☞05hr_SSC-DNRRR_Misc_pt06h

☞ **Exhibits/comments submitted by Tilton. RE: DNR study regarding Lower St. Croix ordinary high water mark.**

(FORM UPDATED: 08/11/2010)

WISCONSIN STATE LEGISLATURE ...
PUBLIC HEARING - COMMITTEE RECORDS

2005-06

(session year)

Senate Select

(Assembly, Senate or Joint)

Committee on ... DNR (SSC-DNRRR)

COMMITTEE NOTICES ...

- Committee Reports ... **CR**
- Executive Sessions ... **ES**
- Public Hearings ... **PH**

INFORMATION COLLECTED BY COMMITTEE FOR AND AGAINST PROPOSAL

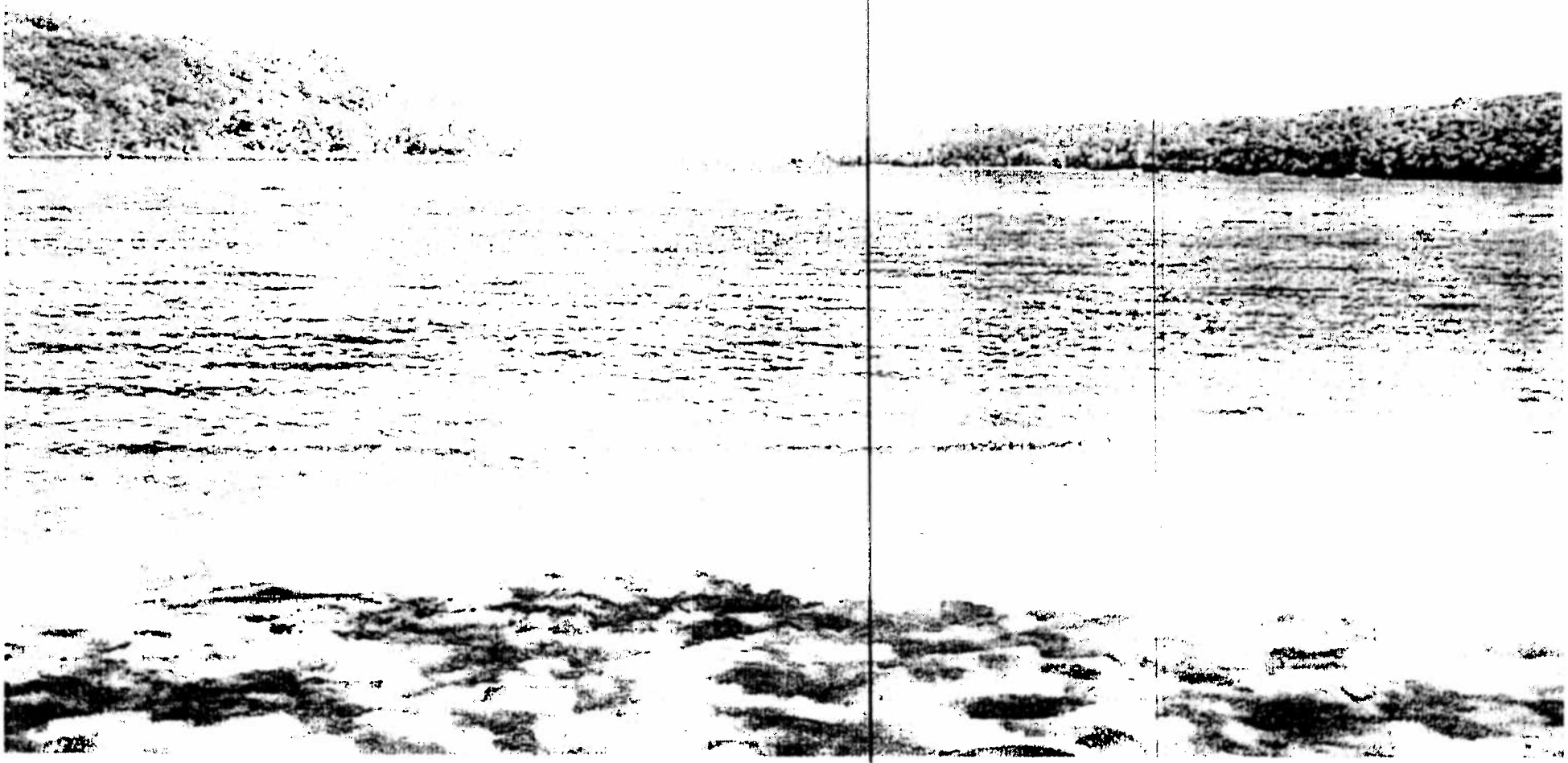
- Appointments ... **Appt** (w/Record of Comm. Proceedings)
- Clearinghouse Rules ... **CRule** (w/Record of Comm. Proceedings)
- Hearing Records ... bills and resolutions (w/Record of Comm. Proceedings)
  (**ab** = Assembly Bill) (**ar** = Assembly Resolution) (**ajr** = Assembly Joint Resolution)
  (**sb** = Senate Bill) (**sr** = Senate Resolution) (**sjr** = Senate Joint Resolution)
- Miscellaneous ... **Misc**

* Contents organized for archiving by: Mike Barman (LRB) (July/2012)

D.01

LOWER ST. CROIX NATIONAL WILD AND SCENIC RIVER
ORDINARY HIGH WATER MARK

000342



Ordinary High-Water Mark

- "By **ordinary high-water mark** is meant the point on the bank or shore up to which the presence and action of the water is so continuous as to leave a distinct mark either by erosion, destruction of terrestrial vegetation, or other easily recognized characteristic.
    - *Diana Shooting Club v. Husting (1914)*

Ordinary High-Water Mark

- … And where the bank or shore at any particular place is of such a character that it is impossible or difficult to ascertain where the point of ordinary high-water mark is, recourse may be had to other places on the bank or shore of the same stream or lake to determine whether a given stage of water is above or below the ordinary high-water mark."

The Ordinary High Water Mark

The ordinary high water mark is defined the same for streams as for lakes.

Muench v. PSC, 1952

Identifying the OHWM

- Biological Indicators
  * multiple trunks on woody vegetation
  * buttressing of tree trunks
  * adventitious roots
  * change in vegetation from aquatic to terrestrial
  * shallow root systems

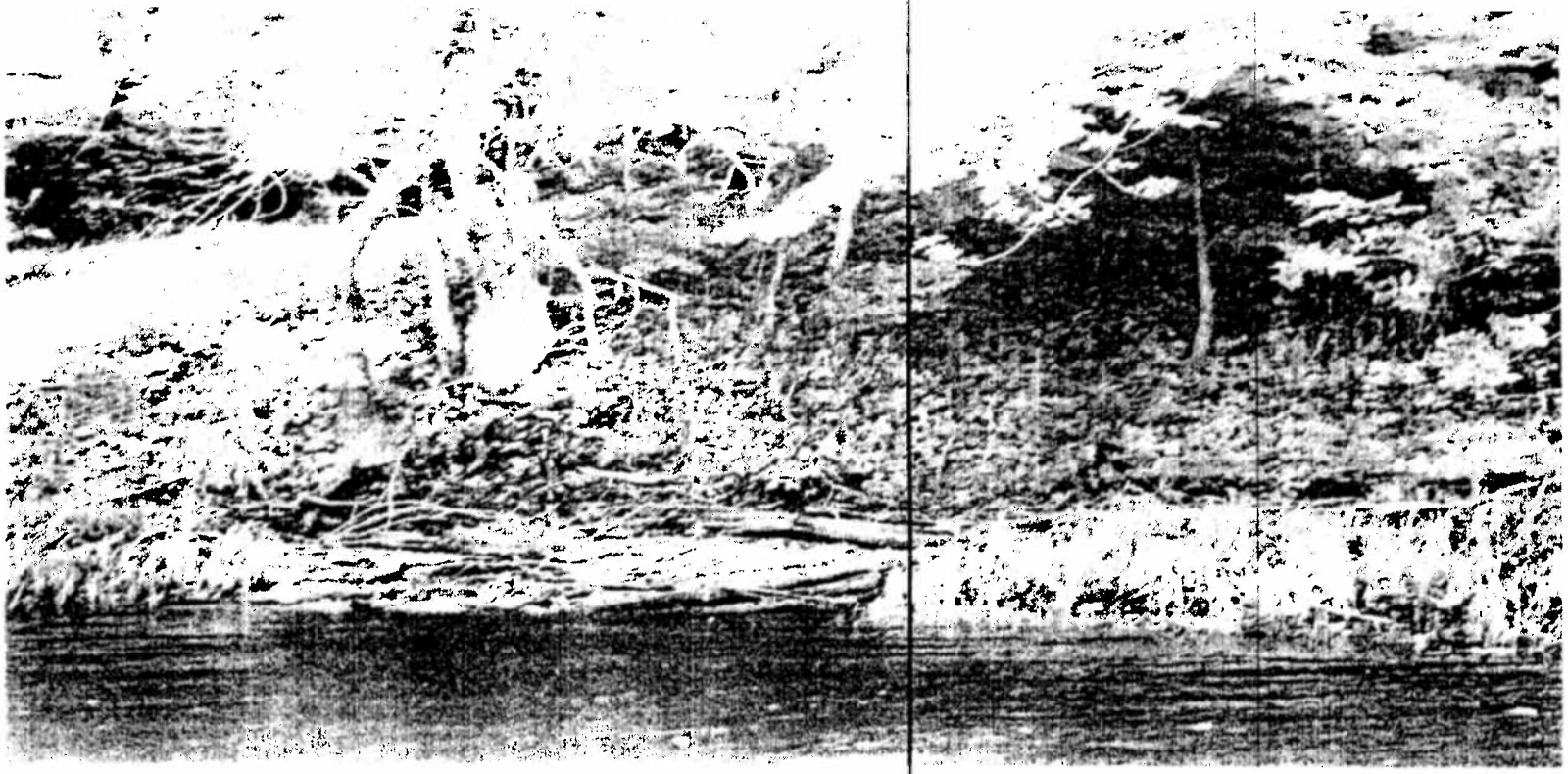
TWIN SPRINGS

TRANSECT 1

The biological indicators we found here were one pipe elbow root and multiple tree trunks on several trees

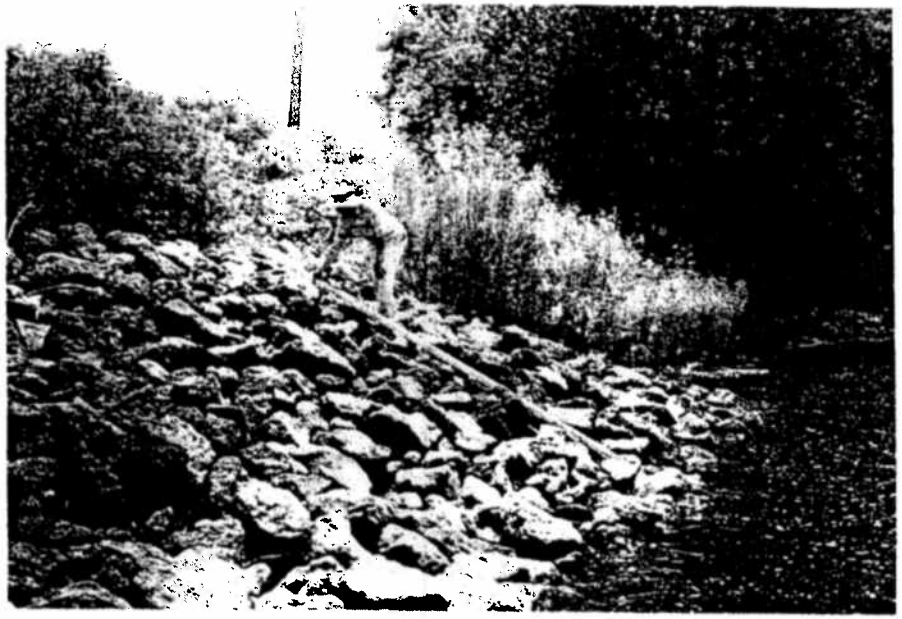
Identifying the OHWM

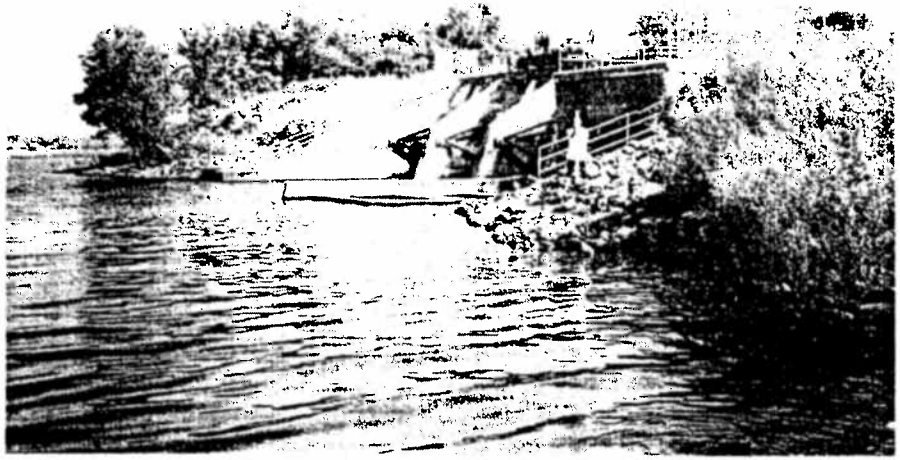
- Physical Indicators
  - exposed tree roots
  - erosion from waves creating a washmark
  - mud stain or debris line
  - water stains on rocks/culverts/seawalls
  - leachate marks in the soil



TWIN SPRINGS---TRANSECT 2

The erosion line and exposed tree roots are both examples of physical indicators that we look for to find the OHWM.





LAKE MALLALIEU DAM

The water stain on the dam is an excellent physical indicator.

