

Fact Sheet for Antidegradation Assessment
Chicago Title Land Trust – Lake Michigan – Cook County
IEPA Log # C-0149-14
COE # 2014-00229
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February 10, 2016

Chicago Title Land Trust c/o Mike Durkin (“Applicant”) has applied for a 401 Water Quality Certification for impacts associated with the construction of a new quarystone breakwater island and quarystone groin toe protection along Lake Michigan in Section 8, Township 42 North, Range 13 East, Cook County, Illinois. The project site is located at 1175 Whitebridge Hill Road in Winnetka. The proposed project will remove an existing stone revetment placed at the water’s edge with a new shoreline protection system consisting of two beach retention groins and a beach cell. The two shoreline-perpendicular beach retention groins will measure 125’ from the toe of the existing bluff. These groins in combination with the open beach cell will create an effective shoreline protection system. Sand overfill quantities of 20% will be provided for the beach cell and a new beach fillet on the north side of the north groin. The north fillet will promote natural sediment by-pass through the system. The purpose of the project is to provide long term shoreline, bluff, and site protection. The protection system will protect the property during all lake levels, reduce wave action energy, and move the locus of wave action further offshore to reduce lakebed downcutting. Construction of the proposed project will be conducted via water based equipment including a crane for steel sheet pile driving and stone placement, material barges for delivery of steel and stone, and a front-end loader and excavator to assist with stone and sand placement. The Applicant will use approximately 1,650 CY of clean quarried stone for construction of the groin structures and place approximately 5,178 CY of clean sand on the existing beach (3,150 + 630), as well as beaches to the north (1,050 + 210) and south (115 + 23). These clean sand totals include the additional IDNR required 20% sand mitigation. Structural fill below the Ordinary High Water Mark (OHWM) will cover 0.11 acres; therefore, a 3:1 mitigation ratio will be required by USACE - Chicago District. Wetland mitigation credits totaling 0.33 acres will be purchased from the Girl Scouts of Northern Illinois for the development of the Sybaquay Council Wetland Mitigation Bank (SCWMB) in McHenry County.

Identification and Characterization of the Affected Water Body.

Lake Michigan is a large oligotrophic lake subject to the Lake Michigan Basin water quality standards of 35 Ill. Adm. Code 302 Subpart E. Lake Michigan Nearshore (QLM-01) is listed as not supporting Fish Consumption and Aesthetic Quality uses according to the draft 2016 Illinois Integrated Water Quality Report and Section 303(d) List. The causes listed for impairment are Mercury and Polychlorinated Biphenyls for Fish Consumption Use and Phosphorus (Total) for Aesthetic Quality Use. Lake Michigan Nearshore is listed as fully supporting Aquatic Life, Public and Food Processing Water Supplies, Primary Contact Recreation, and Secondary Contact uses.

Identification of Proposed Pollutant Load Increases or Potential Impacts on Uses.

The pollutant load increases that would occur from this project include some possible increases in total suspended solids. These increases, a normal and unavoidable result of the placement of the quarystone breakwater, may occur in the lake at the point of construction activity.

Benthic habitat will also be disturbed in the vicinity of the construction area. In accordance with IDNR requirements, all fill material will be clean and from inland quarries. The fill includes clean quarried stone for construction of the breakwater and clean sand to be placed on the subject beach and on beaches to the north and south as sand mitigation.

Fate and Effect of Parameters Proposed for Increased Loading.

The increase in suspended solids will be local and temporary. Lakebed downcutting has resulted in the loss of sand in this section of the coastline. Although the benthic habitat will be disturbed by the construction activities, it is anticipated to recover and improve over time due to the placement of sand over the downcut clay substrates. An extensive stormwater management system has been proposed and will include infiltration, green roof, permeable terrace, and bluff vegetation zones. Excess surface water will be directed through a catch basin, into a rain garden, and then infiltrated into various stone layers of the proposed groin, the sand beach, and a vegetative beach infiltration zone (See Alternative Analysis for additional details). The BMP system is designed to accommodate a volume of stormwater that is greater than the 100-year, 24-hour storm event before stormwater will be discharged to the lake. Mitigation for impacts to 0.11 acres will require the purchase of 0.33 acres of wetland mitigation bank credits from the Girl Scouts of Northern Illinois for the development of the SCWMB in McHenry County. There are currently no Lake Michigan watershed mitigation bank credits available for purchase; SCWMB is a USACE- Chicago District approved mitigation bank.

