MEETING NOTICE AND AGENDA

MANSFIELD PLANNING AND ZONING COMMISSION

AUDREY P. BECK MUNICIPAL BUILDING ▪ 4 SOUTH EAGLEVILLE ROAD ▪ COUNCIL CHAMBER

MONDAY, JULY 18, 2016 ▪ 6:45 PM
OR UPON COMPLETION OF INLAND WETLANDS AGENCY MEETING

1. CALL TO ORDER AND ROLL CALL
2. APPROVAL OF MINUTES
   A. JUNE 20, 2016 – REGULAR MEETING
3. ZONING AGENT'S REPORT
4. PUBLIC HEARINGS
   A. 6:45 PM ▪ AMENDMENTS TO ZONING REGULATIONS RELATED TO STORMWATER MANAGEMENT, WATER SERVICE CONNECTIONS, ALCOHOL, AND LIVE MUSIC; AND AMENDMENTS TO ZONING REGULATIONS AND MAP TO CREATE A WATER PIPELINE OVERLAY DISTRICT (PZC FILE 907-41)
5. OLD BUSINESS
   A. AMENDMENTS TO ZONING REGULATIONS RELATED TO STORMWATER MANAGEMENT, WATER SERVICE CONNECTIONS, ALCOHOL, AND LIVE MUSIC; AND AMENDMENTS TO ZONING REGULATIONS AND MAP TO CREATE A WATER PIPELINE OVERLAY DISTRICT (PZC FILE 907-41)
   B. ZONING REGULATION REVISIONS – MULTI-FAMILY HOUSING
      Referred to Advisory Committees for review and comment
   C. OTHER
6. NEW BUSINESS
   A. UNITED SERVICES REQUEST FOR EXTENSION (PZC FILE 1302)
      Memo from Director of Planning and Development
   B. REFERRAL FROM COUNCIL RE: OUTDOOR WOOD BURNING FURNACES
      Memo from Director of Planning and Development
   C. SPECIAL PERMIT APPLICATION, EFFICIENCY UNIT, D. HEMPLE, 11 SUMMIT ROAD (PZC FILE 1342)
   D. OTHER
7. REPORTS FROM OFFICERS AND COMMITTEES
   A. CHAIRMAN'S REPORT
   B. REGIONAL PLANNING COMMISSION
   C. REGULATORY REVIEW COMMITTEE
   D. PLANNING AND DEVELOPMENT DIRECTOR'S REPORT
   E. OTHER

8. COMMUNICATIONS AND BILLS

A. REBECCA SHAFER MEMO TO PZC (JUNE 17, 2016)
B. DEEP NOTICE OF TENTATIVE DETERMINATION STATEWIDE GENERAL PERMIT
C. UCONN 2015 CONSUMER CONFIDENCE REPORT-STORRS CAMPUS WATER SYSTEM
D. TOWN COUNCIL COMMUNICATION TO CTDOT RE: PROPOSED ANDOVER NATURAL GAS INFUSION STATION
E. OTHER

9. ADJOURNMENT

MINUTES

DRAFT MINUTES

MANSFIELD PLANNING AND ZONING COMMISSION

AUDREY P. BECK MUNICIPAL BUILDING ▪ 4 SOUTH EAGLEVILLE ROAD ▪ COUNCIL CHAMBER

MONDAY, JUNE 20, 2016 ▪ REGULAR MEETING

MEMBERS PRESENT:	J. Goodwin, C. Ausburger, B. Chandy, R. Hall, G. Lewis (left at 8:13 p.m.), K. Rawn, B. Ryan, S. Westa
MEMBERS ABSENT:	V. Ward
ALTERNATES PRESENT:	P. Aho, K. Fratoni
ALTERNATES ABSENT:	T. Berthelot
STAFF PRESENT:	Linda Painter, Director of Planning and Development Janell Mullen, Assistant Planner, Zoning Agent Jennifer Kaufman, Inland Wetlands Agent

Chairman Goodwin called the meeting to order at 6:44 p.m. and appointed Aho to act.

APPROVAL OF MINUTES:

A. JUNE 6, 2016 – REGULAR MEETING

Chandy MOVED, Hall seconded, to approve the 06-06-2016 minutes as presented. MOTION PASSED with all in favor except Westa and Aho who disqualified themselves.

ZONING AGENT'S REPORT:

Mullen reported on the status of various enforcement actions.

PUBLIC HEARING:

A. SPECIAL PERMIT RENEWAL REQUESTS FOR REMOVAL OF ROCK SAND OR GRAVEL FROM:

- PROPERTY OF BANIS, NORTH SIDE OF PLEASANT VALLEY RD., APPROX. 300 FEET EAST OF WOODS RD. (PZC FILE 1164)
- PROPERTY OF HALL, NORTH OF MANSFIELD HOLLOW ROAD (PZC FILE 910-2))
- PROPERTY OF GREEN, 1090 STAFFORD ROAD (PZC FILE 1258)

Chairman Goodwin opened the Public Hearing at 6:45 p.m. Members present were Goodwin, Ausburger, Chandy, Hall, Lewis, Rawn, Ryan, Westa and alternates Aho and Fratoni. Aho was appointed to act. Linda Painter, Director of Planning and Development read the legal notice as it appeared in The Chronicle on 6/7/16 and 6/15/16 and noted the following communications received and distributed to members of the Commission: A 6/20/16 Memo from Janell Mullen, Assistant Planner/ZEO and a 6/13/16 email from Robert and Christine McCarthy, 89 Mansfield Hollow Road.

Chairman Goodwin asked for Commission and Public Comment on each of the applications. There were no questions or comments on the Banis or Green requests for renewal.

Robert McCarthy, 89 Mansfield Hollow Road, summarized his concerns regarding the Hall property contained in his 6/13/16 email. Janell Mullen, Assistant Planner/ZEO, stated that the property referred to by Mr. McCarthy is not property subject to this gravel permit, but that she will visit this

property with the former Zoning Agent to make a determination as to whether any changes have occurred since the former ZEO last inspected the property and/or whether there is any zoning violation. Ed Hall, applicant, stated that the issues raised by Mr. McCarthy are not subject to this gravel permit and should be addressed at a separate time.

Hall MOVED, Rawn seconded, to close the Gravel Permit Renewal Public Hearing at 7:01 p.m. MOTION PASSED UNANIMOUSLY.

OLD BUSINESS:

E. SPECIAL PERMIT RENEWAL REQUESTS FOR REMOVAL OF ROCK, SAND OR GRAVEL (BANIS PROPERTY, PLEASANE.T VALLEY ROAD; HALL PROPERTY, MANSFIELD HOLLOW ROAD; GREEN PROPERTY, 1090 STAFFORD ROAD)

Chandy MOVED, Ausburger seconded, to approve the renewal requests of the gravel operation of Banis of Pleasant Valley Road, Green at Stafford Road, and Hall at Mansfield Hollow Road subject to their specific conditions of approval which generally include strict adherence to the cubic yard limitations, the hours of operation, and the condition that the areas of disturbance will be re-planted. The work should also be confined to the area of activity as indicated on submitted plans and described in the renewal requests and as presented at the Public Hearing on June 20, 2016. This approval is granted because the applications as hereby approved are considered to be in compliance with Article Ten, Section H, and Article Five, Section B of the Zoning Regulations. The renewals will expire on July 1, 2017. MOTION PASSED UNANIMOUSLY.

PUBLIC HEARINGS:

B. AMENDMENT TO ZONING REGULATIONS RELATED TO THE BUSINESS ZONE, S. SCHRAGER (PZC FILE 1341)

Chairman Goodwin opened the Public Hearing at 7:05 p.m. Members present were Goodwin, Ausburger, Chandy, Hall, Lewis, Rawn, Ryan, Westa and alternates Aho and Fratoni. Aho was appointed to act. Linda Painter, Director of Planning and Development read the legal notice as it appeared in The Chronicle on 6/7/16 and 6/15/16 and noted the following communications received and distributed to members of the Commission: A 6/16/16 Memo from Janell Mullen, Assistant Planner/ZEO; a 6/14/16 letter from Karla and Alexander Fox; a 6/16/16 letter from Gregory and Patricia Frantz; and a 6/16/16 email from Beverly Nass.

Attorney Samuel Schrager, representing the property owner, reviewed the proposal, explaining that the proposed amendment will affect only the Business Zone which consists of 3 properties on Flaherty Road.

Karla Fox, 1 Storrs Heights, referred to her letter and added that if one of the proposals is chosen, she prefers the Special Permit option.

Gregory Frantz, 14 Minnesota Road, is opposed to the regulation change because of the minimum proposed lot size of 8,000 square feet, noting potential difficulties if a well or septic required replacement because these properties do not have municipal water or sewer.

Attorney Samuel Schrager replied that if a well or septic on any of the three affected properties should fail and there was not suitable space for replacement, then the property could not be developed/renovated.

Jim Makuch, property owner at 17 Flaherty Road, reviewed how his property has been used since his purchase and stated he intended to continue to use it as a residential dwelling.

Rawn MOVED, Hall seconded, to close the public hearing at 7:18 p.m. MOTION PASSED UNANIMOUSLY.

C. AMENDMENTS TO ZONING REGULATIONS RELATED TO STORMWATER MANAGEMENT, WATER SERVICE CONNECTIONS, ALCOHOL, AND LIVE MUSIC; AND AMENDMENTS TO ZONING REGULATIONS AND MAP TO CREATE A WATER PIPELINE OVERLAY DISTRICT (PZC FILE 907-41)

Chairman Goodwin opened the Public Hearing at 7:19 p.m. Members present were Goodwin, Ausburger, Chandy, Hall, Lewis, Rawn, Ryan, Westa and alternates Aho and Fratoni. Aho was appointed to act. Linda Painter, Director of Planning and Development read the legal notice as it appeared in The Chronicle on 6/7/16 and 6/15/16 and noted the following communications received and distributed to members of the Commission: a 6/16/16 memo from Linda Painter, Director of Planning and Development; a 5/20/16 letter from Sandra Bobowski, Chairman of CRCOG which was read into the record; a 5/26/16 letter from Thomas Seidel, Senior Planner of SECCOG which was read into the record; a copy of the 5/26/16 draft Mansfield Economic Development Commission minutes; a copy of the 6/7/16 draft Four Corners Water and Sewer Advisory Committee minutes; and a 5/31/16 email from Alison Hilding.

Chairman Goodwin stated that each regulation will be taken in turn commencing with an explanation of the revision by the Director of Planning before opening the hearing to public comment.

Alcohol

Linda Painter, Director of Planning and Development, reviewed the proposed changes to the regulations regarding alcohol.

Alison Hilding, 17 Southwood Road, submitted a packet of materials to the members regarding the proposed changes to the regulations in general. With respect to the revisions concerning alcohol, she cited the potential water usage increases; a concern for the elimination of separating distances and asked for on-site sales only and a restriction on wholesale activities.

Live/Amplified Music

Linda Painter, Director of Planning and Development, reviewed the proposed changes to the regulations regarding live music. There was no public comment.

Stormwater Management

Linda Painter, Director of Planning and Development, reviewed the proposed changes to the regulations regarding stormwater management.

Alison Hilding, 17 Southwood Road, submitted written technical revisions and asked that the Assistant Town Engineer address these issues.

Water Service Connections and Water Pipeline Overlay District:

Linda Painter, Director of Planning and Development reviewed the proposed changes to the

regulations regarding water service connections and the creation of a Water Pipeline Overlay District.

Alison Hilding, 17 Southwood Road, submitted written comments and recommended that the regulations clearly exclude undevelopable land such as wetlands, steep slopes, etc. from density calculations and that the overlay district be expanded to apply to University or state-owned properties with significant natural resources as these properties could potentially be sold in the future and become subject to the Commission's jurisdiction.

Painter noted that the Public Hearing must be continued to July 18th for receipt of the Town Attorney's opinion. At 7:50 p.m. Rawn MOVED, Ausburger seconded, to adjourn the Public Hearing to the 7/18/16 meeting. MOTION PASSED UNANIMOUSLY.

OLD BUSINESS:

C. AMENDMENT TO ZONING REGULATIONS RELATED TO THE BUSINESS ZONE, S. SCHRAGER (PZC FILE 1341)

Westa MOVED, Ausburger seconded, to approve the April 25, 2016 petition (File #1341) to amend Article 7, Section Q.2 of the Mansfield Zoning Regulations to add one and two-family dwelling units to the categories of permitted uses in the Business Zone requiring site plan approval as described in application submissions and heard at Public Hearing on June 20, 2016. The subject regulation amendments shall become effective as of July 15, 2016.

In approving this application, the Planning and Zoning Commission considered all Public Hearing Testimony and communications. In accordance with the approval criteria identified in Article XIII, Section D of the Zoning Regulations, the Commission makes the following findings in approval of these amendments:

- The proposal is complete and contains all required information.
- The proposal is consistent with the goals, policies, and recommendations contained within the Mansfield Plan of Conservation and Development. This finding shall be stated on the record, pursuant to section 8-3A of the State Statutes.
- The proposal is consistent with the expression of regulatory intent and purpose contained in the provisions of Article I of these regulations and Section 8-2 of the Connecticut General Statutes, as amended.
- The amendments are appropriately worded, legally sound and suitably coordinated with other provisions in the Mansfield Zoning Regulations.

MOTION PASSED with all in favor except Hall who was opposed.

**At 8:13 p.m., Lewis left and Fratoni was seated.

OLD BUSINESS:

A. ZONING AMENDMENT APPLICATION, 91 & 93 MEADOWBROOK LANE (PZC FILE 1338)

Hall MOVED, Chandy seconded, to approve, the application of Uniglobe Investment LLC (File #1338) to rezone 4.6 acres of land located at 91 and 93 Meadowbrook Lane from R-20 to DMR, as described in application materials dated February 9, 2016 and shown on a map dated January 8, 2016 as revised to April 11, 2016 and as heard at a Public Hearing on May 16, 2016.

This zone change shall become effective on the date the associated Meadowbrook Gardens Special Permit application (PZC File 1284-3) is filed on the Land Records. Approval is granted for the following reasons:

1. The subject rezoning is consistent with mapping and goals identified the Mansfield Tomorrow Plan of Conservation and Development. The subject property and properties to the north, east and west are designated as Compact Residential which is intended to accommodate residential growth in compact, walkable developments accessible to employment, the University (ECSU) and shopping areas. The proposed rezoning is also considered to be consistent with the 2010 Windham Region Land Use Plan; 2014-2024 Capitol Region Plan of Conservation and Development and 2013-2018 Conservation and Development Policies Plan for Connecticut.
2. The subject site is proximate to existing multi-family housing and commercial uses and will be served by public sewer and water systems. The proposed rezoning is an expansion of the existing DMR zone and multi-family residential project located on the east side of the subject property.
3. The site is physically capable of supporting multi-family residential development. An associated special permit application suitably addresses potential environmental, traffic and neighborhood impacts associated with a specific development plan.
4. The proposed rezoning is considered to be consistent with approval considerations contained in Articles I and XIII of Mansfield's Zoning Regulations and Section 8-2 of the State Statutes.

MOTION PASSED with all in favor except Fratoni who disqualified herself.

B. SPECIAL PERMIT APPLICATION, MEADOWBROOK GARDENS, 91 & 93 MEADOWBROOK LANE (PZC FILE 1284-3)

Hall MOVED, Chandy seconded, to approve the Special Permit application of Uniglobe Investment LLC (File #1284-3) for a multi-family housing development on property located at 91 and 93 Meadowbrook Lane in an expansion of the DMR zone, as described in application materials and shown on plans dated January 8, 2016 as revised to May 16, 2016 and as heard at a Public Hearing on May 16, 2016.

This approval is granted because the application is considered to be in compliance with Article V, Section B, Article X, Section A.6 and other provisions of the Mansfield Zoning Regulations, and is granted with the following conditions:

1. Extent of Approval. This approval is specifically tied to the applicant's submissions and the conditions cited in this motion. Unless modifications are specifically authorized, the proposed uses and site improvements shall be limited to those authorized by this approval. Any questions regarding authorized uses, required site improvements and conditions cited in this approval shall

be reviewed with the Zoning Agent and Director of Planning and Development, and, as deemed necessary, the PZC.

2. Permits. No Zoning Permits shall be issued and no construction shall commence, until final plans have been approved by the Windham Water Works (water supply), Windham Engineering Department (sewer), Mansfield Water Pollution Control Authority (sewer); Mansfield Public Works Department (encroachment, driveway, drainage permits) and all permits required by the Connecticut Department of Environmental Protection.
3. Dedications. Prior to the issuance of a Zoning Permit, dedication of right of way along Meadowbrook Lane and the conservation easement shall be submitted by the developer, approved by the PZC Chairman with staff assistance and filed on the Land Records. The easement shall utilize the Town's model format.
4. Removal of Material. Any excess material removed from the site shall be deposited in appropriate locations that comply with municipal zoning and inland wetland requirements.
5. Erosion and Sedimentation Controls. Prior to the commencement of any site work and the issuance of any Zoning Permit, a financial guarantee in the amount of $5,000 shall be submitted to and approved by the PZC Chairman with staff assistance. This financial guarantee will help address any drainage and erosion and sedimentation problems that are not appropriately addressed by the developer.
6. Phase 1 Modifications. No Zoning Permits for development of the subject property shall be issued until the following conditions have been met:
    - A solid fence has been installed along the shared boundary of Phase 1 and Eastbrook Heights Condominiums.
    - The Chair and Zoning Agent have approved a revised landscape plan for the frontage of Phase 1 along Meadowbrook Lane. The revised landscape plan shall be consistent with the landscape design for Phase 2 and shall be designed to screen the rear of the buildings facing Meadowbrook Lane at maturity.
    - The Chair and Zoning Agent have approved a revised plan for the central open space in Phase 1 to include the elements described in the April 26, 2016 letter from Michael Yenke of Uniglobe Investment LLC.
7. Affordable Housing. The Affordable Housing Plan dated February 2016 shall be updated to remove references to income levels for affordable units as the applicant does not intend to restrict units on that basis.
8. Bicycle Racks. Final locations of bicycle racks may be adjusted after construction to meet the needs of residents.
9. Excavation. All excavation and trucking activity shall comply with the requirements of Article 10, Section H.5.a.
10. Final Plans. Finals plans shall incorporate the following revisions:
    - Plans shall be signed and sealed by the respective professionals.
    - Revisions to the lighting plan to address lighting in the courtyard and along pedestrian walkways. Footcandle details shall be provided to ensure that adequate pedestrian lighting is provided and that there is no light spill off-site or into the wetlands.
    - Revisions to the landscape plan as may be determined by the Director of Planning and Development through consultation with Rudy Favretti, a landscape architect on the Design

Review Panel that provided detailed recommendations regarding screening and plant selection.

- The dumpster pads and enclosures shall be enlarged to accommodate two dumpsters, one for recycling and one for regular waste. The containers shall be plugged and curbing shall be provided between the enclosures and the wetlands to prevent wastewater from flowing into the wetlands. Sizing of enclosures and pads shall be coordinated with Willimantic Wastepaper.
- The Stormwater Management Plan shall be updated to address the requirements of Article 6, Section B.4.m regarding use of salts and chemicals for ice management.

11. Validity. This permit shall not become valid until the applicant obtains the special permit form from the Planning Office and files it on the Land Records.

MOTION PASSED with all in favor except Fratoni who disqualified herself.

D. AMENDMENTS TO ZONING REGULATIONS RELATED TO STORMWATER MANAGEMENT, WATER SERVICE CONNECTIONS, ALCOHOL, AND LIVE MUSIC; AND AMENDMENTS TO ZONING REGULATIONS AND MAP TO CREATE A WATER PIPELINE OVERLAY DISTRICT (PZC FILE 907-41)

Tabled pending 7/18/16 continued public hearing.

NEW BUSINESS:

A. CANCELLATION OF JULY 5, 2016 MEETING

Rawn MOVED, Aho seconded, to cancel the 7/5/16 IWA and PZC meetings and schedule a Special Meeting of the IWA on 7/18/16. MOTION PASSED UNANIMOUSLY.

REPORTS FROM OFFICERS AND COMMITTEES:

Painter noted her 6/16/16 Director's report calling attention to the Sustainability Award from CROG; Westa noted a recent CROG Regional Planning Meeting and the "Walkability" presentation.

COMMUNICATIONS AND BILLS:

Painter distributed the following communications that were received after publication of the meeting packet and distributed to the members:

- A 6/17/16 email with attachments from Rebecca Shafer, Mansfield Neighborhood Preservation Group.
- A 6/20/16 email from Rebecca Michlin, Assistant Director, American Legion Auxiliary Laurel Girls State.

ADJOURNMENT:

The Chair declared the meeting adjourned at 8:25 p.m.

Respectfully submitted,

Bonnie Ryan, Acting Secretary

ZONING AGENT'S REPORT

MANSFIELD DEPARTMENT OF PLANNING AND DEVELOPMENT

ZONING AGENT REPORT ▪ JUNE 2016

JANELL MULLEN, ZONING AGENT ISSUED ON JULY 18TH, 2016

ZONING PERMITS ISSUED

ADDRESS	DESCRIPTION
507 Stafford Road	Deck
372 Bassett's Bridge Road	Front Porch
149 Browns Road	In-ground pool
734 Storrs Road	Deck
109 Highland Drive	Free-standing deck
10 Charles Lane	Above ground pool

CERTIFICATES OF ZONING COMPLIANCE

ADDRESS	DESCRIPTION
156 Stafford Road	In-ground pool with deck
42 Marybell Drive	Replacement mobile home with decks
Storrs Center-Kathmandu	signs
Storrs Center-Town House Buildings 5, 7, 8	Construction of Town Houses

ENFORCEMENT ACTIVITY DURING THE MONTH OF JUNE

ADDRESS/BUSINESS	DATE OF ENFORCEMENT/TYPE	DEADLINE TO RESPOND/STATUS
15 Agronomy Road	Spring Semester/Over-Occupancy	Property Owner Ted Panagopolous has requested an appeal for Citation #16-1
32 Riverview Road	Over-occupancy/unregistered vehicles	This property has had a car on blocks in the midst of repair for years according to the file. A letter was written in re neighborhood concerns of the coming and goings of the occupants. Police activity has occurred at the property since initial complaint.
30 Old Kent Road	Keeping of animals	This property owner has been cited for the keeping of too many chickens. The chickens have been moved from the property to RAR 90 site in town.
46 Clover Mill Road	Spring Semester/Over-Occupancy	Property Owner Gregory Roy has requested an appeal hearing for Citation #16-4

109 Hunting Lodge Road	Spring Semester/Over-Occupancy	Property Owner Penny Tavar has requested a hearing for Citation #16-10.
195 Hunting Lodge Road	Spring Semester/Over-Occupancy	Property Owner Ted Wrubel has requested an appeal hearing for Citation #16-19. Steve Bacon is conflicted out of the hearing.
205 Hunting Lodge Road	Spring Semester/Over-Occupancy	Property Owner Steve Rogers has requested an appeal hearing for a Citation. Steve Bacon is conflicted out of this hearing.
78 Lynwood	Spring Semester/Over-Occupancy	Property Owner Ryan McDonald has requested an appeal hearing for Citation #16-9 & #16-16.
14 Westwood	Spring Semester/Over-Occupancy	Property Owner Lynn Kuo has requested an appeal for the Citation #16-8. Steve Bacon is conflicted out of this hearing.
98 Depot Road	Keeping of animals	Neighbor complaint in re 3 chickens and horses. The chickens are allowed. The horses are kept in a 25 acre lot across the street so they have ample land as well.

- Attorney Stephen Bacon has volunteered as a Zoning Citations Hearing Officer. Cases will be heard in July-August. The following Zoning Report will indicate the ruling of the over-occupancy cases for 78 Lynwood, 15 Agronomy Road, 46 Clover Mill Road, 109 Hunting Lodge Road. The other cases will need to be heard by a different Citations Hearing Officer.

PUBLIC HEARINGS

O'MALLEY, DENEEN, LEARY, MESSINA & OSWECKI

ATTORNEYS AT LAW

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ANDREW G. MESSINA, JR.
(1940-2000)

July 12, 2016

Linda M. Painter, AICP
Director of Planning and Development
Town of Mansfield
4 South Eagleville Road
Mansfield, Connecticut 06268-2599

Re: Proposed Amendment to Zoning Regulations
Alcohol and Music Regulations
Water Overlay District
Storm Water Regulations

Dear Linda:

I have reviewed the attached proposed regulations. The proposed Water Overlay District and Storm Water Regulations are acceptable as drafted. I have made some minor edits and changes to the attached Alcohol and Music regulations.

Please feel free to contact me with any further questions.

Very truly yours,

Kevin M. Deneen

KMD/llc
Enclosures

**Attorney Deneen's recommended changes are noted in red.

AMENDMENTS TO ARTICLE SEVEN. Section D.7.g.

g. The sale of alcoholic liquor shall be permitted as accessory to the following uses provided the liquor permit type is authorized pursuant to Chapter 101 of the Mansfield Code of Ordinances and the following primary use is permitted in said zone or district:
   - Retail
   - Restaurant
   - Hotel
   - Place of Assembly-Banquet Hall
   - Commercial recreation facility
   - Brewpub/Restaurant, Brewpub, and Brewery
   - Farm Winery

AMENDMENTS TO ARTICLE TEN, Section I.3.

3. Outdoor Music. Outdoor music will be allowed during the following days and times.

	Outdoor Music Permitted
Thursday-Saturday	12:00 pm – 10 pm
Sunday	12 pm – 6 pm

Outdoor music on days or times other than those identified in the above table may be authorized by Special Permit approval.

4. Noise and Nuisance Regulations. All events involving live and/or amplified music shall comply with the noise and nuisance regulations contained in Chapters 134 and 135 of the Code of Ordinances.

5. Violations. In addition to penalties for violation identified in Article Eleven, Section F of these regulations and Chapters 134 and 189 of the Mansfield Code of Ordinances, the Zoning Permit for any live/amplified music use may be revoked by the Zoning Agent if there are two or more noise and/or nuisance violations within a 12 month period. Special Permit approval shall be required for reinstatement of any Live/Amplified Music Permit that has been revoked.

June 20, 2016

To: Mansfield Planning and Zoning Commission

Subject: Comments on proposed Mansfield Zoning Regulations

The proposed zoning regulations will be an important addition to the town's efforts to control stormwater discharges – both from a quantitative and qualitative perspective. They will also provide needed controls over development in areas served by the Connecticut Water Company waterline that has recently been installed in Mansfield.

However, for the regulations to achieve their objectives, we recommend that the following clarifications and improvements are needed:

Stormwater Management Plan (Section 4.b): This section requires the developer to develop a design report to include "an evaluation of existing on site and off site hydrology including estimates of pre-construction and post construction development from 1, 2 , 25, 50 and 100 year, 24 hour storm event." This sentence should be clarified to read as follows: "an evaluation of existing on site and off site hydrology including estimates of pre-construction and post construction development **runoff volumes** from 1, 2 , 25, 50 and 100 year, 24 hour storm event (added text in bold font)."

Part 2: Proposed Stormwater Regulations

Stormwater Management Plan (Section 4.c): This section requires the developer to develop an improvement plan to "provide a zero net increase in runoff from the 10, 25 and 100 year storm events unless the applicant demonstrates this would be a detriment to downstream properties." The commission needs to clarify under what circumstances such exceptions should be made, including the factors that would contravene the "zero net increase standard" for 10, 25 and 100 year storm events. Also it is not clear whether this element of the improvement plan would entail the development of a retention or a detention basin. Will the "zero net increase standard" be based on a retention basin that meters out discharges to storm events of less than a 10 year peak? Without some clarification on the exceptions to this improvement plan, the proposed regulations, if adopted, could leave the commission with little guidance on managing stormwater discharges that fail to achieve the "zero net increase standard." If the commission is concerned about the potential downstream impacts caused by withholding water during peak storm events for the 10, 25 and 100 year storm, it should also be concerned about the potential impacts of NOT discharging stormwater downstream at a sufficient rate to maintain groundwater supplies, stream flows and wetland ecosystems affected by the proposed stormwater management plan.

Stormwater Management Plan (Section 4.c): This section requires the developer to develop an improvement plan to "reduce peak runoff from the 2 year 24 hour post development event to 50 percent of the pre-development conditions for that storm event or to the equivalent of the 1 year 24

hour storm event, unless the commission determines such reduction is impractical." Unlike the previous section, this provision places the decision making for the exceptions in the hands of the commission. We would recommend that the language of both sections should be the same with respect to who decides – or more importantly who collects and analyzes the data that supports the decisions to make exceptions. Once again, without criteria concerning what constitutes an impractical reduction, the commission will be left without standards to support its decision.

Stormwater Management Plan (Section 4.a): This section requires the developer to develop a stormwater management plan that, among other things, requires the development of an operations, maintenance and monitoring program developed by a professional engineer. While this is a laudable objective and is critical to the success of any stormwater management plan, it is equally important that the interests of the town of Mansfield be represented in this process. A professional engineer represents the interests of the developer – not those of the town of Mansfield. An operations and maintenance and monitoring (OMM) program is an integral element of any stormwater management plan since the ability to retain or detain water on site is determined by maintenance and monitoring over the life of the system. The town needs to include provisions in the proposed regulations that ensure these systems are maintained without town expense. Requiring long term escrow accounts, bonds or other financial instruments for the guarantee of work is critical to the success of large scale stormwater systems. These financial instrument must be accessible to town officials when a developer or successor holding companies are in default of their obligations. Moreover, the town should develop specific OMM program criteria that can be referenced as basic minimum standards of performance to be used by professional engineers working in the town of Mansfield.

Part 2: Proposed Brewery Regulations

The draft of the revisions address the economic benefits without giving due consideration to the social and public safety and environmental issues or their tax consequences to the community. The tax contribution of the brew pub needs to be evaluated against the associated economic impacts to the community. One of the requirements of the water diversion permit was that a long range water conservation plan be created. Has such a plan been created? If so, has this proposed zoning amendment been considered as a factor to be addressed in the Water Conservation Plan? Will there be an annual limit placed on the volume of water used in a brewery? Additionally, in a period of low flow or drought conditions would a brewery be required to reduce its consumption consistent with similar edicts to other water consumers? Wil the regulations restrict the sale of bottled products to on site purchases? This would enable a customer to purchase product and leave to consume at home but would restrict wholesale activities of their brewpub product. Restrictions on wholesale activity makes sense in that this is not intended to be a manufacturing activity in a commercial zone which is intended for retail sales and associated social activity.

Is it wise to increase the availability of alcohol beverages in the town of Mansfield? Has the Planning and Zoning Commission sought guidance from UCONN Health Services, UCONN counseling services, Windham Hospital, the State Police and the Region 19 School District? What metrics have been used to evaluate the costs versus the benefits of this proposal? If the regulations are adopted as proposed, what mechanism would exist to avoid a string of bars in the zones designated for breweries or brewpubs? With new development anticipated at Four Corners, would it benefit the atmosphere of this

neighborhood to have a surfeit of bars given this area given this is the gateway to the town of Mansfield. What atmosphere and what type of traffic do we want to promote in the Four Corners neighborhood?

A key issue is the potential for a brewery across from E.O. Smith High School where underage students might be attracted to drink and/or to be exposed to inebriated persons on or near their own high school campus. A nearby brewery may also increase vandalism at the high school from inebriated customers. Moreover, a location near the school would change the social and educational atmosphere. For this reason, would the elimination of distance requirements that separate breweries from public schools be a good idea? We certainly believe the Region 19 School District should be asked directly to comment on the proposed regulations so that these issues can be shared with the parents of the students attending from Mansfield, Willington, and Ashford.

Is it advantageous to have a brewery on King Hill Road given its proximity to the underage "on campus" student population and its proximity to the large off campus population on Hunting Lodge Road and North Eagleville Road? These areas have a history of alcohol abuse issues including traffic accidents and related social problems associated with high alcohol consumption by students. The negative effects on year round residents as well as the students themselves from this behavior is measurable.

Part 3A: Proposed Water Pipeline Overlay Zone Regulations

With one caveat, the proposed water pipeline overlay zone appears to provide controls over increased density of development that might otherwise occur by the availability of water service. Our chief concern is that the proposed regulations address the potential for higher density development to occur on a portion of the property while preserving the remainder of the property as open space provided that overall density of development is no greater than could be achieved in the underlying zone (see Section 4e. Development requirements). The proposed regulations would be acceptable if the commission based its determination of the underlying zone's density on a requirement – not an option – for the developer to prepare a density analysis that fully identifies and discounts land that is identified as wetlands, water courses, steep slopes (i.e., 15% or more), unstable soils conditions and land needed for access. **We also recommend that land subject to the 100 year flood also be discounted from these calculations.** The density allowed must be based on developable land – not the total acreage of any given parcel of land. Without a requirement that undevelopable land be discounted in the density calculations, the proposed regulations will actually increase the densities of developments built in the water pipeline overlay zone.

Should the existing water pipeline along Bone Mill Road north and south from the Pink Ravine reservoir to the Mansfield Deport campus and to North Eagleville Road and from there east to the UCONN campus be subject to the proposed overlay zone? The Furthermore, is there an existing water main from the Willimantic River Wells that runs along Birch Road that should be subject to the proposed overlay zone regulations?

Part 3B: Need for Overlay Zone Regulations for Critical Water Resource Areas

We believe that an overlay zone concept should be developed that would apply to critical water resource lands owned by the state. Since zoning addresses long range land development issues and not current ownership, it is important for the Planning and Zoning Commission to establish zoning protections for the Pink Ravine Reservoir watershed area since it possesses incalculable water quality and quantity benefits for the town. While an overlay zone may not be the complete solution, it would underscore the importance of protecting this precious watershed land from further development and could be used as a complement to other land conservation strategies for this state owned property. The land that we believe merits an overlay zone is the UCONN forest land west of Bone Mill Road up top Northwood Apartment and from North Eagleville Road to Shelter Falls Park. This parcel comprises 150 acres that was taken over by eminent domain in 1918 by the State of Connecticut from the Costello family farm and the Mansfield Fish and Game Club for the purpose of creating a drinking water reservoir for UCONN and the Mansfield State Training School. As such, its long term value to the town of Mansfield is critical from an ecological, water conservation and aquifer protection perspective. This unique parcel of land is in the watershed of the Cedar Swamp Brook which is currently being monitored by the state for water quality issues. At no point should the watershed of this brook be subjected to development at a density more than would be achieved by the calculation procedure we recommend herein for the overlay zones. Please see bullet eleven regarding formerly used drinking water reservoirs in the attached letter from the Council on Environmental Quality dated May 31, 2016 to CT DEEP concerning the state's "Open Space Acquisition Strategy."

While some may argue that local zoning can't control state owned land, it is important to remember that zoning's purpose is to establish long term controls over the use of land regardless of the status of current land ownership. We cite several examples of land sales or transfers that illustrate why zoning applied to state land is appropriate. For example, UCONN sold land to a private developer to create the Storrs downtown development. Similarly, there is now under consideration the sale of the E.O. Smith High School for state purchase or potentially for a private use. Likewise, the state owned land at the Mansfield Deport property could potentially become regionally owned property.

In summary, we would urge the Planning and Zoning Commission to consider the need to strengthen the proposed zoning overlay zone to minimize any inadvertent increase in the development potential within that zone and to consider the adverse consequences that may ensue by not addressing the development potential created by pre-existing water pipelines within Mansfield. We also encourage the Commission to consider using an overlay concept as a tool to help protect other significant water resources within the town that could be threatened by development.

Respectfully submitted,

Alison Hilding

Gmail

Alison Hilding <aahilding@gmail.com>

Today's Zoning Focus Group Meeting

1 message

Alison Hilding <aahilding@gmail.com> Mon, Mar 7, 2016 at 7:33 AM
To: Jennifer Kaufman <KaufmanJS@mansfieldct.org>
Bcc: Charles Vidich <cvidich@gmail.com>, etwno1 <etwno1@sbcglobal.net>

Dear Jennifer,

I regret that I will not be able to attend this morning's meeting. I fell and have a concussion. I am very limited in what I can do while I am recovering from this injury. .

Regarding the material that will be discussed today concerning storm water regulations I submit my initial comments below and I ask that you please share them with the group this morning:

The proposed regulations need a better set of definitions including defining the word 1) disturbance, 2) retention basins, 3) detention basins, 4) sheet flow, 5) etc. In addition, there are a number of sections that are too vague (e.g., "incorporate vegetative measures where appropriate - what does that mean and when would it apply?) or appear inconsistent (e.g., why is the 1 year storm mentioned under Section 4b but omitted under section 4c?). Section 4d is not clearly written and should be totally revised so that its purpose and intent is understood. What does that section attempt to do? Under Section 5 (small scale projects), the ideas are listed as a potpourri of approaches with no clear understanding of which will be accepted and under what conditions. If this section is a requirement as a matter of right under a zoning permit process, it will require much more clarity for businessmen interested in knowing what is expected of their projects.

In summary, while the regulations for projects that require a site plan or subdivision plan are relatively straight forward, those for the zoning permit process are not acceptable from a common sense perspective. There are too many choices for a developer of a small scale project who normally would only require a zoning permit. This process transforms the zoning permit into a complex process with a high degree of dependency on the town's professional staff to complete the process. This would be unacceptable to the business community. To pass the "straight face" test, this section needs to identify the expected approaches for every project and not overwhelm applicants with a grab bag of choices.

The proposed regulations must also address potential conflicts between the DEEP stormwater regulations and the DOT Drainage Manual and these proposed zoning regulations. It is inevitable that conflicts will emerge and the regulations need to indicate what where conflicts exist, these regulations supersede those of DEEP and DOT with respect to stormwater management plans. If that is not the approach the town wishes to take, then it needs to clarify what portions of the DEEP stormwater regulations and DOT Drainage manual are relevant.

It is my intention to review the proposed regulations further and submit additional comments. I would very much appreciate it if you would please make available to me the audio recording of today's meeting.

Thank you for this opportunity to comment.

Please confirm that you have received this communication.

With appreciation,

Alison Hilding

Gmail

Alison Hilding <aahilding@gmail.com>

storm water regs

1 message

Alison Hilding <aahilding@gmail.com> Wed, Mar 16, 2016 at 8:29 AM
To: Jennifer Kaufman <KaufmanJS@mansfieldct.org>
Bcc: Charles Vidich <cvidich@gmail.com>

Jennifer,

I am planning to come this morning but just in case my driver does not show up I would like the following comments included in the record in response to the staff's remarks that were made at the last meeting regarding my 3/7/16 email on the storm water regs, and more specifically the proposed concept of "a menu of choices" without specificity in performance standards with regard to the geography in which these take place, ie steep slopes, flat land, rocky soil, high water table, or shallow to bedrock:

Too many choices may appear good but without specific guidance on what these really mean, the choices are meaningless. Having choice is good but having choices that are undefined is not good. What are the precise meanings of each stromwater choice? How should each choice be applied and under what circumstances? Where on the property should each choice be applied and under what circumstances? Without specificity, these choices assume an understanding about the principles of stormwater mgt that does not exist within the general public or construction worker. To make this section work, the town planner needs to provide more details of when and where these choices make sense. For example, sheet flow of stormwater is a great idea to avoid erosion but will not work on steep slopes. Similarly, detention and retention ponds will be extremely challenging to implement on flat land with a high groundwater table.

Perhaps a storm water booklet that gives guidance on how to implement these options would be beneficial if they are all personal selections as of right under the zoning permit process. Guidance in matters such as what percent of the disturbed property needs to adhere to these options, can they have, for example, five different options, and under what conditions specific options can be employed should be clarified. Furthermore, are there scenarios where one or more options would not work on a site? For example are there certain soil conditions, slopes, surface bedrock where some of these options would not be appropriate. Likewise, how much of the disturbed area would require a storm water solution? Similarly a detention basin might be an appropriate action in an area of relatively flat land and a high ground water table. If the options are a matter of right, how do we know that implementation of the selected option will be effective?

Thank you.

Alison

From the Klotz

dug well (the University's existing Well A) adjacent to the Fenton River, a pumping station, a 10-inch water line from the Fenton River to two water tanks on campus. Well A is a cassion type well. Other sources show that Well A was dug in 1926.

WILLIMANTIC WELLFIELD

The earliest UConn water system records date back to the early part of the century. About 1920, the Town of Mansfield built a water treatment plant on Cedar Swamp Brook (commonly known as the Pink Ravine) consisting of a rapid sand filter and treatment plant. It furnished water for the Connecticut College of Agriculture (precursor to the University of Connecticut) and the Mansfield Training School. The plant was in operation from 1921 to 1927 and reportedly delivered about 100,000 gallons of water a day to each of these agencies. On the map is a water main from MTS to the Agricultural College, labeled Old 6" Main, which connected the pumping station known as the Pink Ravine, discussed above, to the campus and the training school. Utilities personnel state that this main is still in operation on portions of the campus.

Shown on the 1929 drawing ~~is the first~~ Mansfield Training School well, Well #1 and a pump house. This well was taken out of service in 1961.

1940 - 1950

FENTON WELLFIELD

Two new gravel packed wells were drilled in the Fenton Wellfield in 1949, Wells B and C. The 3 Fenton wells were the source of water for the campus. A clear water basin, consisting of two 25,000 sections was also installed in 1949.

WILLIMANTIC WELLFIELD

MTS Well #2, referenced in 1998-1999 as UConn Well #4, was drilled in 1948.

[Senate Bill No. 613.]

CHAPTER 281.

An Act making Provision for a Water Supply for the Connecticut Agricultural College and the Mansfield State Training School and Hospital.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Appropriation for water supply at Mansfield State Training School and Hospital.

