




Town of Colchester
Integrated Water Resources Management Study

Final Study Summary & Recommendations

Presented by:
Brad Aldrich, P.E. – Aldrich + Elliott, PC

Funded by the United States Environmental Protection Agency

colchestervt.gov

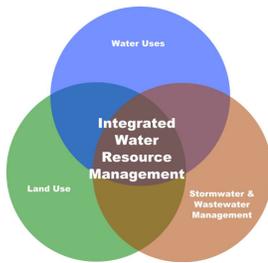



What we'll cover tonight

- ✓ Summarize our findings and conclusions for both wastewater and stormwater systems in Colchester
- ✓ Present recommendations for expanded wastewater and stormwater management




Integrated Approach



Water Quality Standards - Colchester's Development Future




Our Journey

- Inventory both wastewater and stormwater infrastructure town-wide
- Measure water quality (both biological and phosphorus)
- Conduct more detailed investigations where the risk to public health and the environment appears to be the greatest
- Evaluate the interdependent relationships between land use practices, wastewater, stormwater and water quality




Our Journey

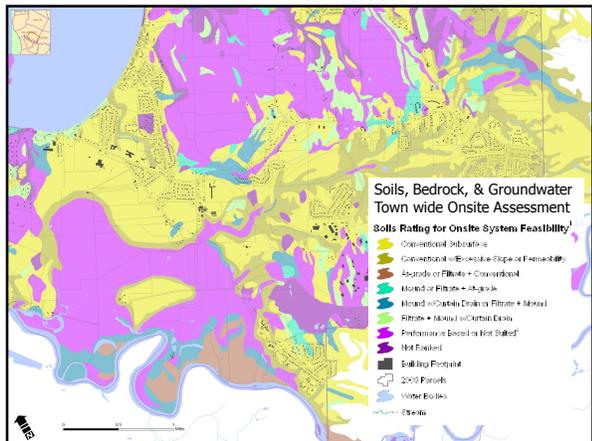
- Assess adequacy of current wastewater and stormwater practices to sustain and improve water quality and protect public health
- Develop recommendations for improved management strategies (if justified) to include specific steps for implementation and estimated costs
- Engage the Colchester community throughout the process to inform them of the progress made in each step and prepare them to make informed decisions about Colchester's future management practices




Project Schedule

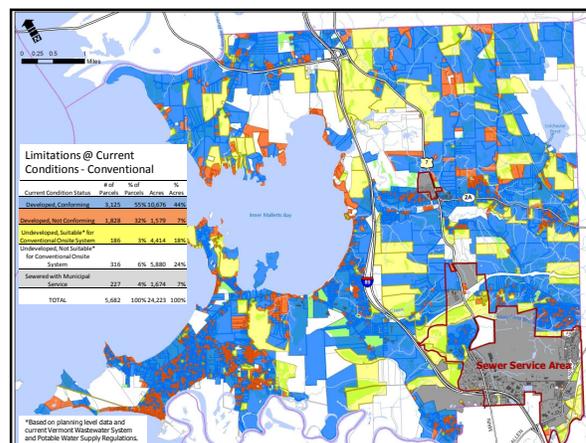
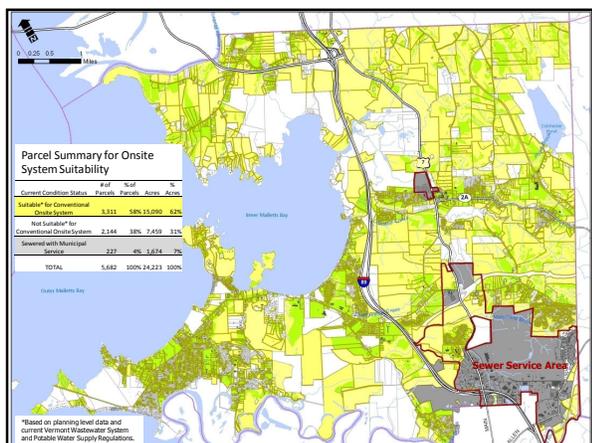
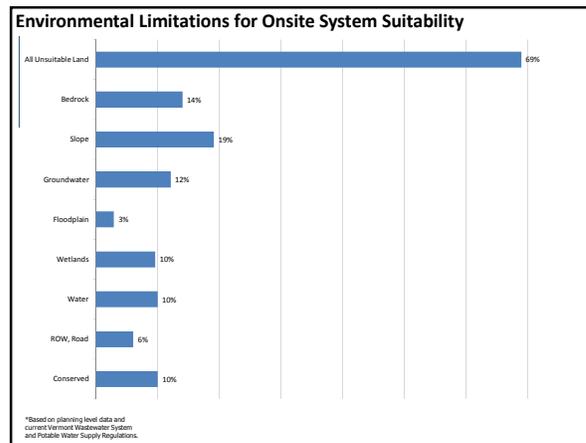
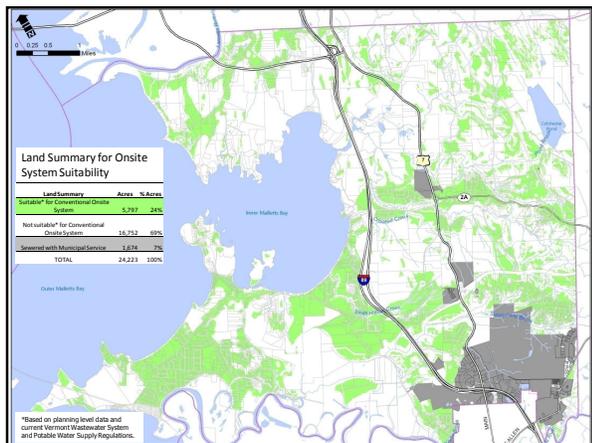
April 2009 | April 2010 | April 2011 | April 2012 | April 2013

