

# Sustainability & EPACT 05

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**USACE Infrastructure  
Systems Conference  
June 25-29, 2007**

# Introduction/Requirements

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## □ USACE LEED Requirements

- New construction: LEED "Silver" (33 points)
- Major Renovation & Repair (>\$7.5m): LEED-EB "certified" (32 points)
- Army facilities exempt from minimum score (NOT exempt from LEED): <50% climate controlled, range, horizontal
- Army requirements include Army tenant organizations
- Family Housing Army: SPIRIT "Gold"



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# USACE IMPLEMENTATION GENERAL

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- **Engineering and Construction Bulletin (ECB) 2006-02 Requires:**
  - **Establish goals at planning charrettes.**
  - **Refine and report LEED levels in P2 at 4 designated stages.**
  - **Self-certify final ratings jointly by the DPW or the Reserve Component equivalent, USACE district, designer, CoS and contractor.**
  
- **LEED-EB is heavy on O&M activities, uses different energy tool and requires historical data that only DPW can provide. Seeking clarification. In the mean time let DPW take a lead on EB**



# Implementation for DB

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- RFP to require minimum LEED Silver.
- RFP to have LEED checklist identifying required, preferred and avoid points.
- RFP to layout documentation requirements.
- Proposors to identify how they intend to meet the LEED requirements.
- Army implementation guidance will have DB contractual guidance.



# Implementation for DBB

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- At parametric estimate stage:
  - Identify preferred, required and avoid points in addition to those required by Army.
  - Refine cost estimates and identify additional costs, if any, to go to LEED Silver.
  - Assure these points become integral part of design.
- Documentation per implementation guidance.
- USGBC certification is not required.



# Planning/Code 3

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- Use of USACE cost template**
  - **Actual costs or 2% default**
  - **"SDD & EPAAct05" line item**
  - **27 APR 2007 DASA Memorandum**



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# TRAINING

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- ❑ **USACE is the first Federal agency to bulk purchase a block of web based training module for designers and architects from USGBC. That enabled us to train 100 people in application of LEED.**
- ❑ **ECB 2007-5 identifies available and recommended training. You should include your requirements in your IDP. Supervisors should use their authority to support it.**
- ❑ **Advising USGBC in its efforts to convert training to web based environment.**
- ❑ **Seeking funds to train districts especially in light of multi building projects and coordination between CoS and geographical districts.**



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# IMPLEMENTATION GUIDE

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- Being prepared that will help execute Army policy.
- Will address single building as well as multi building projects.
- It will establish documentation requirements.
- Will clearly state that project funds will not be used for GBC certification.
- will identify required, preferred and avoid credits. Also will identify credits, installations are responsible for.



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# VALIDATION

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- Subject Matter Experts (SMEs) at districts/CoS are responsible to make sure proper documentation is provided.
- LEED-AP at every district/CoS monitors, verifies and oversees compliance.
- Army SDD team will validate selected projects
- Self certification by all stake holders.



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# EPACT 05

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- Unlike SDD which is Army requirement, EPACT is a law and we are required to follow it.
- EPACT 05 will, in most cases, will help you achieve LEED-Silver level



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# EPACT 05 Requirements

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- Energy/electric metering in federal buildings by 2012
- Energy Star and FEMP products
- Buildings to be designed to 30% below ASHRAE 90.1 or International Energy Conservation Code if Life Cycle Cost-Effective. Establish baseline energy budgets using baseline equipment
- Requires premium efficient motors and equipment



# ASHRAE 90.1 2004 Equipment Baseline Efficiency Requirements

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- Boilers gas-fired hot water under 300K BTUH  
80% annual fuel utilization efficiency (AFUE)
- Boilers gas-fired steam under 300K BTUH 79%  
AFUE
- Boiler oil-fired hot water greater 300K BTUH  
78% AFUE
- Warm Air Furnace gas-fired greater than 225K  
BTUH 80% AFUE
- Warm Air Furnace oil-fired greater than 225K  
BTUH 81% AFUE



