Low Impact Development Structure Suggestions for the Town of Montville

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Our Process

The first thing we did was look at **municipal sites** in Montville using **Google Earth images**, and deciding from that which practices we thought would work best just from photos. To do this, we looked at the properties, looked to see if any storm drains we visible, and used EcoCT to **determine where the elevation changed** at each site.

We created a list of possible sites and then went to **visit Montville**. During our visits, we looked at storm drains, rain gutters, the slant of the ground, any ponding, and possible obstacles at each site. By doing that we could **assess whether our ideas are practical** or if we needed to come up with a more suitable suggestion for the sites.

After that, we **decided on the best practices** to implement at the sites and used Google Earth to **measure the drainage area** which helped us calculate the necessary practice size needed to catch all of the water. During the process, we also looked through the town plans that were provided to us.

Rain garden + Bioretention

- Rain gardens are a depression in the soil for water infiltration
- Bioretention is similar with engineered underdrain, overflow, and special media
- Aesthetically pleasing
- Requires regular maintenance

Green roof

- Rooftop garden designed to reduce stormwater
- Utilizes evapotranspiration
- Many planting options, but commonly short, hearty plants
- Low maintenance (weeding)
- Reduce runoff by ~50%

https://clear.uconn.edu/projects/TMDL/sites/Gant.htm

https://www.cwp.org/wp-content/uploads/2019/05/Arnold_Campus-GSI.pdf

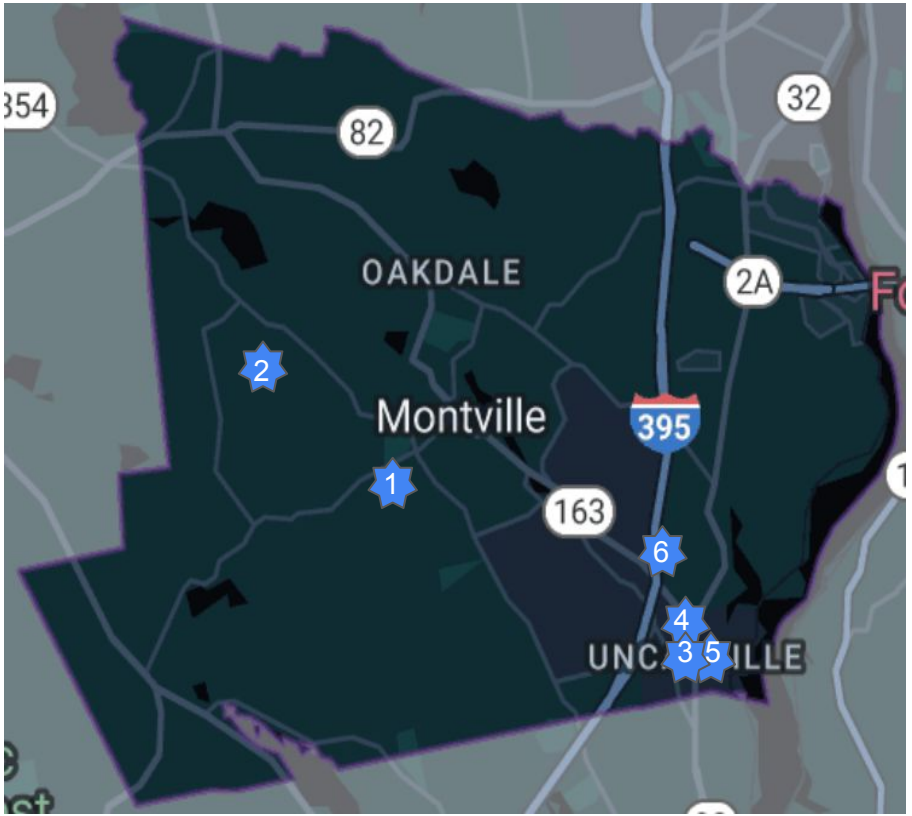
Permeable Pavement

- Pavement that allows water to flow through it and sink into the soil beneath
- Base prep is different than traditional pavements and needs to be designed for infiltration
- Requires periodic maintenance to clear debris

https://www.soils.org/news/media-releases/releases/2018/1001/1037/

Sites

1. Leonard J Tyl Middle School
2. Oakdale Elementary School
3. The Montville Senior Center
4. Montville Parks and Recreation
5. Montville Town Hall/Emergency Management
6. Montville Volunteer Fire Department #1



