HOBSON CREEK CORRIDOR RESTORATION PROJECT, PHASE 3
TRIBUTARY 6 TO THE EAST BRANCH DUPAGE RIVER
Section 319 Project Report

Illinois EPA Agreement No. 3190511

HOBSON CREEK COMMUNITY COUNCIL

Woodridge PARK DISTRICT

Living Waters CONSULTANTS

HOBSON CREEK CORRIDOR RESTORATION PROJECT, PHASE 3
TRIBUTARY 6 TO THE EAST BRANCH DUPAGE RIVER
SECTION 319 FINAL REPORT

ILLINIOS EPA FAA # 3190511
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Prepared For:

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HOBSON CREEK CORRIDOR RESTORATION PROJECT, PHASE 3

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Summary:
The Hobson Creek Community Council completed the Hobson Creek Corridor Restoration Project, Phase 3 in order to protect against severe streambank erosion, to provide nonpoint source pollution control along Hobson Creek and to improve water quality of the downstream East Branch DuPage River. Installed stream stabilization techniques have provided effective and environmentally sound bank protection and channel stability for the Phase 3 reach. The Hobson Creek Community Council will provide long-term maintenance for the project site. Public involvement to date includes awareness of adjacent homeowners, and numerous trail and parkway visitors near existing signage.

Introduction:
The Hobson Creek Corridor Restoration Project is located on common space owned by the Hobson Creek Community Council in unincorporated Naperville, DuPage County, Illinois. Hobson Creek has a 1.71 square mile watershed. The watershed is primarily comprised of single family and multi-family residential areas. Hobson Creek has also been identified as Tributary #6 to the East Branch DuPage River. The East Branch DuPage River is located approximately 1,100 linear feet downstream of the project site. The entire Hobson Creek Corridor has been divided into 3 reaches for construction implementation purposes. Each phase of construction has received Section 319 Clean Water Act grant funding obtained through the Illinois EPA and U.S. EPA. The project phases are as follows:

Phase 1 – Upstream project boundary downstream to stream station 10+00 (Sta. 17+50 to 10+00)
Completed Spring 2004
Phase 2 – Stream station 10+00 downstream to Green Trails Drive (Sta. 10+00 to 3+50)
Completed Spring 2005
Phase 3 – Site 1: Mainstem Hobson Creek from Green Trails Drive to Seven Bridges Park (Sta. 2+75 to 0+00)
Site 2: Hobson Creek Inlet Channel (Sta. 2+75 to 0+00)

The Phase 3 project area is the subject of this Final Report. The entire Phase 3 area is located within the Hobson Creek Subdivision, and is contained within common open space area owned by the Hobson Creek Community Council (HCCC). The Phase 3 Hobson Creek Restoration consists of two project locations. Site Location 1 is located along Hobson Creek at Green Trails Drive immediately downstream of the Phase 2 site. The Hobson Creek project area is comprised of a 275 linear foot mainstem segment of Hobson Creek with a 0.1-acre degraded riparian corridor.

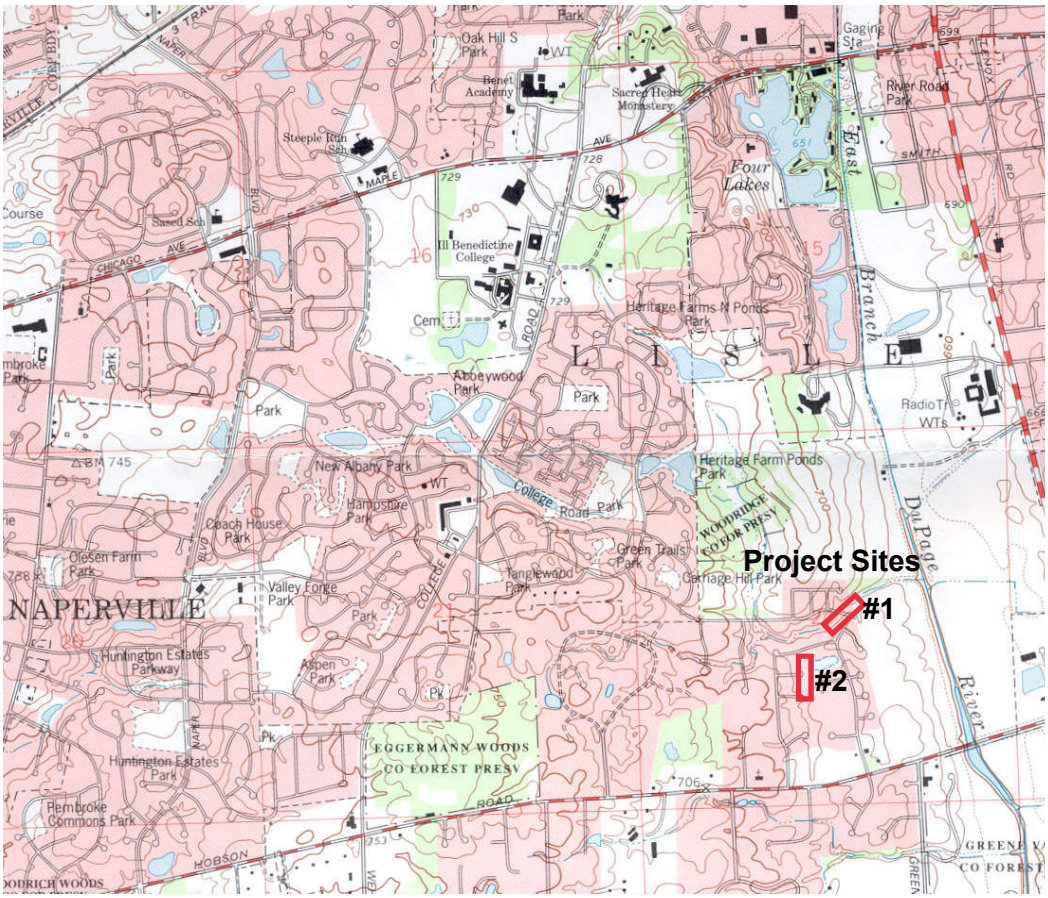
Site Location 2 is the Hobson Creek Inlet Channel Corridor Restoration. The Inlet Channel is approximately 275 linear feet in length and is located south of Hobson Creek on the attached exhibit. The Inlet Channel begins as the discharge of an 18-inch RCP storm pipe from the single-family residential neighborhood (see photos). The sewer-shed area is several acres in area. The Inlet Channel discharge flows into the 1-acre Hobson Creek Detention Pond. The

