
Appendix A

*Established Survey Control for the Lake on Michigan's State Plane
Coordinate System and Map of Surveyed Areas around the Lake
With Photographs*

(Appendix A)

All data for this project is based off the NAVD88 vertical datum. A control point was set near the Dam. Spicer Groups GPS unit was set up on this point to collect data for several hours. This data was uploaded to the National Geodetic Survey (NGS) webpage where the Online Positioning User Service (OPUS) was utilized to determine accurate latitude, longitude, state plane coordinates and NAVD88 datum on the control point by the Dam. The GPS unit was set upon the control point near the Dam and tied in 3 NGS vertical control points in the area to verify the NAVD88 elevation determined by OPUS. All three benchmarks checked within a few hundredths of a foot, which is the expected accuracy of GPS. All points surveyed in the course of this work are based on the state plane coordinates for Michigan, Central Zone. See Appendix A for location of surveyed areas around the lake.

CONVERSION OF NGVD29 ELEVATION TO NAVD88 ELEVATION

Questions concerning the VERTCON process may be mailed to NGS

Latitude: 44 38 39.23

Longitude: 085 44 39.47


NGVD29 height 837.30 Ft (Legal summer lake level set in 1960)

Datum shift (NAVD88 minus NGVD29): -0.249 feet

Converted to NAVD88 height: 837.051 feet (New legal summer lake level based on NAVD88)