Site 1: Leonard J. Tyl Middle School

Location: 166 Chesterfield Rd, Oakdale, CT 06370

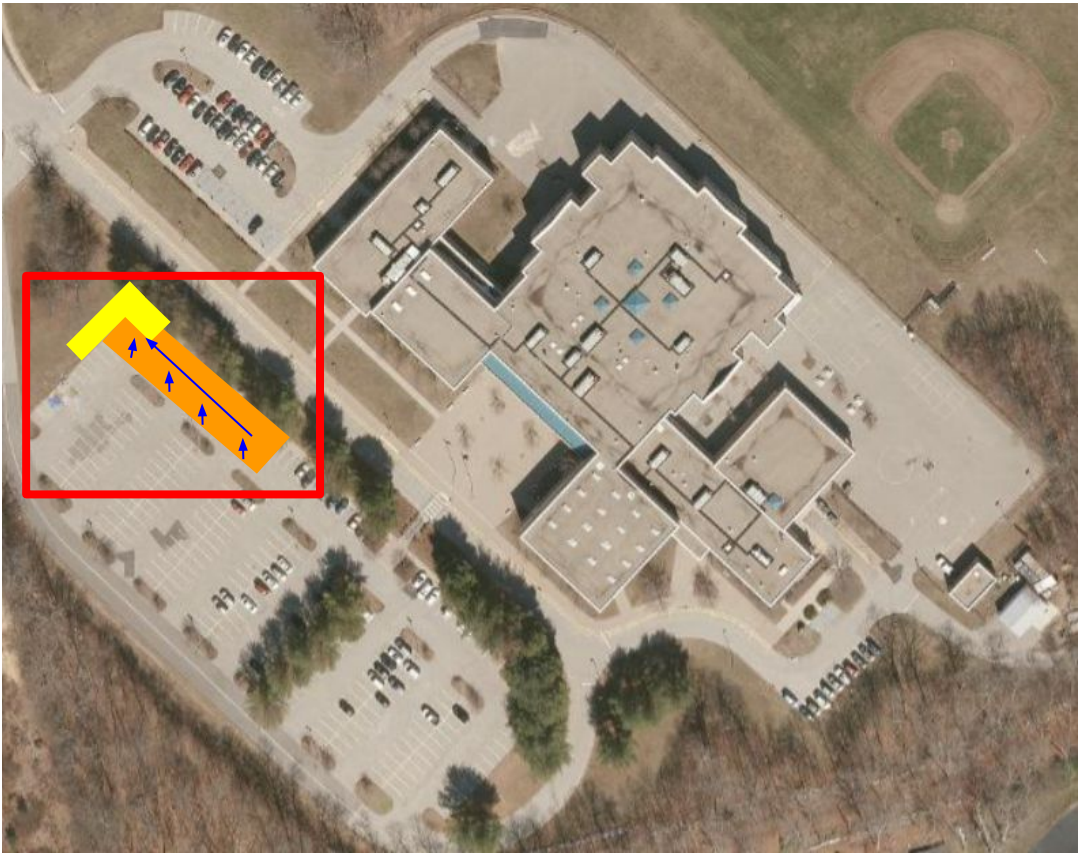
Impervious Area: 7,090 sq. ft

Subregional watershed: Oxoboxo Brook

Site 1: Leonard J. Tyl Middle School

We recommend replacing two spaces next to the storm drain with a bioretention basin that extends into the grassy area nearby. This would allow the water in the parking lot to drain into the ground while also keeping the existing storm drain.