Why?

OHWM - biological and physical

SOME INDICATORS WE FOUND ON THE ST CROIX:

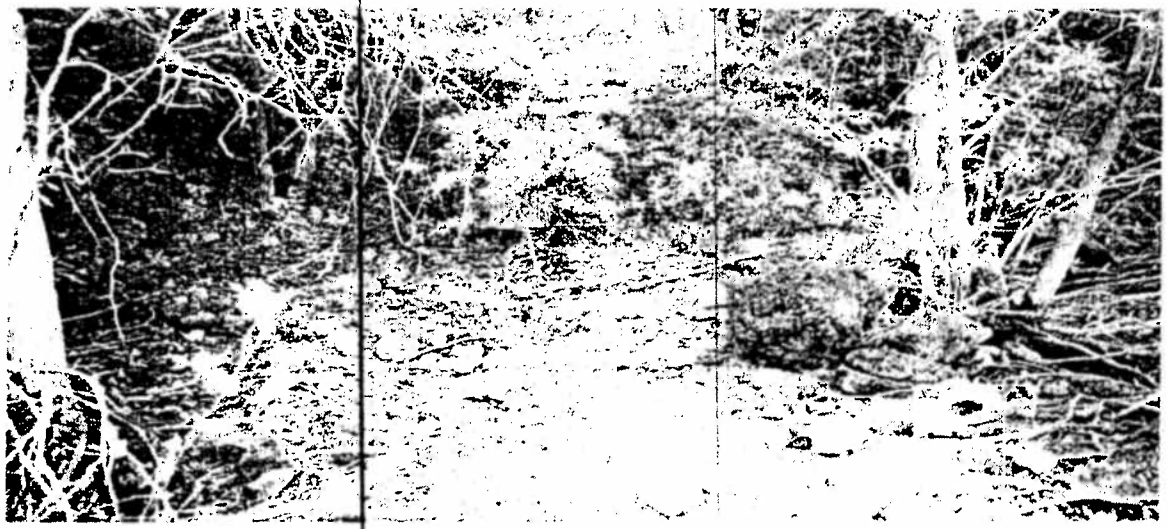
Multiple tree trunks

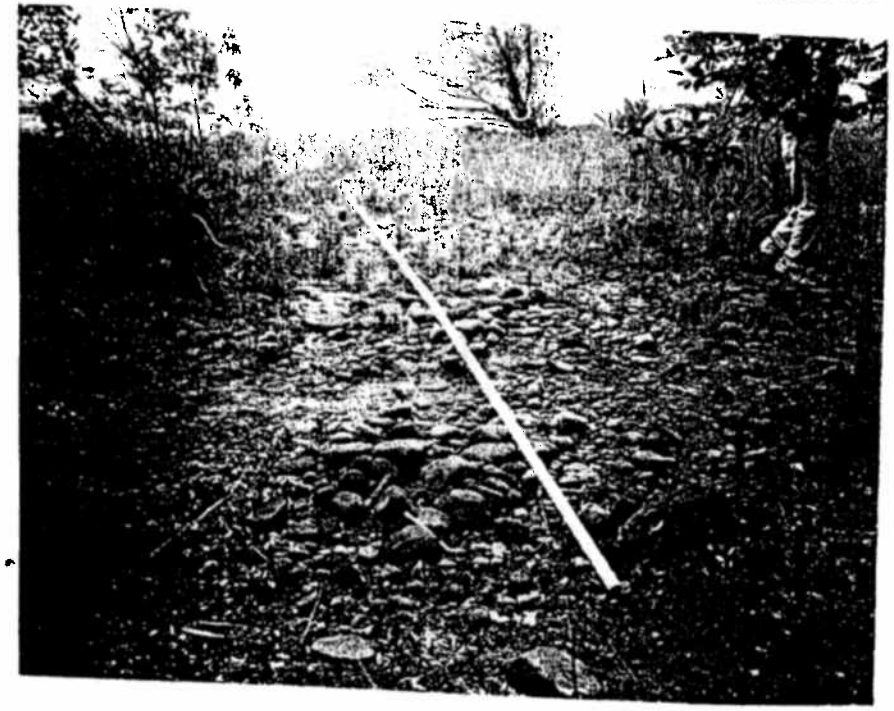
Exposed roots

Shallow roots

Cobble drift line

Hydric vegetation

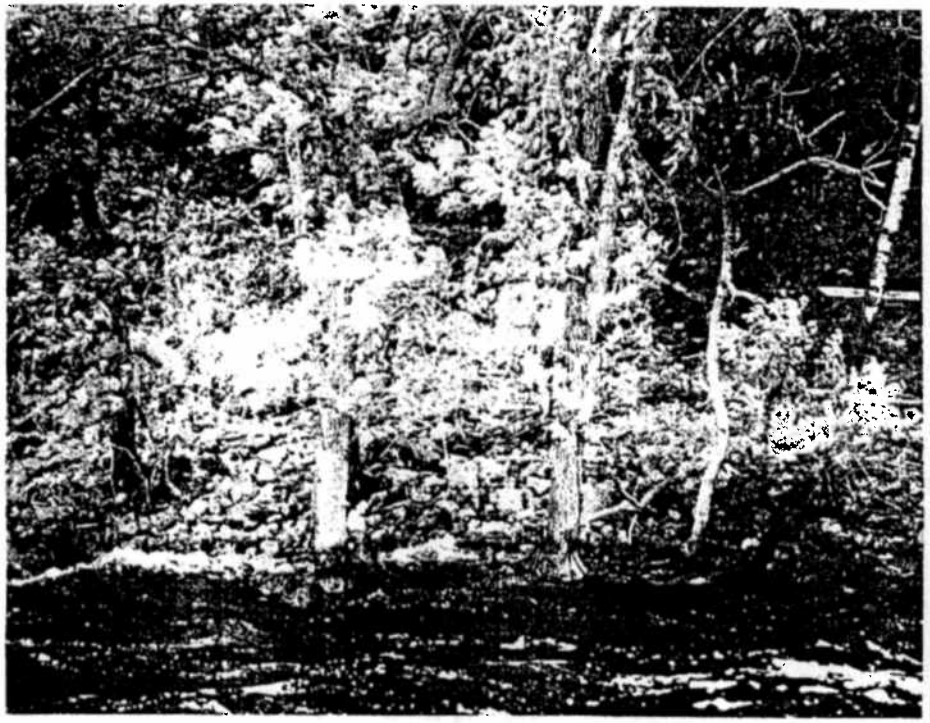




UNION PACIFIC
RAILROAD PROPERTY

Notice the multiple tree trunks, shallow root systems and water dependent vegetation-all good biological indicators.

The exposed tree roots and cobble drift lines are good physical indicators.



BOB ROLLE'S PROPERTY---TRANSECT 1

Notice the water stain—Gary Lepak is standing at the top of the light stain and Bob Rolle is standing at the bottom of the light stain—excellent physical indicator

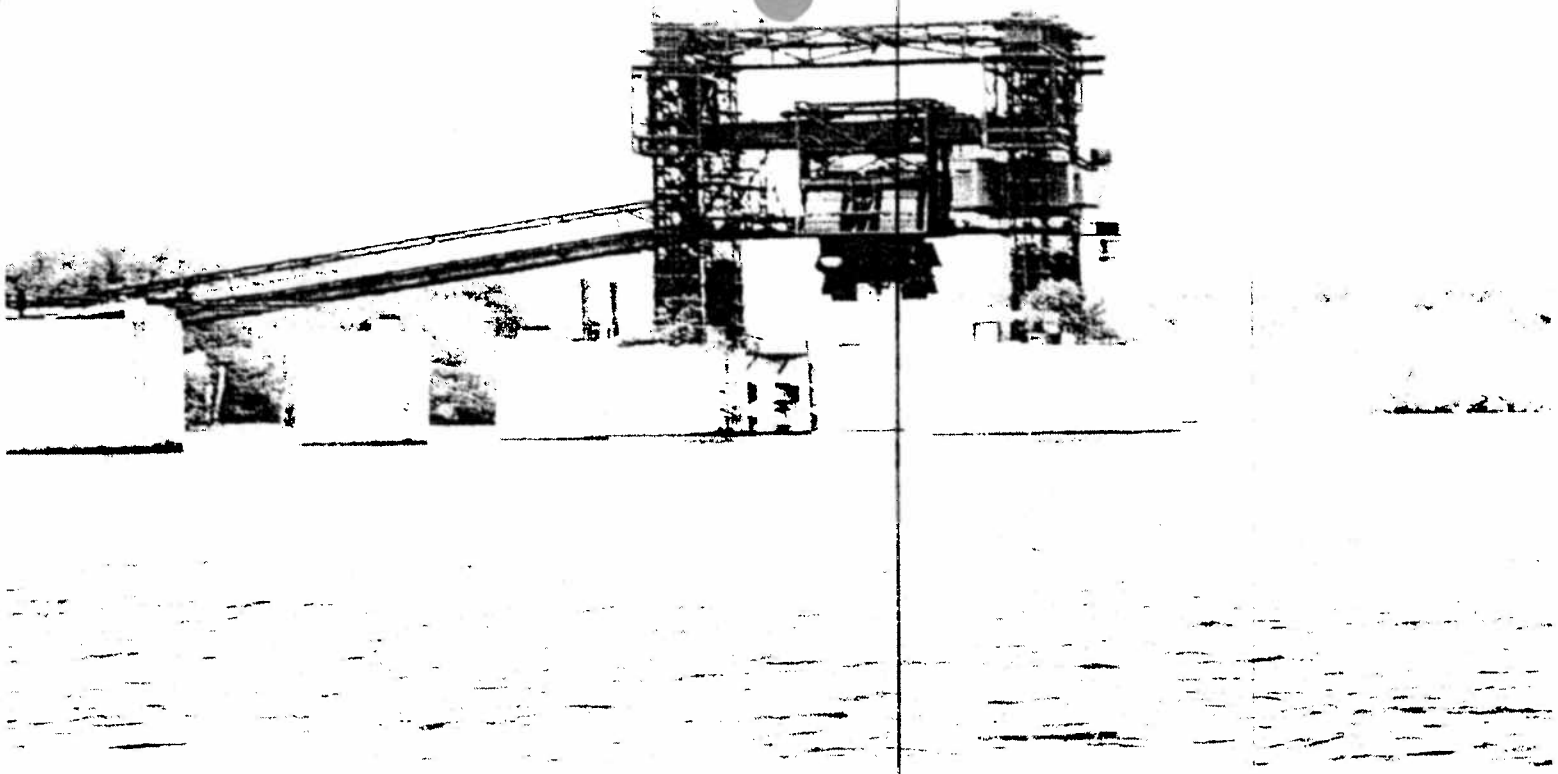
Identifying the OHWM

Physical indicators

- Permanence
- Predominance

To find the OHWM, we focused on which indicators which were well established and most pronounced to find an accurate elevation.

