STORMWATER FACILITIES MAINTENANCE AGREEMENT AND RESTRICTIVE COVENANT

This Stormwater Facilities Maintenance Agreement and Restrictive Covenant (this "**Maintenance Agreement and Restrictive Covenant**") is made this 27th day of October, 2015, by and between the City of Tonka Bay, a Minnesota municipal corporation, having its principal offices at 4901 Manitou Road, Tonka Bay, Minnesota 55331 (the "**City**"), and David C Uhl & JoEllen M Uhl, the current property owner(s) at 4348 Manitou Road, Tonka Bay, Minnesota 55331, (the "**Owner**" or "**David C Uhl & JoEllen M Uhl**"). The City and Owner are sometimes collectively referred to hereafter as the "**Parties**".

RECITALS

WHEREAS, David C Uhl & JoEllen M Uhl are the owners of fee title or a substantial beneficial interest in certain real property commonly described as 4348 Manitou Road, in the City of Tonka Bay, Hennepin County, Minnesota (the "**Property**") and legally described in Exhibit A, attached hereto and incorporated herein by this reference; and

WHEREAS, in connection with the Owner's proposed development of the Property, the City has required and the Owner has agreed to construct a stormwater collection and stormwater quality treatment system (the "**Detention System**"); and

WHEREAS, such Detention System is described in the Shoreland Impact Plan dated September 21, 2015 prepared by Carlson McCain. and shown on the proposed Construction Drawings dated 09/16/2015 prepared by Carlson McCain for the Owner's Property, a copy of which is attached hereto as Exhibit B and incorporated herein by this reference ("**Detention System Drawing**"); and

WHEREAS, as a condition of project approval, the parties have entered into this Maintenance Agreement and Restrictive Covenant, in order to ensure that the Detention System will be constructed and maintained in accordance with the approved plans and the City's development standards;

NOW, THEREFORE, in consideration of the mutual agreements contained herein, as well as other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the Parties hereby agree as follows:

TERMS

Section 1. Construction and Maintenance. Owner agrees to construct and maintain a stormwater collection and detention system on the Property, as shown on the Detention System Drawing. Owner agrees to maintain and preserve the Detention System in keeping with governmental standards until such time as the City, its successors or assigns, reasonably determines that the Detention System requires modification or enhancement to properly attenuate stormwater collection and retention at the Property.

Section 2. No Modification or Removal. No part of the Detention System shall be dismantled, revised, altered, or removed, except as necessary for maintenance, repair, or replacement, or to meet prevailing governmental standards for stormwater attenuation at the Property.

Section 3. Access. The City shall have the right to ingress and egress over those portions of the Property described in Exhibit A in order to access the Detention System for inspection and to reasonably monitor system performance, operational flows, or defects. Except in the case of emergencies, the City agrees to limits its inspection rights to normal business hours.

Section 4. Reporting. The Owner shall be responsible for inspecting and maintaining the stormwater treatment and conveyance system, at minimum, on an annual basis. The Owner shall provide a letter to the City Engineer, by September 1st of each year, stating that inspection and maintenance have been completed (the "**Inspection Report**").

Section 5. Repairs, Failure of Owner to Maintain. If at any time the City Engineer does not receive the Inspection Report, and the City determines that maintenance or repair work is required to be performed on the Detention System, the City Engineer or his/her designee shall give written notice to the Owner of the system deficiency(ies). The City Engineer shall also set a reasonable time in which the Owner shall cause to have performed the necessary repairs. If the repair or maintenance required by the City Engineer is not completed within the time set by him/her, the City may perform the required maintenance and/or repair, all at the Owner's expense. Written notice will be sent to the Owner, stating the City's intention to perform such repair or maintenance, and such work will not commence until at least 15 days after such notice is mailed, except in situations of emergency. If, within the sole discretion of the City Engineer, there exists an imminent or present danger to the Detention System, the City's facilities, or the public health and safety, such 15-day period will be waived and maintenance and/or repair work will begin immediately.

