Considering Stormwater Impacts from the Transportation Network

May 14th, 2013
NEIWPCC Conference

Jenn Callahan
Vermont Agency of Transportation
Traditional Approach to Stormwater

Collect and Convey
VTrans is strengthening its stormwater programs, building partnerships to improve water quality throughout the state, and making water quality protection fundamental to the agency’s way of doing business.
Increased staffing, financial investments and new programs across the Agency

- **Staffing**
  - Policy Planning and Intermodal Development (PPAID)
    - Environmental Policy Planner – legislation, policy, procedure
  - Program Development Division (PDD)
    - Stormwater Engineer – scoping, design development, permitting
    - Construction Engineers – monitor construction for compliance
  - Operations Division
    - Environmental – scoping, design development, mainly post construction maintenance and compliance

Numerous positions thought the Agency support the SW staff
Stormwater Programs

- **Regulated**
  - NPDES - MS4, MSGP, Construction
  - State Operational

- **Unregulated – statewide**
  - Plan Review
  - Water Quality Enhancement
  - Stormwater Retrofits (regulated and unregulated)

- **New and Possible Future Programs**
  - Green Stormwater Infrastructure Executive Order
  - Better Back Roads
  - Watershed based statewide program to address stormwater
    - roll together the regulated and unregulated programs
Project Plan Review

- Input into projects earlier
- Promote sheet flow and infiltration
- Encourage SW BMPs in impaired and stressed watersheds
  - VTrans Projects, Local Transportation Projects, Section 1111 permit applications
Work with maintenance districts, watershed groups and other state agencies to identify and correct:

- Areas of potential or active erosion
- Enhancements to existing infrastructure to benefit water quality
Identify and Implement SW retrofits to:

- Implement TMDLs (SW, Lake Champlain)
- Improve impaired and stressed streams
I-89 Median Stormwater Project
Chittenden & Franklin Counties, VT

Andres Torizzo, Principal
Joanie Stultz, Water Quality Specialist
Watershed Consulting Associates, LLC

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Project funded by Vermont Ecosystem Restoration Program/VTRANS

St. Albans: Stevens and Rugg Brook -
- Seven sand filter BMPs designed for median of I-89 and cloverleaf of exit 19

Williston: Allen Brook
- Five sand filter BMPs for I-89 medians
  - Designed for water quality treatment and channel protection control
  - Runoff from roadway surface and within median only, no drainage from outside ROW
Project Scope

- Project funded by Vermont Ecosystem Restoration Program

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Site Location
St. Albans, Vermont
Williston, Vermont
Stevens, Rugg and Allen Brook Watersheds
  • 303(d) listed as stormwater impaired

VTRANS, City and Town of St. Albans, and Williston impervious surface owners
  • MS4 designated, Flow Restoration Plan requirement

VTRANS wanted to do its part to get “ahead of the game”
Flow Restoration Plan (FRP)

- MS4 Permit requires FRP
- VT BMPDSS is a modeling tool used to develop and assess FRP

VT BMPDSS:
- GIS based decision support tool used to assess progress toward TMDL Flow Targets and BMP implementation
BMP Design Goals

- Easily maintained
  - Feasible to mow
BMP Design Goals

- Easily Designed & constructed
  - Designed and staked out in the field using typical drawings
- Easily reproduced
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**BMP Design Goals**

- **Safety**
  - Designed to VTRANS standards for with/ without guardrails
  - Required low slopes
  - Limited standing water depth
  - Limited standing water ponding time

![Image of a small pond with flowing water and a dry grassy area]

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Subsurface Considerations

Safety/Road Integrity Considerations

- 24-hour drain time
- Limited ponding (<18”)
- No significant infiltration into subbase (underdrain)

Amended Soil

- Promote draining and also treatment through sand
Data sources

- Available LIDAR for 2’ topography
- Available high resolution orthophotography
- VTRANS infrastructure data layer for median drain and cross drain information
Simple site plans developed with typical details

- Plans with basic grading information
- Details with relative elevations and assumed benchmark
Allen Brook Median Design:

- Used existing cross-over as a berm
- Designed around future use of cross-over
Project Highlight

Allen Brook Median

- Used existing cross-over as a berm
- Designed around future use of cross-over
Allen Brook Median Design:

- Water Quality Benefit estimated with WINSLAMM (Source Loading Analysis Model)
  - TSS: 74% annual reduction
  - Phosphorus: 55% annual reduction
Rugg Brook
- Three constructed in summer 2012
- Total Cost of Construction $118,690
- Two more to be constructed (pending funding)

Stevens Brook
- Two to be constructed (pending funding)

Allen Brook
- Five to be constructed (pending funding)
Construction
Construction
Post Construction
10+ year storm event occurred immediately after construction

- Residual ponding observed in two bays
  - Runoff from unstabilized surfaces formed silt veneer
  - Recommend removing silt material then roto-tilling area to “reactivate” sand material

- Large storm highlighted certain areas where grading needs to be refined to ensure flow over the concrete lip and no by pass around the bays.
Lessons Learned (thus far)

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## Project Impact

### Channel Protection Volume (CPv) mitigated by projects

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<th>Watershed</th>
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<th>Percentage of VTRANS FRP Obligation Addressed</th>
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- Progress toward high Flow TMDL target based on CPv
- Projects address a portion of the required FRP
Questions?