DANVILLE HIGH SCHOOL CAMPUS IMPROVEMENT PROJECT

FOR

ILLINOIS ENVIRONMENTAL PROTECTION AGENCY
IGIG ASSISTANCE AGREEMENT NUMBER 1107

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Prepared for:

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1.0 DANVILLE HIGH SCHOOL CAMPUS IMPROVEMENT PROJECT

1.0 INTRODUCTION

The City of Danville had partnered with Danville School District 118 to create the Danville High School Campus Improvement Project. An improvement to the high school area has been a priority for the community. The existing area is located in an older area of the community largely comprised of buildings and parking lots which create significant stormwater and contaminant flows. There is little green space in the area to reduce runoff and even when present, it is generally not located to provide any filtration benefits.

The project plan was collaboratively developed with student, parent, faculty, and administrator stakeholder groups. The desired outcome for the project has been to create a functional campus that reduces both stormwater contamination and stormwater discharge rates to preserve and protect adjacent Stoney Creek and downstream waters. In addition, the project will serve as a model project for future developments and to be in conformance with the Danville Comprehensive Plan that includes incorporation of smart and sustainable growth.

Innovative features of the project include (1) green overflow parking, which utilizes a structured soil to eliminate the need for additional pavement and provides a large infiltration area, and (2) a multi-step stormwater treatment system, consisting of porous pavement and vegetated swales/infiltration basins in series, that increases the overall efficiency of contaminant removal.

A key project component is the multi-use turf modified soil field that is designed to handle bus overflow parking. The field has an irrigation collection system constructed to recapture storm water runoff from rainfall events and recycle onto the turf area. The reconstructed parking areas are another key component that has incorporated water quality facilities. Stormwater BMPs include infiltration planters, bio-retention basins, bioswales, infiltration trenches, and porous pavement areas as shown in Figure 1. These areas have been sized to provide sufficient surface area to capture stormwater to reduce runoff rates. Captured water will be absorbed by the soil to filter oils, nutrients, and sediment prior to their entering the storm sewer system. Trees and other landscaping will provide uptake of water and contaminants from the soil. Discharge rates for the site will be reduced to the 5-year pre-development rate for up to a 50-year storm by utilizing overflow restrictions in vegetated dry basins and infiltration trenches.

Project funding has been made available through the creation of a Tax Incremental Financing District in partnership with all of the area taxing bodies and through the Illinois Protection Agency's IGIG grant program. Construction began May 15, 2013 with substantial completion on August 25, 2013 prior to the start of the school year.

2.0 PROJECT DESCRIPTION

2.1 BEST MANAGEMENT PRACTICES

The Danville High School Campus Improvements Project consisted of a 2.96 acres area of more than 50% existing asphalt student parking and alley pavements with the remaining being open green space that all is surrounded by public streets of Jackson, Woodbury, Hazel and Clay. The objective of the proposed improvements has been to incorporate stormwater best management practices (BMPs) to reduce stormwater volume and nonpoint source pollution to nearby Stoney Creek.

The project has constructed a combination of four infiltration trenches, five bioswales, two dry basins to regulate stormwater runoff, seven infiltration planters, pervious concrete parking, gutter, and sidewalk pavement, and a 57,600 SF practice field consisting of modified turf soil consisting of a sand based root zone with a tile collection system that will capture and recycle stormwater for the irrigation system.

1) Infiltration Trench (BMP #100) - These have been designed and incorporated into the proposed BMPs to provide stormwater storage for smaller 1 to 2 year storm events that will capture runoff and filtrate to an aggregate storage area below the surface to recharge the subsurface ground. By reducing the runoff velocity, suspended sediment is removed through filtering, absorption, and gravity sedimentation. A combination of excess runoff from the proposed practice field and existing asphalt parking areas will capture, filtrate and reduce suspended solids, nitrogen, and phosphorous loadings. Native grasses have been planted throughout each trench.

4 Infiltration Trenches installed totaling 5,670 SF

Installed Cost: $44,189.22

The quantity of pollutants removed by the infiltration trenches is estimated for each pollutant listed:

COD	*394 lbs/year*
TSS	*1167 lbs/year*
Lead	*1 lbs/year*
Zinc	*1 lbs/year*
Total Nitrogen	*5 lbs/year*
Total Phosphorus	*1 lbs/year*

2) Bioswales/Dry Basins (BMP #101) – The bioswales have been places along the north end of the existing asphalt parking areas, west of the proposed handicap parking area, and along Jackson Street to capture stormwater runoff and to intercept runoff infiltrated from the proposed pervious concrete parking and gutter areas. A drain tile has been trenched in with pea gravel that will direct runoff away. Two Dry basins have been constructed to reduce and control stormwater runoff and serve as the last barrier in removing pollutants prior to entering the storm sewer system. The bioswales will capture and reduce suspended solids, nitrogen, and any other contaminants that come off the existing parking lot and street pavements.

