

July 15, 2015

Baird

Federal Consistency Coordinator
Illinois Coastal Management Program
Illinois Department of Natural Resources
160 N. LaSalle Street, Suite 700
Chicago, IL 60601

Baird & Associates
2981 Yarmouth Greenway Drive
Madison, Wisconsin 53711 USA
T. 608 273 0592
F. 608 273 2010

oceans
engineering
lakes
design
rivers
science
watersheds
construction

Re: Proposed shore protection system in Lake Michigan
1175 Whitebridge Hill Road, Winnetka, IL 60093

Dear Federal Consistency Coordinator,

This letter has been prepared to satisfy the Illinois Coastal Management Federal Consistency Review Procedures for a proposed shore protection system located at the 1175 Whitebridge Hill Road, Winnetka, IL.

The following is the list of ICMP requirements in (black) with the applicant's response following in (BLUE):

- A copy of an application for a federal license, from the license applicant, accompanied by a federal consistency certification.
 - Provide a copy of the application for a federal license or permit
 - (James Casey, IDNR/OWR) stated that the IDNR/OWR has an additional copy of the permit application package submitted on June 24, 2015 and will provide this to ICMP for review.
 - Provide information for contact person including: name, title, mailing address, email address, phone and fax number. Indicate location of project (provide map), project start date and duration, and extent of work to be conducted onsite.
 - Contact Person:
Lars Barber, PLA, Principal
W.F. Baird & Associates Ltd.
2981 Yarmouth Greenway Dr.
Madison, WI 53711
Email: lbarber@baird.com
Phone: (608) 273-0592
Fax: (608) 273-2010

Project Location:
See permit application

Project Start Date and (Duration):
May/August 2016 (16 weeks)

Extent of work to be conducted onsite:
This is a residential Lake Michigan shoreline improvement project. An existing stone

RECEIVED
JUL 16 2015
OFFICE OF WATER RESOURCES
DIVISION OF RESOURCE MANAGEMENT

Baird

revetment placed at the water's edge is proposed to be removed and replaced with a new shoreline protection system. This proposed system consists of a beach cell (Torpedo sand) and two shoreline-perpendicular beach retention groins (125 ft long groins, as measured from the toe of the existing bluff). The open beach cell, in combination with the groins, will create an effective shoreline protection system and will replace the existing stone revetment. A new beach fillet will be provided on the north side of the north groin to promote natural sediment by-pass. Sand over-fill quantities of 20% will be provided for both the beach cell and fillet areas.

- Letter should either state: “The proposed activity complies with Illinois’ approved coastal management program and will be conducted in a manner consistent with such policies” or “The proposed activity does not comply with Illinois’ approved coastal management program.”
- “The proposed activity complies with Illinois’ approved coastal management program and will be conducted in a manner consistent with such policies.”

We appreciate your review and consideration. Please let us know if you require any additional information.

Sincerely,
Baird & Associates

Lars Barber, PLA
Principal

cc : James Casey (Illinois Department of Natural Resources)
Soren Hall (U.S. Army Corps of Engineers)
Marty Fahey
Austin DePree

11814.104

JOINT APPLICATION FORM FOR ILLINOIS

ITEMS 1 AND 2 FOR AGENCY USE

1. Application Number <div style="font-size: 1.5em; text-align: center;">C20140022</div>	2. Date Received
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3. and 4. (SEE SPECIAL INSTRUCTIONS) NAME, MAILING ADDRESS AND TELEPHONE NUMBERS

3a. Applicant's Name: Chicago Title Land Trust c/o Mr. Michael Durkin Company Name (if any): Address: 604 Vernon Avenue Glencoe, IL 60022 Email Address:	3b. Co-Applicant/Property Owner Name (if needed or if different from applicant): Company Name (if any): Address: Email Address:	4. Authorized Agent (an agent is not required) Lars T. Barber, PLA Company Name (if any): W.F. Baird & Associates Ltd. Address: 2981 Yarmouth Greenway Dr. Madison, WI 53711 USA Email Address: lbarber@baird.com
Applicant's Phone Nos. w/area code Business: Residence: N/A Cell: N/A Fax:	Applicant's Phone Nos. w/area code Business: Residence: Cell: Fax:	Agent's Phone Nos. w/area code Business: (608) 273-0592 Residence: N/A Cell: (608) 628-6189 Fax: (608) 273-2010

STATEMENT OF AUTHORIZATION

I hereby authorize, W.F. Baird & Associates Ltd. to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

Applicant's Signature

Date

6/23/2015

5. ADJOINING PROPERTY OWNERS (Upstream and Downstream of the water body and within Visual Reach of Project)

Name	Mailing Address	Phone No. w/area code
a. SEE ATTACHED REPORT (APPENDIX B)		
b.		
c.		
d.		

6. PROJECT TITLE:
Whitebridge Hill Residence

7. PROJECT LOCATION:
1175 Whitebridge Hill Road, Winnetka, IL 60093

LATITUDE: 42.12415 °N LONGITUDE: 87.73976 °W	UTM's Northing: 4663825.3765 Easting: 561145.7758										
STREET, ROAD, OR OTHER DESCRIPTIVE LOCATION 1175 WHITEBRIDGE HILL RD.	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th style="width: 15%;">LEGAL DESCRIPT</th> <th style="width: 15%;">QUARTER</th> <th style="width: 15%;">SECTION</th> <th style="width: 15%;">TOWNSHIP NO</th> <th style="width: 15%;">RANGE</th> </tr> <tr> <td style="text-align: center;">SE</td> <td style="text-align: center;">8</td> <td style="text-align: center;">42</td> <td style="text-align: center;">13E</td> <td></td> </tr> </table>	LEGAL DESCRIPT	QUARTER	SECTION	TOWNSHIP NO	RANGE	SE	8	42	13E	
LEGAL DESCRIPT	QUARTER	SECTION	TOWNSHIP NO	RANGE							
SE	8	42	13E								
<input checked="" type="checkbox"/> IN OR <input type="checkbox"/> NEAR CITY OF TOWN (check appropriate box) Municipality Name WINNETKA	WATERWAY LAKE MICHIGAN										
COUNTY: COOK STATE: IL ZIP CODE: 60093	RIVER MILE (if applicable)										

Revised 2010

Corps of Engineers
 IL Dep't of Natural Resources
 IL Environmental Protection Agency
 Applicant's Copy

8. PROJECT DESCRIPTION (Include all features):
 This is a residential Lake Michigan shoreline improvement project. An existing stone revetment placed at the water's edge is propose to be removed, and replaced with a new shoreline protection system. This proposed system consists of a beach cell (Torpedo sand) and two shoreline-perpendicular beach retention groins (125 ft long groins, as measured from the toe of the existing bluff). The open beach cell, in combination with the groins, will create an effective shoreline protection system and will replace the existing stone revetment. Other proposed elements are: a beach house (provided on the bluff slope, above the OHWM), and a ramp for beach launching operations. A new beach fillet will be provided on the north side of the north groin, to promote natural sediment by-pass. Sand over-fill quantities of 20% will be provided for both the beach cell and the north fillet. (See Attached Report for detailed descriptions).

9. PURPOSE AND NEED OF PROJECT:
 See Attached Report

COMPLETE THE FOLLOWING FOUR BLOCKS IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

10. REASON(S) FOR DISCHARGE:
 See Attached Report

11. TYPE(S) OF MATERIAL BEING DISCHARGED AND THE AMOUNT OF EACH TYPE IN CUBIC YARDS FOR WATERWAYS:
 TYPE: See Attached Report
 AMOUNT IN CUBIC YARDS:
 See Attached Report

12. SURFACE AREA IN ACRES OF WETLANDS OR OTHER WATERS FILLED (See Instructions)
 See Attached Report

13. DESCRIPTION OF AVOIDANCE, MINIMIZATION AND COMPENSATION (See Instructions)
 See Attached Report

14. Date activity is proposed to commence: Spring 2016
 Date activity is expected to be completed: Fall 2016

15. Is any portion of the activity for which authorization is sought now complete? Yes No
 Month and Year the activity was completed: _____
 NOTE: If answer is "YES" give reasons in the Project Description and Remarks section. Indicate the existing work on drawings.

16. List all approvals or certification and denials received from other Federal, interstate, state, or local agencies for structures, construction, discharges or other activities described in this application.

Issuing Agency	Type of Approval	Identification No.	Date of Application	Date of Approval	Date of Denial

17. CONSENT TO ENTER PROPERTY LISTED IN PART 7 ABOVE IS HEREBY GRANTED. Yes No

18. APPLICATION VERIFICATION (SEE SPECIAL INSTRUCTIONS)
 Application is submitted herein. I certify that I am familiar with the information contained in the application, and that to the best of my knowledge it is true, complete, and accurate. I further certify that I possess the authority to undertake the proposed activities.

 Authorized Agent

 Date *6-23-15*

 Signature of Applicant or Authorized Agent

 Date

 Signature of Applicant or Authorized Agent

 Date

Corps of Engineers Revised 2010 IL Dep't of Natural Resources IL Environmental Protection Agency Applicant's Copy

SEE INSTRUCTIONS FOR ADDRESS

APPENDIX D
REVISED MONITORING PLAN

1.0 MONITORING PLAN

To satisfy the requirements of the Office of Water Resources (OWR) of the Illinois Department of Natural Resources (IDNR) we have prepared the following five year monitoring plan.

The primary intent of this five year monitoring plan is to demonstrate that the project does not produce impacts to the natural coastal processes (i.e. it does not trap additional sand after construction, and does not produce impacts/erosion to the neighboring properties).

The monitoring plan will include the following project components:

- Beach cell and north beach fillet;
- Coastal structures (groins and backshore revetment).

The following plan has been prepared to conform to IDNR project monitoring and hydrographic survey requirements for Shore-Perpendicular or Offshore Structures. This plan focuses on data collection, data analysis, and summary of findings (project report). The following sub-sections provide an outline for this monitoring in greater detail.

1.1 Project Area to be Monitored

The entire project extents will be monitored, which includes the 200 feet of shoreline (property riparian rights) and an additional 150' updrift of the north property line to include the northern mitigation beach fillet area. See Drawing 11814-PD-090.

1.2 Data Collection

The following sub-sections provide the content that will be included in the monitoring plan.

1.2.1 *Bathymetric and Topographic Surveys*

New bathymetric and topographic surveys (using the site controls established by the 2013 survey) will be conducted. A summary of the proposed survey data collection methods is provided below (the proposed monitoring schedule is presented in Section 1.2.2):

- Survey profiles will be conducted perpendicular to the shoreline and extend from the toe of the existing bluff into Lake Michigan to a point that is 300 feet beyond the offshore extents of the proposed improvements. A total of (8) survey profile transects will be collected at 50' intervals throughout the monitoring area.
- For shallow water depths (less than three feet) to the water's edge, data will be collected by GPS RTK walking survey methods.

- Transects on land may not necessarily correspond directly to those performed in the water. However, the data obtained will be merged with the bathymetric survey data. The merged data set will be used to develop a digital terrain model (DTM). The DTM will be used as a base to which data (and the DTM generated from them) obtained from subsequent surveys can be compared.

1.2.2 Monitoring Schedule

1.2.2.1 Pre-Construction Survey

Coverage: the entire shoreline improvement project extents, which include the 200 feet of shoreline (property riparian rights) and an additional 150' updrift of the north property line to account for the northern mitigation beach fillet area, extending from the toe of the existing bluff (into Lake Michigan to a point that is 300 feet beyond the offshore extents of the proposed improvements. This pre-construction survey will be completed immediately prior to the any construction operations being performed lakeward of the Ordinary High Water Mark (OHWM). The survey will include:

- Bathymetric survey;
- Topographic survey.

1.2.2.2 Post-Construction Survey

Coverage: the entire shoreline improvement project extents, which include the 200 feet of shoreline (property riparian rights) and an additional 150' updrift of the north property line to account for the northern mitigation beach fillet area, extending from the toe of the existing bluff into Lake Michigan to a point that is 300 feet beyond the offshore extents of the proposed improvements. This post construction survey will be performed immediately following the completion of both the north and south groins and placement of all beach sand material. The survey will include:

- Bathymetric survey;
- Topographic survey;

1.2.2.3 One Year after Construction

Coverage: the entire shoreline improvement project extents, which include the 200 feet of shoreline (property riparian rights) and an additional 150' updrift of the north property line to account for the northern mitigation beach fillet area, extending from the toe of the existing bluff into Lake Michigan to a point that is 300 feet beyond the offshore extents of the proposed improvements. This survey will be performed one year following the post construction survey plus or minus one month's time to account for suitable weather and lake conditions. The survey will include:

- Bathymetric survey;

- Topographic survey;

1.2.2.4 Five Years after Construction

Coverage: the entire shoreline improvement project extents, which include the 200 feet of shoreline (property riparian rights) and an additional 150' updrift of the north property line to account for the northern mitigation beach fillet area, extending from the toe of the existing bluff into Lake Michigan to a point that is 300 feet beyond the offshore extents of the proposed improvements. This survey will be performed five years following the post construction survey plus or minus one month's time to account for suitable weather and lake conditions. The survey will include:

- Bathymetric survey;
- Topographic survey;

1.2.3 Data Analysis and Reporting

The data collected during each survey and their subsequent DTM surfaces will be compared to data collected during the previous survey(s). A beach sand net change (volumetric analysis) will be performed and the amounts of accretion and erosion will be determined along the survey transects selected for analysis. The evolution of any sand bypass shoal will also be documented in this dataset.