outflow from the detention basin discharges to Hobson Creek within the Phase 1 Project Area at stream station 12+00. Restoration of the 0.27-acre vegetative corridor along the Inlet Channel will be required to replace the Buckthorn (Rhamnus cathartica) infestations with deep-rooted native plant species to provide improved bank stabilization.

Severe streambank erosion was due several factors. Most of the watershed was developed prior to the enforcement of stormwater detention ordinances, resulting in the rapid discharge of large volumes of urban runoff. A topographic survey was completed for the Hobson Creek Phase 3 mainstem (Site 1) project area in 2003 and for the Inlet Channel (Site 2) in 2006. The Hobson Creek mainstem reach slope is moderately steep for DuPage County, approximately 0.0051 ft/ft, or one foot of vertical fall every 195 linear feet of horizontal distance. The Inlet Channel reach slope is 0.0016 ft/ft, or one foot of fall for every 63 feet. These are moderately steep channel slopes for northeastern Illinois. The dominant soil type in the project area is Ashkum silty clay loam (232). The streambank riparian corridor was also impacted by a dense canopy of invasive shrubs including Buckthorn (Rhamnus cathartica) and Honeysuckle (Lonicera tatarica). The highly eroded streambanks contained little to no ground-stabilizing vegetation. This provided little functional benefit and contributed to site degradation. The mainstem stream channel had incised approximately two feet into the landscape. Moreover, significant channel widening had occurred. There is one location in the Phase 3 mainstem (Site 1) project reach (Station 0+50) where severe streambank erosion caused stream channel migration to within approximately 10 feet of a paved pedestrian walking / biking path used for access to Seven Bridges Park in the Woodridge Park District. On the Inlet Channel (Site 2), large trees had recently fallen into the eroding stream channel. The severe streambank erosion had resulted in significant sediment delivery to the East Branch of the DuPage River. Moreover, the streambank riparian corridor had become encroached with a dense canopy of invasive, exotic shrubs including Buckthorn (Rhamnus cathartica). This has provided little functional benefit to the site, and has contributed to site degradation as discussed below (under Proposed Stabilization Plan). The Illinois EPA Load Reduction Spreadsheet was utilized to quantify the significant sediment delivery to the East Branch of the DuPage River as described below under Project Benefits.

A primary objective of the Hobson Creek Corridor Restoration Project was to improve the water quality in the project area and to reduce the sediment loading caused by streambank erosion into Hobson Creek and the East Branch DuPage River. This objective was accomplished by extensive streambank stabilization, installation of channel grade control structures, removal of invasive shrub species in the riparian area, and installation of native plantings along the stabilized streambanks and within the riparian area.

Project Location Map



Project Schedule

Table 1 below indicates the project schedule and completion requirements. Permits for the Phase 3 Project Sites were submitted in fall 2006 but were not received until June 5, 2008. A significant project delay occurred due to an apparent change in DuPage County permit review process for Phase 3 which required a hydrologic and hydraulic model to ensure that the proposed Phase 3 project did not contribute to impacts in the FEMA flood management areas. Phase 3 project construction began June 17, 2008 and native planting installations (native shrub live stakes and herbaceous plant plugs) were completed September, 2008.

Table 1: Project Schedule.
Hobson Creek Corridor Restoration Project, Phase 3.
IEPA FAA 3190511.

