

## Course Description:

This course provides a detailed introduction to urban roadway drainage design. Design guidance for solving basic problems encountered in urban roadway drainage design is provided. The topics are hydrology (including rational equation, soil conservation method, regression equations, and synthetic hydrographs) and highway drainage (including gutter flow, roadway inlet interception, storm drain systems, energy and hydraulic grade lines, detention ponds, and stormwater management).

## OUTCOMES:

Upon completion of the course, participants will be able to:

- Determine runoff (peak flows and volumes) from urban watersheds
- Apply basic hydraulic principles to urban drainage design
- Perform roadway drainage designs using various roadway inlets
- Size and/or analyze storm drain conveyance systems
- Establish the energy and hydraulic grade lines for storm drains
- Design and/or analyze detention basins

## WHO SHOULD ATTEND:

Highway designers with limited experience in drainage design, but who are familiar with mathematical concepts such as algebra and geometry and have some working background in hydrology and hydraulics.

This course counts towards 1 Roads  
 Scholar Credit/1.8 CEUs

# FHWA NHI #135027: URBAN DRAINAGE DESIGN



\*June 21-23, 2011

Concord, MA --Concord's Colonial Inn

Maximum class size is 30

\*this course will span 3.0 days



This Baystate Roads Program (LTAP) workshop is a cooperative effort of the Federal Highway Administration, Massachusetts Department of Transportation and the University of Massachusetts Transportation Center.

## URBAN DRAINAGE DESIGN

### Agenda

	<i>Day 1</i>
8-8:15 AM	<b>Breakfast/Registration</b>
	Course Introduction
	Basic Principles
11:45 AM	Lunch Break
	Hydrology
	Gutters
	Grates
4:00 PM	Adjourn
	<i>Day 2</i>
8:00 AM	<b>Breakfast/Opening Comment</b>
	Curb-Openings/Slotted Drains
	Combination Inlets
11:45 AM	Lunch Break
	Computer Applications
	Inlet Spacing
4:00 PM	Adjourn
	<i>Day 3</i>
8:00 AM	<b>Breakfast/Opening Comment</b>
	Storm Drains
	Energy/Hydraulic Gradelines
11:45 AM	Lunch Break
	Computer Applications
	Detention Basins
	Storm Drain Design
3:30 PM	Review/Evaluations/Wrap-up

## SPEAKERS

RICHARD SMITH, P.E., AYRE ASSOCIATES  
JAMES SCHALL, PH.D., AYRE ASSOCIATES

Dick Smith is a registered Professional Engineer in Colorado, Maryland, and Delaware and has 38 years experience in the public and private engineering sectors specializing in water resources management, analysis and design. Experience includes the hydrologic and hydraulic design of large drainage systems, storm drainage systems, detention ponds, hydraulic design of spillways, streambank stabilization, stream restoration, flood plain analysis, stable channel design, and bridge and culvert crossings. He is a frequent instructor for this class and also teaches the Culvert Design course.

Dr. Jim Schall is a registered Professional Engineer in Colorado, Nevada and California, and has 30 years as a practicing consulting engineer specializing in water resources. Highway and urban drainage design experience includes large storm drainage systems, detention pond design, stable channel design and culvert crossings. He is an author of HDS-4, the text for the Introduction to Highway Hydraulics course, and is a frequent instructor for the class. He also teaches the Culvert Design and Urban Drainage Design courses.

URBAN DRAINAGE DESIGN
<b>June 21-23, 2011 (3.0 days)</b>
<i>Concord's Colonial Inn</i>
<i>48 Monument Square</i>
<i>Concord, MA 01742</i>
<i>ph. 978-369-9200</i>
<i>Strict Limit of 30 attendees for this workshop!</i>

\*PLEASE DETACH AND MAIL THIS REGISTRATION FORM WITH PAYMENT AFTER REGISTERING ONLINE NH1135027: Urban Drainage Design

NAME: \_\_\_\_\_

TITLE: \_\_\_\_\_

AGENCY: \_\_\_\_\_

ADDRESS: \_\_\_\_\_

TOWN/CITY & ZIP: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_

EMAIL: \_\_\_\_\_

Dates: June 21-23, 2011

Location: Concord's Colonial Inn, Concord MA

#### REGISTRATION FEE:

\$150.00/municipal, \$300.00 private sector  
Light breakfast, Lunch and  
Course Materials are Included

Make checks payable to:  
The University of Massachusetts

Call us if you have a special request or a problem (413)545-5403

Cash or checks are accepted upon arrival.

PLEASE REGISTER ONLINE! [www.mass.gov/baystateroads](http://www.mass.gov/baystateroads)  
or Fax to (413)545-6471

SEND TO: Chris Ahmadian, Baystate Roads Program UMTC,  
214 Marston Hall, 130 Natural Resources Rd, Amherst, MA 01003

Reservations must be received 4 days prior to  
the workshop and MUST BE HONORED!