Drainage Area (sq ft)	Suggested Green Infrastructure	Annual Gallons Treated	Annual N Reduction (lb N/yr)	Annual P Reduction (lb P/yr)	Suggested Practice Size (sq ft)
7,090	Bioretention	186,702	1.94	0.25	1,182



Key:

- Area to disconnect
- Suggested practice
- Direction of water flow

Site 2: Oakdale Elementary School

Location: 30 Indiana Cir, Oakdale, CT 06370

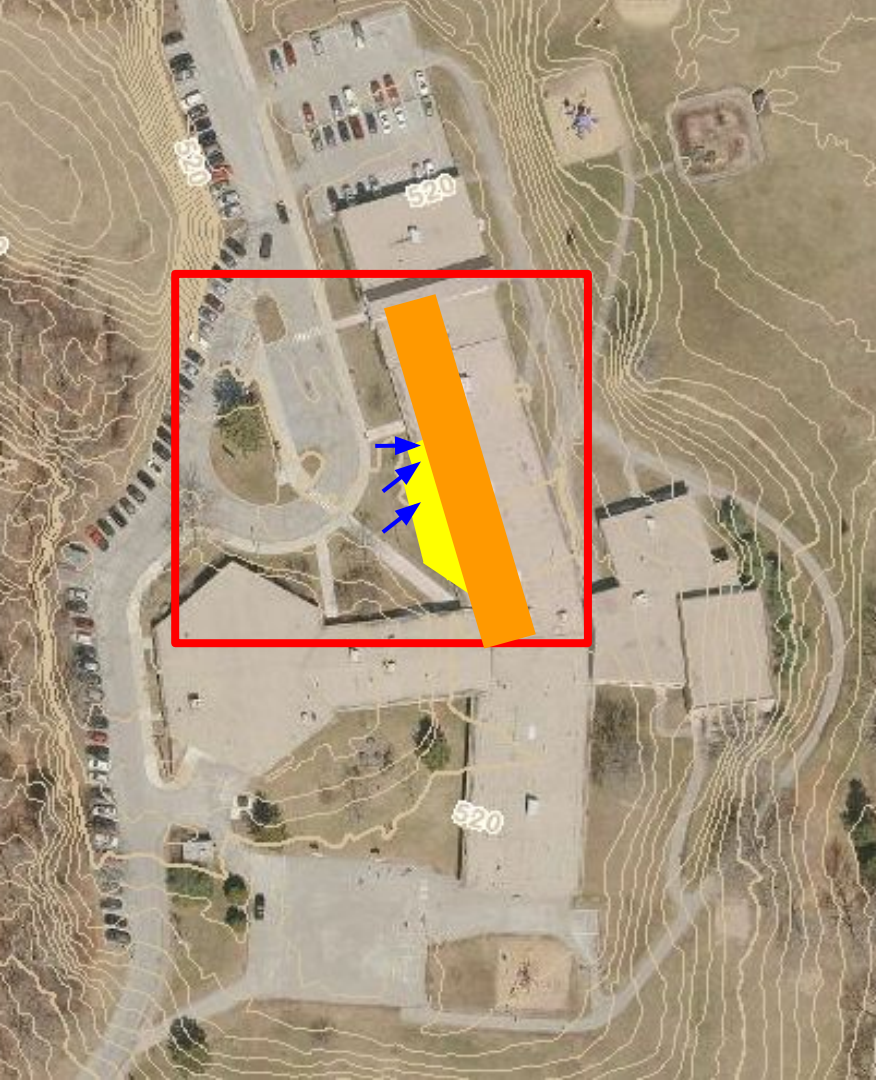
Impervious Area: 8,538 sq. ft

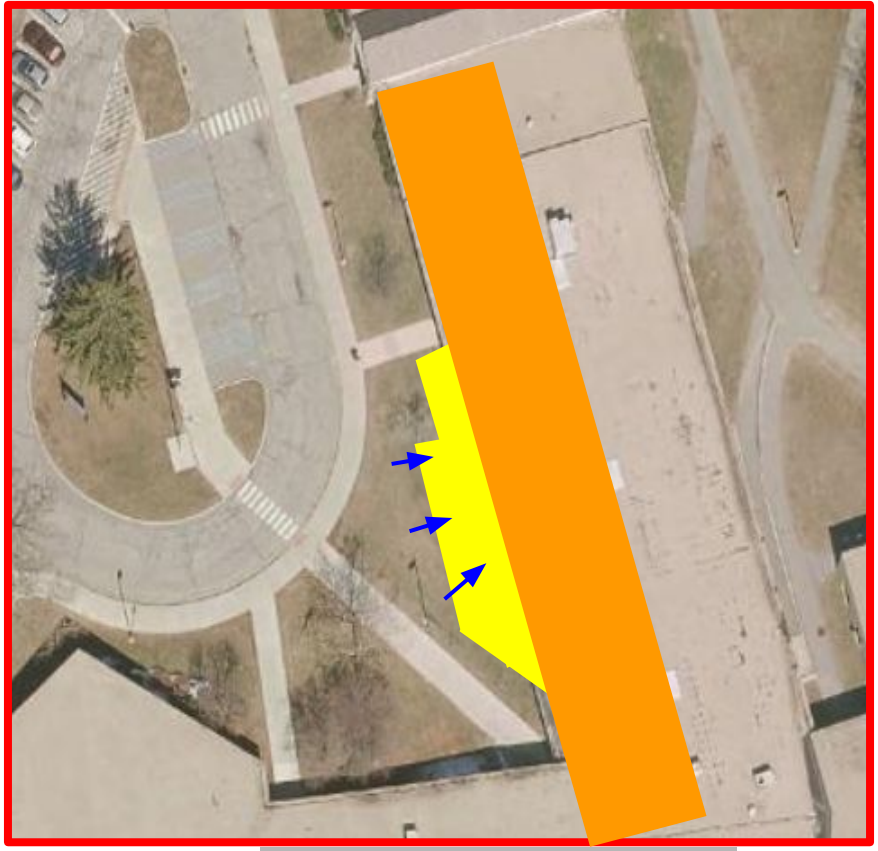
Subregional watershed: Oxoboxo Brook

Site 2: Oakdale Elementary

We recommend a bioretention basin to disconnect 3 downspouts.There is already a drain in the grass that could be used for a bioretention basin. It must be noted that the land slopes slightly toward the school, so this would need to be leveled before a bioretention is installed.

Drainage Area (sq ft)	Suggested Green Infrastructure	Annual Gallons Treated	Annual N reduction (lb N/yr)	Annual P Reduction (lb P/yr)	Suggested Practice Size (sq ft)
8,538	Bioretention	224,851	2.33	0.30	1,423





Key:

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Site 3: The Montville Senior Center

