Airport Cooperative Research Program Project Panel 02-62:

“Incorporating Green Infrastructure for Stormwater Management at Airports”

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Overview

1. Introduction to Airport Cooperative Research Program (ACRP)

2. Project 02-62: Green Stormwater Infrastructure Strategies for Airports
   - ACRP panel process
   - Scope

3. Green Infrastructure/Low Impact Development Strategies
   - EPA Definition of GI/LID
   - GI/LID Strategies
   - FAA Advisory Circulars on Stormwater Design
   - ACRP Guidebooks on Airport Stormwater Design
   - Applicable GI/LID Strategies for Airports
   - GI/LID Strategy Implementation at DFW
1. Introduction to Airport Cooperative Research Program (ACRP)

- 1863 Founding of the National Academy of Sciences
1. Introduction to Airport Cooperative Research Program (ACRP)
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Programs

- Authorized by Congress
- Sponsored by FAA
- Driven by and for the airport industry
- ACRP Oversight Committee reviews, selects, selects and funds projects
- Projects focus on applied research
- Volunteer panels of experts develop scope, select contractors, oversee research, and review results
- Research principal investigators selected by topic experts
- ACRP Oversight Committee funds the Synthesis Program
- ACRP Synthesis Oversight Panel selects annual Synthesis projects and reviews completed reports

Fields

1. Administration
2. Environment
3. Policy and Planning
4. Safety
5. Security
6. Human Resources
7. Design
8. Construction
9. Maintenance
10. Operations
11. Special Projects

Source: Transportation Research Board
1. Introduction to Airport Cooperative Research Program (ACRP)
2. Project 02-62: Green Stormwater Infrastructure Strategies for Airports

ACRP panel process

- Define Scope of Research (2 day meeting)
- Select Contractor (1 day meeting)
- Monitor Progress (1 or more meetings)
- Review and Approve Report (mail ballot and/or meeting)

RFPs → Comments & Modifications → Interim Deliverables → Guidance → Draft Report

Research Phase
Scope

Objective: Develop a guidebook to help airports identify and implement viable green infrastructure techniques to supplement or replace traditional stormwater management methods on airport property.

Gray infrastructure

- Moving water by pipes does not allow the water to infiltrate the ground, decreasing local watersheds water levels
- Piping send large amounts of polluted water into a water body all at one time causing habitat damage, scouring of waterways, and occasional downstream flooding

Green stormwater techniques, systems and processes

- Mimic natural hydrological systems by filtering and infiltrating stormwater
- Examples: bioretention, stormwater planters, bioswales, porous paving and pavers, engineered soils, and drainage wells
- Municipalities are moving toward GI to reduce capital costs and improve water quality while reducing flooding and water treatment costs

Photo 2: http://mmwatershed.blogspot.com/
3. Green Infrastructure/Low Impact Development Strategies

EPA Definition of GI/LID

- A set of stormwater management approaches and technologies that utilize and/or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration and re-use

- GI/LID is a sustainable stormwater management practice

Source: water.epa.gov
3. Green Infrastructure/Low Impact Development Strategies

GI/LID Strategies

Source: 2010 Low Impact Development Design Manual for Urban Areas, published by the University of Arkansas Community Design Center – Fay Jones Scholl of Architecture
3. Green Infrastructure/Low Impact Development Strategies

FAA Advisory Circulars on Stormwater Design

150/5200-33: Hazardous Wildlife Attractants On or Near Airports

“Provides guidance on certain land uses that have the potential to attract hazardous wildlife on or near public-use airports.”

150/5320-5: Airport Drainage Design

“Provides guidance for engineers, airport managers, and the public about the design and construction of airport surface storm drainage systems; and subsurface drainage systems for paved runways, taxiways and aprons.”
3. Green Infrastructure/Low Impact Development Strategies

ACRP Guidebooks on Airport Stormwater Design

Report 125: Balancing Airport Stormwater and Bird Hazard Management

“Provides airport personnel with a means of assessing the potential risk of a bird strike associated with a current or proposed stormwater BMP following the FAA protocols for Aviation Safety Management System.”
3. Green Infrastructure/Low Impact Development Strategies

EPA on Stormwater Design


“Provides a step-by-step framework that will help federal agencies maintain pre-development site hydrology by retaining rainfall on-site through infiltration, evaporation/transpiration, and re-use to the same extent as occurred prior to development.”

Source: EPA. Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act
3. Green Infrastructure/Low Impact Development Strategies

Applicable GI/LID Strategies for Airports

- infiltration planter
- vegetated filter strip
- infiltration trench
- raingarden
- bioswale
- tree boxes
- permeable pavement
3. Green Infrastructure/Low Impact Development Strategies

GI/LID Strategy Implementation at DFW

- *DFW Airport property map*
3. Green Infrastructure/Low Impact Development Strategies

GI/LID Strategy Implementation at DFW

- Global Logistics I

![Site Location Global Logistics I]

1999 vs. 2008
3. Green Infrastructure/Low Impact Development Strategies

GI/LID Strategy Implementation at DFW

- **Global Logistics I**
  - Each pool will drain in one (1) hour after the 100-year storm event ends
  - The north pools in the east and west bioswales will drain first
  - The small drainage swale at the 42-Inch culvert, will be the last pool to drain after approx. the 7th hr.

1999 2015
3. Green Infrastructure/Low Impact Development Strategies

GI/LID Strategy Implementation at DFW

- DFW K9 Facility: A renovation project where a GI/LID strategy will be implemented.
3. Green Infrastructure/Low Impact Development Strategies
GI/LID Strategy Implementation at DFW

- Detention Pond at Flight Safety

<table>
<thead>
<tr>
<th>Drainage area: 10.19 acres</th>
<th>Rain event: May 10</th>
<th>Precipitation: 1.37 inch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Detention pond capacity: 54,676 cu. ft.</td>
<td>Rain volume: 50,676 cu. ft. (93% total)</td>
<td></td>
</tr>
</tbody>
</table>
Summary

- **Project 02-62: Green Stormwater Infrastructure Strategies for Airports**
  - Develop a primer to educate airport management on benefits and applicability of incorporating GI strategies
  - Develop a guidebook that will provide a means to resolve stormwater drainage design conflicts with safety and operational regulations with the implementation of GI strategies

- **Green Infrastructure/Low Impact Development Strategies**
  - “GI/LID approaches are a set of management approaches and technologies that utilize and/or mimic the natural hydrologic cycle processes of infiltration, evapotranspiration and use.” (EPA 2009)

Source: EPA. Technical Guidance on Implementing the Stormwater Runoff Requirements for Federal Projects under Section 438 of the Energy Independence and Security Act
Questions?