# Energy-Star Equipment Efficiency Requirements

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- ❑ **ENERGY STAR qualified boilers have an annual fuel utilization efficiency (AFUE) rating of 85% or greater.**
- ❑ **ENERGY STAR qualified oil and gas furnaces have annual fuel utilization efficiency (AFUE) ratings of 83% and 90%, or higher.**
  - **Note: The Designer of Record (DOR) is required by RFP & EPACT 05 to specify Energy Star equipment. Specifying Energy Star equipment will help to meet 30% better than 90.1.**



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# EPACT 05 IMPLEMENTATION

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## D-B RFP

### RFP Addresses

- Metering all utilities Per EPACT 05 Elect, Gas & Water
- FEMP Energy Star Equipment and premium efficient motors Per EPACT 05 if LCC
- 30% less energy than ASHRAE 90.1 2004 Per EPACT 05
  - RFP will have table with energy budget target for only tier 1 facilities in each climate zone
  - List of options that can be used by DOR that will fully achieve 30%



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# EPACT 05 VALIDATION

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- Design validation after Award
  - Designer of Record (DOR) is responsible to convert RFP & accepted proposal to completed design
  - DOR uses BLAST/DOE-2 software to determine compliance with 30% better than ASHRAE 90.1 or selects RFP options
    - Contractor Submits ASHRAE 90.1 compliance documentation
    - COS will review design for compliance with 30%
  - Program will furnish LCC options to satisfy 30% requirement



# EPACT 05 CERL ANALYSIS RESULTS

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- D-B RFP
  - RFP will be updated to include results of CERL analysis of target Energy Budgets for Tier I facilities, when results are available
    - Will include energy budget targets for each facility in RFP
    - Energy design options for each facility and climate zone
      - Study will address net increase in first cost to achieve 30% better
  - POCS
    - ACSIM Don Juhasz and Jim Patton
    - HQUSACE Gary Bauer
    - CERL Alexander Zhivov and Dale Herron



# Summary: MT RFP Does Implement EPACT 05

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- DOR must design new facilities to achieve an energy consumption level at least 30% below ASHRAE 90.1 2004 if LCC effective
- RFP requires metering of all facilities
- RFP requires the DOR to specify Energy-Star or FEMP equipment
- RFP requires the DOR to specify premium efficient motors



# FY 07 Activities to Implement EPACT 05 for All Facilities

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- Updating Corps training (PROSPECT) courses
- Developing EPACT 05 checklist tool to be used by Corps staff during proposal review, design and construction
- Continuous coordination with ACSIM & CERL to ensure sequence of EPACT 05
- Coordination with final DOE EPACT 05 interim guidance
- Provide training to COS and construction staff on validating EPACT 05 and LEED implementation
- Complete CERL energy budgets and envelope options for tier 1 facilities TEMF, Barracks and Battalion Hqs
- Integrate all EPACT 05 guidance into standard Army processes and execution policies



# Other sessions

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## SDD:

- Track 6, sessions 19-26, a four hour workshop
- Track 12, session 11
- Track 6, session 13
- Track 6, session 14

## EPACT 05

- Track 7, sessions 1-7



# SS Credit 6.1: Stormwater Design Permeable Paving



Permeable Asphalt



Turfstone



Eco-stone



EcoGrid



Uni-Lock



Netpave

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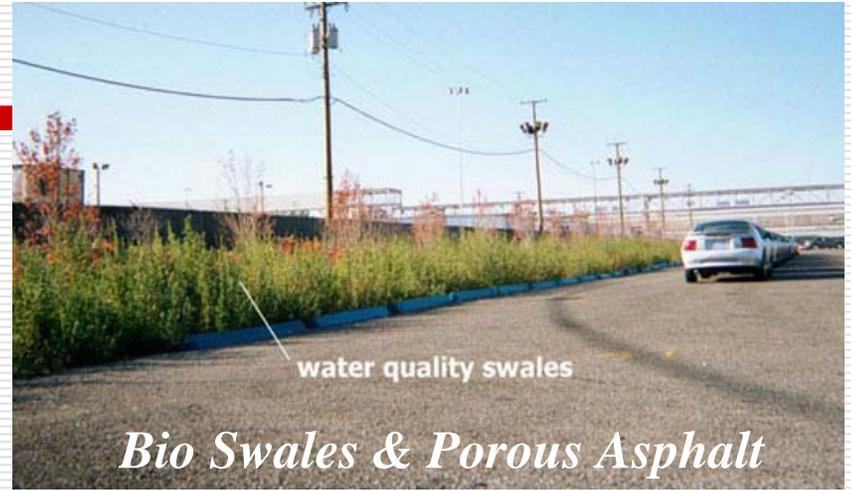
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# SS Credit 6.1: Stormwater Design