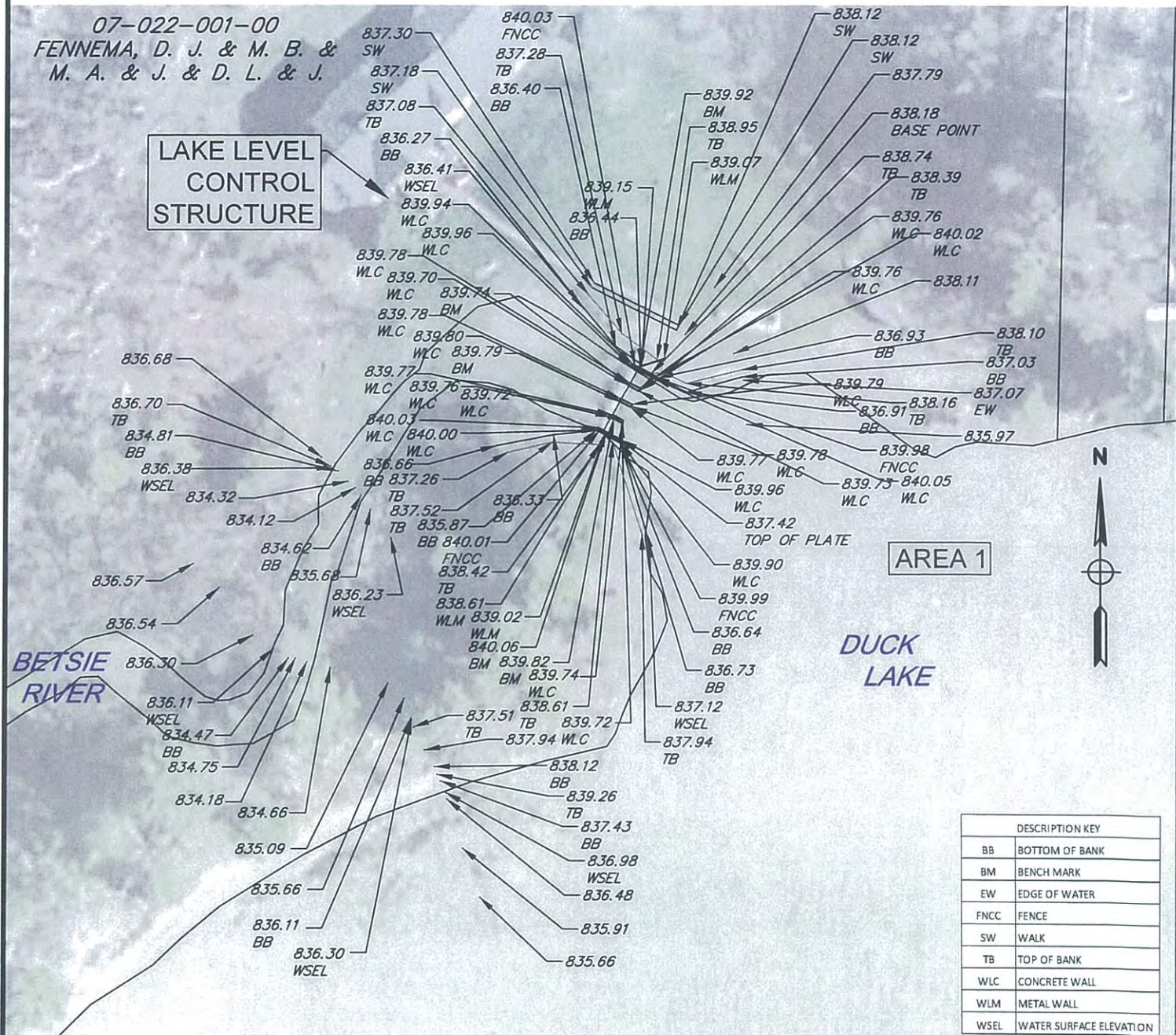
APPENDIX A - SURVEY AREA LOCATIONS



BY		MARK	REVISIONS	DATE	THE WORK REPRESENTED BY THIS DRAWING WAS DESIGNED BY THE ENGINEER FOR THIS SPECIFIC APPLICATION AND SPECIFIC LOCATION DESCRIBED HEREON IN ACCORDANCE WITH THE CONDITIONS PREVALENT AT THE TIME THE DESIGN WAS DONE. THE ENGINEER DOES NOT GUARANTEE AND WILL NOT BE LIABLE FOR ANY OTHER LOCATION, CONDITION, DESIGN OR PURPOSE.	
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APPENDIX A SURVEY AREA LOCATIONS					ST. JOHNS OFFICE 1400 Zeeb Drive St. Johns, MI 48879 Tel. 989-224-2355 Fax. 989-224-2357 www.SpicerGroup.com	
DE. BY: <i>TAM</i>		CH. BY: <i>TDB</i>		PROJECT NO.		
DR. BY: <i>TAM</i>		APP. BY: <i>LJP</i>		122289SG2015		
STDS.		SHEET 1 OF 8		A		
DATE JULY, 2015 SCALE 1" = 3,000'		FILE NO. APPENDIX_A				