Action Item	Start Date	Completion Date
FAA 3190511 Award	August 3, 2005	September 30, 2008
Design Engineering	August 5, 2005	October 9, 2005
Permitting	October 10, 2005	June 5, 2008
Bidding	April 11, 2006	May 4, 2006
Construction Contract Award	N/A	Feb. 29, 2008
Riparian Invasive Species Removal	June 17, 2008	July 1, 2008
Streambank Stabilization Construction	July 1, 2008	August 22, 2008
Native Plantings	August 22, 2008	September 25, 2008
Project Final Report		September 29, 2008

Project Description and Stabilization Techniques

The Hobson Creek Corridor Restoration Project, Phase 3 stream stabilization design, engineering, native planting selection, construction observation, and maintenance assistance has been provided by Living Waters Consultants. Surveying was completed by Patrick Engineering, Inc. and Thompson Surveying. McGinty Brothers provided construction services and was contracted to provide a minimum of 3 years of site maintenance. The best management practices described below were utilized to restore the riparian corridor and to stabilize the streambanks of the Phase 3 project area.

Restoration of Riparian Corridor

Hobson Creek Corridor Restoration included vegetation management with replacement of 0.37 acres of dense stands on non-native and invasive shrubs and trees (such as Buckthorn) with 14 native tree-shrub clusters, along with native herbaceous species. The replacement of undesirable vegetation with native species prevents loss of bank soils and promotes bank stability. This will reduce non-point source pollutant loadings to the downstream East Branch DuPage River. Replacement of invasive species with native tree and shrub clusters, grasses, and

forbs will also promote filtration and assimilation of nutrients as well as contaminated runoff that can be discharged from surrounding upland areas. Aquatic habitat along the Hobson Creek riparian corridor will be enhanced and diversified.

Table 2: Streambank Stabilization Practices.

Hobson Creek Mainstem (Site 1)			
Stabilization Practice	**Left Bank (LF)**	**Right Bank (RF)**	**Total (LF)**
1 Row A-Jacks / 1 Row Geogrid / Reshape	90		90
3 Row A-Jacks / Cobble Layer / 1 Row Permanent Geogrid / Reshape		50	50
2 Row A-Jacks / Reshape	30		30
1 Row A-Jacks / Re-Shape		10	10
Rock Vortex Weir	8	8	16
Cobble Toe / Reshape		30	30
Cobble Replacement at Storm Pipe Outfall	10		10
Cobble Replacement at Detention Basin Outlet	30	30	60
Fiber Roll / Reshape	20		20
Total	**188**	**128**	**316**

Inlet Channel (Site 2)			
Stabilization Practice	**Left Bank (LF)**	**Right Bank (RF)**	**Total (LF)**
1 Row A-Jacks / Reshape / Fiber Roll Terrace		60	60
1 Row A-Jacks / Reshape	70	20	90
Rock Vortex Weir	16	16	32
Cobble Replacement at Storm Pipe Outfall	30	30	60
Cobble Replacement At Stream Bottom (downstream area)	50	50	100
Fiber Roll Toe / Reshape / Fiber Roll Terrace	20		20
Fiber Roll Toe / Reshape	60	60	120
Fiber Roll Terrace		20	20
Native Plant Plugs (2/LF)	25	15	40
Total	**271**	**271**	**542**

Rock Vortex Weir Structures

Channel downcutting has been controlled with the installation of three (3) rock vortex weir grade control structures. The constructed weir structures not only control and prevent further channel downcutting but also dissipate excess stream energy and reduce extremely high erosive forces against the streambanks. Materials utilized ranged from 0.5-inch subsurface gravel to 18-inch surface boulders. The rock weir structures also diversify and improve in-stream habitat, diversify stream substrate materials, and enhance aesthetics.

A-Jacks and Vegetated Geogrid or Re-Shape Slope

Streambank stabilization was a critical BMP to prevent additional soil pollutant transport throughout Hobson Creek and the downstream East Branch DuPage River. In the more severely eroded areas, the streambanks were graded to a flatter slope (excess cut removed), seeded and

planted using native vegetation (described below), stabilized with vegetated geogrid (NAG C350 or Bio-D Block), with toe of slope protection using 1 row or 3 rows of A-jacks. The permanent A-Jacks structures have a high energy-dissipation capability. The vegetated geogrid provided erosion control along tall slopes as steep as 2.5:1 (H:V). These techniques were suited for areas that could be stabilized with vegetation alone, such as areas with high flow velocities along erodible soils, and where high bank shear stresses and sharp meander bends occur. Approximately 50 linear feet of 3-rows a-jacks were installed, 30 linear feet of two-rows a-jacks, as well as 100 linear feet of 1-row a-jacks on the Mainstem (Site 1). Approximately 150 linear feet of 1-row a-jacks were installed at the Inlet Channel (Site 2).

Fiber Roll and Re-Shaped Slopes

Streambanks with moderate erosion along the toe of slope were lightly graded back, on a cut-and-fill balance, seeded and planted with native plant vegetation, covered with an erosion control blanket, with toe (base) stabilization using coconut (coir) fiber roll. Areas exhibiting only minor erosion were stabilized by re-shaping bank slopes, seeding and planting with native vegetation, and installing erosion control blanket. Plant communities were improved by removing the non-native / invasive vegetation, as well as introducing rooted plant materials. Approximately 20 linear feet of fiber roll were installed with re-shaped slopes above the fiber roll on the Mainstem, while 140 linear feet were installed on the Inlet Channel.