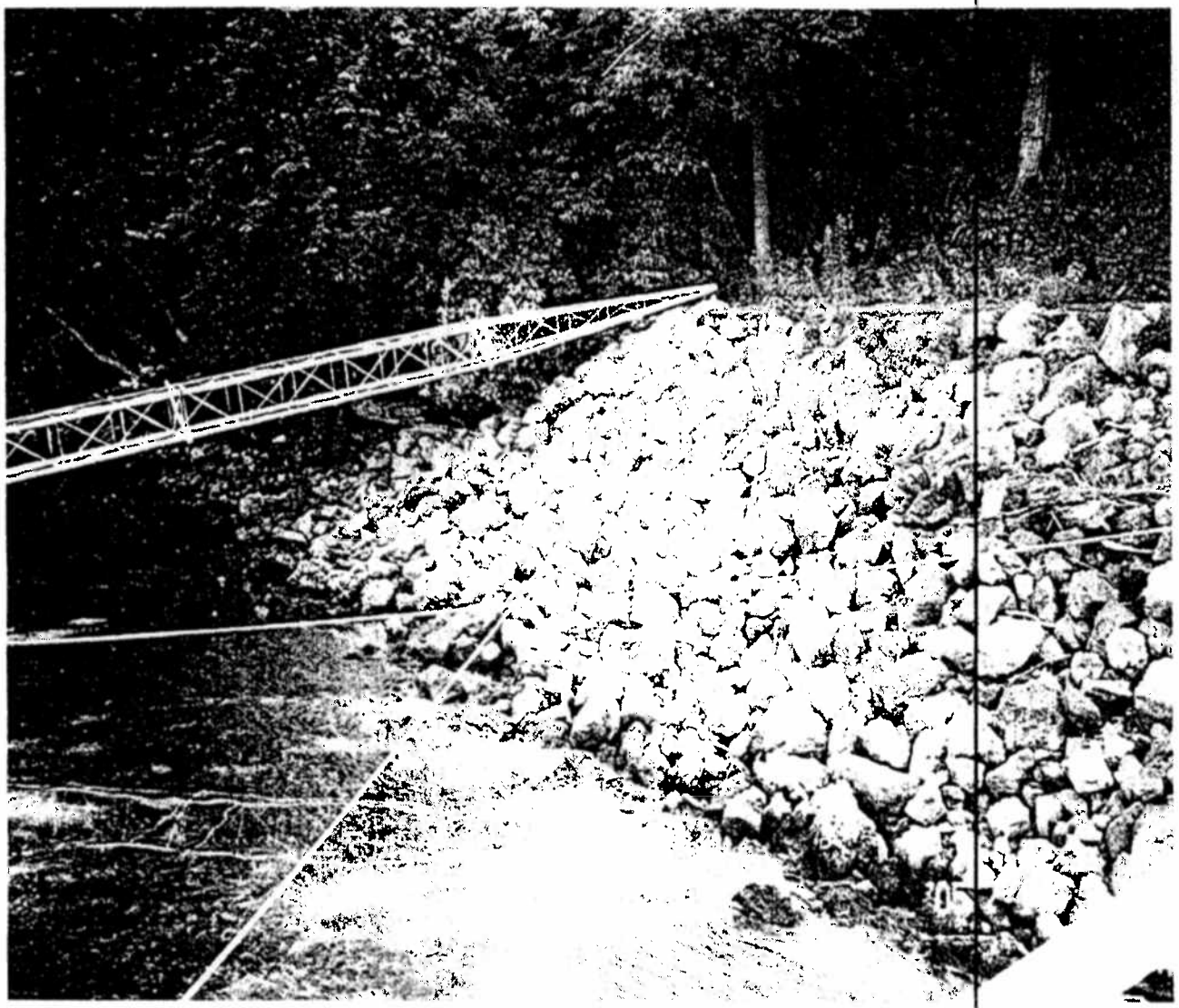
This is what we found……



BARGE DOLPHINS AT THE KING POWER PLANT

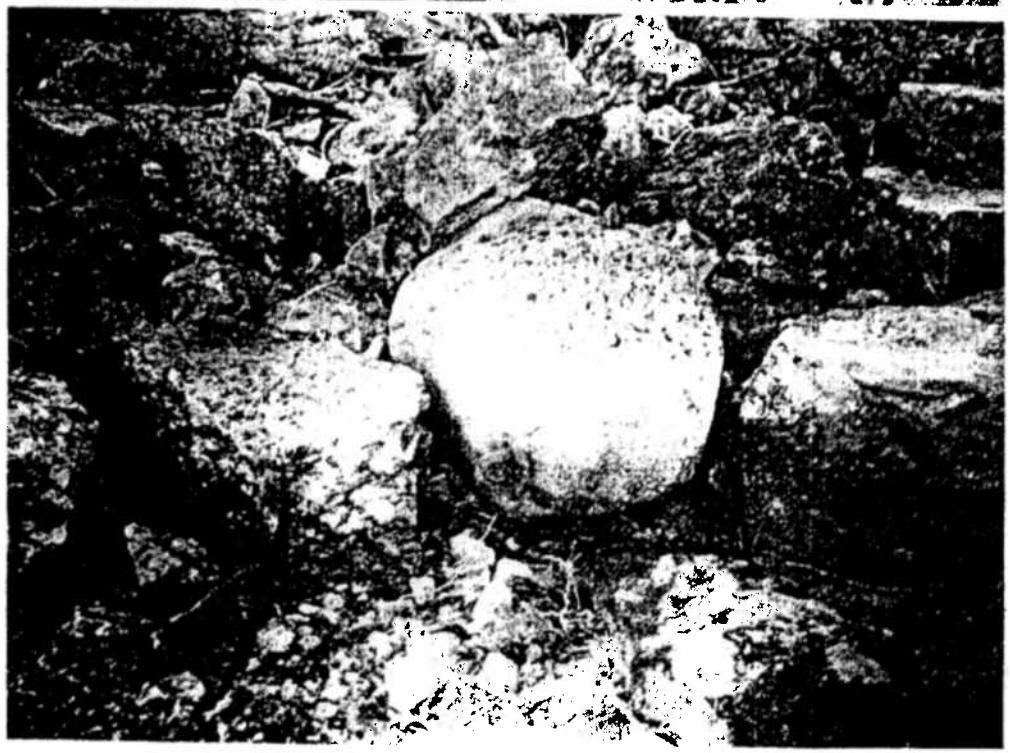
The stain line on the dolphins is a good example of both permanent and predominate.

As the indicator is a line, it is accurate as well



KINNICKINNIC PARK PIER AREA

The water stain is shown on both the artificial riprap and on the natural riprap---notice that this is not a break in the stain



THE STILLWATER EARTHEN CAUSEWAY

Same staining pattern—

Elevation of stain is within 0.1 foot as stated in Ch. 40 of the guidebook

Identifying the OHWM

Corroborating Data

- Water level records
- Rainfall records
- Time series photography

Why These Sites?

- Equally spaced in the reach of river that we did our field work
- Provided a good sampling of the different types of shoreline in the lower 25 miles of river
- Minimal trespass or access concerns
- Convenient—minimal intrusion onto private lands
- Two sites were requested

NOT LIKE MINE AT ALL

The Department did receive other requests for field work, but logistically, we could not conduct the needed field work and meet the August 31 public hearing deadline.

000359

GIVEN THAT...

Water levels of the St Croix have been documented to be at generally 681 for 30 days over a 20-year record,

the presence, the variety of indicator types, and the consistency of the various indicator types, both biological and physical, begin at low control pool of 675 and end in a general range of 681-682,

the permanence and predominance of the water stains found spanning most of the river in the "state zone," and

the guidebook states that the OHWM is not at the edge of open water adjacent to aquatic vegetation, but on the bank or shore where terrestrial vegetation either begins or is destroyed;

staff offers elevation 681.5, 1912 Adjustment, Corps datum as the ordinary high water mark of the St Croix in the lower 25 miles known as the "state zone."

000360

THANK YOU!

Since this project began, we have asked for your ongoing participation and input.

We appreciate all of you taking time out of your busy schedules to attend our previous informational meetings, attend this meeting, and all of your work.

Section Divider

ST. CROIX COUNTY
WISCONSIN
ZONING OFFICE
ST. CROIX COUNTY GOVERNMENT CENTER
1101 Carmichael Road
Hudson, WI 54016-7710
(715) 386-4680 • Fax (715) 386-4686

St. Croix County Land Use Permit Application

This application is to be used for projects that require or qualify for a St. Croix County land use permit.

Property owner: WILLIAM L. TILTON

Mailing address: 101 E. FIFTH ST., STE 2220
ST. PAUL, MN 55101

Daytime phone: (651) 224-7687

Contractor/Agent (if not owner:) _____

Mailing address: _____

Daytime phone: (____) _____

SITE INFORMATION

Property location: ____ 1/4, SE 1/4, Sec. 12, T. 28 N., R. 20 W., Town of TROY

Site address: 278 WEST GROVE ROAD, HUDSON, WISCONSIN 54016

Computer #: 040 - 1144 - 80 - 000 Parcel #: 12 - 28 - 20 - 575A

ZONING INFORMATION

Zoning District: (Check One) ( ) AG. ( ) AG. II ( ) AG. RES. (X) RESIDENTIAL ( ) COMMERCIAL ( ) INDUSTRIAL

Overlay District: (If applicable) (X) SHORELAND (X) RIVERWAY (X) FLOODPLAIN

Type of Land Use Permit Request: (Check One)

- ( ) Animal Waste Storage Facility
- ( ) Signage
- ( ) Nonmetallic Mining Operation
- ( ) Floodplain
- ( ) Wireless Communication Service Facility (co-location)
- ( ) Lower St. Croix Riverway District (Zoning Compliance)
- ( ) Shoreland
- ( ) Other _____

Be sure to obtain a copy of pertinent St. Croix County Zoning Ordinance sections that apply to your request.

Rev. 8/21/03

000362

LAND USE PERMIT FEE SCHEDULE

Sign	$150.00
Temporary Occupancy	$150.00
Rip Rap	$150.00
St. Croix River Valley District	$150.00
All Others	$150.00
Non-Metallic Mining	$200.00
Towers	$200.00
Animal Waste Storage Facility	$200.00

FREQUENTLY USED CONTACT INFORMATION

- **St. Croix County Highway Department**
  Jeff Durkee, Highway Engineer 715-796-2227 hwype@scchwy.org
  Brian Halling (Surveyor) 715-796-2227

- **St. Croix County Land & Water Conservation Department**
  Pete Kling - Land Specialist – Urban 715-684-2874 ext. 131 pkling@co.saint-croix.wi.us
  Steve Olson - Land Specialist – Rural 715-684-2874 ext. 135 steveo@co.saint-croix.wi.us

- **Wisconsin Department of Transportation (District 6)**
  Diane Schermann, Access Coordinator 715-836-3905 dianeschermann@dot.state.wi.us

Wisconsin Department of Natural Resources
Eunice Post - Water and Zoning 715-684-2914 poste@dnr.state.wi.us
Jim Devlin - Wastewater Specialist 715-684-2914 James.Devlin@dnr.state.wi.us

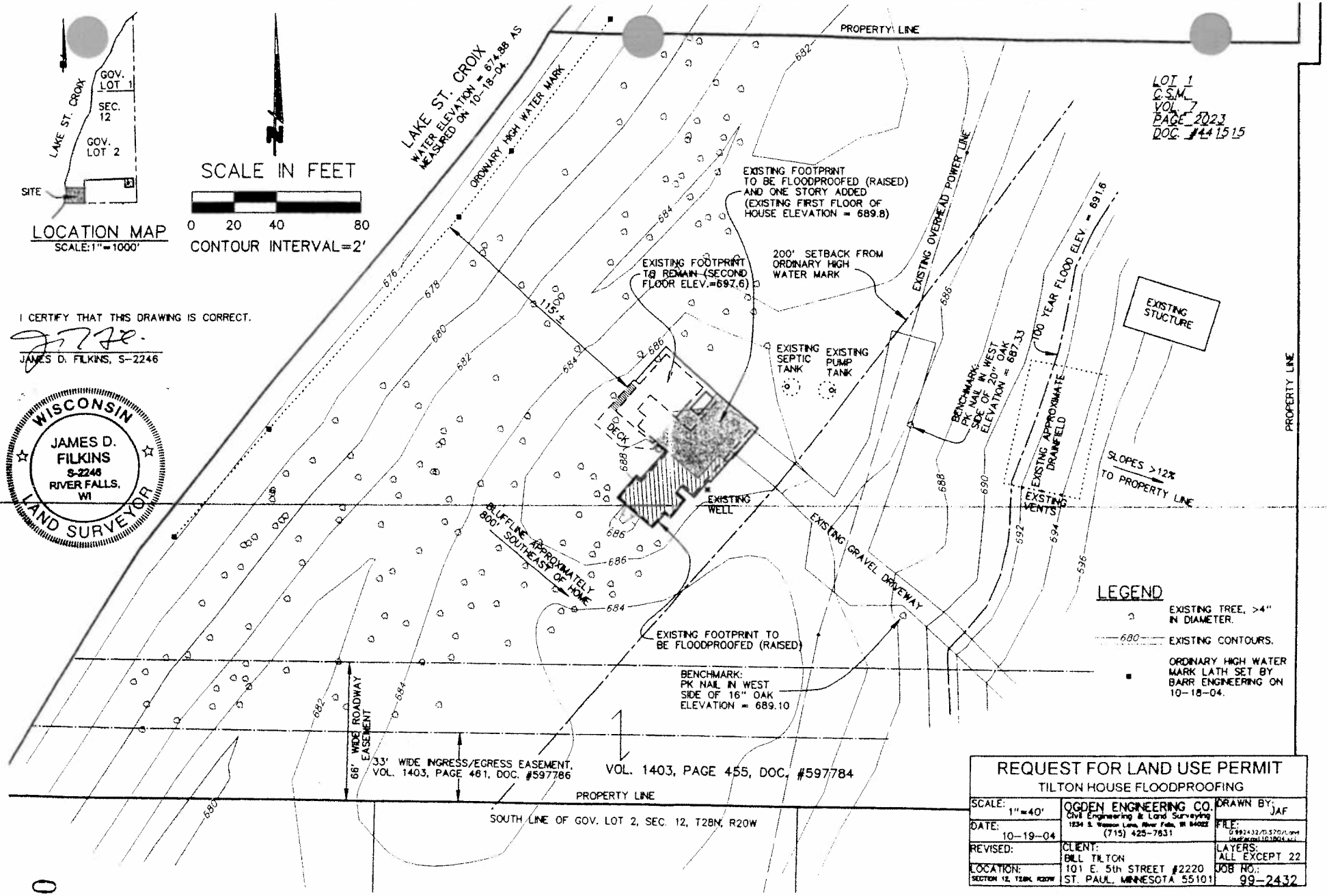
- **U.S. Army Corp of Engineers**
  Daniel Seemon, Ecologist 651-290-5380 daniel.j.seemon@usace.army.mil

- **Wisconsin Department of Commerce**
  Nicholas Charles - Comm. Building Insp. 608-789-5657 ncharles@commerce.state.wi.us

INDEX OF ATTACHMENTS TO APPLICATION FOR LAND USE PERMIT & OTHER MATTERS
278 WEST GROVE ROAD, TROY TOWNSHIP

TAB	DESCRIPTION
1	James D. Filkins, Ogden Engineering Co. -- Tilton House Floodproofing -- topographical survey of my property dated 10/19/04;
2	Thomas Whitcomb Architect, Inc. - Existing Site Plan -- topographical, elevations and floor plans;
3	Thomas Whitcomb Architect, Inc. - Proposed Site Plan - topographical, elevations and floor plans;
4	Thomas Whitcomb Architect sketch showing a footprint of the house if it were to be moved 25 feet east (away from the river) dated 10/10/04;
5	Lewis Filkins / Ogden Engineering survey dated October 19, 2004 showing location and identification of trees (same as #1, but with tree identification and diameters added);
6	Photographs of the existing structure taken from approximately 250 feet from the shoreline from several angles, including from upstream and downstream of the home. These exhibit that under leaf-on conditions this structure is virtually invisible from the waterway and the proposed addition (which would be immediately behind the existing high portion of the structure) would in no way be visible from the riverway;
	Aerial photographs of the subject property, again, showing that it is virtually invisible under leaf-on conditions;
8	Certification of Thomas Whitcomb Architect that floodproofing improvements will be done in accordance with applicable regulations;
9	Letter from Barr Engineering, Thomas McDonald, with miscellaneous attachments described therein, including the following items 10-14:
10	Photos taken by Tom McDonald of stakes placed in the ground for purposes of his ordinary high water mark evaluation;
11	Copy of the 1971 report "Flooded Area of Afton, Minnesota" prepared by the Department of the Interior, U.S. Geological Survey, for Minnesota Department of Natural Resources;
12	11x17 copy of a map of Lake St. Croix with riverbed depths and river valley topographical elevations, showing the locations of S1, S2, S3, S4, S5, and S6, the locations of the valley used by Barr Engineering for its flow analysis;
13	HEC - RAS computer model data regarding the water surface elevation at six profiles of the valley under present conditions compared to conditions if fill were used to floodproof the Tilton home at 278 West Grove Road and if at the same time equal encroachments were to be assumed on the opposite side of the river at six locations as identified on the accompanying map; and
	Copy of "Waterway and Wetland Handbook CHAPTER 40 ORDINARY HIGH-WATER MARKER (OHWM)" and attachments, 19-page portion of Wisconsin DNR publication.