A report of each data collection and the analyses performed for the monitoring program will be prepared. The report will include a digital map depicting data points, shoreline features, and survey contours.

Each of the surveys performed subsequent to the post-construction survey will yield information regarding the project performance and identify any future operational maintenance priorities for the Owner.

APPENDIX F

PROJECT PURPOSE, NEED, AND BENEFITS

Project Purpose and Need

The purpose of the project is to provide long term shoreline, bluff and site protection.

The existing shore protection is random in nature, is failing, and has not been properly designed or engineered to withstand the coastal conditions at the site. Deterioration of the existing stone structures and erosion of the narrow beach will continue to occur exposing the shoreline and bluff to further erosion and increase the potential for significant damage to site improvements.

Project Benefits

Long Term Shore Protection

The existing shoreline along this reach of Lake Michigan typically consists of very narrow and shallow depth sand beaches. With the construction of harbors and shore protection structures in recent history the supply of natural sand to replenish these beaches has been reduced. In addition, the existing lake bottom consists of cohesive soils which erode at a higher rate without the presence of a protective sand beach layer. This erosion of the lakebed creates deeper water which in turn produces higher waves and accelerates erosion rates along the shoreline. Re-establishing or maintaining a beach system provides an environmentally preferred long term shore protection solution compared to other hard structures. The proposed sand retention structures require less maintenance requirements and site disruption than a design that incorporates shorter structures. The proposed structures have been designed to be more aesthetically pleasing than the existing steel groin fields in the area.

Natural Littoral Processes

The direction of the natural littoral movement of sand along this shoreline of Lake Michigan is predominately from north to south. The proposed sand beach retention structures are designed to not interrupt this natural movement of sand. The area between the structures will be pre-filled with 3,780 cubic yards of native sand material. This pre-filling maintains the natural movement of sand along the shoreline at the existing rate and volume. Although the beach has been designed as a long term shore protection solution, it is anticipated that the pre filled sand will migrate out of the proposed beach during periods of high water levels and significant storm events and contribute additional sand to the downdrift littoral system. The beach will be re-nourished periodically following these events which will provide a long term net increase to the sand in the system. An extensive monitoring plan will be conducted to evaluate to performance of the beach and any impacts on the adjacent property.

Long Term Bluff Stability

Long term bluff stability is dependent upon numerous factors including long term shore protection benefits mentioned above, responsible surface and ground water management, establishing a stable slope and protecting that slope with vegetation. The proposed site improvements include numerous measures to accomplish these factors including: establishing a beach shore protection, surface water management/treatment including infiltration zones, green roof zones, permeable terrace zones and bluff vegetation zones as well as other open lawn infiltration areas. The site is designed to infiltrate over 90% of the annual rainfall event. Any excess surface water is directed into a storm water infiltration basin with native plantings (rain garden) and then infiltrated into various stone layers of the proposed groin, the sand beach and a vegetative beach infiltration zone. The bluff has been engineered and re-graded to a stable slope of 2 (horizontal) to 1 (vertical) slope. The slope will be vegetated including native plantings.

Shore Protection for Adjacent Landowners

The proposed improvements include establishing a fillet beach on the property located immediately to the north. This fillet beach will be constructed with approximately 1,260 cubic yards of native sand material and has been designed to be stable and remain in-place over the long term. This beach will extend approximately 150 feet to the north and provide shore protection, reduce erosion, promote vegetation, enhance bluff stability and provide additional recreational opportunities. These neighbors have provided their approval of the project as indicated in their letter attached in Appendix G.

The neighbors located immediate to the south of the project will also benefit from the formation of a small fillet beach and improved wave protection provided from large storm events approaching their site from the north and northeasterly directions.

Enhanced Habitat

Rubblemound breakwaters and groins provide environmental benefits by creating reef-like or rocky shore habitat for a variety of animals, birds, algae and aquatic plants. This habitat provides a potential food source for fish, and will serve as sheltering, foraging, spawning, and nursery habit for fish and invertebrates. The upland beach area can support additional vegetation including native dune grasses to provide habitat for birds and other wildlife. The beach can also provide opportunities for shore birds. The bluff area will be re-vegetated with a variety of species including natives that will provide cover, food and habitat for a variety of birds and animals. The relatively dense vegetation proposed will discourage some bird species, such as geese, that may have a detrimental impact on water quality.

Pedestrian Beach Access

Pedestrian beach access on the site will be improved. The existing site consists of approximately 50% beach and 50% stone revetment along the water's edge. The proposed beach will be wider than the existing beach plus extend the full length of the property. This will provide continuous beach access along the water line during periods of high water levels. Pedestrian stone steps will be naturally integrated into both the north and south groins to provide easy access over these structures. Nearshore swimming and wading opportunities are consistent with or be improved relative to existing structures in the region.

Boat Navigation

It is anticipated that the project will pose little or no negative impacts to navigation. Due to the existing shallow water depths at the site at the outermost extent of the proposed structures, navigation of large vessels is not possible. The proximity of the existing pier structure located immediately to the south of the project, which extends approximately 230 feet into the lake, currently detours the navigation of small vessels around the existing site. In addition to this structure, numerous other structures (groins fields) exist along the shoreline and also detour existing navigation of small craft offshore. The navigation of small non-motorized vessels such as kayakers can easily navigate in and around the proposed structures. During the rapid development or summer storm events, the beach provides for temporary safe refuge for small craft.

Water Quality

As previously mentioned, the extensive proposed storm water management/treatment system includes infiltration zones, green roof zones, permeable terrace zones and bluff vegetation zones and is designed to infiltrate over 90% of the annual rainfall event. Any excess surface water is directed to the shoreline into a catch basin and then into a storm water infiltration basin with native plantings (rain garden) and then infiltrated into various stone layers of the proposed groin, the sand beach and a vegetative beach infiltration zone. Proposed shore protection, bluff grading and re-vegetation will reduce long term shoreline and bluff erosion, lake bottom erosion, reduce the amount of fine sediment and e coli entering the lake resulting in improved water quality.

Construction

The proposed water based improvements will be constructed primarily with marine based equipment. This equipment will likely include a marine plant equipped with a crane for steel sheet pile driving and stone placement, material barges for delivery of steel and stone, a front-end loader and excavator to assist with stone and sand placement. The delivery of stone and steel materials via barge will eliminate the need for trucks required to deliver materials through the neighborhood streets. The delivery and placement of beach sand may be conducted via land or water.

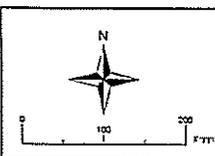
APPENDIX G
SIMILAR REGIONAL PROJECTS



(9) MILES NORTH OF SITE



(1) MILE SOUTH OF SITE



General Note:
 1 HORIZONTAL SCALE (1" = 200') FOR ALL IMAGES
 2 AERIAL IMAGERY (GOOGLE EARTH, 2015)

1175 WHITEBRIDGE HILL RD.

Figure Number
 11814-PD-100

Project Number
 11814.100

Description
 SIMILAR STRUCTURES (SHEET 1 OF 3)

Date of Issue
 24 JUNE 2015

Prepared By

Baird



(1.5) MILES NORTH OF SITE



(1.5) MILES SOUTH OF SITE

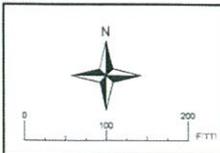
	General Notes 1 HORIZONTAL SCALE: (1" = 200') FOR ALL IMAGES 2 AERIAL IMAGERY (GODDLE EARTH 2015)	1175 WHITEBRIDGE HILL RD.		Prepared By Baird
		Figure Number 11814-PD-110	Project Number 11814.100	
		Descriptor SIMILAR STRUCTURES (SHEET 2 OF 3)	Date Issued 24 JUNE 2015	



(0.25) MILES SOUTH OF SITE



(3) MILES SOUTH OF SITE



General Notes
 1. HORIZONTAL SCALE (1" = 200') FOR ALL IMAGES.
 2. AERIAL IMAGERY (GOOGLE EARTH, 2015).

1175 WHITEBRIDGE HILL RD.

Prepared By:

Figure Number:
11814-PD-120

Project Number:
11814.100

Description:
SIMILAR STRUCTURES (SHEET 3 OF 3)

Date:
24 JUNE 2015

Baird

APPENDIX I

IEPA COORDINATION TRANSMITTAL



Bleck Engineering Company, Inc.
1375 North Western Avenue Lake Forest, IL 60045
T 847.295.5200 F 847.295.7081 W bleckeng.com

February 26, 2015

Memo

To: Thaddeus Faught

From: Joy Corona, PE, CFM

Re: Log #2014-58773
1175 Whitebridge Hill Road, Winnetka

We have had the opportunity to review your comments expressed in your June 26, 2014 letter regarding the above referenced project and related permit application dated March 27, 2014. We understand your water quality concerns and have significantly modified the site plan to incorporate a treatment train throughout the project. We thought the most efficient way to coordinate our re-submittal to address your concerns is to offer this email description and associated Exhibits for your review prior to resubmission. We would appreciate your review of this information and any comments or feedback you may have. We are available to discuss this information via teleconference or in person. We anticipate making a formal re-submittal on February 20th.

The site plan has been reevaluated to eliminate the concern of possible water quality impairments resulting from the project through the modification of the proposed outfall and incorporation a BMP treatment train system throughout the site. Several alternatives of the site plan have been evaluated to eliminate the concerns of water quality impairment and shoreline erosion.

Outfall Modification:

Of most significant note are the changes to the outfall proposed in the coastal area, please refer to Exhibits 1 and 2 - Proposed Stone Beach Retention Groin (plan view, profiles and cross sections). The outfall discharge pipe previously proposed within the groin has been removed. Stormwater will enter a catch basin near the toe of the bluff during peak storm events and flow into a Stormwater Infiltration Basin with native plantings (Rain Garden). From the Rain Garden, stormwater will infiltrate into various stone layers of the groin. During extreme storm events any surface water overflow from this area will be directed north and flow into a Native Vegetated Infiltration Zone along the beach on the north side of the groin and infiltrate into the proposed beach sand.

Please note that primary functions of the sheet pile wall within the groin structure are:

- 1) To prevent stormwater from overflowing onto the neighbor's property;

area prior to the construction of the proposed coastal improvements. Its primary function is to provide shore protection and protection of the patio area improvements should the beach ever be displaced during periods of high water levels and significant storm events.

Introducing rain gardens, bioswales, or an infiltration/detention basin within the limited available space on the landward side of the wall is not desirable because of the hydrostatic loads it will create on the wall and the saturation of sub-base materials beneath the patio area. Introducing a rain garden, bioswale or infiltration/detention basin on the lakeward side of the wall or the back of the sand beach is also problematic. The proposed beach is dynamic over time as it responds to high water levels and storm events. Over the long term the back of the beach can become very narrow. Establishing these features in a very narrow space in dynamic conditions would be difficult and likely require a high degree of maintenance. In addition, saturating the sand beach with treated storm water can liquefy the sand blanket, reduce the slope and stability of the beach and accelerate the lakeward migration of sand out of the beach area.

- ***Infiltrate the treated stormwater into the southern stone groin north of a single walled impermeable sand containment barrier***

In all alternatives mentioned above, and as part of creating a stable beach, it is essential that a vertical impermeable sand containment barrier be provided within the interior of the southern stone groin. This containment prevents the southerly migration of sand from moving out of the beach cell, through the groin, and downdrift of the site. In this alternative treated storm water is routed from the manhole located at the toe of the bluff into a rain garden. The rain garden has been sized to be as large as reasonably possible given the topography of the proposed bluff. As the storm water infiltrates and filters through the rain garden, it further infiltrates along the north side of the impermeable vertical layer in the stone groin into the filter stone of the groin and the sand beach. Overflow water would be directed to a vegetative infiltration zone in the far southwest corner of the beach. This infiltration zone is sized based upon on the largest portion of the beach that is anticipated to be stable over the long term.

This alternative was depicted in the supplemental information memo provided to the IEPA dated February 11, 2015, prior to the anticipated permit pre-submission on February 20th, 2015. Upon further analysis it was determined that sand that accumulates on the north side on the vertical impermeable containment may not have the capacity to infiltrate the treated storm water during periods of the design storm event. Storm water routed to the north side of the containment would take the path of least resistance and migrate along the top of the sand at the same elevation of the vertical containment and then gully wash randomly on the beach. This would be an uncontrolled situation, be unsightly, inhibit pedestrian circulation across the beach, cause a safety concern and require constant maintenance.