SECTION 1. The sum of one hundred thirty thousand dollars, or so much thereof as may be necessary to carry out the purposes of this act, is appropriated for the purpose of acquiring land or water, if either shall be necessary or advantageous to the state, building a dam or dams, laying water mains and pipes and furnishing such equipment as shall be found necessary for a sufficient water supply for the Mansfield State Training School and Hospital and the Connecticut Agricultural College, provided the Mansfield State Training School and Hospital shall first be connected with such water supply.

Power to take lands and streams.

SEC. 2. Water necessary for the purpose of carrying out the provisions of section one of this act shall be taken in the manner provided for taking water under the provisions of sections 2542 and 2543 of the general statutes, and any land necessary may be taken under the provisions of the general statutes for taking land by condemnation proceedings for any public purpose as the committee hereinafter designated may select. Any land or water or both, necessary to be taken, or work necessary to be done by authority of the provisions hereof, shall be under the direction of a committee to be appointed by the governor and shall consist of one member of the board of trustees of each of said institutions, and if such members shall be unable to agree with respect to such work, the governor shall appoint a third member of said commission and upon appointment of such third member a majority of said commission shall be sufficient to make decision thereon.

SEC. 3. This act shall take effect from its passage.

Approved, May 21, 1919.

[House Bill No. 745.]

CHAPTER 282.

An Act concerning the Governor's Foot Guard.

Be it enacted by the Senate and House of Representatives in General Assembly convened:

Adjutant-general authorized to purchase clothing and equipment.

SECTION 1. The adjutant-general is authorized to purchase and issue to the first and second companies, governor's foot guard, necessary clothing and equipment called for in

STATE OF CONNECTICUT

COUNCIL ON ENVIRONMENTAL QUALITY

Susan D. Merrow
Chair

Janet P. Brooks

Alicea Charamut

Lee E. Dunbar

Karyl Lee Hall

Alison Hilding

Kip Kolesinskas

Matthew Reiser

Karl J. Wagener
Executive Director

May 31, 2016

Jamie Sydoriak
Land Acquisition and Management Unit
Department of Energy and Environmental Protection
79 Elm Street
Hartford, CT 06106-5127

RE: Comprehensive Open Space Acquisition Strategy

Dear Ms. Sydoriak:

The Council on Environmental Quality offers the following comments on the proposed revision of the Comprehensive Open Space Acquisition Strategy.

You have advanced the quality and potential usefulness of the Plan by a great margin. One of the ways you have achieved this is by focusing on desired actions and outcomes within the five-year period covered by the Plan.

Because this is the state's official land conservation strategy, accuracy is important. Regrettably, the reader gets no further than the second paragraph of the Executive Summary before encountering the biggest inaccuracy. As you know, the estimate of land protected by DEEP and its partners is almost certainly far off the mark. There is no valid or productive reason for the Department to cling to figures that are known to be wrong. It would be better to state that neither the Department not anyone else knows how much land has been preserved and to state the reasons that this figure is unknown.

The Council offers several important and challenging topics for additional attention in the strategy:

- It becomes more apparent every day that state funds for acquisition will be inadequate, and municipal budgets are likely to be strained as well. There will be a need to adopt additional tactics to preserve land. For example, enhanced planning at the municipal level, for which the state could offer education and incentives, could lead to more preservation. Greater use of easements in lieu of fee acquisition would seem to be necessary.

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- The strategy should recognize the need for *wholly new* tactics. Just one element would be a program to help conservation-oriented landowners, especially those who are getting older and want to see their land preserved. Some such owners would take advantage of a program that might not net them much money but would not cost them. Currently, it often costs the landowner money to donate land.

- Section II, *Land Protection Challenges in Connecticut*, identifies important demographic facts pertaining to land ownership, but does not sound the alarm loudly enough. In addition to the cited 2015 study regarding forest ownership, a new report published by the American Farmland Trust confirms (as the draft strategy suggests) that Connecticut farmland owners also are aging and contemplating succession, most with no young farmer ready to take over. Combined with the forest owner demographics, these data paint a picture of a rapidly-changing pattern of land ownership and, probably, fragmentation of the landscape unless the state is prepared to respond. As of now, the state is not prepared.

- The strategy should be more specific as to how open space preservation will interact with and be coordinated with farmland preservation.

- The emphasis throughout the report on water quality and the effects of stormwater pollution is excellent. The report could probably even emphasize the connection more strongly by pointing out that drinking water watershed lands that are *not* preserved are likely to be developed and contribute pollution to our water supplies.

- The Plan ties itself well to the priorities of the Wildlife Action Plan. If you need more data to illustrate the connection between wildlife and forest protection, you can find new indicators of forest-bird populations in the Council's latest report, *Environmental Quality in Connecticut* for 2015. Several ornithologists assisted the Council in developing these indicators. Unfortunately, the trends are discouraging.

- As the Plan notes, it is required by statute to include "strategies for preserving in perpetuity state lands of high conservation value." In truth, the Plan says little more than the Department hopes to do something along these lines. Evidently the Department is well behind on this required task, as well as the task of developing a process by which other agencies will identify such lands. You might consider stating more clearly the status of these efforts.

- The strategy should be used to guide the entire Department. There is a large role in land development played by DEEP that should be discussed: solar farms, built in response to DEEP energy policies, have been responsible for the conversion of hundreds of acres of farmland and forest, including core

forest. DEEP's energy policies likely will lead to more such conversions. At a time when the Department is handicapped in its ability to preserve forest land, it should not be encouraging the loss of those lands to industrial development. Perhaps the strategy should begin with a "First, do no harm" provision.

- The emphasis on working with partners to maximize preservation is well-placed. You should note the importance of grants administered by the Natural Resources Conservation Service as well as other USDA programs; the total for those programs actually exceeds the recent total for the "traditional" fish, wildlife and forestry grants. The Natural Resources Conservation Service's Healthy Forest Reserve Program, for example, is providing 3.5 million dollars in grants to be awarded this year through the Long Island Sound Watershed Regional Conservation Partnership Program. Also, if you are optimistic, you could note the proposed creation of the Great Thicket National Wildlife Refuge, which could lead to several thousand acres of land conservation in the state; adequate funding of the other two federal refuges also would benefit the state.

- The references to coordinating public access with brownfield redevelopment are excellent, and could go further. As the strategy says, land will be needed for many public purposes. Some lands that now are brownfields could be converted to important wildlife habitat and places where green infrastructure retains and renovates polluted stormwater.

- Connecticut has a limited number of reservoirs that previously were used as drinking water sources. They have a number of characteristics – high water quality, valuable habitat, the possibility of future need for their water, and their status as features of the landscape that probably never can be re-created – that warrant special attention when making plans for statewide land conservation and acquisition. It would seem to be a doable task to develop an inventory of these sites and assess their conservation values.

- DEEP requires grant-funded properties to allow for public access, a good policy in most instances. However, there are properties that should be preserved but are not suitable for public access. The Council recommends adding consideration of a flexible approach to be exercised by the Commissioner so that important opportunities are not lost to a too-rigid policy.

- The Council also recommends that you ask the Recreation and Natural Heritage, Open Space and Watershed Land Acquisition Review Board to evaluate, on an ongoing basis, the current cost-sharing formula for open space grants, and also the rules regarding eligibility for the urban green and community garden grants. The purpose of the evaluation would be to ensure that important projects are not being lost because of an inability to fund the local match.

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- The strategy's recognition of climate change and rising sea level also is excellent. How will municipalities and nonprofit organizations know what lands need to be protected? Should DEEP (or other organization) provide model criteria for planning purposes?

- As you note, stewardship and management are very important, and both are in short supply. The strategy should note that successful stewardship and management of preserved land is essential for conservation and public enjoyment. Inadequate stewardship and management could greatly hinder future preservation efforts by undermining public support. We encourage you to include in this strategy any and all measures which you think are realistic for improving stewardship and management.

- Land-cover data from UConn's Center for Land Use Education and Research are now available through 2015 (in draft form, at least).

This strategy, even in draft form, is far superior to the three previous versions. You are to be commended for taking a thorough and studied approach to revising a Plan that should be an important factor in Connecticut's future landscape and quality of life. The Council is following this strategy and its potential effects on Connecticut's landscape with great interest.

Thank you for your consideration of these comments.

Sincerely,

Susan Merrow

Susan Merrow
Chair

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Gmail

Alison Hilding <aahilding@gmail.com>

Cedar Swamp Brook and Eagleville Brook, Mansfield

12 messages

Alison Hilding <aahilding@gmail.com> Fri, Apr 22, 2016 at 6:54 AM
To: "Thomas, Eric" <eric.thomas@ct.gov>

Dear Eric,

Good morning. Could you please tell me what the current status is of the Eagleville Brook? If it was removed from the Impaired Waterways list, at what date did this officially occur? I have looked on the CLEAR and TDML websites but I am not finding the specific current designation.

Likewise, what is the current status of the Cedar Swamp Brook? A year or so ago I believed you mentioned that it had some bacteria issues, perhaps slightly elevated E. coli, if I remember correctly. Is that still the case? Do you have recent and historical water quality tests available on the Cedar Swamp Brook?

Thank you.

Alison

Thomas, Eric <Eric.Thomas@ct.gov> Fri, Apr 22, 2016 at 11:20 AM
To: Alison Hilding <aahilding@gmail.com>

Hello Alison,

Eagleville Brook continues to be included in our Department's Water Ambient Monitoring program. The biennial Integrated Water Quality Report to Congress, developed statewide for all surface waters (streams, lakes, estuaries), was last completed in 2014 and is under a current assessment process for a late 2016 report. You can access our Department's webpage here, at http://www.ct.gov/deep/cwp/view.asp?a=2719&q=325610&deepNav_GID=1654 , for access to the full reports for the last ten years (5 assessment cycles).

The statewide assessment report, which several cycles ago combined the formerly known "305(b)" assessment listings and the "303(d)" impairment sub-category listings into a single, integrated report, lists the two assessed segments of Eagleville Brook. These include the so called "_01" segment is from the mouth of Eagleville Lake up to the confluence with King Brook, and "_02" segment is from this King Brook confluence up to the core UConn Storrs campus (@ North Hillside Road). There is an additional, uppermost brook section, upstream of the walkway to the Towers dorm complex and upstream to the large commuter parking lot and school band practice area, that has not been an officially assessed segment.

- The lower Eagleville Brook _01 segment was assessed as Not Supporting for the designated use of Aquatic Life and assessed as impaired, starting in the 2004 assessment cycle. Recent water quality monitoring by DEEP resulted in an assessment determination for the 2012 report that this Aquatic Life use was in Full Support of the CT Water Quality Standards, and the review process led to what we call a delisting from the impaired waters list. That delisting occurred in the 2012 assessment report, dated 12/17/2012.

- The upper Eagleville Brook _02 segment has been assessed as Impaired for the designated use of Aquatic Life for several assessment cycles. Our Department has continued to include this segment in our water quality monitoring work. The 2014 assessment report listed this segment as Not Supporting the designated use of Aquatic Life. This upper Eagleville Brook_02 segment is also listed as Not Supporting the designed use of Recreation, due to excess E. coli fecal indicator bacteria. This segment is included in the 2012 CT Statewide Bacteria TMDL, online here, at xxx.

- As you know, the Department continues to investment technical and financial involvement in the Eagleville Brook Impervious Cover TMDL implementation efforts with both UCONN and with the Town of Mansfield. In fact, just yesterday UCONN Extension/CLEAR program staff presented a case study talk on the UCONN long term institutional commitment to green stormwater infrastructure for 100+ people at a CT-hosted nonpoint source conference here in Hartford. That talk was followed by an afternoon group tour of 24 New England-wide nonpoint source managers through a number of Low Impact Development practices on the UCONN core campus area – it was very well received. Currently, I am managing a Section 319 NPS grant-funded project that includes installation of a number of interpretive signs at 12+ practices across the UCONN Storrs campus. I will also be managing a Section 319 NPS-funded project agreement with UCONN to retrofit the UCONN Field House parking lot with pre-cast pervious concrete parking stalls – probably later this summer or fall. We are also partially funding the installation of a vegetated green roof on the new Engineering and Science building currently under construction. We are also partially funding the UCONN-managed Storrs Friends Meeting stormwater retrofit project, slated for spring construction.

With respect to Cedar Swamp Brook, we have developed an lower "_01" assessed segment, an "_02" assessed segment, and an "_03" assessed segment.

- The lower segment was assessed as Full Support for the designated use of Recreation in the 2012 and in the 2014 assessment cycle reports.

- The middle segment was assessed as Full Support for the designated use of Aquatic Life in the 2014 assessment cycle report.

- The upper segment was assessed as Not Supporting for the designated use of Recreation in the 2012 assessment cycle and included in the impaired waters list. That assessment was unchanged for the 2014 assessment cycle report. You are correct - the listed cause for this impairment is excess *E. coli* fecal indicator bacteria. This segment was also incorporated into the 2012 Statewide Bacteria TMDL document. The full document is available online and the appendix specific to the Willimantic River segments of Eagleville Brook and of Cedar Swamp Brook is available here, at http://www.ct.gov/deep/lib/deep/water/tmdl/statewidebacteria/willimanticriver3100.pdf. The upper

segment will be assessed for Aquatic Life (for the first time, I believe) in the forthcoming 2016 assessment cycle.

Assessment information is publicly available through the national EPA ATTAINS database web site here, at https://www.epa.gov/waterdata/assessment-and-total-maximum-daily-load-tracking-and-implementation-system-attains.

- Here is the ATTAINS database query return for Eagleville Brook.
- Here is the ATTAINS database query return for Cedar Swamp Brook.

I hope this is helpful for your query. Have a good spring weekend!

Eric

Eric Thomas

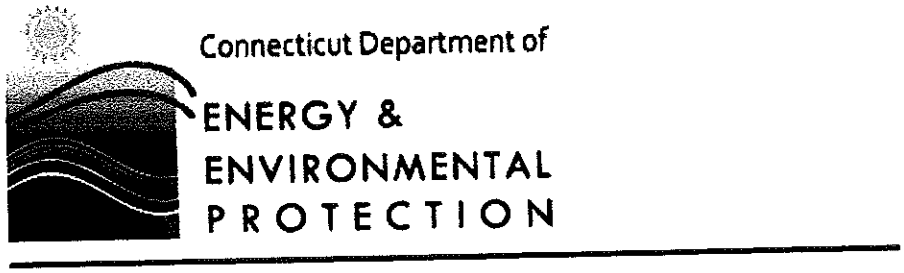
Watershed Manager

Watershed/Nonpoint Source Management Program

Planning and Standards Division

Bureau of Water Protection and Land Reuse

Connecticut Department of Energy and Environmental Protection
79 Elm Street, Hartford, CT 06106-5127
P: 860.424-3548 / E: Eric.Thomas@ct.gov



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Willimantic River Watershed Summary

Willimantic River, Eagleville Brook, and Cedar Swamp Brook

Watershed Description and Maps

The Willimantic River watershed covers an area of approximately 32,774 acres in northeastern Connecticut (Figure 1). There are multiple municipalities located at least partially in the watershed, including Ellington, Willington, Tolland, Coventry, Windham, Stafford, and Mansfield, CT.

The Willimantic River watershed includes three segments, Willimantic River (CT3100-00_06), Eagleville Brook (CT3100-19_02), and Cedar Swamp Brook (CT3100-08_01), impaired for recreation due to elevated bacteria levels. These segments were assessed by Connecticut Department of Energy and Environmental Protection (CT DEEP) and included in the CT 2010 303(d) list of impaired waterbodies. An excerpt of the Integrated Water Quality Report is included in Table 1 to show the status of some of the other waterbodies in the watershed (CT DEEP, 2010).

Impaired Segment Facts

Impaired Segments, Lengths (miles), and Water Quality Classifications:

1. Willimantic River (CT3100-00_06); 0.4; B
2. Eagleville Brook (CT3100-19_02); 1.67; A
3. Cedar Swamp Brook (CT3100-17_03); 0.61; A

Towns: Stafford and Mansfield

Designated Use Impairments: Recreation

Sub-regional Basin Name and Code: Willimantic River, 3100

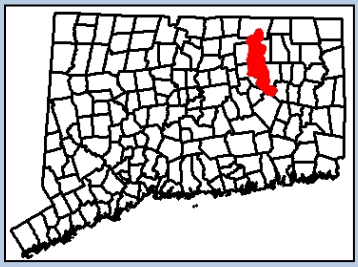
Regional Basin: Willimantic River

Major Basin: Thames

Watershed Area (acres): 32,774

MS4 Applicable? No

Figure 1: Watershed location in Connecticut



The Willimantic River (CT3100-00_06) begins in Stafford adjacent to Route 32 at the confluence of the Middle River and Furnace Brook, flows south and parallel to Route 32, and ends just upstream of the Stafford Publicly Owned Treatment Works (POTW). The impaired segment of the Willimantic River is 0.4 miles long and is located entirely within the Town of Stafford (Figure 2). Eagleville Brook (CT3100-19_02) begins on the University of Connecticut's Campus in Mansfield, flows southeast, and ends at the confluence with King's Brook just east of North Eagleville Road. This impaired segment is 1.67 miles long and is located entirely within the Town of Mansfield (Figure 3). Cedar Swamp Brook (CT3100-17_03) begins at the outlet to Swamp Brook Pond just north of US Route 44 in Mansfield, flows southwest through residential neighborhoods, and ends just upstream of the Hunting Lodge Road crossing in Mansfield. This impaired segment is 0.61 miles long and is located entirely within the Town of Mansfield (Figure 3).

The impaired segment of the Willimantic River (CT3100-00_06) has a water quality classification of B. Its designated uses include habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. The impaired segments of Eagleville Brook (CT3100-19_02) and Cedar Swamp Brook (CT3100-17_03) have a water quality classification of A. Designated uses include potential drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, and industrial and agricultural water supply. These segments are impaired due to elevated bacteria concentrations, affecting the designated use of recreation. As there are no designated beaches in these

impaired segments of the Willimantic River, Eagleville Brook, or Cedar Swamp Brook, the specific recreation impairment is for non-designated swimming and other water contact related activities.

Table 1: Impaired segments and nearby waterbodies from the Connecticut 2010 Integrated Water Quality Report

Waterbody ID	Waterbody Name	Location	Miles	Aquatic Life	Recreation	Fish Consumption
CT3100-00_06	Willimantic River-06	From Stafford POTW (east of Route 32 (River Road)), US to headwaters at confluence of Middle River and Furnace Brook.	0.40	FULL	NOT	FULL
CT3100-19_02	Eagleville Brook-02	From confluence with Kings (Roberts) Brook (east side of North Eagleville Road), US to headwaters near UConn campus (just crossing Stadium Road), Mansfield.	1.67	NOT	NOT	FULL
CT3100-17_03	Cedar Swamp Brook (Mansfield)-03	From Hunting Lodge Road crossing, US to Swamp Brook Pond outlet dam (just US of Route 44 crossing), Mansfield.	0.61	U	NOT	FULL

Shaded cells indicate impaired segment addressed in this TMDL

FULL = Designated Use Fully Supported

NOT = Designated Use Not Supported

U = Unassessed

Figure 2: GIS map featuring general information of the Willimantic River watershed at the sub-regional level – Showing the Willimantic River impaired segment

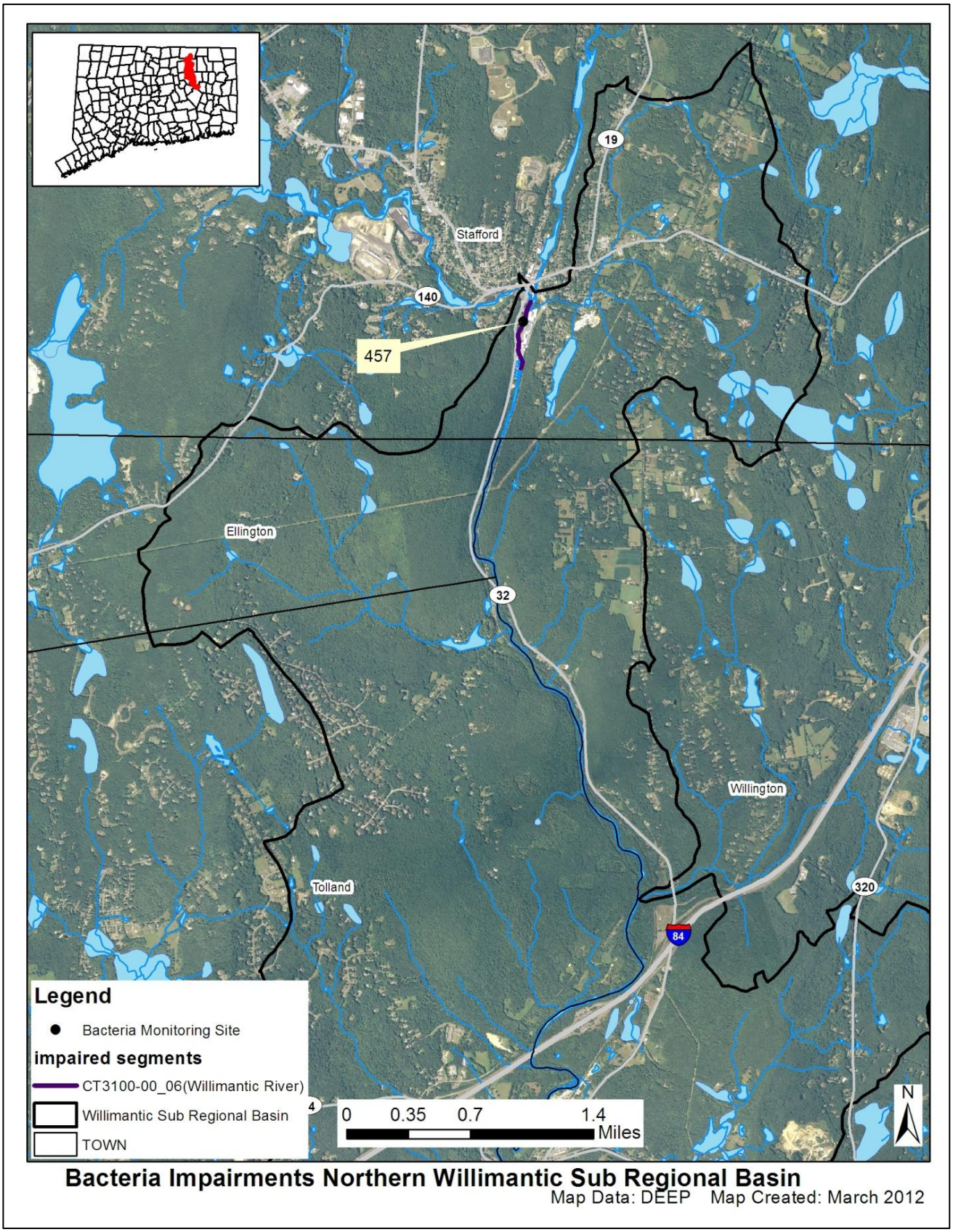
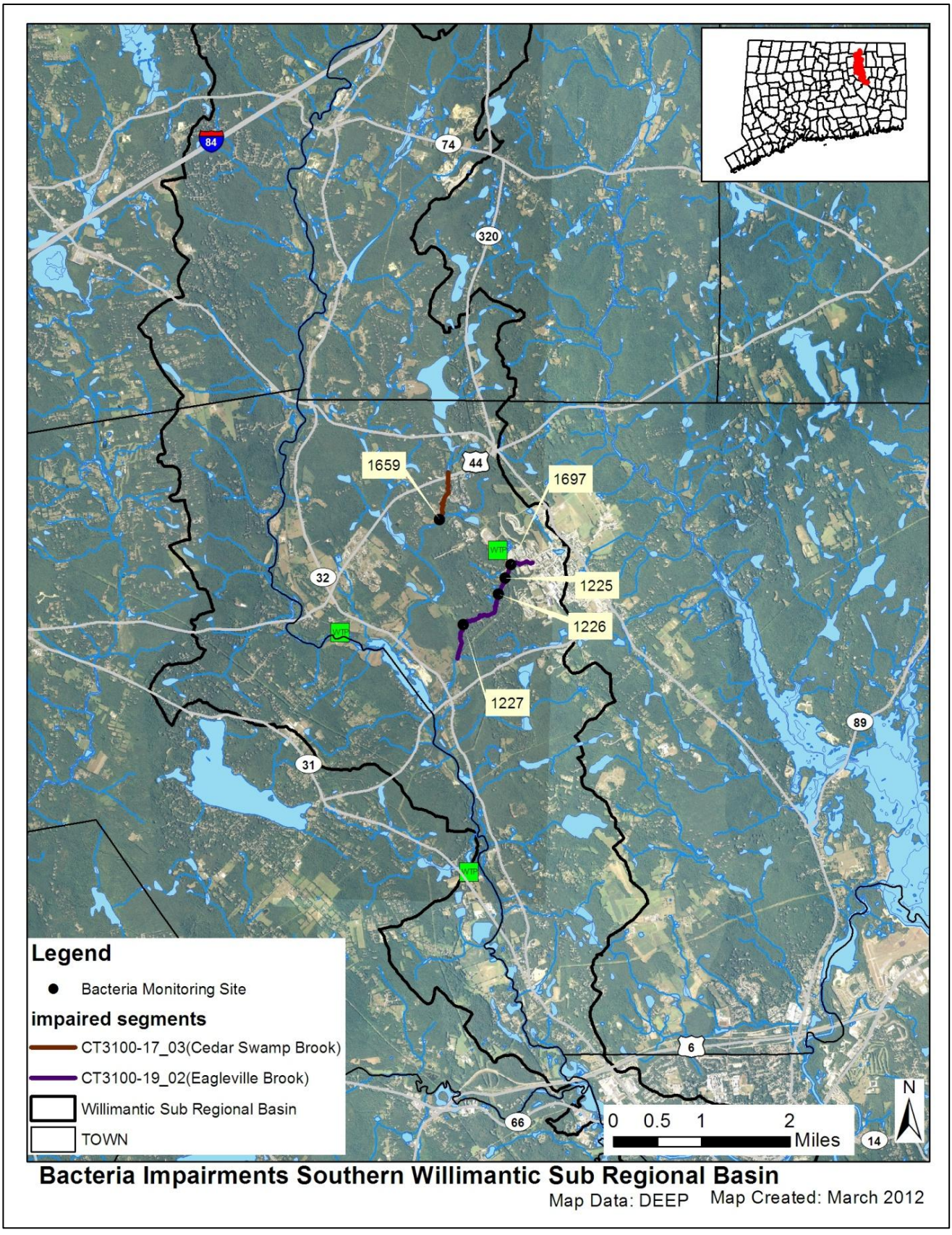


Figure 3: GIS map featuring general information of the Willimantic River watershed at the sub-regional level – Showing Eagleville Brook and Cedar Swamp Brook impaired segments



Land Use

Existing land use can affect the water quality of waterbodies within a watershed (USEPA, 2011c). Natural processes, such as soil infiltration of stormwater and plant uptake of water and nutrients, can occur in undeveloped portions of the watershed. As impervious surfaces (such as rooftops, roads, and sidewalks) increase within the watershed landscape from commercial, residential, and industrial development, the amount of stormwater runoff to waterbodies also increases. These waterbodies are negatively affected as increased pollutants from failing and insufficient septic systems, oil and grease from automobiles, and sediment from construction activities become entrained in this runoff. Agricultural land use activities, such as fertilizer application and manure from livestock, can also increase pollutants in nearby waterbodies (USEPA, 2011c).

As shown in Figures 4, 5, and 6, the Willimantic River watershed consists of 63% forest, 24% urban area, 5% water, and 8% agriculture. All three of the impaired segments are surrounded by urban-dominated landscapes, particularly the Willimantic River (CT3100-00_06) in Stafford (Figures 5 and 6). Eagleville Brook and Cedar Swamp Brook are characterized by a mix of urban and forested land use in Mansfield. There are also several agricultural operations identified near the downstream terminus of Eagleville Brook in Mansfield off North Eagleville Road.

Figure 4: Land use within the Willimantic River watershed

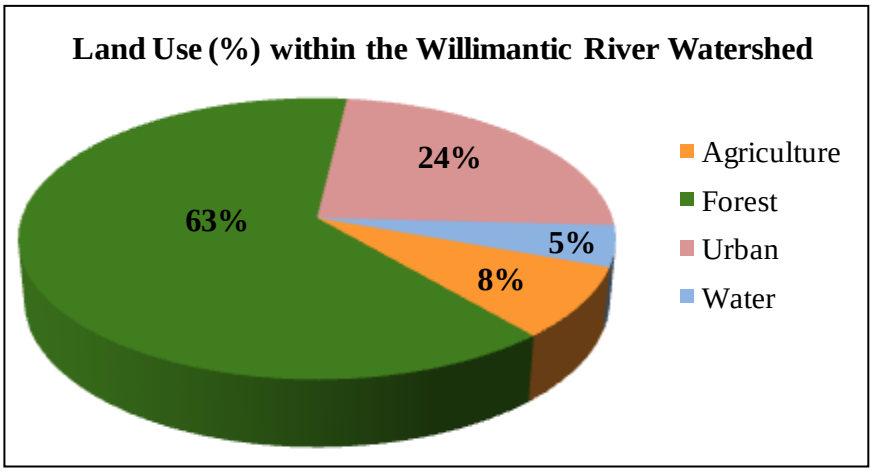


Figure 5: GIS map featuring land use for the Willimantic River watershed at the sub-regional level showing the Willimantic River impaired segment

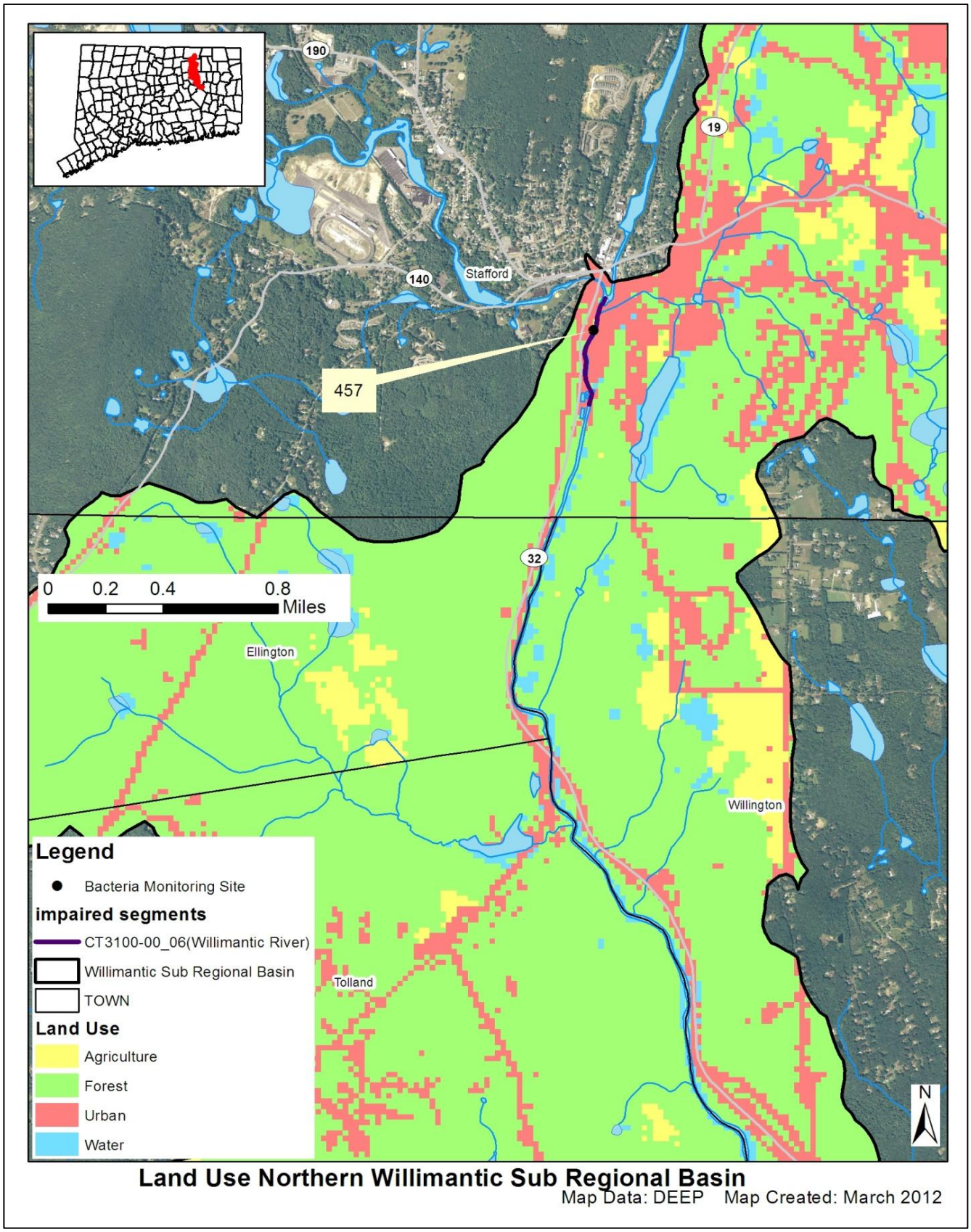
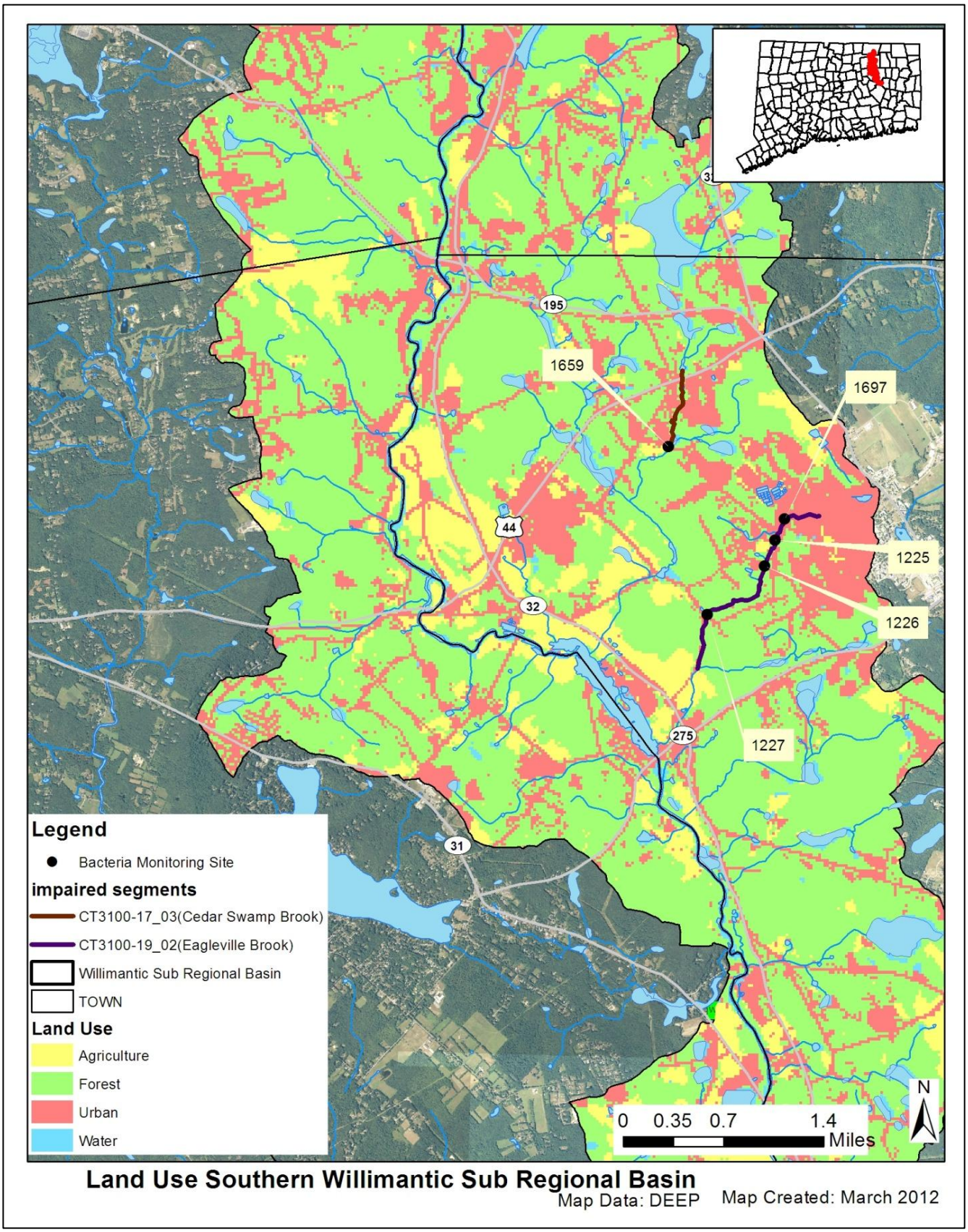


Figure 6: GIS map featuring land use for the Willimantic River watershed at the sub-regional level showing the Eagleville Brook and Cedar Swamp Brook impaired segments



WHY IS A TMDL NEEDED?

E. coli is the indicator bacteria used for comparison with the CT State criteria in the CT Water Quality Standards (WQS) (CTDEEP, 2011). All data results are from CT DEEP, USGS, Bureau of Aquaculture, or volunteer monitoring efforts at stations located on the impaired segments.

Table 2: Sampling station location description for impaired segments in the Willimantic River watershed

Waterbody ID	Waterbody Name	Station	Station Description	Municipality	Latitude	Longitude
CT3100-00_06	Willimantic River	457	Upstream Stafford POTW adjacent to park	Stafford	41.95049	-72.303653
CT3100-19_02	Eagleville Brook	1227	Upstream of Hillyndale Road	Mansfield	41.79908	-72.273817
		1226	Upstream of Separatist Road	Mansfield	41.80401	-72.266044
		1225	#43 Hunting Lodge Road (private driveway)	Mansfield	41.80668	-72.264592
		1697	N Eagleville Road adjacent to F-lot	Mansfield	41.80888	-72.263319
CT3100-17_03	Cedar Swamp Brook	1659	Upstream of Hunting Lodge Road	Mansfield	41.81637	-72.278984

The Willimantic River (CT3100-00_06) is a Class B freshwater river (Figure 7). Its applicable designated uses are habitat for fish and other aquatic life and wildlife, recreation, navigation, and industrial and agricultural water supply. Eagleville Brook (CT3100-19_02) and Cedar Swamp Brook (CT3100-17_03) are Class A freshwater streams (Figure 7). Their applicable designated uses are potential drinking water supplies, habitat for fish and other aquatic life and wildlife, recreation, navigation, and industrial and agricultural water supply. Water quality analyses were conducted using data from one sampling location on the Willimantic River (Station 457), four stations on Eagleville Brook (Stations 1227, 1226, 1225, and 1697), and one station on Cedar Swamp Brook (Station 1659).

Water quality criteria for *E. coli*, along with bacteria sampling results from 2010, for the Willimantic River (CT3100-00_06) are presented in Table 10. Single sample values at Station 457 exceeded the WQS for *E. coli* 18 out of the 23 (78%) samples taken in 2010. The annual geometric mean was calculated for Station 457 and exceeded the WQS for *E. coli* in 2010.

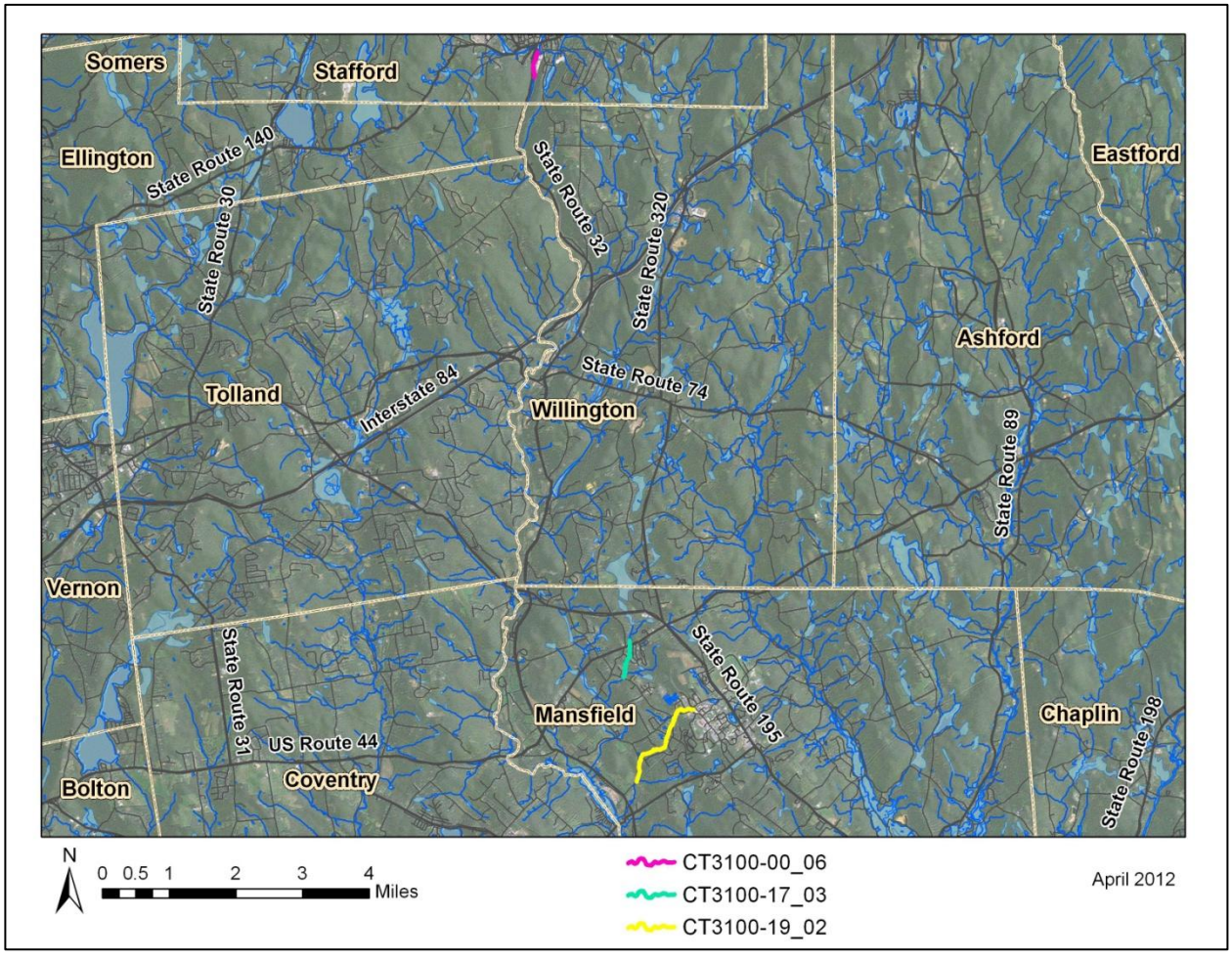
Water quality criteria for *E. coli*, along with bacteria sampling results from 2005 and 2010, for Eagleville Brook are presented in Table 11. Single sample values exceeded the WQS for *E. coli* multiple times at Stations 1227 and 1225 in 2005 and at Station 1697 in 2010. Single sample values exceeded the WQS for *E. coli* at Station 1226 at least once in 2005 and 2010. The annual geometric mean was calculated for all stations and exceeded the WQS for *E. coli* at Stations 1227, 1226, and 1225 in 2005.