1



I CERTIFY THAT THIS DRAWING IS CORRECT.

JAMES D. FILKINS, S-2246

WISCONSIN JAMES D. FILKINS S-2246 RIVER FALLS, WI LAND SURVEYOR

000366

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8015

TWA

THOMAS WHITCOMB ARCHITECT, INC.
8741 Plymouth Avenue North
Golden Valley, MN 55427
(763) 593.4985 fax (763) 543.0204

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I hereby certify that this plan, specification or report prepared by me or under my direct supervision and I am a duly registered architect under the laws of the State of Minnesota

LICENSE NUMBER: 20126

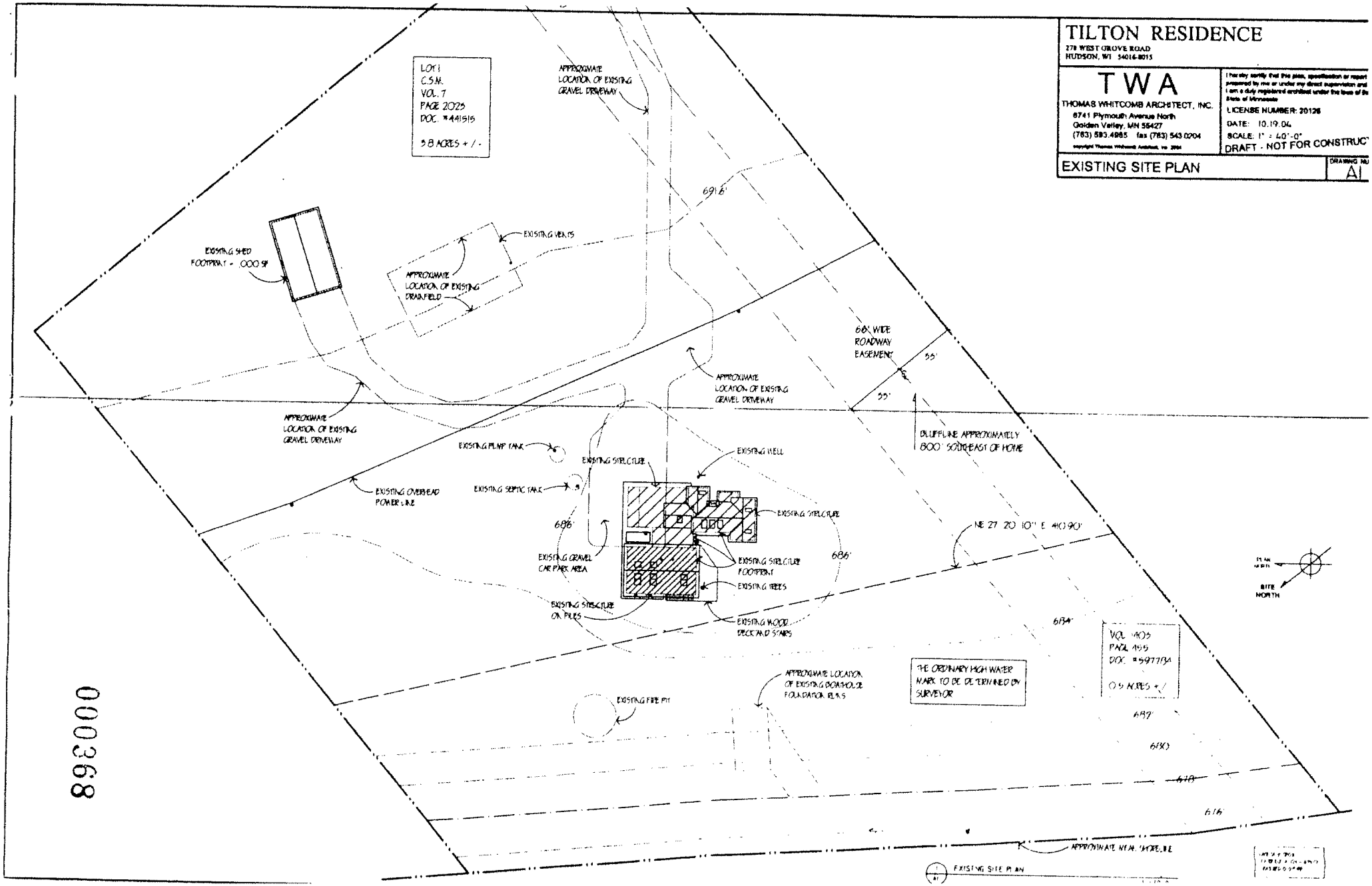
DATE: 10.19.04

SCALE: 1" = 40'-0"

DRAFT - NOT FOR CONSTRUCT

EXISTING SITE PLAN

DRAWING NU A1



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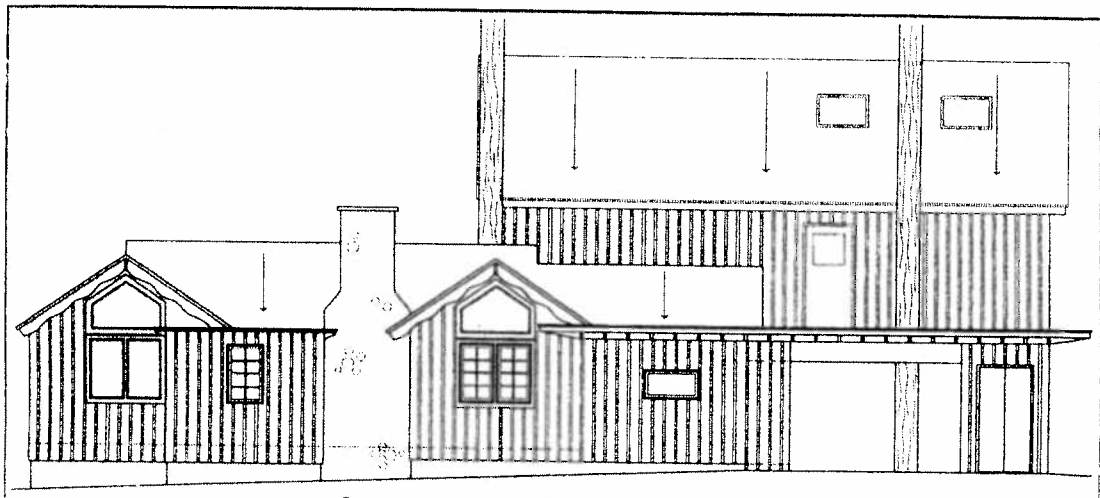
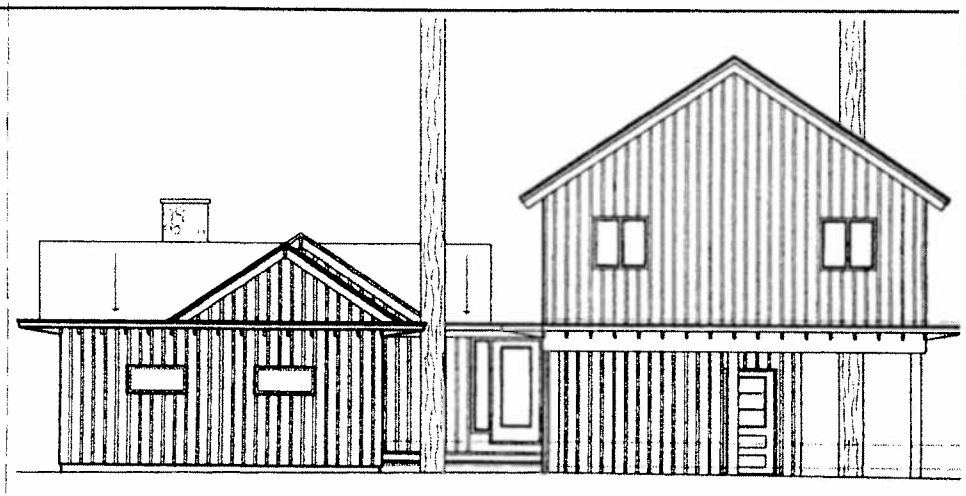
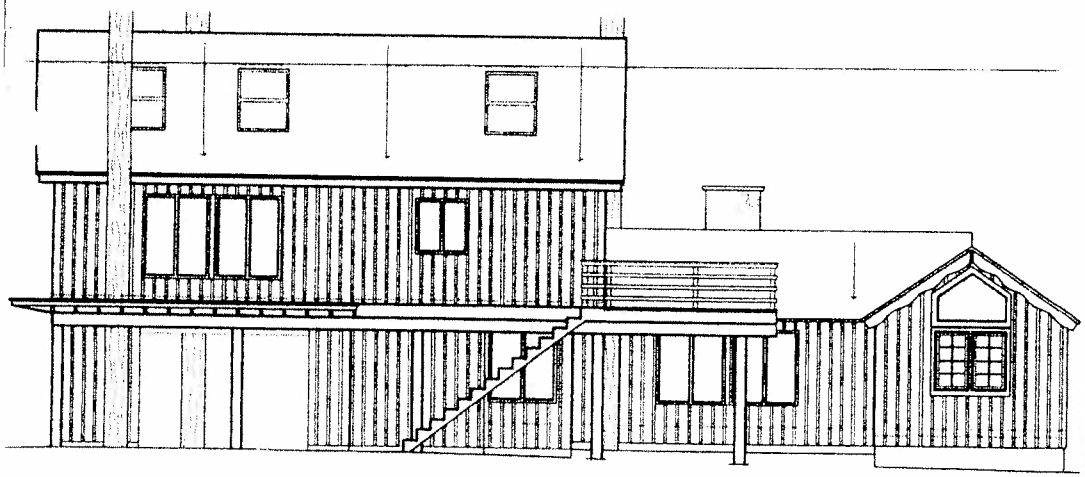


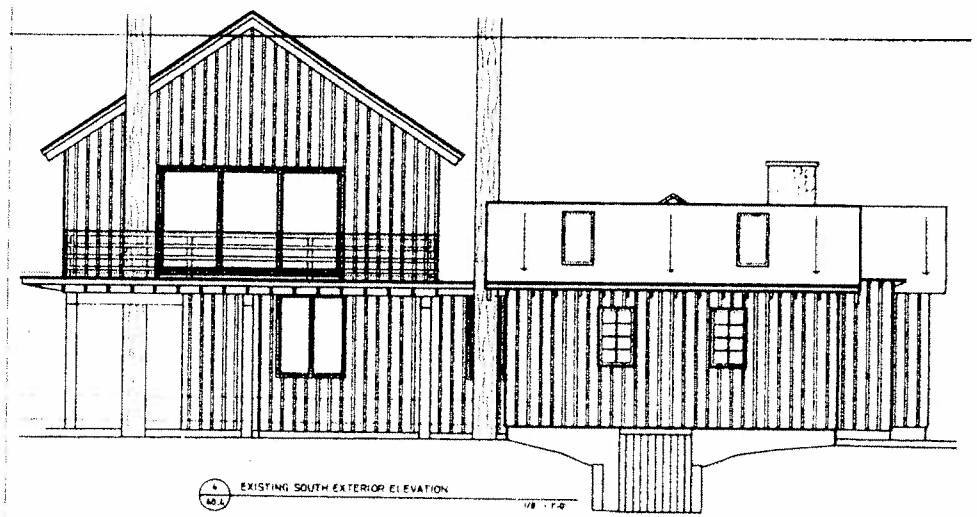
1 / A0.4 EXISTING EAST EXTERIOR ELEVATION 1/8" = 1'-0"



2 / A0.4 EXISTING NORTH EXTERIOR ELEVATION 1/8" = 1'-0"



3 / A0.4 EXISTING WEST EXTERIOR ELEVATION 1/8" = 1'-0"



4 / A0.4 EXISTING SOUTH EXTERIOR ELEVATION 1/8" = 1'-0"

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8015

TWA
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8741 Plymouth Avenue North
Golden Valley, MN 55427
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LICENSE NUMBER: 20126