- ***Infiltrate the treated storm water into the southern stone groin between a double parallel wall impermeable sand containment barrier.***

This alternative is similar to the alternative above with a slight modification. The single wall impermeable sand containment is relocated to a position within the groin which is in alignment with the northerly crest line of the structure. This containment extends the entire length of the groin and its primary purpose is to contain sand in the beach area. A second shorter containment wall extends parallel to the primary containment and terminates approximately midway along the south crest line of the structure. The top elevation of this containment wall is slightly higher than the northerly containment wall. After the water infiltrates through the rain garden it is routed between the parallel walls. The beach sand migrating south through the groin structure will be contained by the first impermeable surface. This will protect the area between the parallel containment to be free of sand and provide a greater capacity to infiltrate treated storm water during peak storm events. Because the containment to the south is at a slightly higher elevation any overflow that would occur during a significant event would be directed to the north into the sand beach area. This overflow would gully wash over the beach in an uncontrolled fashion as described in the previous alternative; however, since the alternative introduces a much greater capacity to infiltrate the treated stormwater, this situation is anticipated to occur very infrequently. This has been selected as the preferred alternative to be advanced during the final design phase.

- **Connection to existing outfalls.**

There is an existing storm sewer outfall located to the southeast of the property. The feasibility of connecting into this outfall was explored. It was determined that the use of system proposed significant engineering challenges and limited the opportunity of several aspects of the overall treatment train currently proposed.

Attachments:

Exhibits 1 and 2 - Proposed Stone Beach Retention Groin
Exhibits 3 and 4 - Best Management Practices
Exhibit 5 - Drainage Area
EcoCat - February 26, 2015

Applicant: Bleck Engineering
Contact: Joy Corona
Address: 1375 Northwestern Avenue
Lake Forest, IL 60045

IDNR Project Number: 1509727
Date: 02/26/2015
Alternate Number: 2014-58773,
1301006

Project: Whitebridge Hill Residence
Address: 1175 Whitebridge Hill Road, Winnetka

Description: Renovation and addition to existing single family residence

Natural Resource Review Results

Consultation for Endangered Species Protection and Natural Areas Preservation (Part 1075)

The Illinois Natural Heritage Database shows the following protected resources may be in the vicinity of the project location:

Glencoe Botanical Area INAI Site
Hubbard Woods Site INAI Site

An IDNR staff member will evaluate this information and contact you to request additional information or to terminate consultation if adverse effects are unlikely.

Location

The applicant is responsible for the accuracy of the location submitted for the project.

County: Cook

Township, Range, Section:
42N, 13E, 8



IL Department of Natural Resources
Contact
Karen Miller
217-785-5500
Division of Ecosystems & Environment

Local or State Government Jurisdiction
IL Environmental Protection Agency
Thaddeus Faught
1021 North Grand Avenue East
PO Box 19276
Springfield, Illinois 62794

Disclaimer

The Illinois Natural Heritage Database cannot provide a conclusive statement on the presence, absence, or condition of natural resources in Illinois. This review reflects the information existing in the Database at the time of this inquiry, and should not be regarded as a final statement on the site being considered, nor should it be a substitute for detailed site surveys or field surveys required for environmental assessments. If additional protected resources are encountered during the project's implementation, compliance with applicable statutes and regulations is required.

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Privacy

EcoCAT generates a public record subject to disclosure under the Freedom of Information Act. Otherwise, IDNR uses the information submitted to EcoCAT solely for internal tracking purposes.

1175 Whitebridge Hill Road

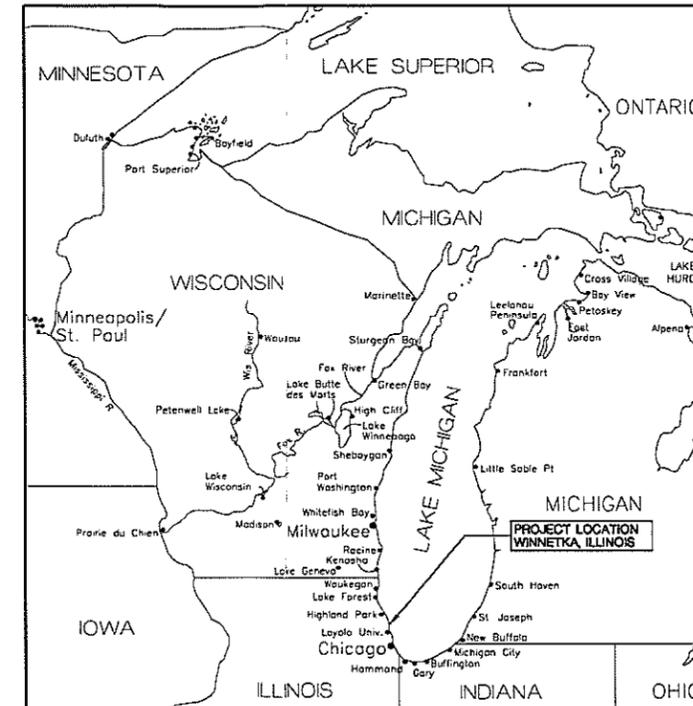
Village of Winnetka, Illinois

Shoreline Improvements

DRAWING INDEX

PERMIT RESUBMISSION DRAWINGS

TITLE	DRAWING NUMBER
TITLE SHEET - DRAWING INDEX	11814-PD-000
EXISTING CONDITIONS	11814-PD-010
PROPOSED IMPROVEMENTS - PLANVIEW	11814-PD-020
PROPOSED IMPROVEMENTS - DETAILED PLAN AND SECTION	11814-PD-030
PROPOSED IMPROVEMENTS - DETAILED PLAN AND SECTION	11814-PD-040
PROPOSED IMPROVEMENTS - SECTIONS AND DETAILS	11814-PD-050
PROPOSED IMPROVEMENTS - SECTIONS AND DETAILS	11814-PD-060
PROPOSED IMPROVEMENTS - BOAT LAUNCH RAMP	11814-PD-070
ADJACENT PROPERTIES	11814-PD-080
PROJECT MONITORING PLAN	11814-PD-090



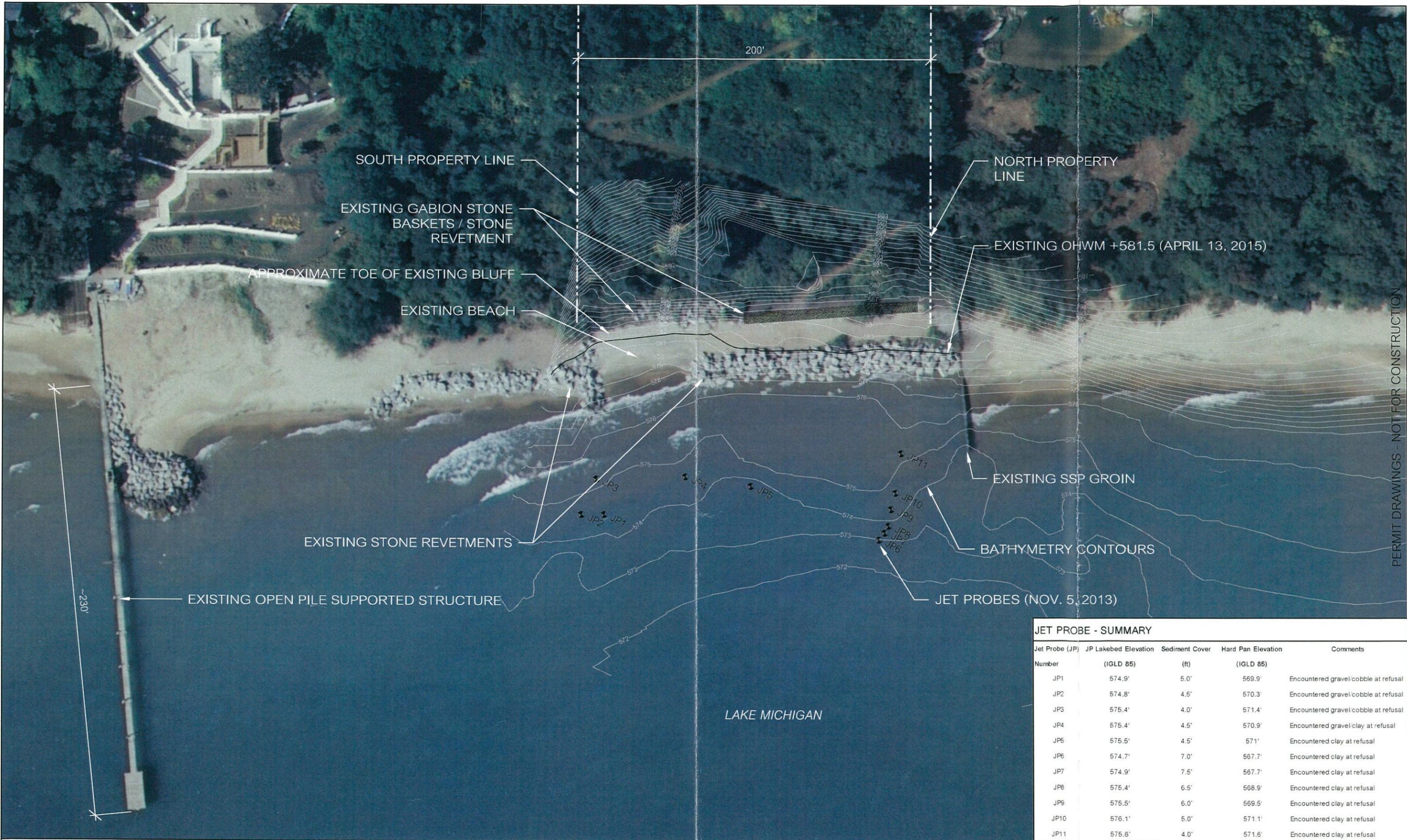
Applicant:

Chicago Title Land Trust Company
 c/o Mr. Michael Durkin
 604 Vernon Avenue
 Glencoe, IL 60022
 PH: 847-581-4214

Consultant:

Coastal Engineer:
 W. F. Baird & Associates Ltd.
 2981 Yarmouth Greenway Dr.
 Madison, WI 53711
 PH: 608-273-0592

JUNE 24, 2015
 DRAWING NUMBER: 11814-PD-000



PERMIT DRAWINGS - NOT FOR CONSTRUCTION

JET PROBE - SUMMARY				
Jet Probe (JP) Number	JP Lakebed Elevation (IGLD 85)	Sediment Cover (ft)	Hard Pan Elevation (IGLD 85)	Comments
JP1	574.9'	5.0'	569.9'	Encountered gravel/cobble at refusal
JP2	574.8'	4.5'	570.3'	Encountered gravel/cobble at refusal
JP3	575.4'	4.0'	571.4'	Encountered gravel/cobble at refusal
JP4	575.4'	4.5'	570.9'	Encountered gravel/clay at refusal
JP5	575.5'	4.5'	571'	Encountered clay at refusal
JP6	574.7'	7.0'	567.7'	Encountered clay at refusal
JP7	574.9'	7.5'	567.7'	Encountered clay at refusal
JP8	575.4'	6.5'	568.9'	Encountered clay at refusal
JP9	575.5'	6.0'	569.5'	Encountered clay at refusal
JP10	576.1'	5.0'	571.1'	Encountered clay at refusal
JP11	575.6'	4.0'	571.6'	Encountered clay at refusal

- General Notes:
- ALL ELEVATIONS ARE IN FEET, REFERENCED TO IGLD 85.
 - +0.0 LOW WATER DATUM (LWD) = +577.5 (IGLD 85) = +578.1 (NAVD 88).
 - ORDINARY HIGH WATER MARK (OHWM) = +581.5' (IGLD 85).
 - ALL DISTANCES ARE IN FEET.
 - AERIAL IMAGERY: USGS (MAY, 2008).
 - SITE SURVEY DATA (TOPOGRAPHIC AND BATHYMETRIC) COLLECTED BY BLECK ENGINEERING COMPANY (NOVEMBER 3, 2010, NOVEMBER 13, 2013, AND APRIL 13, 2015), ILLINOIS STATE PLANE EAST.
 - WATER ELEVATION = +578.26 (IGLD 85) (NOVEMBER 13, 2013).

- PROPERTY LINE INFORMATION FROM BLECK ENGINEERING COMPANY DRAWING VIA B.H. SUHR & COMPANY, INC. (REVISED SEPTEMBER 1, 2010).
- JET PROBE DATA COLLECTED AND COMPILED BY BAIRD (NOVEMBER 05, 2013).