Water quality criteria for *E. coli*, along with bacteria sampling results from 2010, for Cedar Swamp Brook are presented in Table 12. Single sample values at Station 1659 exceeded the WQS for *E. coli* multiple times in 2010. The annual geometric mean was calculated for Station 1659 and exceeded the WQS for *E. coli* in 2010.

To aid in identifying possible bacteria sources, the geometric mean was also calculated for each station for wet-weather and dry-weather sampling days (Tables 10, 11, and 12). For the Willimantic River, the geometric mean at Station 457 exceeded the WQS for *E. coli* during both wet and dry-weather, and dry-weather was more than twice the wet-weather value. For Eagleville Brook, geometric means at Stations 1227, 1226, and 1225 exceeded the WQS for *E. coli* during wet-weather, and the geometric mean at Station 1226 also exceeded the WQS for *E. coli* during dry-weather. The geometric mean during wet-weather at Station 1226 was more than 10 times greater than the geometric mean during dry-weather, which may indicate a significant stormwater runoff issue. For Cedar Swamp Brook, the geometric mean at Station 1659 exceeded the WQS for *E. coli* during wet-weather, and wet-weather was nearly three times greater than the geometric mean during dry-weather.

Due to the elevated bacteria measurements presented in Tables 10, 11, and 12, the impaired segments of the Willimantic River, Eagleville Brook, and Cedar Swamp Brook did not meet CT's bacteria WQS, were identified as impaired, and were placed on the CT List of Waterbodies Not Meeting Water Quality Standards, also known as the CT 303(d) Impaired Waters List. The Clean Water Act requires that all 303(d) listed waters undergo a TMDL assessment that describes the impairments and identifies the measures needed to restore water quality. The goal is for all waterbodies to comply with State WQS.

Figure 7: Aerial map of the impaired segments in the Willimantic River watershed



POTENTIAL BACTERIA SOURCES

Potential sources of indicator bacteria in a watershed include point and non-point sources, such as stormwater runoff, agriculture, sanitary sewer overflows (collection system failures), illicit discharges, and inappropriate discharges to the waterbody. Potential sources that have been tentatively identified in the Willimantic River watershed based on land use (Figures 5 and 6) and a collection of local information for the impaired waterbodies are presented in Table 3 and Figures 8 and 9. However, the list of potential sources is general in nature and should not be considered comprehensive. There may be other sources not listed here that contribute to the observed water quality impairment in the study segment. Further monitoring and investigation will confirm listed sources and discover additional ones. Some segments in this watershed are currently listed as unassessed by CT DEEP procedures. This does not suggest that there are no potential issues on these segments, but indicates a lack of current data to evaluate the segments as part of the assessment process. For some segments, there are data from permitted sources, and CT DEEP recommends that any elevated concentrations found from those permitted sources be addressed through voluntary reduction measures. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement these TMDLs.

Table 3: Potential bacteria sources in the Willimantic River watershed

Impaired Segment	Permit Source	Illicit Discharge	CSO/SSO Issue	Failing Septic System	Agricultural Activity	Stormwater Runoff	Nuisance Wildlife/ Pets	Other
Willimantic River CT3100-00-06_01	**x**	**x**		**x**		**x**	**x**	
Eagleville Brook CT3100-19_02	**x**	**x**		**x**	**x**	**x**	**x**	**x**
Cedar Swamp Brook CT3100-17_03	**x**			**x**		**x**	**x**	

Figure 8: Potential sources in the Willimantic River watershed at the sub-regional level showing the Willimantic River impaired segment

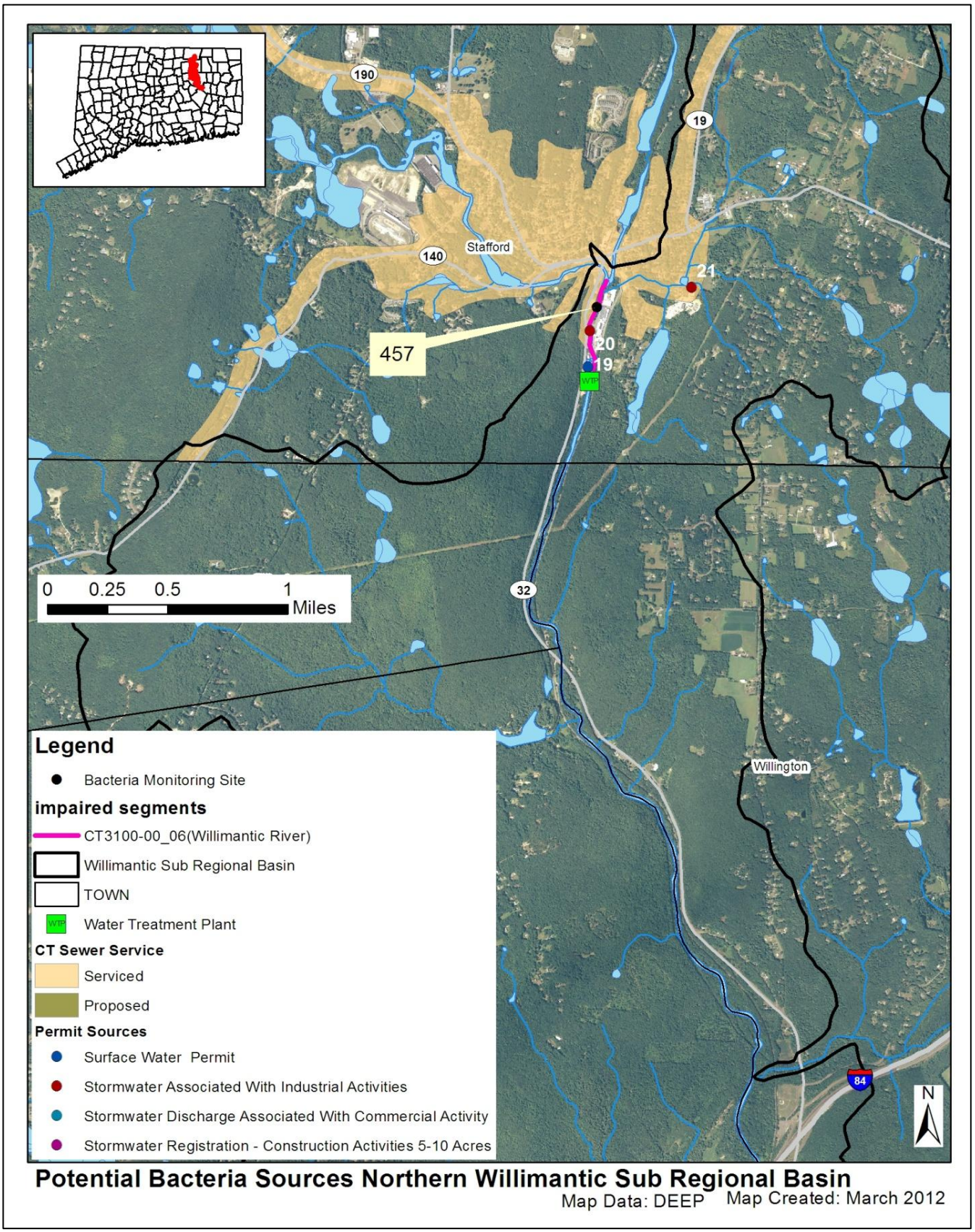
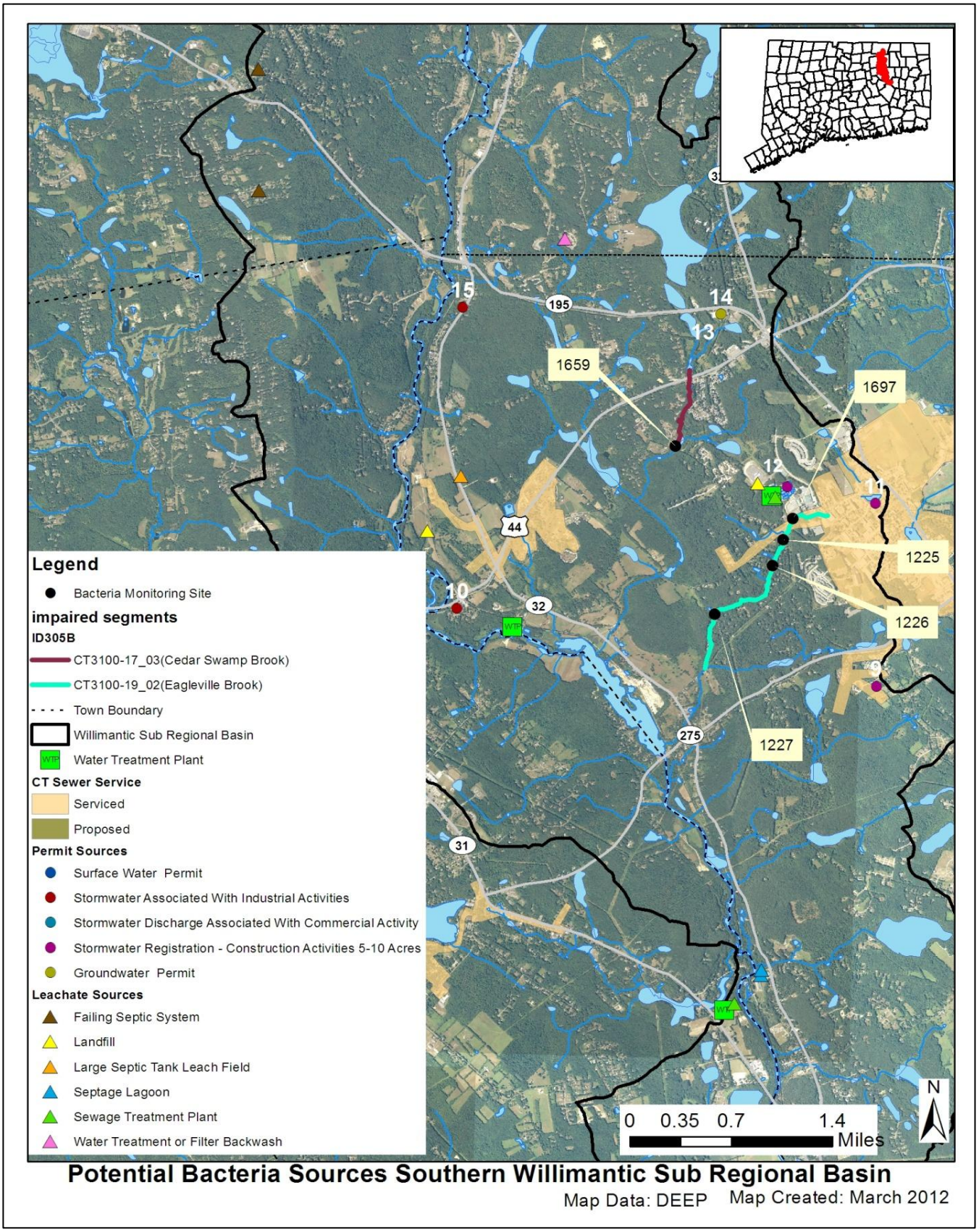


Figure 9: Potential sources in the Willimantic River watershed at the sub-regional level showing Eagleville Brook and Cedar Swamp Brook impaired segments



The potential sources map for the impaired basin was developed after thorough analysis of available data sets. If information is not displayed in the map, then no sources were discovered during the analysis. The following is the list of potential sources that were evaluated: problems with migratory waterfowl, golf course locations, reservoirs, proposed and existing sewer service, cattle farms, poultry farms, permitted sources of bacteria loading (surface water discharge, MS4 permit, industrial stormwater, commercial stormwater, groundwater permits, and construction related stormwater), and leachate and discharge sources (agricultural waste, CSOs, failing septic systems, landfills, large septic tank leach fields, septage lagoons, sewage treatment plants, and water treatment or filter backwash).

Point Sources

Permitted sources within the watershed that could potentially contribute to the bacteria loading are identified in Table 4. This table includes permit types that may or may not be present in the impaired watershed. A list of active permits in the watershed is included in Table 5. Additional investigation and monitoring could reveal the presence of additional discharges in the watershed. Available effluent data from each of these permitted categories found within the watershed are compared to the CT State WQS for the appropriate receiving waterbody use and type. When available, bacteria data results from these permitted sources are listed in Table 6.

Table 4: General categories list of other permitted discharges

Permit Code	Permit Description Type	Number in watershed
CT	Surface Water Discharges	1
GPL	Discharge of Swimming Pool Wastewater	0
GSC	Stormwater Discharge Associated with Commercial Activity	0
GSI	Stormwater Associated with Industrial Activity	4
GSM	Part B Municipal Stormwater MS4	0
GSN	Stormwater Registration – Construction	3
LF	Groundwater Permit (Landfill)	0
UI	Underground Injection	2

Permitted Sources

As shown in Table 5, there are multiple permitted discharges in the Willimantic River watershed. Bacteria data from 2001 – 2005 from several of these industrial permitted facilities are included in Table 6. Although this data cannot be compared to a water quality standard as there is no recreation standard for fecal coliform, multiple samples were high with readings exceeding 1,000 colonies/100 mL, including Warren Corp (GSI000985), CUNO Inc. (GSI000253), and J.J. Motts Concrete (GSI001187). These results indicate that permitted discharges within the Willimantic River watershed may be contributing bacteria to the impaired segments. Since the MS4 permits are not targeted to a specific location, but the geographic area of the regulated municipality, there is no one accurate location on the map to display the location of these permits. One dot will be displayed at the geographic center of the municipality as a reference point. Sometimes this location falls outside of the targeted watershed and therefore the MS4

permit will not be displayed in the Potential Sources Map. Using the municipal border as a guideline will show which areas of an affected watershed are covered by an MS4 permit.

Table 5: Permitted facilities within the Willimantic River watershed

Town	Client	Permit ID	Permit Type	Site Name	Address	Map #
Mansfield	CT DOT	GSI001176	Stormwater Associated With Industrial Activities	Mansfield Salt Storage	Plains Road	10
Mansfield	Board of Trustees Connecticut State University System	GSN001873	Stormwater Registration - Construction Activities 5-10 Acres	E.C.S.U. Women's NCAA Softball Field & Facilities	Mansfield City Road	9
Mansfield	University Of Connecticut	GSN002185	Stormwater Registration - Construction Activities 5-10 Acres	Reclaimed Water Facility	Ledoyt Road, UCONN	12
Mansfield	Rosal Trust	UI0000019	Groundwater Permit	Dundee's & Two Steps	Unknown	13
Stafford Springs	Town of Stafford	CT0101214	Surface Water Permit	Stafford WPCF	50 River Road	19
Stafford Springs	The Joseph J. Mottes Co.	GSI001187	Stormwater Associated With Industrial Activities	J.J. Motts Concrete Co.	10 Meadow Lane	21
Stafford Springs	3M Purification, Inc.	GSI001961	Stormwater Associated With Industrial Activities	3M Purification, Inc.	32 River Road	20
Storrs	University Of Connecticut	GSN002186	Stormwater Registration - Construction Activities 5-10 Acres	Storrs Hall Addition, UCONN	231 Glenbrook Road	11
Storrs Mansfield	Durham School Services	GSI002280	Stormwater Associated With Industrial Activities	Durham School Services	1725 Stafford Road	15
Storrs Mansfield	Rosal Trust	UI0000019	Groundwater Permit	Dundee's & Two Steps	1717 Storrs Road	14

Table 6: Industrial permits in the Willimantic River watershed and available fecal coliform data (colonies/100 mL). The result cannot be compared to the water quality standard as there is no recreation standard for fecal coliform.

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Stafford	CUNO, Inc.	GSI000253	Willimantic River	001	09/21/01	880
Stafford	CUNO, Inc.	GSI000253	Willimantic River	001	08/02/02	24
Stafford	CUNO, Inc.	GSI000253	Willimantic River	002	09/21/01	1,500

Table 6: Industrial permits in the Willimantic River watershed and available fecal coliform data (colonies/100 mL). The result cannot be compared to the water quality standard as there is no recreation standard for fecal coliform. (continued)

Town	Location	Permit Number	Receiving Water	Sample Location	Sample Date	Result
Stafford	CUNO, Inc.	GSI000253	Willimantic River	003	09/21/01	6,300
Stafford	CUNO, Inc.	GSI000253	Willimantic River	004	09/21/01	3,400
Stafford	Warren Corp.	GSI000985	Willimantic River	001	09/26/02	1,400
Stafford	Warren Corp.	GSI000985	Willimantic River	001	06/18/03	2,200
Stafford	Warren Corp.	GSI000985	Willimantic River	002	09/26/02	250
Stafford	Warren Corp.	GSI000985	Willimantic River	002	06/18/03	150
Stafford	Stafford Enterprises	GSI001343	Tributary to Willimantic River	001	03/26/02	2
Stafford	Stafford Enterprises	GSI001343	Tributary to Willimantic River	001	08/29/02	>600
Stafford	Stafford Enterprises	GSI001343	Tributary to Willimantic River	003	03/26/02	18
Stafford	Stafford Enterprises	GSI001343	Tributary to Willimantic River	003	08/29/02	>600
Stafford Springs	J.J. Motts Concrete Co.	GSI001187	Dennis Pond	001	07/17/01	10
Stafford Springs	J.J. Motts Concrete Co.	GSI001187	Dennis Pond	001	09/26/02	10
Stafford Springs	J.J. Motts Concrete Co.	GSI001187	Dennis Pond	001	06/18/03	80
Stafford Springs	J.J. Motts Concrete Co.	GSI001187	Dennis Pond	drain to stream	10/22/05	3,300

Municipal Stormwater Permitted Sources

Per the EPA Phase II Stormwater rule all municipal storm sewer systems (MS4s) operators located within US Census Bureau Urbanized Areas (UAs) must be covered under MS4 permits regulated by the appropriate State agency. There is an EPA waiver process that municipalities can apply for to not participate in the MS4 program. In Connecticut, EPA has granted such waivers to 19 municipalities. All participating municipalities within UAs in Connecticut are currently regulated under MS4 permits by CT DEEP staff in the MS4 program.

The US Census Bureau defines a UA as a densely settled area that has a census population of at least 50,000. A UA generally consists of a geographic core of block groups or blocks that exceeds the 50,000 people threshold and has a population density of at least 1,000 people per square mile. The UA will also include adjacent block groups and blocks with at least 500 people per square mile. A UA consists of all or part of one or more incorporated places and/or census designated places, and may include additional territory outside of any place. (67 FR 11663)

For the 2000 Census a new geographic entity was created to supplement the UA blocks of land. This created a block known as an Urban Cluster (UC) and is slightly different than the UA. The definition of a

UC is a densely settled area that has a census population of 2,500 to 49,999. A UC generally consists of a geographic core of block groups or blocks that have a population density of at least 1,000 people per square mile, and adjacent block groups and blocks with at least 500 people per square mile. A UC consists of all or part of one or more incorporated places and/or census designated places; such a place(s) together with adjacent territory; or territory outside of any place. The major difference is the total population cap of 49,999 people for a UC compared to >50,000 people for a UA. (67 FR 11663)

While it is possible that CT DEEP will be expanding the reach of the MS4 program to include UC municipalities in the near future they are not currently under the permit. However, the GIS layers used to create the MS4 maps in this Statewide TMDL did include both UA and UC blocks. This factor creates some municipalities that appear to be within an MS4 program that are not currently regulated through an MS4 permit. This oversight can explain a municipality that is at least partially shaded grey in the maps and there are no active MS4 reporting materials or information included in the appropriate appendix. While these areas are not technically in the MS4 permit program, they are still considered urban by the cluster definition above and are likely to contribute similar stormwater discharges to affected waterbodies covered in this TMDL.

As previously noted, EPA can grant a waiver to a municipality to preclude their inclusion in the MS4 permit program. One reason a waiver could be granted is a municipality with a total population less than 1000 people, even if the municipality was located in a UA. There are 19 municipalities in Connecticut that have received waivers, this list is: Andover, Bozrah, Canterbury, Coventry, East Hampton, Franklin, Haddam, Killingworth, Litchfield, Lyme, New Hartford, Plainfield, Preston, Salem, Sherman, Sprague, Stafford, Washington, and Cromwell. There will be no MS4 reporting documents from these towns even if they are displayed in an MS4 area in the maps of this document.

The list of US Census UCs is defined by geographic regions and is named for those regions, not necessarily by following municipal borders. In Connecticut the list of UCs includes blocks in the following Census Bureau regions: Colchester, Danielson, Lake Pocotopaug, Plainfield, Stafford, Storrs, Torrington, Willimantic, Winsted, and the border area with Westerly, RI (67 FR 11663). Any MS4 maps showing these municipalities may show grey areas that are not currently regulated by the CT DEEP MS4 permit program.

The impaired segments of the Willimantic River watershed are in the Towns of Stafford and Mansfield. As mentioned above, Mansfield (Storrs) is an Urban Cluster (UC) block and Stafford is one of 19 municipalities in Connecticut to receive a waiver, and therefore, these towns are not designated urban areas and are not required to comply with the General Permit for the Discharge of Stormwater from Small Municipal Storm Sewer Systems (MS4 permit) issued by the CT DEEP (Figures 10 and 11). Information regarding stormwater management and the MS4 permit can be obtained on CT DEEP's website (http://www.ct.gov/dep/cwp/view.asp?a=2721&q=325702&depNav_GID=1654).

Figure 10: MS4 areas of the Willimantic River watershed – Showing the Willimantic River impaired segment

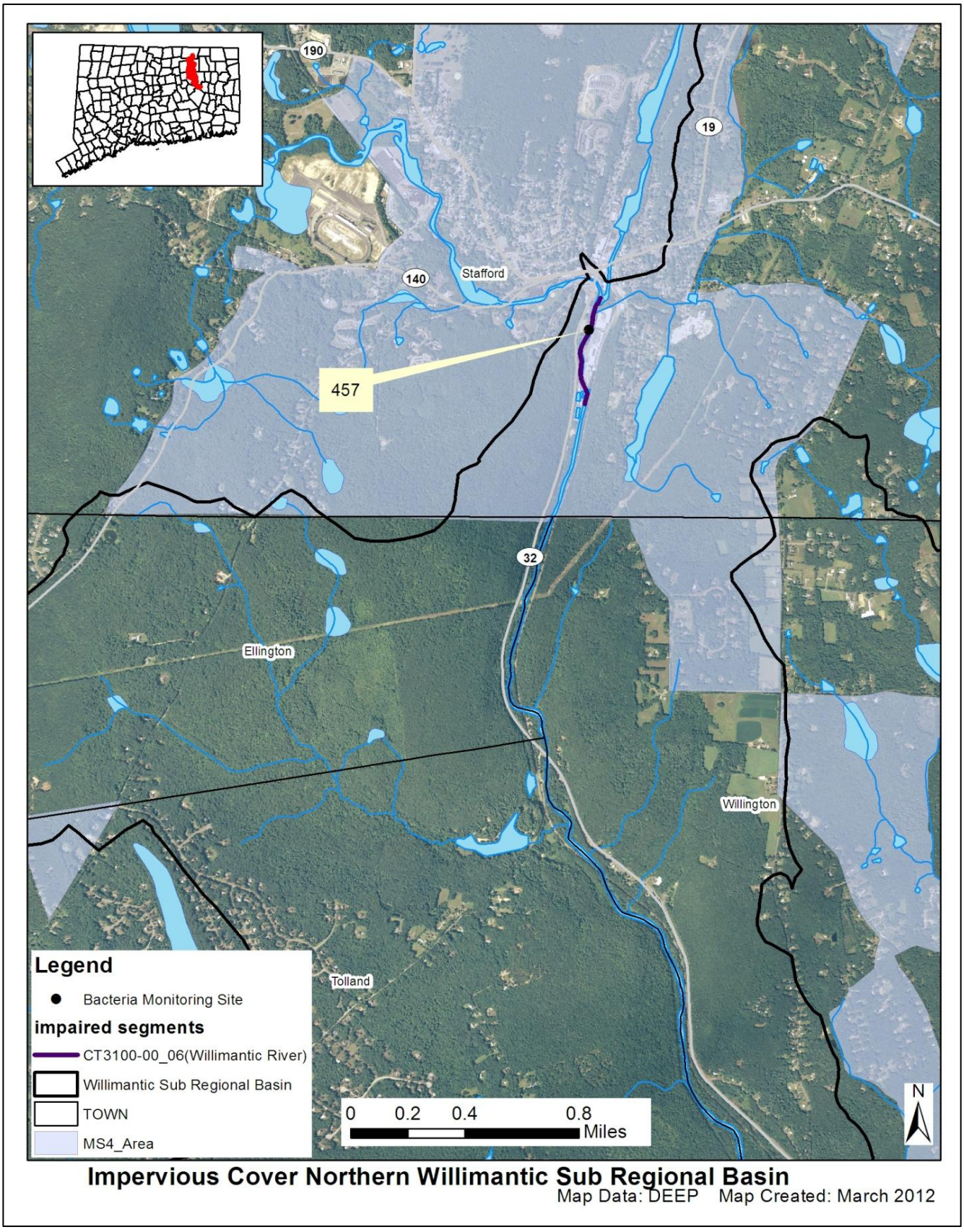
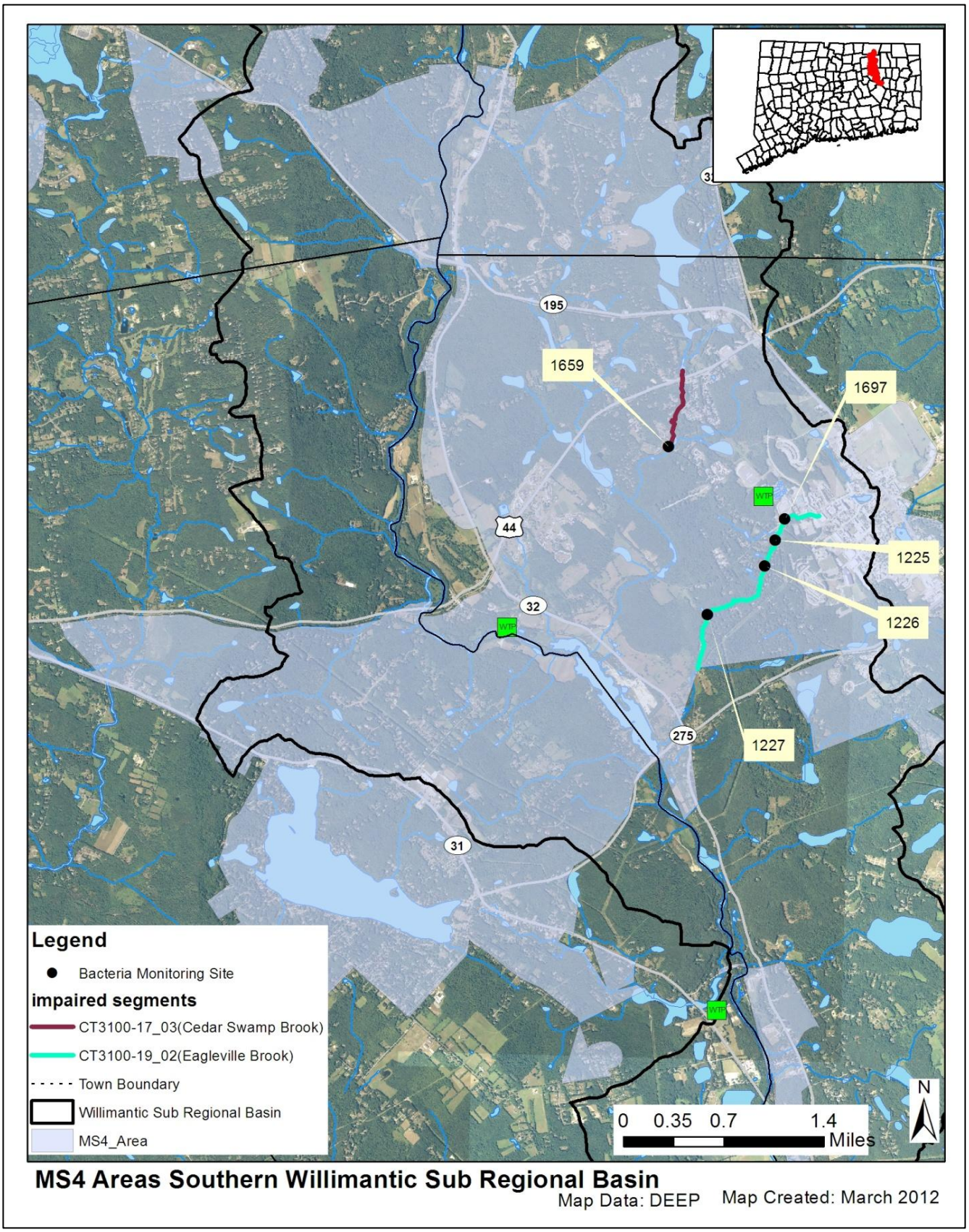


Figure 11: MS4 areas of the Willimantic River watershed – Showing Eagleville Brook and Cedar Swamp Brook impaired segments



Publicly Owned Treatment Works

As shown in Figures 8 and 9, there are four publicly owned treatment works (POTWs), or wastewater treatment plants, in the Willimantic River watershed, one of which is in Stafford at the downstream terminus of the Willimantic River (CT3100-00_06), two of which are located along the Willimantic River in Mansfield, and one of which is located along Eagleville Brook in Mansfield. Data were only available for the Stafford Water Pollution Control Facility (WPCF) (CT0101214) along the Willimantic River (CT3100-00_06), which exceeded its 7-day and 30-day geometric mean permit limit on at least one sampling date in 2010 (Table 7).

Table 7: Wastewater treatment plant fecal coliform (colonies/100 mL) data discharging to the Willimantic River

Town	Permitee	Permit Number	Receiving Water	Date	30-Day Geometric Mean	7-Day Geometric Mean
Stafford	Stafford WPCF	CT0101214	Willimantic River	05/31/2009	16	23
Stafford	Stafford WPCF	CT0101214	Willimantic River	06/30/2009	11	15
Stafford	Stafford WPCF	CT0101214	Willimantic River	07/31/2009	6	9
Stafford	Stafford WPCF	CT0101214	Willimantic River	08/31/2009	9	16
Stafford	Stafford WPCF	CT0101214	Willimantic River	09/30/2009	5	14
Stafford	Stafford WPCF	CT0101214	Willimantic River	05/31/2010	45	134
Stafford	Stafford WPCF	CT0101214	Willimantic River	06/30/2010	9	69
Stafford	Stafford WPCF	CT0101214	Willimantic River	07/31/2010	16	169
Stafford	Stafford WPCF	CT0101214	Willimantic River	08/31/2010	207	770
Stafford	Stafford WPCF	CT0101214	Willimantic River	09/30/2010	146	1999
Stafford	Stafford WPCF	CT0101214	Willimantic River	05/31/2011	3	14
Stafford	Stafford WPCF	CT0101214	Willimantic River	07/31/2011	1	10
Stafford	Stafford WPCF	CT0101214	Willimantic River	08/31/2011	1	5
30-Day Geometric Mean Permit Limit = 200 colonies/100 mL						
7-Day Geometric Mean Permit Limit = 400 colonies/100 mL						

Non-point Sources

Non-point source pollution (NPS) comes from many diffuse sources and is more difficult to identify and control. NPS pollution is often associated with land-use practices. Examples of NPS that can contribute bacteria to surface waters include insufficient septic systems, pet and wildlife waste, agriculture, and contact recreation (swimming or wading). Potential sources of NPS within the Willimantic River watershed are described below.

Stormwater Runoff from Developed Areas

Approximately 24% of the watershed is considered urban, the majority of which is concentrated around the impaired segments in the Towns of Mansfield and Stafford (Figures 5 and 6). Urban areas are often characterized by impervious cover, or surface areas such as roofs and roads that force water to run off land surfaces rather than infiltrate the soil. Studies have shown a link between increasing impervious cover and degrading water quality conditions in a watershed (CWP, 2003). In one study, researchers

correlated the amount of fecal coliform to the percent of impervious cover in a watershed (Mallin *et al*., 2000).

Approximately 86% of the Willimantic River watershed is characterized by 0-6% impervious cover, 5% is characterized by 7-11% impervious cover, 3% is characterized by 12-15% impervious cover, particularly along the majority of Eagleville Brook, and 6% is characterized by greater than 16% impervious cover, particularly in the upstream reaches of the Willimantic River (CT3100-00_06) (Figures 12, 13, and 14). The western portion of the University of Connecticut's main campus in Mansfield (Storrs) drains into Eagleville Brook, and contains large sections of impervious surface such as buildings, roads, walkways, and parking lots. Water quality data taken at Station 457 on the Willimantic River, Stations 1227, 1226, and 1225 on Eagleville Brook, and Station 1659 on Cedar Swamp Brook were consistently high, especially during wet-weather, which suggests that stormwater runoff may be a source of bacteria to the Willimantic River watershed (Tables 10, 11,and 12). In particular, geometric means during wet-weather at Stations 1226 and 1659 were 10 and 3 times greater than dry-weather values, respectively.

Figure 12: Range of impervious cover (%) in the Willimantic River watershed

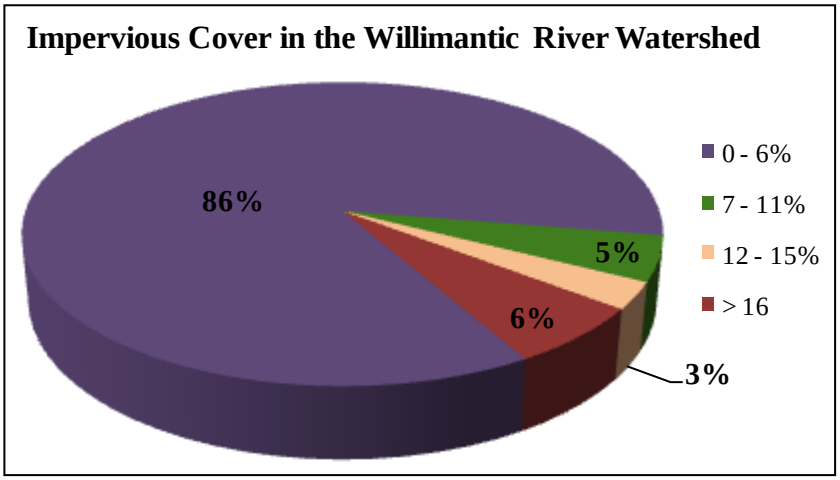


Figure 13: Impervious cover (%) for the Willimantic River sub-regional watershed showing the Willimantic River impaired segment

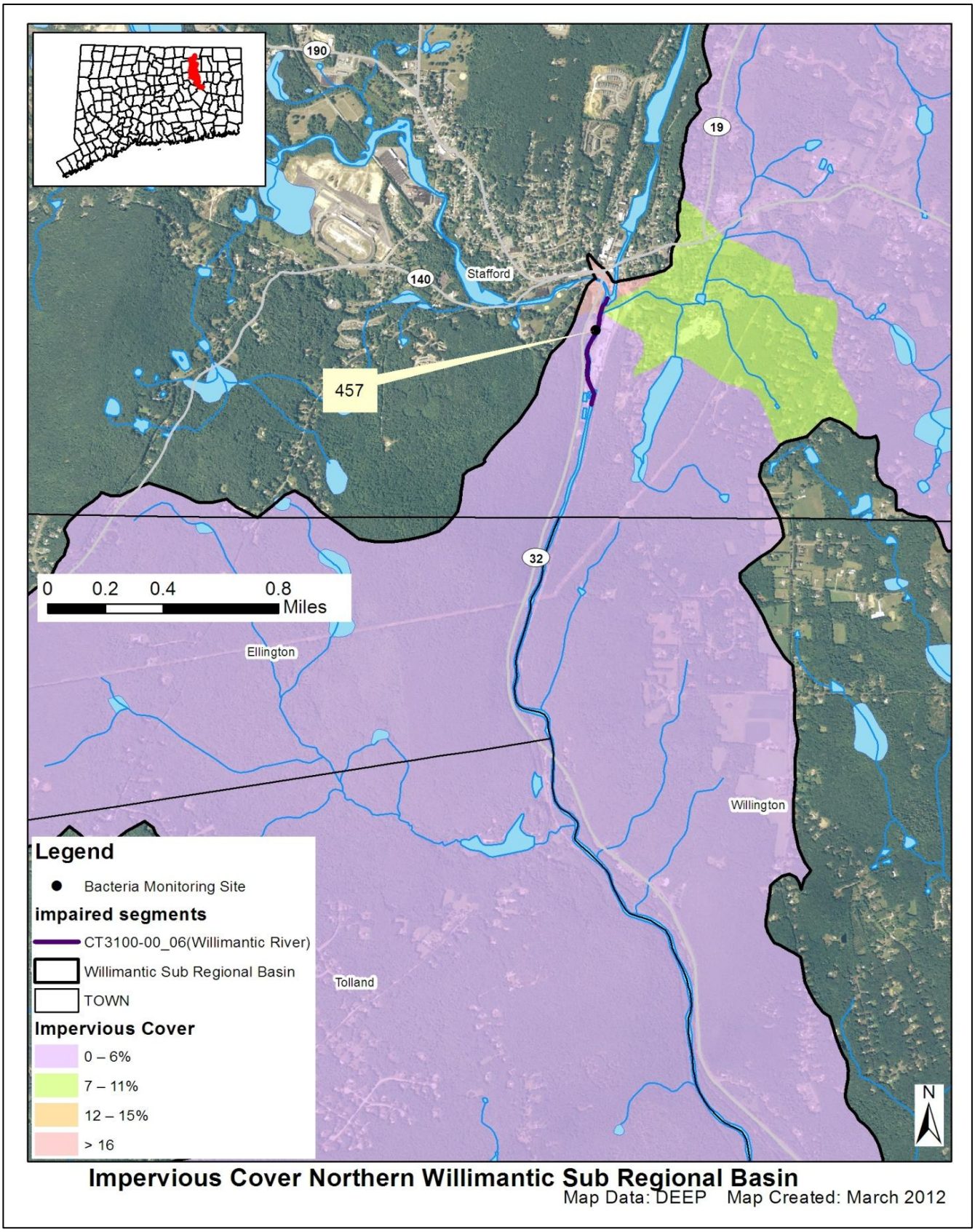
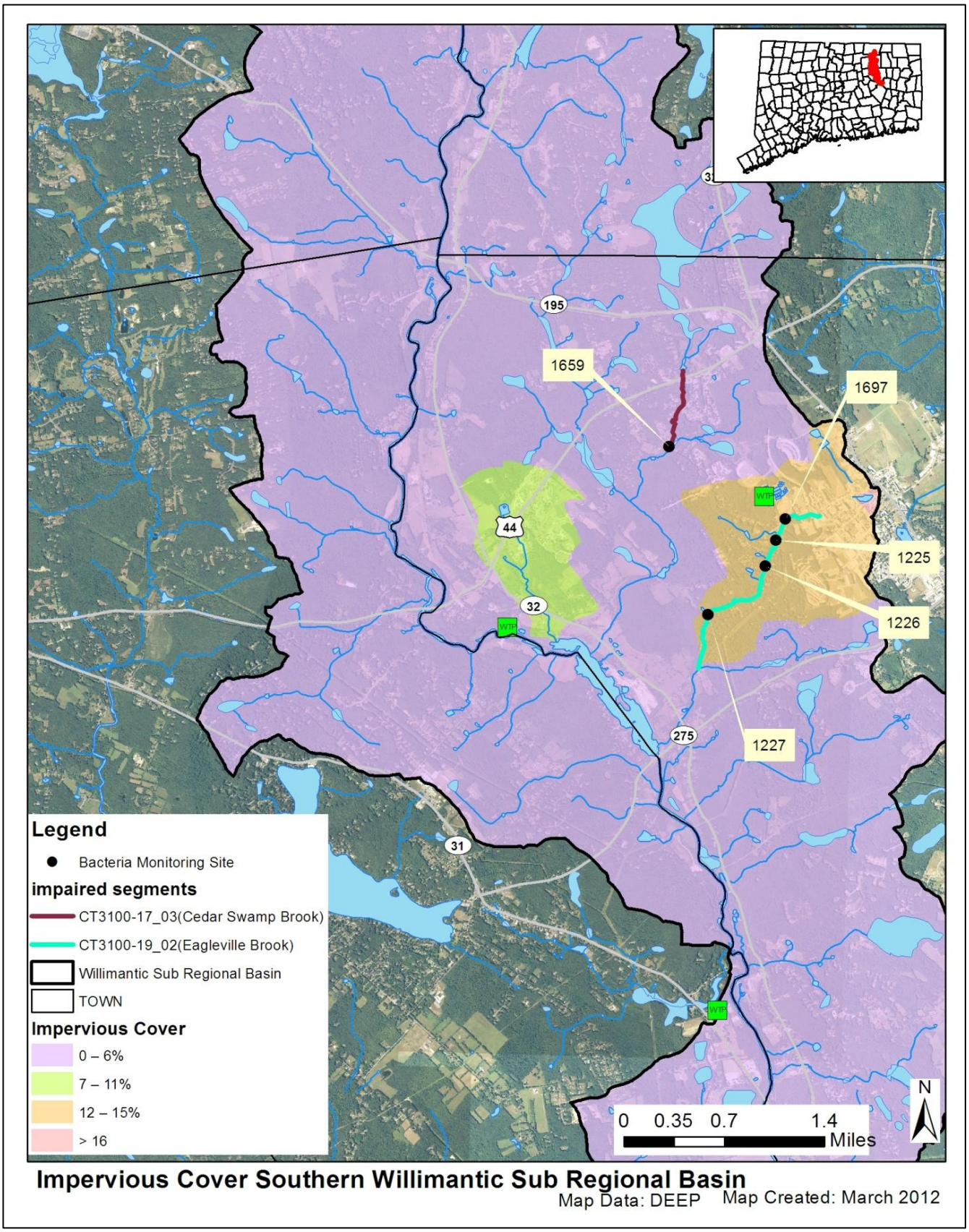


Figure 14: Impervious cover (%) for the Willimantic River sub-regional watershed showing the Eagleville Brook and Cedar Swamp Brook impaired segments



Insufficient Septic Systems and Illicit Discharges

As shown in Figures 8 and 9, there are residential and commercial areas around the impaired segments that do not have access to a sanitary sewer and instead rely on onsite wastewater treatments systems, such as septic systems. Two failing septic systems were identified in Figures 8 and 9 along tributaries to the Willimantic River north of Cedar Swamp Brook and Eagleville Brook. Although not directly impacting the impaired segments, these failing septic systems may be an indication of a more widespread issue in the watershed. A large septic tank leachfield was also identified along Route 32 and the Willimantic River upstream of the confluences with Cedar Swamp Brook and Eagleville Brook. Insufficient or failing septic systems can be significant sources of bacteria by allowing raw waste to reach surface waters. In Connecticut, local health directors or health districts are responsible for keeping track of any reported insufficient or failing septic systems in a specific municipality. The Town of Stafford has its own Health Department (www.staffordct.org/health.php). The Town of Mansfield is part of the greater Eastern Highlands Health District (www.ehhd.org).