5 Bioswales installed totaling 6,838 SF

2 Dry Basins installed totaling 5,763 SF

Installed Cost: $176,046.59

The quantity of pollutants removed by the bioswales and dry basins is estimated for each pollutant listed:

BOD	*25 lbs/year*
COD	*357 lbs/year*
TSS	*2460 lbs/year*
Lead	*3 lbs/year*
Zinc	*2 lbs/year*
Total Nitrogen	*4 lbs/year*

3) Infiltration Planters (BMP #102) – All Infiltration planters will replace once impervious asphalt paved surfaces with open green spaces that will reduce surface runoff temperatures. These will serve as pervious areas to infiltrate rainwater, reduce runoff, and contain plantings and mulch that will allow for areas for infiltration that will help in reducing suspended solids.

7 Infiltration Planters installed totaling 2,870 SF

Installed Cost: $28,404.17

The quantity of pollutants removed by the infiltration planters is estimated listed:

TSS	*1 lbs/year*

4) Practice Field Sand Base Root Zone (BMP #103) – The entire area where the practice field and overflow bus parking has been excavated and re-graded to provide a 10 inch sand base root zone with polypropylene fibers and a tile collection system. The sand base root zone will provide an excellent infiltration media to capture runoff that will be directed to a 36" storm water storage pipe for reuse as water for irrigation. Polypropylene fibers have been blended into the upper 6 inch layer of the sand base to provide stability for bus loading during occasional overflow parking events. The entire area has been seeded with turf type tall fescue that once established will provide for a strong root zone bond with the blended fibers. An irrigation system has been constructed that is connected to the storage pipe to provide water to the entire field. Reduction in suspended solids and nitrogen loadings shall be seen as a result of this construction.

Practice Field Sand Base Root Zone installed totaling 57,600 SF

Installed Cost: $369,908.11

The quantity of pollutants removed by the sand base root zone is estimated for each pollutant listed:

COD	*27 lbs/year*
TSS	*48 lbs/year*
Total Nitrogen	*1 lbs/year*

5) Pervious Concrete Paving (BMP #104) - A pervious parking lot was constructed to the north end of the practice field to allow for additional parking during school events. The area for the accessible parking was also constructed with pervious concrete pavement along the west side of the high school. A 10 foot wide pervious concrete sidewalk (2795 SF) was added and constructed along the west side of the high school to accommodate students from the parking lot areas. The porous paved surface will help reduce stormwater runoff volumes to the street right-of-way and will reduce suspended solids and nitrogen loadings coming from adjacent areas. Along Jackson Street, where the existing profile is very flat, 395 lineal feet of combination curb and pervious concrete gutter was constructed that will discharge into either the proposed dry basins or bioswales. The porous paved surface will help reduce stormwater runoff volumes to the street right-of-way and will reduce suspended solids and nitrogen loadings coming from adjacent areas.

Pervious Concrete Paving installed totaling 8510 SF

Combination Type B Curb and Pervious Concrete Gutter installed totaling 395 LF

Installed Cost: $185,616.53

The quantity of pollutants removed by the sand base root zone is estimated for each pollutant listed:

COD	*83 lbs/year*
TSS	*239 lbs/year*
Total Nitrogen	*1 lbs/year*

2.2 INSTALLATION COSTS

	Estimated Quantity	Estimated Cost	Installed Quantity	Installed Cost
Infiltration Trenches	5,670 SF	$110,779.00	5,670 SF	$44,189.22
Bioswales/Dry Basins	13,317 SF	$119,641.00	12,601 SF	$176,046.59
Infiltration Planters	2,870 SF	$26,864.00	2,870 SF	$28,404.17
Practice Field Sand Base Root Zone	57,000 SF	$605,505.00	57,600 SF	$369,908.11
Pervious Concrete Paving	6,327 SF	$64,891.14	8,510 SF	$171,396.53
Combination Type B Curb and Pervious Concrete Gutter	507 LF	$25,350.00	395 LF	$14,220.00
Total Cost		$952,626.86		$804,164.62
75% IEPA Funding				$603,123.47
25% Recipient Match				$201,041.15

3.0 INFORMATION, OUTREACH, AND EDUCATION

The desired outcome for the project has been to create a functional campus that reduces both stormwater contamination and stormwater discharge rates to preserve and protect Stoney Creek and downstream waters. This project will serve as a model for future developments and partnerships in guiding construction and planning that will be in conformance with the Danville Comprehensive Plan that includes its commitment to environmental stewardship and implementing smart and sustainable growth.