Location: 12 Maple Ave., Uncasville, CT 06382

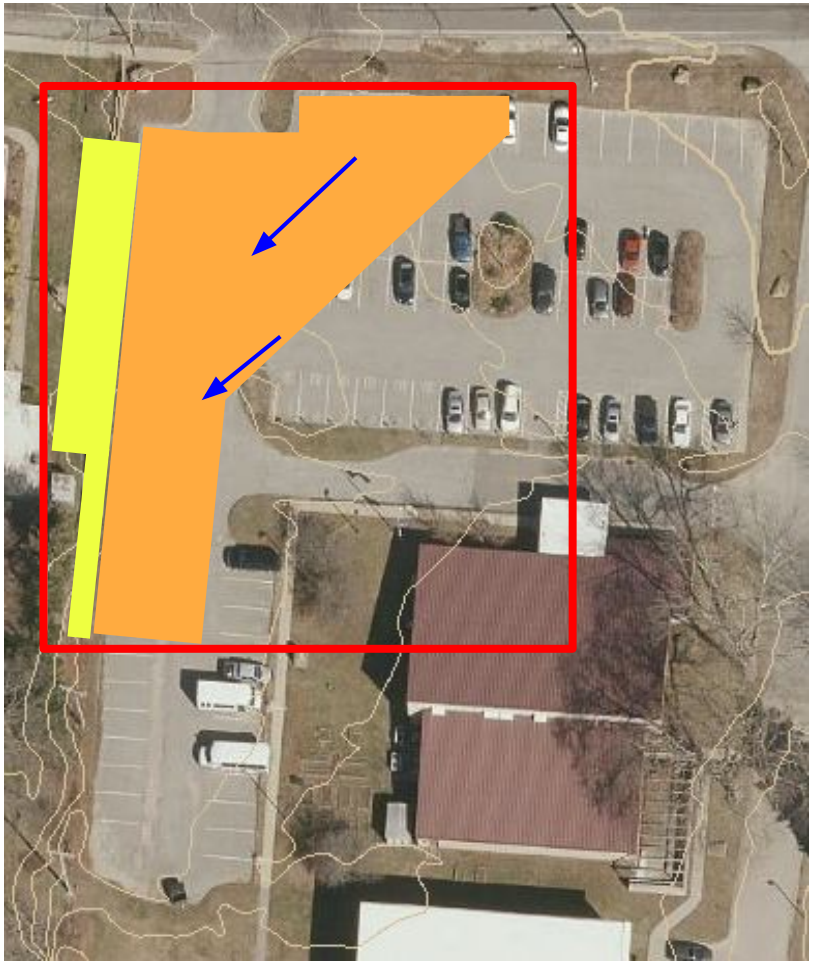
Impervious Area: 12,734 sq. ft

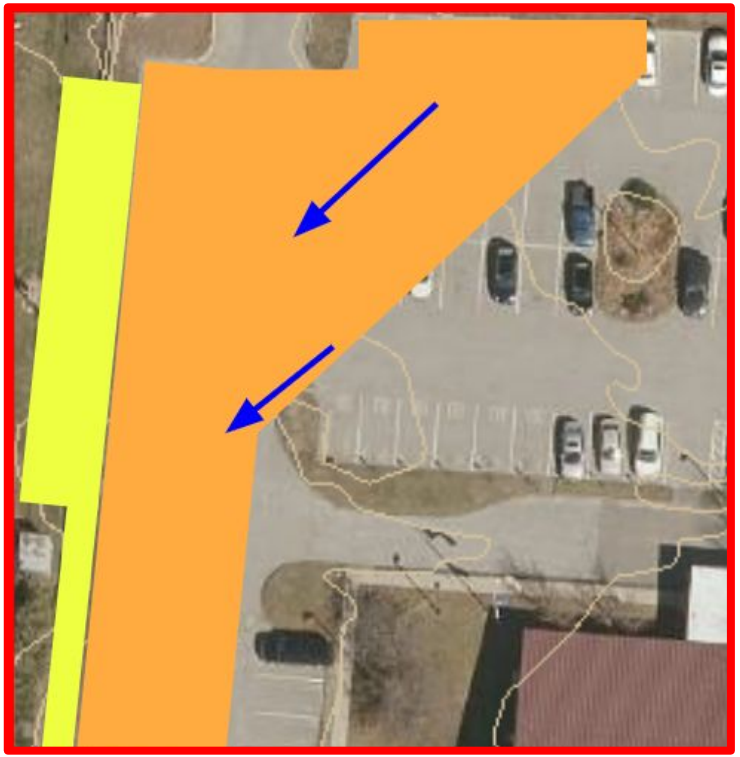
Subregional watershed: Oxoboxo Brook

Site 3: The Montville Senior Center

We recommend removing the curb on the far end of the parking lot and adding a strip rain garden along the edge. This will catch stormwater that would otherwise enter the storm drain along the edge of the parking lot.

Drainage Area (sq ft)	Suggested Green Infrastructure	Annual Gallons Treated	Annual N Reduction (lb N/yr)	Annual P Reduction (lb P/yr)	Suggested Practice Size (sq ft)
12,734	Rain garden	335,326	3.48	0.44	2,122





Key:

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Site 4: Montville Parks and Recreation