*Recharge Garden*

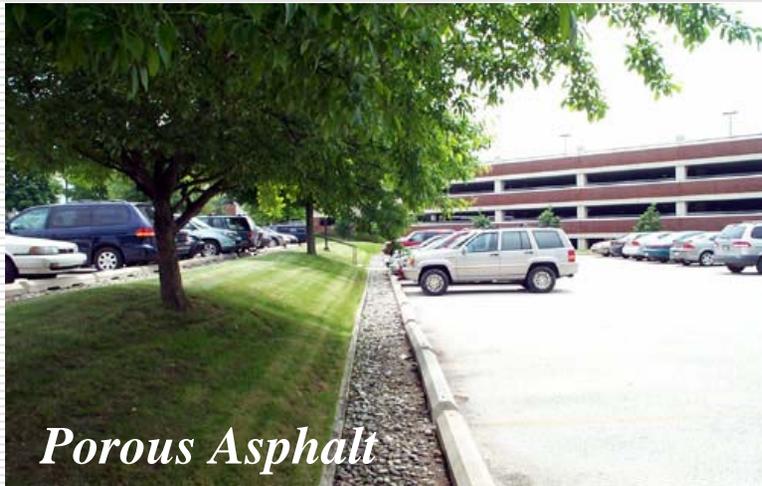
*Courtesy Cahill & Associates*



water quality swales

*Bio Swales & Porous Asphalt*

*Ford River Rouge Courtesy Cahill & Associates*



*Porous Asphalt*

*Courtesy Cahill & Associates*



*Constructed Wetland*

*Courtesy Cahill & Associates*



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Filter Strips and Swales

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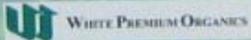
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American Hydrotech, Inc.  
phone 800.877.6125  
www.hydrotechusa.com



(Local Sales Representative)  
Rediger Associates  
phone 847.695.3299  
ronrediger@aol.com



# Garden Roof<sup>®</sup> Assembly Extensive Design



## Vegetation

LiteTop<sup>®</sup> - Engineered Soil

System Filter SF<sup>®</sup>

FLORADRAIN<sup>®</sup> - Retention/Drainage

Moisture Mat SSM45<sup>®</sup>

STYROFOAM<sup>®</sup> - Insulation

WSF40<sup>®</sup> - Root Barrier

HYDROFLEX<sup>®</sup> - Protection Course

MM6125<sup>®</sup> - Rubberized Asphalt

Surface Conditioner

Substrate

Saturated Weight 24#-30#/Sq ft  
Total Installed Cost\* \$12-\$20/Sq ft

\* (roof membrane thru vegetation,  
cost will vary per project)