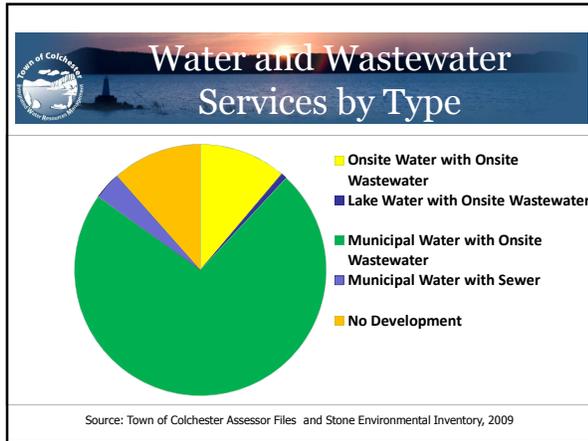
- Technical Phase
- Public Education and participation
- Draft IWRM Plan



Wastewater Suitability

- Land area
- Proximity to Waterways
- Soil Slopes
- Soil characteristics
- Bedrock
- Groundwater





Future Build-Out Capacity

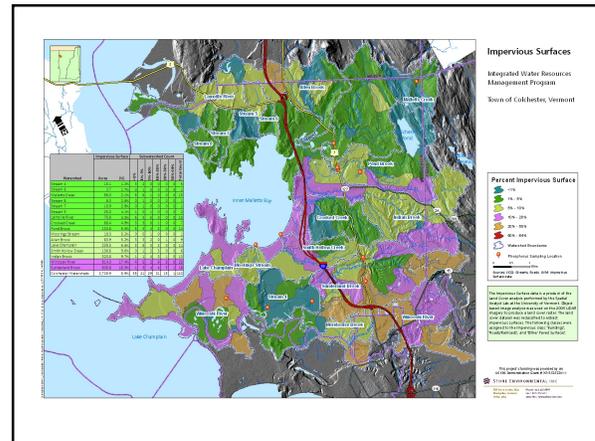
- **186 parcels available for development** with wastewater capacity (3% of all parcels)
- **4,414 acres** (18% of all acreage)

Based on current build-out rates it is estimated that Colchester will be completely built-out in 2038!

Unsuitable Development?