There are multiple areas within the watershed with access to a sanitary sewer, including the majority of the Willimantic River (CT3100-00_06) in Stafford and the upstream portion of Eagleville Brook in Mansfield (Figures 8 and 9). Sewer system leaks and other illicit discharges located within the watershed, particularly near the impaired segments of the Willimantic River and Eagleville Brook, may be contributing bacteria to these waterbodies. Water quality data taken at Station 457 on the Willimantic River, and Station 1226 on Eagleville Brook were consistently high, especially during dry-weather, which suggests that leaks from septic systems or sewer pipes may be a source of bacteria to the Willimantic River watershed (Tables 10,11, and 12). In particular, geometric means during dry-weather values at Station 457 were twice that of wet-weather values.

Wildlife and Domestic Animal Waste

Wildlife and domestic animals within the Willimantic River watershed represent a potential source of bacteria. With the construction of roads and drainage systems, these wastes may no longer be retained on the landscape, but instead may be conveyed via stormwater to the nearest surface water. These physical land alterations can exacerbate the impact of natural sources on water quality (USEPA, 2001).

Geese and other waterfowl are known to congregate in open areas, including recreational fields, golf courses, and agricultural crop fields. In addition to creating a nuisance, large numbers of geese can also create unsanitary conditions on the grassed areas and cause water quality problems due to bacterial contamination associated with their droppings. Large populations of geese can also lead to habitat destruction as a result of overgrazing on wetland and riparian plants.

As hotspots for dog and horse owners, residential development surrounds portions of all three impaired segments in the Willimantic River watershed, particularly along Hyde Park Road and Highland Terrace in Stafford adjacent to the Willimantic River (CT3100-00_06), along Hunting Lodge Road and Separatist Road near Eagleville Brook in Mansfield, and along Old Wood Road adjacent to Cedar Swamp Brook in Mansfield. When not properly disposed, waste from domestic animals such as dogs and horses can enter surface waters directly or through stormwater infrastructure.

Agricultural Activities

Agricultural operations are an important economic activity and landscape feature in many areas of the State. Runoff from agricultural fields may contain pollutants such as bacteria and nutrients (USEPA, 2011a). This runoff can include pollutants from farm practices such as storing manure, allowing livestock

to wade in nearby waterbodies, applying fertilizer, and reducing the width of vegetated buffer along the shoreline. Agricultural land use makes up 8% of the Willimantic River watershed (Figure 4). There are few agricultural operations near the impaired segments. Of particular note, agricultural areas were identified near the downstream terminus of Eagleville Brook off North Eagleville Road. These operations may carry pollutants, including bacteria, to the impaired segments.

Additional Sources

Two landfills were identified in the Willimantic River watershed in Mansfield (Figure 9). One is located near the Willimantic River upstream of the confluences with Cedar Swamp Brook and Eagleville Brook. The other is located near the upstream portion of Eagleville Brook and may be a concern for water quality. There may be other sources not listed here or identified in Figures 8 and 9 that contribute to the observed water quality impairment in the Willimantic River, Eagleville Brook, and Cedar Swamp Brook. Further monitoring and investigation will confirm the listed sources and discover additional ones. More detailed evaluation of potential sources is expected to become available as activities are conducted to implement this TMDL.

Land Use/Landscape

Riparian Buffer Zones

The riparian buffer zone is the area of land located immediately adjacent to streams, lakes, or other surface waters. The boundary of the riparian zone and the adjoining uplands is gradual and not always well-defined. However, riparian zones differ from uplands because of high levels of soil moisture, frequent flooding, and the unique assemblage of plant and animal communities found there. Through the interaction of their soils, hydrology, and vegetation, natural riparian areas influence water quality as contaminants are taken up into plant tissues, adsorbed onto soil particles, or modified by soil organisms. Any change to the natural riparian buffer zone can reduce the effectiveness of the natural buffer and has the potential to contribute to water quality impairment (USEPA, 2011b).

The CLEAR program at UCONN has created streamside buffer layers for the entire State of Connecticut (http://clear.uconn.edu/), which have been used in this TMDL. Analyzing this information can reveal potential sources and implementation opportunities at a localized level. The land use directly adjacent to a waterbody can have direct impacts on water quality from surface runoff sources.

The riparian zones of the entire Willimantic River (CT3100-00_06) and the upstream reaches of Eagleville Brook are characterized by developed land use (Figures 15 and 16). The riparian zone along downstream portion of Eagleville Brook is primarily forested. The riparian zone of Cedar Swamp Brook is characterized by a mix of forested, developed, and turf/grass areas. Developed areas within the riparian zone likely contribute pollutants such as bacteria to the waterbody since the natural riparian buffer cannot treat stormwater runoff from impervious surfaces.

Figure 15: Riparian buffer zone information for the Willimantic River watershed showing the Willimantic River impaired segment

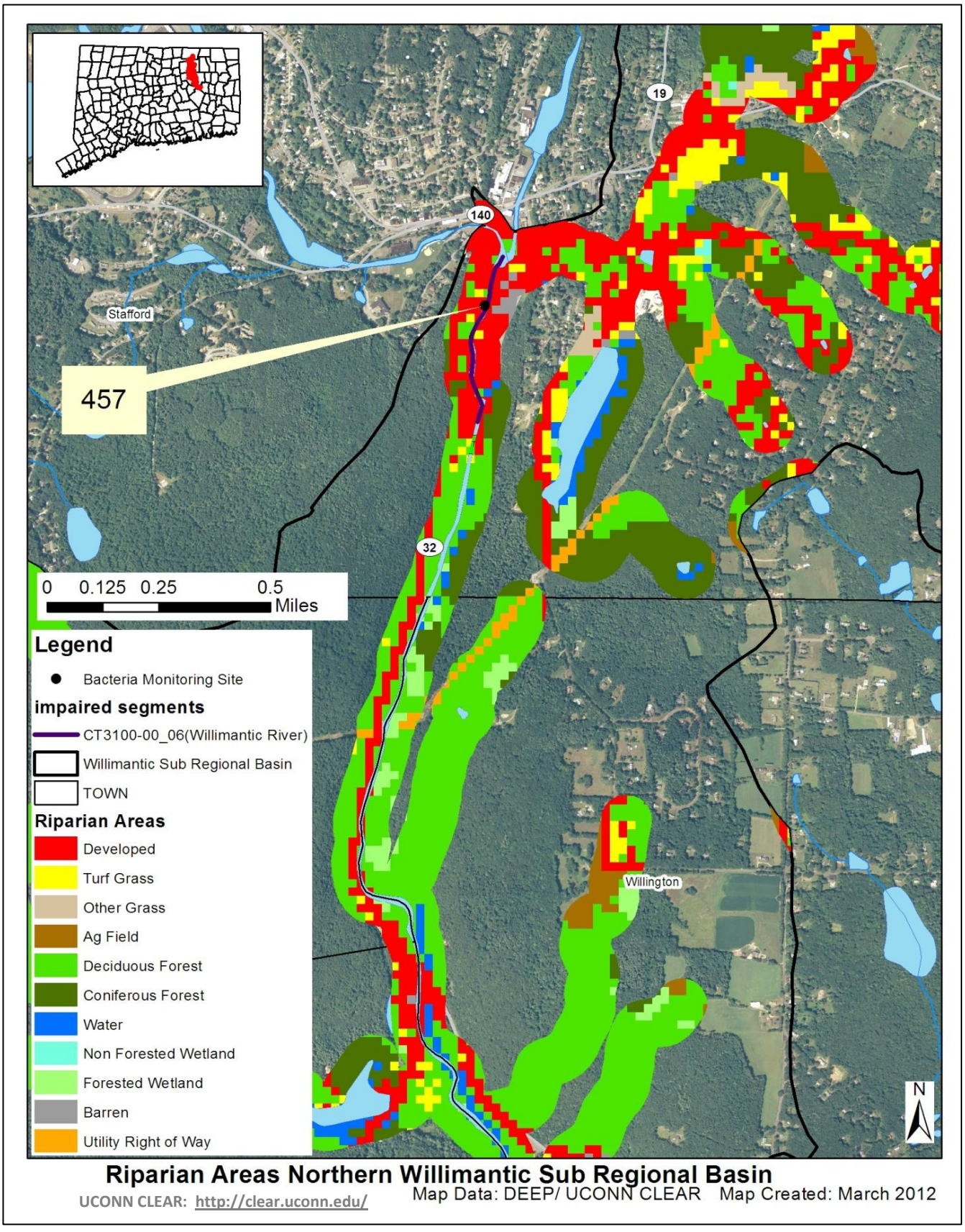
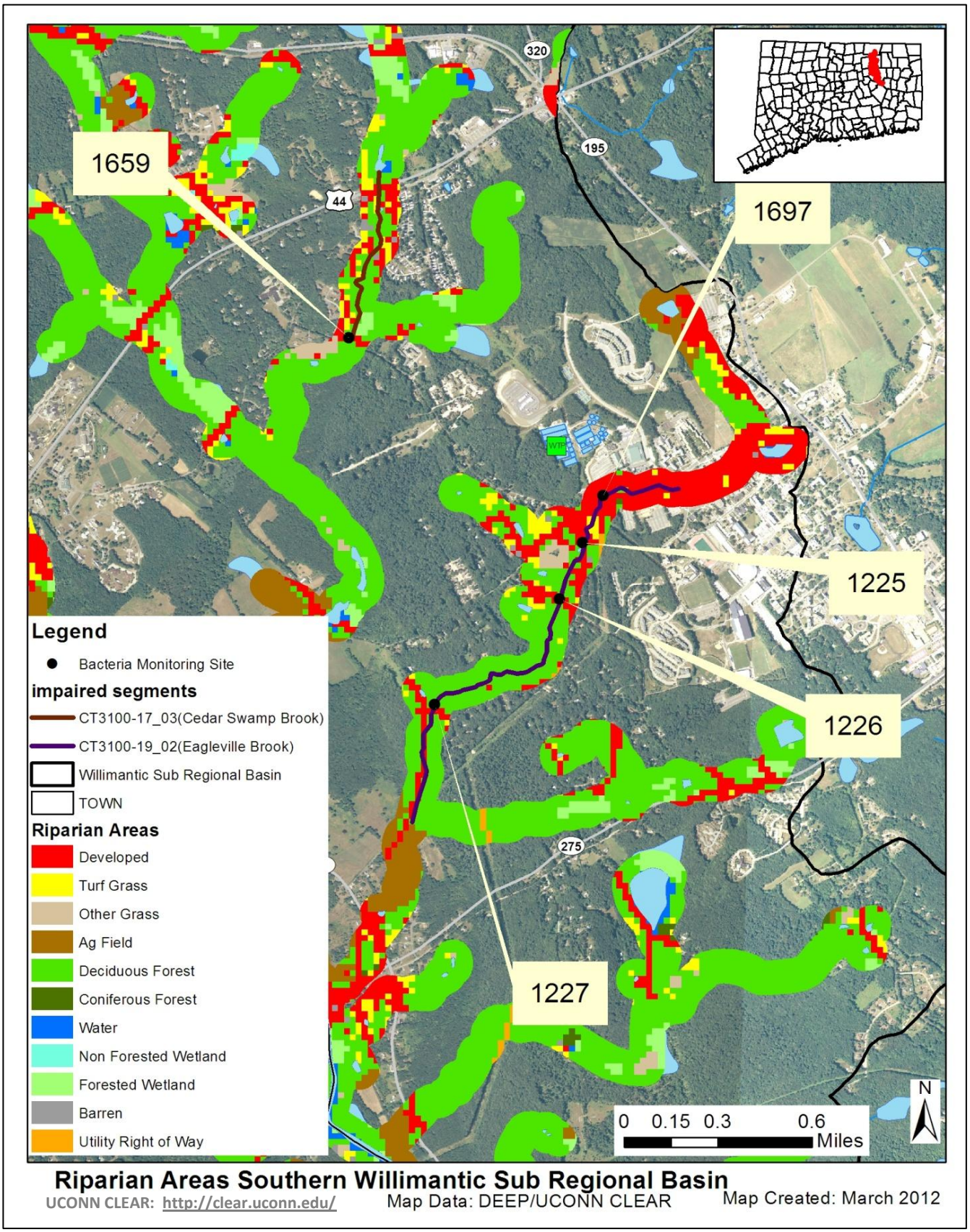


Figure 16: Riparian buffer zone information for the Willimantic River watershed showing the Eagleville Brook and Cedar Swamp Brook impaired segments



CURRENT MANAGEMENT ACTIVITIES

The watershed community has developed and implemented programs to protect water quality from bacterial contamination. In 2011, the Eagleville Brook Watershed Management Plan was developed by the University of Connecticut Cooperative Extension and made available at http://www.ct.gov/dep/lib/dep/water/watershed_management/wm_plans/eagleville_brook_wbplan.pdf. This document outlines current actions in the watershed in response to the 2007 Eagleville Brook Impervious Cover (IC) TMDL and recommends future actions necessary to maintain or improve water quality (Dietz and Arnold, 2011).

CT DEEP's Non-Point Source Pollution Program administers a Non-Point Source Grant Program with funding from EPA under Section 319 of the Clean Water Act (319 grant). A $200,000 319 grant was awarded to the University of Connecticut (UConn) to support the completion of an impervious cover-based TMDL for Eagleville Brook and ultimately address TMDL goals through a watershed-based management plan. In response to the Eagleville Brook IC TMDL, a $50,000 319 grant was awarded to the UConn to install and monitor a green roof on Gant Plaza on the UConn campus and determine other suitable locations for disconnection of impervious areas through bioretention installation.

RECOMMENDED NEXT STEPS

The Town of Mansfield has developed and implemented programs to protect water quality from bacterial contamination. Future mitigative activities are necessary to ensure the long-term protection of the Willimantic River watershed and have been prioritized below. Some of these actions are provided in more detail in the 2011 Eagleville Brook Watershed Based Plan (Dietz and Arnold, 2011).

Table 8: Recommended structural BMPs in Mansfield from the 2011 Eagleville Brook Watershed Based Plan

Location	Town	Recommended BMPs
UConn - Warehouse and Motor Pool	Mansfield	Install perimeter sand filter and green roof
UConn - F Lot	Mansfield	Install terraced bioretention areas.
UConn - Hurley Hall	Mansfield	Install rooftop and walkway bioretention areas.
UConn - Chemistry Building Quad	Mansfield	Install rooftop and walkway bioretention areas.
UConn - North Eagleville Road	Mansfield	Integrate stormwater, landscaping, and traffic calming measures by installing street planter areas.
UConn - Lot 9	Mansfield	Install parking lot bioretention areas (grassed swales).
UConn - Lot Y	Mansfield	Manage parking lot with bioswales.
UConn - Christian Field/Batting Cages	Mansfield	Install gravel-based wetland system.
UConn - Lot W	Mansfield	Manage parking lot with bioretention areas.
UConn - Education/Gentry Buildings and Sundial Garden	Mansfield	Integrate stormwater and landscape management by installing planter beds and buffers.

1) Identify areas in the developed portions of the Willimantic River watershed to implement Best Management Practices (BMPs) to control stormwater runoff.

As noted previously, 24% of the Willimantic River watershed is considered urban. As such, stormwater runoff is likely contributing bacteria to the impaired segments of the Willimantic River watershed. To mitigate stormwater runoff to Eagleville Brook, the University of Connecticut (UConn) has already installed multiple BMPs throughout the campus. Bioretention areas were constructed at the Towers dorm in 2004, at the Burton-Skenkman Facility and Hilltop dorms in 2005, and at the Northwoods apartments and complex in 2010. Pervious pavement (either porous asphalt or pervious concrete) were installed at Lakeside apartments in 2005, at the Towers dorms and field house in 2009, and along a portion of the access road to Northwoods apartments in 2010. As noted previously, a green roof was installed on Gant Plaza in 2009 using funding from a 319 grant. The Eagleville Brook Watershed Management Plan made several recommendations for BMP installations that would disconnect impervious areas discharging directly to Eagleville Brook, including 110 potential projects at 51 sites on the UConn campus. Recommended BMPs at parking lots, academic buildings, and student housing include rain gardens,

grassed swales, water harvesting stations, pervious pavement, and green roofs. A sampling of high priority BMP sites addressed in the plan is listed in Table 8.

To identify other areas that are contributing bacteria to the impaired segments, the towns should continue to conduct wet-weather sampling and prioritize sampling stations with high bacteria concentrations for BMP installation (Table 6). To treat stormwater runoff, the towns should identify areas along the impaired segments to install BMPs that encourage stormwater to infiltrate the ground before entering the waterbodies. These BMPs would disconnect impervious areas and reduce pollutant loads to the river. More detailed information and BMP recommendations can be found in the core TMDL document.

2) Continue monitoring of permitted sources.

As shown in Figures 8 and 9, there are multiple permitted discharges within the Willimantic River watershed near the impaired segments. Further monitoring will provide information essential to better locate, understand, and reduce pollution sources. If any current monitoring is not done with appropriate bacterial indicator based on the receiving water, then a recommended change during the next permit reissuance is to include the appropriate indicator species. If facility monitoring indicates elevated bacteria, then implementation of the permit required, and voluntary measures to identify and reduce sources of bacterial contamination at the facility are an additional recommendation. Regular monitoring should be established for all permitted sources to ensure compliance with permit requirements and to determine if current requirements are adequate or if additional measures are necessary for water quality protection.

Section 6(k) of the MS4 General Permit requires a municipality to modify their Stormwater Management Plan to implement the TMDL within four months of TMDL approval by EPA if stormwater within the municipality contributes pollutant(s) in excess of the allocation established by the TMDL. For discharges to impaired waterbodies, the municipality must assess and modify the six minimum measures of its plan, if necessary, to meet TMDL standards. Particular focus should be placed on the following plan components: public education, illicit discharge detection and elimination, stormwater structures cleaning, and the repair, upgrade, or retrofit of storm sewer structures. The goal of these modifications is to establish a program that improves water quality consistent with TMDL requirements. Modifications to the Stormwater Management Plan in response to TMDL development should be submitted to the Stormwater Program of DEEP for review and approval.

Table 9 details the appropriate bacteria criteria for use as waste load allocations established by this TMDL for use as water quality targets by permittees as permits are renewed and updated, within the Willimantic River Watershed.

For any municipality subject to an MS4 permit and affected by a TMDL, the permit requires a modification of the SMP to include BMPs that address the included impairment. In the case of bacteria related impairments municipal BMPs could include: implementation or improvement to existing nuisance wildlife programs, septic system monitoring programs, any additional measures that can be added to the required illicit discharge detection and elimination (IDDE) programs, and increased street sweeping above basic permit requirements. Any non-MS4 municipalities can implement these same types of initiatives in effort to reduce bacteria source loading to impaired waterways.

Any facilities that discharge non-MS4 regulated stormwater should update their Pollution Prevention Plan to reflect BMPs that can reduce bacteria loading to the receiving waterway. These BMPs could include nuisance wildlife control programs and any installations that increase surface infiltration to reduce overall

stormwater volumes. Facilities that are regulated under the Commercial Activities Stormwater Permit should report any updates to their SMP in their summary documentation submitted to DEEP.

Table 9. Bacteria (e.coli) TMDLs, WLAs, and LAs for Recreational Use

		Instantaneous *E. coli* (#/100mL)						Geometric Mean *E. coli* (#/100mL)	
Class	**Bacteria Source**	**WLA[6]**			**LA[6]**			**WLA[6]**	**LA[6]**
	Recreational Use	[1]	[2]	[3]	[1]	[2]	[3]	**All**	**All**
A	Non-Stormwater NPDES	0	0	0				0	
	CSOs	0	0	0				0	
	SSOs	0	0	0				0	
	Illicit sewer connection	0	0	0				0	
	Leaking sewer lines	0	0	0				0	
	Stormwater (MS4s)	235[7]	410[7]	576[7]				126[7]	
	Stormwater (non-MS4)				235[7]	410[7]	576[7]		126[7]
	Wildlife direct discharge				235[7]	410[7]	576[7]		126[7]
	Human or domestic animal direct discharge[5]				235	410	576		126
B[4]	Non-Stormwater NPDES	235	410	576				126	
	CSOs	235	410	576				126	
	SSOs	0	0	0				0	
	Illicit sewer connection	0	0	0				0	
	Leaking sewer lines	0	0	0				0	
	Stormwater (MS4s)	235[7]	410[7]	576[7]				126[7]	
	Stormwater (non-MS4)				235[7]	410[7]	576[7]		126[7]
	Wildlife direct discharge				235[7]	410[7]	576[7]		126[7]
	Human or domestic animal direct discharge[5]				235	410	576		126

(1) **Designated Swimming.** Procedures for monitoring and closure of bathing areas by State and Local Health Authorities are specified in: Guidelines for Monitoring Bathing Waters and Closure Protocol, adopted jointly by the Department of Environmental Protections and the Department of Public Health. May 1989. Revised April 2003 and updated December 2008.

(2) **Non-Designated Swimming.** Includes areas otherwise suitable for swimming but which have not been designated by State or Local authorities as bathing areas, waters which support tubing, water skiing, or other recreational activities where full body contact is likely.

(3) **All Other Recreational Uses.**

(4) Criteria for the protection of recreational uses in Class B waters do not apply when disinfection of sewage treatment plant effluents is not required consistent with Standard 23. (Class B surface waters located north of Interstate Highway I-95 and downstream of a sewage treatment plant providing seasonal disinfection May 1 through October 1, as authorized by the Commissioner.)

(5) Human direct discharge = swimmers

(6) Unless otherwise required by statute or regulation, compliance with this TMDL will be based on ambient concentrations and not end-of-pipe bacteria concentrations

(7) Replace numeric value with "natural levels" if only source is naturally occurring wildlife. Natural is defined as the biological, chemical and physical conditions and communities that occur within the environment which are unaffected or minimally affected by human influences (CT DEEP 2011a). Sections 2.2.2 and 6.2.7 of this Core Document deal with BMPs and delineating type of wildlife inputs.

3) Develop a system to monitor septic systems.

The majority of residents within the Willimantic River watershed, particularly near the impaired segments, rely on septic systems. If not already in place, the towns should establish a program to ensure that existing septic systems are properly operated and maintained. For instance, communities can create

an inventory of existing septic systems through mandatory inspections. Inspections help encourage proper maintenance and identify failed and sub-standard systems. Policies that govern the eventual replacement of the sub-standard systems within a reasonable timeframe could be adopted. Towns can also develop programs to assist citizens with the replacement and repair of older and failing systems.

4) Implement a program to evaluate the sanitary sewer system.

Many residents and businesses surrounding the Willimantic River (CT3100-00_06) and the upstream portion of Eagleville Brook rely on a municipal sewer system (Figures 8 and 9). It is important for municipalities to develop a program to evaluate their sanitary sewer and reduce leaks and overflows. This program should include periodic inspections of the sewer line.

5) Evaluate municipal education and outreach programs regarding animal waste.

Any education and outreach programs should highlight the importance of not feeding waterfowl and wildlife, managing horse and livestock waste, and picking up after dogs and other pets. Municipalities and residents can take measures to minimize waterfowl-related impacts such as allowing tall, coarse vegetation to grow in the riparian areas of the Willimantic River and its tributaries that are frequented by waterfowl. Waterfowl, especially grazers like geese, prefer easy access to water. Maintaining an uncut vegetated buffer along the shore will make the habitat less desirable to geese and encourage migration. In addition, any educational program should emphasize that feeding waterfowl, such as ducks, geese, and swans, may contribute to water quality impairments in the Willimantic River watershed and can harm human health and the environment. Animal wastes should be disposed of away from any waterbody or storm drain system. BMPs effective at reducing the impact of animal waste on water quality include installing signage, providing pet waste receptacles in high-use areas, enacting ordinances requiring the clean-up of pet waste, and targeting educational and outreach programs in problem areas.

6) Ensure there are sufficient buffers and BMPs in place on agricultural lands along the impaired segments.

Agricultural land use represents 8% of the Willimantic River watershed, and may be a concern for water quality in the impaired segments, particularly agricultural operations near the downstream terminus of Eagleville Brook. If not already in place, agricultural producers should work with the CT Department of Agriculture and the U.S. Department of Agriculture Natural Resources Conservation Service to develop conservation plans for their farming activities within the watershed. These plans should focus on ensuring that there are sufficient stream buffers, that fencing exists to restrict access to livestock and horses from streams and wetlands, and that animal waste handling, disposal, and other appropriate BMPs are in place.

BACTERIA DATA AND PERCENT REDUCTIONS TO MEET THE TMDL

Table 10: Willimantic River Bacteria Data

Waterbody ID: CT3100-00_06

Characteristics: Freshwater, Class B, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply

Impairment: Recreation (*E. coli bacteria)*

Water Quality Criteria for E. coli:

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

Percent Reduction to meet TMDL:

Geometric Mean: **84%**

Single Sample: **89%**

Data: 2010 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* (colonies/100 mL) data from Station 457 on the Willimantic River with annual geometric means calculated

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
457	Upstream Stafford POTW adjacent to park	4/27/2010	130	wet	**808* (84%)**
457	Upstream Stafford POTW adjacent to park	5/5/2010	310	dry	
457	Upstream Stafford POTW adjacent to park	5/11/2010	97	dry	
457	Upstream Stafford POTW adjacent to park	5/18/2010	150	wet	
457	Upstream Stafford POTW adjacent to park	5/25/2010	250	dry	
457	Upstream Stafford POTW adjacent to park	6/1/2010	490	wet	
457	Upstream Stafford POTW adjacent to park	6/8/2010	590	dry	
457	Upstream Stafford POTW adjacent to park	6/15/2010	530	dry	
457	Upstream Stafford POTW adjacent to park	6/22/2010	490	wet	
457	Upstream Stafford POTW adjacent to park	6/29/2010	740	dry	
457	Upstream Stafford POTW adjacent to park	7/6/2010	990	dry	
457	Upstream Stafford POTW adjacent to park	7/13/2010	1500	wet	
457	Upstream Stafford POTW adjacent to park	7/20/2010	**3900* (89%)**	dry	
457	Upstream Stafford POTW adjacent to park	7/27/2010	1100	dry	
457	Upstream Stafford POTW adjacent to park	8/3/2010	1800	dry	
457	Upstream Stafford POTW adjacent to park	8/10/2010	2000	dry	

457	Upstream Stafford POTW adjacent to park	8/17/2010	3300	dry	
457	Upstream Stafford POTW adjacent to park	8/24/2010	1300	dry	
457	Upstream Stafford POTW adjacent to park	8/31/2010	2000	dry	
457	Upstream Stafford POTW adjacent to park	9/7/2010	1700	dry	
457	Upstream Stafford POTW adjacent to park	9/14/2010	1900	dry	
457	Upstream Stafford POTW adjacent to park	9/21/2010	1800	dry	
457	Upstream Stafford POTW adjacent to park	9/28/2010	790	wet	

Shaded cells indicate an exceedance of water quality criteria

†Average of two duplicate samples

**** Weather conditions for selected data taken from Hartford because local station had missing data**

***Indicates single sample and geometric mean values used to calculate the percent reduction**

Wet and dry weather geometric mean values for Station 457 on the Willimantic River

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
457	Upstream Stafford POTW adjacent to park	2010	6	17	808	421	1017

Shaded cells indicate an exceedance of water quality criteria

Weather condition determined from rain gages at Hartford Bradley International Airport, CT.

Table 11: Eagleville Brook Bacteria Data

Waterbody ID: CT3100-19_02

Characteristics: Freshwater, Class A, Potential Drinking Water Source, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply

Impairment: Recreation (*E. coli bacteria)*

Water Quality Criteria for E. coli:

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

Percent Reduction to meet TMDL:

Geometric Mean: **91%**

Single Sample: **96%**

Data: 2005 and 2010 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* (colonies/100 mL) data from all monitoring stations on Eagleville Brook with annual geometric means calculated

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
1227	Upstream of Hillyndale Road	8/15/2005	2900	wet	701
1227	Upstream of Hillyndale Road	8/16/2005	440	wet	
1227	Upstream of Hillyndale Road	8/17/2005	270	dry	
1227	Upstream of Hillyndale Road	4/27/2010	190	wet	28
1227	Upstream of Hillyndale Road	5/5/2010	10	dry	
1227	Upstream of Hillyndale Road	5/11/2010	10	dry	
1227	Upstream of Hillyndale Road	5/18/2010	10	dry	
1227	Upstream of Hillyndale Road	5/25/2010	10	dry	
1227	Upstream of Hillyndale Road	6/1/2010	10	dry	
1227	Upstream of Hillyndale Road	6/8/2010	10	dry	
1227	Upstream of Hillyndale Road	6/15/2010	150	dry	
1227	Upstream of Hillyndale Road	6/22/2010	200	dry	
1227	Upstream of Hillyndale Road	6/29/2010	31	wet	
1227	Upstream of Hillyndale Road	7/6/2010	52	dry	

Single sample *E. coli* (colonies/100 mL) data from all monitoring stations on Eagleville Brook with annual geometric means calculated (continued)

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
1226	Upstream of Separatist Road	8/15/2005	1100	wet	**1351* (91%)**
1226	Upstream of Separatist Road	8/16/2005	440†	wet	
1226	Upstream of Separatist Road	8/17/2005	5100	dry	
1226	Upstream of Separatist Road	4/27/2010	510	wet	211
1226	Upstream of Separatist Road	5/5/2010	200	dry	
1226	Upstream of Separatist Road	5/11/2010	84	dry	
1226	Upstream of Separatist Road	5/18/2010	85	dry	
1226	Upstream of Separatist Road	5/25/2010	98	dry	
1226	Upstream of Separatist Road	6/1/2010	220	dry	
1226	Upstream of Separatist Road	6/8/2010	7700	dry	
1226	Upstream of Separatist Road	6/15/2010	140	dry	
1226	Upstream of Separatist Road	6/22/2010	310	dry	
1226	Upstream of Separatist Road	6/29/2010	400	wet	
1226	Upstream of Separatist Road	7/6/2010	210	dry	
1226	Upstream of Separatist Road	7/13/2010	260	dry	
1226	Upstream of Separatist Road	7/20/2010	190	wet	
1226	Upstream of Separatist Road	7/27/2010	160	dry	
1226	Upstream of Separatist Road	8/3/2010	220	Dry	
1226	Upstream of Separatist Road	8/10/2010	700	dry	
1226	Upstream of Separatist Road	8/17/2010	1600	wet	
1226	Upstream of Separatist Road	8/24/2010	440	wet	
1226	Upstream of Separatist Road	8/31/2010	160	Dry	
1226	Upstream of Separatist Road	9/7/2010	160	dry	
1226	Upstream of Separatist Road	9/14/2010	41	Dry	
1226	Upstream of Separatist Road	9/21/2010	74	dry	
1226	Upstream of Separatist Road	9/28/2010	10	wet	
1225	#43 Hunting Lodge Road (private driveway)	8/15/2005	945†	wet	1295
1225	#43 Hunting Lodge Road (private driveway)	8/16/2005	230	wet	
1225	#43 Hunting Lodge Road (private driveway)	8/17/2005	**10000* (96%)**	dry	
1225	#43 Hunting Lodge Road (private driveway)	7/20/2010	150	wet	216
1225	#43 Hunting Lodge Road (private driveway)	8/3/2010	310	dry	

Single sample *E. coli* (colonies/100 mL) data from all monitoring stations on Eagleville Brook with annual geometric means calculated (continued)

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
1697	N Eagleville Road adjacent to F-lot	7/13/2010	6900	dry	622
1697	N Eagleville Road adjacent to F-lot	7/20/2010	1100	wet	
1697	N Eagleville Road adjacent to F-lot	8/3/2010	190	Dry	
1697	N Eagleville Road adjacent to F-lot	8/10/2010	530	Dry	
1697	N Eagleville Road adjacent to F-lot	8/17/2010	10	wet	
1697	N Eagleville Road adjacent to F-lot	8/24/2010	1500	wet	
1697	N Eagleville Road adjacent to F-lot	8/31/2010	1400	dry	
1697	N Eagleville Road adjacent to F-lot	9/7/2010	1400	dry	
1697	N Eagleville Road adjacent to F-lot	9/14/2010	61	dry	
1697	N Eagleville Road adjacent to F-lot	9/21/2010	2600	dry	
1697	N Eagleville Road adjacent to F-lot	9/28/2010	1500	wet	

Shaded cells indicate an exceedance of water quality criteria

†Average of two duplicate samples

**** Weather conditions for selected data taken from Hartford because local station had missing data**

***Indicates single sample and geometric mean values used to calculate the percent reduction**

Wet and dry weather geometric mean values for all monitoring stations on Eagleville Brook

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
1227	Upstream of Hillyndale Road	2005, 2010	4	10	56	294	29
1226	Upstream of Separatist Road	2005, 2010	5	12	262	451	296
1225	#43 Hunting Lodge Road (private driveway)	2005, 2010	3	2	632	319	1760
1697	N Eagleville Road adjacent to F-lot	2010	4	7	2755	397	1234

Shaded cells indicate an exceedance of water quality criteria

Weather condition determined from rain gages at the Norwich Public Utility Plant in Norwich, CT.

Table 12: Cedar Swamp Brook Bacteria Data

Waterbody ID: CT3100-17_03

Characteristics: Freshwater, Class A, Potential Drinking Water Source, Habitat for Fish and other Aquatic Life and Wildlife, Recreation, and Industrial and Agricultural Water Supply

Impairment: Recreation (*E. coli bacteria)*

Water Quality Criteria for E. coli:

Geometric Mean: 126 colonies/100 mL

Single Sample: 410 colonies/100 mL

Percent Reduction to meet TMDL:

Geometric Mean: **15%**

Single Sample: **66%**

Data: 2010 from CT DEEP targeted sampling efforts, 2012 TMDL Cycle

Single sample *E. coli* (colonies/100 mL) data from Station 1659 on Cedar Swamp Brook with annual geometric means calculated

Station Name	Station Location	Date	Result	Wet/Dry	Geomean
1659	Upstream of Hunting Lodge Road	5/5/2010	52	dry	**149* (15%)**
1659	Upstream of Hunting Lodge Road	5/11/2010	31	dry	
1659	Upstream of Hunting Lodge Road	5/18/2010	63	dry	
1659	Upstream of Hunting Lodge Road	5/25/2010	41	dry	
1659	Upstream of Hunting Lodge Road	6/1/2010	20	dry	
1659	Upstream of Hunting Lodge Road	6/8/2010	52	dry	
1659	Upstream of Hunting Lodge Road	6/15/2010	120	dry	
1659	Upstream of Hunting Lodge Road	6/22/2010	530	dry	
1659	Upstream of Hunting Lodge Road	6/29/2010	170	wet	
1659	Upstream of Hunting Lodge Road	7/6/2010	330	dry	
1659	Upstream of Hunting Lodge Road	7/13/2010	400	dry	
1659	Upstream of Hunting Lodge Road	7/20/2010	490	wet	
1659	Upstream of Hunting Lodge Road	7/27/2010	240	dry	
1659	Upstream of Hunting Lodge Road	8/3/2010	85	unknown	
1659	Upstream of Hunting Lodge Road	8/10/2010	560	unknown	
1659	Upstream of Hunting Lodge Road	8/17/2010	1100	unknown	
1659	Upstream of Hunting Lodge Road	8/24/2010	380	unknown	
1659	Upstream of Hunting Lodge Road	8/31/2010	150	unknown	
1659	Upstream of Hunting Lodge Road	9/7/2010	74	unknown	
1659	Upstream of Hunting Lodge Road	9/14/2010	120	unknown	
1659	Upstream of Hunting Lodge Road	9/21/2010	30	unknown	
1659	Upstream of Hunting Lodge Road	9/28/2010	**1200* (66%)**	unknown	

Shaded cells indicate an exceedance of water quality criteria

†Average of two duplicate samples

**** Weather conditions for selected data taken from Hartford because local station had missing data**

***Indicates single sample and geometric mean values used to calculate the percent reduction**

Wet and dry weather geometric mean values for Station 1659 on Cedar Swamp Brook

Station Name	Station Location	Years Sampled	Number of Samples		Geometric Mean		
			Wet	Dry	All	Wet	Dry
1659	Upstream of Hunting Lodge Road	2010	2	11	116	289	99

Shaded cells indicate an exceedance of water quality criteria

Weather condition determined from rain gages at the Norwich Public Utility Plant in Norwich, CT.

REFERENCES

Costa, Joe (2011). Calculating Geometric Means. Buzzards Bay National Estuary Program. **Online**: http://www.buzzardsbay.org/geomean.htm

CTDEEP (2010). State of Connecticut Integrated Water Quality Report. **Online:** http://www.ct.gov/dep/lib/dep/water/water_quality_management/305b/ctiwqr10final.pdf

CTDEEP (2011). State of Connecticut Water Quality Standards. **Online:** http://www.ct.gov/dep/lib/dep/water/water_quality_standards/wqs_final_adopted_2_25_11.pdf

CWP (2003). Impacts of Impervious Cover on Aquatic Systems. Center for Watershed Protection. **Online**: http://clear.uconn.edu/projects/tmdl/library/papers/Schueler_2003.pdf

Dietz, M.E., and C. Arnold (2011). Eagleville Brook Watershed Management Plan. **Online:** http://www.ct.gov/dep/lib/dep/water/watershed_management/wm_plans/eagleville_brook_wbplan.pdf

Federal Register 67 (March 15, 2002) 11663-11670. Urban Area Criteria for Census 2000

Mallin, M.A., K.E. Williams, E.C. Escham, R.P. Lowe (2000). Effect of Human Development on Bacteriological Water Quality in Coastal Wetlands. Ecological Applications 10: 1047-1056.

USEPA (2001). Managing Pet and Wildlife Waste to Prevent Contamination of Drinking Water. **Online**: http://www.epa.gov/safewater/sourcewater/pubs/fs_swpp_petwaste.pdf.

USEPA (2011a). Managing Nonpoint Source Pollution from Agriculture. **Online:** http://water.epa.gov/polwaste/nps/outreach/point6.cfm

USEPA (2011b). Riparian Zone and Stream Restoration. **Online:** http://epa.gov/ada/eco/riparian.html

USEPA (2011c). Land Use Impacts on Water. Online: http://epa.gov/greenkit/toolwq.htm

Linda M. Painter

From: Alison Hilding <aahilding@gmail.com>
Sent: Monday, June 20, 2016 9:15 PM
To: Linda M. Painter
Subject: Mistake in my letter

Linda,

I just re-read the letter I handed in to PZC this evening and I noticed that I made a mistake. On the fourth page I wrote "west" when I meant "east". Please see the first paragraph on page four and note in the eighth line it should read: **east** of Bone Mill Road NOT west!! The correct sentence should read: "The land that we believe merits an overlay zone is the UCONN forest land ***east*** of Bone MIll Road up to Northwood Apartments and from North Eagleville Road to Shelter Falls Park."

Would you please inform the PZ Commission members of my correction as soon as possible so that this error does not create confusion or a misimpression?

I apologize for my error.