APPENDIX A - SURVEY AREA LOCATIONS

AREA 1



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APPENDIX A

SURVEY AREA LOCATIONS

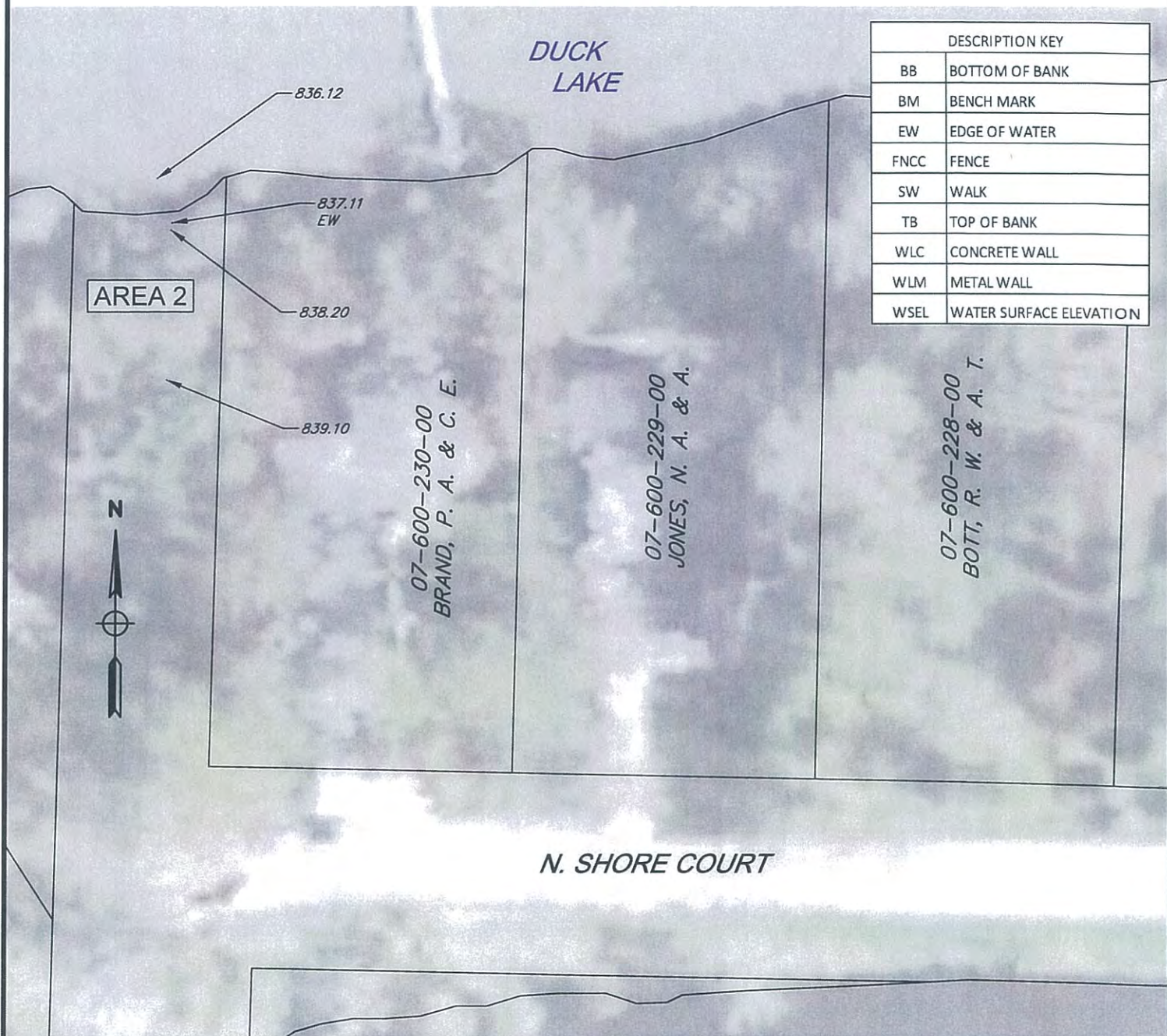
AREA 1



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DATE JULY, 2015	1" = 50'	APPENDIX_A
SCALE		2