Purpose and Social & Economic Benefits of the Proposed Activity.

The proposed breakwater system will help retain and improve the sandy beach area, reduce the impacts of wave energy on the shoreline, protect benthic habitats by reducing lakebed downcutting, prevent the destabilization of the bluff face which could lead to the loss of land and infrastructure, and provide access for landowners and their watercraft to Lake Michigan.

Assessments of Alternatives for Less Increase in Loading or Minimal Environmental Degradation.

The Applicant originally considered four shoreline improvement alternatives and based their preferred alternative on expected performance (shoreline and bluff protection), estimated annual maintenance, ability to improve the natural setting, improved Lake Michigan access along and to the shoreline, construction cost, and the total area of Lake Michigan open bottom fill. These alternatives are listed below (Alternatives 1 – 4).

Alternative 1: No Build

- Existing stone revetments are not well engineered and do not provide adequate shoreline protection at high water levels
- Leaves currently eroding narrow beach in existing state
- Storm waves will continue to erode bluff toe during high lake levels
- Bluff slope/stability is not improved
- Limits safe access to lake

Alternative 2: 125' North and South Groins

- Includes two shore perpendicular groins and sand fill to create a beach cell
- North groin consists of parallel, tied-back steel sheet pile (SSP) walls filled with granular material
- South groin consists of a stone structure
- Beach fillet will be created north of the SSP and south of the beach cell to promote natural sand bypassing

- Will require periodic beach re-nourishment and a backshore stone revetment
- Stabilizes sand on adjacent beaches, provides protection of the bluff toe
- Maintains landowners access across beach with no obstruction

Alternative 3: 145' North and South Groins

- Similar to Alternative 2 except north and south groins are 20' longer
- Increases the beach fill volume
- Will require beach re-nourishment and a backshore stone revetment, but with reduced quantities as compared to Alternative 2
- Addresses all concerns listed in Alternative 1

Alternative 4: 175' North and South Groins

- Similar to Alternative 2 except north and south groins are 30' longer with associated increases in beach fill volume
- Addresses all concerns listed in Alternative 1
- Largest lakebed footprint and most expensive alternative

The Applicant originally chose Alternative 3 (145' Groins) as the preferred alternative. However, IDNR requirements limit groins to a maximum of 125' from the toe of the bluff. The Applicant's proposed project will utilize Alternative 2 to abide by this requirement.

In addition to reducing the length of the proposed groins, the Applicant has also reduced the overall proposed width and lake bottom coverage of the south groin, reduced the northern groin from 15' to 10', and designed the SSP to be stable without the requirement for scour stone protection, further reducing the area of lake bottom impact.

An additional alternative analysis was completed to ensure that pollutant loading to Lake Michigan will not be increased as compared with existing conditions. Seven alternatives (listed below) were considered for the assessment of alternative outfall designs for stormwater runoff from the Applicant's property.

Option 1: Discharge pipe within proposed stone groin discharging to south

- Route treated storm water from a manhole located landward of the OHWM
- 15" diameter pipe discharging in a southerly direction into the lake midway along the south groin
- Alternative abandoned due to discharge toward adjacent property to south and potential damage to the outfall from possible exposure to ice conditions

Option 2: Discharge pipe within proposed stone groin discharging to north

- Similar to Option 1 except discharging water onto proposed beach
- Alternative unacceptable due to the potential for outfall to become blocked with beach sand creating a possible backflow/overflow condition at the man hole

Option 3: Perforated pipe within the groin structure

- Perforate drain tile would allow the treated storm water to infiltrate into the filter stone of the proposed groin structure

- Capped lakeward end would allow even distribution of treated stormwater along the length of the groin
- Alternative abandoned due to possible damage to the tile from settlement and potential loss of capacity due to sedimentation

