



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 re-channelizing 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 bank 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 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.



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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.

A handwritten signature in black ink that reads "Jon Gumtow". The signature is fluid and cursive.

Jon 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 Mallard nesting platform.



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.



Description: Overview of martin house after completion.



Description: Native seeding area.



Description: Boundary of native seeding area at pond bank.



Description: Overview of installed bat house.



Description: Overview of installed bat house.



ATTACHMENT B: As-Built Drawing



Attachment C: Seed Mixes



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STANTEC 1165 SCHEURING RD DE PERE WI 54115-1001 US

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Account	Ordered	Ship Date	Customer PO#	Telephone	Operator	Terms	Ship Method
265083	11/19/19		193704101		Kaitlyn	NET 30	BEST WAY

Ln	Item#/Description	UM	QOR	QBO	QSH	Price	Amount
1	MIXINFO STANTEC MIX - Manitowoc County (Ecotype Specific - Do not change lots. Pack large, small, fluffy seed separate for drill planting)	EA	1	0	1	0.000	0.00
2	CAS02F-S-Z Chamaecrista fasciculata (Partridge Pea) Lot: PM1714M Qty: 2.0000	OZ	2.0000	0	2.0000	1.880	3.76
3	PET06F-S-Z Dalea purpurea (Purple Prairie Clover) Lot: PM1688T Qty: 1.5000	OZ	1.5000	0	1.5000	4.000	6.00
4	AGA02F-S-Z Agastache foeniculum (Anise Hyssop) Lot: PX2171T Qty: 0.7500	OZ	0.7500	0	0.7500	20.000	15.00
5	ANE02F-S-Z Anemone canadensis (Canada Anemone) Lot: FS1700T Qty: 0.4000	OZ	0.4000	0	0.4000	40.000	16.00
6	AQU02F-S-Z Aquilegia canadensis (Columbine) Lot: NC2340T Qty: .1394 Lot: OL1910T Qty: .095 Lot: PJ1528T Qty: .0156	OZ	0.2500	0	0.2500	30.000	7.50
7	ASC14F-S-Z Asclepias syriaca (Common Milkweed) Lot: MH2916U Qty: 1.2500	OZ	1.2500	0	1.2500	8.000	10.00
8	ASC16F-S-Z Asclepias tuberosa (Butterfly Weed)	OZ	0.4000	0	0.4000	20.000	8.00

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Ln	Item#/Description	UM	QOR	QBO	QSH	Price	Amount
	Lot: PM2391T Qty: 0.4000						
9	ECH08F-S-Z Echinacea purpurea (Purple Coneflower)	OZ	1.0000	0	1.0000	2.810	2.81
	Lot: PM2390T Qty: 1.0000						
10	GAU02F-S-Z Gaura biennis (Biennial Gaura)	OZ	1.0000	0	1.0000	12.000	12.00
	Lot: MV2341T Qty: 1.0000						
11	HEL82F-S-Z Helianthus helianthoides (Early Sunflower)	OZ	1.5000	0	1.5000	3.750	5.63
	Lot: PM2653M Qty: 1.5000						
12	LIA02F-S-Z Liatris aspera (Button Blazing Star)	OZ	0.5000	0	0.5000	50.000	25.00
	Lot: PM3365M Qty: 0.5000						
13	MON02F-S-Z Monarda fistulosa (Wild Bergamot)	OZ	0.6000	0	0.6000	15.000	9.00
	Lot: PX2351T Qty: 0.6000						
14	OEN02F-S-Z Oenothera biennis (Common Evening Primrose)	OZ	0.5000	0	0.5000	6.000	3.00
	Lot: OL1725M Qty: 0.5000						
15	SOL12F-S-Z Oligoneuron rigidum (Stiff Goldenrod)	OZ	1.2500	0	1.2500	15.000	18.75
	Lot: PX2521T Qty: 1.2500						
16	PEN02F-S-Z Penstemon digitalis (Foxglove)	OZ	0.7500	0	0.7500	15.000	11.25

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Ln	Item#/Description	UM	QOR	QBO	QSH	Price	Amount
	Beardtongue)						
	Lot: PM1261M Qty: 0.7500						
17	PYC06F-S-Z Pycnanthemum virginianum (Mountain Mint)	OZ	0.2000	0	0.2000	40.000	8.00
	Lot: AR2773T Qty: 0.2000						
18	RAT04F-S-Z Ratibida pinnata (Yellow Coneflower)	OZ	0.7500	0	0.7500	10.000	7.50
	Lot: PM3415M Qty: 0.7500						
19	RUD02F-S-Z Rudbeckia hirta (Black-eyed Susan)	OZ	3.5000	0	3.5000	3.000	10.50
	Lot: PM1082T Qty: 3.5000						
20	SOL05F-S-Z Solidago juncea (Early Goldenrod)	OZ	0.2500	0	0.2500	60.000	15.00
	Lot: PM2589M Qty: 0.2500						
21	AST10F-S-Z Symphyotrichum laeve (Smooth Blue Aster)	OZ	0.2500	0	0.2500	35.000	8.75
	Lot: ME3195M Qty: 0.2500						
22	AST18F-S-Z Symphyotrichum novae-angliae (New England Aster)	OZ	0.2000	0	0.2000	40.000	8.00
	Lot: PM1088T Qty: 0.2000						
23	TRA06F-S-Z Tradescantia ohiensis (Ohio Spiderwort)	OZ	0.5000	0	0.5000	25.000	12.50
	Lot: UF2236T Qty: 0.5000						
24	VER04F-S-Z Verbena stricta (Hoary Vervain)	OZ	0.7500	0	0.7500	8.000	6.00

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Ln	Item#/Description	UM	QOR	QBO	QSH	Price	Amount
	Lot: MX2466T Qty: 0.7500						
25	ZIZ04F-S-Z Zizia aurea (Golden Alexanders)	OZ	0.7500	0	0.7500	12.000	9.00
	Lot: UF3469M Qty: 0.7500						
26	BOU02G-S-Z Bouteloua curtipendula (Side-oats Grama)	OZ	9.0000	0	9.0000	0.870	7.83
	Lot: PM2639M Qty: 9.0000						
27	CAR03G-S-Z Carex bicknellii (Copper-shouldered Oval Sedge)	OZ	1.0000	0	1.0000	20.000	20.00
	Lot: PX1676M Qty: 1.0000						
28	ELY02G-S-Z Elymus canadensis (Canada Wild Rye)	OZ	10.0000	0	10.0000	0.940	9.40
	Lot: PM1255T Qty: 10.0000						
29	ELY08G-S-Z Elymus virginicus (Virginia Wild Rye)	OZ	4.0000	0	4.0000	0.750	3.00
	Lot: PM2241T Qty: 4.0000						
30	JUN03G-S-Z Juncus dudleyi (Dudley's Rush)	OZ	0.0500	0	0.0500	40.000	2.00
	Lot: PM1272T Qty: 0.0500						
31	AND06G-S-Z Schyzachyrium scoparium (Little Bluestem)	OZ	12.0000	0	12.0000	1.120	13.44
	Lot: PM1112T Qty: 12.0000						
32	SOR52G-S-Z Sorghastrum nutans (Indian Grass)	OZ	2.0000	0	2.0000	0.870	1.74

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Ln	Item#/Description	UM	QOR	QBO	QSH	Price	Amount
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Lot: UF3479M Qty: 2.0000

Merchandise	Shipping	Add Amt	Other	Credits	Tax	Order Total
296.36	14.82	0.00	0.00	0.00	17.17	328.35

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