Thank you.

Kind regards,

Alison Hilding

Jessie Richard

From: Alison Hilding <aahilding@gmail.com>
Sent: Tuesday, June 21, 2016 2:08 PM
To: PlanZoneDept
Subject: Follow-up comments to June 6, 2016 public hearing presentation
Attachments: Follow -up letter to PZC post June 6 hearing.doc; OLR Bill Analysis.doc

Follow Up Flag: Follow up
Flag Status: Flagged

Dear Mansfield Planning and Zoning Commissioners,

I have attached below some additional comments regarding last night's public hearing.

I have also attached a copy of the Office of Legislative Management's analysis of Senate Bill 422, "An Act Concerning Residential Water Rates, Public Drinking Water Supply Emergencies and Sellers of Bottled Water." I note that this bill failed in the 2016 legislative session. You can find more information on this bill and its predecessor , SB 450 using the following link:
https://www.cga.ct.gov/asp/cgabillstatus/cgabillstatus.asp?selBillType=Bill&which_year=2016&bill_num=SB+422

Thank you.

Kind regards,

Alison Hilding

June 21, 2016

To: Mansfield Planning and Zoning Commission

Subject: Follow-up on June 20, 2016 public hearing comments

Thank you for the opportunity to speak before you last night. Driving home a few points that I forgot to mention came to mind. I have addressed them below.

1) When CT Water bid on providing water for UCONN and Mansfield, they sweetened their offer by stating that they would underwrite the $8 million cost to build the pipe line from the Shenipsit to Mansfield. When they made that offer a large Tech Park and a growing student body at UCONN were anticipated. Associated growth in businesses and faculty at UCONN were also expected. The Tech Park seems to have fizzled and student growth is currently not occurring on the level previously imagined. Therefore CT Water will not be seeing the level of water sales it hoped for from these users in the immediate future. Surely CT Water must still want to recover their $8 million investment in the infrastructure. The obvious alternate source for water sales for CT Water is to promote growth and development in Mansfield. An obvious parallel exists elsewhere in the state; MDC did not get the contract to sell water to UCONN they turned around and sold the same volume of water, 1.8 million gallons per day, to the Niagara Bottling Company who in turn is bottling and shipping the water out of state.

It should be noted that CT Water sells water at different rates. UCONN gets a special lower institutional rate. A private user or private business in Mansfield pays more per gallon than UCONN does. I hope that you will take the time to look at the CT Water rate structure by user type. A brewery might look like a much more attractive customer to CT Water than, for instance, a shoe store. Similarly, water sold for student use on-

campus versus off-campus will net CT Water a very different profit. I hope that you will keep these financial interests and pressures in mind while making zoning decisions in Mansfield and that you will also take into consideration both the short term and long term health of the Shenipsit Reservoir, Fenton River, and Willimantic River.

Last night I mentioned the Water Diversion Permit requirement for a Long Range Water Conservation Plan. I underscore the importance of such planning and I hope that zoning decisions will be made with a mindfulness to judicious and thoughtful water use choices. Perhaps there might be a place for the exercise of informally prioritizing future water use in Mansfield, or at least thinking about it given that water resources are limited and climate change offers no promises. I encourage the Commission to look at the town water allocation (actual gallons) for the twenty and fifty year time frame for Mansfield as listed in the water diversion planning documents and to consider zoning decisions within this framework.

I was not pleased to learn last night after the PZC meeting that the Four Corners, and one other area, brew pub/brewery proposed reg changes would accommodate wholesale bottling sales. Would you please review this issue and clarify, if indeed, this is what the Commission proposed?

2) Another area I forgot to mention last night is traffic issues associated with both bars and package stores. I believe traffic concerns warrant your thoughtful consideration.

In my neighborhood I don't need a calendar to know when it is Thursday or Friday. The heavy, large, beer and other alcohol-laden trucks start zooming up North Eagleville Road Thursday morning headed for the package store on North Eagleville by the UCONN police station, the bar next to it, and the bar on King Hill Road. The drivers of these very large trucks must be on a tight pre-weekend delivery schedule because they move fast. While walking on North Eagleville Road I have more than once had to jump into the

poison ivy on the side of the road or a snow bank for safety as the delivery trucks race up the hill. I know the face of the St Paulie Girl well. I see her every week.

What similar or more intense delivery truck traffic might brew pubs, or an increase in the number of bars in Mansfield, create?

What is the likelihood of an increase in customer related DUI incidents from an increase in bars or the addition of brew pubs? Have you asked the State Police for statistics on frequency or location of DUI arrests in Mansfield? Age of DUI drivers?

If there is a need for increased policing as a result of more alcohol providers in Mansfield, what might the associated costs be on a routine basis? Would we need an additional police officer? What are the costs of periodic DUI road checkpoints?

What are the road wear consequences of trucking associated with the delivery to Mansfield or shipping from Mansfield of bottled products? These are heavy trucks and we have many country roads. What time of day might this shipping occur and what might the traffic consequences be in a retail area or near the high school? Where could trucks of this size and delivery frequency park at the downtown?

3) I believe that Mansfield has benefitted over the years from careful alcohol related zoning regulations. We don't have a proliferation of bars in Mansfield thanks to these regulations. In a college town this could be different. Furthermore, I see no problem with distance requirements. These are standard in many communities in this state. Might the current staff recommendation to do away with them be because there is the high school and now a day care center at the Storrs Downtown where a brew pub is being proposed? Would it be possible to waive the distance requirements in this special design district alone? Although I mentioned for your consideration potential issues regarding the high school's proximity to this proposed brew pub site, on the other hand, it seems to be the one site most likely to get closer policing and more careful management given the investment in and visibility of the downtown.

Overall, I think a much more careful and comprehensive study by the town is warranted before recommending any changes to the current alcohol regulations. Furthermore, it seems premature to change these regulations before addressing off campus behavior issues and student housing since alcohol is one of the contributing factors to these community wide problems. Frankly, it seems irresponsible to promote more alcohol sales to a largely youthful population in order to create more tax revenue for the town or more water sales for CT Water.

Sincerely,

Alison Hilding

Attachment: CT Office of Legislative Management review of Senate Bill SB 422 (File 450, as amended by Senate "A") 3 pages

OLR Bill Analysis

sSB 422 (File 450, as amended by Senate "A")*

AN ACT CONCERNING RESIDENTIAL WATER RATES, PUBLIC DRINKING WATER SUPPLY EMERGENCIES AND SELLERS OF BOTTLED WATER.

SUMMARY:

This bill increases the state's oversight of entities selling or bottling water diverted from the state. Specifically, it requires certain entities that begin diverting water from the state after June 1, 2017 for purposes of selling or bottling the water to obtain a water diversion permit from the Department of Energy and Environmental Protection (DEEP).

The bill makes two changes to the state Water Policy Council's activities, including (1) expanding the scope of the state water plan it develops to include recommendations on certain water diversions and water company rates and rate-setting practices and (2) requiring the council to report to the legislature, by September 30, 2017, on water diversions and any modifications necessary to comply with the state water plan.

The bill requires the Department of Public Health (DPH) commissioner, when implementing water use restrictions during a public drinking water supply emergency, to order that water sales to residential customers for essential residential use be given priority over sales to commercial water bottling companies exporting water out of the state during the emergency. Existing law gives the DPH commissioner broad authority to mandate water use restrictions during such an emergency, including allowing or ordering the implementation of water conservation practices. The bill specifies that these may include local, regional, or statewide practices.

Lastly, the bill requires water companies to implement certain drought metrics and comply with all water use restrictions the DPH commissioner orders during a public drinking water supply emergency.

*Senate Amendment "A" adds the provisions on (1) water diversion permits; (2) the state water plan; (3) the Water Planning Council reporting requirement; (4) local, regional, or statewide water conservation practices; and (5) water company drought metrics and water use restrictions. It eliminates a provision establishing certain water and sewer rate restrictions for licensed water bottlers.

EFFECTIVE DATE: Upon passage

WATER DIVERSIONS

By law, a diversion is any activity that causes, allows, or results in the withdrawal from, or alteration of, the flow of water in the state (such as wells, reservoirs, watercourses, and other bodies of water). The law generally requires anyone wanting to establish a water diversion to apply for a permit from DEEP, which has to consider specific criteria and standards including the diversion's effect on existing and planned water uses and public water supply needs, its relationship to economic development, and possible alternatives to diversion. Specific types of water diversions are exempt from the permit requirement, including withdrawals of 50,000 gallons or less of water from wells or surface water in any 24-hour period. In addition, any water diversion maintained on or before July 1, 1982, is exempt from the permit requirement if the owner registered it with DEEP by July 1, 1983.

Beginning June 1, 2017, the bill requires a person or municipality to obtain a water diversion permit from DEEP before beginning to divert more than 500,000 gallons of water per day from state waters for the purposes of selling or bottling the water. This requirement applies regardless of any statute or special act and includes any water previously registered as a water diversion.

By September 30, 2017, the bill requires the Water Planning Council to report to the legislature on the status of any registered or authorized water diversions and whether any modifications to them are necessary to comply with the state water plan. It must submit the report to the Energy and Technology, Environment, Planning and Development, and Public Health committees.

STATE WATER PLAN

The bill expands the scope of the state water plan to include recommendations regarding:

1. water rates charged licensed water bottlers;

2. water company rates, rate setting practices, and rate structures;

3. water company consumer advocates and public input regarding water company rates, including whether municipalities or entities should charge licensed water bottlers a clean water project charge rate less than that charged residential consumers (see BACKGROUND); and

4. guidelines on (a) daily water volume restrictions, (b) transport modes, and (c) the reduction of negative environmental impacts from registered or authorized daily water diversions of more than 500,000 gallons of water.

By law, the state's Water Planning Council must prepare the plan by July 1, 2017 and submit it to the legislature for approval, revision, or disapproval.

DROUGHT METRICS AND WATER USE RESTRICTIONS

The bill requires water companies to:

1. recognize and implement the uniform drought metrics specified in the National Drought Mitigation Center's U.S. Drought Monitor (see BACKGROUND) and

2. comply with all water use restrictions the DPH commissioner orders during a public drinking water supply emergency.

Under the bill, as under existing law, "water company" means any individual, municipality, or entity that owns, maintains, operates, manages, controls, or employs any pond, lake, reservoir, well, stream, or distributing plant or system that supplies water to two or more consumers or to 25 or more people on a regular basis.

BACKGROUND

Public Drinking Water Supply Emergency

The law authorizes the DPH commissioner, in consultation with the DEEP commissioner and Public Utilities Regulatory Authority, to declare a public drinking water supply emergency when he receives information that one exists, is imminent, or is reasonably expected to occur without immediately implementing conservation practices. During such an emergency, the DPH commissioner may allow or order the (1) water conservation practices, including restrictions on a public water system's or municipality's water use; (2) sale, supply, or taking of waters; and (3) temporary interconnection of water mains to sell or transfer water between water companies (CGS § 25-32b).

Clean Water Project Charge

The Metropolitan District Commission (MDC) levies this charge to repay debt associated with its Clean Water Project, a $2.1 billion project mandated by state and federal environmental officials to reduce sewage overflow into the Connecticut River. The charge is based on metered water consumption and is charged to MDC customers who receive both water and sewer services.

U.S. Drought Monitor

The U.S. Drought Monitor, established in 1999, is a weekly map of drought conditions based on climatic, hydrologic, and soil condition measurements and reported impacts and observations from more than 350 contributors around the country. It is jointly produced by the National Oceanic and Atmospheric Administration, the U.S. Department of Agriculture, and the National Drought Mitigation Center at the University of Nebraska-Lincoln.

COMMITTEE ACTION

Planning and Development Committee

Joint Favorable Substitute

Yea 15 Nay 5 (03/18/2016)

OLD BUSINESS

NEW BUSINESS

TOWN OF MANSFIELD

DEPARTMENT OF PLANNING AND DEVELOPMENT

Date: July 7, 2016

To: Planning and Zoning Commission

From: Linda M. Painter, AICP

Subject: Request for Special Permit Extension
United Services Inc., North Frontage Road
PZC File 1302

Diane Manning, the President and CEO of United Services Inc., has requested that the Special Permit approval granted on September 19, 2011 be extended for an additional year. According to her request dated July 5, 2016, they are in the process of finalizing financing for the project from the USDA and State of Connecticut. Construction drawings are almost completed and a groundbreaking is planned for September 2016. The one year extension is requested as they anticipate that construction may not commence until after expiration of their permit on September 19th.

The project consists of a new two-story, 28,738 square foot office building and other site improvements on a 6-acre site on North Frontage Road. Article V, Section B.7.e of the Zoning Regulations states that the construction of buildings or the commencement of the approved use shall take place within one year of the date of the PZC's approval. The Commission may grant extensions upon request of the applicant for periods up to one year for good cause. The PZC has granted prior extensions on this project, with the current extension expiring on September 19, 2016.

There have not been any changes to the regulations or site conditions since the Commission's 2011 approval that would alter the conditions under which the special permit was granted. If the Commission concurs with the extension request, the following motion would be in order:

MOVE to approve a one-year extension, until September 19, 2017, of the special permit granted to United Services, Inc., for the construction of an office building and associated site development on North Frontage Road.

United Services, Inc.

Creating healthy communities

July 5, 2016

Mansfield Planning and Zoning Commission
Linda Painter, Director of Planning and Development
Audrey P. Beck Building
Four South Eagleville Road
Storrs, CT 06268

Re: Mansfield's PZC Approval
PZC file #483-5
North Frontage Road

Dear Ms Painter:

United Services, Inc is requesting an additional one year extension for our Special Permit Approval adopted by the Mansfield Planning and Zoning Commission on September 19, 2011 for the property located on North Frontage Road.

United Services is finalizing USDA financing for the project, and anticipates additional state bonding may also become available. We are planning a groundbreaking in September 2016, with construction underway this fall. Construction bid documents are almost complete, but we are not likely to begin construction prior to the expiration of our approval in mid September.

Please contact me if you need any additional information in order to approve this request. We are anxious to begin construction and expand our available space to provide services for our community.

Thank you for attention.

Sincerely,

Diane L. Manning
President/CEO

www.UnitedServicesCT.org

1007 North Main Street, P.O. Box 839, Dayville, CT 06241-0839 Telephone 860.774.2020 • Fax 860.774.0826

TOWN OF MANSFIELD

DEPARTMENT OF PLANNING AND DEVELOPMENT

Date: July 7, 2016

To: Planning and Zoning Commission

From: Linda M. Painter, AICP

Subject: Town Council Referral – Outdoor Wood Burning Furnaces

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The Town Council voted at their June 27, 2016 meeting to refer the consideration of the regulation of outdoor wood burning furnaces to the Planning and Zoning Commission for review and consideration. The official referral from the Town Manager and supporting documentation provided to the Town Council are attached to this memo for your review.

If the Commission concurs, staff recommends referring the issue to the Regulatory Review Committee for further review.

MEMORANDUM

Town of Mansfield
Town Manager's Office
4 So. Eagleville Rd., Mansfield, CT 06268
860-429-3336
Hartmw@mansfieldct.org

To: Planning and Zoning Commission
CC: Linda Painter, Director of Planning and Development
From: Matt Hart, Town Manager
Date: June 29, 2016
Re: Referral: Outdoor Wood Furnaces

Per the attached, the Town Council has requested the Planning and Zoning Commission to review the above captioned matter and comment on the proposal.

Please note that an amendment to the proposed motion was made during the Council meeting. The motion passed on June 27, 2016 stated:

"Move, effective June 27, 2016, to refer the consideration of the regulation of outdoor wood furnaces to the Planning and Zoning Commission for its review and consideration."

Your assistance with this matter is greatly appreciated.

Town of Mansfield
Agenda Item Summary

To:	Town Council
From:	Matt Hart, Town Manager MWH
CC:	Maria Capriola, Assistant Town Manager; Linda Painter, Director of Planning and Development
Date:	June 27, 2016
Re:	Outdoor Wood Furnaces

Subject Matter/Background

At the June 13, 2016 Town Council meeting, Patricia Taylor, Deputy Outreach Director for Environment and Human Health, Inc. (EHHI) spoke in favor of Mansfield banning the use of Outdoor Wood Furnaces (OWFs). Ms. Taylor provided the Council with a number of resources that were published in the June 13th Town Council packet.

An Outdoor Wood Furnace is a structure located on residential property that is used primarily for home heating. The owner burns untreated wood in the furnace, which heats water that runs between the OWF and the home. The energy expended from this heats the home.

At this time OWFs are permitted in Connecticut and are regulated by Connecticut General Statute (CGS). In 2005 the General Assembly passed CGS §22a-174k which requires that all OWFs built after 07/08/2005 meet certain construction standards. All land use issues related to OWFs are left to the discretion of the local municipality, under the purview of the appropriate local land use agency. Currently 19 Connecticut communities ban OWFs.

According to information provided by EHHI, there is concern that the smoke produced by OWF burning wood is detrimental to a person's health and to the health of the neighborhood. According to studies conducted by EHHI, the smoke produced as a by-product of an OWF is known to contain a number of carcinogens and other toxins. EHHI cites a further concern that such OWFs located in neighborhoods could inhibit home sales due to potential buyers wishing to avoid the smoke byproducts.

Recommendation.

If the Town Council wishes explore the subject further, staff recommends that the Town Council refer this matter to the Planning and Zoning Commission (PZC) for further review and consideration. Any local regulations concerning OWFs would need to be adopted by the PZC.

If the Town Council agrees with this recommendation, the following motion is in order:

Move, effective June 27, 2016, to refer the consideration of a ban against outdoor wood furnaces to the Planning and Zoning Commission for its review and consideration.

Attachments

1) EHHI re Outdoor Wood Furnaces
2) CT DEP Fact Sheet – Conn. Gen. Stat. 22a-174k and Outdoor Wood Burning Furnaces
3) CT Towns Banning OWFs
4) EHHI 2010 Report – The Dangers to Health from OWFs
5) EHHI Short Overview of OWFs
6) Tolland Zoning Regulation Prohibiting Outdoor Wood Furnaces

Sara-Ann Chaine

Item #13

From:	Patricia Taylor <ptaylor.ehhi@gmail.com>
Sent:	Thursday, May 05, 2016 5:50 PM
To:	Town Mngr
Cc:	Virginia D. Walton
Subject:	EHHI - Outdoor Wood Furnaces
Attachments:	OWF 3.jpg; CT Towns Banning OWFs.pdf; Tolland Zoning Regulation Prohibiting Outdoor Wood Furnaces (Mayors, Town Managers.pdf; EHHI Short Overview of OWFs.pdf; CT DEEP Fact Sheet - Conn. Gen. Stat. 22a-174k and Outdoor Wood Burning Furnaces.pdf; Case 2 - Converse, Weston, CT.pdf; EHHI 2010 Report - The Dangers to Health from OWFs.pdf

Mr. Hart,

I spoke briefly on the phone today with Assistant Town Manager Capriola.

Thank you for this opportunity to reach out with the attached information from Environment and Human Health, Inc. (EHHI). **We encourage Mansfield to pass an ordinance or zoning regulation prohibiting outdoor wood furnaces (OWFs).**

I've shared this information with Rob Miller, your Director of Health at Eastern Highlands Health District Health, so you may seek his advice on the health information enclosed. **CT DEEP and DPH are very pleased with our effort.**

Currently, 2 towns in your county – Hebron and Tolland – prohibit these appliances.

While Connecticut General Statute 22a-174k limits setbacks and restricts stack heights and what may be burned in OWFs, it is left to local leadership to regulate or to ban their use in your community.

Wood smoke contains many of the same toxic compounds that are found in cigarette smoke.

OWFs are one area of study and policy for EHHI because of their harm to human health. Neighbors who live near an OWF suffer illness and injury. Their homes lose value. When they decide the only solution to their health problems is to sell and move, they can't find a buyer because inspection uncovers the nearby furnace and the sale falls apart.

See www.ehhi.org/woodsmoke/ for an overview.

Only Mansfield can guarantee clean air and good health for its residents, when it comes to OWFs – by banning them. Please be assured it is ONLY OWFs that we seek to ban. The 19 Connecticut towns that have already passed bans will verify that fact.

On Tuesday May 10, I will drop a hard copy of the (large attachment) 2010 EHHI report entitled *The Dangers to Health from Outdoor Wood Furnaces* to your office. The study it reports was peer-reviewed and published in 2014 in the *Journal of Inhalation Toxicology*.

If you'd like to meet me then, please let me know. I'd love to speak with you or any member of your team about whether you support this effort

Regards,

Tricia Taylor

About EHHI:

Environment and Human Health, Inc. (EHHI) is a ten-member, science-based organization composed of physicians, public health professionals and policy experts. The organization is dedicated to protecting human health from environmental harms through research, education and the promotion of sound public policies.

EHHI is not a membership organization and therefore all of its support comes from foundations and committed individuals. EHHI does not receive any funds from businesses or corporations.

--

Patricia Taylor
Deputy Outreach Director
Environment & Human Health, Inc.

Telephone: (203) 227-4100
Mobile: (203) 856-3544

ptaylor.ehhi@gmail.com

Case number 2 - Suzan Converse, Weston, CT

My neighbor across the street has a wood-burning furnace and it has become an extreme disturbance and problem in our lives. Once he begins using his furnace in the fall I can no longer open my windows to get fresh air, in fact, my house is always contaminated by his wood smoke.

I found out that indoor air is 70% of what is outdoors...that no windows or doors can keep the smoke out. I also cannot hang any laundry out on my line because it will get completely smoked out and thus I am forced to use more energy with my clothes dryer. We are very health conscious and environmentally conscious people who make decisions carefully so that we don't leave much of a footprint.

We feel extremely frustrated that we are defeated in our efforts by someone else's lack of consideration. One of my children recovered from a serious autoimmune disease before we moved into our house (3 years ago) and had we known the circumstance with my neighbor we would never have bought it.

No one in my family had ever suffered any upper respiratory illness until three years ago. At that time I was very ill and had borderline pneumonia. The following year my entire family spent a day outdoors on our property doing yard work and playing and 3 days later we were all sick with bad coughs and I again was close to pneumonia.

We are very careful not to go out anymore when his furnace is in use and try to have our property cleaned up in the fall before he begins using his furnace. There are times when the smoke is at ground level. I can never even feel comfortable letting my own children out to play for fear of their breathing the toxic wastes. If we could afford to move we would.

We feel trapped and defeated not only by our neighbor but by our town and the illogical grandfather laws allowing someone to harm others if they have been doing it already before a certain time. Why aren't people protected from wood smoke like this automatically? The people who sold us this house moved because one of the owners had a terminal lung condition and had difficulty going up and down stairs (he used oxygen tanks). Was it exacerbated by my neighbor's furnace? I feel afraid for our future health and will do anything to stop this man from using his furnace not just for my family's health but my neighbors' health and that of the wildlife and plant life that still exists in our area.

From: Suzan Converse, Weston, CT
Phone number 203-587-1023
szan@optonline.net

CT DEP Fact Sheet

Produced Sept 2005, revised 2011

Conn. Gen. Stat. 22a-174k and Outdoor Wood Burning Furnaces

During the 2005 session of the General Assembly Public Act 05-227, now codified as Connecticut General Statute 22a-174k, concerning the siting of Outdoor Wood Burning Furnaces (OWFs) was signed into law.

The Conn. Gen. Stat. 22a-174k requires that any OWF constructed, installed, established, or modified after July 8th, 2005:

- Must operate only on wood that has not been chemically treated.
  - Any other material burned in the OWF would constitute a violation of the statute.
  - Additionally, installation and operation must be conducted in accordance with the manufacturer's written instructions provided they do not conflict with the statute.

  - Must be located not less than 200 feet from the nearest residence not being served by the unit. (If the unit will be closer than 200 feet to the nearest residence not being served by the unit, then the OWF must not be installed).

- Must have a chimney that is more than the height of the roof peaks of residences located within 500 feet of the OWF, provided the chimney height is not more than 55 feet (This is to the actual roof peak, not the mid-line of the slope).
  - A chimney's height is limited to no more than 55 feet, from ground level, at its installed location. (If this is not more than the height of the roof peaks of residences located within 500 feet of the OWF, then the OWF must not be installed).
  - A licensed Land Surveyor or Professional Engineer would be able to provide appropriate mapping, showing both the horizontal and the vertical control measurements to all residences within the 500 foot radius required by law in order to demonstrate compliance with Conn. Gen. Stat. 22a-174k.

- Is subject to an infraction, not to exceed $90/day, for every day of operation not in compliance with Conn. Gen. Stat. 22a-174k. Violation of this statute is listed under miscellaneous in the Judicial Infraction Schedule.

Connecticut municipalities continue to have local control of land use in and around areas with OWFs, for instance:

- Some municipalities institute summer bans, complete bans, or limit installation of OWFs within their jurisdictions. Local municipalities may choose to limit installations near schools, churches, and commercial areas as the statute only addresses set back requirements from residences.

- The installation of an OWF requires a building permit.

- While not required by the statute, some municipalities may choose to require a submittal from a licensed surveyor or professional engineer documenting the location of the OWF, distances to residences, and comparative heights of the stack and residential rooflines, as required by the statute, as part of the local zoning or building permit process.
    - This could ensure the local municipality limits its potential liability by not issuing a permit granting authorization to a resident to install an OWF unit in a non-compliant manner.
    - Property owners, local officials, and state officials do not have jurisdiction to allow variances or exception for any of these regulatory requirements.
    - As with any tall narrow structure, adequate foundation and guying support should be installed as needed to meet applicable codes and ensure public safety.

- Municipalities affected by operation of an OWF, along with DEP, have authority to enforce the provisions of Conn. Gen. Stat. 22a-174k.

Other Obligations

In addition to the provisions of Conn. Gen. Stat. 22a-174k and local ordinances, Sections 22a-174-18 and 22a-174-23 of the Regulations of Connecticut State Agencies for the abatement of air pollution also apply to the owner or operator of an OWF.

- The provisions of subsection (b) of 22a-174-18 provide that an owner or operator of any fuel burning source shall not exceed 20% opacity during any six-minute block average and 40% opacity during any one-minute block average.

- The provisions of subsection (c) of 22a-174-18 provide that no person shall cause or allow the emission of visible particulate matter beyond the legal boundary of the property on which such emission occurs that either; remains near ground level beyond such property boundary, or diminishes the health, safety or enjoyment of people using a building or structure located beyond the property boundary. Additionally, no person shall emit particulate matter into the ambient air in such a manner as to cause a nuisance.

- The provisions of subsection (a) of 22a-174-23 provide that no person shall cause or permit the emission of any substance or combination of substances which creates or contributes to an odor, in the ambient air, that constitutes a nuisance. Additionally, an odor constitutes a nuisance if present with such intensity, characteristics, frequency and duration that; it is, or can reasonably be expected to be, injurious to public health or welfare, or it unreasonably interferes with the enjoyment of life or the use of property.

For More Information

The CT DEP operates an **Air Pollution Complaint Line at 860-424-3436.** This line is open to all citizens with concerns regarding smoke and other air pollution. It is operated from 8:00 am - 4:30 pm, Monday through Friday; voice mail is available for complaints made during evening and weekend hours or you can e-mail a complaint to dep.aircomplaints@ct.gov

THE 19 TOWNS in Connecticut that have now banned outdoor wood furnaces are:

Avon

Bethel

Cheshire

Clinton

Granby

Haddam

Hamden

Hebron

Norfolk

North Haven

Plainville

Portland

Ridgefield

Rocky Hill

Simsbury

South Windsor

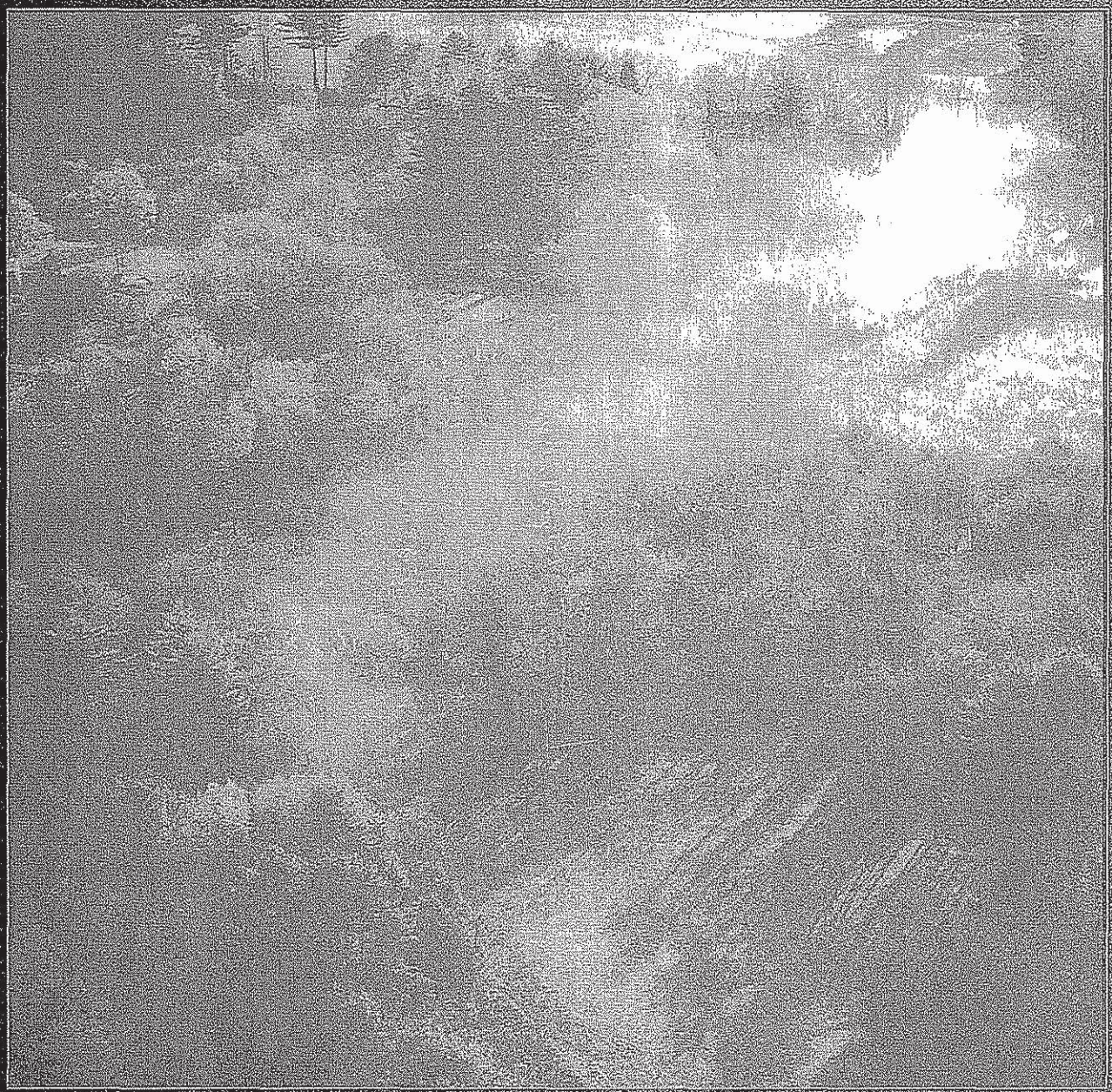
Tolland

West Hartford

Woodbridge

January 26, 2016

THE DANGERS TO HEALTH FROM Outdoor Wood Furnaces



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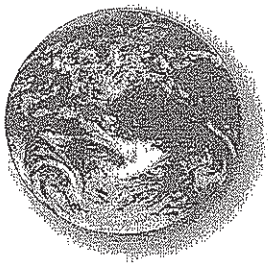

THE DANGERS TO HEALTH FROM Outdoor Wood Furnaces

Research and publication of this report was made possible by The Tortuga Foundation and The William C. Bullitt Foundation.

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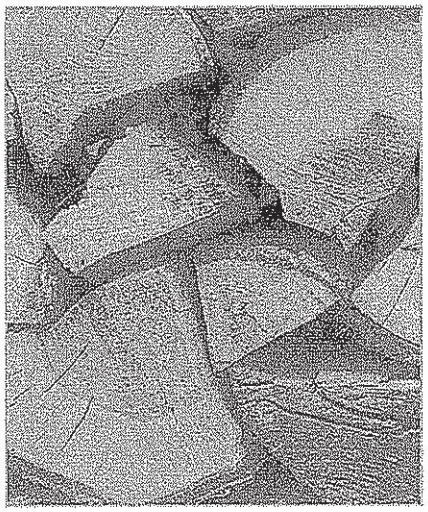
Introduction

This study investigates how homes are affected by neighboring outdoor wood furnaces, as well as the health implications for the families living inside homes impacted by wood smoke.



When the weather forecast includes a warning of poor air quality, many people reduce their levels of activity and stay inside. However, many homes that are impacted by neighboring outdoor wood furnaces have air quality *inside* that is poor all the time. What can people do? This study investigates how homes are affected by neighboring outdoor wood furnaces, as well as the health implications for the families living inside homes impacted by wood smoke.

In this report, Environment and Human Health, Inc. (EHHI) explains its study, which measured potential wood smoke inhalation by people living in homes in the vicinity of outdoor wood furnaces (OWFs), also known as outdoor wood boilers (OWBs). EHHI's study monitored levels of $PM_{2.5}$ and $PM_{0.5}$ particles in each house for 72 hours.

The U.S. Environmental Protection Agency (EPA) has shown that $PM_{2.5}$ and $PM_{0.5}$ are the most common size particles in wood smoke. $PM_{2.5}$ and smaller cause the greatest health impacts because they are small enough to go deep inside the lungs, where they can not only damage the lungs, but also pass through into the blood stream,

delivering their toxins throughout the body. EHHI's study was performed over three days, for 72 hours per house, in each house that was monitored. This is the only study of its kind to date.

People have a long association with burning wood as a fuel, and because of that fact, one could easily believe that wood smoke is a natural part of our environment and is quite benign. This, however, would be wrong. Wood smoke has many of the same components as cigarette smoke, now heavily regulated because of its harmful health effects. Not only is wood smoke harmful to health, but there are currently almost no regulations restricting it or protecting neighbors who are harmed by it.[1,2]

OWFs use a heating technology that has grown in popularity, especially in the northern United States. In most cases, OWFs look like small sheds with short stacks. They are self-contained, and are connected to the building or house that they heat through underground insulated water pipes. The wood-burning shed contains a metal combustion chamber for a wood fire, surrounded by a water jacket. The fire heats the water, which is then circulated through the insulated water pipes into the house or building for heat.[3]

People have a long association with burning wood as a fuel, and because of that fact, one could easily believe that wood smoke is a natural part of our environment and is quite benign. This, however, would be wrong.

The components of cigarette smoke and wood smoke are very similar, and some components of both are carcinogenic.

Outdoor wood furnace emission problems are exacerbated by the fact that these devices cycle between oxygen-deficient and oxygen-rich burning. This causes the smoke that leaves the stack to be cool. Irrespective of the stack's height, the wood smoke will fall toward the ground and will then travel in a plume for up to one-half mile, impacting houses in its wake.[4]

Wood smoke contains particles that are so small they cannot be kept out of homes, even tightly built homes. The smoke particles enter through the windows and the doors and remain in the homes for long periods of time, impacting a family's health.[5]

As the use of outdoor wood furnaces has increased, so has the number of complaints. Neighbors have reported serious health impacts, including reduced lung function, increased asthma attacks, headaches, sinusitis, bronchitis and pneumonia. Many of the components of wood smoke are carcinogenic—and wood smoke as a whole can aggravate heart disease.[6]

According to the Environmental Protection Agency (EPA), wood smoke includes toxic air pollutants and can cause coughs, headaches, and eye and throat irritation in otherwise healthy people.[7] Scientific literature further demonstrates that wood smoke exposure can depress the immune system and damage the layer of cells in the lungs that protect and cleanse the airways. Wood smoke interferes with normal lung development in infants and children. It also increases children's risk of lower respiratory infections, such as bronchitis and pneumonia. The components of cigarette smoke and wood smoke are very similar, and some components of both are carcinogenic.

Why outdoor wood furnaces (OWFs) emit far more smoke than other wood-burning devices

The design of an outdoor wood furnace does not allow for complete combustion, and thus generates large amounts of dense smoke. When it leaves the stack, the smoke is much cooler

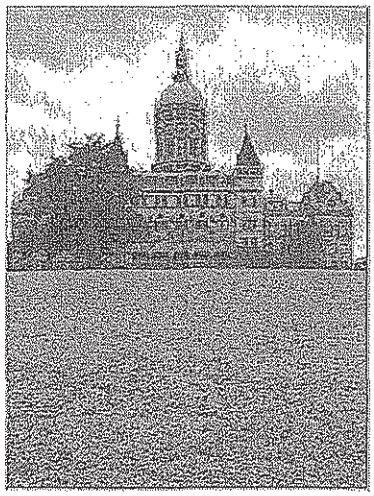
than smoke from other wood-burning appliances. The firebox inside the shed of most OWFs is fully surrounded by a water jacket. This causes the wood fire to remain well below the needed 1000° F temperature for a complete burn. The slower, cooler fire is inefficient and creates a great deal of smoke, carbon monoxide and creosote.[8,9]

The Northeast States for Coordinated Air Use Management (NESCAUM) found that the average fine particle emissions from one OWF are equivalent to the emissions from 22 EPA-certified wood stoves, 205 oil furnaces, or as many as 8,000 natural gas furnaces. The report notes, to put these numbers in perspective, that a single outdoor wood-burning boiler can emit as much fine particulate matter as four heavy duty diesel trucks, on a grams per hour basis.[10] The smallest OWF has the potential to emit almost one and one-half tons of particulate matter every year.[11]

Why Environment and Human Health, Inc. undertook this study

In 2008, Environment and Human Health, Inc. (EHHI) began receiving requests for help from people whose neighbors were using outdoor wood furnaces to heat their homes. These people had sought help from their town and state officials, and only called EHHI after they had been unable to obtain any help to stop wood smoke emissions from entering their homes and making them sick. Because of the harmful effects of wood smoke on health and because federal and state agencies were not stepping in to protect health, Environment and Human Health, Inc. felt that it needed to act to try to protect the families being adversely impacted by OWFs.

Many states have materials on their websites citing the dangers of OWFs, as well as the harmful effects of wood smoke in general. Some states have passed "set-back" regulations and stack height regulations for OWFs—but none of these measures has been able to protect human health. To date, only the state of Washington has banned OWFs throughout the state.

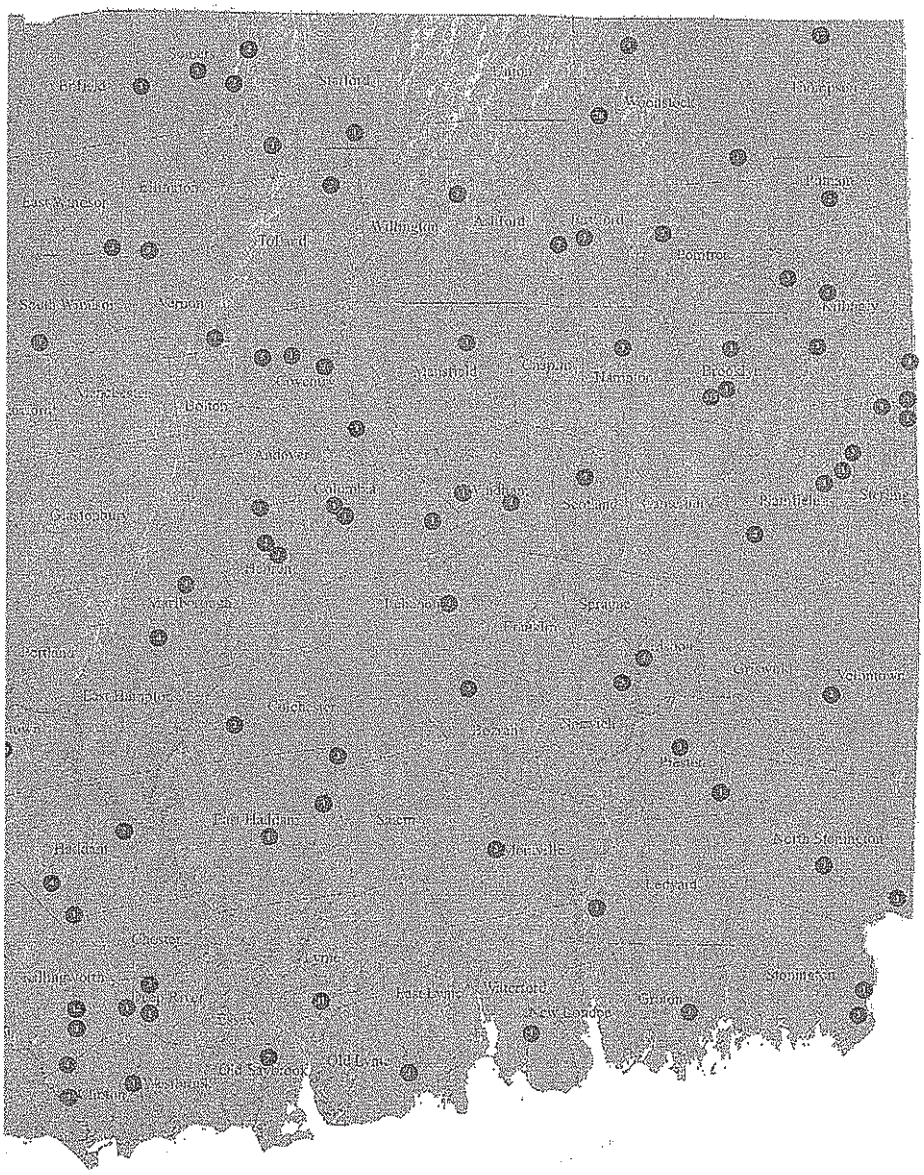


Some states have passed "set-back" regulations and stack height regulations for OWFs—but none of these measures have been able to protect human health.