Fiber Roll Terrace

Streambanks with moderate erosion along the toe of slope along with moderately steep or eroding overbank slopes were also stabilized by lightly grading back the overbank slope, on a cut-and-fill balance, seeded and planted with native plant vegetation, along with a coconut (coir) fiber roll installed along the middle of the slope, parallel to the bank. The fiber roll terrace will serve to reinforce steep slope areas to prevent bank sliding or other failure due to steep bank slopes and / or tall bank heights. Approximately 100 linear feet of fiber roll terrace were installed on the Inlet Channel.

Cobble Placement At Streambank, Storm Pipe Outfalls, Tree Roots, and Channel Bottom

Cobble toe was installed over 20 linear feet on the mainstem along the right bank toe of slope at Station 0+25. Three existing storm pipe outfalls were also stabilized by re-placing rock that had previously been removed by the erosive force of the flowing stream. The Mainstem (Site 1) left bank contained a storm pipe outfall that was stabilized by installing a rock toe near left bank Station 2+00. Cobble rock was also placed along 10 linear feet of exposed tree roots at the right bank near Station 2+00. The Inlet Channel (Site 2) had two locations where storm pipe outfalls were stabilized by re-placing cobble rock (Stn. 2+75 and Stn. 0+00). The latter location included replacing approximately 30 linear feet of rock along an outfall path between the storm sewer outfall and the detention basin. The total length of outfall channel banks protected by rock placement was 60 linear feet. Other maintenance activities included replacing approximately 50 linear feet of cobble rock along the stream bottom (extending from the left bank to the right bank of the channel) at the downstream end of the Inlet Channel extending to the existing detention basin, between Station 0+50 and 0+00. The total length of both streambanks protected by rock placement at the stream bottom between Station 0+50 and

0+00 was 100 linear feet. Cobble rock was also placed along 30 linear feet of the channel bottom of a detention basin flowpath at Site 1.

Native Plantings

Proper selection and installation of native plantings and seed is instrumental to project success. Native seed and plantings were installed along all stabilized streambank areas. Effective native plant installations improve long-term streambank stabilization, pollutant filtration, wildlife habitat, dissipation flow energy, and improvement of site aesthetic values. Toe-of-slope (Type 1) native seed and plug lists, and mid-slope to upper slope native seed (Type 2) plug lists are provided in Tables 3 and 4 below. Native shrub live stakes (cut live stems) were replaced with potted herbaceous native plant plugs since the installation had to occur between June and September, 2008. (This construction schedule likely would not have allowed for substantial survival of shrub live stakes which are in general most successfully installed in the dormant growing season.) Approximately 40 linear feet of stream channel was stabilized using native plantings alone without other streambank stabilization treatments. Also, as described above under Restoration of Riparian Corridor, fourteen (14) native trees and 42 native potted shrubs were installed as tree-shrub clusters throughout each riparian area. Fifty-eight (58) native potted shrubs were also installed, primarily along the Inlet Channel (Site 1). The ball-and-burlap tree and shrub species used for the tree-shrub clusters are described in Table 6.

Table 3. Native Herbaceous Plant Plugs Species List.

Scientific Name	Common Name	Percent of Total
TYPE 1 NATIVE PLANT PLUGS		
ACORUS CALAMUS	SWEET FLAG	10%
ANDROPOGON GERARDII	BIG BLUESTEM	3%
ANDROPOGON SCOPARIUS	LITTLE BLUESTEM	8%
ASCLEPIAS INCARNATA	SWAMP MILKWEED	3%
CAREX COMOSA	BRISTLY SEDGE	7%
CAREX TRIBULOIDES	POINTED OVAL SEDGE	5%
CAREX VULPINOIDEA	FOX SEDGE	7%
ELYMUS CANADENSIS	PRAIRIE WILD RYE	5%
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	7%
IRIS VIRGINICA	BLUE FLAG IRIS	8%
JUNCUS TORREYI	TORREY'S RUSH	5%
PANICUM VIRGATUM	SWITCH GRASS	14%
SCIRPUS CYPERINUS	WOOL GRASS	3%
SPARTINA PECTINATA	PRAIRIE CORD GRASS	10%
VERBENA HASTATA	BLUE VERVAIN	5%
		100%

TYPE 2 NATIVE PLANT PLUGS		
ALLIUM CERNUUM	NODDING WILD ONION	3%
ANDROPOGON SCOPARIUS	LITTLE BLUESTEM	3%
AQUILEGIA CANADENSIS	COLUMBINE	3%
ASTER LATERIFLORUS	SIDE-FLOWERING ASTER	3%
ASTER NOVAE-ANGLIA	NEW ENGLAND ASTER	3%
CAREX JAMESII	GRASS SEDGE	3%
DIARRHENA AMERICANA	BEAK GRASS	4%
ECHINACEA PURPUREA	PURPLE CONEFLOWER	9%
ELYMUS CANADENSIS	WILD CANADA RYE	6%
ELYMUS VIRGINICA	VIRGINIA WILD RYE	7%
EUPATORIUM PERFOLIATUM	BONESET	8%
GERANIUM MACULATUM	WILD GERANIUM	3%
HELIANTHUS GROSSESERATUS	SAWTOOTH SUNFLOWER	3%
LOBELIA CARDINALIS	CARDINAL FLOWER	3%
LOBEILIA SIPHILITICA	GREAT BLUE LOBELIA	3%
MONARDA FISTULOSA	BERGAMONT	5%
PANICUM VIRGATUM	SWITCH GRASS	9%
PARTHENIUM INTEGRIFOLIUM	QUININE	3%
PENSTEMON CALYCOSUS	SMOOTH PENSTEMON	3%
SOLIDAGO OHIENSIS	OHIO GOLDENROD	3%
SOLIDAGO PATULA	SWAMP GOLDENROD	3%
SOLIDAGO SPECIOSA	SHOWY GOLDENROD	3%
TRADESCANTIA OHIENSIS	SPIDERWORT	3%
TRILLIUM ERECTUM	TRILLIUM	3%
		100%

Table 4. Native Plant Seed List.