- **1,828 parcels (32%)**
- **1,579 acres (7%)**

We'll talk more about what this means later in the presentation



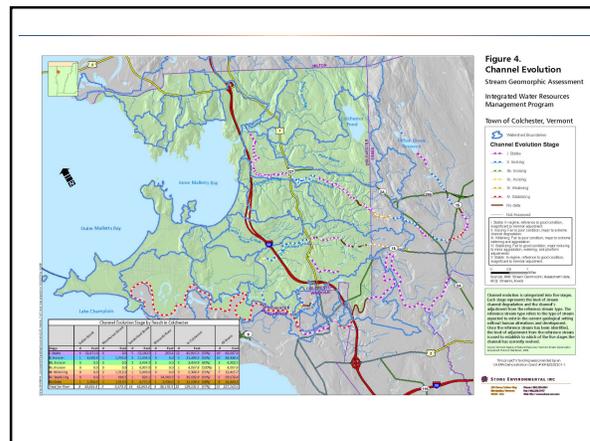
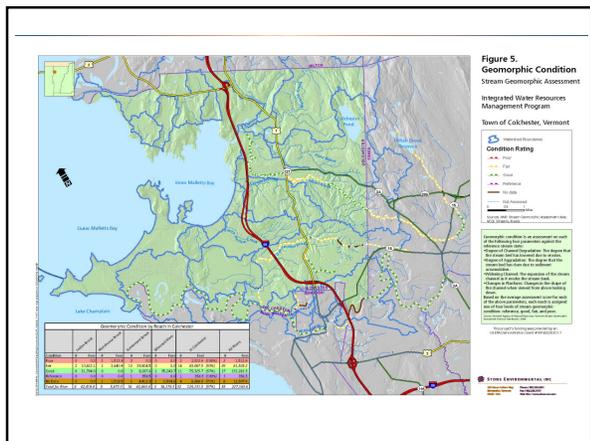
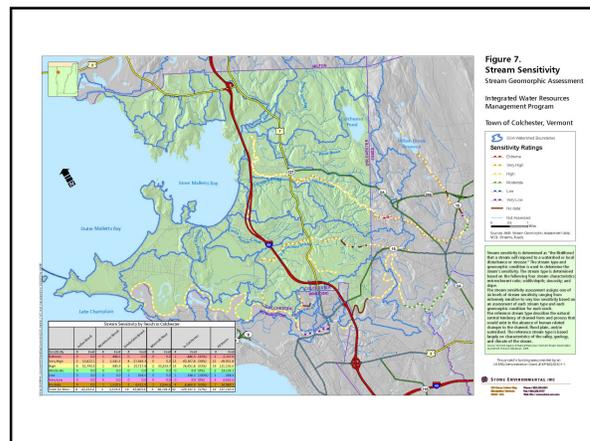
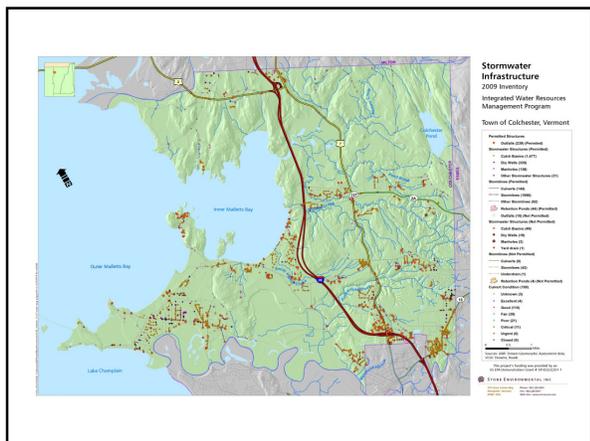
Impervious by Watershed

Watershed	Impervious Surface		Subwatershed Count						Total Count
	Acres	(%)	<1%	1%-5%	5%-10%	10%-20%	20%-50%	50%-60%	
Stream 4	15.1	1.2%	3	2	0	0	0	0	5
Stream 6	3.7	1.7%	0	1	0	0	0	0	1
Malletts Creek	68.0	2.1%	5	8	1	0	0	0	15
Stream 8	8.3	2.6%	0	1	0	0	0	0	1
Stream 7	10.9	2.9%	0	1	0	0	0	0	1
Stream 5	25.0	4.1%	1	0	1	0	0	0	2
Lamoille River	75.8	4.3%	5	3	5	0	0	0	13
Crooked Creek	68.4	4.9%	3	3	0	1	0	0	7
Pond Brook	133.8	5.0%	5	3	4	2	0	0	14
Moorings Stream	18.0	5.2%	0	0	1	0	0	0	1
Allen Brook	83.9	5.2%	3	3	2	0	1	0	9
Lake Champlain	238.5	6.6%	3	6	3	2	0	0	14
Smith Hollow Creek	136.6	9.6%	0	1	2	3	0	0	6
Indian Brook	320.8	9.7%	1	1	4	3	1	0	10
Winooski River	914.3	17.4%	4	5	2	6	8	0	25
Sunderland Brook	605.8	18.3%	1	3	4	4	5	1	18
Colchester Watersheds	2,726.9	8.9%	35	41	29	21	15	1	142

