

# **WAWASEE AREA CONSERVANCY FOUNDATION**

## **Thorpe Property Sediment Control Project**

### **Concept Plan Summary Report**

#### **I. INTRODUCTION**

Cardno JFNew was contracted by the Wawasee Area Conservancy Foundation (WACF) in July 2012 regarding a recently purchased 4.51 acre parcel in Section 27, Township 34 North, Range 7 East, Kosciusko County, Indiana (Figure 1). The parcel is known as the Thorpe property with access from County Road 1000 North, approximately midway between State Road 13 and County Road 800 East. The project purpose was to delineate wetlands and develop a concept plan for reducing sediment and controlling stormwater in the Martin drainage. The entire Martin Drain Watershed is approximately 240 acres (Figure 2), while the drainage area that includes the Thorpe property and above is approximately 120 acres. Martin Drain empties into a manmade channel off Lake Wawasee in the Vawter Park Subdivision.

While there is no defined stream channel above or within the Thorpe parcel, there are two 12-inch diameter clay tiles that enter the property from the southwest and discharge onto the neighboring property along the north property line. These tile lines follow the lowest elevations of the property and the resulting discharge point becomes a wetland that is in part on WACF property, but is mostly on neighboring properties to the north. This wetland is primarily silver maples; however, the portion on the Thorpe parcel is primarily reed canary grass and has been significantly impacted from past erosion. A high ridge that was previously cultivated makes up the majority of the parcel. This ridge is dominated by annuals, primarily foxtail, and is bordered to the east by wooded residential lots and on the south and west by a wooded fence row and a large agricultural field. The agricultural field is under a conservation tillage program; however, the field is still occasionally tilled allowing surface erosion of sediment.

#### **II. PRELIMINARY WORK SUMMARY**

Cardno JFNew delineated the wetland on August 22, 2012 and produced a separate wetland delineation report dated September 28, 2012 to submit to the US Army Corps of Engineers for verification of the wetland boundaries. Approximately 0.64 acres of the 4.51 acre parcel qualify as wetlands that are considered jurisdictional waters of the United States. The wetland includes most of the northern 80 feet of the property (Figure 3).

Cardno JFNew also took relative elevation shots throughout the property to help determine what could be designed on this parcel to meet the goal of reducing the sediment load into Lake Wawasee from this drainage. The elevation difference from the top of the hill near the center of the parcel to the lowest point along the northern boundary was 13 feet. Beginning at the west property line approximately 100 feet north of the south property line the grade drops 3 feet in the

first 200 feet and then begins to rise quickly up to the high point approximately 9 feet higher. Then the grade drops 8 feet again into a broad swale before rising again 3.6 feet near the eastern boundary. The southwesterly low swale area accepts approximately 70 percent of the surface drainage (85 acres) from the watershed, while the remaining 30 percent of the drainage (35 acres) passes through the second swale in the eastern half of the parcel. The grade continues to decrease further north and to the east of the property and does not begin to increase in elevation for another 300 feet to the north causing the lowest portion of the drainage to be off site. The two 12-inch diameter drainage tiles, which cross the Thorpe property, discharge into the lower elevations to the north.

### **III. CONCEPT PLANNING**

The project goal is to retain stormwater as much as possible while trapping sediment to prevent it from moving downstream to Lake Wawasee. Options ranged from creating a four acre storage basin to creating a grassed swale and improving the vegetation density and diversity throughout the parcel. The topography within the Thorpe parcel does not allow for a dam like structure typically used to construct detention in a drainage way. Creating a four acre detention basin would have involved moving over 50,000 cubic yards of earth to an off-site location costing in excess of \$400,000. A four acre sediment basin was not deemed feasible due to cost.

Developing a grassed swale to guide surface water through permanent vegetation on the way through the Thorpe parcel is feasible, estimated to cost approximately \$20,000. Reforestation and enhancement of vegetation throughout the remainder of the parcel would add an estimated \$12,000 in additional work. However, a grassed swale did not address storage and detention of water, only the capture of sediment and the concept was not pursued.

A combination sediment basin and grassed swale was subsequently developed as a compromise project (Figure 3). The current concept plan includes a one acre, six foot deep sediment basin that can also be used to detain and regulate stormwater using an in-line water control structure at its outlet. The outlet of the basin through the in-line structure and over an emergency rock spillway is designed to pass the water through a 500-foot long x 40-foot wide grassed swale before allowing it to leave the Thorpe property. The concept has an option to be determined during the design phase of allowing water from the 12-inch drainage tiles to empty into the basin if elevations allow, or be routed around the basins into the grassed swale. Additional work proposed includes permanent herbaceous cover and tree planting on the three acres of high ground and approximately one half acre of wetland enhancement that would remove the sediment and replant the wetland area on the property.

#### IV. COST ESTIMATES

The combination sediment basin and grassed waterway project with vegetated enhancements to the upland and wetland is estimated at \$76,300.00 (Table 1). This estimate represents the highest probable cost per design feature. Since the design is only conceptual at this time, engineering and project management costs have been included in this estimate. The project can be completed in phases or portions can be removed to reduce the cost as needed. Construction costs can be reduced significantly by reducing the size or depth of the sediment basin, reducing the size of the riprap spillway, reducing the width of the grassed waterway (less erosion blankets), or not using erosion blankets for the wetland enhancement area.

**Table 1: Probable Costs for the Thorpe Property Sediment Control Project**

Task	Unit	Unit cost	Unit #	Task Total
Sediment Basin Excavation	CYS	\$ 4.00	5111	\$ 20,444.00
Sediment Basin Seeding	SYS	\$ 0.50	7000	\$ 3,500.00
Water Control Structure	each	\$2,000.00	1	\$ 2,000.00
Rock Chute (2)	Tons	\$ 45.00	300	\$ 13,500.00
Tile Relocation (2)	Feet	\$ 16.00	400	\$ 6,400.00
Bioswale Excavation	CYS	\$ 4.00	1066	\$ 4,264.00
Bioswale Seeding	SYS	\$ 0.50	2133	\$ 1,066.50
Bioswale Erosion Blankets	SYS	\$ 2.50	2133	\$ 5,332.50
Wetland Enhancement Excavation	CYS	\$ 4.00	1511	\$ 6,044.00
Wetland Enhancement Seeding	SYS	\$ 0.50	3000	\$ 1,500.00
Woodland Tree Planting	each	\$ 1.75	1300	\$ 2,275.00
<b>Sub Total</b>				<b>\$ 66,326.00</b>
Project Engineering	each	10%	1	\$ 6,632.60
Project Management	each	5%	1	\$ 3,316.30
<b>Project Total</b>				<b>\$ 76,274.90</b>

#### V. SUMMARY

Cardno JFNew investigated the 4.51 acre Thorpe parcel located within the headwaters of the Martin Drainage off CR 1000 E near State Road 13 in Kosciusko County, Indiana for the purpose of a wetland delineation and a sediment control concept plan. The parcel contains approximately 0.64 acres of wetland along the north property boundary. The parcel has over 13 feet of fall from the center of the south edge to the northeast corner, with the majority of off-site surface water draining through the southwest corner of the parcel. Cardno JFNew developed a concept plan that will capture surface water from approximately 85 of the 120 acres draining into this parcel. The plan also includes reforestation of three acres and wetland enhancement. As presented the probable cost to complete the design and construction of the project is estimated at \$76,300. Grant funding may be available to assist with the cost of this project.