Outdoor Wood Smoke: Number of Complai

In 2008, EHHI began receiving requests for help from people whose neighbors were using outdoor wood furnaces to heat their homes.

...ts by Location in the State of Connecticut



Unless states take decisive action to protect their citizens, confusion and inaction will remain with regard to who has jurisdiction over wood smoke problems—and who will actually enforce wood smoke regulations.

24 32 Miles

N W E S

- 1
- 2–2
- 21–40
- 41–60
- >60

Emissions from a smoldering fire, with incomplete combustion, contain more carbon monoxide, carcinogens, organic toxicants and irritants than smoke emissions from a very hot fire that is supplied with high levels of air and oxygen.

Although some individual towns across the country have banned new installations of OWFs, this is a very cumbersome way to address the problem, as there are thousands of towns. In addition, bans by towns, going forward, do not address the problems created by "grandfathered" OWFs. In the meantime, new OWFs are being installed across the northern states in this country, creating more and more problems for people living near them *(see map, preceding page)*.

When neighbors complain to the state about an outdoor wood furnace that is *in compliance*, but is causing them harm, they are often referred back to their town officials. Unless states take decisive action to protect their citizens, confusion and inaction will remain with regard to who has jurisdiction over wood smoke problems—and who will actually enforce wood smoke regulations.

Wood smoke contains unhealthy amounts of:

- particulate matter
- dioxin
- carbon monoxide
- nitrogen dioxide
- sulfur dioxide
- hydrochloric acid
- formaldehyde
- other toxic air pollutants

Exposure to these pollutants is associated with a diverse range of harmful health effects, some of them short-term and others long-term.

How can the risks to residents' health in a home impacted by wood smoke be determined?

The amount of wood smoke inhaled determines the health risk.

The amount of contaminated air inhaled inside a house determines the health risk. In the case of complex mixtures of toxins, such as those present in wood smoke, the health effects are determined by the chemical components of the smoke emissions. Thus, the health

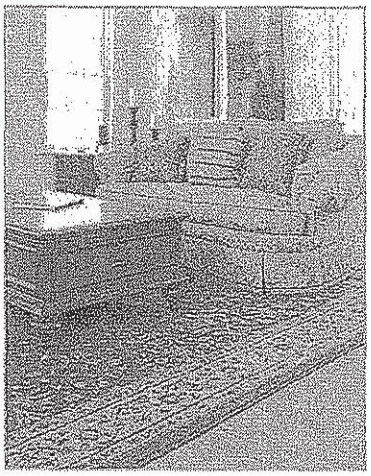
effects from smoldering fires are not the same as from hot "oxygen-rich" fires. Mixtures that include particulates that can be inhaled deep into the lungs put individuals at high risk. Certain gaseous toxins may be adsorbed onto the surfaces of the particulates and carried to the most sensitive regions of the lungs, where they are readily absorbed into the body. Normally, such gases would be removed in the nose and upper respiratory tract and would not reach the sensitive areas of the lungs.

The small respirable particles, 0.1 to 5 microns[12] in size, are present in all wood smoke. The particles remain suspended in the air for several hours and readily flow into houses. Thus, the particulates in the 0.1 to 5 micron size range are a surrogate for measuring the presence and intensity of wood smoke inhalation risk. Other sources of particulates in this size range include tobacco smoke, cooking particles and combustion gases from industrial sources found in ambient air.[13] Therefore, the indoor measures must be compared with background levels in the ambient air.

The inhalation of wood smoke is hazardous. Wood smoke contains irritants, systemic toxins and carcinogens. All wood smoke emissions are not the same. The levels of irritants and carcinogens are determined by the type of wood, its source and the method of burning. Emissions from a smoldering fire, with incomplete combustion, contain more carbon monoxide, carcinogens, organic toxicants and irritants than smoke emissions from a very hot fire that is supplied with high levels of air and oxygen.

Almost all burning wood and biomass release a range of particulate matter, from dense smoke to fine particulates that readily penetrate the deep lungs. Levels of particulates can be used as a surrogate for the amount of smoke emissions that enter a building. According to the EPA, toxics in the wood smoke emissions from outdoor wood furnaces include carbon monoxide, $PM_{2.5}$, PM_{10}, methane, volatile organic compounds, benzene, sulfur dioxide, nitrogen oxides, ammonia, formaldehyde, acetaldehyde, phenol, naphthalene, cresols, acrolein, 1,3-butadiene, benzopyrene, mercury, dioxins and furans.[14]

According to the EPA, toxics in the wood smoke emissions from outdoor wood furnaces include carbon monoxide, $PM_{2.5}$, PM_{10}, methane, volatile organic compounds, benzene, sulfur dioxide, nitrogen oxides, ammonia, formaldehyde, acetaldehyde, phenol, naphthalene, cresols, acrolein, 1,3-butadiene, benzopyrene, mercury, dioxins and furans.



Until Environment and Human Health, Inc. conducted this study, very little was known about how much wood smoke was actually inside homes located near outdoor wood furnaces.

Until Environment and Human Health, Inc. conducted this study, very little was known about how much wood smoke was actually inside homes located near outdoor wood furnaces. EHHI has now evaluated the indoor air quality inside a number of homes near outdoor wood furnaces. EHHI also evaluated a number of homes that were not near outdoor wood furnaces, which served as the control houses.

The critical question is the safety of those who continue to inhabit a house that has accumulated wood smoke emissions.

In order to understand the risk from the exposures occurring inside houses impacted by wood smoke emissions, it is necessary to monitor the hourly concentrations over several days to establish the patterns of air changes. To establish the added risk from wood smoke, it is necessary to compare the measurements to concentrations in control, or background, houses.

How outdoor wood smoke enters the inside of neighboring homes and the resulting health effects

The amount of smoke emissions that enter a house is dependent on the concentration of the smoke emissions outside of the house, as well as the rate at which the house exchanges outside and inside air. Typical houses in the Northeast exchange one total volume of air each hour, but can vary from one air change every two hours for "tight" houses to one air change every half-hour for a very drafty house.

Over a period of several hours, the amount of smoke emissions inside the house will reach the same concentration as in the air that surrounds the house. As a rule of thumb, it can be assumed that after one hour—in a house with good interior circulation to mix the emissions entering the house with the clean air inside it—the concentration of emissions inside a house is approximately half of that outside. The concentration inside the house will increase hourly,

until after a period of six to nine hours, the concentrations of emissions inside and outside of the house are essentially the same.[15]

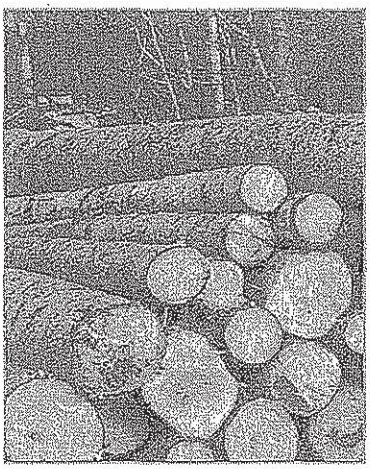
Once a house is contaminated with wood smoke emissions, several hours are required to totally remove the contaminated air. The rate of removal is again determined by the number of air changes per hour. If the outside air is absolutely clean, after one air change the interior contamination is reduced by about one-half. After three to four hours, about 10 percent of the contamination is still present inside of the house. The house retains the contamination after the emissions surrounding the house have been diluted.

Large amounts of wood smoke, like the plumes from OWFs, cannot be kept out of neighboring houses, even those with tight windows and doors.

A study by the University of Washington in Seattle showed that 50 to 70 percent of the outdoor levels of wood smoke was entering homes that were not burning wood.[16] The EPA performed a similar study in Boise, Idaho, with similar results. The data in the charts on pages 23–27 demonstrate that similar exposures are occurring in Connecticut.

Key background information about wood smoke:

- Large amounts of wood smoke, like the plumes from OWFs, cannot be kept out of neighboring houses, even those with tight windows and doors.
- Wood smoke has many of the same components as cigarette smoke and, therefore, these exposures pose a real health risk for families living in the vicinity of OWFs.
- Wood smoke is a complex mixture of chemicals and particulates. It contains carbon monoxide and other organic gases, particulate matter, chemicals and some inorganic gases. Some of these compounds are toxic (aldehydes and phenols) and some are known carcinogens (benzopyrene and cresols).
- Wood smoke contains carbon monoxide (CO) gas, which at low levels can lead to serious health problems for individuals with compromised heart and circulatory conditions.



A study by the University of Washington in Seattle showed that 50 to 70 percent of the outdoor levels of wood smoke were entering homes that were not burning wood. The EPA performed a similar study in Boise, Idaho, with similar results.

- Particulate matter in wood smoke that is less than 10 microns in diameter finds its way into the alveoli in the lungs. Once in the alveoli, the particulate matter can cause structural and chemical changes, which interfere with oxygen uptake. As well, the toxic compounds and carcinogens enter into the bloodstream by way of the alveoli of the lungs.

- Episodes of short-term exposures to extreme levels of fine particulates from wood smoke and other sources, for periods as short as two hours, produce significant adverse health effects.[17, 18, 19]

- Wood smoke interferes with normal lung development in infants and children. The components of smoke increase children's risk of lower respiratory infections, such as bronchitis and pneumonia. Wood smoke exposure can depress the immune system and damage the layer of cells in the lungs that protects and cleanses the airways.

- Wood smoke causes coughs, headaches, and eye and throat irritation in otherwise healthy people. For vulnerable populations, such as people with asthma, chronic respiratory disease and those with cardiovascular disease, wood smoke is particularly harmful—even short exposures can prove dangerous.

- Children and the elderly have the highest sensitivity to wood smoke. However, no age group is without risk for respiratory problems, including asthma and chronic obstructive pulmonary disease (COPD), that result from breathing wood smoke. The effects are cumulative.

- The air impact of health exposure to wood smoke is increased two-fold during periods with stagnant air. Under such conditions, the inhaled dose levels of particulates within houses approach the hazardous level found in regulated work sites by OSHA. EHHI found smoke entering houses, every day, at even higher levels.

- The particulate matter and gases in wood smoke are so small that windows and doors cannot keep them out—even the newer energy-efficient, weather-tight homes cannot keep out wood smoke. This is consistent with reports from people in the EHHI study who say their children awaken in the middle of the night having difficulty breathing.

- In 2009, the state of Massachusetts commissioned a study on the environmental impacts of burning wood for electricity. That study, conducted by the Manomet Center for Conservation Sciences, has now been released. The Manomet study shows that, per unit, wood releases more climate-damaging gases than coal.[20]

The Manomet study shows that wood burning releases more heat-trapping carbon dioxide into the atmosphere per unit of energy than oil, coal or natural gas.

Wood burning has been promoted as a "green" energy source because growing forests can absorb the same amount of greenhouse gases that are emitted from burning wood, essentially canceling out the pollutants. The Manomet study shows that wood burning releases more heat-trapping carbon dioxide into the atmosphere per unit of energy than oil, coal or natural gas.

Summary of the Study's Findings

States have tried to control the harmful effects of outdoor wood furnaces by legislating set-back regulations. Some states have set-back regulations of 100 feet from the nearest neighbor, while other states have set-back regulations of 200 feet. This study shows that none of the regulations that have been put in place protect the neighboring properties or the health of the families living in the homes on those properties.

- EHHI measured the two particle sizes—$PM_{2.5}$ and $PM_{0.5}$—designated by EPA to be the most dangerous to human health. Both of these particulates were continuously recorded in each of the impacted homes for a period of three days. Both hourly averages and minute-by-minute data were collected.

- Two of the most hazardous components of wood smoke, particulate matter (PM) measuring 2.5 and 0.5μ (u) microns in size, were significantly elevated inside homes neighboring outdoor wood furnaces. High levels were present in every 24-hour period tested, in every home.

- A look at the hours of peak exposures to $PM_{2.5}$ particles in both the background houses and the impacted houses shows that House A had peak levels that were six times higher than the control houses; House B had peak levels 14 times higher than the control houses; House C had peak levels 12 times higher than the control houses; and House D had peak levels more than eight times higher than the control houses (see charts showing Houses A, B, C and D on pages 23–26, where the blue line represents background levels in control houses).

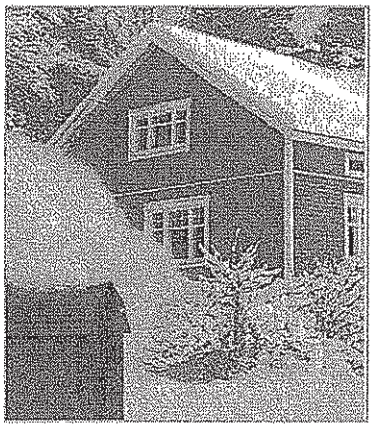
- Comparing the derived equivalent $PM_{2.5}$ particle count to the estimated EPA 24-hour air standard of 35 micrograms per cubic meter (ug/m^3) shows that House A had four times the EPA air standard; House B had nine times the EPA air standard; House C had eight times the EPA air standard; and House D had six times the EPA air standard.

- Every impacted home had many hours when $PM_{2.5}$ particles were significantly above both the levels found in the background houses and the EPA air standards.

- All impacted houses had particulate exposures well above the EPA air ambient air quality standard. Levels of $PM_{2.5}$ that exceed the EPA standard are associated with asthma or COPD attacks and hospitalizations, and are also associated with increased risk of cardiovascular problems.

- An impacted house 100 ft. from an OWF had 14 times the levels of $PM_{2.5}$ compared to the background houses, and nine times the levels of $PM_{2.5}$ in the EPA's air standards.

- An impacted house 120 feet from an OWF had more than eight times the levels of $PM_{2.5}$ compared to the background houses, and six times the levels of $PM_{2.5}$ in the EPA's air standards.
- An impacted house 240 feet from an OWF had 12 times the levels of $PM_{2.5}$ compared to the background houses, and eight times the levels of $PM_{2.5}$ in the EPA's air standards.
- An impacted house 850 feet from an OWF had six times the levels of $PM_{2.5}$ compared to the background houses, and four times the levels of $PM_{2.5}$ in the EPA's air standards.
- The study shows that regulating a 200-foot setback is not protective, and does not keep wood smoke from entering neighbors' homes.
- Even the impacted house as far away as 850 feet from the OWF had levels six times that of the background houses, and four times higher than the EPA air standards, showing that a 200-foot set-back regulation in no way protects property values or human health.
- EHHI's study shows that emissions from the OWFs enter neighboring homes at all hours of the day—and it takes several hours for the particulates to clear out of the homes.
- This study shows that $PM_{0.5}$ particle exposures are also high throughout the 24-hour period, yet state and federal standards are only based on $PM_{2.5}$ particulates.
- The state and federal governments regulate particulate exposures by averaging them over a 24-hour period. Yet this study shows that the exposure peaks can be very high, and these peaks can cause health effects. The peak exposures should be examined and regulated, as well as the average exposure.
- The study confirms that windows and doors, even tight ones, cannot keep wood smoke out if it is close enough and dense enough.



Even the impacted house as far away as 850 feet from the OWF had levels six times that of the background houses, and four times higher than the EPA air standards, showing that a 200-foot set-back regulation in no way protects property values or human health.

Health Effects of Wood Smoke Exposures

Fine particulate matter is especially harmful to people with chronic obstructive pulmonary disease (COPD), increasing their hospital admission rates.[22]

Wood smoke poses risks for healthy people who are physically active outdoors. Wood smoke contains gases and other respiratory irritants linked to allergies, inflammation of the throat and sinuses, or decreased lung function.[21]

Short-term and immediate effects

Burning eyes and throat, sinusitis, bronchitis, pneumonia[22]

Long-term effects

Chronic Obstructive Pulmonary Disease

- Fine particulate matter is especially harmful to people with chronic obstructive pulmonary disease (COPD), increasing their hospital admission rates.[23]

Asthma

- Currently, 19.2 million people (8.5 percent of adults) in the United States report that they have asthma.[24] New England states have some of the highest asthma rates in the country.

  A nonprofit, public health and medical research funding organization, Health Resources in Action, produced a report entitled, *The Burden of Asthma in New England.* The report shows the very high and growing rates of asthma in both adults and children in the region. Asthmatic children are particularly sensitive to fine particulate matter and wood smoke.[25]

Cancer

- OWFs emit a number of carcinogenic chemicals. Wood smoke contains benzene, formaldehyde, polycyclic aromatic hydrocarbons (PAHs) and dioxin. Fine particulate matter also increases the risk of cancer. Analysis of data from an American Cancer Society

cohort study found that for each 10 ug/m^3 elevation in fine particulate air pollution, the risk of lung cancer mortality increased by 8 percent.[26]

Asthmatic children are particularly sensitive to fine particulate matter and wood smoke.

Cardiovascular Disease

- Mortality and hospital admissions for myocardial infarction, congestive heart failure and cardiac arrhythmia increase with a rise in the concentrations of particulate and gaseous pollutants.

  As concentrations of airborne particles increase, people with cardiovascular disease may experience increasing severity of symptoms, rates of hospitalization, and mortality.[27]

Carbon Monoxide Poisoning

- The low-burning fires of OWFs emit larger amounts of carbon monoxide than high-combustion fires. Carbon monoxide exposure is not only an immediate health risk; continuous exposures, even at low levels, can lead to neurological effects.[28, 29, 30]

Methods Used in the Research Study

Environment and Human Health, Inc. (EHHI) designed its research with two goals in mind. The first goal was to measure, with precision, the air quality in homes near outdoor wood furnaces (OWFs). This entailed setting up a particle monitor in people's homes, and also taking into account other factors that might affect air quality, such as heating and hot water systems. Data on weather conditions were also collected. The second goal of the research was to design a protocol that would be easily replicable by citizens with similar smoke concerns.

EHHI chose four homes to study from the pool of individuals who had contacted EHHI about their problems with smoke from OWFs that had been installed in neighboring houses. These four impacted families were willing to have EHHI's researchers come into their homes and were willing to abide by the research protocol. Each of the four houses in the study was between 100 and 850 feet from an OWF. Each of the families had a series of health problems that they attributed to the smoke from a nearby OWF.

EHHI's researchers measured the presence of two sizes of particles in the indoor air of the four homes—those measuring 2.5 microns and those 0.5 microns and smaller. Particles of both sizes are two of the most hazardous components of wood smoke because they are inhaled deep into the respiratory system. The device used for measurement was a Dylos Air Quality Monitor 1100 Pro. This monitor provides counts of particles (both sizes) per 0.01 cubic feet of air.

Before the measurement process began in participants' homes, they were given a description of the project. They also completed a short questionnaire to provide background information about their homes, additional potential sources of particulate matter in the air, and their health concerns. In addition, forms were provided for participants to record outdoor conditions (air temperature, wind, cloud cover) and activities inside that might increase particles in the air (vacuuming, cooking, children's activities).

At each site the Dylos Air Quality Monitor 1100 Pro was set up and stationed out of the way of daily traffic, but in a room that residents said was both exposed to the smoke and frequented by the family. Since cooking increases particulate matter in the air, kitchens

were not monitored. Depending on the house, the monitor was set up either in a bedroom or in a living room or study.

The monitor was hooked up to a laptop computer (either a Toshiba Portégé 7100 or a Presario laptop). As the monitor continuously counted the particles, minute-by-minute data were stored on the computer via its HyperTerminal. Due to recording limitations associated with the HyperTerminal, EHHI could record only about eight and a half continuous hours. The Dylos monitor itself, however, retains hourly average counts for 24 hours.

To obtain the most comprehensive array of readings possible, EHHI instituted the following data collection protocol:

- Participants were asked not to touch the monitor or the computer and to call the researchers any time they had concerns or questions. At each house, monitoring began at mid-day on the first day. Researchers then downloaded the minute-by-minute data and the hourly readings mid-day the following day (Day 2). This provided 24 hours of hourly average readings, as well as the preceding eight and a half hours of minute-by-minute data. After downloading both sets of data, the particle monitor was reset for the next 24-hour period. Day 3 followed the same protocol. On Day 4, the data were downloaded and the equipment was then removed from the home. By measuring the particles over a three-day period, EHHI was able to estimate the quality of the indoor air with confidence.

- In addition to measuring levels of both sizes of particles in the four affected homes, EHHI measured the presence of those size particles in seven homes that were not exposed to smoke from an OWF. The identical measurement protocol was followed for the non-affected houses. These measurements served as a set of comparison data. They helped to answer the question, "What would we normally expect to find in Connecticut houses during the winter season?" The data from the houses near OWFs were also compared to the EPA's Air Quality Index.

- After completing the data collection, each household was provided with two graphs reflecting its own hourly averages for the two particles sizes we measured. Both graphs also included the average hourly readings from the comparison houses that were not located near OWFs. With each family's permission, we made public the graphs representing the individual houses, but kept names and specific locations confidential.

Key Tables and Abbreviations

EPA Air Quality Index for $PM_{2.5}$ (with particulate counts scale estimate) [31]

EPA developed the Air Quality Index to compare health risks from exposures of less than 24 hours.

EPA measures the particle load, $PM_{2.5}$ particles in terms of weight (ug/cubic meter). Below is a table estimating the conversion between EPA's measures in mass and the measures in number of particles from the meter (cts/0.01 ft^3).

Air Quality	Exposure (ug/m^3)	Exposure Particle (counts/0.01 ft^3)
Good	0–20	0–45
Moderate	21–40	45–95
Unhealthy for sensitive groups	41–60	95–140
Unhealthy for all	61–80	140–195
Very Unhealthy	81–120	over 195

Keys to Abbreviations in the Following Charts

Dylos = The Dylos measuring device was a Dylos Air Quality Monitor DC 1100 Pro used to measure the particulates. The readout is the number of particles counted in 0.01 cubic feet of air. The particles are drawn through the meter by an air fan at constant rate. As they pass through a laser beam, each particle is counted. There were two particle sizes counted: 2.5 microns in diameter and 0.5 microns in diameter. Wood smoke falls into the 2.5 and 0.5 range.

CT = Counts, actual number of particles counted in 0.01 cubic feet of indoor air. The (cts/0.01 ft^3) refers to the number of particles in 0.01 cubic feet of air. That is the actual number of particles in 0.01 cubic feet exactly as it reads out on the meter dials. *(This method was used to explain the data so that a homeowner could understand the information exactly as it is shown on the meter, without doing mathematical conversions. Most scientists would have converted the data to the millions-of-particles-per-cubic-feet form. This study did not do so because it introduces another complex step and makes the information less user-friendly for the homeowners testing their own houses.)*

AVG. = The average or mean

SD = is the standard deviation of the sample. SD 54 is the average number of counts per 0.01 cubic feet of air in the background houses. SD is a measure of the variability of the hourly measurements. The data are not normally distributed, i.e., following a bell shaped curve; therefore the SD exceeds the mean.

Hours = The charts show the hourly average levels from noon to noon; e.g., 13:00 refers to 1:00 p.m.

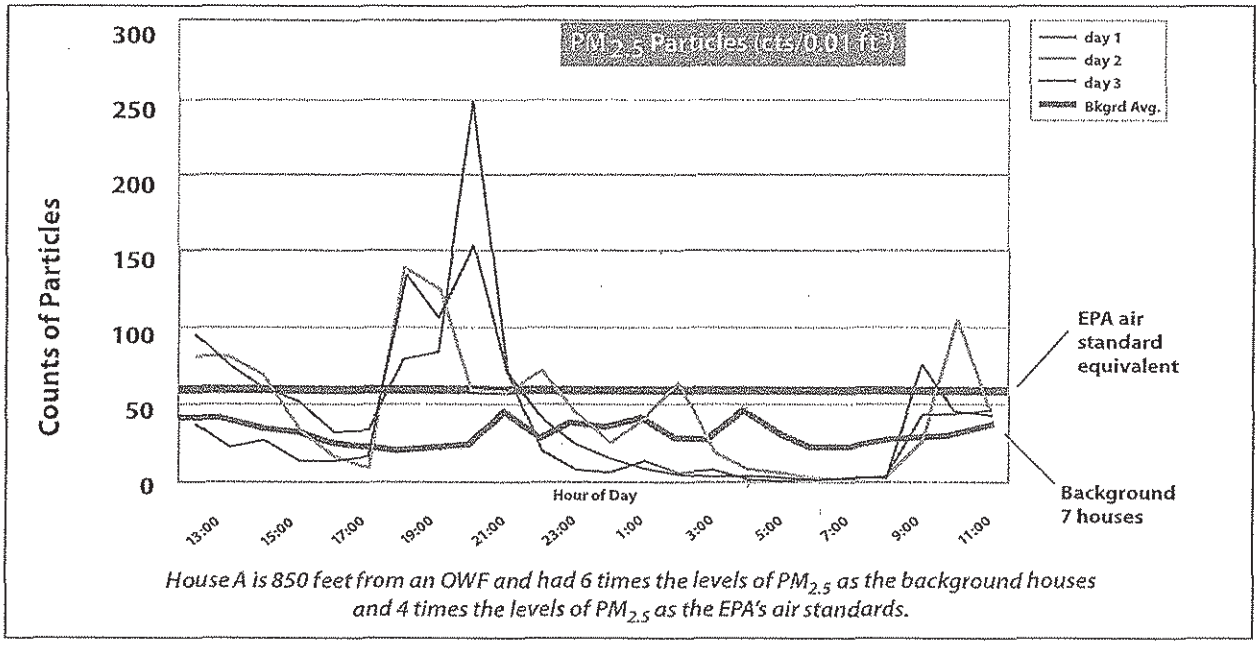
N = 308 is the total number of hours measured in the control houses with no outdoor wood furnace in the area. There were seven control houses tested for 24 hours each, some for two and some for three days.

The charts on the following pages show the impacted houses designated A, B, C and D measured over three days. Periods of very high exposure were seen for both $PM_{2.5}$ and $PM_{0.5}$ particulates in every house on every day. There are some periods of the day when the particulate matter recedes in impacted houses, but most of the time there are elevated exposures that last for hours, tending to peak in the middle of the night when residents are sleeping.

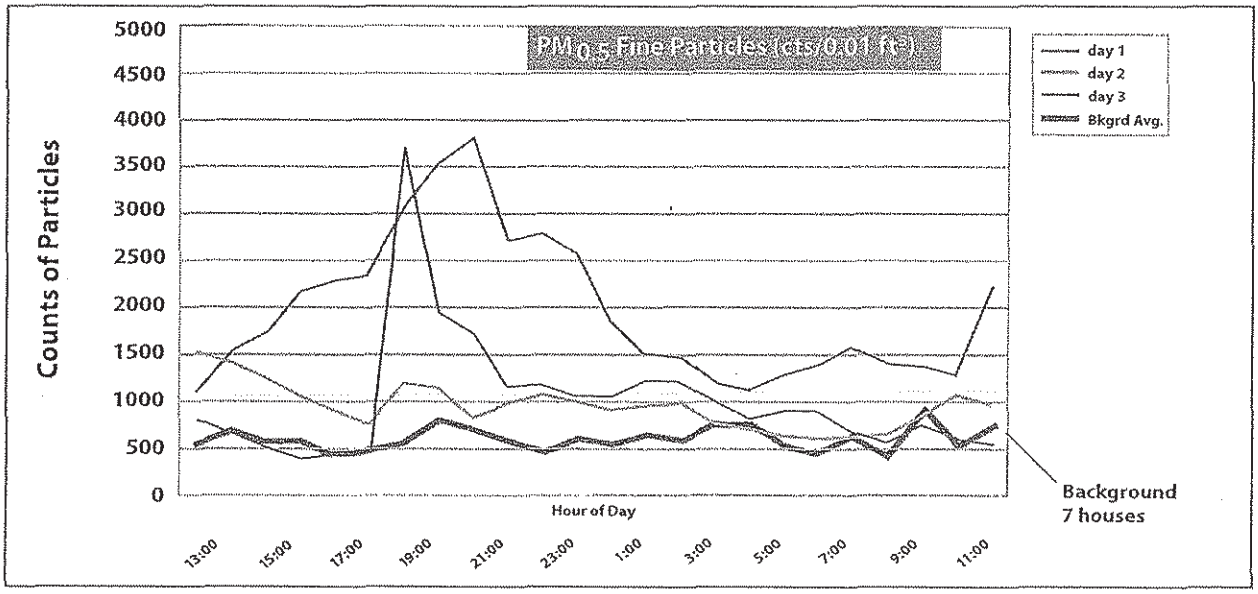
Graphic Presentation of the Study's Findings

House A

Distance = 850 feet from the neighboring Outdoor Wood Furnace, Litchfield County, Connecticut



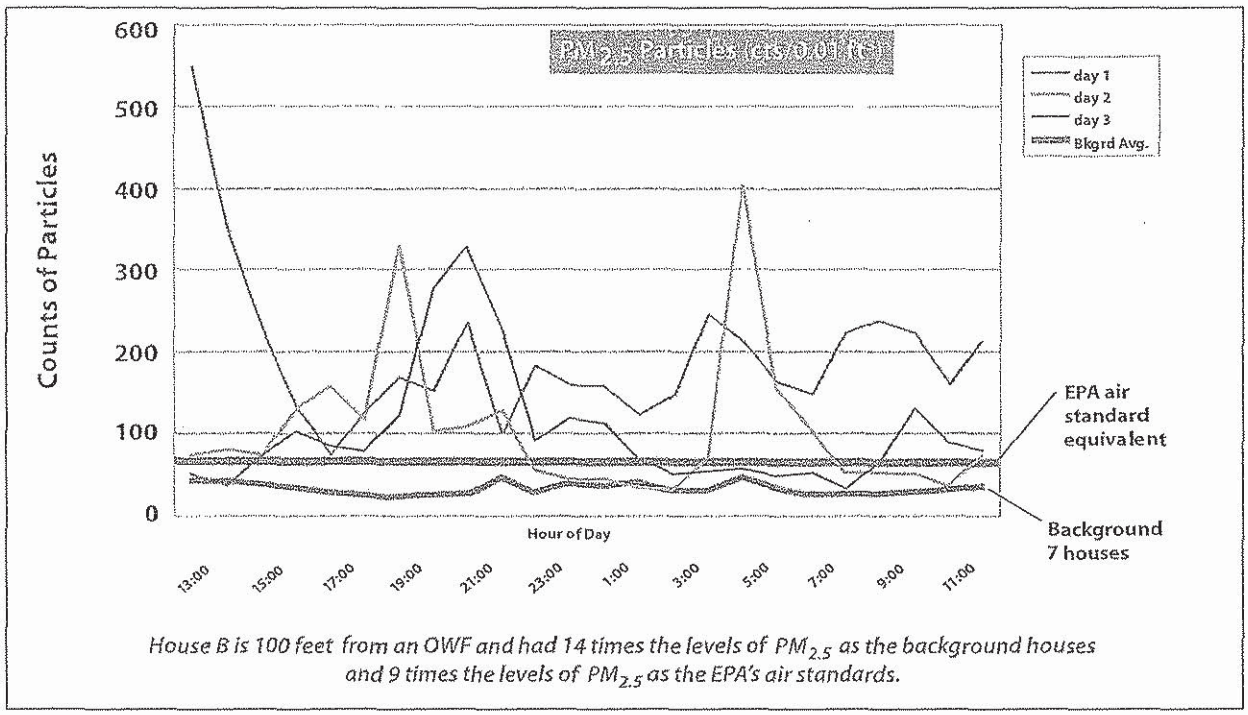
House A is 850 feet from an OWF and had 6 times the levels of $PM_{2.5}$ as the background houses and 4 times the levels of $PM_{2.5}$ as the EPA's air standards.



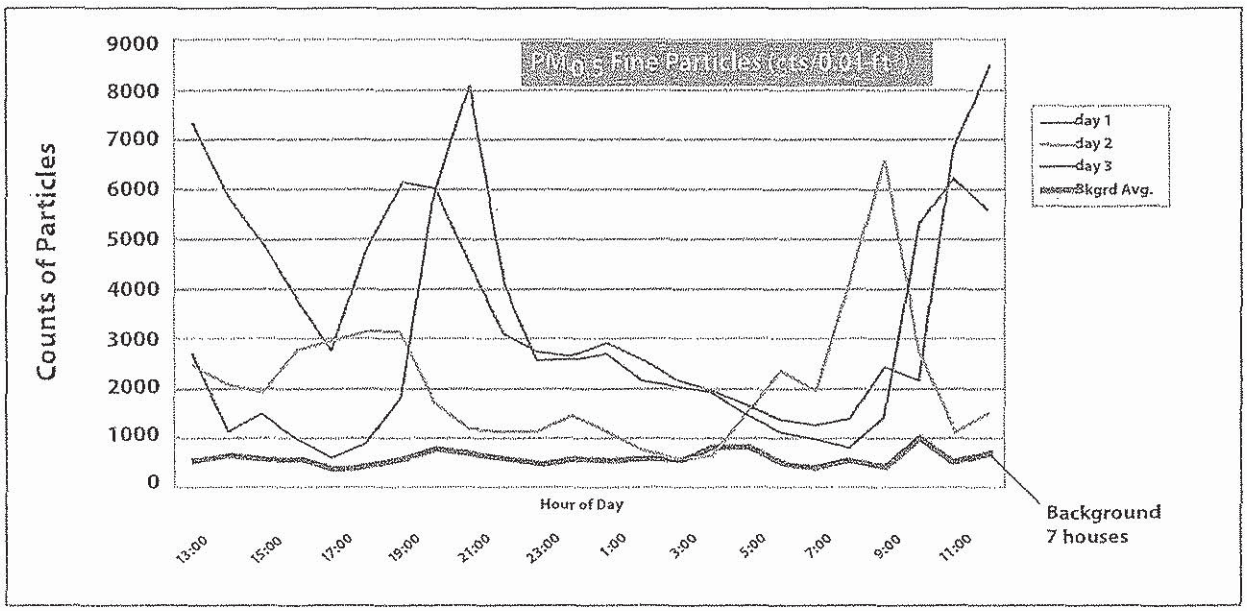
Red horizontal line = EPA federal standard for $PM_{2.5}$ expressed in ug/m³ for outdoor air.
It is used for regulatory purposes. There are no standards for the inside of houses.

House B

Distance = 100 feet from the neighboring Outdoor Wood Furnace, Fairfield County, Connecticut
(The OWF was grandfathered in before the Connecticut set-back regulation of 200 feet was instituted.)



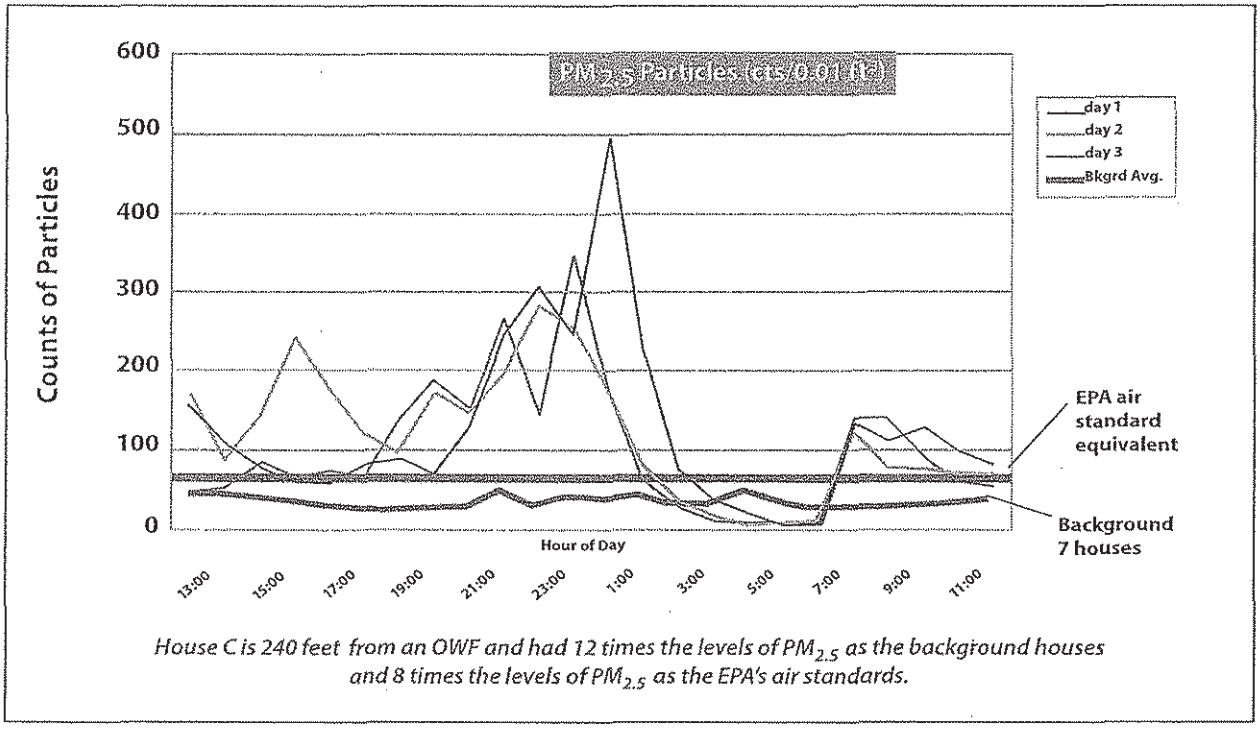
House B is 100 feet from an OWF and had 14 times the levels of $PM_{2.5}$ as the background houses and 9 times the levels of $PM_{2.5}$ as the EPA's air standards.



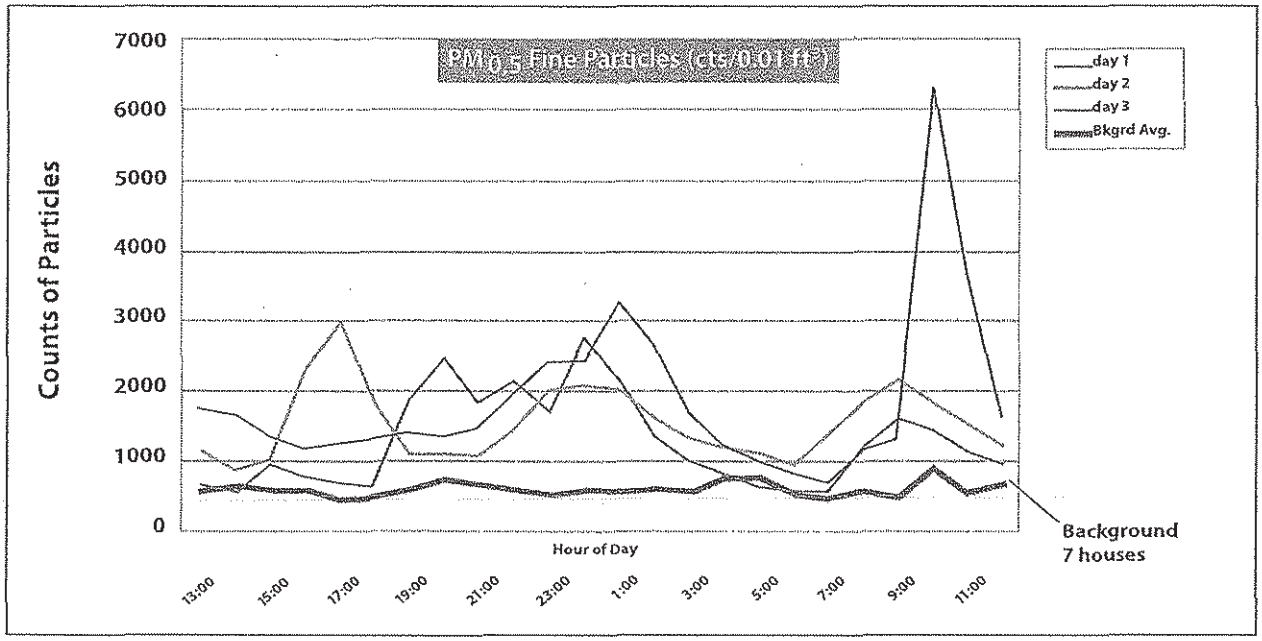
Red horizontal line = EPA federal standard for $PM_{2.5}$ expressed in ug/m³ for outdoor air.
It is used for regulatory purposes. There are no standards for the inside of houses.

House C

Distance = 240 feet from the neighboring Outdoor Wood Furnace, Windham County, Connecticut



House C is 240 feet from an OWF and had 12 times the levels of $PM_{2.5}$ as the background houses and 8 times the levels of $PM_{2.5}$ as the EPA's air standards.