Stormwater Infrastructure

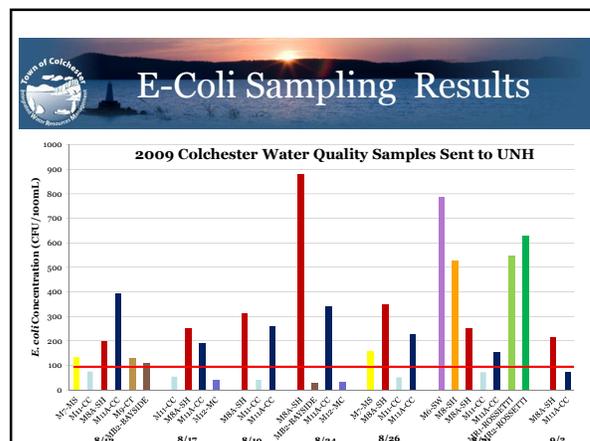
Type	#
Outfalls	254
Catch Basins	1,526
Dry Wells	357
Manholes	138
Retention Ponds	44
Other Structures	22

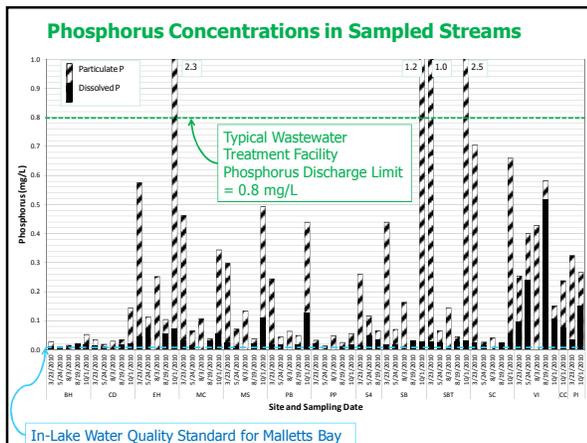
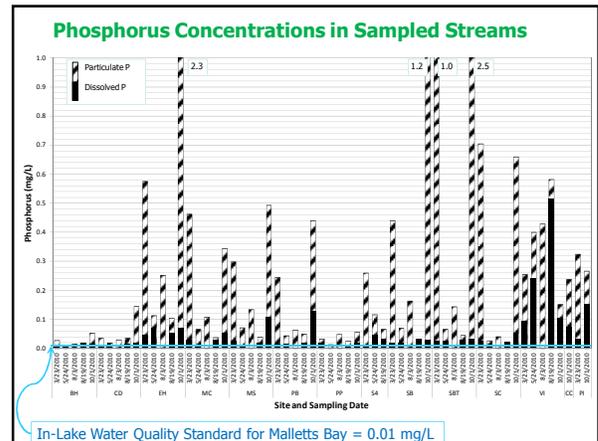
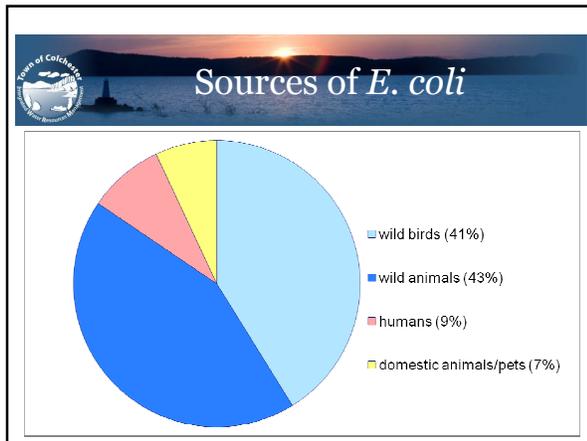
Source: Stone Environmental Field Inventory, Summer 2009



Water Quality Sampling

- **Bacteriological (*e-coli*) Sampling and Testing (DNA Ribotyping)**
- **Phosphorus Sampling**





Phosphorus Sampling

Erosion is an important driver of phosphorus pollution

- Monitoring during spring and fall high-flow events show **phosphorus moving with sediment** (as “particulate P”)
- Sediment loss** is attributable to a combination of **land surface erosion** and **failing stream banks**

Sunderland Brook

Phosphorus Sampling

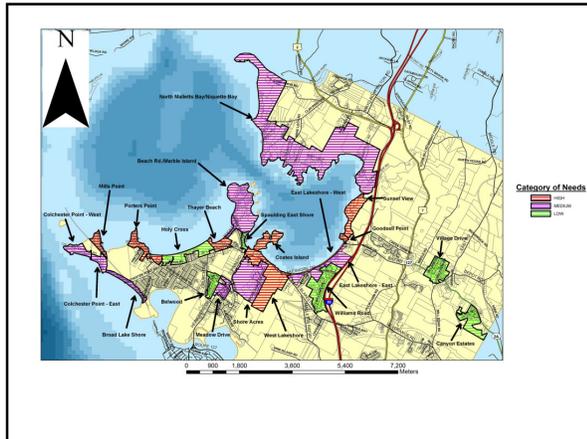
Drainages to Malletts Bay **have significant phosphorus** concentrations **under high-flow conditions**