Section 6. Cost of Repairs and/or Maintenance. The Owner shall assume all responsibility for the cost of any maintenance and repairs to the Detention System, including all associated engineer's fees, attorney's fees and administrative costs. Such responsibility shall include reimbursement to the City within 30 days after the City mails an invoice to the Owner for any work performed by the City. Overdue payments will require payment of interest at the then-current legal rate, as liquidated damages.

Section 7. Notice to City of Repairs and/or Maintenance. The Owner is hereby required to obtain written approval from the City Engineer prior to performing any repairs, modifications, or alterations to the Detention System.

Section 8. Rights Subject to Permits and Approvals. The rights granted herein are subject to permits and approvals granted by the City affecting the Property subject to this Maintenance Agreement and Restrictive Covenant.

Section 9. Terms Run with the Property. The terms of this Maintenance Agreement and Restrictive Covenant are intended to be and shall constitute a covenant running with the Property and shall inure to the benefit of and be binding upon the parties hereto and their respective heirs, successors, and assigns.

Section 10. Notice. All notices required or permitted hereunder shall be in writing and shall either be delivered in person or sent by certified U.S. Mail, return-receipt requested, and shall be deemed delivered on the sooner of actual receipt of three (3) days after deposit in the mail, postage prepaid, addressed to the City or the Owner at the addresses set forth below:

To the City:
City Administrator
City of Tonka bay
4901 Manitou Road
Tonka Bay, MN 55331

And

City Engineer
City of Tonka bay
4901 Manitou Road
Tonka Bay, MN 55331

To the Owner:
David C Uhl & JoEllen M Uhl
4348 Manitou Road
Tonka Bay, Minnesota 55331

Section 11. Severability. Any invalidity, in whole or in part, of any provision of this Maintenance Agreement and Restrictive Covenant shall not affect the validity of any other provision.

Section 12. Waiver. No term or provision herein shall be deemed waived and no breach excused unless such waiver or consent is in writing and signed by the party claimed to have waived or consented.

Section 13. Integration. This Maintenance Agreement and Restrictive Covenant constitutes the entire agreement between the parties on this subject matter, and supersedes all prior discussions, negotiations, and all other agreements on the same subject matter, whether oral or written.

Section 14. Modification. This Agreement may be terminated, amended or modified only by recording with the County Recorder for Hennepin County, Minnesota, a document executed by the parties (or their respective successors and assigns) representing their unanimous consent to such amendment or modification. This consent may require City Council action.

SIGNATURE LINES

OWNER:

By: _____ By: _____

David C Uhl JoEllen M Uhl

ACKNLOWLEDGEMENT

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNEPIN)

This instrument was acknowledged before me on October 27, 2015, by David C Uhl & JoEllen M Uhl.

CLARE THERESE LINK
Notary Public - Minnesota
My Commission Expires 1/31/2020

_____
(signature of notarial officer)

My commission expires: 1/31/2020

(stamp)

CITY OF TONKA BAY:

By: _____ By: _____
Gerry De La Vega, Mayor Lindy Crawford, City Administrator

ACKNLOWLEDGEMENT

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNEPIN)

This instrument was acknowledged before me on _____, 2015, by Gerry De La Vega, Mayor of the City of Tonka Bay, a Minnesota municipal corporation, on behalf of the corporation.

_____
(signature of notarial officer)

My commission expires: _____

(stamp)

ACKNLOWLEDGEMENT

STATE OF MINNESOTA)
) ss.
COUNTY OF HENNEPIN)

This instrument was acknowledged before me on _____, 2015, by Lindy Crawford, City Administrator of the City of Tonka Bay, a Minnesota municipal corporation, on behalf of the corporation.

_____
(signature of notarial officer)

My commission expires: _____

(stamp)

THIS INSTRUMENT WAS DRAFTED BY:
Justin Messner, PE – City Engineer
WSB & Associates, Inc.
477 Temperance Street
St. Paul, MN 55101

EXHIBIT A

LEGAL DESCRIPTION

Street Address:	4348 Manitou Road
PID:	21-117-23-42-0028
Municipality:	Tonka Bay
Legal Description:	Interlachen Addition, Lot 54

EXHIBIT B

APPROVED DETENTION SYSTEM PLAN

Carlson McCain

MEMORANDUM

Date: 9/21/2015	**From: Brian Kallio**
	Phone: 763-489-7910
To: Project File	
Company:	

Re: 4348 Manitou Road Stormwater Management

The purpose of this memorandum is to provide a summary of stormwater management practices proposed for a new home planned at 4348 Manitou Road in Tonka Bay, Minnesota.