Scientific Name	Common Name	Percent of Total
TYPE 1 NATIVE PLANT SEED (35 LB/ACRE)		
ASTER LATERIFOLIUS	SIDE-FLOWERING ASTER	5%
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	5%
ASTER SIMPLEX	MARSH ASTER	3%
ANDROPOGON SCOPARIUS	LITTLE BLUESTEM	5%
CAREX COMOSA	BRISTLY SEDGE	6%
CAREX SPARGANOIDES	BURRED SEDGE	6%
CAREX STIPATA	COMMON FOX SEDGE	6%
CAREX TRIBULOIDES	POINTED OVAL SEDGE	3%
CAREX VULPINOIDEA	FOX GRASS	6%
ELYMUS CANADENSIS	CANADA WILD RYE	7%

ELYMUS VIRGINICUS	VIRGINIA WILD RYE	6%
GENTIANA ANDREWSII	BOTTLE GENTIAN	3%
GILARDIA PULCHELLA	INDIAN BLANKET	3%
JUNCUS TORREYI	TORREY'S RUSH	3%
MONARDA FISTULOSA	BERGAMONT	5%
PANICUM VIRGATUM	SWITCH GRASS	9%
PHLOX DIVARTICA	BLUE PHLOX	2%
RUDBECKIA HIRTA	BLACK-EYED SUSAN	5%
SOLIDAGO GIGANTEA	LATE GOLDENROD	3%
SORGHASTRUM NUTANS	INDIAN GRASS	3%
SPARTINA PECTINATA	PRAIRIE CORD GRASS	6%
		100%

TYPE 2 NATIVE PLANT SEED (35 LB/ACRE)

ALLIUM CERNUUM	NODDING WILD ONION	3%
ANDROPOGON SCOPARIUS	LITTLE BLUESTEM	6%
AQUILEGIA CANADENSIS	COLUMBINE	3%
ASTER CORDIFOLIUS	HEART-LEAVED BLUE ASTER	3%
ASTER LAEVIS	SMOOTH ASTER	3%
ASTER NOVAE-ANGLIAE	NEW ENGLAND ASTER	3%
CAREX CRINITA	FRINGED SEDGE	5%
CAREX NORMALIS	SPREADING OVAL SEDGE	4%
CAREX SPARGANOIDES	BURRED SEDGE	4%
CASSIA FASCICULATA	PARTRIDGE PEA	2%
DIARRHENA AMERICANA	BEAK GRASS	4%
ECHINACEA PURPUREA	PURPLE CONEFLOWER	5%
ELYMUS CANADENSIS	WILD CANADA RYE	5%
ELYMUS VIRGINICUS	VIRGINIA WILD RYE	6%
EUPATORIUM PERFOLIATUM	BONESET	4%
GLYCERIA STRIATA	FOWL MANNA GRASS	4%
MONARDA FISTULOSA	BERGAMONT	3%
PANICUM VIRGATUM	SWITCH GRASS	7%
RATIBIDA PINNATA	YELLOW CONEFLOWER	5%
RUDBECKIA HIRTA	BLACK-EYED SUSAN	8%
SOLIDAGO GIGANTEA	LATE GOLDENROD	5%
SOLIDAGO SPECIOSIA	SHOWY GOLDENROD	5%
VERONIA FASCICULATE	IRONWEED	3%
		100%

Table 5. Native Tree-Shrub Clusters.

Scientific Name	Common Name	Percent of Total
Trees		
Carya ovata	Shagbark Hickory	10%
Juglans nigra	Black Walnut	20%
Platanus occidentalis	American Sycamore	25%
Quercus bicolor	Swamp White Oak	20%
Quercus macrocarpa	Burr Oak	25%
		100%
Shrubs		
Cephalanthus occidentalis	Button Bush	25%
Cornus stolonifera	Red-Osier Dogwood	15%
Sambucus canadensis	Elderberry	25%
Viburnum dentatum	Arrowwood Viburnum	20%
Viburnum lentago	Nannyberry Viburnum	15%
		100%

Project Costs and Quantities

A summary of quantities and costs are listed below.

Table 6: Summary of Quantities.