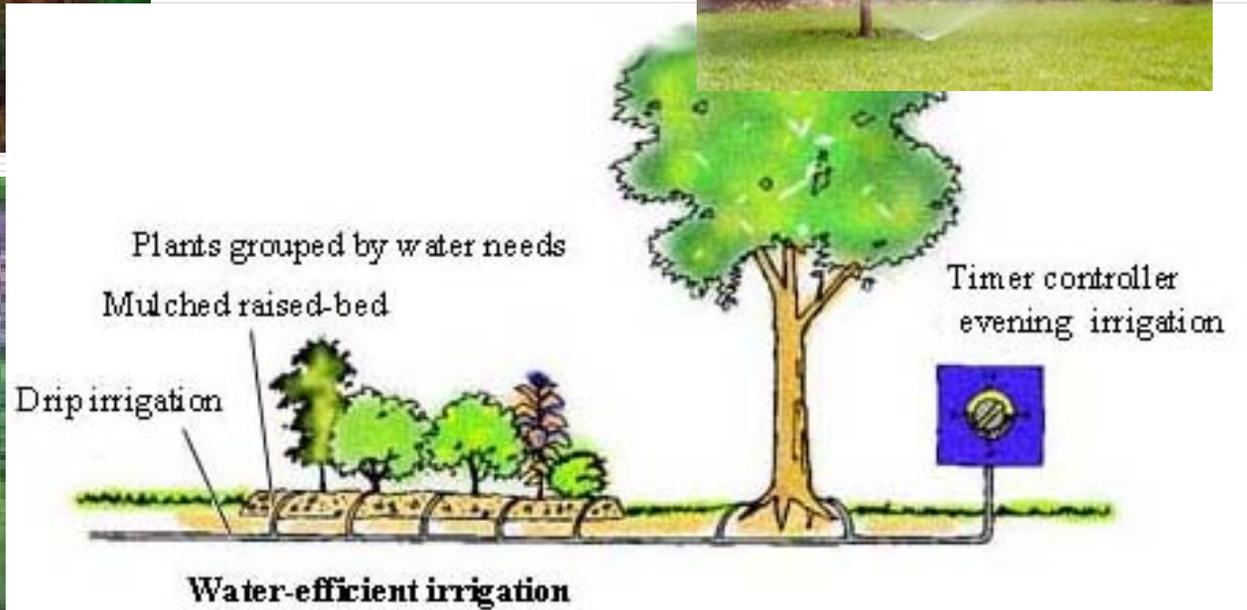
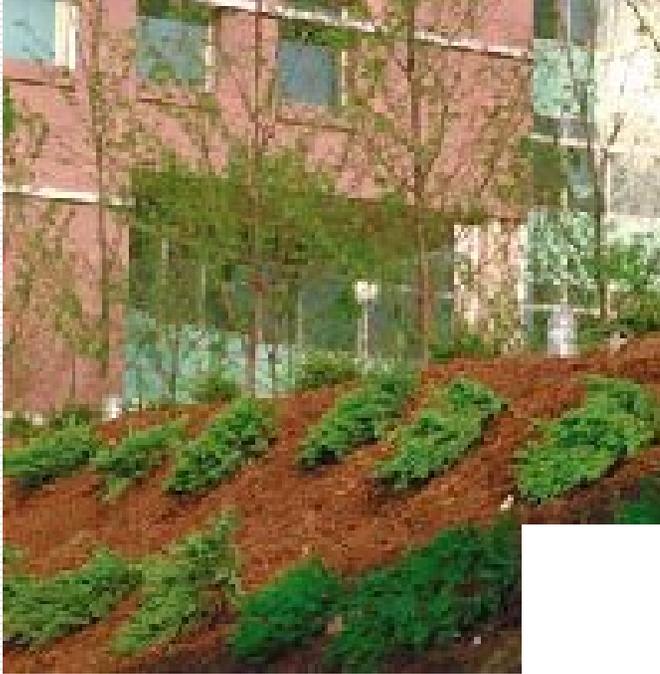
# Green Roofs