The existing home, garage, driveway and other features will be removed and a new home with attached garage, driveway and other site features will be constructed. The new home will be constructed as a slab on grade due to the high anticipated groundwater table on the project site.

The existing site includes approximately 4,791 square feet of impervious features. The proposed construction includes approximately 4,164 square feet of impervious areas, for a net decrease of approximately 627 square feet. The existing driveway consists of a paved surface the entire width of the lot and up to the edge of the road. The proposed driveway is only 16 feet wide from the edge of the road to inside of the right of way. Approximately 320 square feet of impervious surface will be removed from inside of the right of way as a part of the construction project, so the resulting net change in impervious surface as a result of the project is a decrease of 947 square feet.

The United States Department of Agriculture, natural Resources Conservation Service (NRCS) was reviewed to estimate the soil types that are likely to be encountered on the site. Based on the Custom Soil Resource Report for the property, provided in Attachment 1, the soil is likely to be land and loamy fine sand with high infiltration potential. The current owner reported that the existing soil is "like beach sand." Based on the presence of high permeability sandy soil, the water table elevation on the property is likely to be close to the water surface of Lake Minnetonka. That elevation does not provide for adequate separation from the existing grades on the site to the water table to construction an infiltration basin.

Proposed plans are shown in Attachment 2. The stormwater runoff from the proposed house and other impervious surfaces will be by surface flow through flat, vegetated areas, which will provide opportunities for infiltration of small flows. The front yards areas will drain into a rain garden and then an existing catch basin in Manitou Drive and the rear yard areas will drain over the vegetated back yard, through the rip rap shoreline protection and into Lake Minnetonka. The proposed rain garden provides enough capacity to completely contain approximately 0.4 inches of runoff from all of the total proposed impervious areas on the site. The vegetated areas will provide significant pre-treatment of runoff upstream of the rain garden and upstream of the Lake Minnetonka.

The Lake Minnetonka shoreline will be protected from site sediments by installation of silt fence and by stabilization of all disturbed areas. Disturbed areas will be stabilized with seed and mulch or sod after grading is completed to reduce potential erosion of sediments and protect the shoreline. Discharges to the catch basin in Manitou Drive will be protected with silt fence, stabilization, inlet protection devices, and a rock construction entrance. Erosion and sediment control devices will remain in place until they are no longer needed to protect the adjacent resources.

ATTACHMENT 1
NRCS CUSTOM SOIL RESOURCE REPORT

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for Hennepin County, Minnesota

4348 Manitou Road

September 15, 2015

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

The U.S. Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, age, disability, and where applicable, sex, marital status, familial status, parental status, religion, sexual orientation, genetic information, political beliefs, reprisal, or because all or a part of an individual's income is derived from any public assistance program. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means

for communication of program information (Braille, large print, audiotape, etc.) should contact USDA's TARGET Center at (202) 720-2600 (voice and TDD). To file a complaint of discrimination, write to USDA, Director, Office of Civil Rights, 1400 Independence Avenue, S.W., Washington, D.C. 20250-9410 or call (800) 795-3272 (voice) or (202) 720-6382 (TDD). USDA is an equal opportunity provider and employer.

Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the

individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

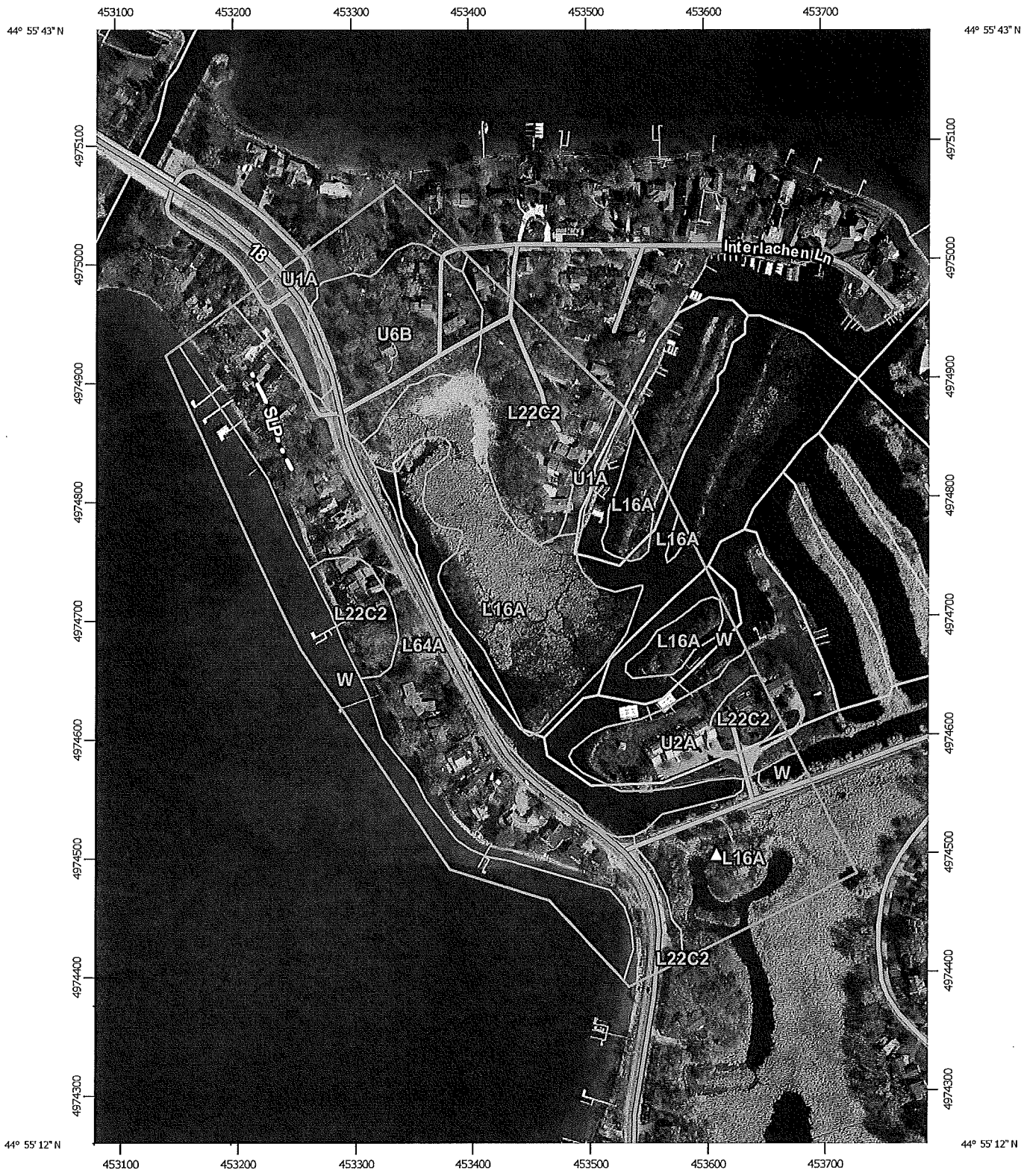
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Custom Soil Resource Report
Soil Map



Map Scale: 1:4,570 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 50 100 200 300

Feet: 0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:12,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Hennepin County, Minnesota
Survey Area Data: Version 10, Sep 16, 2014

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Mar 16, 2012—Apr 6, 2012

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Hennepin County, Minnesota (MN053)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
L16A	Muskego, Blue Earth, and Houghton soils, ponded, 0 to 1 percent slopes	12.2	24.7%
L22C2	Lester loam, 6 to 10 percent slopes, moderately eroded	5.7	11.6%
L64A	Tadkee-Tadkee, depressional, complex, 0 to 2 percent slopes	11.1	22.4%
U1A	Urban land-Udorthents, wet substratum, complex, 0 to 2 percent slopes	2.8	5.8%
U2A	Udorthents, wet substratum, 0 to 2 percent slopes	2.3	4.7%
U6B	Urban land-Udorthents (cut and fill land) complex, 0 to 6 percent slopes	3.9	7.8%
W	Water	11.4	23.0%
Totals for Area of Interest		**49.4**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified

by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Hennepin County, Minnesota

