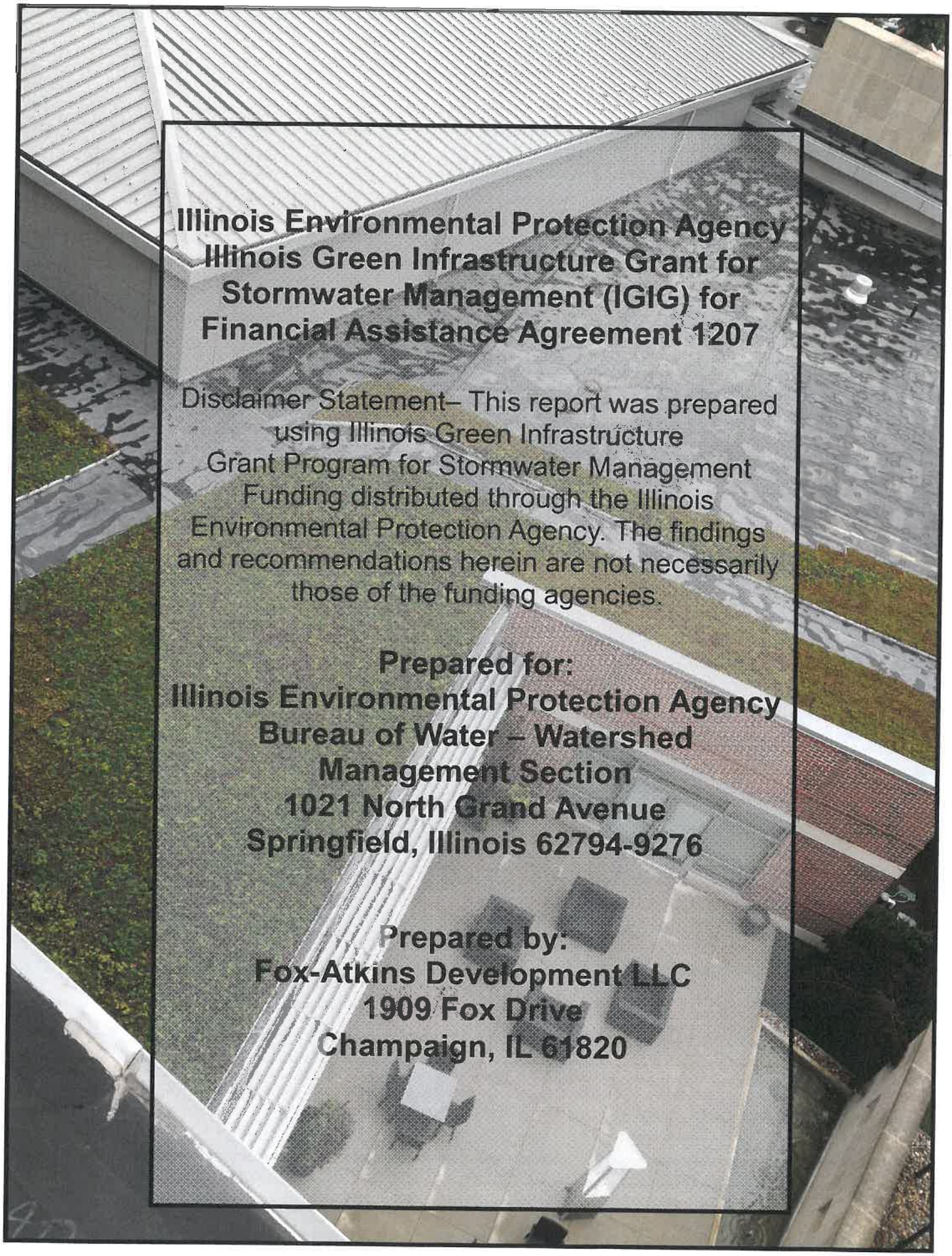

Illinois Environmental Protection Agency Illinois Green Infrastructure Grant for Stormwater Management (IGIG) for Financial Assistance Agreement 1207

Disclaimer Statement– This report was prepared using Illinois Green Infrastructure Grant Program for Stormwater Management Funding distributed through the Illinois Environmental Protection Agency. The findings and recommendations herein are not necessarily those of the funding agencies.

