-impermeable material may be used to create a containment structure to prevent the material from flowing.
3. Report the spill to the Minnesota Duty Officer at (651) 649-5451.
4. Clean up the spilled material and dispose of the wastes properly. With the exception of used oil, waste generated from petroleum spills that have been reported and cleaned up immediately are exempt from Minnesota's Hazardous Waste Rules. Waste generated from used oil spills must be sent to a facility for energy recovery.

The contractor is responsible for monitoring air pollution and ensuring it does not exceed levels set by local, state, or federal regulations. This includes dust created by work being performed on the site. Air pollution and dust control correction is considered incidental to the unit bid prices for which work is being performed. Additional dust control measures may be required by the Engineer.

Concrete washout offsite: All liquid and solid wastes generated by concrete washout operations must be contained and not have the opportunity to come in contact with surface waters or ground water. This includes ditches, slopes to ditches, curb and gutter, storm sewer systems and ponds. All concrete trucks used on site will not be allowed to washout on site. All excess water and concrete must leave the site within the concrete trucks. Liquid and solids wastes must be disposed of properly offsite.

INSPECTION AND MAINTENANCE:

The Permittees must routinely inspect the construction site once every seven (7) days during active construction and within 24 hours of a rainfall event greater than 0.5 inches in a 24 hour period.

All inspections performed during construction must be recorded and records retained with the SWPPP in accordance with the Stormwater Permit. Contractor is responsible for keeping a record of all rainfall data & erosion control maintenance until final establishment of turf.

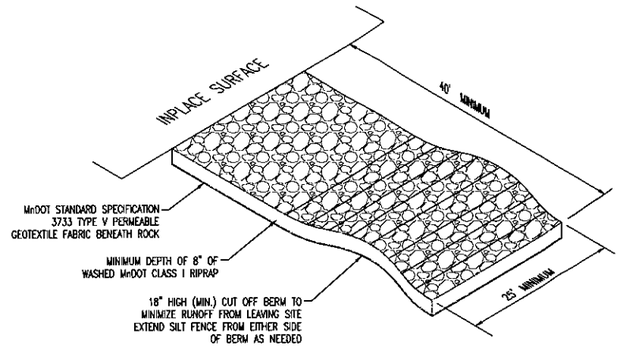
All silt fences must be repaired, replaced, or supplemented when they become nonfunctional or the sediment reaches 1/2 of the height of the fence. Erosion control and other BMP's must be replaced, repaired, or supplemented when they reach 50% design load.

See MPCA website for example of SWPPP inspection and maintenance forms.
http://www.pca.state.mn.us/index.php/view-document.html?gid=7409

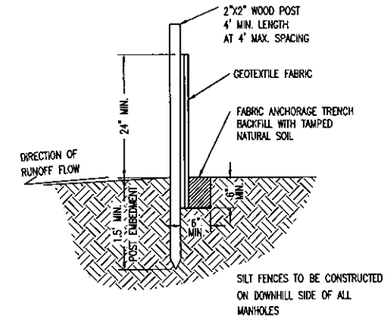
FINAL STABILIZATION:

The Permittees must ensure final stabilization of the site. The Permittees must submit a Notice of Termination within 30 days after final stabilization is complete or control has been passed to another owner. All temporary erosion control measures and BMP's must be removed as part of the final site stabilization.

The storm water permit further defines final stabilization and its requirements.



ROCK CONSTRUCTION ENTRANCE
N.T.S



PREASSEMBLED SILT FENCE
N.T.S

ISG

PRELIMINARY
NOT FOR CONSTRUCTION

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE_____ LIC. NO._____

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 PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

DATE_____ LIC. NO._____

PROJECT

LYLE JACOBSON

LE SUEUR COUNTY MINNESOTA

REVISION SCHEDULE

DATE	DESCRIPTION	BY

PROJECT NO.	16-19712
CAD FILE NAME	19712 SITE
DRAWN BY	NJH
DESIGNED BY	NJH
REVIEWED BY	MT
ORIGINAL ISSUE DATE	04/10/17
CLIENT PROJECT NO.	-

TITLE

STORMWATER POLLUTION PREVENTION NOTES

SHEET

4 OF 4