BASE BID SCHEDULE OF QUANTITIES AND PRICES

BASE BID

Item No.	Stream Restoration Practice	Quantity	Units	Unit Cost	Extended Cost
1	Nuisance Shrub Removal	0.37	ACRES	$6,500.00	$2,405.00
2	Tree Removal 4" to 12" Diameter	6	EA	$350.00	$2,100.00
3	Tree Trimming / Limb Removal	10	EA	$55.00	$550.00
4	Rock Vortex Weirs	3	EA	$1,800.00	$5,400.00
5	Fiber Roll	150	LF	$40.00	$6,000.00
6	1-Row A-Jacks	270	LF	$57.50	$15,525.00
7	3-Row A-Jacks	30	LF	$130.00	$3,900.00
8	3-Row A-Jacks / Cobble Layer / Grout Surface Cobble	50	LF	$160.00	$8,000.00
9	Vegetated Geogrid (Bio-D Block)	200	LF	$8.00	$1,600.00
10	Fiber Roll Terrace (mid-slope)	110	LF	$40.00	$4,400.00
11	Re-Shaped Streambank Earthwork / Erosion Blanket	360	LF	$7.00	$2,520.00
12	Round Cobble Installation Along Storm Pipe Outlets	11	CY	$550.00	$6,050.00
13	Native Tree / Shrub Clusters	14	EA	$200.00	$2,800.00
14	Native Shrub Live Stakes (2 / LF)	90	LF	$6.00	$540.00
15	Native Potted Plugs (2 / LF)	80	LF	$9.00	$720.00
16	Native Potted Shrubs	20	EA	$50.00	$1,000.00
17	Boulder Placement	12	EA	$175.00	$2,100.00
18	Trench Downspouts to Stream (Avg. 10 ft. each)	2	EA	$880.00	$1,760.00
19	Construction fencing	1,000	LF	$3.25	$3,250.00
20	Erosion Control	1	LS	$1,750.00	$1,750.00
21	Site Cleanup and Restoration	1	LS	$2,800.00	$2,800.00
22	Native Plant Maintenance	3.0	Year	$3,300.00	$9,900.00
23	Relocate Existing Project Sign and Install 2 Decals	2	LS	$600.00	$1,200.00
24	Repair Woodcrest Lane Storm Sewer Inlet	1	LS	$4,000.00	$4,000.00
				Construction Total - Base Bid	**$90,270.00**

BID EXTRAS

Item No.	Stream Restoration Practice	Quantity	Units	Unit Cost	Extended Cost
101	Bury Drain Tiles	2	HR	$50.00	$100.00
102	Clear Walking Path at Top of Bank	3	HR	$50.00	$150.00
103	Cut Tree	2	HR	$50.00	$100.00
104	Grade Swale for Drain Tile	3	HR	$50.00	$150.00
105	Earthwork at Top of Bank	6	HR	$50.00	$300.00
106	Extra Construction Fence	470	LF	$3.25	$1,527.50
107	10 LF Fiber Roll	10	LF	$40.00	$400.00
108	Replace Rock at End of Inlet Channel, Site 2 (50 LF)	1	LS	$3,300.00	$3,300.00
109	Replace Rock in Detention Basin Outlet Channel , Site 1 (30 LF)	1	LS	$2,800.00	$2,800.00
110	Replace Rock at Storm Outfall Pipe , Site 2 (30 LF)	1	LS	$1,700.00	$1,700.00
111	Added Two Red Viburnum 9-24-08 (1 near sledding sign,	2	EA	$175.00	$350.00
112	Shrubs - 3 Gallon Size	2	EA	$50.00	$100.00
	Shrubs - 5 ft Size				
113	Viburnum lentago (5 ft tall)	6	EA	$175.00	$1,050.00
114	Sambucus canadensis (4.5 ft / largest size)	12	EA	$125.00	$1,500.00
115	Shrubs - 3 Gallon Size	8	EA	$50	$400.00
116	Install Shrubs - 3 Gallon Size	30	EA	$50	$1,500.00
	Native Plant Plugs (2-in potted plugs)				
117	Canada Wild Rye	250	EA	$4.50	$1,125.00
118	Virginia Wild Rye	250	EA	$4.50	$1,125.00
119	Columbine	225	EA	$4.50	$1,012.50
120	Prairie Seed	1	LS	$8,520.00	$8,520.00
				Construction Total - Bid Alternates	**$27,210.00**

Total Phase 3 Contractor Bid Costs: $117,480.00

Table 7: Project Cost Summary.
Hobson Creek Corridor Restoration Project, Phase 3.
IEPA FAA 3190511.

Project Cost Summary	Total Cost to Date	Local Match Share	Grant Assistance Amount
Clerical	$0.00	$0.00	$0.00
Supervisor	$0.00	$0.00	$0.00
DIRECT LABOR	$0.00	$0.00	$0.00
Fringe Benefits	$0.00	$0.00	$0.00
Overhead Costs	$0.00	$0.00	$0.00
INDIRECT COSTS	$0.00	$0.00	$0.00
EQUIPMENT, MATERIALS, SUPPLIES	$0.00	$0.00	$0.00
Engineering	$64,016.92	$25,606.77	$38,410.15
Surveyor / Surveying	$10,928.55	$4,371.42	$6,557.13
Streambank Stabilization	$105,380.00	$42,152.00	$63,228.00
Legal Expenses	$5,340.00	$2,136.00	$3,204.00
Misc. Materials	$214.06	$85.62	$128.44
SUBCONTRACTS	$185,879.53	$74,351.81	$111,527.72
Totals	$185,879.53	$74,351.81	$111,527.72
		IEPA Grant Award:	$116,986.00
		Balance of Award:	**$5,458.28**

Operation and Maintenance Plan

Maintenance of native plantings along the stabilized streambanks and within the riparian corridor is critical to project success. The Hobson Creek Community Council will take responsibility for the EPA Section 319 grant 10-year Operations & Maintenance agreement for streambank bioengineering protection measures and plant maintenance. The following are provisions for this Agreement.