L16A—Muskego, Blue Earth, and Houghton soils, ponded, 0 to 1 percent slopes

Map Unit Setting

National map unit symbol: h4xy
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 124 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition

Muskego, ponded, and similar soils: 30 percent
Houghton, ponded, and similar soils: 30 percent
Blue earth, ponded, and similar soils: 30 percent
Minor components: 10 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blue Earth, Ponded

Setting

Landform: Marshes on moraines
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Coprogenous earth

Typical profile

A - 0 to 50 inches: silt loam
Cg - 50 to 60 inches: silt loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 40 percent
Available water storage in profile: Very high (about 12.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: B/D
Other vegetative classification: Not Suited (G103XS024MN)

Description of Houghton, Ponded

Setting

Landform: Marshes on moraines
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material

Typical profile

Oa - 0 to 80 inches: muck

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 6.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Available water storage in profile: Very high (about 23.9 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: A/D
Other vegetative classification: Not Suited (G103XS024MN)

Description of Muskego, Ponded

Setting

Landform: Marshes on moraines
Down-slope shape: Concave
Across-slope shape: Concave
Parent material: Organic material over coprogenous earth

Typical profile

Oa1 - 0 to 9 inches: muck
Oa2 - 9 to 36 inches: muck
Lco - 36 to 60 inches: coprogenous earth

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 80 percent
Available water storage in profile: Very high (about 19.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8w
Hydrologic Soil Group: C/D
Other vegetative classification: Not Suited (G103XS024MN)

Minor Components

Klossner, ponded

Percent of map unit: 10 percent
Landform: Marshes on moraines
Down-slope shape: Concave

Across-slope shape: Concave
Other vegetative classification: Not Suited (G103XS024MN)

L22C2—Lester loam, 6 to 10 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2ttc4
Elevation: 690 to 1,840 feet
Mean annual precipitation: 24 to 37 inches
Mean annual air temperature: 43 to 52 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Lester, moderately eroded, and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lester, Moderately Eroded

Setting

Landform: Ground moraines, ground moraines
Landform position (two-dimensional): Summit, shoulder, backslope
Landform position (three-dimensional): Interfluve, rise
Down-slope shape: Convex
Across-slope shape: Convex, linear
Parent material: Fine-loamy till

Typical profile

Ap - 0 to 6 inches: loam
Bt - 6 to 38 inches: clay loam
C - 38 to 79 inches: loam

Properties and qualities

Slope: 6 to 10 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 47 to 63 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water storage in profile: High (about 10.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)

Minor Components

Storden
Percent of map unit: 10 percent
Landform: Ground moraines
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Rise
Down-slope shape: Convex
Across-slope shape: Linear

Le sueur
Percent of map unit: 3 percent
Landform: Ground moraines
Landform position (two-dimensional): Toeslope
Landform position (three-dimensional): Dip
Down-slope shape: Concave
Across-slope shape: Linear

Hamel
Percent of map unit: 2 percent
Landform: Ground moraines
Landform position (three-dimensional): Dip
Down-slope shape: Concave, linear
Across-slope shape: Linear

L64A—Tadkee-Tadkee, depressional, complex, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: f8cn
Mean annual precipitation: 25 to 34 inches
Mean annual air temperature: 43 to 46 degrees F
Frost-free period: 124 to 172 days
Farmland classification: Not prime farmland

Map Unit Composition
Tadkee and similar soils: 50 percent
Tadkee, depressional, and similar soils: 36 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tadkee

Setting
Landform: Beaches on moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Beach sand over till

Typical profile

A - 0 to 6 inches: loamy fine sand
Bg - 6 to 34 inches: sand
2Cg - 34 to 80 inches: loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: About 6 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 1 percent
Available water storage in profile: Moderate (about 7.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3w
Hydrologic Soil Group: B/D
Other vegetative classification: Level Swale, Acid (G103XS005MN)