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I Hotel & Conference Center Green Roof System
HUC: 0512011201

Illinois Green Infrastructure Grant Program (IGIG) Application

Funding Category: Green Infrastructure Small Projects
Impaired Waterway: Embarras River

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Introduction:

The I Hotel & Conference Center (I Hotel) is located in the Research Park at the University of Illinois and serves University and Champaign-Urbana visitors, renown University guests and performing artists, members of Fortune 500® companies, and the community at large. The I Hotel has implemented several energy-saving measures during construction and in its day-to-day operation. As a further step to conserve natural resources and encourage sustainability throughout the south campus a 2,860 square-foot green roof system was developed for the conference center roof, adjoining the I Hotel (Image 1). This eco-friendly system created additional green space and complements the natural landscaping that has already been implemented in the Research Park. While limiting storm water discharge by over 50%, the green roof system also filters and detoxifies runoff, reducing energy usage by 25% through decreased roof temperatures and removing particulates traveling to the Embarras River. Moreover, the I Hotel is dedicated to maintaining the project to the highest level in order to not only retain the investment made by the IGIG, but to also increase public awareness of the State's support and commitment to sustainability. The I Hotel has developed marketing and educational materials, distributed in-house information to conference center attendees and provided green roof visibility to hotel guests and visitors. Due to these efforts, the public now has a greater understanding of the benefits of storm water management.

Project Description:

Drought resistant plants were delivered on April 15, 2011 (Image 2) and installed by April 30, 2011 (Image 3). A lift was used to hoist the 1,600 vegetated 4" deep modules onto the roof. Modules are composed of 100% post-consumer polypropylene and the soil contains recycled materials such as compost or reclaimed components (Image 4). Perimeter and walkway gravel was provided from recycled ballast. The vegetation includes sedum, known for its drought tolerance, and one accent plant per module (Image 5). These plants are optimal because they require significantly less than 50% of typical irrigation.

The green roof's growing medium acts as a sponge to collect and filter excess rainwater, reducing storm water discharge and detoxifying runoff by removing suspended solids and other pollutants. Based on the NOAA rainfall chart average 10 year, 24 hour rainfall for the region at 4" per month, the green roof's dry weight of 60 lbs. per cubic ft., and saturated weight of 90 lbs. per cubic ft., the I Hotel 2,860 sq. ft. green roof system retains 1.19904

gallons per sq. ft. per month. This results in a total of 3,429.25 gallons saved per month and a 51.913 run-off coefficient.

Best Management Practices:

2,860sf of Installed Green Roof

Total Cost: $54,859.55

Best management practices have been implemented in the I Hotel green roof site to improve water quality within the Embarras River watershed, providing numerous ecological, aesthetic, and financial benefits, including:

- Controlled storm water runoff (over 50%), erosion and pollution.
- Reduced levels of cadmium, copper, zinc and lead in rainwater.
- Improved water quality and downstream effects:

  I Hotel runoff discharges into a tributary of the Embarras River, a 303 (d) listed river, which provides drinking water to communities downriver.

- Mitigated urban heat-island effects, cooling and cleaning the air.
- More than doubling the estimated service life of the roof, reducing both costs and landfill:
  - Protected the roof from mechanical damage, ultraviolet radiation and temperature extremes.
- Conserved energy by reducing both heating and cooling costs (25%) by providing an insulation layer.
- Reduced sound reflection and transmission.
- Created a wildlife habitat.
- Improved the aesthetic environment for guest hotel rooms overlooking the conference center roof.
- Developed public and educational outreach programs, which successfully maximized exposure to the State's investment in sustainability.

Construction Costs:

Construction Detail	Quantity	Price	Total
Materials:			
Standard 4' deep vegetated modules	1590	26.08	$41,467.20
4.25" mill finish edging	45	41.92	$1,886.40
Standard module mix/accent plants	1590	1.30	$2,067.00
Freight			$3,021.00
Discount	9%		-$3,732.05
Slipsheet (Advanced)			$3,200.00
Total Materials			**$47,909.55**
Labor:			
6 hour crane rental	1		$950.00
5 workers x 16 hours	80	35	$2,800.00
Total Labor			**$3,750.00**
Engineering:			
Smith/Burgett Architects			$3,200.00
Total Engineering			**$3,200.00**
General Conditions & Overhead			**$0.00**
Total Construction Cost			**$54,859.55**
IGIG Assistance		**70%**	**$38,506.50**
Fox/Atkins LLC Investment		**30%**	**$16,353.05**

The original budget total of $51,342.00 included $38,506.50 (75%) of IGIG funding, while Fox/Atkins provided $12,835.50 (25%) in matching funds. The final construction cost for the project was 54,859.55; the IGIG amount remained at $ 38,506.50, while the Fox-Atkins' investment increased to $16,353.05 (30% of the final cost).

