

December 20, 2019

Jim Kettler, Executive Director Lakeshore Natural Resource Partnership P.O. Box 358 Cleveland, WI 53015 jim@LNRP.org

RE: As-Built Summary – Little Manitowoc River Estuary Habitat Restoration

Manitowoc County, Wisconsin Stantec Project 193704101

Dear Jim.

Stantec Consulting Services Inc. (Stantec) is pleased to present this As-Built summary for the Little Manitowoc River Estuary Habitat Restoration Project (Project or Site).

PROJECT OVERVIEW

The Project is located within the Little Manitowoc River Estuary that is owned by the City of Manitowoc and private landowners.

The Site is located south of Waldo Boulevard within the Lake Michigan watershed. The Site has historically exhibited shallow marsh habitat containing a cattail monoculture and Phragmites sp. within a channelized segment of the Little Manitowoc River. The surrounding area contains natural habitats and residential/commercial land uses with a mixture of native and non – native vegetation species.

The project design included improving habitat in the estuary by dredging and helping to rechannelizing the river to its historic and natural course. The design also included installing woody debris (fish sticks), installing native shrubs and pollinator prairie, and installing a variety of wildlife nesting structures to increase habitat use.

HABITAT INSTALLATION

Fish stick structures were installed to enhance the woody debris in the old river channel and provide habitat for fish, reptiles, amphibians and mammals. Fish sticks also provide bank stabilization and reduce bank erosion. The structures were built using 12-foot sections of ash trees with a diameter at breast height over 8 inches harvested on City-owned park land. Each fish stick consisted of three ash tree sections bundled together with cable in a crisscross pattern. Cable was tied to the butt ends of the logs and anchored into the back using anchors.

A variety of wildlife nest structures were installed to provide habitat for migratory and resident species. These habitat structures included wood duck houses, mallard nesting platforms, bat houses, purple martin houses, and bluebird houses.

Two species of native shrubs, Red Osier Dogwood (*Cornus sericea*) and Arrowwood Viburnum (*Viburnum dentatum*), were installed along the west and north perimeter of the Site and around the stormwater outflow structure located in the southwest corner of the Site. The shrub beds were prepped by herbicide treatment, mowing, and mulched after the shrubs were planted. All shrubs were watered after they were planted.



Reference: As-Built Summary - Manitowoc County, Wisconsin

An upland native pollinator prairie seed mixture was installed in a one-half acre parcel on the west bank of the estuary to the sidewalk near the stormwater discharge. The seed was hand broadcast at a rate of 30.65 oz. per acre, and the seeding boundaries were marked with wood stakes. Attachment C presents the seed list of species that were planted onsite.

Woody debris comprised of ash tree trunk sections were scattered along the shoreline of the north boundary. These trunk sections were partially buried into the substrate.

Attachment A presents a photograph log of the restoration work completed at the Site. Attachment B presents a drawing showing the actual location and number of habitat structures installed at the Site.

Stantec will use remaining funds to complete operations and management through 2020. There is no warranty or performance standards associated with this Project, however mowing and herbicide applications will be performed by Stantec in 2020 to assist in establishment of native plants. Friends of the Manitowoc River Watershed will be responsible for annual maintenance of nesting structures on the Site.

We appreciate working with the LNRP and City of Manitowoc staff on this Project. If you have any questions or would like to discuss this submittal, please contact Jon Gumtow at (920) 980-2800. Sincerely,

STANTEC CONSULTING SERVICES INC.

on Gumtow, PWS, PSS Principal, Senior Scientist Jon.Gumtow@stantec.com

cc: Dan Koski, City of Manitowoc

Attachments:

Attachment A: Photograph Log Attachment B: As-Built Drawing

Attachment C: Seed List



ATTACHMENT A: Photograph Log





Description: Overview of Truxor placing fish sticks.



Description: Overview of fish sticks.



Description: Overview of fish sticks being anchored into the bank.





Description: Overview of fish sticks being taken from shore into the river.



Description: Overview of fish sticks being moved.



Description: Overview of Truxor moving fish sticks.





Description: Overview of fish sticks being placed.



Description: Overview of bluebird house.