REV	DESCRIPTION	RPA	CWM	LTB	DATE
A	PERMIT DRAWING				24-06-15
REV	T.I.	DRN	DSN	APR	DATE

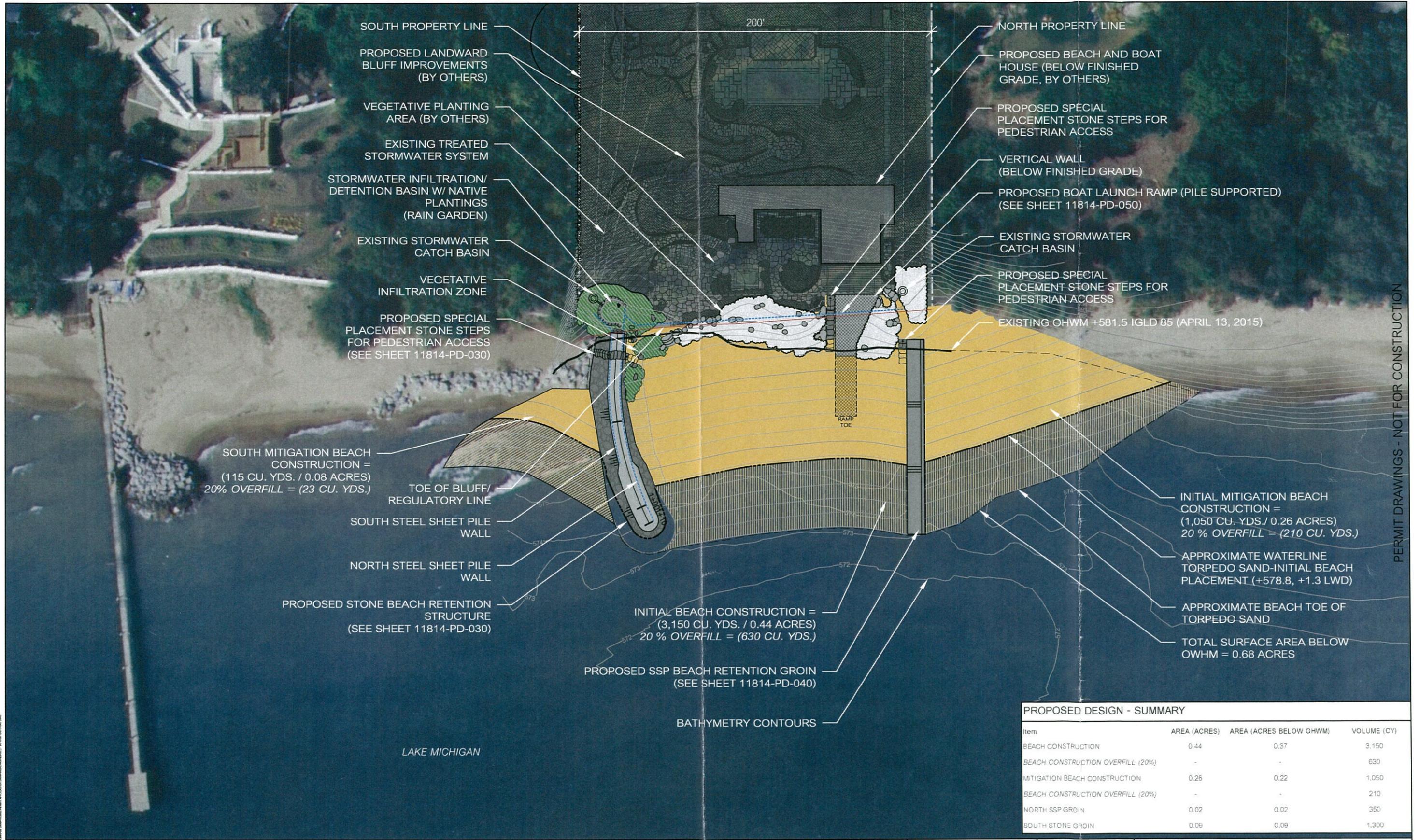
REVISIONS					
(1) I.D.	(A) PRELIMINARY	(C) FOR APPROVAL	(F) CONTRACT OCCUPANT	(S) AS BUILT	
(2) OF 25, 26	(B) FOR REVIEW	(D) FOR INFORMATION	(G) FOR CONSTRUCTION	(H) CANCELLED	

PREPARED BY

 W.F. Baird & Associates Ltd.

1175 WHITEBRIDGE HILL RD.
 EXISTING CONDITIONS
 DRAWING NUMBER 11814 PD 010 REV A DATE 24 JUN 15

DATE PLOTTED: 6/11/2015 3:20:10 PM



SOUTH PROPERTY LINE

PROPOSED LANDWARD BLUFF IMPROVEMENTS (BY OTHERS)

VEGETATIVE PLANTING AREA (BY OTHERS)

EXISTING TREATED STORMWATER SYSTEM

STORMWATER INFILTRATION/ DETENTION BASIN W/ NATIVE PLANTINGS (RAIN GARDEN)

EXISTING STORMWATER CATCH BASIN

VEGETATIVE INFILTRATION ZONE

PROPOSED SPECIAL PLACEMENT STONE STEPS FOR PEDESTRIAN ACCESS (SEE SHEET 11814-PD-030)

NORTH PROPERTY LINE

PROPOSED BEACH AND BOAT HOUSE (BELOW FINISHED GRADE, BY OTHERS)

PROPOSED SPECIAL PLACEMENT STONE STEPS FOR PEDESTRIAN ACCESS

VERTICAL WALL (BELOW FINISHED GRADE)

PROPOSED BOAT LAUNCH RAMP (PILE SUPPORTED) (SEE SHEET 11814-PD-050)

EXISTING STORMWATER CATCH BASIN

PROPOSED SPECIAL PLACEMENT STONE STEPS FOR PEDESTRIAN ACCESS

EXISTING OHWM +581.5 IGLD 85 (APRIL 13, 2015)

SOUTH MITIGATION BEACH CONSTRUCTION = (115 CU. YDS. / 0.08 ACRES) 20% OVERFILL = (23 CU. YDS.)

TOE OF BLUFF/ REGULATORY LINE

SOUTH STEEL SHEET PILE WALL

NORTH STEEL SHEET PILE WALL

PROPOSED STONE BEACH RETENTION STRUCTURE (SEE SHEET 11814-PD-030)

INITIAL BEACH CONSTRUCTION = (3,150 CU. YDS. / 0.44 ACRES) 20% OVERFILL = (630 CU. YDS.)

PROPOSED SSP BEACH RETENTION GROIN (SEE SHEET 11814-PD-040)

BATHYMETRY CONTOURS

INITIAL MITIGATION BEACH CONSTRUCTION = (1,050 CU. YDS. / 0.26 ACRES) 20% OVERFILL = (210 CU. YDS.)

APPROXIMATE WATERLINE TORPEDO SAND-INITIAL BEACH PLACEMENT (+578.8, +1.3 LWD)

APPROXIMATE BEACH TOE OF TORPEDO SAND

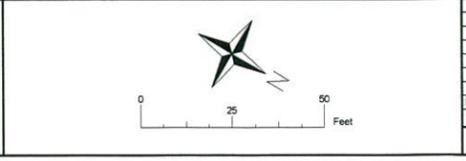
TOTAL SURFACE AREA BELOW OHWM = 0.68 ACRES

PROPOSED DESIGN - SUMMARY

Item	AREA (ACRES)	AREA (ACRES BELOW OHWM)	VOLUME (CY)
BEACH CONSTRUCTION	0.44	0.37	3,150
BEACH CONSTRUCTION OVERFILL (20%)	-	-	630
MITIGATION BEACH CONSTRUCTION	0.26	0.22	1,050
BEACH CONSTRUCTION OVERFILL (20%)	-	-	210
NORTH SSP GROIN	0.02	0.02	350
SOUTH STONE GROIN	0.09	0.09	1,300

General Notes:

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- +0.0 LOW WATER DATUM (LWD) = +577.5 (IGLD 85) = +578.1 (NAVD 88)
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- ALL DISTANCES ARE IN FEET
- AERIAL IMAGERY: USGS (MAY 2008)
- SITE SURVEY DATA (TOPOGRAPHIC AND BATHYMETRIC) COLLECTED BY BLECK ENGINEERING COMPANY (NOVEMBER 3, 2010, NOVEMBER 13, 2013, AND APRIL 13, 2015). ILLINOIS STATE PLANE EAST
- WATER ELEVATION = +578.26 (IGLD 85) (NOVEMBER 13, 2013)
- PROPERTY LINE INFORMATION FROM BLECK ENGINEERING COMPANY DRAWING VIA B.H. SUHR & COMPANY, INC. (REVISED SEPTEMBER 1, 2010)
- JET PROBE DATA COLLECTED AND COMPILED BY BAIRD (NOVEMBER 05, 2013)



REV	T.I.	DESCRIPTION	DRN	DSN	APR	DATE
B	A	PERMIT DRAWING (UPDATED REGULATORY LINE)	RPA	CMM	LTB	20-07-15
A	A	PERMIT DRAWING	RPA	CMM	LTB	24-06-15

REVISIONS

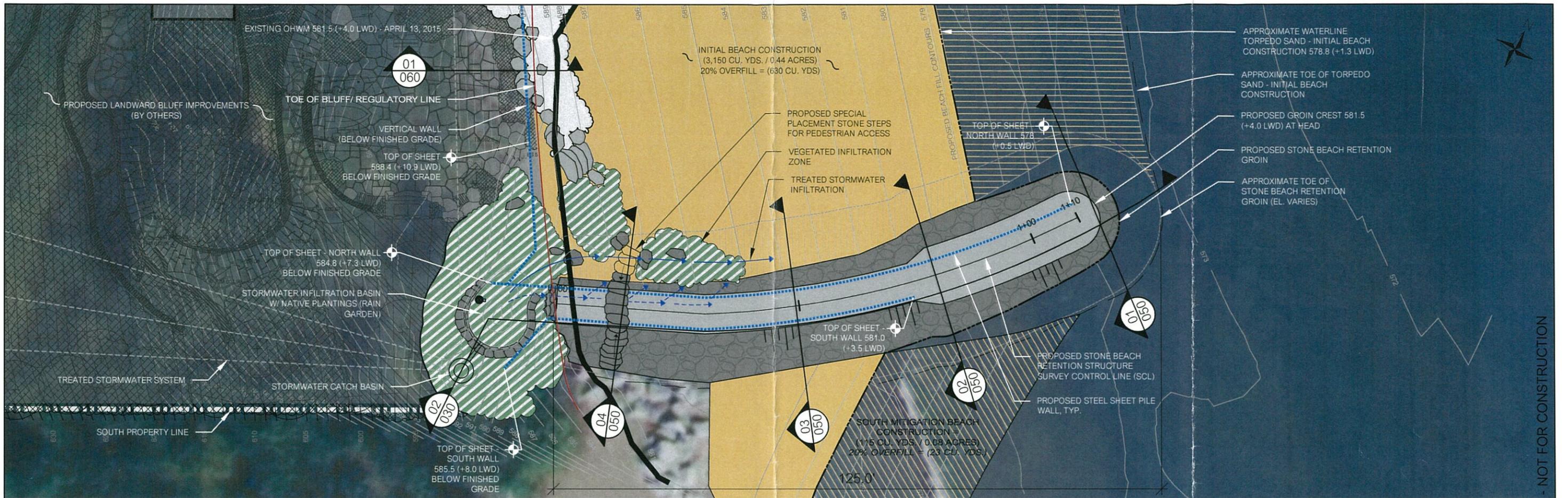
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PREPARED BY: **Baird**
W.F. Baird & Associates Ltd.