Description of Tadkee, Depressional

Setting

Landform: Shores on beaches on moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Beach sand over till

Typical profile

A - 0 to 6 inches: mucky loamy fine sand
Bg - 6 to 27 inches: sand
2Cg - 27 to 80 inches: loam

Properties and qualities

Slope: 0 to 1 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Very poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 2.00 in/hr)
Depth to water table: About 0 inches
Frequency of flooding: None
Frequency of ponding: Frequent
Calcium carbonate, maximum in profile: 20 percent
Gypsum, maximum in profile: 1 percent
Available water storage in profile: High (about 9.8 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6w
Hydrologic Soil Group: B/D
Other vegetative classification: Not Suited (G103XS024MN)

Minor Components

Better drained soil
Percent of map unit: 8 percent
Landform: Beaches on moraines
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Sloping Upland, Acid (G103XS006MN)

Granby
Percent of map unit: 4 percent
Landform: Shores on beaches on moraines
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Not Suited (G103XS024MN)

Less sandy soil
Percent of map unit: 2 percent
Landform: Beaches on moraines
Down-slope shape: Linear
Across-slope shape: Linear
Other vegetative classification: Level Swale, Acid (G103XS005MN)

U1A—Urban land-Udorthents, wet substratum, complex, 0 to 2 percent slopes

Map Unit Setting
National map unit symbol: rvkn
Mean annual precipitation: 23 to 35 inches
Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 80 percent
Udorthents, wet substratum, and similar soils: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting
Landform: Stream terraces, moraines, outwash plains

Description of Udorthents, Wet Substratum

Setting
Landform: Moraines, outwash plains, stream terraces
Down-slope shape: Linear
Across-slope shape: Linear

Parent material: Variable soil material

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

U2A—Udorthents, wet substratum, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: glwg
Elevation: 660 to 1,640 feet
Mean annual precipitation: 27 to 33 inches
Mean annual air temperature: 39 to 46 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition

Udorthents, wet substratum, and similar soils: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udorthents, Wet Substratum

Setting

Landform: Stream terraces, moraines, outwash plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Variable soil material

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

U6B—Urban land-Udorthents (cut and fill land) complex, 0 to 6 percent slopes

Map Unit Setting

National map unit symbol: h656
Mean annual precipitation: 23 to 35 inches

Mean annual air temperature: 43 to 50 degrees F
Frost-free period: 155 to 200 days
Farmland classification: Not prime farmland

Map Unit Composition
Urban land: 75 percent
Udorthents, cut and fill land, and similar soils: 25 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Urban Land

Setting
Landform: Moraines

Description of Udorthents, Cut And Fill Land

Setting
Landform: Moraines
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Variable loamy material

Properties and qualities
Slope: 0 to 6 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None

W—Water

Map Unit Setting
National map unit symbol: h4xs
Elevation: 660 to 1,640 feet
Mean annual precipitation: 27 to 33 inches
Mean annual air temperature: 39 to 46 degrees F
Frost-free period: 135 to 160 days
Farmland classification: Not prime farmland