Operations and Maintenance Plan:

Spring, 2011 - Began bi-weekly weed walk which continued until fall. Twenty (20) minutes to one hour was designated to maintain a weed free area. In early March, soil tests were sent to John Deere Landscape.

Upon receipt of soil test results, needed nutrients including nitrogen, phosphorus, and potassium were applied using a handheld spreader per the manufacture's recommendations. This application was performed by a certified technician using granular product with slow release ingredients. Finally, a search for damaged material took place and replacements were installed as needed.

May through October, 2011 - The bi-weekly weeding schedule continued. Soil displacement was monitored and additional soil added as needed. All drains were regularly inspected and any undesirable debris was removed. The green roof was monitored for insects and/or other pests and treated as needed. The green roof was also watered as needed, resulting in a luscious green landscape (Image 6).

Partnerships:

The I Hotel is jointly owned by the University of Illinois and Fox-Atkins Development LLC (Fox-Atkins). Their 10-year long partnership in developing the Research Park at the University of Illinois has resulted in twelve commercial office buildings in the Research Park, the I Hotel, and a daycare center. During that time, the partners have collaborated on master planning and storm water management. Architectural students at the University developed the sustainable landscape plan shared by the I Hotel and a yet to be constructed building directly to the south. This landscaping includes rain gardens, bioswales, and native plants – all installed in an effort to reduce storm water runoff. Both the University and Fox-Atkins have implemented energy-saving construction methods, reengineered existing buildings for optimal energy efficiency, and included additional green infrastructure to optimize natural resources and lessen the environmental impact from development. Fox-Atkins Development also continues to work with Prairie Rivers Network, as well as local landscaping specialists, to complete sustainable projects throughout the Research Park. The City of Champaign and the Champaign Park District are also great stewards in this effort, providing staff expertise when evaluating sustainable landscaping plans. Information, Outreach and Education:

The green roof installation has served as an outward gesture of the I Hotel's and Fox-Atkins' commitment to conservation and environmental stewardship and additional measures have also been implemented to educate the public.

The following strategies to inform and educate the public have been employed:

Passive Outreach:

- Signage has been placed inside the I Hotel (Image 7).

Active Outreach:

- Public awareness has been maximized by promoting the green roof through the I Hotel's partnership with the University of Illinois and its presence at the Research Park, where nearly 90 companies and 1,400 employees operate daily. Tours have also been incorporated into the I Hotel's operations to educate guests, clients and community members visiting the facility about the benefits of the green roof. In the future, Fox Development, managing partner of Fox/Atkins, will also take advantage of the relationships it has fostered with the Champaign and Urbana public school districts to develop educational outreach programs and organize annual field trips.

Project Evaluation:

This project has been very successful in reducing heating/cooling costs, as well as generating awareness of the benefits of green roofs. The increased public awareness has resulted in several requests for tours and information on the facility's green roof. To further explain the green roof, an information sheet was created (Image 8) and is now used as a tour handout and is available to I Hotel guests.

I Hotel Green Roof Images:

(Image 1: Rendering of I Hotel Green Roof Site)