- Much of this is particulate phosphorus transported downstream with sediment

Steam bank stabilization could play a role in reducing phosphorus pollution

Wastewater Management

- How serious is the problem?
- Is the problem town-wide?
- What does Colchester currently know about existing systems?
- Are there practical solutions that Colchester can implement to improve wastewater management (maintenance and function)?



Recommendations High Risk Areas

Area	Recommendations	Cost
Goodsell Point	Cluster system or central sewer	\$1,300,000
Sunset View Road	Manage with O&M permits	\$19,000
Mills Point	Manage with O&M permits	\$42,500
East Lakeshore Drive - West	Central Sewers	\$3,100,000
Porters Point	Manage with O&M permits	\$46,500
West Lakeshore Drive	Central sewers	\$2,200,000
Coates Island	Manage with O&M permits	\$18,000
Thayer Beach	Manage with O&M permits	\$9,500
Total Estimated Cost		\$6,735,500

Recommendations Medium Risk Areas

Area	Recommendations	Cost
North Mallets Bay/Niquette Bay	Inspect systems every 5 years.	\$62,500
Beach Road / Marble Island	Inspect systems every 5 years.	\$50,500
Meadow Drive	Inspect systems every 5 years.	\$41,000
East Lakeshore Drive - East	Connect to central sewer if extended to East Lakeshore Drive	Included above
Colchester Point - West	Inspect systems every 5 years.	\$30,500
Colchester Point - East	Inspect systems every 5 years.	\$1,500
Broad Lake Shore	Inspect systems every 5 years.	\$78,500
Shore Acres	Inspect systems every 5 years.	\$37,000
Total Estimated Cost		\$301,500

Recommendations Low Risk Areas

Area	Recommendations	Cost
Spaulding East Shore	Maintain status quo	\$0
Village Drive	Maintain Status quo	\$0
Belwood	Maintain Status quo	\$0
Canyon Estates	Maintain Status quo	\$0
Williams Road	Maintain Status quo	\$0
Holy Cross	Maintain Status quo	\$0
Total Estimated Cost		\$0

Wastewater Cost Summary

Risk Assessment Ranking	Total Cost of Recommendations
High	\$6,735,500
Medium	\$301,500
Low	\$0
Total Estimated Cost	\$7,037,000*

* Does not include the cost of a trunk sewer along Heineberg Road to the Burlington North WWTF **estimated to cost \$8,000,000.**

- ### Recommended Plan
- **Property Owner Awareness Program:** Town-Wide
 - **O&M Permits:** High Risk & Medium Risk Areas
 - **Central Sewers:** Only where onsite wastewater cannot adequately meet the needs

Implementation Budget (Awareness Program and O&M Permits)

Budget Item	Cost
Salaries	\$5,145
Benefits	\$2,573
Miscellaneous Supplies	\$200
Total Cost	\$7,918
Use	\$8,000

Annual Budget (Awareness Program and O&M Permits)

Budget Item	Cost
Salaries	\$15,944
Benefits	\$7,972
Reminder Notice Copying	\$263
Educational Material Copying	\$526
Postage	\$2,630
Information & Technology	\$500
Miscellaneous Supplies	\$300
Total Annual Cost	\$28,135
Use	\$28,000

- ### O&M Permit Issues
- Colchester has **delegated authority** to issue permits, but **permits must strictly follow DEC requirements**
- Most permits don't currently have O&M conditions
 - It is unclear whether O&M conditions can be placed on "conventional permits"
 - It is unclear whether Colchester can treat "high risk" and "medium risk" areas differently than the rest of Colchester

Permits by Type (what is currently in the database)

Priority Needs Area	Electronic Permits		No Electronic Permit	Total Developed Parcels
	WSWRP	Town Septic		
High Risk Areas	34	219	141	394
Medium Risk Areas	137	369	200	706
Low Risk Areas	121	339	150	610
Parcels Outside Risk Areas	878	1,883	789	3,550
Total Developed Parcels	1,170	2,810	1,280	5,260

- ### Conclusions - Wastewater
- Colchester should do something to better regulate onsite wastewater systems in the higher risk areas.
 - Simply maintaining status quo is not a sustainable long-term strategy for wastewater management to protect public health and the environment.