Map Unit Composition
Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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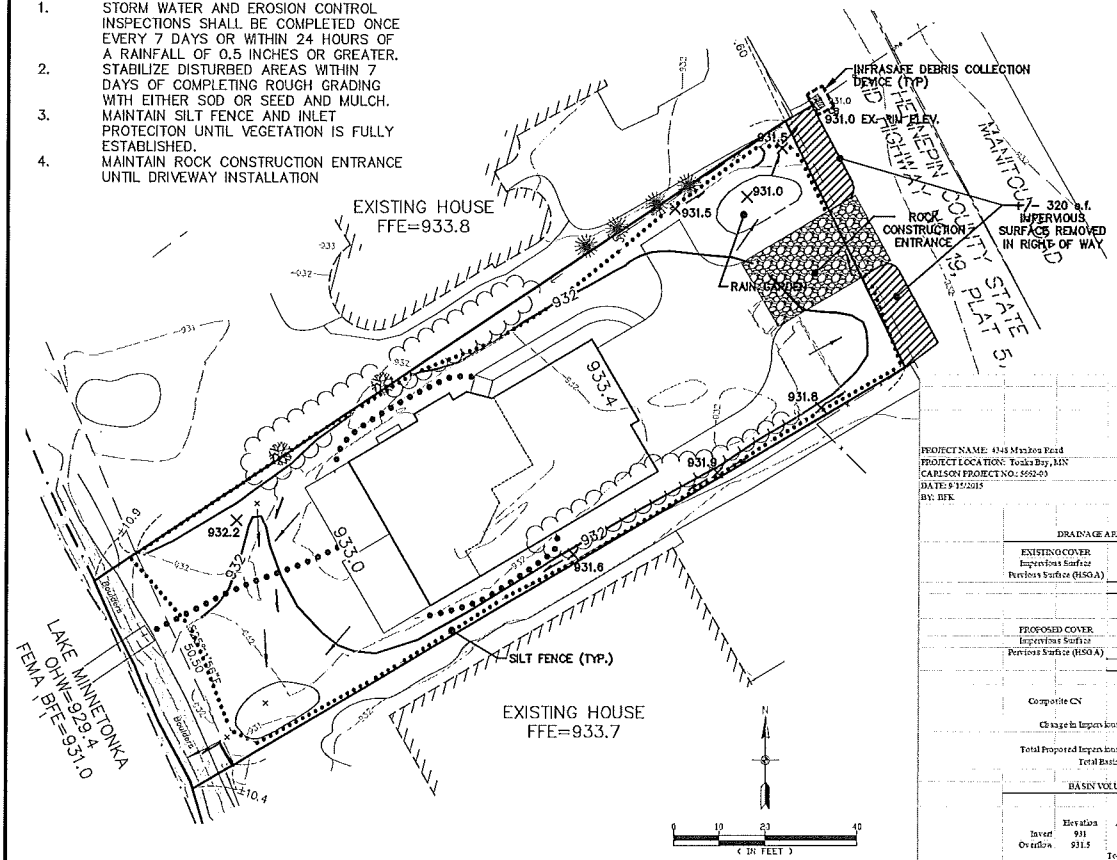
ATTACHMENT 2
STORMWATER, SHORELINE PROTECTION, AND EROSION CONTROL PLAN

NOTES:

1. STORM WATER AND EROSION CONTROL INSPECTIONS SHALL BE COMPLETED ONCE EVERY 7 DAYS OR WITHIN 24 HOURS OF A RAINFALL OF 0.5 INCHES OR GREATER.
2. STABILIZE DISTURBED AREAS WITHIN 7 DAYS OF COMPLETING ROUGH GRADING WITH EITHER SOD OR SEED AND MULCH.
3. MAINTAIN SILT FENCE AND INLET PROTECITON UNTIL VEGETATION IS FULLY ESTABLISHED.
4. MAINTAIN ROCK CONSTRUCTION ENTRANCE UNTIL DRIVEWAY INSTALLATION



Carlson McCain

PROJECT NAME: 4348 Manitou Road
PROJECT LOCATION: Tonka Bay, MN
CARLSON PROJECT NO.: 5552-03
DATE: 9/15/2015
BY: BFK

DRAINAGE AREA CHARACTERISTICS

EXISTING COVER	CN	AREA (SF)	
Impervious Surface	98	4791	
Pervious Surface (HSG A)	49	5037	
	Totals	9828	
PROPOSED COVER	CN	AREA (SF)	
Impervious Surface	98	4164	
Pervious Surface (HSG A)	49	5664	
	Totals	9828	
Composite CN	70		
Change in Impervious Surface =		-627	sq. ft.
Total Proposed Impervious Surface =		4164	sq. ft.
Total Basin Volume =		134	cubic ft

BASIN VOLUME INFORMATION

Basin 1	Elevation	Area (sf)	Volume (cf)	
Invert	931	147		
Overflow	931.5	300	134	
		Total Volume	134	cubic feet
Inches Treated over proposed impervious =			0.39	inches

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STORMWATER, SHORELINE PROTECTION & EROSION CONTROL PLAN

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Tonka Bay, Minnesota

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