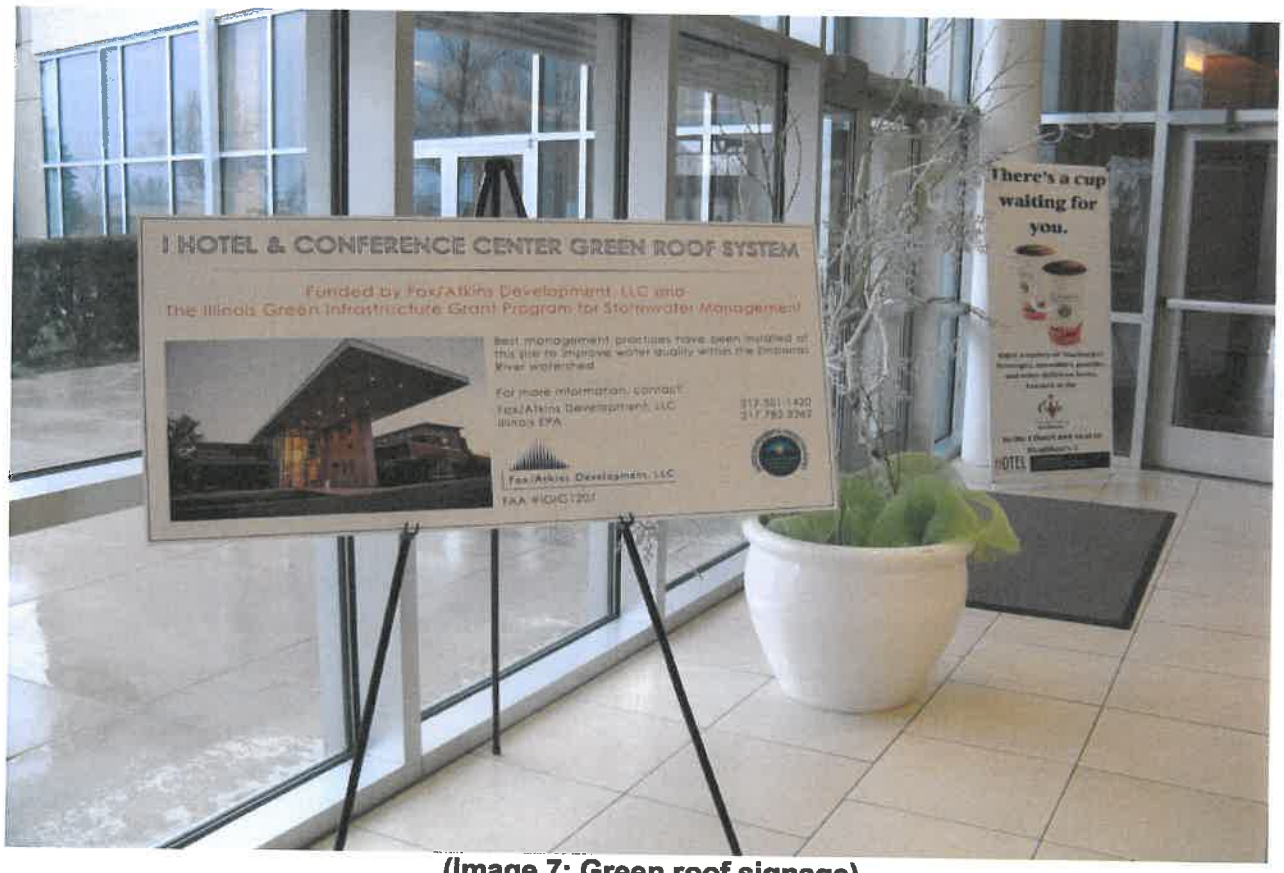
(Image 2: Arrival of plant materials)

(Image 3: Installation of trays)

(Image 4: Green Roof Vegetation Modules)

(Image 5: Close up of plant mix)

(Image 6: Completed installation)



(Image 7: Green roof signage)

LiveRoof
Hybrid Green Roof System
Natural Function
Natural Beauty

I Hotel and Conference Center Green Roof

Plants on the Roof? Why?

- They soak up the sunlight, including UV rays which are hard on roof materials (and human skin).
- They soak up rain so there is less storm water run-off into our sewer system, lessening the chance for overflow into our rivers and lakes.
- The soak up sound, too.
- The plants provide insulation from heat and cold, so inside temperatures can be more comfortable.
- The green roof actually protects roofing materials ad lengthens their lifetime- even preventing fires.

The I Hotel and Conference Center green roof is 2,860 square feet with 2 mixes comprising of:

Extra Red mix:

- Sedum album 'Atropurpureum'
- Sedum spurium Wild Cherry
- Sedum album 'Coral Carpet'
- Sedum floriferum 'Weihenstephaner'
- Sedum hybridum 'Immergrunchen'
- Sedum spurium 'Dark Dragon'
- Sedum spurium Cherry Blast
- Sedum spurium New Voo
- Sedum rupestre 'Angelina'

Evergreen mix:

- Sedum album 'Coral Carpet'
- Sedum floriferum 'Weihenstephaner'
- Sedum hybridum 'Immergrunchen'
- Sedum reflexum
- Sedum rupestre 'Angelina'
- Sedum sexangulare
- Sedum spurium 'Dragon's Blood'
- Sedum spurium 'Voo Doo'

Varieties will bloom in April/May- July/August.

(Image 8: Information sheet)