City staff in partnership with the School District has established the BMPs to inform and educate the public and future residences and business about nonpoint source pollution and what can be done to improve water quality in their community.

3.1 PASSIVE OUTREACH

1) BMP Interpretive Signage

- City staff has been in contact and will be working with the high school faculty and students to manufacture interpretive signs at all five BMP locations at the project site. These signs will serve as an educational tool and inform the public and students of the measures incorporated to improve water quality discharge.

3.2 ACTIVE OUTREACH

2) Project Monitoring

- A way to involve students who are daily in direct contact with the project site, by either parking in the student parking area or participating on the practice field, will be to develop a project monitoring program that will be incorporated with samplers to provide for experiments and measure the water quality of discharges from the site to determine the effectiveness of the various BMP's implemented with the project. City staff is working with high school faculty and students to create a monitoring program that will be available for educational opportunities.

4.0 PROJECT EVALUATION

4.1 PROJECT SUMMARY

The project was substantially completed by the start of the 2013/2014 school year with the exception of the major landscaping and seeding due to very dry conditions and awaiting a fall planting schedule. The School District was pleased with the project and the partnership to see the project completed on time and the improvements have been well received by the community. The project area will serve as a benchmark for future and redevelopments projects within the Danville community.

As stated earlier, water quality should be met with the installed BMPs as well as the educational opportunities with students. Load reduction worksheets have been attached in Appendix B demonstrating the expected pollutant removal rates.

The total anticipated annual pollutant removal is summarized in the following table:

BOD	*25 lbs/year*
COD	*861 lbs/year*
TSS	*3915 lbs/year*
Lead	*4 lbs/year*
Zinc	*3 lbs/year*
Total Nitrogen	*7 lbs/year*
Total Phosphorus	*1 lbs/year*

APPENDIX A

PHOTOGRAPHIC DOCUMENTATION

PRE & POST CONSTRUCTION

Looking North - Dry basin area pre-construction

Looking South - Dry basin area pre-construction

Looking North - Dry basin along Jackson Street during construction

Looking North – Turf Modified Soil Field pre-construction

Looking West – Turf Modified Soil Field pre-construction

Looking Southeast – Turf Modified Soil Field pre-construction

Looking North – Turf Modified Soil construction collection tile

Looking South – Turf Modified Soils finished grade

Looking South along Jackson - Bioswales area pre-construction

Looking North along Jackson St. – Bioswales area pre-construction

Looking West along Woodbury St. – Bioswales area pre-construction

Looking East along Woodbury St. – Pervious parking area pre-construction

Looking East along Clay St. – Infiltration planter areas pre-construction

Looking Northeast – Pervious concrete sidewalk area pre-construction

Looking Northwest – Parking lot Infiltration trench areas pre-construction

Looking South – Parking lot infiltration trench/planters pre-construction

Looking South – Pervious HC Parking/Bioswale area pre-construction

Looking East - Pervious HC Parking/Bioswale area pre-construction

Looking North – Dry Basins post construction

Looking North – Infiltration Trench post construction

Looking South – Dry Basins/Infiltration Trenches post construction

Looking South – Infiltration Trenches/Planters post construction

Looking Southeast – Infiltration Trenches/Planters post construction

Looking North – Infiltration Trenches/Planters post construction

Looking Southeast – Turf Modified Soils post construction

Looking North – Turf Modified Soils post construction

Looking South – Turf Modified Soils post construction

Looking North – Irrigation Pump Station post construction

Looking East – Infiltration Planters post construction

Looking South – Pervious HC Pavement Parking & Bioswale post construction

Looking South – Pervious HC Pavement Parking & Bioswales post construction

Looking East – Pervious Parking area post construction

Looking West – Bioswales along Woodbury Street post construction

Looking West – Bioswales/Pervious Parking area post construction

Looking East – Pervious Concrete Sidewalk post construction

Looking North – Pervious Concrete Sidewalk post construction

APPENDIX B

IEPA ESTIMATED LOAD REDUCTION WORKSHEET

APPENDIX C

CONSTRUCTION DOCUMENTS AND SPECIFICATIONS

APPENDIX D

OPERATIONS AND MAINTENANCE PLAN