Location: 310 Norwich-New London Turnpike, Uncasville, CT 06382

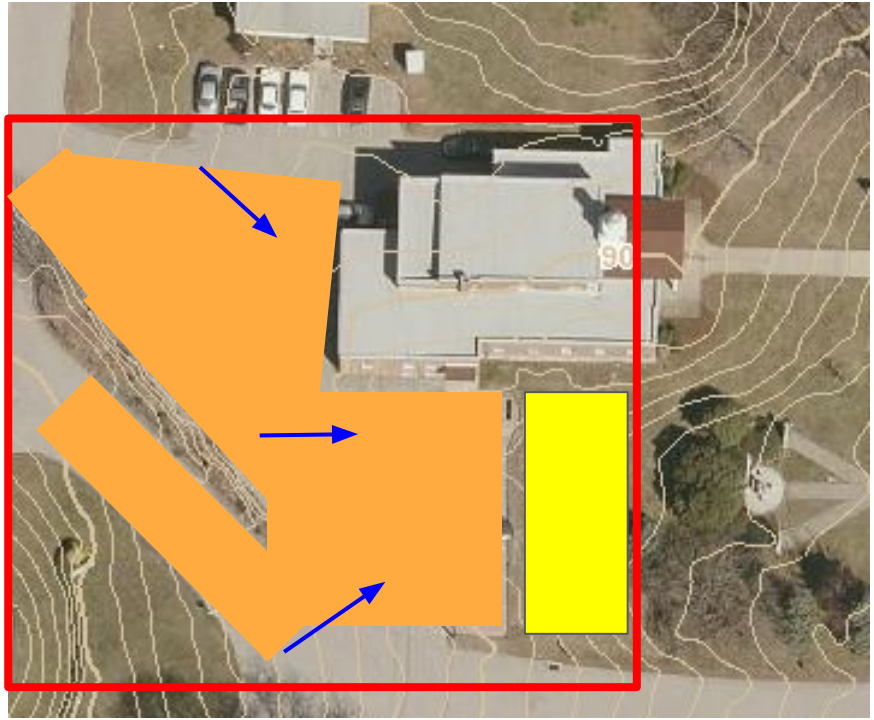
Impervious Area: 17,553 sq. ft

Subregional watershed: Oxoboxo Brook

Site 4: Montville Parks and Recreation

We recommend a bioretention basin with curb cuts to allow water from the lot to flow into the basin. The entire parking lot drains to one storm drain that could be used as the bioretention overflow drain. This area is perfect for bioretention because the land is sloped toward that storm drain. Signage could also be placed by the bioretention area to educate people about bioretention basins.

Drainage Area (sq ft)	Suggested Green Infrastructure	Annual Gallons Treated	Annual N Reduction (lb N/yr)	Annual P Reduction (lb P/yr)	Suggested Practice Size (sq ft)
17,554	Bioretention	462,252	4.8	0.61	2,926



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Site 5: Montville Town Hall/Emergency Management

Location: 310 Norwich-New London Turnpike, Uncasville, CT 06382

Impervious Area: 11,330 sq. ft

Subregional watershed: Oxoboxo Brook

Site 5: Montville Town Hall/Emergency Management

We recommend a green roof on the top of the building because the roof is large and flat. It could be made of movable plastic trays to make sure that they could be moved if needed for maintenance atop the roof. It must be noted that the roof would have to be inspected to make sure it could support the added weight of the green roof.

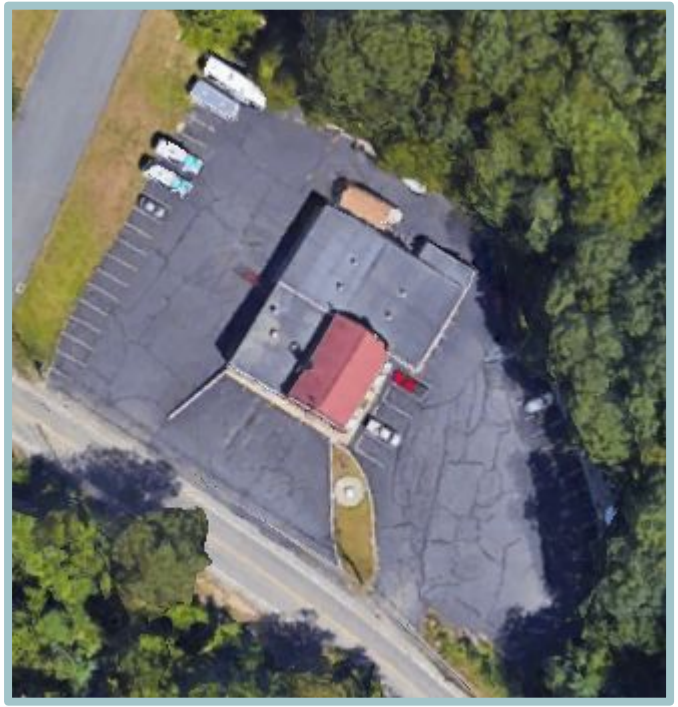
Drainage area (sq ft)	Suggested Green infrastructure	Annual Gallons treated	Suggested Practice Size (sq ft)
11,330	Green Roof	169,534	11,331