Bioengineering Materials Inspections

Bioengineering materials inspections for the constructed streambank stabilization area will occur at least two times per year according to the attached schedule in Table 8. Repairs will be made as necessary, as determined by the Owner and their designated Representative.

1. A-Jacks: Inspections will occur for dislodgement or relocation of A-Jacks components if any, broken pieces, or other indications of potential stabilization concerns.
2. Fiber Roll Toe and Fiber Roll Terrace: Inspections will occur for the staking, undercutting, cord fasteners, and integrity of the Fiber Roll.
3. Rock Vortex weirs: Some rock displacement at the vortex weir is expected, but significant relocation of larger rock materials is not desirable. Major relocation of rock will be inspected and noted.
4. Re-Shaped Slopes and Vegetated Geogrid: The performance of the re-shaped slopes and vegetated geogrid to stabilize the site slopes will be inspected. Growth of vegetation and locations requiring additional planting will be inspected. Eventually, the vegetated geogrid will biodegrade presumably within a few years. The capability of plantings to stabilize the resulting angle of repose will be noted.

Native Plant Maintenance

Conditions will be monitored and maintenance will be performed as described in the attached schedule. Native plant maintenance will occur using spot herbicide applications, hand removal of nuisance weeds, and related activities performed at least three times per year per the attached schedule. Tree / shrub clusters which contain dead trees will be replaced according to the 3-year Vegetative Performance Standards in the Specifications plan sheet. Non-native species will be removed from the streambank stabilization area.

Maintenance Costs

The annual site maintenance budget will be $5,000 annually, primarily to control re-introduced invasive species such as Buckthorn (Rhamnus cathartica), and Tartarian Honeysuckle (Lonicera tatarica) from taking over the newly establishing native plants. Expenditures may be higher expenditures during the first three years for native plant maintenance and nuisance weed control as the native plantings become established. Costs for Operations and Maintenance shall be paid by the Owner, the Hobson Creek Community Council.

Table 8. Site Maintenance Schedule.

Post-Construction through 2018

Activity	late March	mid-May	mid-June	mid-July	mid-August
Mow and/or Cut Natives	X				
Spot Herbicide / Remove Weeds		X	X		X
Bioengineering Materials Inspection	X		X		

Responsibilities

The Hobson Creek Community Council Board and their designated Representative shall be responsible for project site maintenance. Participating parties will include the Owner's Representative, professional Contractor services support, or possibly volunteers of the Hobson Creek Community.

Project Benefits

Water Quality

The Phase 3 substantial completion of streambank stabilization was completed by August 22, 2008. Final planting installations were completed by September 25, 2008. Rapid establishment of temporary cover crop following slope stabilization occurred in early to mid-August with substantial rainfall events. Subsequent observations of streambank stabilization occurred following recent extremely intense regional rainfalls September 12-14, 2008. The banks remained protected and erosion was greatly reduced. Between mid-August and mid-September, several site watering applications were performed by the Contractor which helped to maintain vegetative growth. Selected vegetation replacement of invasive trees and shrubs with native species in the 0.37-acre riparian area will also substantially reduce the loss of bank soils and promote bank soil stability. Native riparian plantings will reduce sheet erosion within the flood zone. Rock vortex weirs will prevent channel downcutting which in the past caused site degradation. These measures will significantly reduce non-point source pollutant loadings to the downstream East Branch DuPage River. Based on site observations, there is minimal sediment delivered to the stream from the restoration site.

The Illinois EPA Load Reduction Spreadsheet was used to calculate pollutant loading rates from the project site. Input data included a combined streambank (left and right bank) length of 858 linear feet (see Table 2). For the Mainstem (Site 1), severe erosion included 200 linear feet of streambank with a height of 5 feet and an erosion rate of 0.55 ft/yr. Moderate erosion included 46 linear feet of streambank with a height of 3.5 feet and an erosion rate of 0.35 ft/yr. Low erosion included 70 linear feet storm pipe outfall and detention basin flowpath erosion with an estimated erosion rate of 0.2 ft/yr. For the Inlet Channel (Site 2), severe erosion included 262 linear feet of streambank with a height of 5 feet and an erosion rate of 0.4 ft/yr. Moderate erosion included 180 linear feet of streambank with a height of 3.5 feet and an erosion rate of 0.4 ft/yr. Low erosion included 100 linear feet of Inlet Channel bottom erosion with an estimated erosion rate of 0.2 ft/yr. Based on these assumptions, Site 1 and Site 2 had previously contributed approximately 53 tons of sediment, 53 pounds of phosphorus, and 108 pounds of nitrogen annually to Tributary # 6. These estimates do not include historic sediment loss due to severe channel downcutting which has also occurred at this site. Due to stream stabilization, these pollutant loading rates to Hobson Creek have been dramatically reduced at the project site.