SS Credit 7.2: Heat Island Effect: Roof

# WE Credit 1.1: Water Efficient Landscaping

## Efficient Irrigation



# EA Credit 2: On-Site Renewable Energy

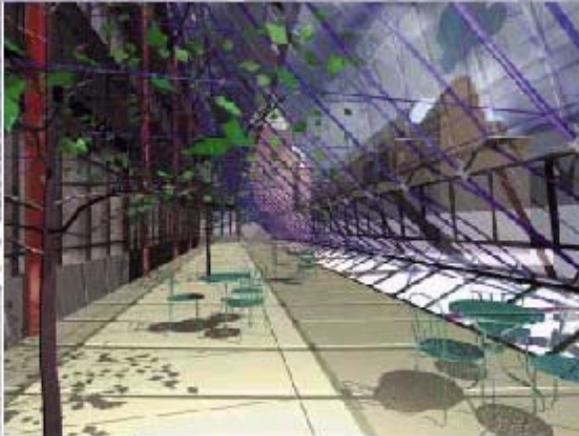


# EA Credit 2: On-Site Renewable Energy

## Building-Integrated Photovoltaic Designs for Commercial and Institutional Structures

### A Sourcebook for Architects

Patrina Eiffert, Ph.D.  
Gregory J. Kiss



## Building integrated photovoltaics



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# EA Credit 6: Green Power



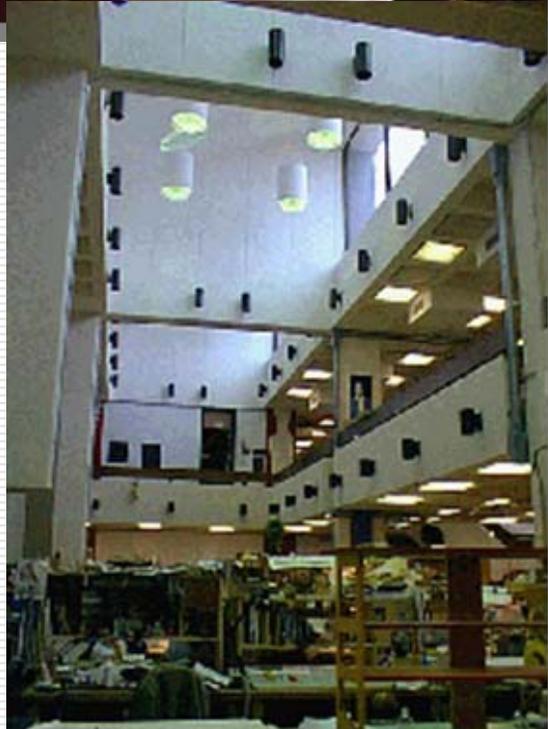
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# EQ Credit 8.2: Daylight & Views



## WE Credit 2: Innovative Wastewater Technologies

The Ecoplay system  
<http://www.ecoplay.nl/>

Ecoplay is a unique water management system, which collects bath and shower water and re-uses it for toilet flushing. Ecoplay reduces mains water consumption and drainage in a typical household by up to 30%