Description: Overview of fish sticks being tied together.



Description: Overview of fish sticks being prepared for installation.



Description: Overview of bluebird house

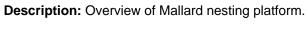




Description: Overview of fish sticks being bundled.



Description: Overview of fish stick habitat.







Description: Overview of martin house foundation.

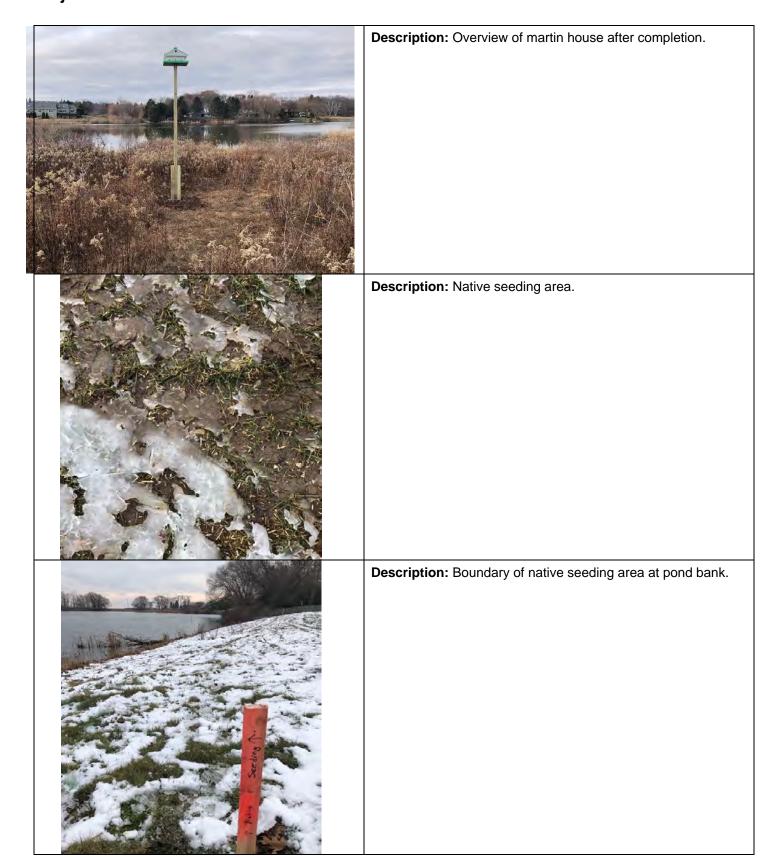


Description: Overview of martin house foundation with mast pole.

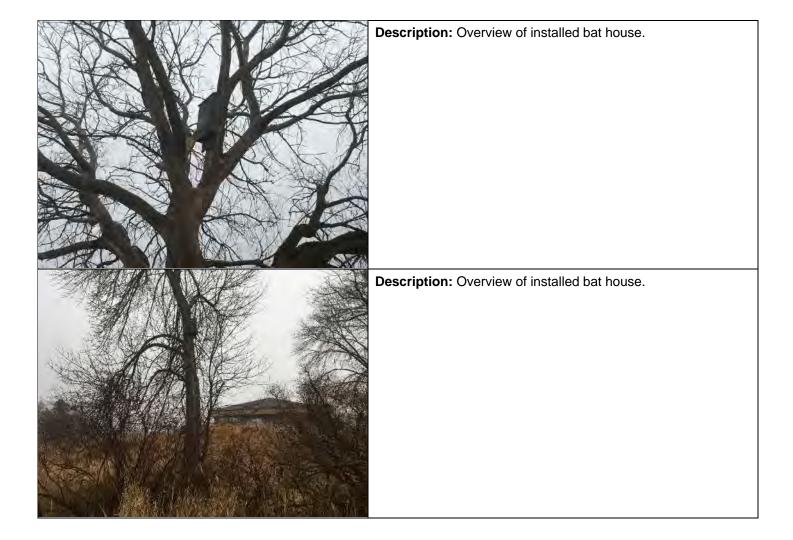


Description: Overview of martin house foundation with mast pole installed.











ATTACHMENT B: As-Built Drawing



Attachment C: Seed Mixes



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