DATE: 10.19.04

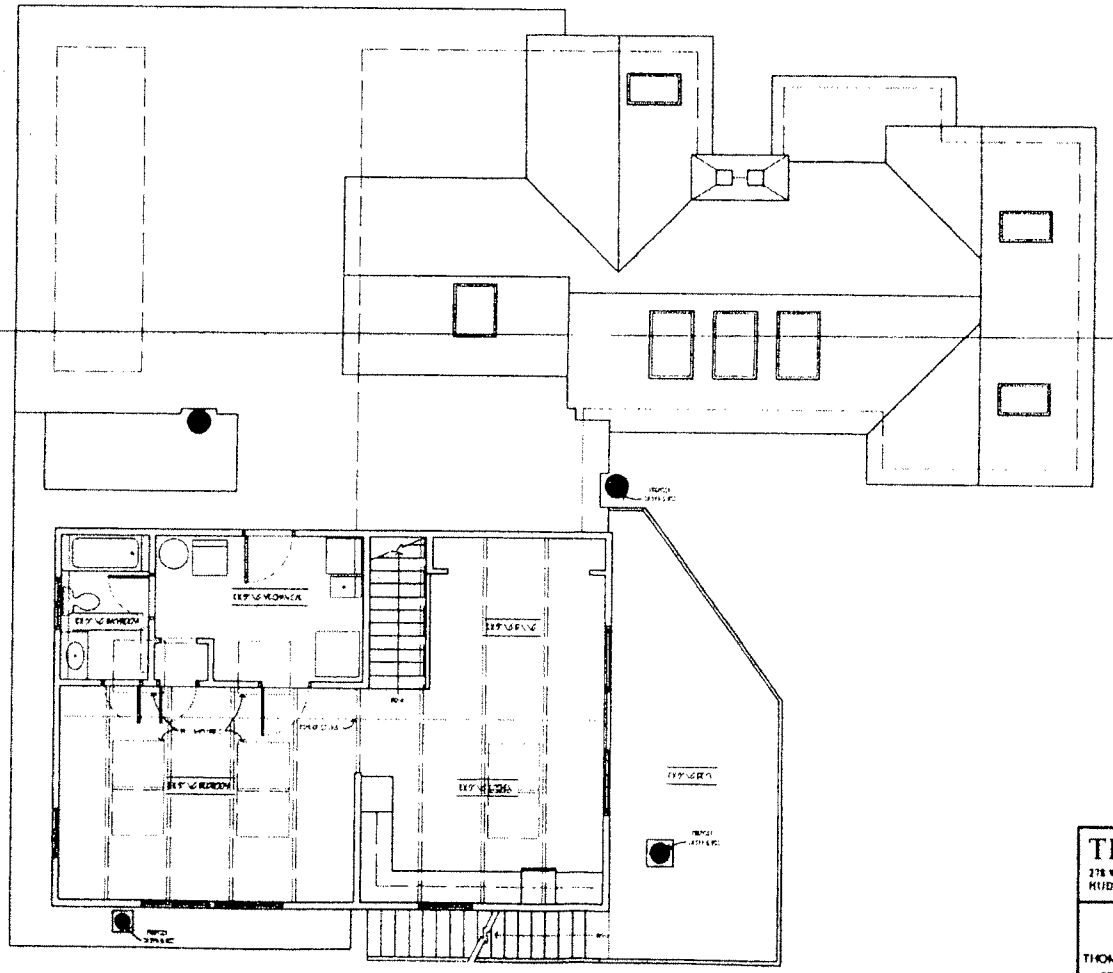
SCALE: 1/8" = 1'-0"

DRAFT - NOT FOR CONSTRUCTION

EXISTING RESOURCE LEVEL FLOOR PLAN

DRAWING NUMBER

000369



1 EXISTING SECOND LEVEL FLOOR PLAN
1/8" = 1'-0"

PLAN NORTH

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8015

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LICENSE NUMBER: 20126

DATE: 10.19.06

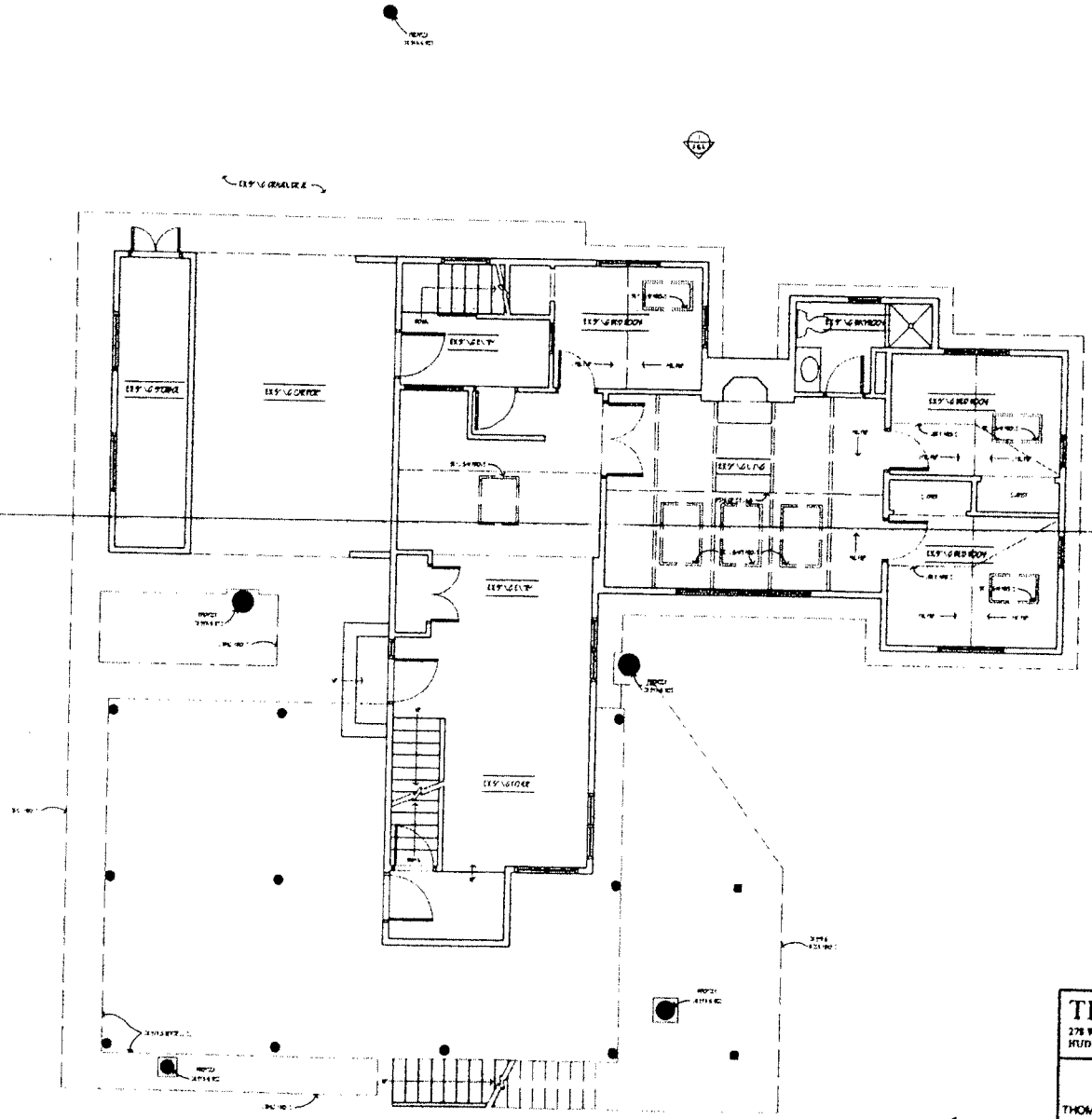
SCALE: 1/8" = 1'-0"

DRAFT - NOT FOR CONSTRUCTION

EXISTING SECOND LEVEL FLOOR PLAN

DRAWING NUMBER A0.2

000370



EXISTING FIRST LEVEL FLOOR PLAN

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8013

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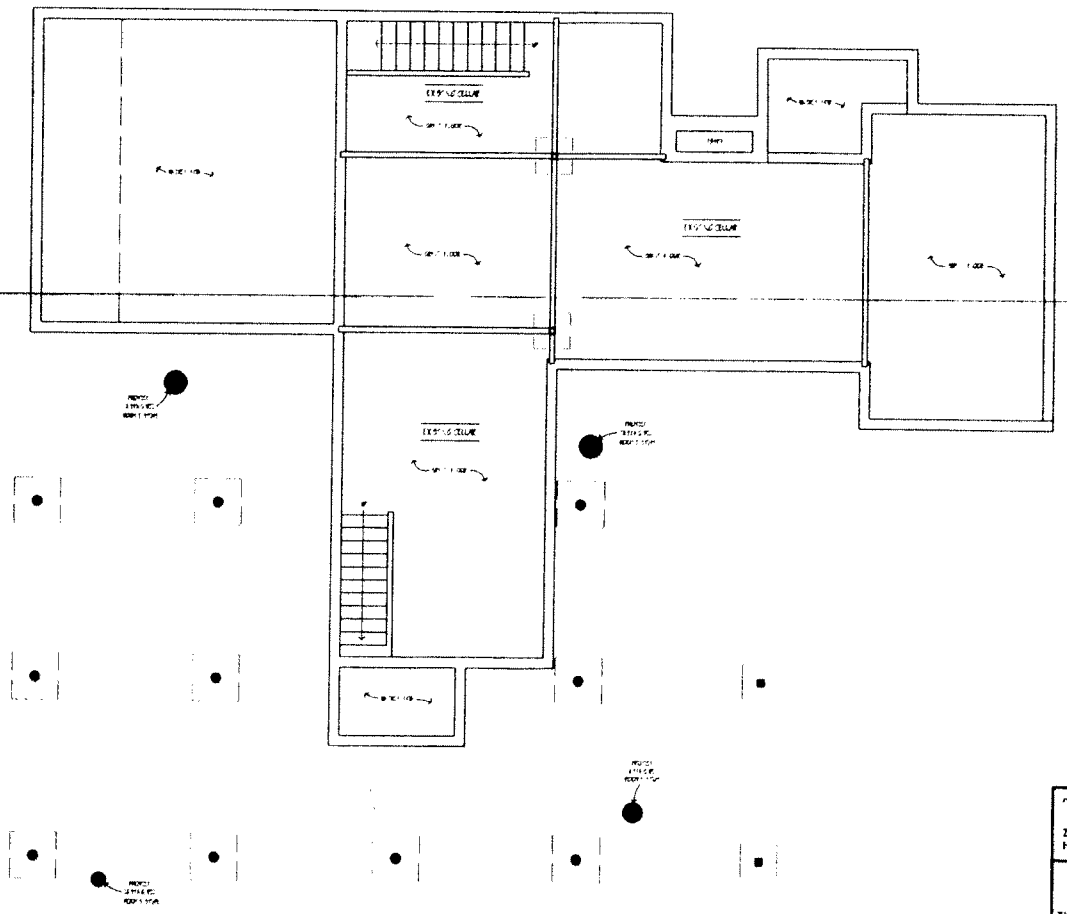
LICENSE NUMBER 20128

DATE 10.19.04

SCALE 1/8" = 1'-0"

DRAFT - NOT FOR CONSTRUCTION

000371



EXISTING FOUNDATION LEVEL FLOOR PLAN

1/8" = 1'-0"

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8015

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LICENSE NUMBER 20126

DATE: 10.19.04

SCALE: 1/8" = 1'-0"

DRAFT - NOT FOR CONSTRUCTIO

EXIST. FOUNDATION LEVEL FLOOR PLAN

DRAWING N A0.

000372

3

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8015

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LICENSE NUMBER: 20126

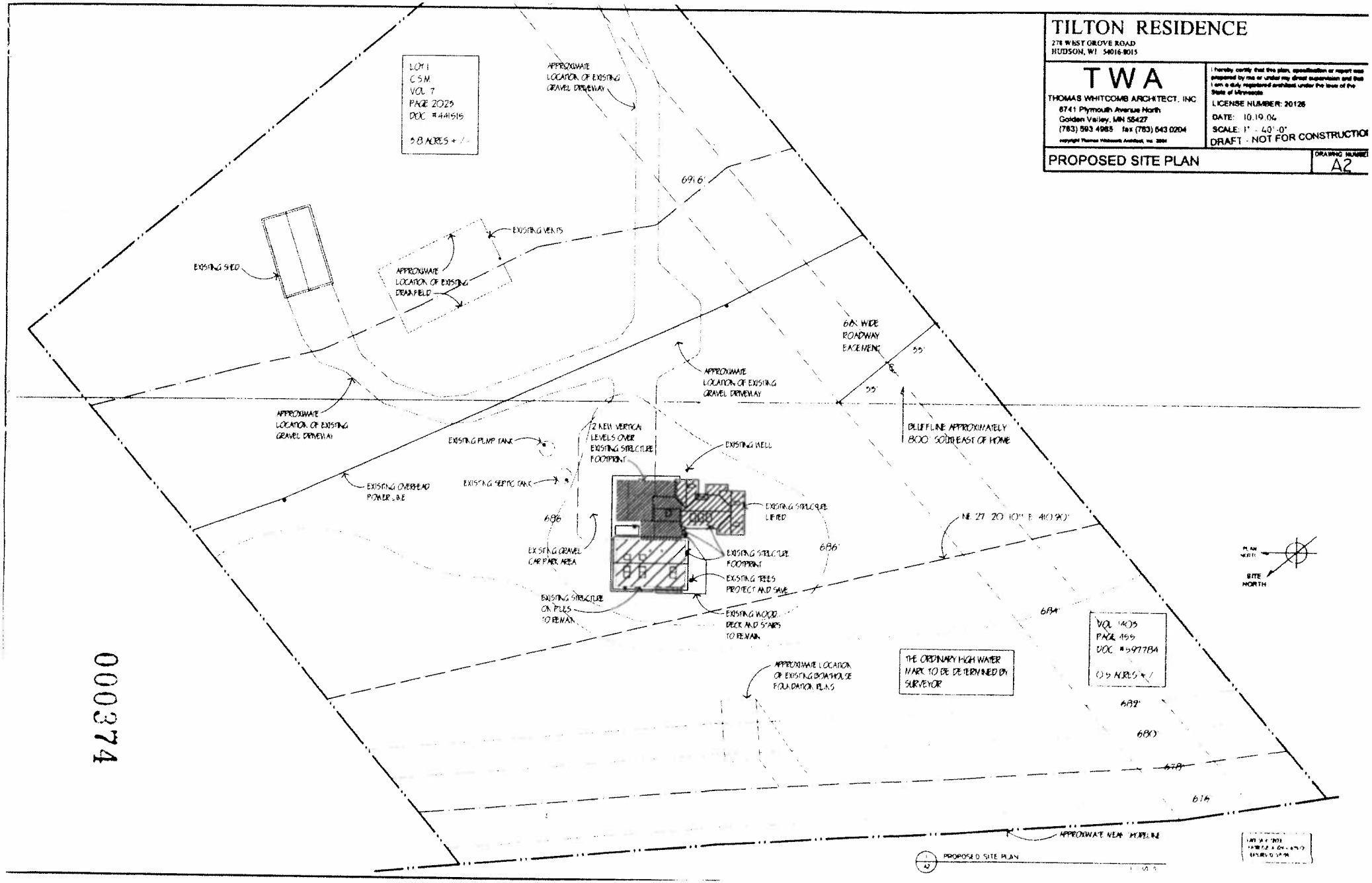
DATE: 10.19.04

SCALE: 1" - 40'-0"