Site 6: Montville Volunteer Fire Station #1

Location: 77 CT-163, Uncasville, CT 06382

Impervious Area: 2,400 sq. ft

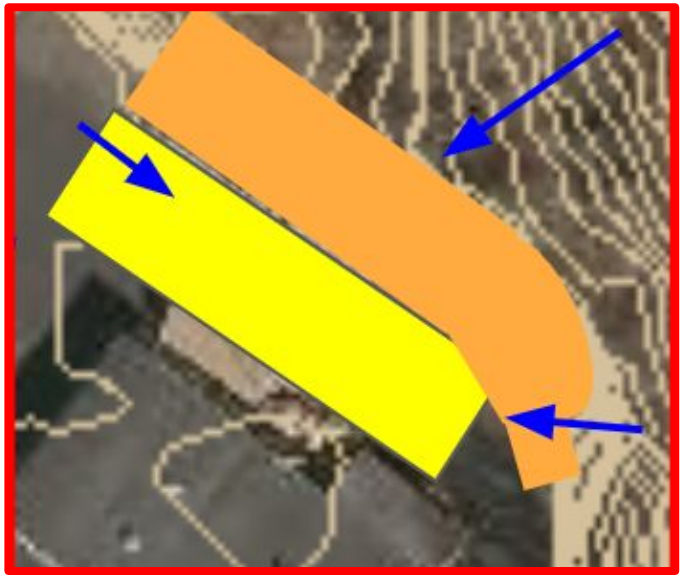
Subregional watershed: Oxoboxo Brook



Site 6: Montville Volunteer Fire Station #1

We recommend permeable pavement in the rear of the fire station. Repaving this area with permeable pavement would help catch runoff that runs from the hill behind the fire station.

Drainage Area (sq ft)	Suggested Green Infrastructure	Annual Gallons Treated	Annual N Reduction (lb N/yr)	Annual P Reduction (lb P/yr)	Suggested Practice Size (sq ft)
2,400	Permeable pavement	71,818	0.66	0.08	1,858



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Continued Suggestions

Camp Oakdale: Check dam on the side of the road in the grass where the rain water currently flows. This would give the water more time to absorb into the ground and help prevent erosion

Oakdale Pavilion: New parking lot should have rain garden in the center

Charles E. Murphy: Bioretention would be possible if the active wells ever became inactive

Totals

Site	Drainage area (sq ft)	Suggested Green infrastructure	Annual Gallons treated	Annual N reduction (lb N/yr)	Annual P Reduction (lb P/yr)	Suggested Practice Size (sq ft)
1	7,090	Bioretention	186,702	1.94	0.25	1,182
2	8,538	Bioretention	224,851	2.33	0.3	1,423
3	12,734	Rain garden	335,326	3.48	0.44	2,122
4	17,554	Bioretention	462,252	4.8	0.61	2,926
5	11,331	Green Roof	169,534	--	--	11,331
6	2,400	Permeable pavement	71,818	0.66	0.08	1,858
Total	**59,647**	**--**	**1,450,483**	**13.2**	**1.7**	**20,842**

Codes and Ordinances

We used the Center for Watershed Protection's **COW Scoring Spreadsheet**:

- Used to evaluate land use regulations
- Used to identify strengths and weaknesses within Montville's regulations to help with MS4 requirement
- Found codes that could be revised with the intent of decreasing impervious cover, decreasing stormwater runoff, and protecting wetlands

Final Score: 31%

Strong- Definition of watercourse

Lacked- Stormwater management codes and buffer management

Review of Codes and Ordinances

Strengths:

- Definition of watercourse
- Inland Wetlands and Watercourses regulations of the Town of Montville, CT.:

"Watercourses" means rivers, streams, brooks, waterways, lakes, ponds, marshes, swamps, bogs, and all other bodies of water, natural or artificial, vernal or intermittent, public or private, which are contained within, flow through or border upon the Town or any portion thereof not regulated pursuant to Section 22a-28 through 22a-35, inclusive, of the Connecticut General Statutes.

- This is important because it protects more bodies of water bodies protected from contaminants in stormwater runoff

Room for Improvement:

- Lack of regulations requiring buffer management along waterways
- No mention of development standards require a vegetated buffer along waterways
- Could be updated to:
  - Require buffers along waterways w/ native vegetation
  - Require buffers to protect sensitive resources (like water), adjacent wetlands, or steep slopes
  - Regulate allowable activities on the buffers
- This is important to include in revisions because buffers protect waterways and filter runoff before it enters them

Partners and Contacts

Contacts:

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Thank you for working with us!

CLEAR

Center for Land Use Education & Research