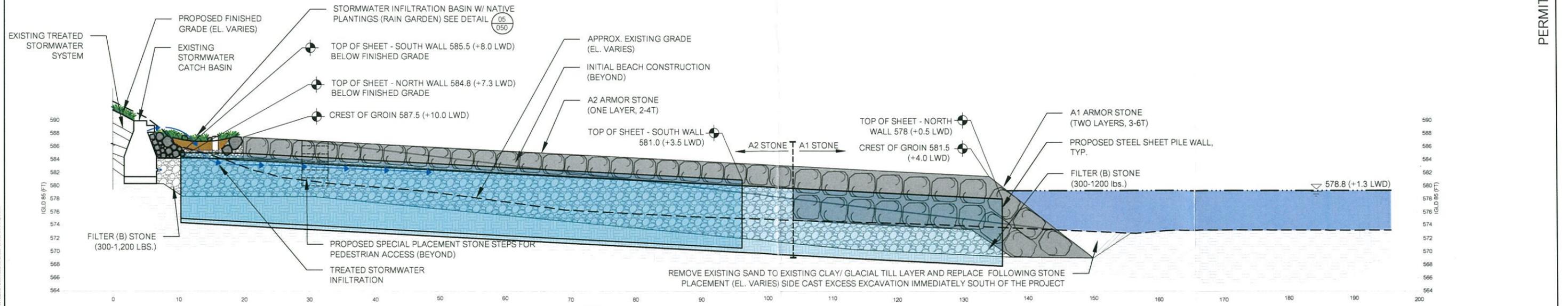
1175 WHITEBRIDGE HILL RD.
PROPOSED IMPROVEMENTS - OVERALL PLAN

DRAWING NUMBER: 11814 - PD - 020 REV B DATE: 20 JULY 15

PERMIT DRAWINGS - NOT FOR CONSTRUCTION



01 CONCEPTUAL PLAN
030 PROPOSED STONE BEACH RETENTION STRUCTURE



02 CONCEPTUAL PROFILE
030 PROPOSED STONE BEACH RETENTION STRUCTURE

General Notes:

- ALL ELEVATIONS ARE IN FEET, REFERENCED TO IGLD 85
- 40.0 LOW WATER DATUM (LWD) = +577.5 (IGLD 85) = +578.1 (NAVD 88)
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- AERIAL IMAGERY USGS (MAY 2008)
- SITE SURVEY DATA (TOPOGRAPHIC AND BATHYMETRIC) COLLECTED BY BLECK ENGINEERING COMPANY (NOVEMBER 3, 2010, NOVEMBER 13, 2013, AND APRIL 13, 2015), ILLINOIS STATE PLANE EAST
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- JET PROBE DATA COLLECTED AND COMPILED BY BAIRD (NOVEMBER 05, 2013)

REV	T.I.	DESCRIPTION	DRN	DSN	APR	DATE
B	A	PERMIT DRAWING (UPDATED REGULATORY LINE)	RPA	CM	LTB	20-07-15
A	A	PERMIT DRAWING	RPA	CM	LTB	24-06-15

TYPE OF ISSUE	(1) PRELIMINARY	(2) FOR APPROVAL	(3) FOR INFORMATION	(4) CONTRACT DOCUMENT	(5) FOR CONSTRUCTION	(6) CANCELED
REVISIONS						

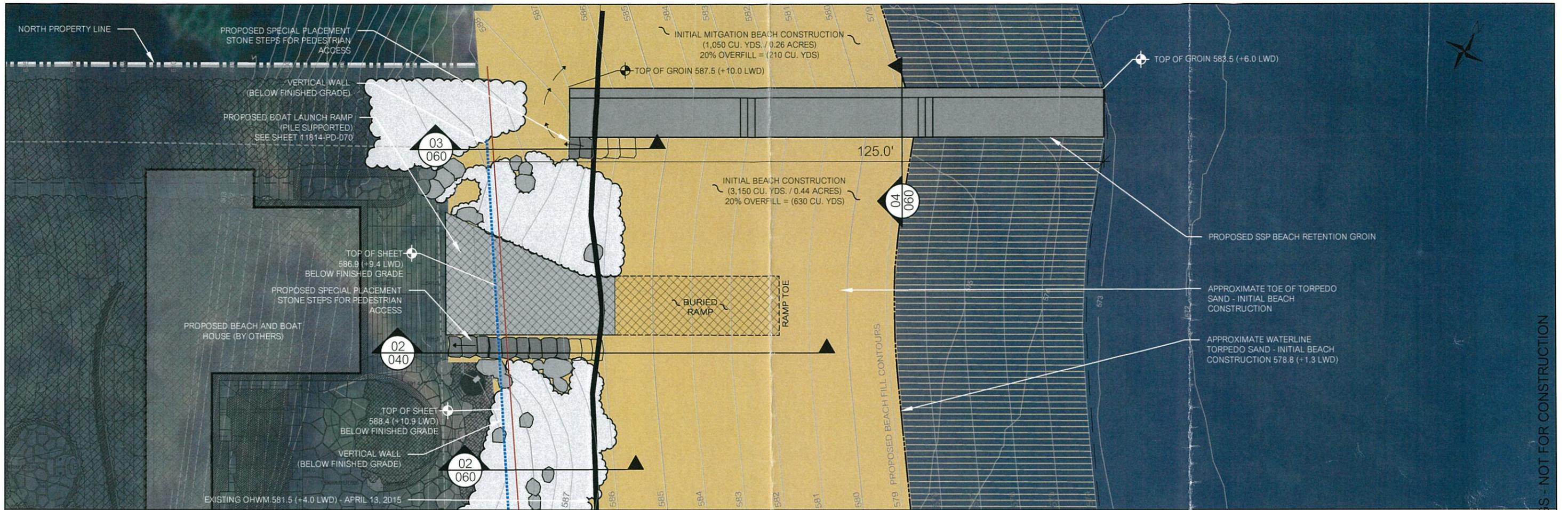
PREPARED BY: **Baird**
W.F. Baird & Associates Ltd.

1175 WHITEBRIDGE HILL RD.
PROPOSED IMPROVEMENTS - DETAILED PLAN AND SECTION

DRAWING NUMBER: 11814 - PD - 030

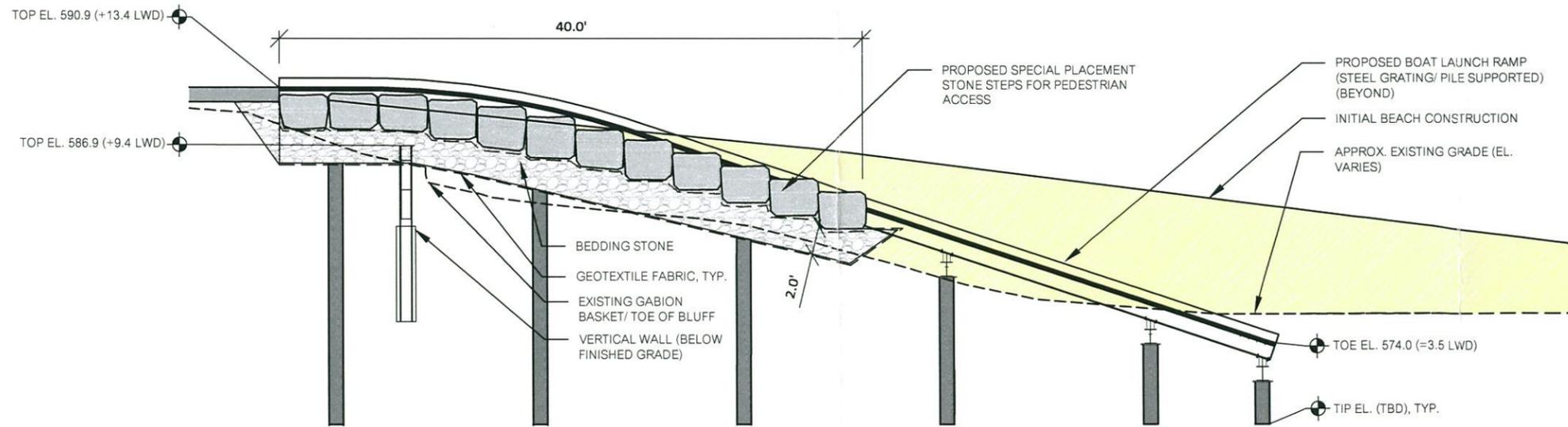
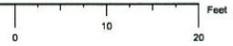
DATE: 20 JUL 15

PERMIT DRAWINGS - NOT FOR CONSTRUCTION



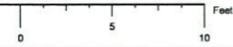
01 CONCEPTUAL PLAN

040 PROPOSED STEEL SHEET PILE BEACH RETENTION STRUCTURE AND BOAT LAUNCH RAMP



02 CONCEPTUAL CROSS SECTION

040 PROPOSED SPECIAL PLACEMENT STONE ACCESS STEPS



- General Notes:
- ALL ELEVATIONS ARE IN FEET, REFERENCED TO IGLD 85
 - +0.0 LOW WATER DATUM (LWD) = +577.5 (IGLD 85) = +578.1 (NAVD 88)
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- JET PROBE DATA COLLECTED AND COMPILED BY BAIRD (NOVEMBER 05, 2013)

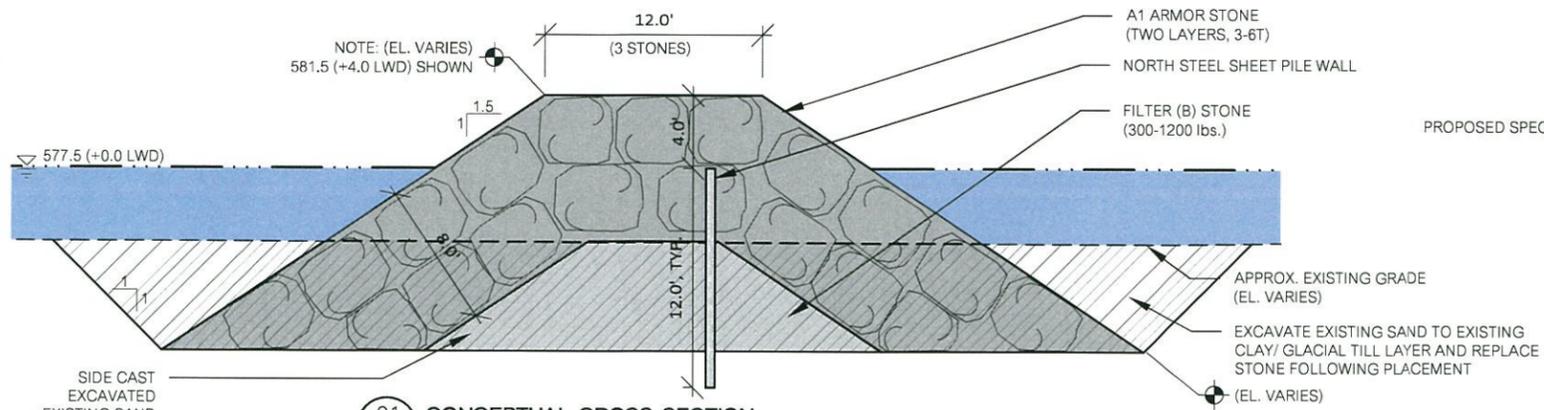
REV	T.I.	DESCRIPTION	RPA	CMM	LTB	24-06-15
A	A	PERMIT DRAWING				

REVISIONS			
(1) TYPE OF ISSUE	(A) PRELIMINARY	(C) FOR APPROVAL	(E) CONTRACT DOCUMENT
	(B) FOR REVIEW	(D) FOR INFORMATION	(F) FOR CONSTRUCTION
			(G) AS BUILT
			(H) CANCELED

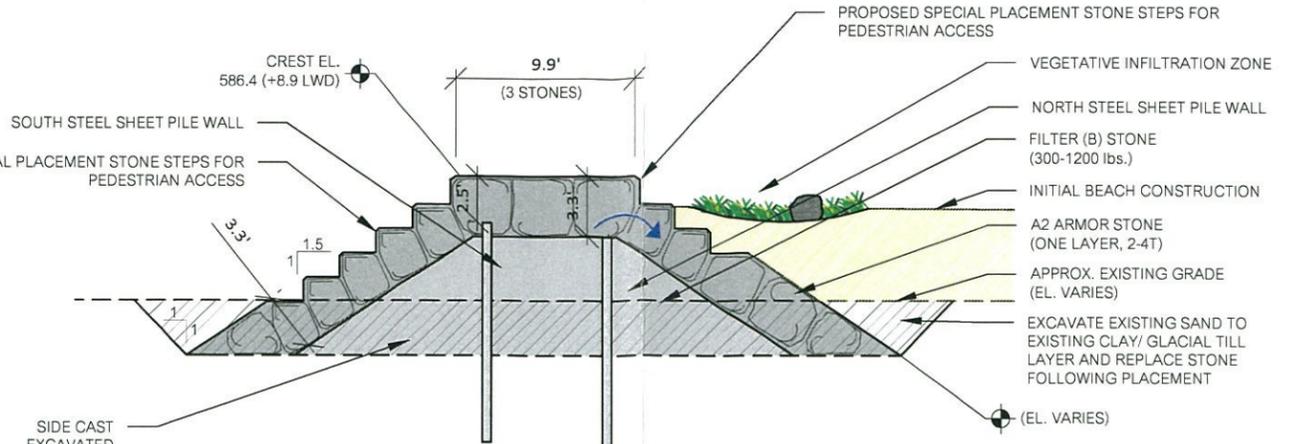
PREPARED BY:
Baird
 W.F. Baird & Associates Ltd.