Habitat and Riparian Function

- Selected vegetation replacement of non-native species with native trees and shrub clusters, grasses, and forbs will protect and diversity wildlife habitat corridor along Hobson Creek, as well as diversity the native plant understory which is an indicator of a healthy ecosystem. The proposed plant species will also increase the diversity of foraging opportunities for wildlife.

- Selected vegetation replacement will allow more desirable and beneficial species to flourish. There were numerous impacts to ecological integrity caused by the previously existing invasive plant species in the riparian zone. Dense stands of invasive shrubs such as common buckthorn and Tartarian honeysuckle previously shaded and out-competed growth of seedlings of bur oak (Quercus macrocarpa) and black walnut (Juglans nigra) which occur in limited number in the riparian area. Indeed, few seedlings of these desirable tree species were previously observed in the existing riparian area. Riparian restoration will increase sunlight penetration and increase the density of desirable tree and shrub species.

- The proposed riparian planting restoration will enhance the function of interception of rainfall. Deep-rooted trees and plants have increased absorption properties over the existing riparian species.

- The proposed density of trees, shrubs, forbs and grasses will enhance pollutant filtration and assimilation of nutrients as well as contaminated runoff discharged from surrounding upland areas, or through the project site. Native groundcover such as grasses and forbs are particularly efficient at trapping sediment in the uptake of phosphorus and nitrogen nutrients which otherwise cause pollution within the waterway. The proposed planting plan will significantly increase the abundance of groundcover species. Deep-rooted trees will increase the uptake of nitrogen from shallow groundwater, improving water quality of the stream.

- The proposed planting plan will help restore in-stream vegetative cover by encouraging partial sunlight penetration into the water column to enhance growth of shoreline forbs and grasses, as well as potentially allowing in-stream aquatic macrophytes. This will enhance the function of in-stream habitat conditions.

Public Outreach / Education

Project Signage (per project plans) placed at strategic locations along Green Trails Drive near Seven Bridges Park and at Spyglass Court are being utilized to notify motorists, pedestrians, and visitors regarding the project, funding sources, and proposed improvements and activities. The Mainstem project site # 1 adjoins a walking trail and outdoor athletic facilities at Seven Bridges Park owned by the Woodridge Park District that likely receives thousands of visitors annually. This park is located immediately downstream of Green Trails Drive. Many residents and park visitors use trails and sidewalks along the Hobson Creek stream corridor which will further enhance community educational outreach from the project site.

The Hobson Creek Community Council (HCCC) Board and members have been active over the last several years in acquiring Phase 1, 2 and 3 Section 319 Clean Water Act grant funding through the Illinois EPA and U.S. EPA, acquiring DuPage County Water Quality Improvement Program funding, completing final engineering design, obtaining regulatory permit approvals for the Phase 1, 2 and 3 project areas, educating homeowners, acquiring landowner signoffs for the proposed

work in the common area, setting aside matching funds to complete portions of this project, contracting with stream consultants, and other activities. Over 20 landowners along the project site have been personally contacted by HCCC regarding the Phase 3 project and the entire community has been notified regarding the work. Additional HCCC education includes Board meetings, and quarterly newsletter updates. According to Mr. Bob Longacre of HCCC, in part as a result of these efforts and a successful project, the residents of HCCC have been pleased with the project results to date.

In the future, it is likely that the project sites will be used for site tours and workshops. For example, in April 2006 the Phase 3 site was the subject of a field laboratory study for a workshop presented by Ted Gray on Stream Restoration hosted at Illinois Institute of Technology.

In the past, various newsletter, newspaper and periodical articles have been published regarding the Hobson Creek Corridor Restoration Project Phases 1 and 2. Known information is as follows:

1) The Conservation Foundation newsletter Watershed Currents published a project article in 2003, Vol. 2, Issue 2.
2) An article titled "Homeowners Work to Restore Creek" was published in The Naperville Sun in mid-November, 2003. A letter to the editor of the Naperville Sun was published in response to the newspaper article was submitted by the Commissioner of the Forest Preserve District of DuPage County, entitled "Hobson Creek Restoration Lifts Quality of Life."
3) One pre-construction newspaper article was published in the Daily Herald, Section 1. This newspaper article was entitled "Your Actions May Be Key to Water Quality, County Says."
4) One professional publicist published three professional journal articles featuring the Hobson Creek Corridor Restoration Project.
    a. An article entitled "Hobson Creek Restoration Project" was published in the November / December 2004 Land & Water Magazine by Greg Northcutt including interviews with Ted Gray.
    b. An article entitled "Stable Streams" was published by Mr. Northcutt in December 2004 Civil Engineering News Magazine. November 2004.
    c. An article titled "Stabilizing an Urban Streambank" was published by Mr. Northcutt in the November, 2004 Landscape Architect and Specifier News.
5) Rolanka, manufacturer of Bio-D Block, has includes photos of the Hobson Creek Restoration Project in national advertising materials.

ATTACHMENT 1: PROJECT PHOTOS

ATTACHMENT 2: PROJECT ARTICLES