APPENDIX A - SURVEY AREA LOCATIONS AREA 2



DESCRIPTION KEY	
BB	BOTTOM OF BANK
BM	BENCH MARK
EW	EDGE OF WATER
FNCC	FENCE
SW	WALK
TB	TOP OF BANK
WLC	CONCRETE WALL
WLM	METAL WALL
WSEL	WATER SURFACE ELEVATION

BY	MARK	REVISIONS	DATE

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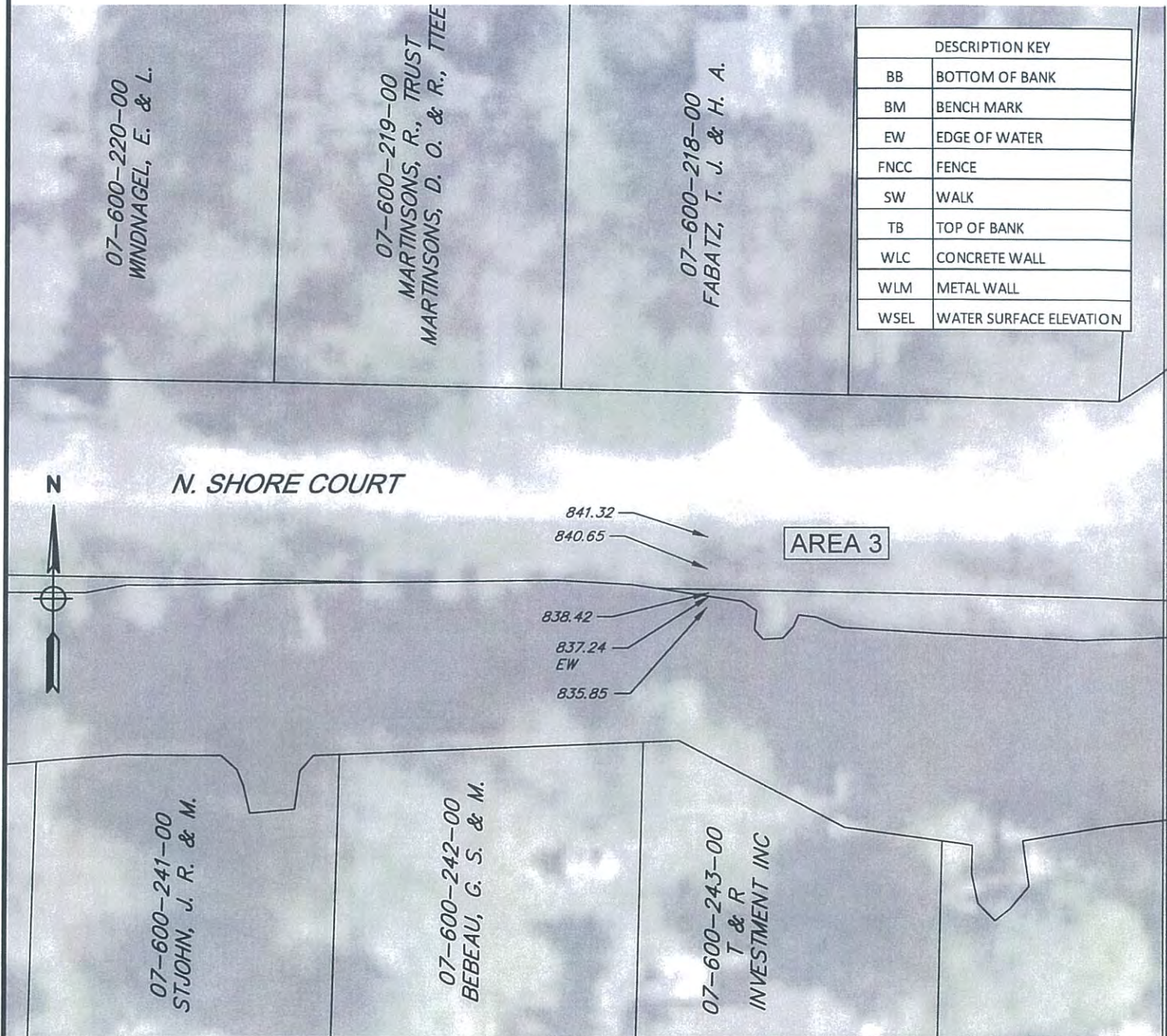