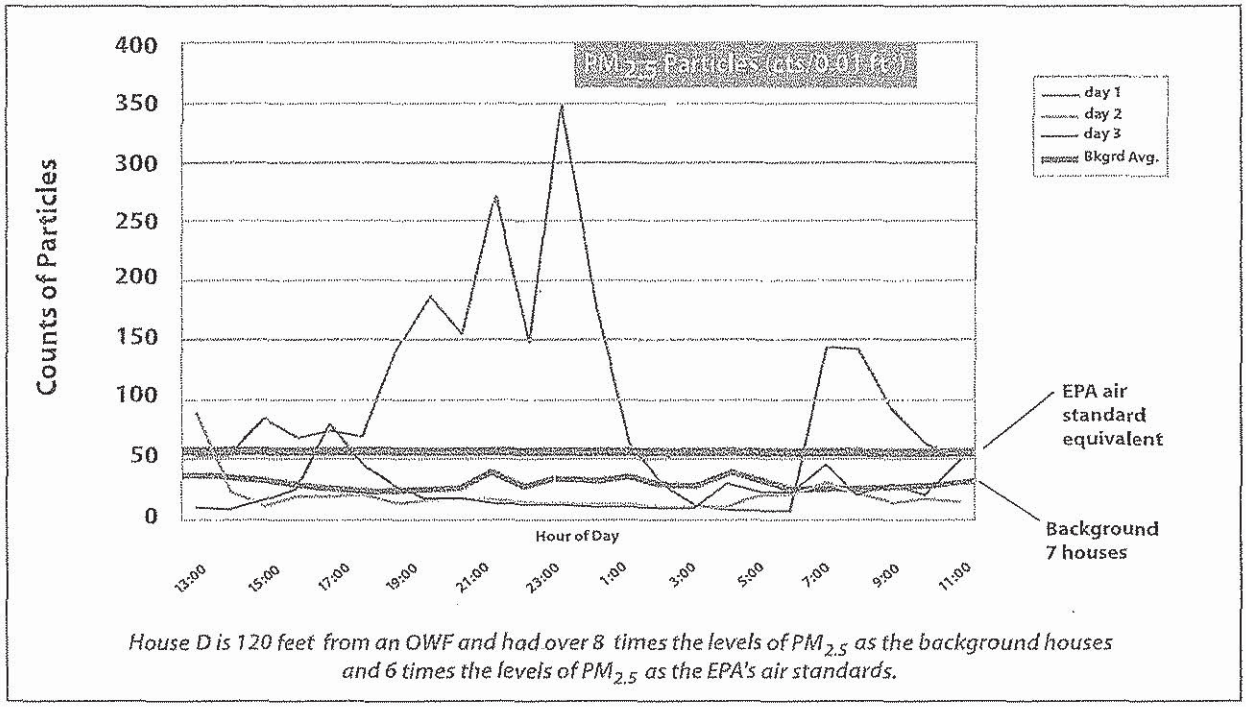
Red horizontal line = EPA federal standard for $PM_{2.5}$ expressed in ug/m³ for outdoor air.
It is used for regulatory purposes. There are no standards for the inside of houses.

House D

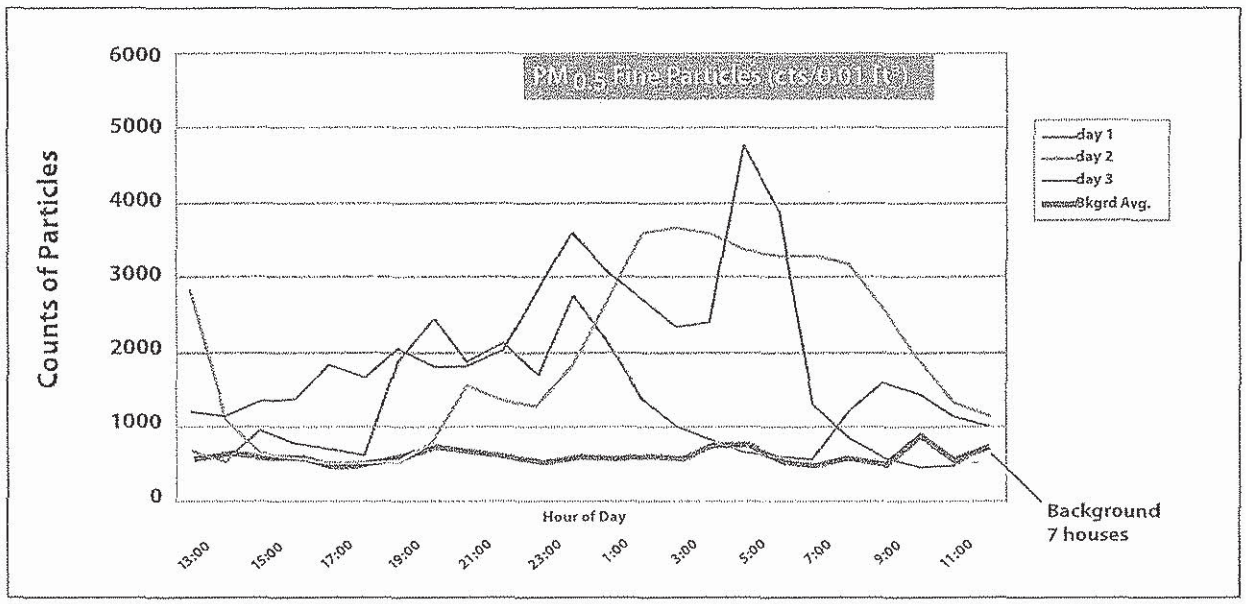
Distance = 120 feet from the neighboring Outdoor Wood Furnace

Northeastern Windham County, Connecticut

(The OWF was grandfathered in before the Connecticut set-back regulation of 200 feet was instituted.)



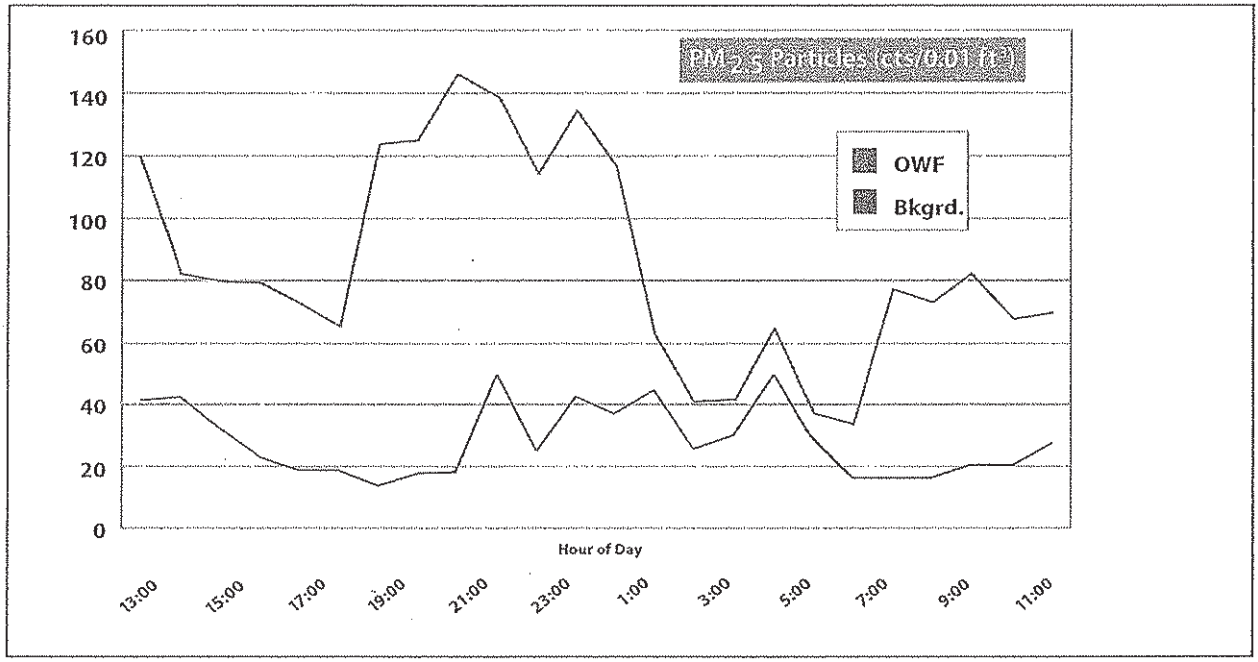
House D is 120 feet from an OWF and had over 8 times the levels of $PM_{2.5}$ as the background houses and 6 times the levels of $PM_{2.5}$ as the EPA's air standards.



Red horizontal line = EPA federal standard for $PM_{2.5}$ expressed in ug/m³ for outdoor air. It is used for regulatory purposes. There are no standards for the inside of houses.

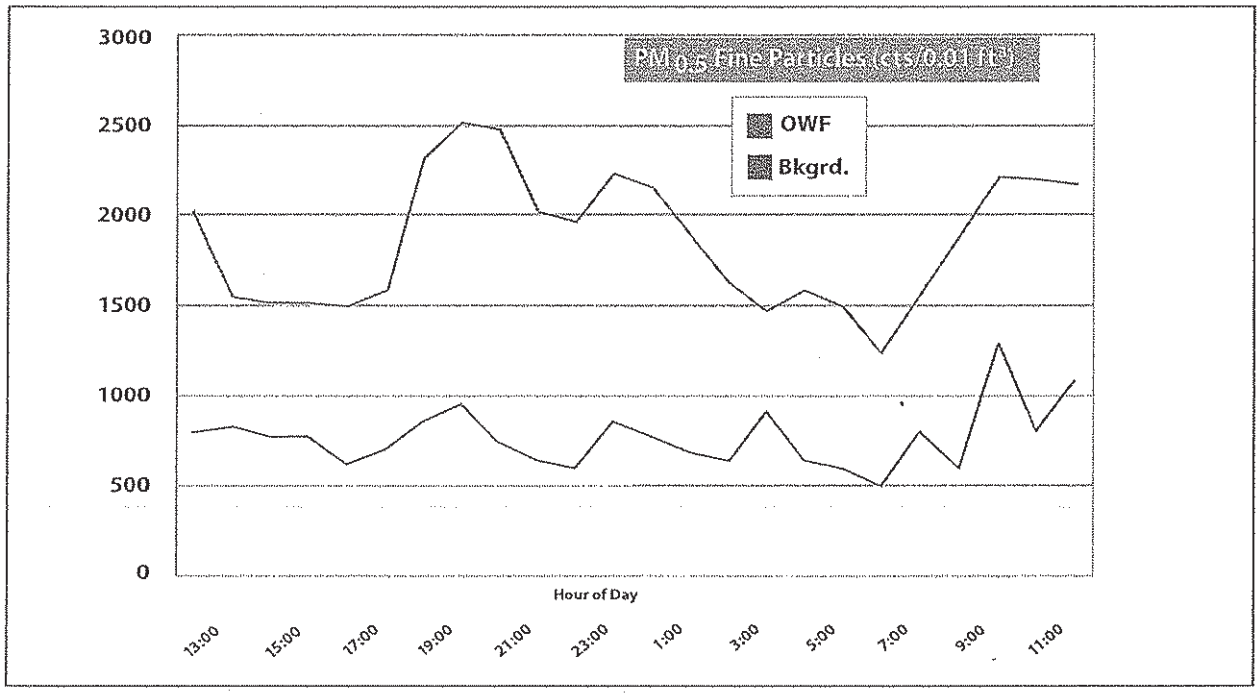
Average Hourly Particle Levels

Particulate levels inside houses near outdoor wood boilers



Red line shows impacted houses and blue shows control houses.

AVERAGE hourly $PM_{2.5}$ levels (above) and fine particles $PM_{0.5}$ (below) inside houses near outdoor wood boilers



The above two charts show dangerously high levels of smoke particulates inside houses near OWFs at all hours of the day, especially at night, compared to normal houses.[32]

Government Response to Health Issues

The response from government to complaints about the smoke from outdoor wood furnaces (OWFs) has been completely inadequate to protect human health.

The response from government to complaints about the smoke from outdoor wood furnaces (OWFs) has been completely inadequate to protect human health. Federal and state governments have acknowledged that the wood smoke from outdoor wood furnaces can cause health problems, yet they continue to allow OWFs to be manufactured in ways that produce particularly dangerous smoke, and people continue to be allowed to buy and install them. The federal and state responses to regulations have been inadequate to protect homeowners' property values and their health.

In an effort to curb the dangers of OWFs, the EPA has developed a voluntary agreement with some OWF manufacturers. The agreement asks that OWF manufacturers make cleaner models with stricter emission standards than their original OWF models. These newer models are now in the marketplace and are called "Phase II" models. Although the Phase II models have somewhat reduced wood smoke emissions, they are still emitting more than 12 times the amount of wood smoke that an indoor wood stove is allowed to emit under EPA regulations. These Phase II models are still dangerous and in no way solve the human health problems that OWFs have created.[33]

The EPA provided technical and financial support to the New England States for Coordinated Air Use Management (NESCAUM) to develop policy models that state and local governments could use to address OWF problems.

NESCAUM reported that OWFs put out dangerous levels of particulates compared to other residential wood burning devices and found that current regulations did not provide neighbors the protection they needed.

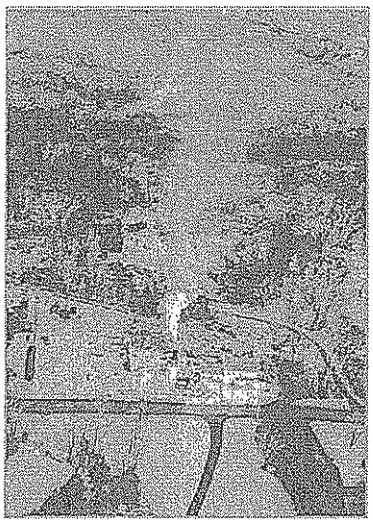
At present, much of the responsibility to address OWFs lies with the state and town governments. Some towns have acted boldly, although many have not. The state of Washington has banned the use of OWFs throughout the state. A few states, including Vermont, New Hampshire and Maine, have instituted air emission regulations. In Connecticut, only limited measures have been taken.

A look at the Connecticut Department of Environmental Protection's (CTDEP) fact sheet shows a blunt assessment of the harmful impacts of OWFs. The CTDEP asks, *"Are OWFs harmful to the environment and human health?"* The answer on the fact sheet is, *"Yes."* The CTDEP continues, "OWFs produce a lot of thick smoke, which in addition to being a nuisance to neighbors has serious health and air pollution impacts." In spite of this assessment, Connecticut has only instituted a set-back of 200 feet, with a chimney height that is higher than the roof peaks of residences located within 500 feet of the OWF.

Washington State has taken the lead in the nation by instituting a statewide ban. No other state has done so to date.

Vermont was the first state to adopt emission standards for outdoor wood furnaces in 2007. Some other states have now followed Vermont's lead and have instituted their own state standards and regulations as they try to make OWFs safer for neighbors' health. However, EHHI's research makes clear that even when OWFs are in compliance with their state regulations, the OWFs still pose a danger to the health of the families who live nearby.

In the absence of further federal or state actions, individual towns across the northern states have banned OWFs. For instance, as of the writing of this report, eleven towns in Connecticut have banned OWFs through their planning and zoning commissions. As well, many towns in New York State, Massachusetts, Wisconsin, Minnesota and New Jersey have banned them.



EHHI's research makes clear that even when OWFs are in compliance with their state regulations, the OWFs still pose a danger to the health of the families who live nearby.

Recommendations

Recommendations for the Federal Government

- The federal government should ban outdoor wood furnaces until safer technologies are found.
- If the federal government supports the idea of outdoor wood furnaces for the purpose of heating, then it should support research on how to make them safe. At the very least, the federal government should stop giving tax credits for their purchase.
- The government should determine the levels of particulates, carcinogens and carbon monoxide emanating from an outdoor wood furnace.
- The EPA's stated mission is "to protect human health and to safeguard the natural environment." With that as its mission, the agency should recommend a ban on outdoor wood furnaces until safer technologies are found.
- The federal government should set air safety standards for inside air, including $PM_{0.5}$ particles, just as it has set standards for outside air.
- Healthful air emission standards should be applied to outdoor wood furnaces.

Recommendations for State Governments

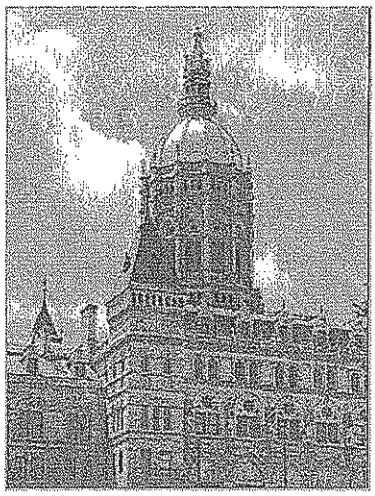
- States should ban outdoor wood furnaces until safer technologies are found.
- States should set air standards that are stringent enough to protect human health, and require OWFs to comply.
- States should add "wood smoke" to their Public Health Nuisance Codes so that state health departments and local health departments are required to enforce wood smoke nuisance cases.
- States should put outdoor wood furnace information on their websites and explain why OWFs are dangerous to human health.
- States' air standards should take into account peak exposures, as well as the current 24-hour average exposures.

Recommendations for Towns

- Towns should ban outdoor wood furnaces through their planning and zoning commissions or appropriate governmental agencies.
- Local health departments should enforce wood smoke public health issues in ways that protect an individual's health.

Recommendations for Individuals

- People should find other ways to heat their homes rather than installing outdoor wood furnaces, which harm neighbors' health and property values.
- People should work with their town planning and zoning commissions to have outdoor wood furnaces banned in their towns.
- People who are being harmed by an outdoor wood furnace should contact their state or local health department and ask to have the offending outdoor wood furnace closed down under their state or local public health nuisance code.
- Individuals living in homes impacted by wood smoke from outdoor wood furnaces might want to purchase an air monitor that measures and records the particulates inside their houses. Monitors such as this sell for about $250. See pages 32–34, Appendix A, for instructions for using a monitor of this type. Having actual documentation of the smoke infiltration inside a home may cause state or local health departments, or other government agencies, to act in ways that will protect human health.
- Patients who are being treated for respiratory issues should discuss their exposures to an OWF when being evaluated by their physician, as other health issues related to these exposures might be involved.



Healthful air emission standards should be applied to outdoor wood furnaces.

Appendix A.

Instructions for Home Monitoring with the Dylos 1100 Pro Air Quality Monitor

The Dylos monitor stores up to eight hours of minute-by-minute data, and up to 24 hours of hourly averages. It also stores daily averages for up to 30 days. To make the best use of the data, it is advisable to download it to a laptop computer on a regular basis. The following protocol requires downloading data once every 24 hours. *Note:* **This monitor records data for 24 hours. If the data aren't downloaded, the monitor begins to record over the earlier data.**

Be sure to begin your monitoring project at least 24 hours in advance of when you plan to download the first day of data (Day 1). The device records eight hours of minute-by-minute data for the most recent eight hours of monitoring. For example, let's say you set up your monitor to begin recording on Day 1 at noon. On Day 2, you download the data from the monitor onto your computer at noon. This will give you hourly averages for the past 24 hours, as well as minute-by-minute data beginning at about 4 a.m. that morning. This will occur again on Days 3 and 4.

Getting Started

Place the monitor and laptop computer in a room you think is affected by smoke, but not in a kitchen, a room with a woodstove or fireplace, or a room with lots of activity, such as a playroom. Cooking, heating and kids' play will create or stir up particulate matter and skew the data you get from the monitor. Place the instrument and laptop three to six feet off the floor, where they are easy to access but out of the way of foot traffic.

- Plug in the Dylos monitor.
- Attach monitor to the computer with the USB.
- Turn on computer. Log on.
- Go to: Start → Programs → Accessories → Communication → HyperTerminal.
- Open new HyperTerminal document.
- Save with name and date.
- Turn on the particle monitor.
- Open Excel spreadsheet. Label sheets Day 1, Day 2, Day 3. Name and save the spreadsheet.
- Monitor the house air for at least three days.

The monitor must remain connected to the computer and the computer left running with the "HyperTerminal" open. Because there is no time clock in the monitoring device, it is very important to record the time that the data are downloaded.

Download to an Excel Spreadsheet

The eight hours of minute-by-minute data

- Open the Excel spreadsheet. (Once open, you can leave it open for the rest of the monitoring period.)
- On the HyperTerminal, click "select all."
- Copy and paste the data in the Excel spreadsheet.

(Be SURE to record the time and date at the top of the column.)

The 24 hours of hourly data

- On the HyperTerminal, press "Capital D" and "Enter" at the same time.
  The last hour of minute-by-minute data is downloaded to the HyperTerminal, the last 24 hours of hourly data are downloaded to the HyperTerminal, and the last several days of daily data are downloaded to the HyperTerminal. These are appended to the end of the minute-by-minute data already on the HyperTerminal.
- Select this set of data by highlighting.
- Copy and paste in the spreadsheet that is already open. Paste the data in one of the next columns on the spreadsheet and label it with time and date. Save the spreadsheet data.

For each consecutive day, repeat the process to open, label and save a new HyperTerminal document. There is no need to create a new Excel document. There is also no need to reset the Dylos monitor because it records over the last day's data every 24 hours.

For each day, copy and save the data on consecutive sheets in the Excel document, labeled Day 1, Day 2 or Day 3, or you may want to label the sheets with the time and date you downloaded.

Save the spreadsheet every time data are downloaded, because if the power to the computer is lost, the data will also be lost. The spreadsheet data can also be saved in a backup location.

Separate the Data into Two Columns

When the data are downloaded in Excel, two numbers, representing the two different sizes of particles ($PM_{2.5}$ and $PM_{0.5}$ microns), are recorded together in one column separated by a comma (for example: 2304,88). A few steps are required to separate the two into different columns.

- In Excel, select the data column.
- Click on "data."
- Select "text to columns."
- Choose "delimited," then click "next."
- Check the "comma" box, then click "finish."

This will separate the data into two columns.

If the downloaded numbers contain more than one comma (for example: 11,820,49), there are additional steps to take. If there are just a few of these in the data, the numbers can be selected and separated one at a time, manually.

If there are several in a row, do the following:

- Select "data."
- Select "text to columns."
- Choose "fixed width," then click "next."
- On the ruler that appears above the selected numbers, use the cursor to place a line between the two numbers to be separated.
- Click "finish."

The data will separate into two columns. Label the columns by particle size.

Prepare the Data for Charts (Using $PM_{2.5}$ Data)

To convert the data to charts using Excel, it is necessary to create a corresponding column that notes "time of day." To convert the 24 hours of hourly averages for three consecutive days into a chart, as was done in this study, take the following steps:

- On a new Excel sheet, create a "time of day" column. Begin at the top with the hour at which the data was downloaded for the previous day. Going backward in time, enter the previous 24 hours (military time is recommended).
- Next, copy and paste into three consecutive columns the 24-hour data for $PM_{2.5}$ microns from the three days of monitoring. Each hour in the "time of day" column should correspond with data for all three days. There should now be one column listing hours of the day and three columns of data stretching down 24 rows—one row for each hour monitored—three columns for the three days monitored.
- Highlight the time column and the columns containing the $PM_{2.5}$ data. (Do not highlight headings if you have put them in.)
- Click "Insert."
- Click "Chart."
- Click "Line Chart."
- Click "Line with data markers."
- Click "Next."

The new window has two tabs: "Data Range" and "Series." Click the "Series" tab. This screen allows you to label the lines. *Series1* will be highlighted. Click the box for *Name.* Label the first series, for example, as Day 1, or with the start date of the first 24-hour period of monitoring. Highlight *Series2* and repeat with a new name, and repeat again for *Series3.*

- Click "Next."

  In Chart Options, under "Title" you can title the chart, for example, "$PM_{2.5}$ Readings."
  In the box "Category X axis," enter "Time of Day."
  In the box "Category Y axis," enter "$PM_{2.5}$/hr."
- Click "Finish."

You can now move and resize the chart.

Repeat the above instructions to produce a chart for the $PM_{0.5}$ data.

Appendix B:

Ways to Interpret Indoor Air Assessments When Monitoring Homes Impacted by Wood Smoke

When assessing a house impacted by wood smoke, the first step is to characterize the duration and intensity of human exposure risks from particulates. The Dylos air monitor or a similar device analyzes the air inside the house to assess the emissions that have penetrated a wood smoke-impacted home.

The second step is to compare the risk from monitored indoor wood smoke exposures to risks from outdoor air, and also to compare the monitored house to indoor air in houses that are not near sources of outdoor wood smoke. (See pages 36-40.)

The three indicators used in this study to evaluate the levels of exposures are based on:

- Observations of the levels of hourly $PM_{2.5}$ and $PM_{0.5}$ particle counts in wood smoke-impacted houses compared to control houses.
- The maximum particulate counts in wood smoke-impacted houses compared to control houses.
- The six-hour inhaled dose of particulate $PM_{2.5}$. (See page 41.)

Methods of Comparison

- ***Comparisons between hourly $PM_{2.5}$ and $PM_{0.5}$ particle counts in wood smoke-impacted houses and control houses***

The U.S. EPA Health-Based Standards

The EPA set a health-based standard for $PM_{2.5}$ in 2006. The EPA standard, which is based on interpretation of a series of health studies by expert panels, is primarily used for regulatory purposes as a component of the national air monitoring program. The Clean Air Act requires the EPA to set National Ambient Air Quality Standards (NAAQS) for particle pollution (also known as particulate matter). Primary standards set limits to protect public health, including the health of "sensitive" populations, such as asthmatics, children and the elderly.

The EPA revised the PM standards, setting separate standards for fine particles ($PM_{2.5}$), based on their links to serious health problems, ranging from increased symptoms, hospital

admissions and emergency room visits for people with heart and lung disease, to premature death in people with heart or lung disease.

The EPA 24-hour standard for ambient air is 35 ug/m^3. The EPA standard is a mass per unit volume measurement that is equivalent to 75 to 80 particle counts per 0.01 cubic feet (values are recorded in counts per 0.01 cubic feet in the Dylos monitor). See page 22 for conversion of EPA's measures in mass to the measures in number of particles from the meter.

- *Comparison of exposures in OWF-impacted houses to the CONTROL houses*

This option for interpretation of indoor monitoring compares the 24-hour average to the EPA's 24-hour ambient air standard. It is based on an assumption that all health risks are directly related to the average 24-hour exposures to $PM_{2.5}$. While this demonstrates the impacts of indoor air contamination, it underestimates the significance of hourly peaks over the 24-hour period, and underestimates health risks.

The table below compares the 24-hour measurements in wood smoke-impacted houses to measurements in the control houses.

Comparison of the 24-hour averages for $PM_{2.5}$ in control houses and OWF-impacted houses, from the EHHI study

# of 24-hour measurement periods	Control/background houses (cts/0.01ft^3)	OWF-impacted houses (Counts/0.01ft^3)
1	13.8	44.4
2	18.1	48.5
3	71	35.1
4	68	195.2 (exceeds EPA std.)
5	84 (exceeds EPA std.)	101.5 (exceeds EPA std.)
6	32	103.5 (exceeds EPA std.)
7	16.8	101.5 (exceeds EPA std.)
8	23	126.5 (exceeds EPA std.)
9	21.4	129.2 (exceeds EPA std.)
10	22.3	101.5 (exceeds EPA std.)
11	6.9	19.0
12	15	23.0

In this analysis, when the EPA ambient air standard (75-80 cts/0.01 ft^3) is used to estimate the risk to indoor air, it can be seen that excess exposures to $PM_{2.5}$ occur consistently inside houses in areas impacted by OWFs, but not in the control houses. The levels of $PM_{2.5}$ in OWF-impacted houses are substantially above the EPA's 24-hour standard. These levels are also significantly above both those in the control houses and the outside air measurements.

Thus, the comparison of 24-hour indoor air levels to EPA standards shows the impact of a neighborhood OWF. However, the intensity of the wood smoke exposures inside the houses at different times of the day is not observed for periods of less than 24 hours.

- *Comparison to the EPA Air Quality Index scale for exposures of less than 24 hours*

  The Air Quality Index (AQI) assesses the impact of exposures lasting less than 24 hours. The AQI focuses on health effects individuals may experience within a few hours or days after breathing polluted air, and provides a warning if the 24-hour average fine particle ($PM_{2.5}$) concentration is *"unhealthy for sensitive groups"* — above 40.5 ug/m^3.

The EPA's table of break points for periods of less than 24 hours is shown below.

C_{low}*	C_{high}	Category
0	15.4	Good
15.5	40.4	Moderate
40.5	65.4	Unhealthy for sensitive groups
65.5	150.4	Unhealthy
150.5	250.4	Very Unhealthy
250.5	350.4	Hazardous
350.5	500.4	Hazardous

*C = concentrations of $PM_{2.5}$ in ug/m^3

The EPA warns that both fine and coarse particles can cause a variety of serious health problems. When exposed to these particles, people with heart or lung diseases and older adults are more at risk for hospital and emergency room visits or, in some cases, even death. **These effects have been associated with short-term exposures lasting 24 hours or less.** Long-term exposures of a year or more have been linked to the development of lung diseases, such as chronic bronchitis.

Particles can aggravate heart diseases, such as congestive heart failure and coronary artery disease. If you have heart disease, particles may cause you to experience chest pain, palpitations, shortness of breath and fatigue. Particles have also been associated with cardiac arrhythmias and heart attacks.

Particles can aggravate lung diseases, such as asthma and bronchitis, causing increased medication use and doctor visits. If you have lung disease, and you are exposed to particles, you may not be able to breathe as deeply or vigorously as normal. You may have respiratory symptoms, including coughing, phlegm, chest discomfort, wheezing and shortness of breath. You also may experience these symptoms even if you're healthy, although you are unlikely to experience more serious effects. Particles can also increase your susceptibility to respiratory infections.

The EPA's system of health warnings for different exposures

Air quality	ug/m^3	cts/0.01ft^3	Health Warning
Good	0 to 15.4	0 to 35.4	Air quality is considered satisfactory, and air pollution poses little or no risk
Moderate	15.5 to 40.4	35.5 to 92.4	Air quality is acceptable; however, for some pollutants there may be a moderate health concern for a very small number of people who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	40.5 to 65.4	92.5 to 150.4	Members of sensitive groups may experience health effects. The general public is not likely to be affected.
Unhealthy for All	65.5 to 150.4	150.5 to 345.9	Everyone may begin to experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	150.5 to 250.4	346 to 575.9	Health alert: everyone may experience more serious health effects

The EPA's assessment in support of the Air Quality Index points out that exposures of less than 24 hours can have effects on the lungs and heart, and increase respiratory infections. Therefore, it is necessary to examine exposures of less than 24 hours.

- *Comparison of the hourly averages for $PM_{2.5}$ in control houses and OWF-impacted houses during different periods of the day, from the EHHI study*

There are four distinct periods in the day: afternoon hours (12 to 5 p.m.); evening hours (6 to 11 p.m.); night hours (midnight to 5 a.m.); and morning hours (6 to 11 a.m.). When the wood smoke and particulate-induced physiological actions of clinical significance are applied to these periods, it gives a quantitative measure of the risk from $PM_{2.5}$ exposures at different times of the day.

$PM_{2.5}$ levels during the different periods of the day in houses impacted by OWFs

House/Day	Afternoon	Evening	Night	Morning
A/1	59.7	86.2	7.2	24.6
A/2	50.8	84.3	28.2	31.7
A/3	23.3	90.3	7.8	29.8
B/1	243.2	164.3	175.7	200.2
B/2	105.0	127.2	121.7	60.8
B/3	69.8	193.3	65.8	73.2
C/1	66.3	206.3	49.3	83.3
C/2	159.3	193.8	56.3	84.4
C/3	89.5	180.7	144.3	94.6
D/1	66.3	206.3	49.8	83.3
D/2	30.3	15.2	12.5	19.7
D/3	31.1	16.8	15.5	31.7

= Very Unhealthy, EPA's health alert warning

$PM_{2.5}$ levels during the different periods of the day inside control houses

House/Day	Afternoon	Evening	Night	Morning
Control 1/1	11.7	15.3	7.0	21.7
Control 1/2	25.3	15.3	17.0	15.3
Control 1/3	14.3	8.8	15.8	22.7
Control 2/1	60.3	83.3	120.5	21.0
Control 3/1	68.0	107.2	4.5	92.3
Control 3/2	81.0	195.7*	16.8	45.2
Control 3/3	21.2	35.2	32.2	42.0
Control 4/1	40.0	40.0	17.3	3.8
Control 4/2	16.8	45.0	46.8	6.0
Control 5/1	27.2	3.8	30.4	25.7
Control 6/1	32.7	21.7	4.8	6.5
Control 7/1	34.3	20.2	19.3	19.5
Control 7/2	12.7	4.0	4.7	6.5

* The homeowner burned food while cooking dinner

The chart below shows the hourly averages of $PM_{2.5}$ in *outdoor* air in the vicinity of the control houses, which can be compared to the $PM_{2.5}$ levels in the *indoor* air in the control houses (see bottom chart on page 39).

$PM_{2.5}$ levels in the ambient air in control area

House/Day	Afternoon	Evening	Night	Morning
24 Apr	59	37	42	73
25 Apr	82	34.5	39.0	57.7
26 Apr	52.7	74.7	40.0	40.3
27 Apr	53.5	21.3	19.8	30.7
28 Apr	33.2	38.7	39.2	36.8
29 Apr	17.8	10.8	13.0	9.7
30 Apr.	13.8	26.5	44.3	32.2
1 May	33.3	23.3	25.0	41.2
2 May	43.0	36.7	34.8	51.2
3 May	52.7	55.2	41.5	106.0
4 May	118.0	62.3	60.5	58.7
8 May	40.0	30.2	19.2	16.2
9 May	24.7	48.5	64.7	81.2
10 May	60.0	19.2	12.5	111.5
11 May	9.7	18.5	46.7	25.5
12 May	10.3	16.0	20.3	29.5
13 May	18.2	17.2	21.7	28.7
14 May	34.2	46.8	21.6	25.2
15 May	21.3	15.5	23.7	30.7
16 May	41.0	65.0	65.0	32.8
17 May	13.0	13.7	9.7	7.8
18 May	8.0	15.3	15.7	15.3
19 May	21.2	20.8	26.2	22.2

- *Comparison of the clinical effects associated with six-hour inhaled dose exposure to $PM_{2.5}$*

The $PM_{2.5}$ particulate counts are viewed as surrogate measures for the presence of wood-burning emissions. Other toxics from wood-burning will also be present inside the houses, including carbon monoxide, oxides of nitrogen, and polyaromatic hydrocarbons (PAHs). These exposures could be included in the differential diagnosis.

At these six-hour average levels, susceptible people with asthma, chronic obstructive pulmonary disease (COPD) or chronic bronchitis may experience clinical effects (see chart on page 38 for the *Unhealthy for All* category). At the *Very Unhealthy* levels on the same chart, everyone may experience chronic bronchitis, and those who are susceptible may require medical support. Those with cardiovascular conditions may experience physiologic effects.

When evaluating health effects in individuals, the actual dose of air pollutants inhaled, including $PM_{2.5}$, is a clear determinant of the clinical response to acute respiratory and cardiovascular toxicants. The findings from the monitoring study permit the determination of actual dose levels for different people.

There are peer-reviewed literature articles that describe the effects of inhalation of increased doses of $PM_{2.5}$, notably a 2006 article published in the journal *Human and Ecological Risk Assessment,* "Assessment of Risk from Particulate Released from Outdoor Wood Boilers."[34] This report, by Brown *et al.,* recommends that the assessment of risks of individual health effects be based on the actual amounts of particulate matter inhaled. A reproducible measure of dose is the mass (micrograms) of particulate inhaled for a specified period of time (six hours or one-quarter of the day). The advantage of such a measure is that it is more directly linked to the target organ for the toxic material, and it incorporates activity differences that influence inhalation of the dose and variability inherent in ambient air measures.

Therefore, we recommend monitoring the hourly air concentrations over a minimum period of 72 hours in order to establish the structure of the exposure patterns. The 72 hours of one-hour monitoring data are divided into 12 units of six-hour intervals. The six-hour inhalation dose is calculated based on the assumption that 0.8 cubic meters of air is inhaled per hour. This can be altered to adjust for greater or lesser activity patterns, such as running or sleeping, and for the ages of the persons exposed. A scale of exposure is suggested in the Brown *et al.* report.

The following six-hour doses* are linked to the following clinical outcomes:

- A dose of 96 ug or more is associated with an increase in the number of asthma attacks.
- A dose of 120 ug or more is associated with an increased need for medical intervention in cases of chronic obstructive pulmonary disease (COPD) in the elderly or asthma in children.
- A dose of 250 ug or more is associated with increased emergency room interventions and hospitalizations for ischemic heart attacks.

Dose risk evaluation for mixtures

Wood smoke emissions are a mixture of gases and particulates. In a local neighborhood setting, a number of other toxic compounds emitted from an outdoor wood furnace would enter the house in the same manner as the fine particulates. Therefore, the presence of particulate in the house is a surrogate measure of certain other toxic compounds from the OWF that would enter the house.

The burning of wood also introduces other toxic materials into the neighborhood. Data from the EPA were used to prepare the chart and graph on the following page, which show the relative concentrations of emission products from outdoor wood burning. Relative amounts of wood smoke emission products are shown in the chart. These graphics demonstrate that substantial amounts of carbon monoxide and other toxics emitted by outdoor wood furnaces, in addition to $PM_{2.5}$, would be expected to enter an OWF-impacted home.

Therefore, any evaluation of the health of persons exposed to wood smoke inside houses in the neighborhood of OWFs must also take into account exposures to all the agents shown by the EPA to be present in wood-fire emissions.

Wood smoke contains unhealthy amounts of particulate matter, as well as a number of unhealthy emissions, including carbon monoxide, volatile organic compounds, benzene, sulfur dioxide, nitrogen dioxide, formaldehyde and several other air pollutants. From the chart, it can be seen that finding $PM_{2.5}$ particulates in indoor air predicts that a number of other toxic compounds will also be present in the indoor air mixture.

* To obtain the six-hour dose, multiply cts/0.01 ft^3 by 2.2

Relative percentages of toxic emissions predicted to be emitted by OWFs in EPA's Model

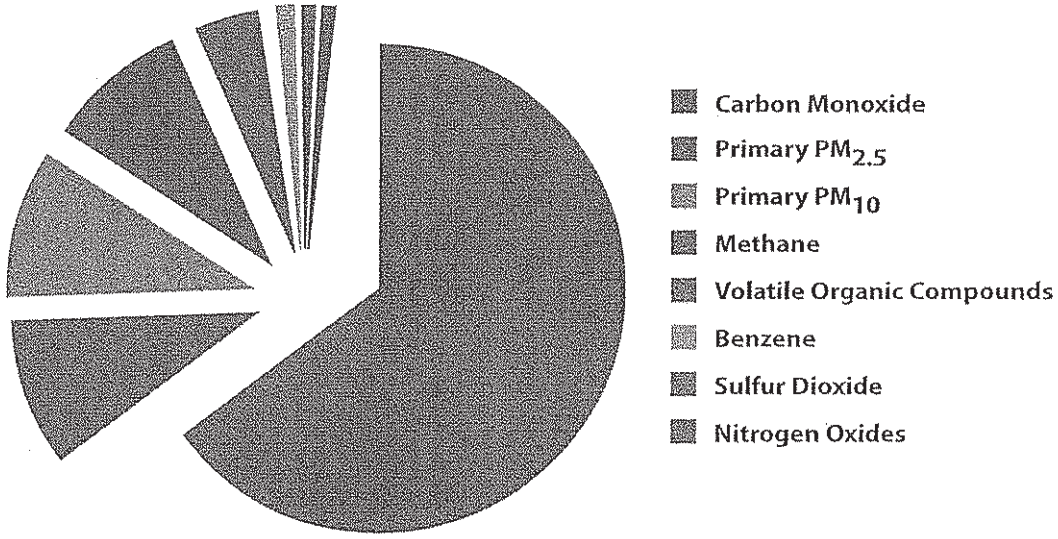


Chart showing relative percentages of toxic emissions predicted by EPA's Model

Carbon Monoxide	64.0249
Primary $PM_{2.5}$	9.6037
Primary PM_{10}	9.6037
Methane	9.0818
Volatile Organic Compounds	4.0711
Benzene	0.9673
Sulfur Dioxide	0.7064
Nitrogen Oxides	0.6263
Ammonia	0.6263
Formaldehyde	0.2436
Acetaldehyde	0.2373
Phenol	0.0839
Naphthalene	0.0517
Cresols (Includes o, m, & p)/Cresylic Acids	0.0456
Acrolein	0.0152
1,3-Butadiene	0.0101
Benzo[a]pyrene	0.0010
Mercury	0.0000
Dioxins/Furans as 2,3,7,8-TCDD TEQs - WHO/98	0.0000

Appendix C.

Findings from the Questionnaire Used in the Study

	House A	House B	House C	House D
Distance to OWF	850 ft.	100 ft.	240 ft.	120 ft.
Square footage	1,664	3,000	1,300	—
Floor plan	Open	Small Rooms	Open	Small Rooms
# of floors	2	2	1	2 plus basement
Style	Split level	Traditional	Ranch	Traditional
Attached garage	Yes	Yes	No	No
Car in attached garage?	No	Yes, but coasts in	N/A	N/A
Working fireplace or woodstove	1 propane, 1 wood	Woodstove	No	No
Burns wood?	No	Not during monitoring	No	No
Smokers	No	No	No	1 person, but not in the house
# of adults	2	2	2	2
# of children < age 5	1	0	0	0
# of children age 5–12	0	1	2	2
# of children 13+	0	1	0	0
Pets	1 dog	1 dog	No	3 cats
Type of Heat	Oil, baseboards	Oil, radiators, baseboards	Electric	Oil, forced air
Type of Hot Water Heat	Oil	Oil	Electric	Electric
Cooking Stove	Electric	Gas	Electric	Electric
Near Major Road?	No	15 minutes from highway	No	No, moderate traffic
How Situated Relative to OWF	OWF is W, house a bit lower than OWF	OWF is N across street, downhill from from house, which has slope behind	OWF is NW and downhill from house	OWF is NNE and downhill
Health Effects	Asthma, sinus infection, ear infection, bronchitis, ongoing cough, child on inhaler	Winter sicknesses, "near pneumonia"	Decreased lung capacity, increased asthma symptoms, sore throat, dizzy, headaches, vision/ hearing decline	Migraines, rash like sunburn, raspy breathing, heart palpitations, son with learning changes
When Health Problems First Noticed	Mother, winter 2003–04; child, 1 1/2 years ago	Past 3 years, not much this year	Over 5 years ago	Within last 2 years

Appendix D:

Planning and Zoning Regulation Used to Ban OWFs in a Town

Below are the zoning regulations from the town of Tolland, Connecticut, which banned outdoor wood furnaces (OWFs), also known as Outdoor Wood Boilers (OWBs). These regulations provide a model for other towns, and planning and zoning commissions that might want to ban outdoor wood furnaces.