DRAFT - NOT FOR CONSTRUCTION

PROPOSED SITE PLAN

DRAWING NUMBER A2



PROPOSED SITE PLAN

000374

1 A10 PROPOSED WEST EXTERIOR ELEVATION

000375

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8015

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LICENSE NUMBER: 20126

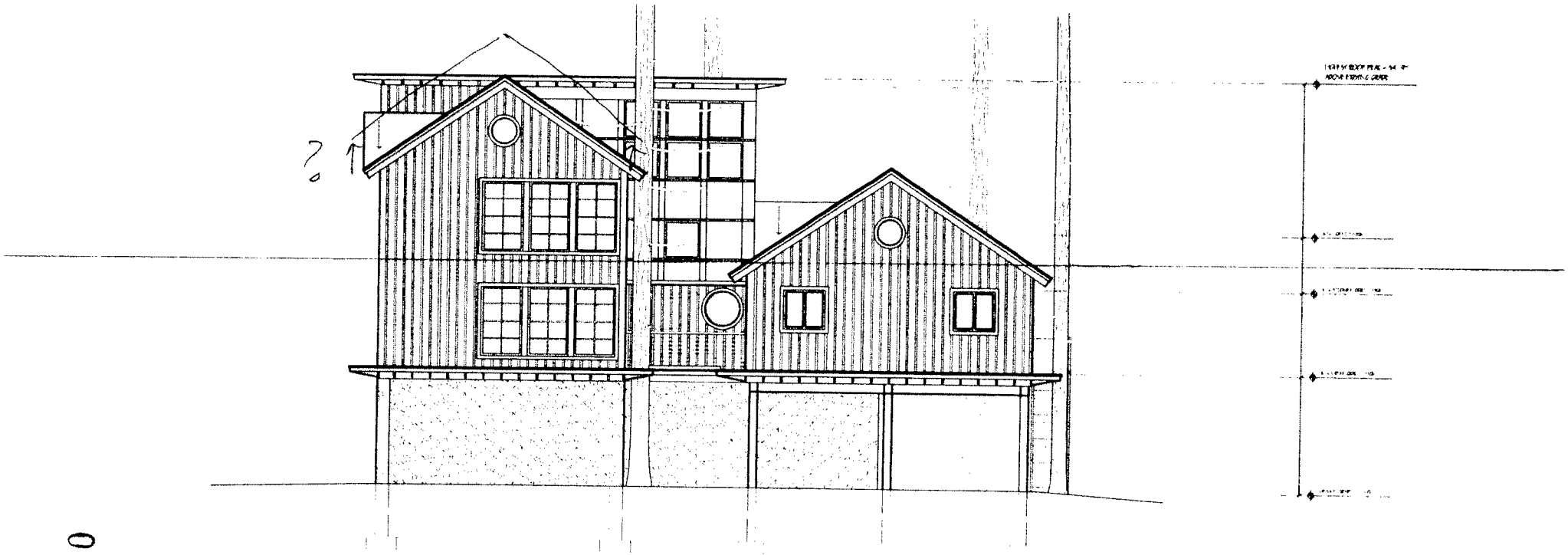
DATE 10 19 04

SCALE 1/8" = 1' 0"

DRAFT - NOT FOR CONSTRUCTIO

PROPOSED EXTERIOR ELEVATIONS

DRAWING A9



1 PROPOSED NORTH EXTERIOR ELEVATION

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8015

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LICENSE NUMBER: 20126

DATE: 10 19 06

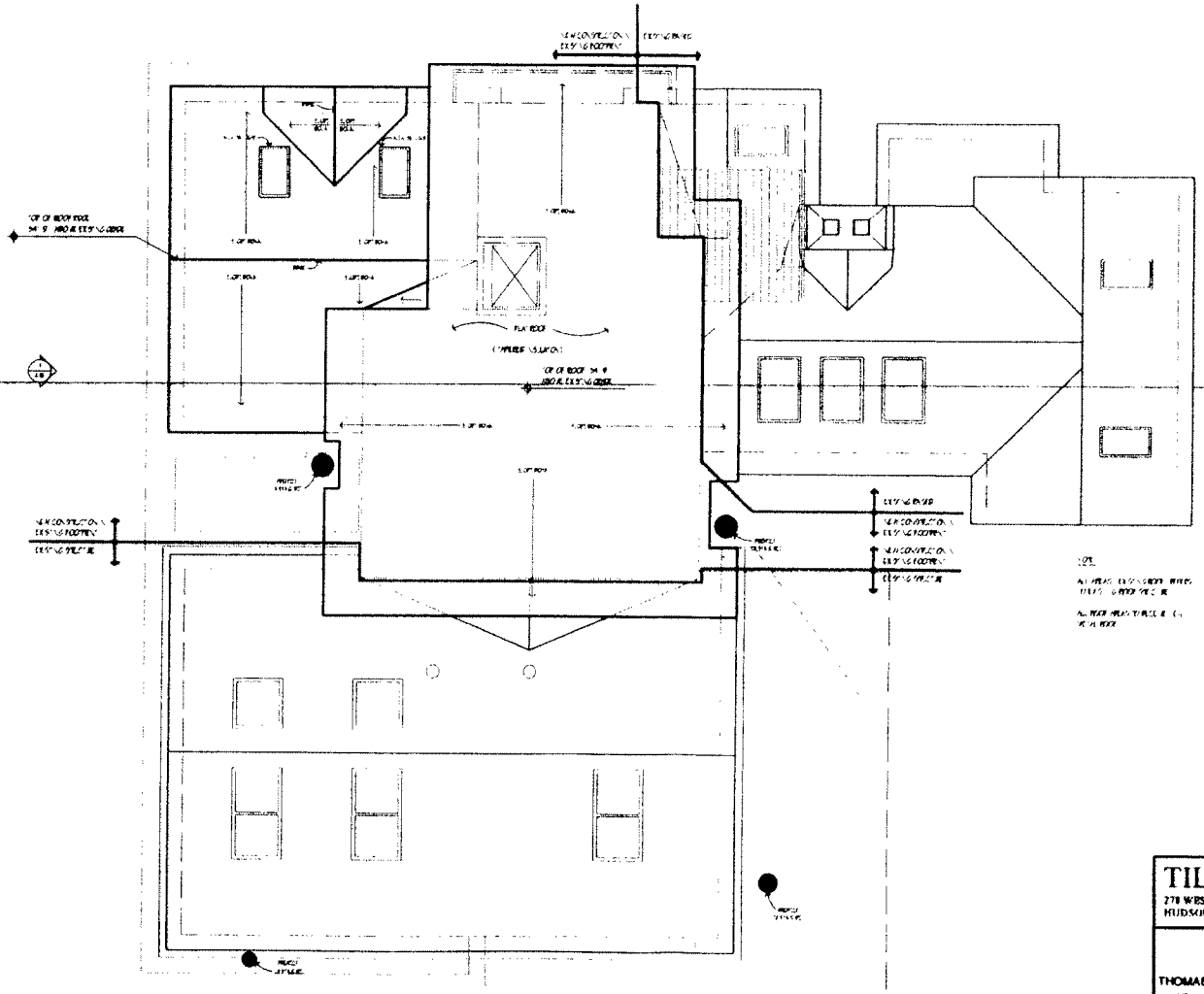
SCALE: 1/8" = 1' 0"

DRAFT - NOT FOR CONSTRUCTION

PROPOSED EXTERIOR ELEVATIONS

DRAWING NO. A10

003376



PROPOSED ROOF PLAN

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8913

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LICENSE NUMBER: 20126

DATE: 10.19.04

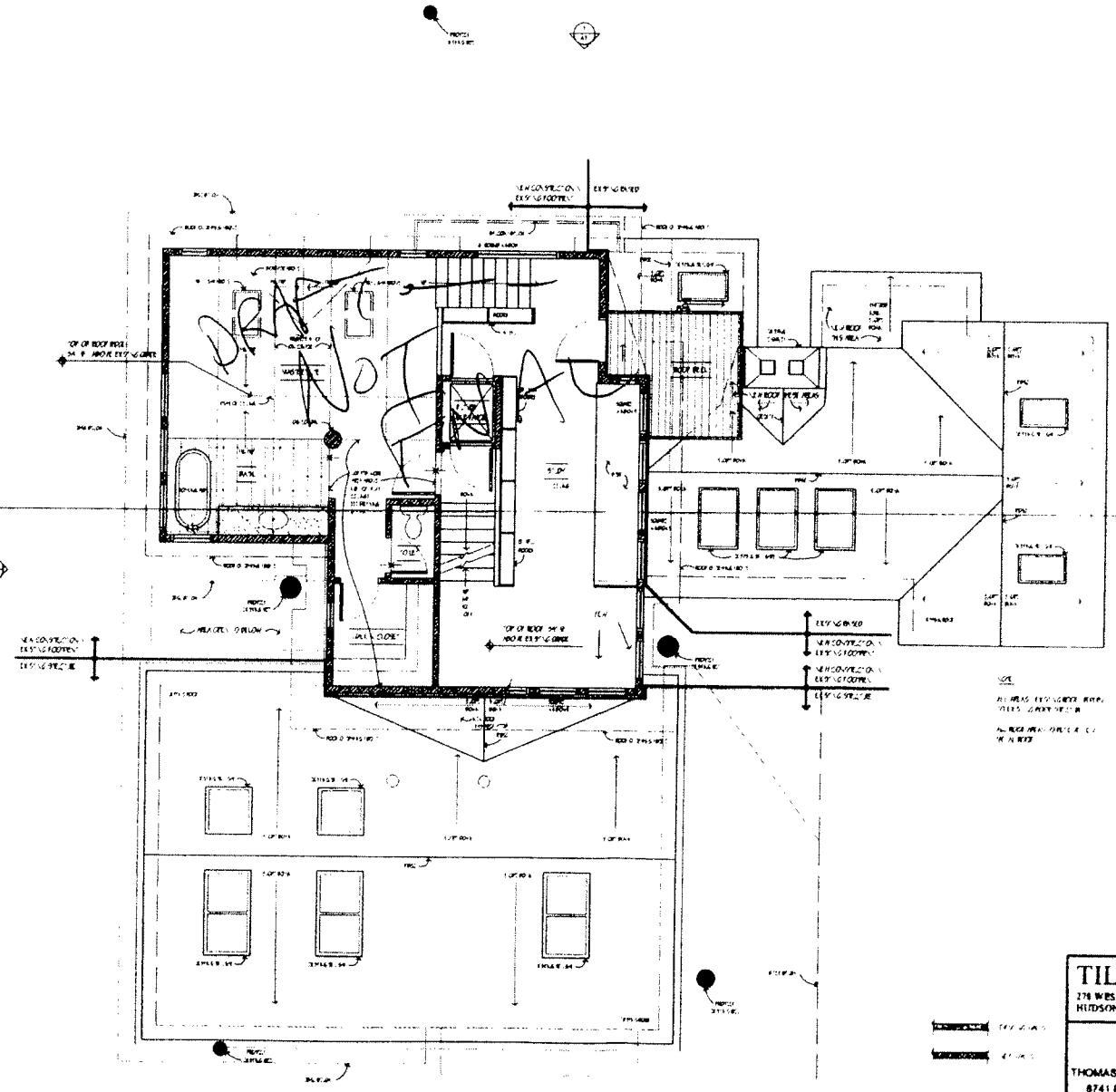
SCALE: 1/8" = 1'-0"

DRAFT - NOT FOR CONSTRUCTION

PROPOSED ROOF PLAN

DRAWING NO. A6

000377



TILTON RESIDENCE

276 WEST GROVE ROAD
HUDSON, WI 54016-8015

TWA

THOMAS WHITCOMB ARCHITECT, INC
8741 Plymouth Avenue North
Golden Valley, MN 55427
(763) 593 4985 fax (763) 543 0204