- ### Next Steps - Wastewater
- ✓ Colchester needs to decide if they want to pursue O&M permits in "high" and "medium" risk areas
 - ✓ If so, seek more clear direction from DEC regarding what is allowed
 - ✓ Seek legislative fixes if needed to provide Colchester with reasonable regulatory control over onsite systems in sensitive areas



Current stormwater practices

- Outfall inspections
- Illicit discharge detection and elimination
- Highway maintenance (e.g. street sweeping, catch basin cleaning, gravel road maintenance, sand and salt application)
- Compliance with MS4 requirements
- Compliance with local stormwater ordinances
- Capital improvement projects



Colchester's already done a lot

Since FY 05 Colchester has completed **16 capital projects** directly related to public stormwater systems totaling nearly **\$1.4M**.

(Repairs to failed outfalls, culverts and storm lines and other measures to alleviate localized flooding)



Regulatory Changes

- **New MS4 requirements** (add flow restoration plans to permit conditions)
- **Act 138** – Water Quality Remediation
- Pending updates to the **Phosphorus TMDL for Lake Champlain**

We conclude that **Colchester will be required to do more** to improve stormwater practices **at additional annual cost** to the community



Current Stormwater Budget

FY 14 stormwater budget is **~\$250,000**

- Costs are supported through property taxes* (a tax rate of **\$0.0127/\$100 assessed value**)

*This is **not an equitable funding model** to pay for stormwater maintenance



Future Stormwater Budgets

- **MS4 changes** are estimated to add **\$150,000** annually to the budget
- It is estimated that **future capital improvement projects** could cost another **\$120,000** annually
- **Fluvial Geomorphic Improvements** could total **\$2.6M**



Future Funding Model

A **hybrid funding model** based on impervious surface calculations and an ERU basis

- This system treats stormwater more like a utility (similar to municipal water and sewer)
- Every property would pay their share of the stormwater utility costs (including undeveloped parcels and tax-exempt properties)



Hybrid Funding Model

- Impervious surface calculations would be determined for every parcel in town
- One ERU would equal the average impervious surface of a single family home (~3,000 SF)
- Every single family home would be assigned **one** ERU regardless of the amount of impervious surface on their parcel
- Other property types would be assigned a number of ERUs based on their impervious surface divided by the average for single family homes (rounded to the nearest whole number)
- Every parcel (even undeveloped parcels) would be assigned a minimum value of **1** ERU



Implementation Costs

Budget Item	Cost
Salaries	\$4,320
Benefits	\$2,160
Billing System Modifications	\$7,500
Impervious Surface Determinations	\$20,000
	\$33,980
	\$34,000



Annual Administration Costs

Budget Item	Annual Cost
Salaries	\$819
Benefits	\$410
	\$1,229
	\$1,300



Cost to a Homeowner

- For FY 14 a home valued at \$250,000 will pay **\$31.75** in taxes to fund the stormwater budget (FY 14 budget is \$248,511)
- Using the hybrid model described above it is estimated that there would be ~18,500 ERUs throughout Colchester. For FY 14, the stormwater utility bill for a homeowner (1 ERU) would be **\$13.50***

*Based on a rough estimate of impervious surface area by type



Conclusions - Stormwater

- **Stormwater management costs will only increase** in the coming years as new (more stringent) regulations and permit conditions are implemented
- Colchester's **current system** of funding stormwater management through the property **tax is not equitable**
- Colchester should **consider creating a stormwater utility** that would provide more equitable funding to more fairly fund future cost increases



Next Steps - Stormwater

- Decide whether a stormwater utility is the preferred method to fund stormwater management going forward
- If so, develop the necessary ordinances, policies and billing system to administer a new stormwater utility
- Complete a detailed calculation of impervious surface for each parcel and use type
- Formally establish the number of ERUs town-wide and the annual cost/ERU to support the stormwater fund.



Next Steps - Stormwater

- Continue to assess the future requirements and associated costs to comply with the new MS4 permit
- Monitor outcomes of Act 138 as they relate to stormwater management in Colchester
- Assess impacts of the new Lake Champlain phosphorus TMDL (due out by the end of 2013)
- Develop strategies, policies and actions steps to meet these future regulations as cost-effectively as possible.



Want to know more?

Visit 
colchestervt.gov
...and please tell a friend.