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APPENDIX A SURVEY AREA LOCATIONS AREA 2

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DATE JULY, 2015 SCALE 1" = 50'	FILE NO. APPENDIX A	

APPENDIX A - SURVEY AREA LOCATIONS AREA 3



DESCRIPTION KEY	
BB	BOTTOM OF BANK
BM	BENCH MARK
EW	EDGE OF WATER
FNCC	FENCE
SW	WALK
TB	TOP OF BANK
WLC	CONCRETE WALL
WLM	METAL WALL
WSEL	WATER SURFACE ELEVATION

BY	MARK	REVISIONS	DATE

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APPENDIX A SURVEY AREA LOCATIONS AREA 3



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SHEET **4** OF **8**

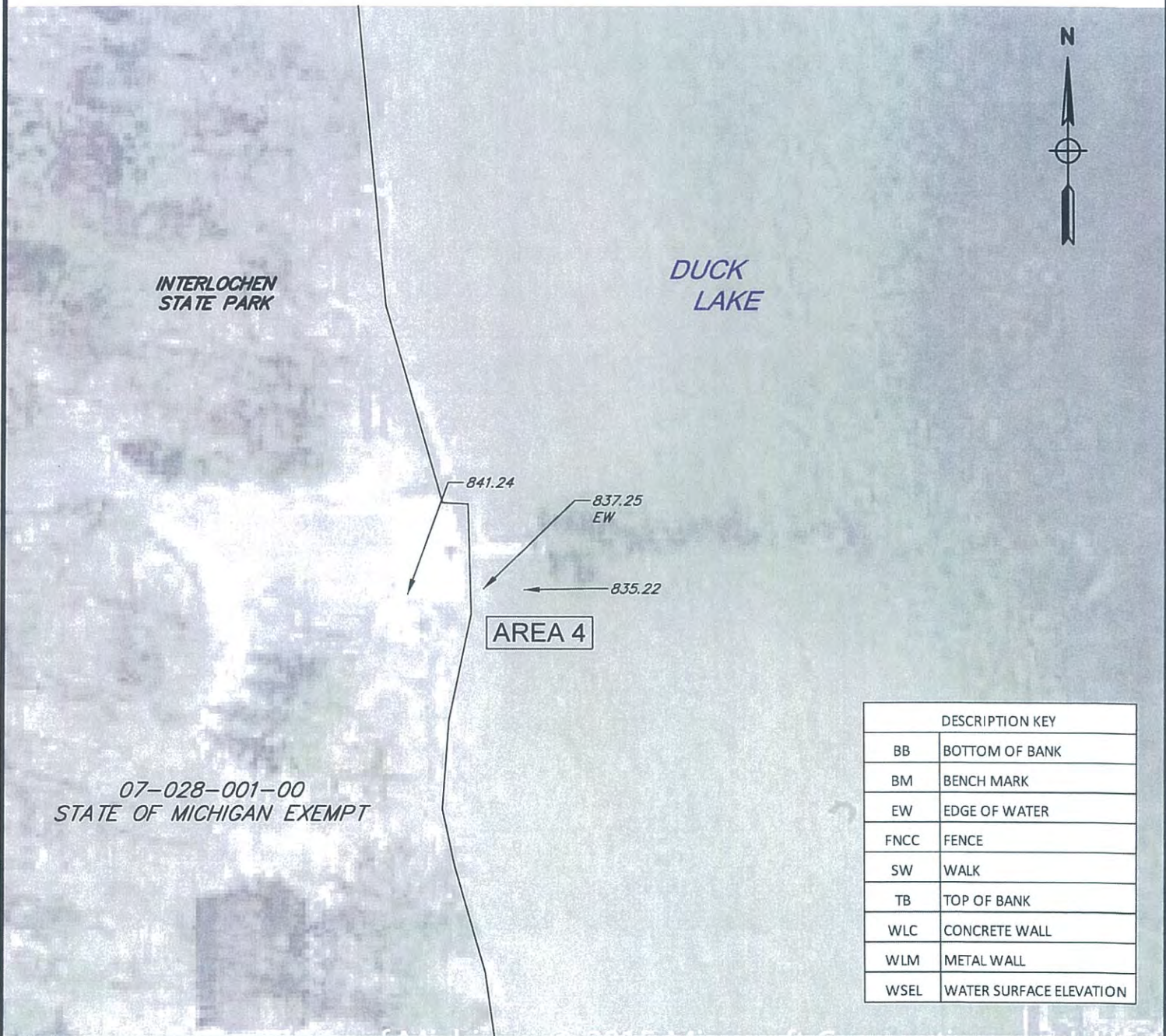
DATE **JULY, 2015**
SCALE **1" = 50'**

FILE NO.
APPENDIX A

4

APPENDIX A - SURVEY AREA LOCATIONS

AREA 4



DESCRIPTION KEY	
BB	BOTTOM OF BANK
BM	BENCH MARK
EW	EDGE OF WATER
FNCC	FENCE
SW	WALK
TB	TOP OF BANK
WLC	CONCRETE WALL
WLM	METAL WALL
WSEL	WATER SURFACE ELEVATION

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SURVEY AREA LOCATIONS

AREA 4



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STDS.	SHEET 5 OF 8	5
DATE <i>JULY, 2015</i> SCALE <i>1" = 50'</i>	FILE NO. APPENDIX A	

APPENDIX A - SURVEY AREA LOCATIONS

AREA 5

DESCRIPTION KEY	
BB	BOTTOM OF BANK
BM	BENCH MARK
EW	EDGE OF WATER
FNCC	FENCE
SW	WALK
TB	TOP OF BANK
WLC	CONCRETE WALL
WLM	METAL WALL
WSEL	WATER SURFACE ELEVATION

DUCK
LAKE

AREA 5

836.11

837.30
EW

838.22

839.74

843.16

07-N/O ROLL

BRIGHAM ROAD WEST

N

07-260-043-00
EGAN, J. P.

07-730-003-00
HARTZ, K. F. & M. G.

07-730-002-00
COOK, J. W., TRUST

07-730-001-00
THOMPSON, D. & BRYAN, L. &
KOVACS, C. & BRYAN, D.

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SHEET 6 OF 8

DATE JULY, 2015
SCALE 1" = 50'