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

LICENSE NUMBER: 20126

DATE 10 19 04

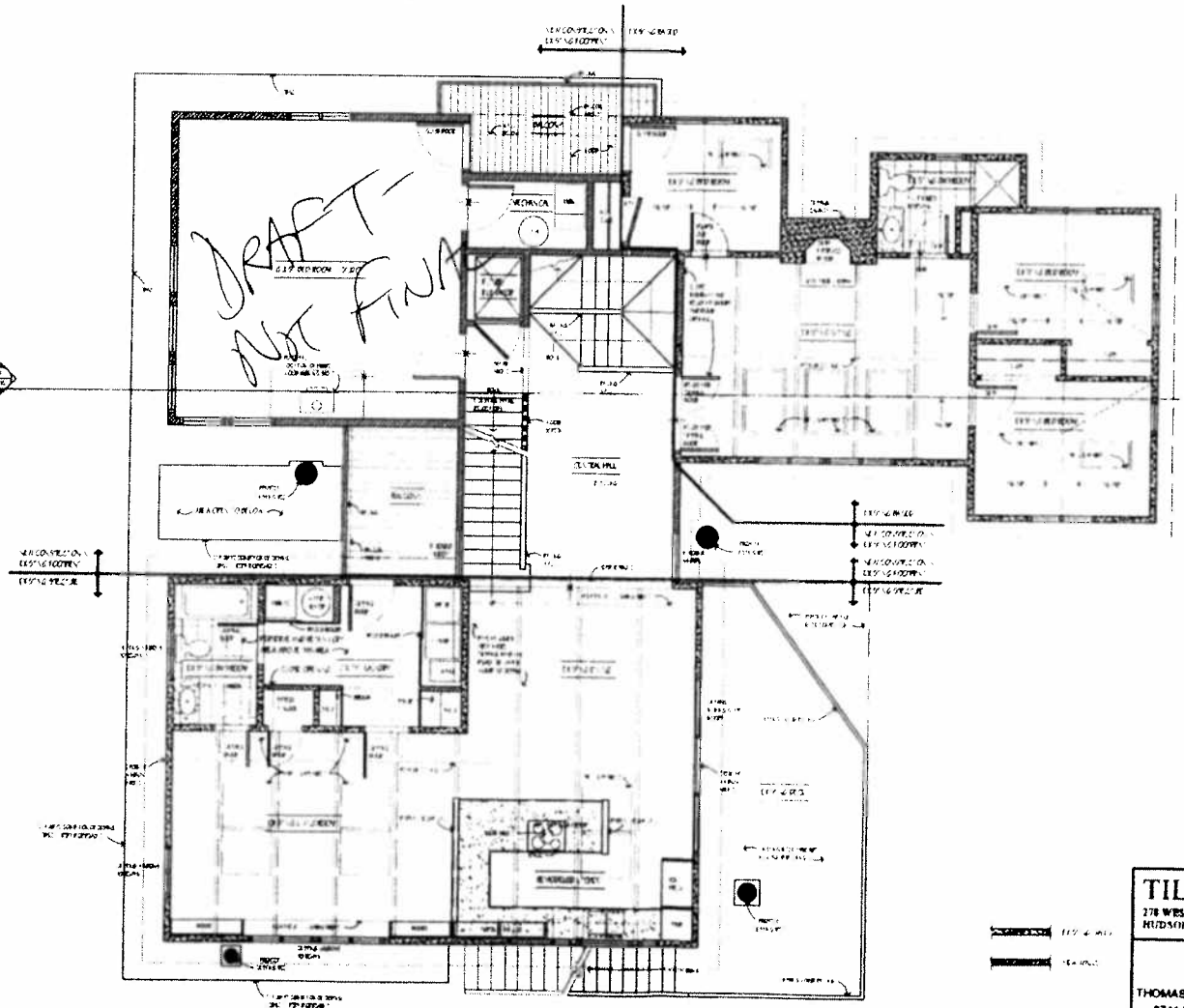
SCALE 1/8" = 1' 0"

DRAFT - NOT FOR CONSTRUCTI

PROPOSED SECOND LEVEL FLOOR PLAN

DRAWING A5

000378



PROPOSED FIRST LEVEL FLOOR PLAN

TILTON RESIDENCE

278 WEST GROVE ROAD
HUDSON, WI 54016-8011

TWA

THOMAS WHITCOMB ARCHITECT, INC
8741 Plymouth Avenue North
Golden Valley, MN 55427
(763) 593 4985 fax (763) 543 0204

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

LICENSE NUMBER 20126

DATE: 10.19.06

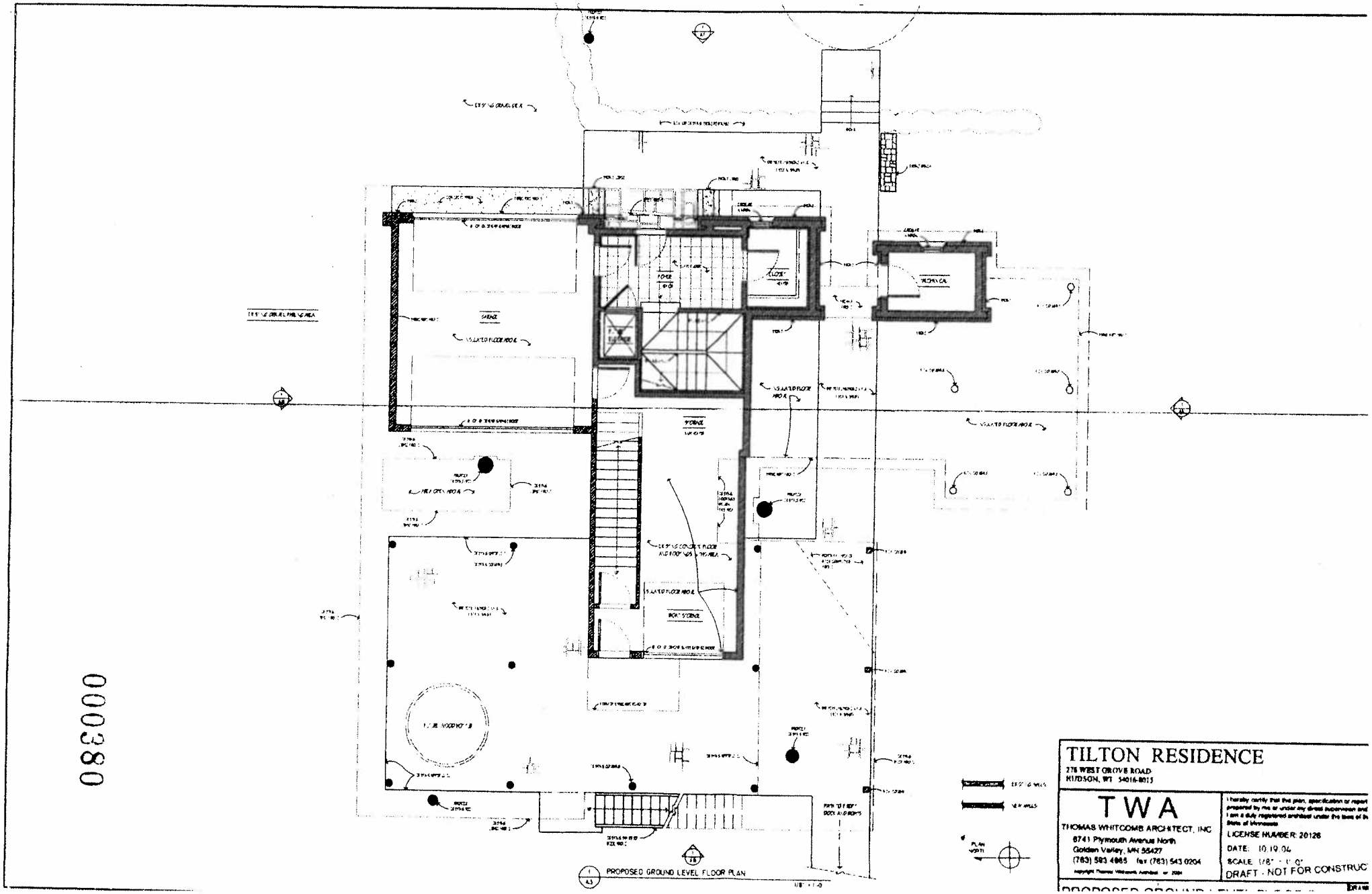
SCALE: 1/8" = 1'-0"

DRAFT - NOT FOR CONSTRUCTION

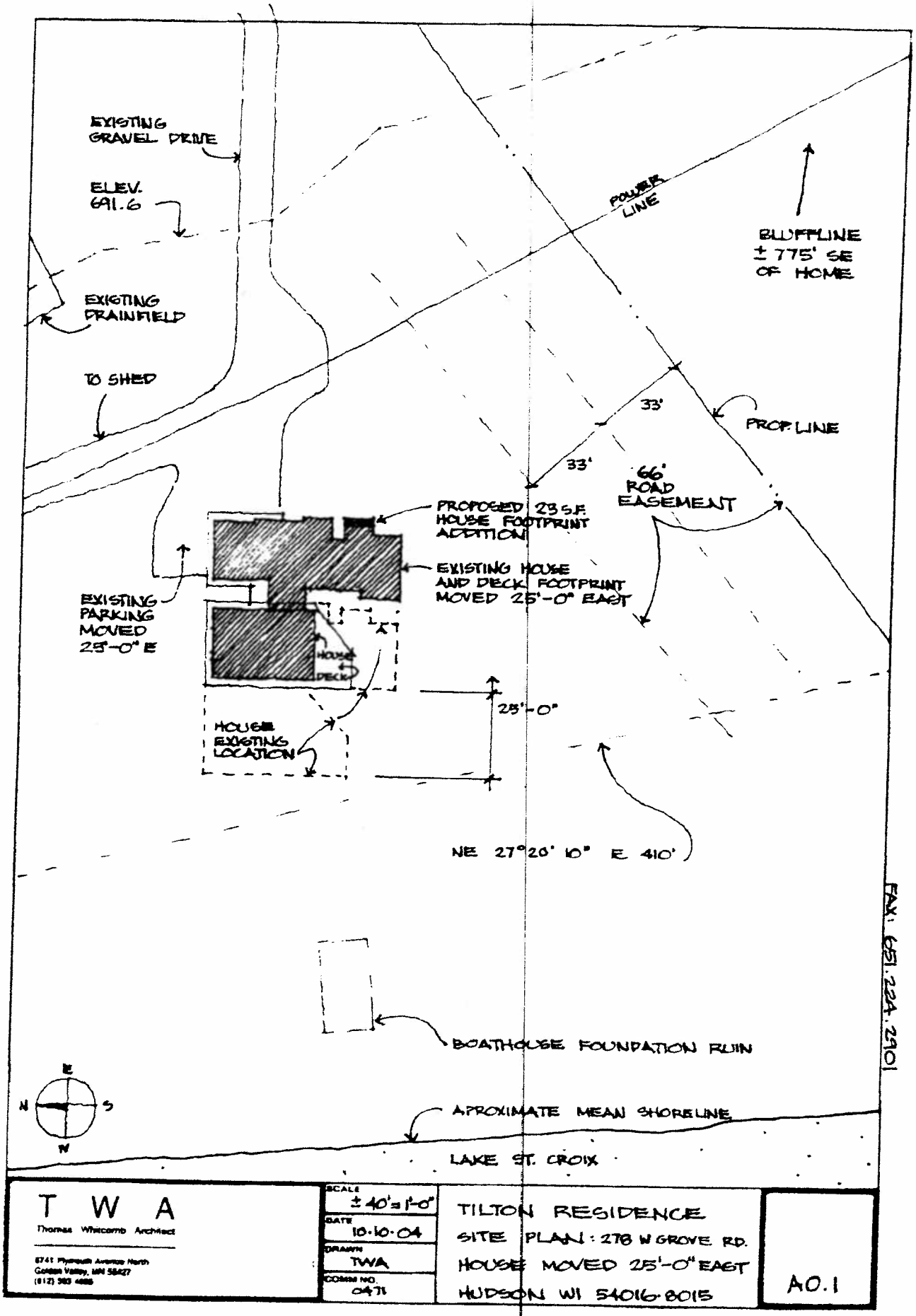
PROPOSED FIRST LEVEL FLOOR PLAN

DRAWING NUMBER A1.

000379


PROPOSED GROUND LEVEL FLOOR PLAN
TILTON RESIDENCE
276 WEST GROVE ROAD
HUDSON, WI 54016-8015
TWA
THOMAS WHITCOMB ARCHITECT, INC
8741 Plymouth Avenue North
Golden Valley, MN 55427
(763) 593 4965 fax (763) 543 0204
LICENSE NUMBER: 20126
DATE: 10.19.04
SCALE: 1/8" = 1'-0"
DRAFT - NOT FOR CONSTRUCT
PROPOSED GROUND LEVEL FLOOR PLAN

000380



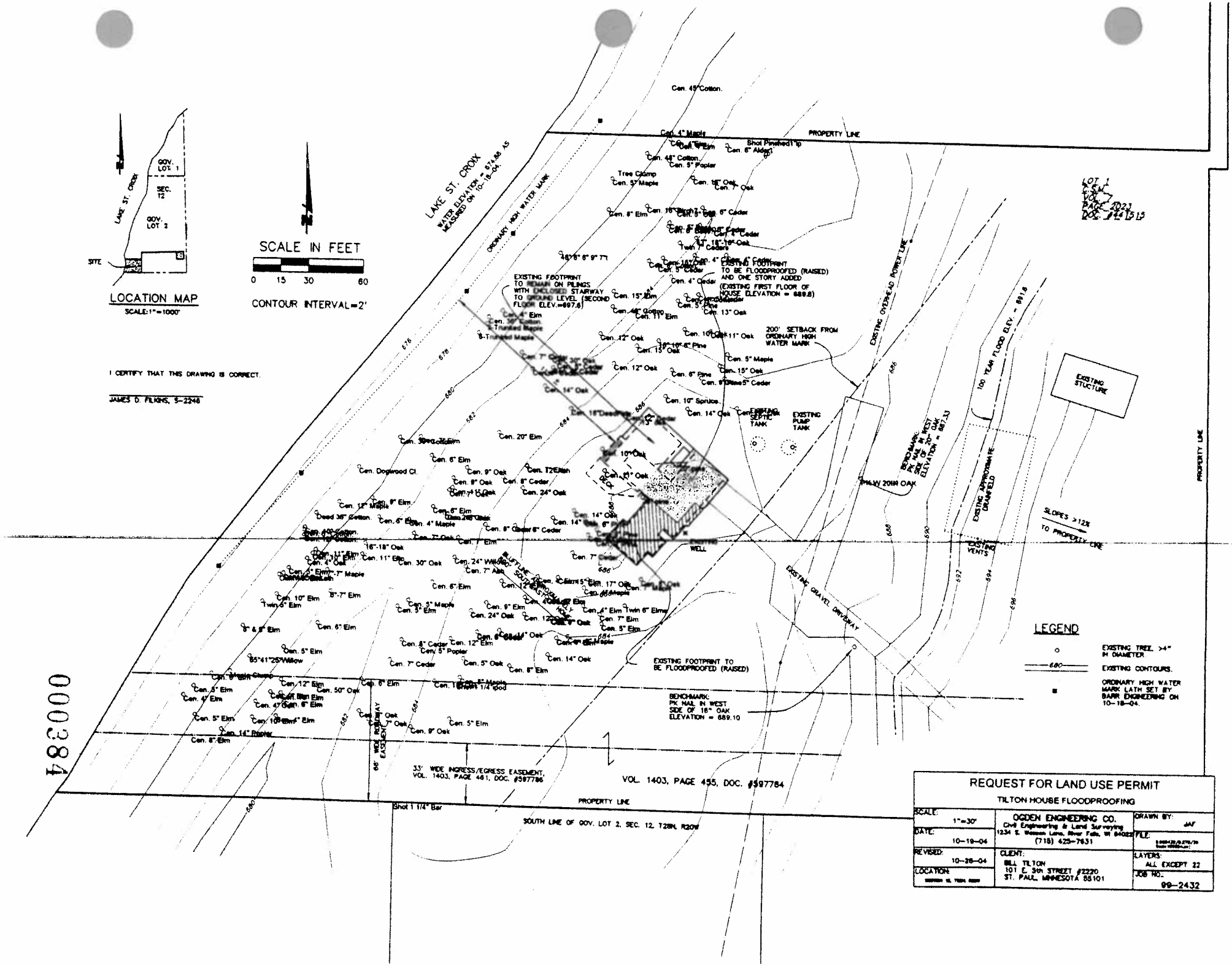
T W A
Thomas Whitcomb Architect
8741 Plymouth Avenue North
Golden Valley, MN 55427
(612) 593 4666