Option 4: Creation of rain gardens, bioswales, and subsurface infiltration/detention basins

- Narrow and limited space at the toe of the existing bluff limit opportunities to incorporate rain gardens, bioswales, and infiltration/detention areas
- Final design plans for the property include a secondary coastal protection wall that will be buried along the landward edge of the proposed beach. This retaining wall will serve as a soil retaining wall and provide shore and patio improvement protection
- Introducing these types of water retention basins on the landward side of the wall is problematic because of the hydrostatic loads created on the proposed wall and saturation of substrates beneath the patio area
- Water detention areas on the proposed beach could result in liquefying the sand beach reducing the slope and stability of the beach and accelerating the lakeward migration of sand out of the beach area.

Option 5: Connection to existing outfalls

- Existing storm sewer outfall is located to the southeast of the property
- Results in significant engineering challenges and limits the opportunity to utilize the overall treatment train proposed

Option 6: Infiltrate the treated stormwater into the south groin north of a single walled sand containment barrier

- Treated stormwater routed from manhole located at toe of bluff into rain garden
- Stormwater is filtered through rain garden then 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 southwest corner of the beach
- During a large storm event, stormwater routed to the north side of the containment could cause gully washing randomly on the beach

Option 7: Infiltrate the treated stormwater into the south groin north of a double walled sand containment barrier- Preferred Alternative

- Similar to Option 6
- Single wall impermeable sand containment which extends the length of the groin is realigned with the northerly crest line of the structure
- A second shorter containment wall will extend parallel to the primary containment wall and terminate approximately midway along the south crest line of the groin
- Provides greater capacity to infiltrate the treated stormwater
- Limits the amount of gully washing that would occur on the beach

Conclusion:

The construction of the proposed project will follow conditions set forth by the Agency and USACE. The least intrusive alternative would be to not complete the project. This is not an acceptable alternative given the need to protect the bluff and lakebed from additional erosion during storm surges.

Fluctuating lake levels over the past few years has led to extreme beach erosion and greater lakebed downcutting. Completion of the proposed project will allow for protection of the Lake Michigan shoreline and nearby infrastructure and provide residents safe access to the lake.

The Applicant will follow a 5 year monitoring plan to assure that the proposed project does not impact the natural coastal processes including the migration of sand through the system. While the proposed sand beach retention structures are designed to not interrupt this natural migration, it is anticipated that sand will migrate out of the system during significant storm events at which point the Applicant will re-nourish the sand resulting in a long term net increase to the sand in the system. The monitoring plan, which will include bathymetric and topographic surveys, will yield information regarding the project performance, assure that the proposed project does not impact or cause erosion to the neighboring properties, and identify any future maintenance priorities for the Applicant.

Summary Comments of the Illinois Department of Natural Resources, Regional Planning Commissions, Zoning Boards or Other Entities

An EcoCAT endangered species consultation submitted on February 26, 2015 to the Illinois Department of Natural Resources resulted in the identification of two INAI protected areas, Glencoe Botanical Area and Hubbard Woods. IDNR has evaluated the EcoCAT information, concluded that adverse effects are unlikely, and terminated consultation for IDNR Project #1509727 on March 3, 2015.

Agency Conclusion.

This preliminary assessment was conducted pursuant to the Illinois Pollution Control Board regulation for Antidegradation found at 35 Ill. Adm. Code 302.105 (antidegradation standard) and was based on the information available to the Agency at the time this assessment was written. We tentatively find that the proposed activity will result in the attainment of water quality standards; that all technically and economically reasonable measures to avoid or minimize the extent of the proposed increase in pollutant loading have been incorporated into the proposed activity; and that this activity will benefit the Lake Michigan shoreline by providing a breakwater system that reduces the impacts of wave energy, protects benthic habitats by reducing lakebed downcutting, prevents the destabilization of the bluff toe which could lead to the loss of land and infrastructure, retains the sandy beach area, and provides access for landowners and their watercraft to the lake. Comments received during the 401 Water Quality Certification public notice period will be evaluated before a final decision is made by the Agency.