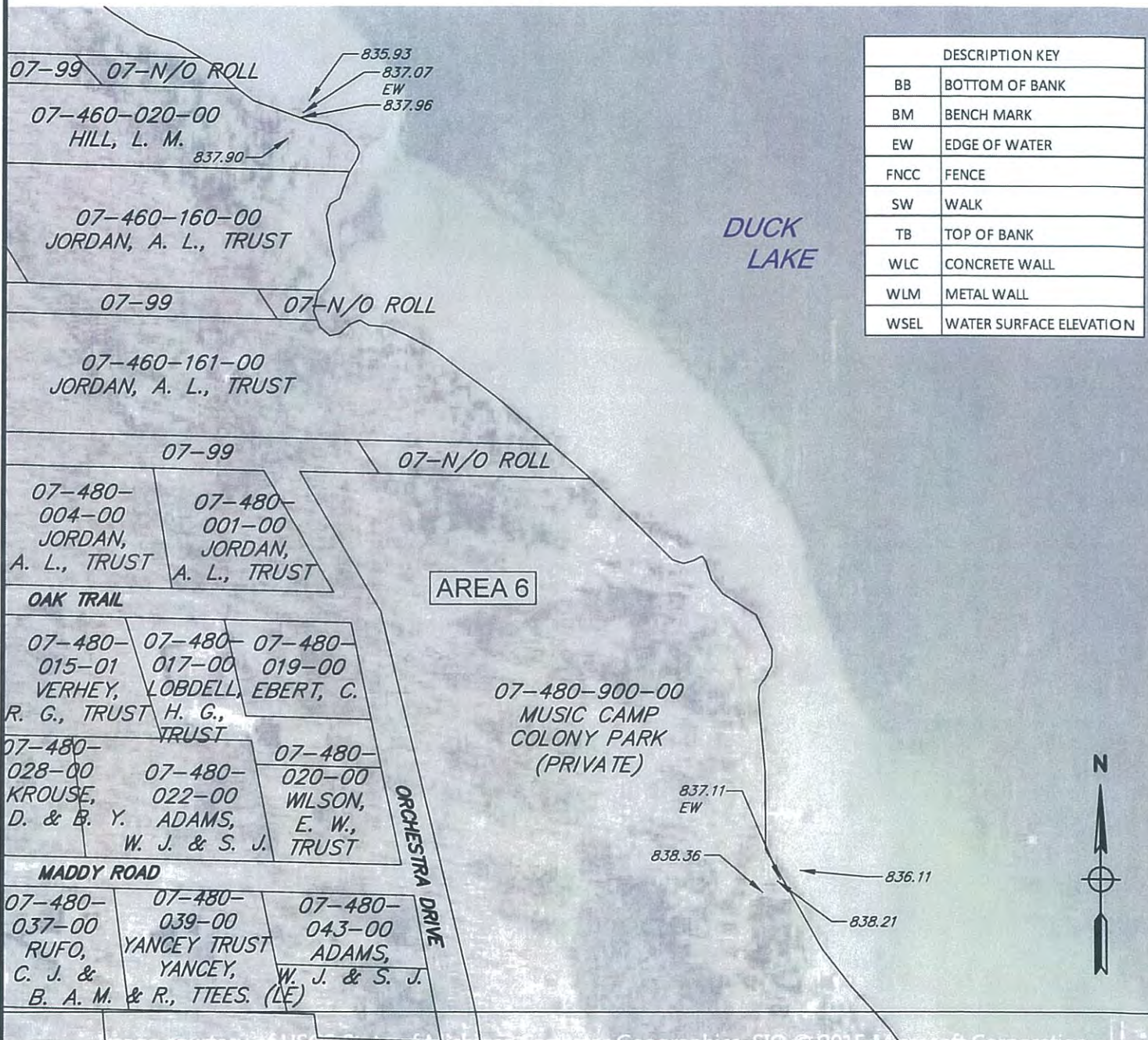
FILE NO.
APPENDIX_A

6

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APPENDIX A
SURVEY AREA LOCATIONS
AREA 5

APPENDIX A - SURVEY AREA LOCATIONS AREA 6



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SURVEY AREA LOCATIONS
AREA 6