1175 WHITEBRIDGE HILL RD.
 PROPOSED IMPROVEMENTS - DETAILED PLAN AND SECTION
 DRAWING NUMBER: 11814 - PD - 040
 REV. A DATE: 24 JUN 15

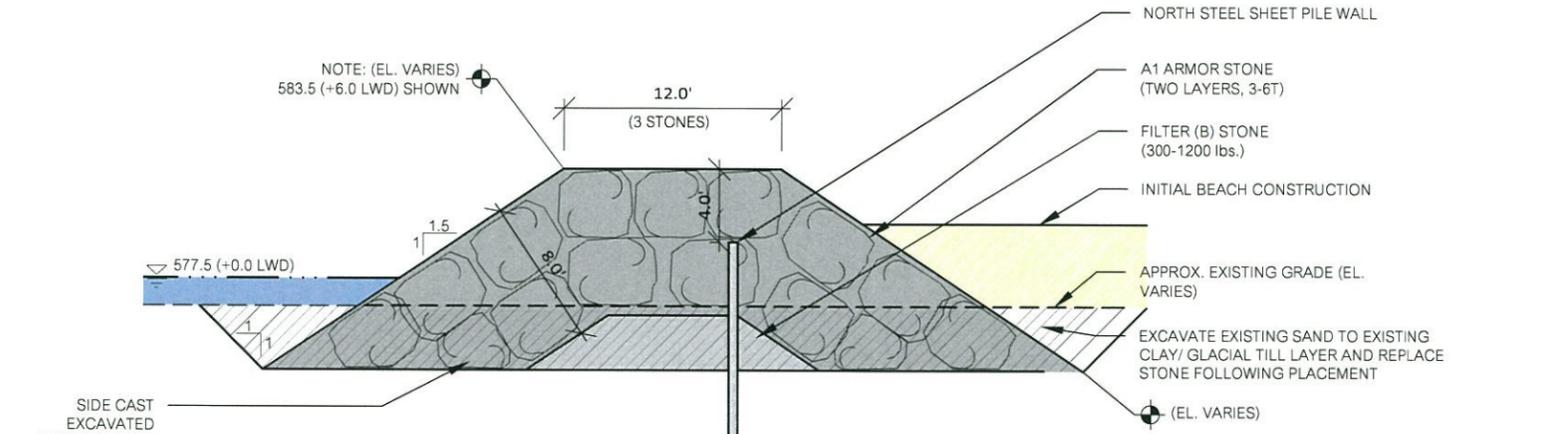
PERMIT DRAWINGS - NOT FOR CONSTRUCTION



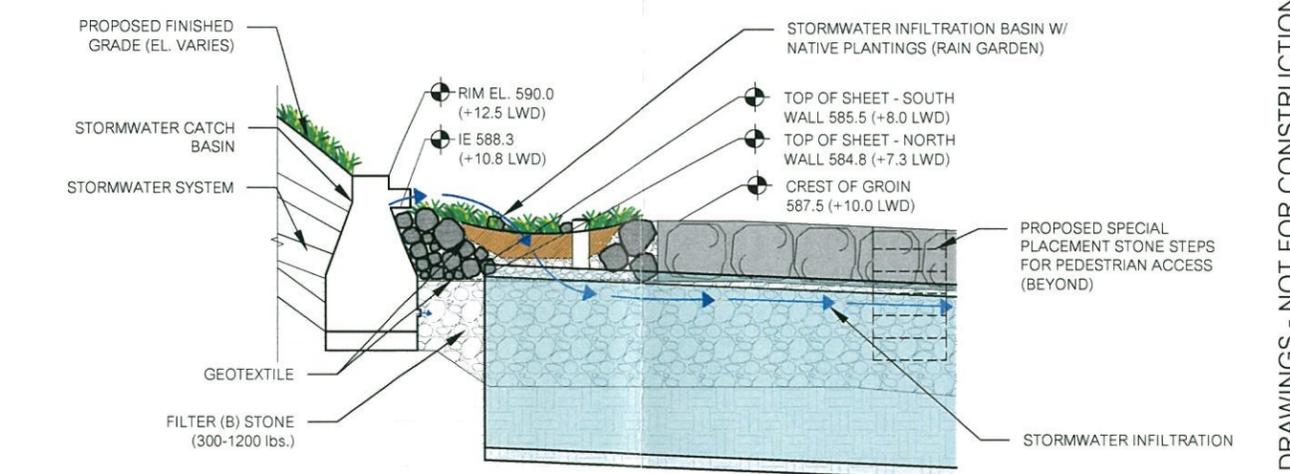
01 CONCEPTUAL CROSS SECTION
050 STONE GROIN - HEAD SECTION



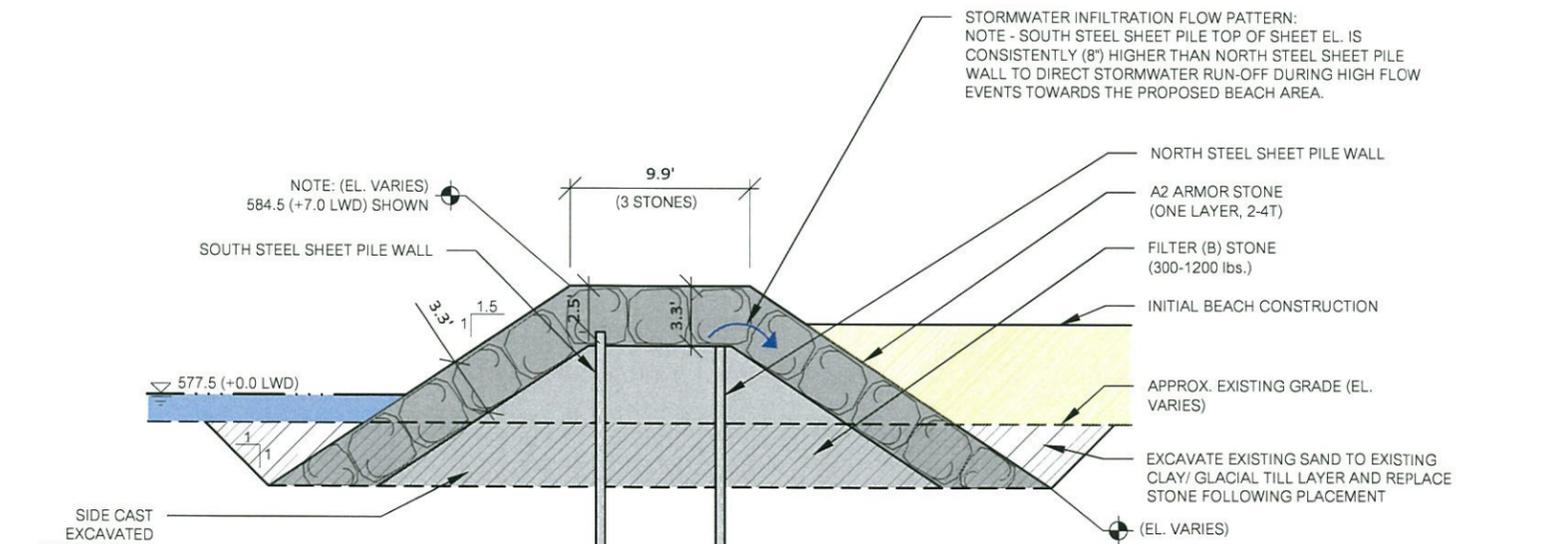
04 CONCEPTUAL CROSS SECTION
050 STONE GROIN ROOT WITH PEDESTRIAN ACCESS



02 CONCEPTUAL CROSS SECTION
050 STONE GROIN - STATION (1+10.0') - (0+80.0')



05 CONCEPTUAL CROSS SECTION
050 STORMWATER INFILTRATION BASIN (RAIN GARDEN)



03 CONCEPTUAL CROSS SECTION
050 STONE GROIN - STATION (0+80.0') - (0+00.0')



06 CONCEPTUAL IMAGE
060 PROPOSED SPECIAL PLACEMENT STONE STEPS FOR PEDESTRIAN ACCESS CHARACTER IMAGE

- General Notes:
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 - JET PROBE DATA COLLECTED AND COMPILED BY BAIRD (NOVEMBER 05, 2013).

REV	T.I.	DESCRIPTION	RFA	MJC	LTR	26-0616
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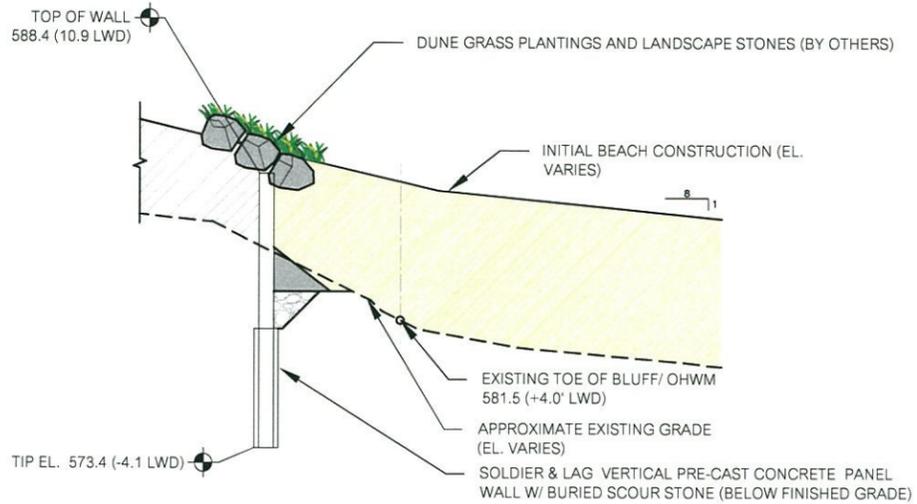
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(1) AS BUILT	(2) FOR CONSTRUCTION
(3) FOR INFORMATION	(4) CANCELED
(5) FOR REVIEW	(6) FOR APPROVAL
(7) FOR CONSTRUCTION	(8) FOR CONSTRUCTION

REV	T.I.	DESCRIPTION	RFA	MJC	LTR	26-0616
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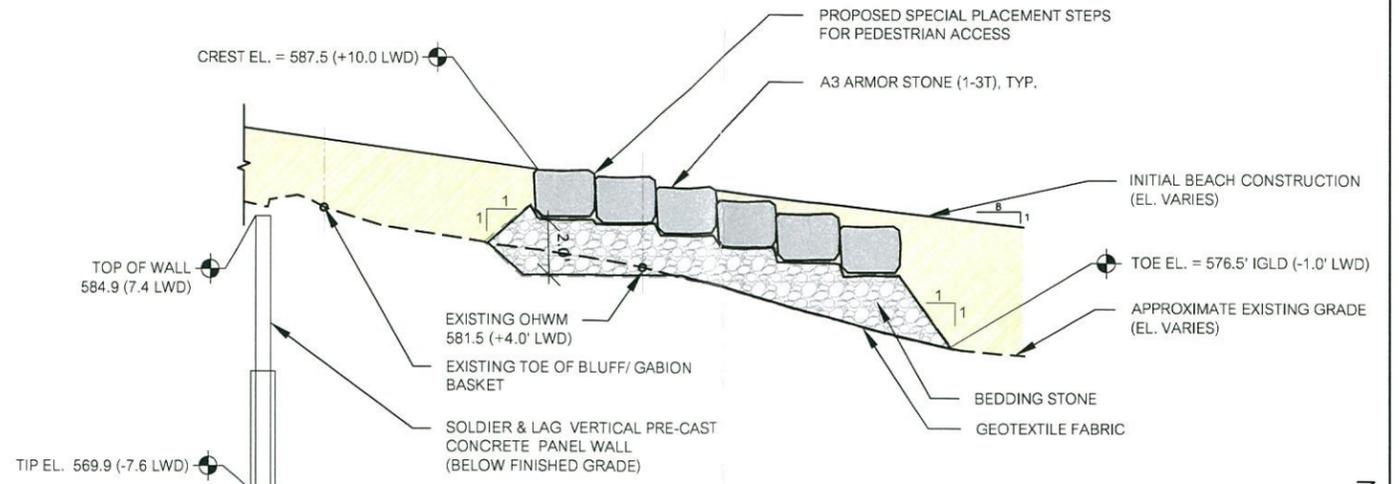
PREPARED BY
Baird
W.F. Baird & Associates Ltd.