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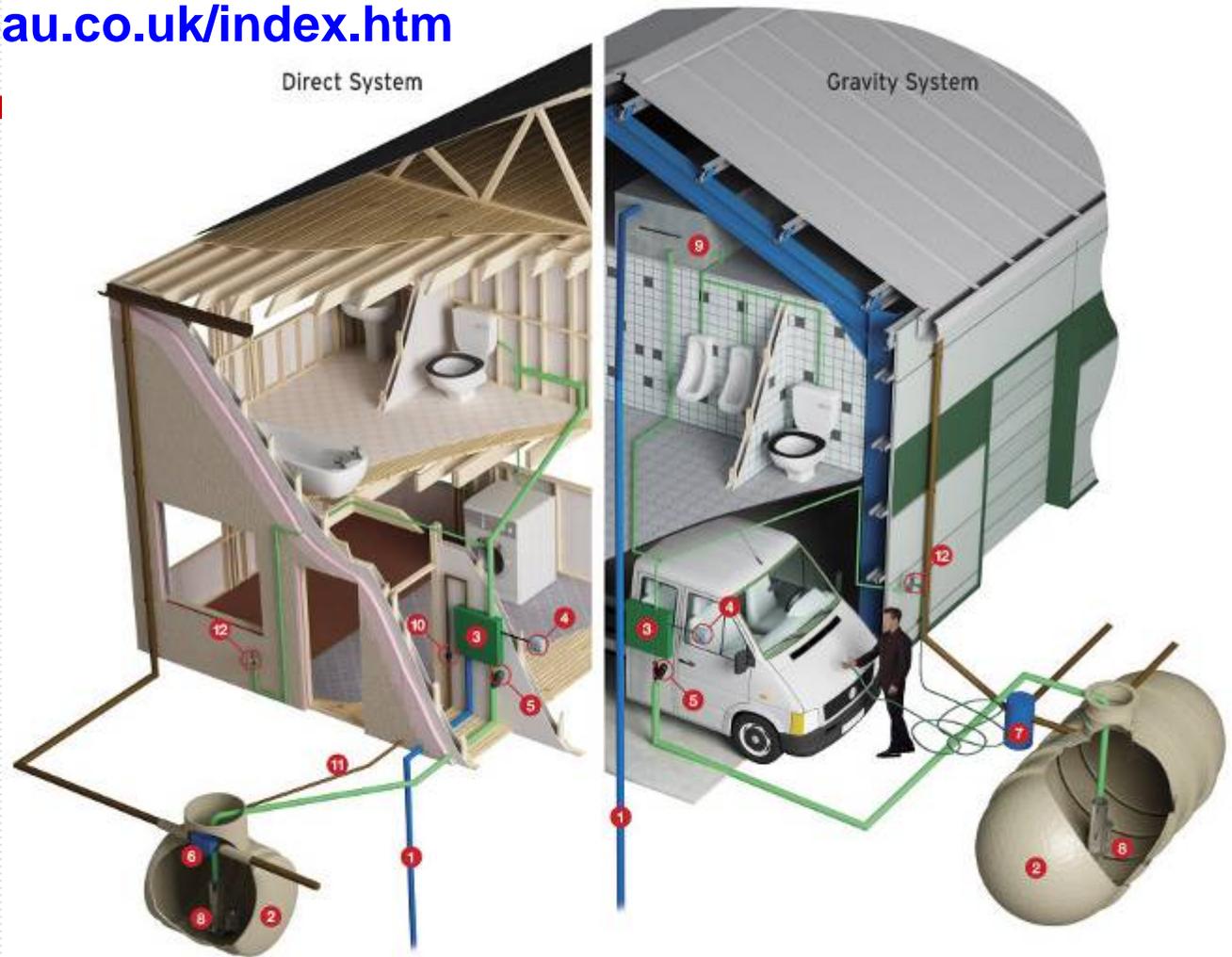


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# WE Credit 2: Innovative Wastewater Technologies

## Envireau Rainwater Harvesting

<http://www.envireau.co.uk/index.htm>



- |                      |                              |                         |
|----------------------|------------------------------|-------------------------|
| 1 Water main         | 5 In-line filter 120 microns | 9 Header tank           |
| 2 Storage tank       | 6 Internal rain filter       | 10 Tundish valve        |
| 3 Main control panel | 7 External rain filter       | 11 Mains top-up to tank |
| 4 Level display unit | 8 Pump                       | 12 External tap         |



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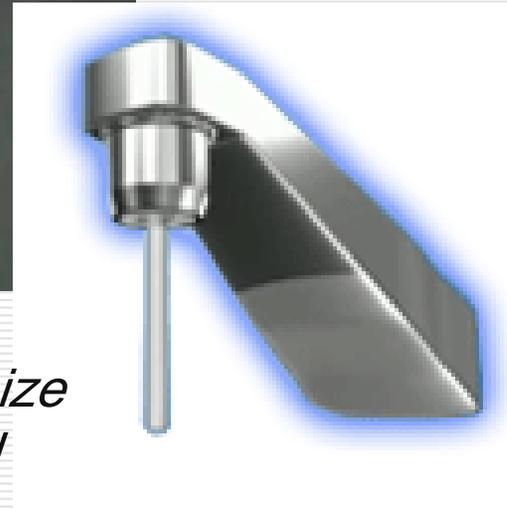


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# WE Credit 3.1: Water Use Reduction Cambria Office Building



*Push-rod automatic faucet controls, reduce water consumption by over 40% and minimize piping redundancies by mixing hot and cold water into single pipe supply lines.*



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# EA Credit 1: Optimize Energy Performance



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