Executive Summary

Implementing Stormwater Regulation in Urban Systems: Insights from the 2024–2025 UPCD Planning Studio

The 2024–2025 Urban Planning and Community Development (UPCD) Planning Studio at the University of Massachusetts Boston focused on advancing the implementation of the **Residual Designation Authority (RDA) permit program** under the National Pollutant Discharge Elimination System (NPDES) in the City of Boston. In partnership with the City's Department of Green Infrastructure, the studio examined how regulatory mandates can be translated into practical, equitable, and scalable solutions for managing stormwater runoff in a dense urban environment.

Context and Challenge

Stormwater runoff from commercial, industrial, and institutional properties with large impervious surfaces is a major contributor to water pollution in Boston's Charles, Mystic, and Neponset River watersheds. While federal regulation provides the framework for addressing these impacts, implementation at the local level presents significant challenges. These include identifying affected properties, determining feasible compliance pathways, engaging stakeholders, and balancing environmental goals with economic and operational constraints.

The RDA program represents a critical regulatory intervention, extending permitting requirements to previously unregulated properties. However, its success depends on the ability of cities and stakeholders to operationalize these requirements through context-sensitive planning and coordinated action.

Approach and Methods

The studio adopted a **two-semester, applied planning approach**, combining technical analysis, policy research, and stakeholder engagement. Students worked collaboratively to:

- Conduct geospatial analysis to identify and classify properties with significant impervious surface area
- Undertake policy analysis and national case studies to understand alternative regulatory and implementation models
- Develop a catalog of green infrastructure solutions, assessing their performance, feasibility, and scalability
- Engage property owners, community stakeholders, and public agencies to understand barriers to compliance and opportunities for collaboration
- Identify and analyze pilot sites for targeted intervention
- Evaluate implementation strategies, including financing mechanisms, regulatory incentives, and co-benefits

This integrated approach ensured that proposed solutions were both technically grounded and responsive to real-world conditions.

Key Findings

1. Implementation Gaps Between Regulation and Practice
While the RDA framework establishes clear regulatory expectations, significant gaps remain in translating these requirements into actionable, site-level solutions. Property-specific constraints, information gaps, and limited technical capacity pose barriers to compliance.

2. Heterogeneity of Sites Requires Differentiated Strategies
Properties subject to the RDA permit vary widely in size, ownership, land use, and physical conditions. A one-size-fits-all approach is insufficient; instead, tailored strategies are needed to address distinct site typologies and feasibility constraints.

3. Green Infrastructure Offers Significant Potential with Constraints
Green infrastructure solutions—such as bioswales, permeable pavements, and rain gardens—offer multiple environmental and social benefits. However, their applicability depends on site conditions, maintenance capacity, and upfront costs, necessitating flexible implementation pathways.

4. Stakeholder Engagement is Central to Feasible Implementation
Engagement with property owners and community stakeholders revealed practical concerns related to cost, liability, and operational disruptions. Addressing these concerns is essential for achieving compliance and ensuring long-term success.

5. Equity Considerations are Integral to Environmental Regulation
The distribution of regulated properties and the capacity to comply vary across neighborhoods and ownership types. Effective implementation must account for these disparities to avoid disproportionate burdens and ensure equitable outcomes.

Strategic Directions

The studio proposes a set of strategic directions to support the City of Boston's implementation of the RDA program:

- **Develop a Typology-Based Compliance Framework:** Classify properties based on physical and ownership characteristics to guide appropriate intervention strategies
- **Expand Technical Assistance and Outreach:** Provide targeted support to property owners to navigate regulatory requirements and identify feasible solutions
- **Leverage Incentives and Financing Mechanisms:** Utilize grants, subsidies, and innovative financing tools to reduce barriers to implementation
- **Prioritize Pilot Projects:** Demonstrate feasibility and build momentum through strategically selected pilot sites
- **Integrate Co-Benefits into Planning:** Align stormwater interventions with broader goals, including urban heat mitigation, climate resilience, and neighborhood improvement

Outcomes

The studio produced a comprehensive set of deliverables to support ongoing implementation efforts, including:

- A **detailed inventory and classification of properties** subject to RDA requirements
- A **catalog of green infrastructure solutions** tailored to Boston's urban conditions
- **Pilot site analyses and recommendations**
- A **menu of implementation strategies** integrating regulatory, financial, and community considerations

These outputs provide a foundation for advancing stormwater management practices that are both effective and context-sensitive.

Experiential Learning and Community Engagement

A central component of the studio was its emphasis on hands-on, site-based learning and public engagement. Students translated their analytical work into practice through direct collaboration with community and institutional partners, gaining insight into the real-world constraints and opportunities of green infrastructure implementation.

Students worked in two teams to conduct site-specific assessments and engagement activities in:

- Chinatown (Boston) in partnership with the Chinatown Community Land Trust (CLT)
- Malden in collaboration with the Mystic River Watershed Association (MyRWA)

These site-based engagements enabled students to evaluate the feasibility of green infrastructure interventions under varying physical, social, and institutional conditions. By working closely with community stakeholders, students developed a grounded understanding of how factors such as land use

constraints, ownership structures, community priorities, and environmental risks shape what is practically achievable on the ground.

In addition, students presented their work at the Museum of Science, providing an opportunity to communicate their findings to a broader public audience. This experience strengthened their ability to translate technical analysis into accessible narratives and reinforced the role of planners as intermediaries between policy, science, and community stakeholders.

These activities ensured that the studio moved beyond conceptual analysis to engage directly with the complexities of implementation—preparing students to navigate the technical, institutional, and social dimensions of contemporary planning practice.