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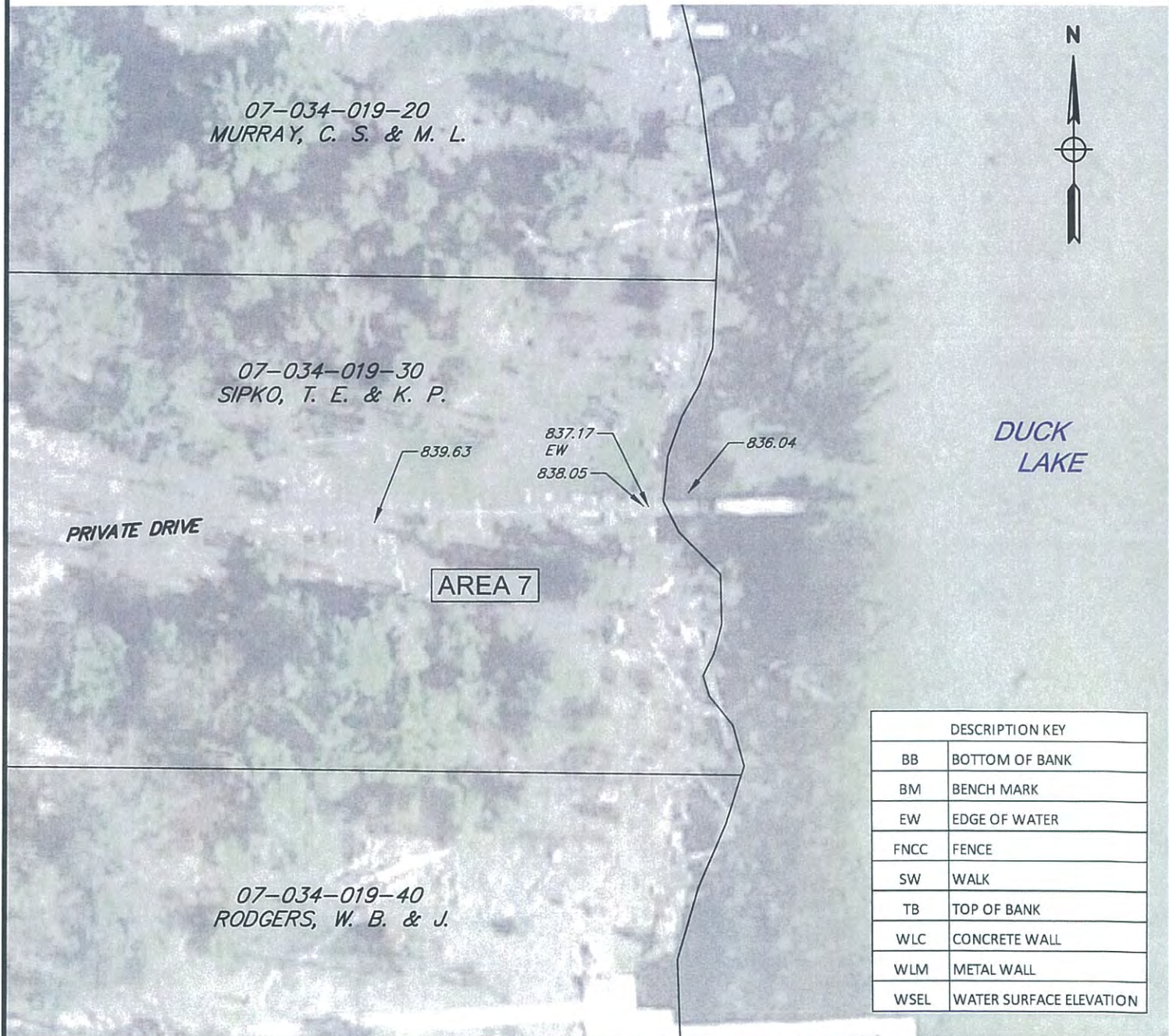
SHEET **7** OF **8**

DATE **JULY, 2015**
SCALE **1" = 150'**

FILE NO.
APPENDIX_A

7

APPENDIX A - SURVEY AREA LOCATIONS AREA 7



DESCRIPTION KEY	
BB	BOTTOM OF BANK
BM	BENCH MARK
EW	EDGE OF WATER
FNCC	FENCE
SW	WALK
TB	TOP OF BANK
WLC	CONCRETE WALL
WLM	METAL WALL
WSEL	WATER SURFACE ELEVATION

BY	MARK	REVISIONS	DATE

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APPENDIX A SURVEY AREA LOCATIONS AREA 7



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STDS.	SHEET 8 OF 8	8
DATE SCALE JULY, 2015 1" = 50'	FILE NO. APPENDIX_A	



Name: IMG_2380

Description: Area #1 - Downstream of Dam looking upstream into Duck Lake. Note: The narrows are located on the west side of the Dam and extend approximately 300 ft southwest.



Name: IMG_2381

Description: Area #1 - Retaining wall on east side of Dam.



Name: IMG_2382

Description: Area #1 - Retaining wall on east side of Dam looking downstream.



Name: IMG_2383

Description: Area #1 - Dam looking downstream.



Name: IMG_2384

Description: Area #1 - Duck Lake Dam looking downstream pointing west. Note: Narrows located on west side of Dam and extend approximately 300 ft southwest.



Name: IMG_2385

Description: Area #1 - Shoreline immediately east of Duck Lake Dam.



Name: IMG_2386

Description: Area #1 - Shoreline immediately east of Duck Lake Dam.



Name: IMG_2387

Description: Area #1 - West side of Duck Lake Dam.



Name: IMG_2388

Description: Area #1 - Walking along earthen Dam and found a rodent burrow.



Name: IMG_2389

Description: Area #1 - Shoreline of earthen Dam looking east.



Name: IMG_2390

Description: Area #1 - Shoreline of earthen Dam looking east.



Name: IMG_2411

Description: Area #2.