1175 WHITEBRIDGE HILL RD.
PROPOSED SECTIONS AND DETAILS
DRAWING NUMBER 11814 - PD - 050
REV A DATE 24 JUN 15

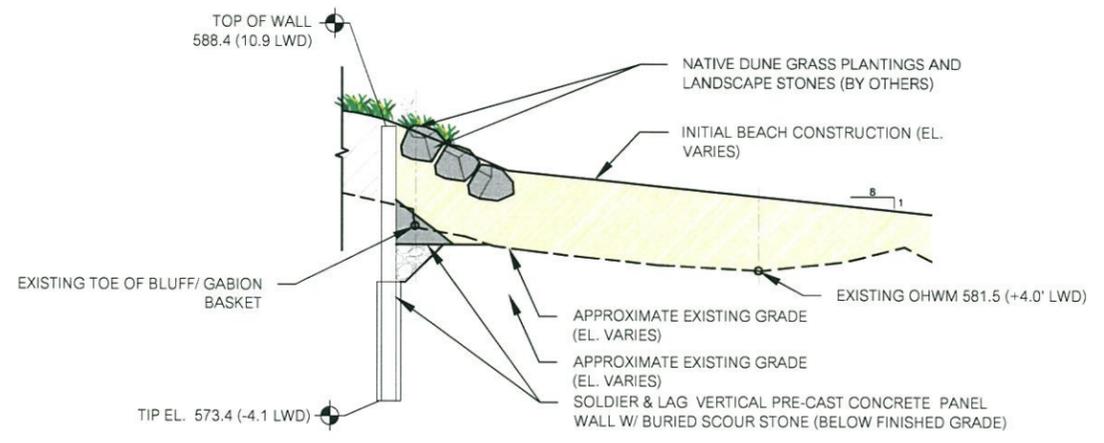
PERMIT DRAWINGS - NOT FOR CONSTRUCTION



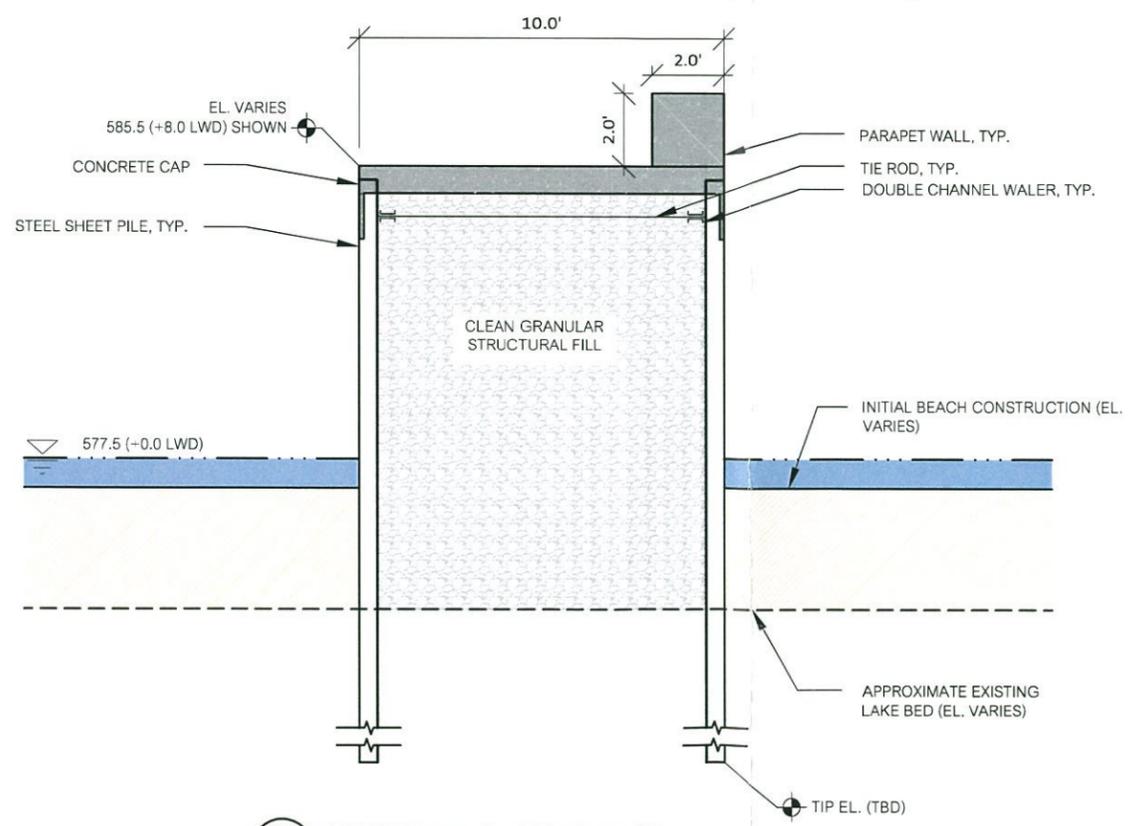
01 CONCEPTUAL CROSS SECTION
060 VERTICAL WALL



03 CONCEPTUAL CROSS SECTION
060 SPECIAL PLACEMENT STEPS AND VERTICAL WALL



02 CONCEPTUAL CROSS SECTION
060 VERTICAL WALL



04 CONCEPTUAL CROSS SECTION
060 SSP BEACH RETENTION STRUCTURE

PERMIT DRAWINGS - NOT FOR CONSTRUCTION

- General Notes:**
- ALL ELEVATIONS ARE IN FEET REFERENCED TO IGLD 85.
 - +0.0 LOW WATER DATUM (LWD) = +577.5 (IGLD 85) = +578.1 (NAVD 88).
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 - WATER ELEVATION = +578.26 (IGLD 85) (NOVEMBER 13, 2013).

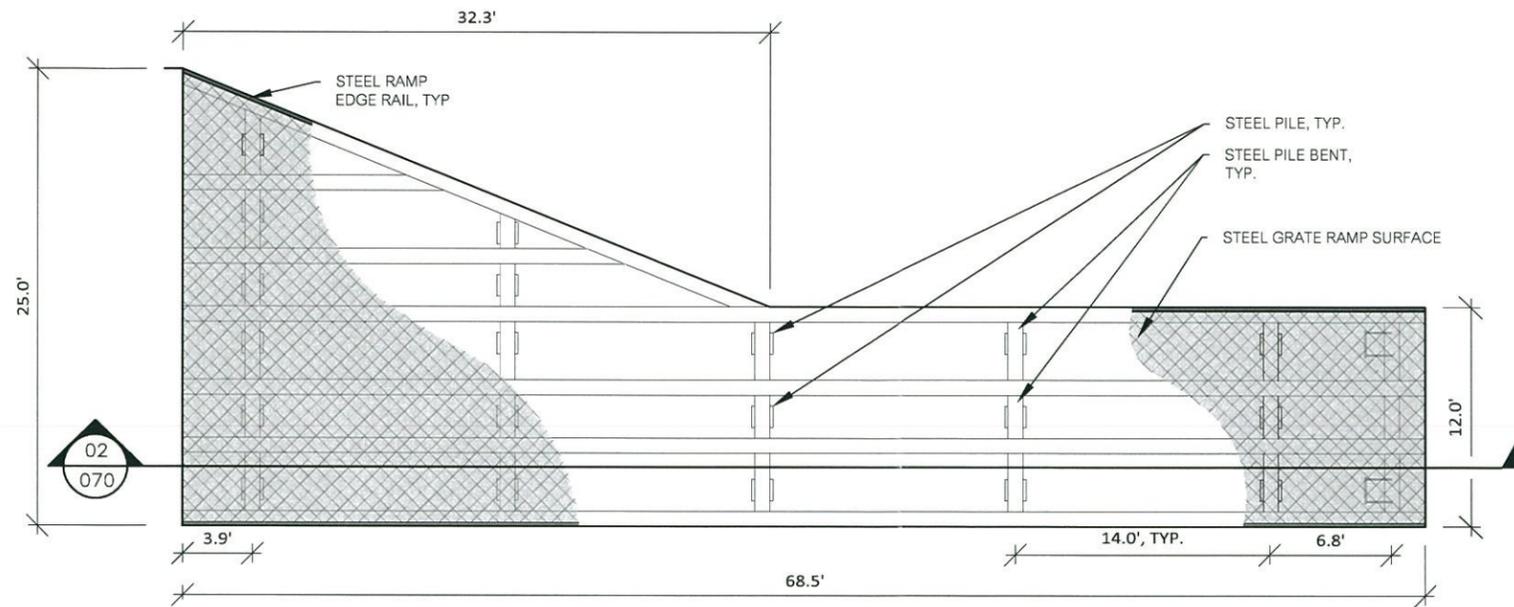
- PROPERTY LINE INFORMATION FROM BLECK ENGINEERING COMPANY DRAWING VIA B.H. SUHR & COMPANY, INC. (REVISED SEPTEMBER 1, 2010).
- JET PROBE DATA COLLECTED AND COMPILED BY BAIRD (NOVEMBER 05, 2013).

REV	T.J.	DESCRIPTION	DRN	DSN	APR	DATE
REVISIONS						
(1)	(A)	PREP. DRAWING	(2)	(B)	(3)	(4)
(2)	(A)	FOR REVIEW	(3)	(B)	(4)	(5)
(3)	(A)	FOR INFORMATION	(4)	(B)	(5)	(6)
(4)	(A)	FOR CONSTRUCTION	(5)	(B)	(6)	(7)
(5)	(A)	CANCELLED	(6)	(B)	(7)	(8)

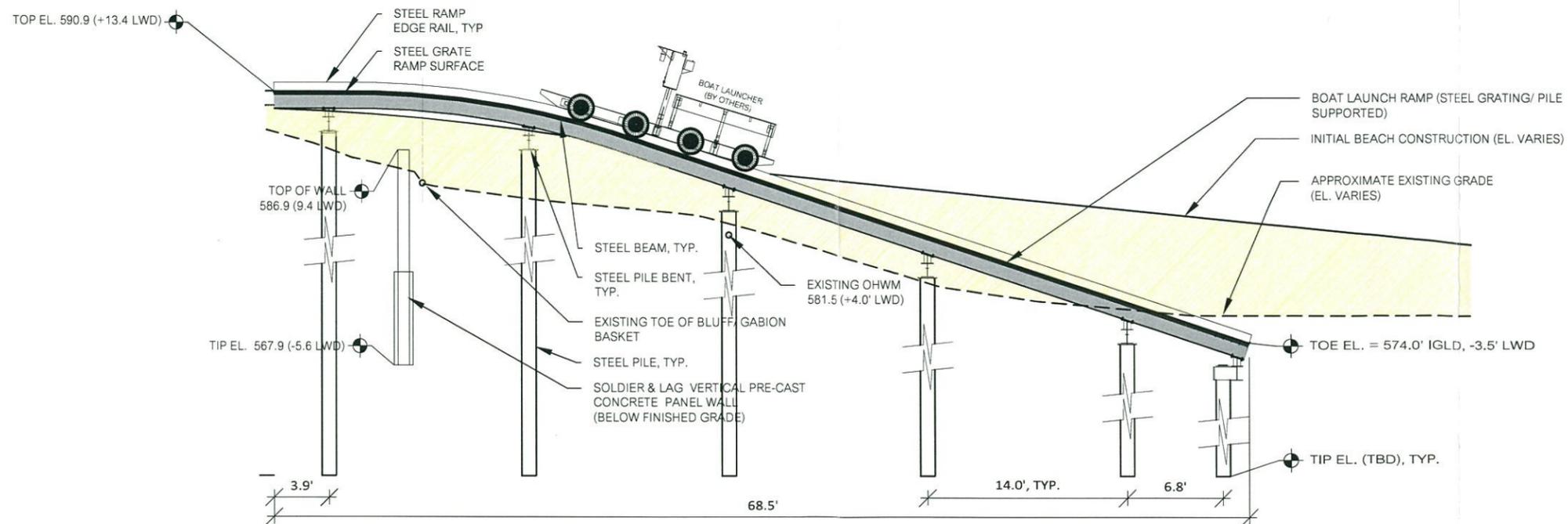
PREPARED BY
Baird
 W.F. Baird & Associates Ltd.

1175 WHITEBRIDGE HILL RD.
 PROPOSED SECTIONS AND DETAILS

DRAWING NUMBER: 11814 - PD - 060
 REV. A DATE: 24 JUN 15



01 CONCEPTUAL PLAN
070 BOAT LAUNCH RAMP - PER MANUFACTURER



02 CONCEPTUAL CROSS SECTION
070 BOAT LAUNCH RAMP - PER MANUFACTURER

PERMIT DRAWINGS - NOT FOR CONSTRUCTION

General Notes:

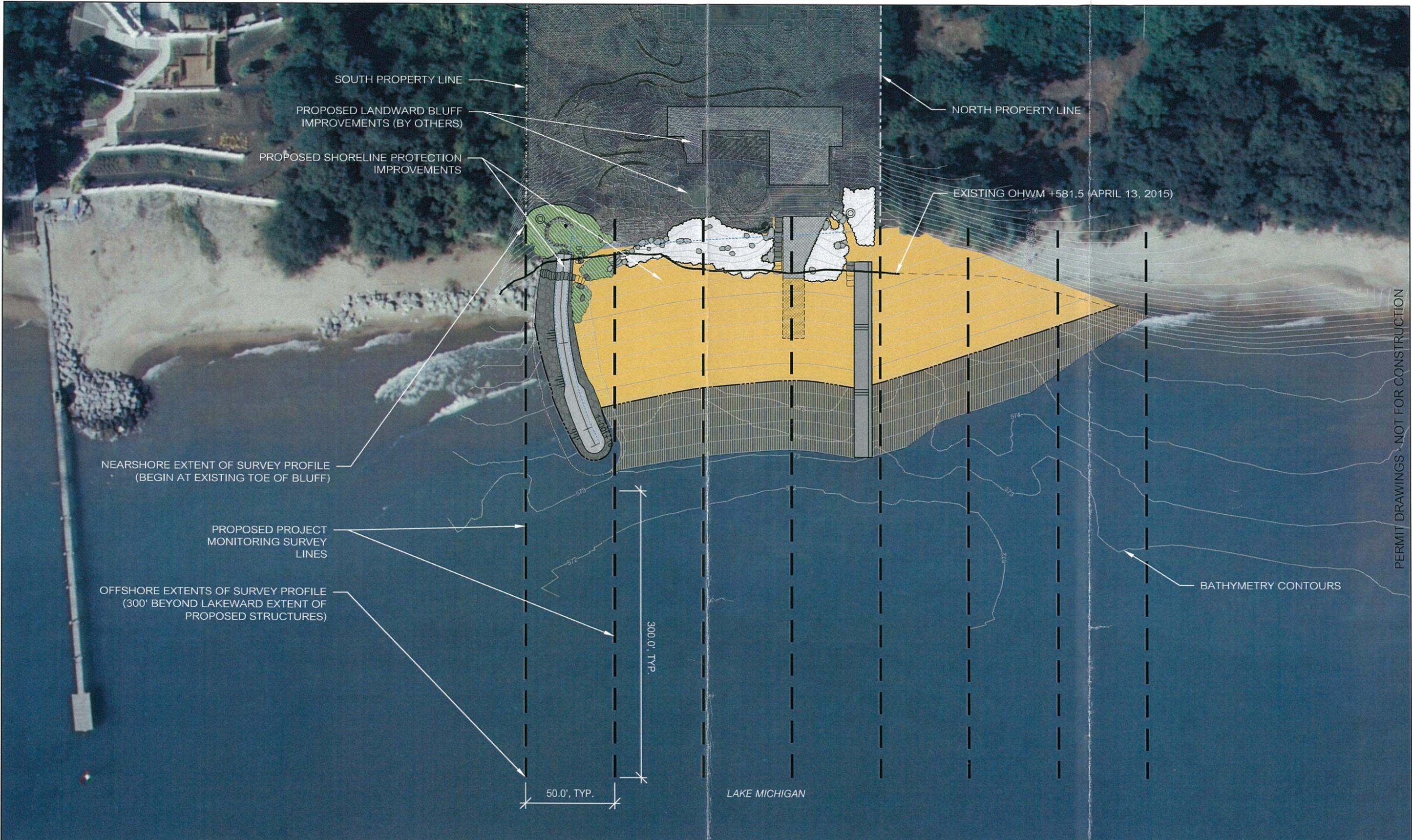
- ALL ELEVATIONS ARE IN FEET, REFERENCED TO IGLD 85.
- +0.0 LOW WATER DATUM (LWD) = +577.5 (IGLD 85) = +578.1 (NAVD 88).
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- JET PROBE DATA COLLECTED AND COMPILED BY BAIRD (NOVEMBER 05, 2013).

REV	T.I.	DESCRIPTION	DRN	DSN	APR	DATE
REVISIONS						
(1) AS BUILT	(2) FOR REVIEW	(3) FOR APPROVAL	(4) CONTRACT DOCUMENT	(5) FOR CONSTRUCTION	(6) AS BUILT	(7) CANCELED



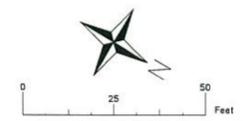
1175 WHITEBRIDGE HILL RD.
PROPOSED BOAT LAUNCH RAMP - DETAILED PLAN AND SECTION

DRAWING NUMBER: 11814 - PD - 070 REV: A DATE: 24 JUN 15



PERMIT DRAWINGS - NOT FOR CONSTRUCTION

- General Notes:**
- ALL ELEVATIONS ARE IN FEET, REFERENCED TO IGLD 85.
 - +0.0 LOW WATER DATUM (LWD) = +577.5 (IGLD 85) = +578.1 (NAVD 88).
 - ORDINARY HIGH WATER MARK (OHWM) = +581.5' (IGLD 85).
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 - SITE SURVEY DATA (TOPOGRAPHIC AND BATHYMETRIC) COLLECTED BY BLECK ENGINEERING COMPANY (NOVEMBER 3, 2010, NOVEMBER 13, 2013, AND APRIL 13, 2015), ILLINOIS STATE PLANE EAST.
 - WATER ELEVATION = +578.25 (IGLD 85) (NOVEMBER 13, 2013).
 - PROPERTY LINE INFORMATION FROM BLECK ENGINEERING COMPANY DRAWING VIA B.H. SUHR & COMPANY, INC. (REVISED SEPTEMBER 1, 2010).
 - JET PROBE DATA COLLECTED AND COMPILED BY BAIRD (NOVEMBER 05, 2013).



REV	T.I.	DESCRIPTION	RRA	CM	LTB	DATE
A	A	PERMIT DRAWING				24-06-15

(1) TYPE OF ISSUE	(2) PRELIMINARY	(3) FOR APPROVAL	(4) CONTRACT DOCUMENT	(5) AS BUILT
	(A) FOR REVIEW	(B) FOR INFORMATION	(C) FOR CONSTRUCTION	(D) CANCELLED

PREPARED BY: **Baird**
W.F. Baird & Associates Ltd.

1175 WHITEBRIDGE HILL RD.
PROJECT MONITORING PLAN

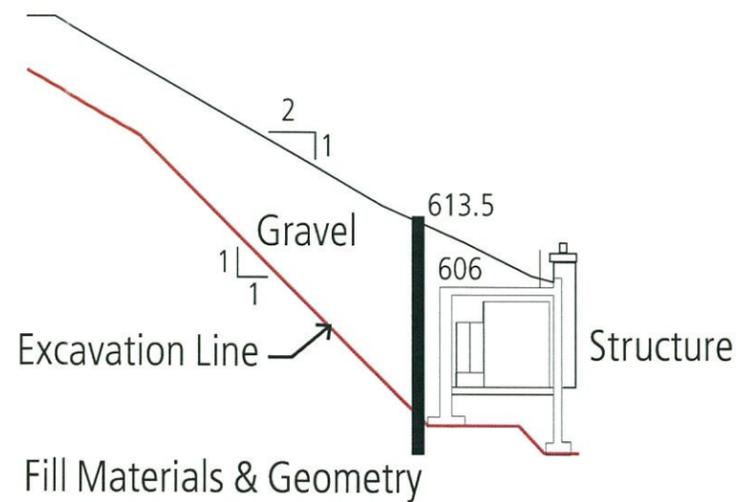
DRAWING NUMBER: 11814 - PD - 090
REV: A DATE: 24 JUN 15

2.54 Acre Property

- Green Roof Zone: 0.18 acres
- Stormwater Infiltration Basin: 0.01 acres
- Tableland Vegetated Infiltration Zone: 0.31 acres
- Bluff Vegetated Infiltration Zone: 0.42 acres (See Exhibit 4)
- Permeable Terrace: 0.02 acres



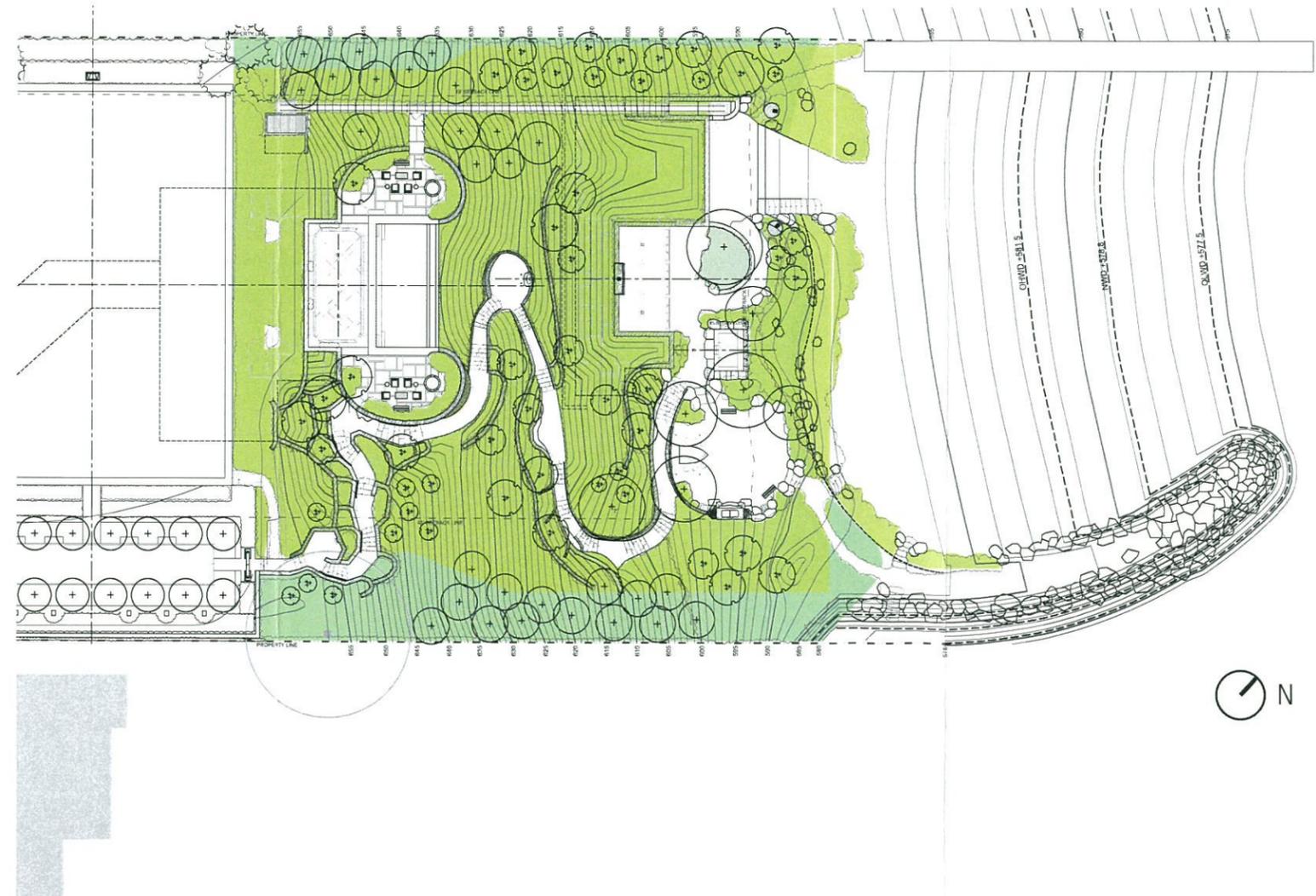
Site Images of Gravel Backfill Areas



 Bluff Vegetation Zone (For Areas Beyond the Limits of Gravel Backfill): 0.12 acres
 • Will Incorporate Native Plantings

 Bluff Vegetation Infiltration Zone: 0.42 acres
 • Will Incorporate Native Plantings

Potential Native Plantings List for Bluff area		
Scientific Name	Common Name	Type
Agrostis stolonifera	Redtop Grass	Perennial
Asclepias sp	Milkweed	Perennial
Aronia	Chokeberry	Shrub
Aster sp	Native Aster varieties	Perennial
Baptisia sp	Wild Indigo	Perennial
Camassia	Camas	Bulb
Carex sp	Sedge	Perennial
Cercis canadensis	Redbud	Tree
Convolvulus sepium (Americanus)	Hedge Bindweed	Perennial
Cornus racemosa	Gray Dogwood	Shrub
Cornus sericea	Red Osier Dogwood	Shrub
Desmodium glutinosum	Pointed tick trefoil	Perennial
Eupatorium	Joe Pye Weed	Perennial
Hamamelis virginiana	Witch Hazel	Shrub
Helianthus	Native Sunflower	Perennial
Hydrangea arborescens	Smooth Hydrangea	Shrub
Juniperus communis	Common Juniper	Shrub
Juniperus virginiana 'Grey Owl'	Grey Owl Juniper	Shrub
Liatris	Blazing Star	Perennial
Lolium multiflorum	Annual Rye	Perennial
Oenothera biennis	Evening Primrose	Perennial
Ostrya	Hop Hornbeam	Shrub/Tree
Panicum sp	Switch Grass	Perennial
Penstemon	Beardtongue	Perennial
Physocarpus	Ninebark	Shrub
Populus balsamifera	Balsam poplar	Tree
Populus deltoides (Cottonless)	Cottonless Cottonwood	Tree
Rhus aromatica	Gro-Low Sumac	Shrub
Rhus typhina	Staghorn Sumac	Shrub
Sambucus	Elderberry	Shrub
Schizachyrium scoparium	Little Bluestem	Perennial
Solidago	Golden Rod	Perennial
Sporobolus heterolepis	Dropseed Grass	Perennial
Viburnum dentatum	Arrowwood Viburnum	Shrub





North
Scale 1" = 20'



Site Area = 2.51-ac

KEY

-  PROPERTY LINE
-  STORM STRUCTURES
-  STORM SEWER
-  DRAINAGE DIVIDE
-  STRUCTURE
NOTE:
SOME PORTIONS UNDERGROUND
-  POOL/SPA
-  HARDSCAPE
-  LANDSCAPE