SCALE	± 40'=1'-0"
DATE	10-10-04
DRAWN	TWA
COMM NO.	0471

TILTON RESIDENCE
SITE PLAN: 278 W GROVE RD.
HOUSE MOVED 25'-0" EAST
HUDSON WI 54016-8015

A0.1

557409


LOCATION MAP
SCALE: 1" = 1000'
LAKE ST. CROIX
GOV. LOT 1
SEC. 12
GOV. LOT 2
SITE
SCALE IN FEET
0 15 30 60
CONTOUR INTERVAL = 2'
I CERTIFY THAT THIS DRAWING IS CORRECT.
JAMES D. FILKINS, S-2248
LAKE ST. CROIX
WATER ELEVATION = 674.48 AS MEASURED ON 10-18-04.
ORDINARY HIGH WATER MARK
PROPERTY LINE
EXISTING FOOTPRINT TO REMAIN ON PILINGS WITH ENCLOSED STAIRWAY TO GROUND LEVEL (SECOND FLOOR ELEV.=697.6)
EXISTING FOOTPRINT TO BE FLOODPROOFED (RAISED) AND ONE STORY ADDED (EXISTING FIRST FLOOR OF HOUSE ELEVATION = 689.8)
200' SETBACK FROM ORDINARY HIGH WATER MARK
EXISTING OVERHEAD POWER LINE
100 YEAR FLOOD ELEV. = 691.6
EXISTING STUCTURE
EXISTING SEPTIC TANK
EXISTING PUMP TANK
BENCHMARK: PK NAIL IN WEST SIDE OF 20" OAK ELEVATION = 687.33
EXISTING APPROXIMATE DRAINFIELD
SLOPES >12% TO PROPERTY LINE
EXISTING VENTS
EXISTING WELL
EXISTING GRAVEL DRIVEWAY
EXISTING FOOTPRINT TO BE FLOODPROOFED (RAISED)
BENCHMARK: PK NAIL IN WEST SIDE OF 18" OAK ELEVATION = 689.10
33' WIDE INGRESS/EGRESS EASEMENT, VOL. 1403, PAGE 461, DOC. #597786
VOL. 1403, PAGE 455, DOC. #597784
SOUTH LINE OF GOV. LOT 2, SEC. 12, T29N, R20W
LOT 1 REM VOL. PAGE DOC.
LEGEND
EXISTING TREE >4" IN DIAMETER
EXISTING CONTOURS
ORDINARY HIGH WATER MARK LATH SET BY BARR ENGINEERING ON 10-18-04.
REQUEST FOR LAND USE PERMIT
TILTON HOUSE FLOODPROOFING
SCALE: 1"=30'
DATE: 10-19-04
REVISED: 10-26-04
LOCATION:
OGDEN ENGINEERING CO.
Civil Engineering & Land Surveying
1234 S. Wabasso Lane, River Falls, WI 54022
(715) 425-7831
CLIENT:
BILL TILTON
101 E. 5th STREET #2220
ST. PAUL, MINNESOTA 55101
DRAWN BY: JAF
FILE:
LAYERS: ALL EXCEPT 22
JOB NO.: 99-2432

000384

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BARR

Barr Engineering Company
4700 West 77th Street • Minneapolis, MN 55435-4803
Phone: 952-832-2600 • Fax: 952-832-2601 • www.barr.com An EEO Employer

Minneapolis, MN • Hibbing, MN • Duluth, MN • Ann Arbor, MI • Jefferson City, MO

October 29, 2004

William Tilton, Esq.
TILTON & ROSENBAUM, P.L.L.P.
2220 US Bank Center
101 East Fifth Street
St. Paul, MN 55101

RE: Section 12, T28, R29 along the St. Croix River
Proposed Flood Protection

Dear Mr. Tilton:

You asked Barr Engineering to provide for you some detailed analysis of your property on Lake St. Croix in regard to (1) the flood impacts associated with a proposed flood-proofing project for your home at 278 Westgrove Road, Troy Township, Wisconsin; and (2) determination of the Ordinary High Water Mark (OHWM) elevation for this property. Barr Engineering has 40 years of experience in analyzing such matters, including extensive work with the Army Corps of Engineers and the National Park Service, including projects involving the St. Croix River. Barr Engineering assigned to me the task of assembling and analyzing the data on these issues. I have an M.S. Civil Engineering degree from the University of Minnesota, with over 18 years of education and experience with these issues. A summary of my findings and conclusions follows.

(1). IMPACT ON FLOOD LEVELS

Clearly, your home at 278 Westgrove Road, Troy Township, Wisconsin, is in the floodplain of the St. Croix River. This raises the question as to whether flood-proofing of the structure would have any impact on the height of any flood stage that may occur on the St. Croix River/Lake St. Croix. An ancillary question is whether your home is in the floodway or the flood-fringe of the St. Croix River. For reasons detailed below, we have concluded that if you were to flood-proof this structure by means of fill, said flood-proofing would have no discernable effect on the flood stage of the St. Croix River. Following from that analysis, the only conclusion is that your home is in the St. Croix River flood-fringe, not its floodway.

It is my understanding that you have at least a couple of different options for flood-proofing your house. For example, using fill under and around the entire footprint of the house versus using pilings. Given that our conclusion that a "greatest fill" scenario would have no discernable increase in the flood stage of the St. Croix River, obviously any method which uses less than a maximum amount of fill would have even less of an impact on the flood.

In doing this analysis, I have relied upon several resources, including the survey of the property done by Ogden Engineering; United States Geological Survey 7.5 Minute Topographic maps of the St. Croix Valley; my own personal inspection of the site; and upon detailed scientific modeling by Barr Engineering of multiple cross-sections of the St. Croix Valley, including precisely at your property and 1+ miles upstream and downstream from your property (this reach model was located from approximately river mile 12 to river mile 14.5).

Per these sources, it appears your home is (presently) more than 130 ft. from the shoreline of the St. Croix River/Lake St. Croix. If the entirety of your home's footprint plus a 15-foot bench around the home were to be flood-proofed with sloped fill, the edge of the fill would be about 85-feet from the shoreline. Assuming this, the volume of fill (from that 85' mark to the hill behind your house) below the regulatory flood level which would be used to flood-proof your house is calculated to be about 3,000 cubic yards or 1.9 acre feet. In contrast, the volume of the St. Croix River floodplain between the proposed fill and the Mississippi River is more than 50,000 acre feet.

We used an HEC-RAS computer model to check the effect of any loss of conveyance which your flood-proofing might cause. *See* attached documentation and calculations. The model was created using six cross-sections from USGS 7.5 Minute Topographic maps. The reach model was located from approximately river mile 12 to river mile 14.5, as noted. Encroachments were included on both sides of the cross-sections to produce an equal conveyance loss on both sides of the river, i.e., for purposes of analyzing the effect of flood-proofing your property via fill, it was assumed that similar fill would be placed not only on the Wisconsin side, but also on the Minnesota side of the river for all six cross-sections. The conveyance loss that was modeled at each side of each cross-section is equivalent to that which would occur due to your proposed flood-proofing project. Using this data and these calculations, a comparison of the regulatory 100-year flood profile, both with the fill and without the fill, indicates that there would be no increase (0.00 feet) in flood stage as the result of equal degree of encroachments in this stretch of the river/Lake St. Croix.

In short, scientific modeling data of the profile of the St. Croix River Valley proves conclusively that, if you were to flood-proof your home using 3,000 cubic yards of fill, which would be required by flood-proofing to be done via fill, there would be <u>no</u> discernable effect on any flooding of the river/lake.

This finding is supported by the 1971 report *Flooded Area of Afton, Minnesota*, prepared by the United States Geological Survey (copy enclosed), which states that "complete on-land encroachment would cause less than 0.1 foot of backwater." Please note that in this report "complete on-land encroachment" assumes complete encroachment above the normal streambed level of 675 feet for the entirety of the St. Croix River upstream from where it meets the Mississippi River. This USGS report further states that "floodway limits along the St. Croix River could be drawn at the natural shoreline with no significant backwater effect." Accordingly, the USGS considers all areas along the St. Croix River higher than the normal pool elevation of 675 ft. to be flood-fringe area. As the report indicates, this is due to the fact that the backwater from the Mississippi River controls the regulatory flood levels of the St. Croix River.

In short, this scientific data also supports the conclusion that your property is clearly in a flood-fringe area, not in a floodway area.

(2). ORDINARY HIGH WATER MARK (OHWM) DETERMINATION

For the reasons described below, I have determined that the true Ordinary High Water Mark (OHWM) for your property in Troy Township should be between 676.0 and 677.0 feet above sea level.

In reaching this conclusion, I have used the above-describe resources and personal investigation plus a review of Chapter 40, "Ordinary High Water Mark," and the Waterway and Wetland Handbook (State of Wisconsin). I have used Chapter 40 as a guideline for interpreting the following definition of Ordinary High Water Mark:

> The point on the bank or shore up to which the presence and action of surface water is so continuous as to leave a distinctive mark, such as by erosion, destruction or prevention of terrestrial vegetation, predominance of equatic vegetation, or other easily recognized characteristic.

Chapter 40 of the Wisconsin Waterway and Wetland Handbook, above-referenced, provides guidance for a field determination of the OHWM, including biological and physical indicators. From my personal examination of your property on October 18, 2004, I determined that there was inconclusive physical evidence of the OHWM from a few of the Chapter 40 guidelines. For example, the soil was sandy throughout the floodplain area; water staining of rocks and walls was faint and possibly caused by the flooding of 2001; and there were no mud stains or ice scars noted. There was no significant erosion line along the shore.

On the other hand, Chapter 40 mentions several biological indicators of the OHWM. There were several of these apparent on your property. Specifically, there were mosses and trees abundant along your shoreline. According to Chapter 40, "...mosses which are located on exposed rocks, stumps, tree roots, etc., are usually considered terrestrial and the lowermost elevation of these mosses is a good indicator of the OHWM." We surveyed this transition from moss to no-moss at four locations on your property, designated on the attached survey map as "OHW-1," "OHW-3," "OHW-4," and "OHW-5." The elevations of these locations, which were up to 325 feet apart, were within 1.8 feet in elevation of each other. All of these moss/no-moss elevations were between 676.0 and 677.8 above sea level, with an average elevation of 677.0.

According to Chapter 40, tree roots are another biological indicator or guide of the OHWM. It states therein, "The roots of living trees and shrubs along the shoreline will turn up and away from the water. Exposed bases and roots of older trees with roots growing primarily toward the shoreland on a horizontal plane are usually just above the OHWM if no slumpage has occurred."

We surveyed two locations where trees provided an indication of the OHWM. On the enclosed survey map, "OHW-2" marked the lower-most elevation of a line of willow trees along the shore. The ground elevation of the willow trees is 676.3 feet above sea level. In addition, a white oak is located approximately 40 feet from the shoreline. White oak are commonly found

above the OHWM, according to Page 18 of Chapter 40. The ground elevation at the white oak is 679.4 feet above sea level. There are many other mature trees on your property at similar and even lower elevations, including 4 to 5 foot diameter cottonwoods, a 4-inch diameter elm, and several maples.

I have been told that occasionally the Wisconsin DNR has used an OHWM of 686.0 feet above sea level for the St. Croix River in the vicinity of your home. However, according to the hydrologic modeling that we performed, this elevation is only slightly lower than the particular elevation for a 10-year flood. Given the guidance of Page 15 of Chapter 40 ("Ordinary high water marks are generally established by the presence of water at a given elevation for a minimum of 30-70 days a year, over a 20 day period"), clearly the actual OHWM must be lower than a typical one-year flood level. Therefore, it must be far below a predicted 10-year flood level. Therefore, a use of 686.0 feet is a dramatically higher level for the OHWM than that suggested by the Chapter 40 guidelines.

Instead, based upon the above-described analysis, it is my opinion that the Ordinary High Water Mark for your property is between 676.0 and 677.0 feet above sea level.

The opinions expressed in this letter are also based upon my education and experience and are held by me to a reasonable degree of professional certainty. It is my understanding that this letter will be included as supporting your application for a land use permit for flood-proofing and remodeling your home at 278 Westgrove Road. I am available for further discussion of these opinions.

Sincerely,

Thomas E. MacDonald, P.E.
Senior Engineer, Barr Engineering Company

Enclosures

WISCONSIN
THOMAS E. MACDONALD
30231-006
MINNEAPOLIS, MN
PROFESSIONAL ENGINEER

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