Name: IMG_2413
Description: Area #2.



Name: IMG_2414
Description: Area #2.



Name: IMG_2415
Description: Area #2.



Name: IMG_2416
Description: Area #3.



Name: IMG_2417
Description: Area #3.



Name: IMG_2418
Description: Area #3.



Name: IMG_2419
Description: Area #3.



Name: IMG_2420
Description: Area #3.



Name: IMG_2422
Description: Area #3.



Name: IMG_2423
Description: Area #3.



Name: IMG_2391
Description: Area #4.



Name: IMG_2392
Description: Area #4.



Name: IMG_2393
Description: Area #4.



Name: IMG_2394
Description: Area #4.



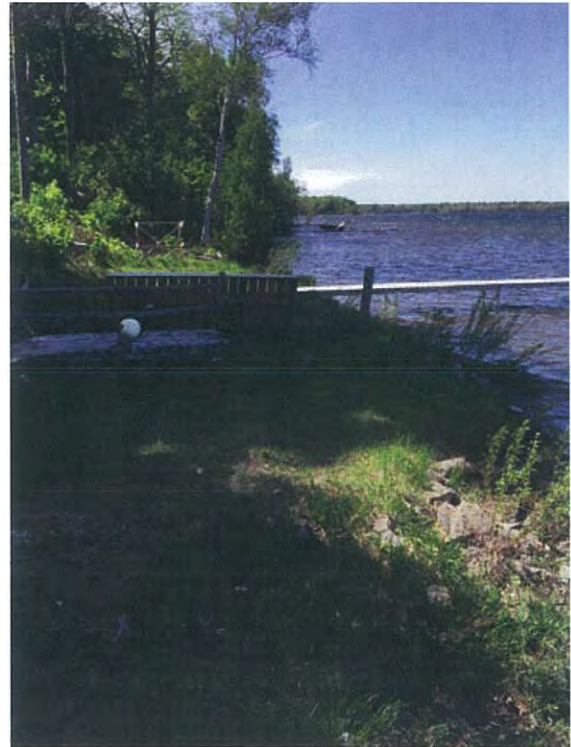
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Description: Area #5.



Name: IMG_2407
Description: Area #5.



Name: IMG_2408
Description: Area #5.



Name: IMG_2409
Description: Area #5.



Name: IMG_2410
Description: Area #5.



Name: IMG_2397
Description: Area #6.



Name: IMG_2398
Description: Area #6.



Name: IMG_2399
Description: Area #6.



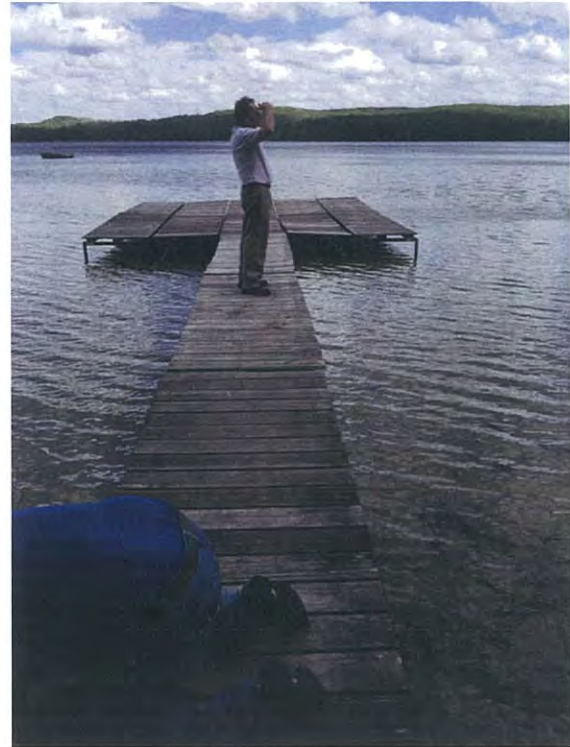
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Description: Area #6.



Name: IMG_2427
Description: Area #6.



Name: IMG_2430
Description: Area #6.



Name: IMG_2431
Description: Area #6.



Name: IMG_2433
Description: Area #6.



Name: IMG_2434
Description: Area #6.



Name: IMG_2435
Description: Area #6.



Name: IMG_2436
Description: Area #6.



Name: IMG_2437
Description: Area #6.



Name: IMG_2401
Description: Area #7.



Name: IMG_2402
Description: Area #7.



Name: IMG_2403
Description: Area #7.



Name: IMG_2404
Description: Area #7.