ZONING REGULATIONS, TOWN OF TOLLAND
Chapter 170, page 96

CODE of the TOWN OF TOLLAND, STATE OF CONNECTICUT
Zoning Regulations, Rev. July 20, 2009

ARTICLE XIV
Accessory Uses and Structures
Section 170-84. General Requirements.
Accessory uses and structures shall be subject to the following conditions:

A. Establishment of accessory uses.

1. Accessory buildings, structures and uses shall be located on the same lot as the principal building, structure or use to which they are accessory.

2. Accessory buildings, structures and uses shall not be located on a lot without the prior establishment of a permitted principal use, nor shall any new lot be created that has an accessory building, structure or use without a principal use.

B. Prohibited Accessory Uses and Structures.

The Commission feels that, by their very nature, the following uses and structures cannot be regulated in such a fashion as to protect the Health, Safety and Welfare of the general public and are prohibited in all zones.

Outdoor Wood Burning Furnaces, as defined by P.A. 05-227

References

[1] http://www.epa.gov/burnwise/healtheffects.html

[2] http://des.nh.gov/organization/divisions/air/cb/ceps/npsap/smoke.htm

[3] http://www.ct.gov/dep/cwp/view.asp?a=2684&Q=321780

[4] http://www.woodheat.org/technology/outboiler.htm

[5] http://www.ecy.wa.gov/biblio/91br023.html

[6] http://www.ecy.wa.gov/biblio/91br023.html

[7] http://www.epa.gov/burnwise/healtheffects.html

[8] http://www.ct.gov/dep/cwp/view.asp?a=2684&Q=321780

[9] http://www.vtwoodsmoke.org/health.html

[10] http://www.nescaum.org/documents/assessment-of-outdoor-wood-fired-boilers

[11] http://www.spokanecleanair.org/publications.asp (Outdoor Wood-fired Boilers.pdf)

[12] For comparison, fine beach sand is about 90 microns, and the average human hair is 70 microns, in diameter. Thus, particles of 0.1 to 5 microns (very small) are carried in the same way as vapors or gases in the inhaled air stream, reaching the deep and most sensitive areas of the lung.

[13] The United States Environmental Protection Agency (U.S. EPA) has established health-based standards for exposure to particulates in the 10 micron and 2.5 micron range (PM_{10} and $PM_{2.5}$). The standards are used to evaluate the efficiency of air pollution control programs and to warn the public of impending health risk. Background $PM_{2.5}$ 24-hour averages fall between 10 and 15 micrograms per cubic meter (ug/m³) of air, with high levels reaching 40 to 50 ug/m³.

[14] http://www.epa.gov/ttnchie1/net/2008inventory.html — the Nonpoint section. Residential Heating: Wood.

[15] Houses that are heated with oil, gas, and coal or wood stoves will draw more air into the house to support the combustion used to heat the house. As warmer air from the stove or furnace exits the house through the chimney, that air is replaced with air drawn from the outside. Thus, greater inflows of outside air increase the rate of contamination in houses with interior stoves and furnaces.

[16] http://des.nh.gov/organization/divisions/air/cb/ceps/npsap/smoke.htm

[17] http://chestjournal.chestpubs.org/content/119/4/1260.full

[18] http://oem.bmj.com/content/65/5/319.abstract

References

[19] http://toxsci.oxfordjournals.org/cgi/content/full/65/1/115#SEC3

[20] http://michiganmessenger.com/38678/study-finds-wood-burning-releases-more-greehouse-gas-than-coal

[21] www.swcleanair.org/pdf/WoodSmokeHealthBrochure.pdf

[22] http://www.yakimacleanair.org/woodstove_information.htm

[23] http://www.epa.gov/burnwise/healtheffects.html

[24] http://www.ct.gov/dph/cwp/view.asp?a=3137&q=398480

[25] http://www.hria.org/services/environmental-health/cs-burden-of-asthma.html

[26] http://www.ncbi.nlm.nih.gov/pubmed/11879110

[27] http://oem.bmj.com/content/54/2/108.abstract

[28] http://www.epa.gov/iaq/co.html#Health%20Effects%20Associated%20with%20Carbon%20Monoxide

[29] http://www.health.state.mn.us/divs/eh/indoorair/co/index.html

[30] http://www.merck.com/mmhe/sec24/ch297/ch297d.html

[31] www.epa.gov/airnow/aqi_brochure_08-09.pdf

[32] Zanobetti A, Schwartz J, Gold D. Are there sensitive subgroups for the effects of airborne particles?

[33] http://www.nescaum.org/documents/owbfactsheetfinal.pdf/

[34] Brown, et al. "An Assessment of Risk from Particulate Released from Outdoor Wood Boilers." Human Ecol Risk Assess 13:191-208

Environment and Human Health, Inc.

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David R. Brown, Sc.D. *Public Health Toxicologist; Past Chief of Environmental Epidemiology and Occupational Health at the Connecticut Department of Health; Past Deputy Director of The Public Health Practice Group of ATSDR at the National Centers for Disease Control and Prevention (CDC) in Atlanta, Georgia.*

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Cover photo: smoke from an outdoor wood furnace near Danielson, Connecticut, by G. Leslie Sweetnam

Design & Layout
by Jane Bradley
www.capservices.com

Aerial photos of smoke from outdoor wood furnaces in Connecticut on the front cover, page 15 and page 29 were taken by **G. Leslie Sweetnam** *(specializing in aerial art photos of the last green valley, central Massachusetts and northeast Connecticut)*
www.glsweetnam.com

Environment and Human Health, Inc.
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North Haven, Connecticut 06473
Phone (203)248-6582 Fax (203)288-7571

A recent study on outdoor wood furnaces (OWFs) shows that homes as far away as 850 feet from an outdoor wood furnace are impacted by enough smoke to cause illness. Connecticut has setbacks regulations for OWFs of only 200 feet.

- NESCAUM has estimated that each OWF emits 20 times the wood smoke as one certified indoor wood stove. NESCAUM is an association of air quality agencies in the Northeast. Their Board of Directors consists of the air directors of the six New England states - Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont - and New Jersey, and New York. Their purpose is to provide scientific, technical, analytical, and policy support to the air quality and climate programs of the eight Northeast states.

- Although many people associate tobacco smoke with certain health risks, research indicates that second hand wood smoke has potentially even greater ability to damage health. Tobacco smoke causes damage in the body for approximately 30 seconds after it is inhaled. Wood smoke, however, continues to be chemically active and cause damage to cells in the body for up to 20 minutes, or 40 times longer.

- A house as far away as 850 feet from an outdoor wood furnace (OWF) had 6 times the levels of PM 2.5 as the houses not near an outdoor wood furnace and 4 times above the levels of the EPA air standards.

- *EPA defines PM 2.5 as Particle Matter less than 10 micrometers in diameter. These small particles pose a health concern because they can be inhaled into and accumulate in the respiratory system. Health studies have shown a significant association between exposure to fine particles and premature mortality. Other important effects include aggravation of respiratory and cardiovascular disease (as indicated by increased hospital admissions, emergency room visits, absences from school or work, and restricted activity days), lung disease, decreased lung function, asthma attacks, and certain cardiovascular problems such as heart attacks and cardiac arrhythmia. Individuals particularly sensitive to fine particle exposure include older adults, people with heart and lung disease, and children.*
  Sources of fine particles include all types of combustion activities - motor vehicles, power plants and wood burning.

  A house 240 feet from OWF had 12 times the levels of PM 2.5 as the houses not near an outdoor wood furnace and 8 times above the levels of the EPA air standards.

- Both those heavily impacted homes were within the Connecticut setback regulations of 200 feet.

- For some homes that are near OWFs that have been grandfathered in – they have wood smoke levels as high as 14 times that of houses not near outdoor wood furnaces and 9 times above the levels of the EPA air standards.

- High levels of wood smoke were present in every 24-hour period tested inside homes neighboring outdoor wood furnaces.

- The particles of wood-smoke are so small that windows and doors cannot keep smoke out.

- Public Health Toxicologist David Brown, Sc.D., an expert on the health effects of wood smoke, states, "Episodes of short-term exposures to extreme levels of fine particulates from wood smoke and other sources for periods as short as two hours can produce significant adverse health effects."

- Oncologist D. Barry Boyd, MD, says, "Wood smoke contains a number of organic compounds that are both potential and recognized carcinogens. Exposure to wood smoke over time may raise the risk of both chronic lung disease and lung cancer.

Town of Tolland Zoning Regulation Prohibiting Outdoor Wood Furnaces

http://www.tolland.org/sites/tollandct/files/uploads/zoning_regulations_0.pdf

Article XVII Zoning Regulations Rev.: March 15, 2015

Page 131

Accessory Uses and Structures

Section 17-1. General Requirements

B. Prohibited Accessory Uses and Structures.

The Commission feels that, by their very nature, the following uses and structures cannot be regulated in such a fashion as to protect the Health, Safety and Welfare of the general public and are prohibited in all zones.

1. Outdoor Wood Furnaces as defined by P.A. 05-227

Jessie Richard

From: janis.cary@att.net
Sent: Monday, July 11, 2016 1:24 PM
To: PlanZoneDept
Subject: Air Quality

Town of Mansfield Planning and Zoning Committee July 11, 2016
Audrey P. Beck Municipal Building
4 South Eagleville Road
Mansfield, CT 06268

Dear Committee Members:
We were happy to read that the town council forwarded to you for consideration the regulation of outdoor furnaces. Having seen such a furnace in operation at the intersection of Pine Street and Brendi Trail in Columbia CT, we can attest to the amount of smoke that envelops neighboring homes. We would hate to see such a situation face any neighborhood in Mansfield (or any other community, for that matter). It appears that regulations such as a required height for the pipe do little to protect air quality. We believe that the towns of Tolland and Hebron did the right thing by banning such furnaces. We hope you, too, will consider such a ban.

Also, we noted that the topic of fire pits came up at the council meeting. While we understand that they are very trendy right now, we would like to remind you that not everyone has air conditioning, and some of us enjoy open windows in the evening. Once again, the question of air quality arises---especially when the smoke hangs in the air and enters a neighboring home. Perhaps some type of reminder might go out Mansfield residents regarding the considerate use of these pits. Thank you.

Janis and Cary Fausey
208 Puddin Lane
Mansfield Center, CT 06250

RECEIPT OF APPLICATION FOR A SPECIAL PERMIT:

_____, move and _____ seconds to receive the

Special Permit Application (File #1342)

submitted by **David Hempel**

for **an efficiency unit within a single family dwelling**

on property located at **11 Summit Road**

as shown on plans dated **July 2016**

as shown and described in application submissions, and to refer said application to staff and committees, for review and comments and to set a **Public Hearing for 8-1-16.**

SPECIAL PERMIT APPLICATION
(see Article V, Section B of the Zoning Regulations)

Mansfield Planning and Zoning Commission

File # 1342
Date 7-8-16

1. **Name of development** (where applicable)_____

2. **Proposed use** of the property is EFFICIENCY UNIT in accordance with Sec.(s)_____ of Article VII (Permitted Use provisions) of the Zoning Regulations

3. **Address/location** of subject property 11 SUMMIT RD STORRS

   Assessor's Map 11 Block 45 Lot(s) 3-2 Vol. 728 Page 117

4. **Zone** of subject property RAR-90 **Acreage** of subject property 2.07 acres

5. **Acreage of adjacent land in same ownership** (if any)_____

6. **APPLICANT** DAVID HEMPEL _____
   (please **PRINT**) Signature
   Street Address 11 SUMMIT RD Telephone 860 428 8575
   Town STORRS Zip Code 06268

   Interest in property: Owner ✓ Optionee_____ Lessee_____ Other_____

   (If "Other", please explain)_____

7. **OWNER OF RECORD:** SAME _____
   (please **PRINT**) Signature
   (**OR** attached Purchase Contract _____ **OR** attached letter consenting to application _____)
   Street Address _____ Telephone _____
   Town _____ Zip Code _____

8. **AGENTS** (if any) representing the applicant who may be directly contacted regarding this application:

   Name_____ Telephone _____
   Address_____ Zip Code _____
   Involvement (legal, engineering, surveying, etc.) _____

   Name_____ Telephone _____
   Address _____ Zip Code _____
   Involvement (legal, engineering, surveying, etc.) _____

(over)

9. The following items have been submitted as part of this application:

_____ Application fee in the amount of $_____

_____ Statement of Use further describing the nature and intensity of the proposed use, the extent of proposed site improvements and other important aspects of the proposal. To assist the Commission with its review, applicants are encouraged to be as detailed as possible and to include information justifying the proposed special permit with respect to the approval criteria contained or referenced in Article V, Section B.5.

_____ Site plan (6 copies) as per Article V, Section B.3.d

_____ Site plan checklist including any waiver requests

_____ Sanitation report as per Article V, Section B.3.e

_____ Acknowledgement that certified notice will be sent to neighboring property-owners, as per the provisions of Article V, Section B.3.c (use Neighborhood Notification Form).

_____ As applicable for projects within the watershed of the Willimantic Reservoir, acknowledgement that certified notice will be sent to the Windham Water Works, as per the provisions of Article III, Section l.

_____ As applicable for projects within State designated aquifer protection areas, acknowledgment that the Commissioner of Public Health will be notified as per the provisions of Article III, Section l. The State Department of Public Health's on line form (www.dph.state.ct.us/BRS/Water/Source_Protection/PA0653.htm) shall be used with a copy of the submittal delivered to the Planning Office.

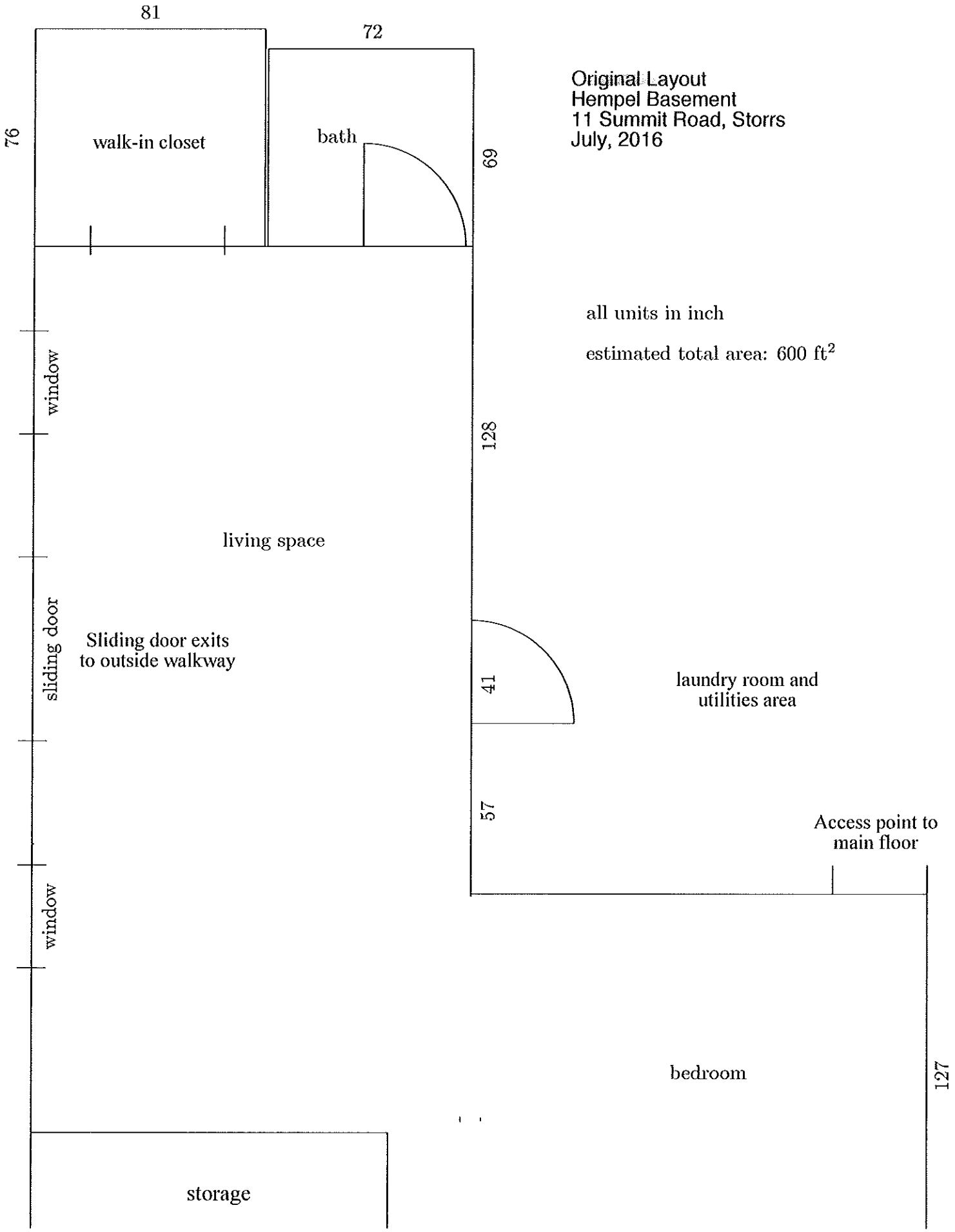
_____ Other information (see Article V, Section B.3.g). Please list items submitted (if any):

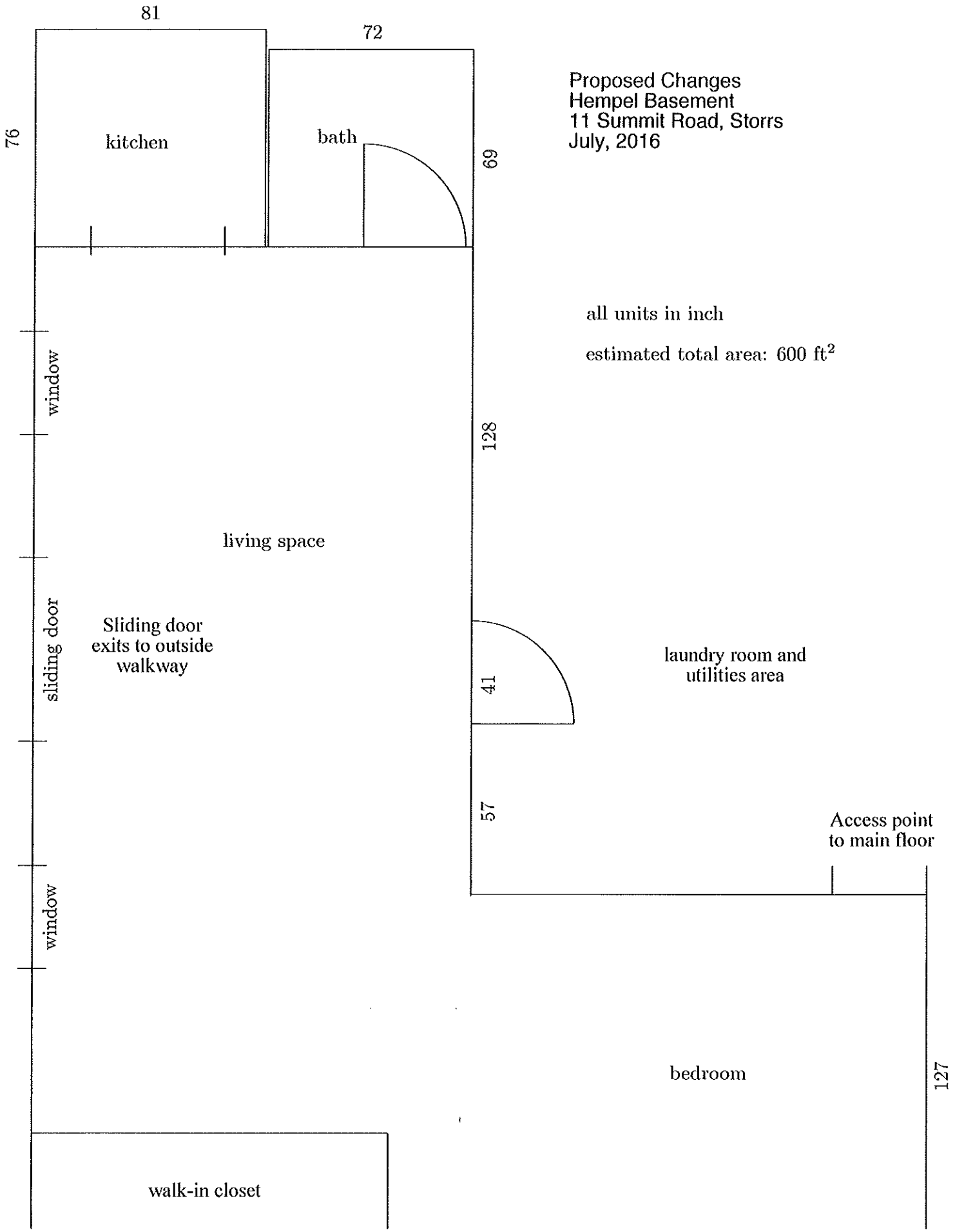
_____

_____

10. **ALL APPLICATIONS, INCLUDING MAPS AND OTHER SUBMISSIONS, MUST COMPLY WITH ALL APPLICABLE SECTIONS OF THE ZONING REGULATIONS, INCLUDING, BUT NOT LIMITED TO:**

Art. X, Sec. E, Flood Hazard Areas, Areas Subject to Flooding
Art. V, Sec. B, Special Permit Requirements (includes procedure, application requirements, approval criteria, additional conditions and safeguards, conditions of approval, violations of approval, and revisions)
Art. VI, Sec. A, Prohibited Uses
Art. VI, Sec. B, Performance Standards
Art. VI, Sec. C, Bonding
Art. VII, Permitted Uses
Art. VIII, Dimensional Requirements/Floor Area Requirements
Art. X, Sec. A, Special Regulations for Designed Development Districts
Art. X, Sec. C, Signs
Art. X, Sec. D, Parking and Loading
Art. X, Sec. H, Regulations regarding filling and removal of materials
Art. X, Sec. S, Architectural and Design Standards


81
72
76
walk-in closet
bath
69
Original Layout
Hempel Basement
11 Summit Road, Storrs
July, 2016
all units in inch
estimated total area: 600 ft²
window
128
living space
sliding door
Sliding door exits
to outside walkway
41
laundry room and
utilities area
57
Access point to
main floor
window
bedroom
127
storage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Proposed Changes
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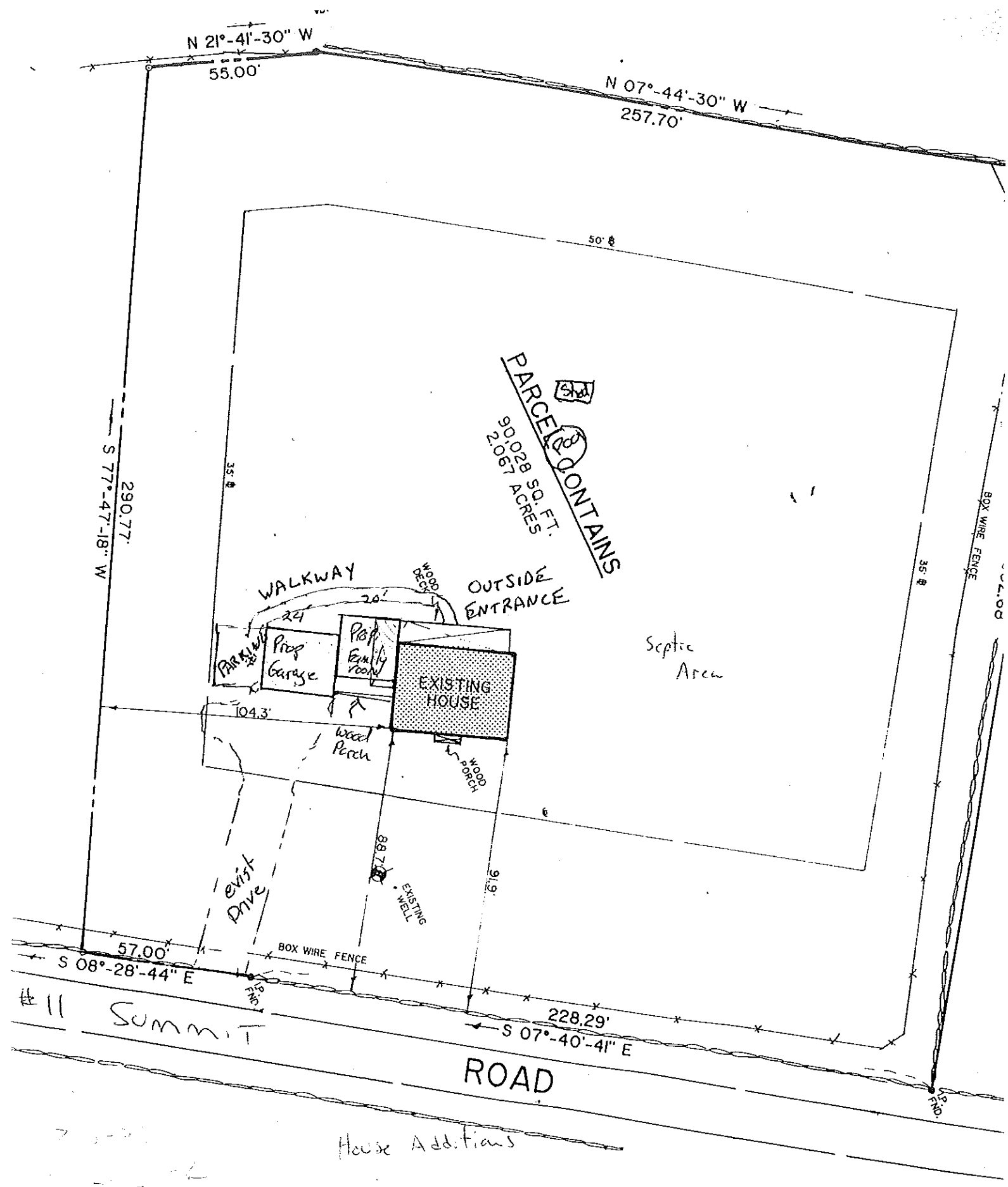

House Additions

Ken & MARYBETH DAUTRIC

11 SUMMIT ROAD

AUGUST 1997

Jessie Richard

From: Chris Hempel <dchempel@gmail.com>
Sent: Friday, July 08, 2016 10:07 AM
To: Jessie Richard
Subject: 11 Summit Road Efficiency Unit

Good morning Jessie,

Here is my statement of proposed use for 11 Summit Road:

The proposed efficiency will reside in the basement of an existing structure that currently has a full bathroom as well as exterior access through a sliding glass door and interior access through a set of stairs to the main floor of the structure. The renovation includes installation of a kitchenette in the existing walk-in closet along with the construction of a closet on the opposite side of the unit.

The house is owner occupied. The current structure includes a two-car garage and additional parking for two vehicles.

Thank you again for your assistance.

David Hempel

REPORTS

TOWN OF MANSFIELD

DEPARTMENT OF PLANNING AND DEVELOPMENT

Date: July 7, 2016

To: Planning and Zoning Commission

From: Linda M. Painter, AICP

Subject: Director's Report

If there are any other items or questions, I will address them at the July 18th meeting.

HOUSING

Ad Hoc Committee on Rental Regulation and Enforcement. The Committee voted at their June 29th meeting to send proposed changes to rental housing ordinances to the Town Council for their consideration (see attached Council Agenda Item for more information). The next meeting is scheduled for Wednesday, August 10th at 5:30 p.m. in the Mansfield Community Center Community Room.

Town of Mansfield
Agenda Item Summary

To:	Town Council
From:	Matt Hart, Town Manager MWH
CC:	Maria Capriola, Assistant Town Manager; Michael Ninteau, Director Building & Housing Inspection; Linda Painter, Director of Planning and Development
Date:	July 11, 2016
Re:	Proposed Amendments to the Mansfield Housing Code and Related Ordinances

Subject Matter/Background

Staff has been working with the Ad Hoc Committee on Rental Regulations and Enforcement to review and update various provisions within the Town's housing code and related ordinances. The Committee has voted to send the attached draft language for consideration and possible action by the Town Council.

The objectives of the proposed amendments are to accomplish the following:

- The amendments to the Section 901.1 of the Housing Code and Section 152-4 of the Landlord Registration Ordinance would ensure that the definition of an owner-occupied dwelling is consistent and in line with the most stringent provisions as presently codified within the Mansfield Off Street Parking Ordinance. This change would eliminate the current loophole that exempts certain rental properties from landlord registration and certificate requirements when a small percentage of the property is transferred into the name of someone residing in the unit (such as 1%) or when an officer of the LLC holding title to the property resides in the unit.

- The amendment to Section 901.2 of the Housing Code would require a dwelling unit to be in compliance with all pertinent laws, ordinances and regulations prior to a rental certificate being issued. This would give staff the ability to hold a certificate and for fines to accrue if the subject unit meets the requirements of the Housing code but is not in compliance with other regulations such as zoning, health, fire, building, etc.

- The amendment to Section 404.5 of the Housing Code would delete the current overcrowding provision in the code and replace the language in its entirety to be consistent with the current Mansfield Zoning Regulations. This would allow housing certificates to be revoked for noncompliance and fines to accrue at a rate of $100 per day until the zoning violation is

corrected. Please be aware while this step adds tools to achieve compliance it remains challenging to prove overcrowding and a violation of this provision of the Zoning Regulations. The current method of monitoring and counting cars is imperfect.

As a reminder, Chapter 130 of the Mansfield Code adopts the International Property Maintenance Code (2003 edition) to serve as the Town's Housing Code, with local modifications.

Financial Impact
Other than a minor increase in certification fees collected from currently exempt properties, there should be little to no financial impact if the proposed changes are enacted.

Recommendation
Staff recommends that the Town Council schedule a public hearing to solicit public comment regarding the proposed changes to the housing code and related ordinances.

If the Council supports this recommendation, the following motion is in order:

Move, effective July 11, 2016, to schedule a public hearing for 7:00 PM at the Town Council's regular meeting on July 25, 2016, to solicit public comment regarding the proposed amendments to the Mansfield Housing Code and related ordinances.

Attachments
1) Chapter 130, Section 901 of the Housing Code (**blackline** and clean copy)
2) Chapter 152. Rental Property (**blackline** and clean copy)
3) Chapter 130, Section 404 of the Housing Code (**blackline** and clean copy)

Chapter 130. Housing Code

Article II. Amendments to Code

§ 130-35. Chapter 9, Rental Certification and Inspections.

[Amended 3-26-2007, effective 4-20-2007; 10-14-2014, effective 11-7-2014]
Add CHAPTER 9, RENTAL CERTIFICATION AND INSPECTIONS:

SECTION 901
CERTIFICATION

Findings. The Town Council of the Town of Mansfield finds that inadequate maintenance of residential rental property within the community is a detriment to the public welfare, health and safety.

901.1 Scope. No owner, agent or person in charge of a residential rental housing unit offered for rent within the Town of Mansfield shall allow any person to occupy the same as a tenant or lessee for a valuable consideration, unless the owner, agent or person in charge holds a valid certificate of compliance issued by the Code Official for the specific housing unit.

Exception: The provisions of this chapter shall not apply to those housing units that are:

1. Age-restricted to persons aged 55 and older.

2. Owned by the Mansfield Housing Authority.

3. Owned by the State of Connecticut. This exception shall not include those dwellings or dwelling units located within the Town of Mansfield that are owned by an entity leasing real property from the State of Connecticut.

4. Newly constructed housing units for the first five years after issuance of an initial certificate of occupancy by the Town of Mansfield Building Department.

5. Housing units in any building consisting of not more than four units, ~~one of which is~~ **where** the owner~~'s primary place of residence in which he or she remains for more than half of the calendar year.~~ **resides at least 6 months per calendar year. Owner is defined as that individual owning at least a 50% fee simple interest in said property. To qualify for this exemption, any such owner-occupant must be the record owner of a minimum 50% fee simple interest in said residential rental property in his or her personal individual capacity only.**

6. Single-family dwelling units rented or leased for a period not to exceed one year when the original owner occupant will return to that unit as his or her primary residence at the end of the rental term or lease.

7. Single-family dwelling units sold and rented or leased by the buyer to the seller as a condition of the sale to provide the seller with extended occupancy for a period not to exceed one year.

Implementation Schedule: The provisions of this chapter shall be implemented pursuant to a schedule, hereinafter referred to as the "implementation schedule," developed and maintained by the Code Official. No owner, agent or person in charge of a dwelling or dwelling unit located within the Town of Mansfield shall be found in violation of this chapter until such time as he/she fails to obtain a valid certificate of compliance within the period of time specified by the implementation schedule.

Term of Certificate: Every rental certificate of compliance shall expire pursuant to the date set forth within the implementation schedule. The fee for a certificate of compliance shall be $150 for the two-year period established pursuant to the schedule.

901.2 Conditions for issuance of certificates. Upon request of the owner, agent or other person authorized to rent a dwelling unit (hereinafter referred to as the "applicant"), the Code Official will be available at an appointed time, within a reasonable amount of time, agreed upon by the Code Official and the applicant, or later if the applicant requests, to inspect such dwelling or dwelling unit. If such inspection **or reports provided to the Code Official pursuant to 130-10** establishes that the dwelling or dwelling unit is in substantial compliance with this code **and any other applicable law, regulation or code**, the Code Official shall issue a certificate of compliance for said dwelling or dwelling unit, provided that all fees or other assessments charged against the dwelling or dwelling unit pursuant to this Housing Code have been paid. One copy of the certificate of compliance shall be handed to or sent by mail to the applicant; a second copy shall be posted by the owner or his/her designated agent in a conspicuous location inside the dwelling or dwelling unit for the information of the tenant and shall not be removed by or at the direction of anyone other than the tenant; and a third copy shall be kept on file in the Code Official's office. After the issuance of a certificate, if, upon reinspection **or receipt of reports provided to the Code Official pursuant to Section 130-10** ~~pursuant to this code~~ it is determined by the Code Official that the dwelling or dwelling unit is no longer in substantial compliance with this code **or any other applicable law, regulation or code**, the certificate may be revoked by the Code Official in a writing stating the reasons for the revocation.

Chapter 130. Housing Code

Article II. Amendments to Code

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Chapter 152. Rental Property

Article I. Landlord Registration

§ 152-4. Definitions.

As used in this article, the following terms shall have the meanings indicated:

ADDRESS

A location as described by the full street number, if any, the street name, the city or town, and the state, and not a mailing address such as a post office box.

AGENT IN CHARGE

One who manages real estate, including, but not limited to, the collection of rents and supervision of property.

NONRESIDENT OWNER

Of a residential rental housing unit means any owner of ~~such~~ **said** property who does not reside **onsite or does not own at least a 50% interest fee simple in his individual capacity.** ~~in any such unit or its associated premises, which is owned by her or him.~~ **Any owner-occupant who is not the record owner of a minimum of 50% fee simple interest in said residential rental property in his or her personal individual capacity shall also be considered a non-resident owner for the purposes of this article.**

Chapter 152. Rental Property

Article I. Landlord Registration

§ 152-4. Definitions.

As used in this article, the following terms shall have the meanings indicated:

ADDRESS

A location as described by the full street number, if any, the street name, the city or town, and the state, and not a mailing address such as a post office box.

AGENT IN CHARGE

One who manages real estate, including, but not limited to, the collection of rents and supervision of property.

NONRESIDENT OWNER

Of a residential rental housing unit means any owner of said property who does not reside onsite or does not own at least a 50% interest fee simple in his individual capacity. Any owner-occupant who is not the record owner of a minimum of 50% fee simple interest in said residential rental property in his or her personal individual capacity shall also be considered a non-resident owner for the purposes of this article.

Chapter 130. Housing Code

Article II. Amendments to Code

§ 130-25. Section 404, Occupancy Limits.

SECTION 404, OCCUPANCY LIMITS, is amended as follows:

A. **404.1 Privacy.** Dwelling units, housekeeping units, rooming units and apartment units shall be arranged to provide privacy and be separate from other adjoining spaces.

B. **404.5 Overcrowding. The maximum occupancy by unrelated individuals in a dwelling unit shall be as provided in the Mansfield Zoning Regulations, as may be amended.**

Chapter 130. Housing Code

Article II. Amendments to Code

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B. 404.5 Overcrowding. The maximum occupancy by unrelated individuals in a dwelling unit shall be as provided in the Mansfield Zoning Regulations, as may be amended.

COMMUNICATIONS

MEMORANDUM

From: Rebecca Shafer

To: Mansfield Planning and Zoning Commission

Date: June 17, 2016

RE: Proposed Rental Regulation Amendments

I am writing to follow up on some suggestions that were mentioned at two recent Ad Hoc Rental Committee meetings and which the Mansfield Neighborhood Preservation Group made at previous meetings and to clarify the specific provisions of the 2015 Mansfield Tomorrow Plan of Conservation and Development (POCD) under which the changes fit.

The critical proposals include:

- Reducing the number of unrelated persons for rental units in single family neighborhood zones from 3 to 2
- The exclusion of "dormitory" as a permitted use in RAR zones
- Two-strike rule

The proposed regulation amendments, a copy of which is attached to this memorandum for reference, are consistent with the POCD and they help meet Goal 7.3 "Mansfield Maintains High Quality Living Condition Throughout The Town".

Since the proposed regulation changes would likely discourage investor or absentee landlord purchases of single family homes for the purpose of transient rental units, the Measure of Effectiveness for Goal 7.3 would be enhanced. That measure of effectiveness states simply:

- Number of investor-owned single family homes in neighborhoods close to campus decreases.

Additionally, Goal 7.4 "Mansfield's Land Use Regulations Support Development of a Wide Range of Housing Options to Meet the Needs of Residents at All Ages of the Life Cycle, Including Singles, Families, Seniors and Students" has a Measure of Effectiveness which is similar that quoted above:

- Decrease in number of single family homes on rental registry.

Clearly, the protection of single family neighborhoods close to campus is a priority for Mansfield and decreasing rentals of single family homes near campus is encouraged by changes that make such conversions less attractive, thereby driving student housing back onto campus or into more appropriate locations.

In fact, “Supporting Neighborhoods” is one of the top ten ‘visions for the future’ in Mansfield Tomorrow called out as a singular priority at page 1.4 of the POCD which notes that the “continued conversion of single family homes into rental units ….is a significant concern for the long-term health of these neighborhoods.”

Goal 7.3 also has language that recognizes the need for strengthening in the Mansfield land use regulations to ensure the Goals are reached.

- Enhance code enforcement systems for rental properties through researching and implementing enforcement practices successfully used by other college communities. Implementation of the Nuisance Ordinance in 2011 has been successful at addressing neighborhood nuisances, particularly in off-campus neighborhoods; however, it is too early to determine whether the penalties to property owners are sufficient to promote long-term compliance. ***If patterns of problem properties appear, stronger measures may be needed to promote better property management.*** One potential resource is State College, PA.

This is further supported under the federal livability principals found at page iv of the POCD.

- Value communities and neighborhoods.
  Enhance the unique characteristics of all communities by investing in healthy, safe, and walkable neighborhoods—rural, urban, or suburban.

And the Regional Land Use Plan found at p. v of the POCD:

- Develop in a manner that respects and preserves community character and key natural resources.

And the Vision for the Future which places a strong emphasis on community character (p.1.4 POCD)

- Preserve Community Character. One of the most common values voiced by residents was a strong desire to preserve Mansfield’s rural character, historic assets, and natural resources.

There is a distinct call-out of the reduction of the number of unrelated persons who can live together by defining family to a traditional direct lineal descendent blood relative. Note Goal 7.3, Strategy B2.

- ***Identify strategies to improve enforcement of the Town’s restrictions on number of unrelated individuals that can live together.***

At Strategy B3 of Goal 7.3 the POCD recognizes the specific impacts of rental units:

- Track changes in quantity and location of rental units to determine impact of policy and regulatory changes and identify needed changes to policies and regulations.

Later, in the POCD addressed to future development patterns, there was specific support for protecting historic development patterns at Section 8.22.

- The purpose of this designation is to protect and enhance the pattern of development unique to historic villages.
  Ensure that infill residential development reflects existing village patterns in terms of lot width and building placement. This may be accomplished through mandates for narrow, deep lots to allow for clustering while meeting minimum lot sizes for wells and septic systems.

More importantly, the POCD recognizes that UConn's growth and impacts on residential neighborhoods need to be curtailed:

- Strategy D | Accommodate University growth while maintaining the town's rural character and minimizing impacts on adjacent neighborhoods. Encourage new university development along campus edges to respect community context in scale and design.

Finally, the POCD recognizes that larger lots with more open space provides buffer and healthier neighborhoods at Goal 9.5:

- Strategy B | Strengthen land use regulations to prevent sprawl and support development consistent with the Future Land Use Strategy and Community Design Goals.

  Consider providing incentives such as density bonuses for subdivisions that preserve larger amounts of open space through use of community wells and innovative wastewater treatment approaches.

Separation distances between uses that erode neighborhoods, like rental units, are a form of density-related incentive that prevents the creation of degraded stretches of housing. Mansfield should consider a separation distance between rental uses of 9 times the minimum lot frontage for the zone, so that rental units can continue to exist, but not to overwhelm, neighborhoods. This standard is derived from State College, Pennsylvania, a community considered to use best practices with regard to neighborhood/university balance.

The Mansfield Neighborhood Preservation Group continues to encourage the adoption of specific and rigorous protections which discourage additional rental conversions in single family neighborhoods. By making existing conversions non-conforming uses, there is a hope that eventually these uses will be converted back to single family uses which preserve community neighborhoods and encourage the containment of student housing.

Mansfield Regulation Modifications to Control Student Housing Impacts on Residential Neighborhoods

DEFINITIONS: (new and/or modified)

17. **Dormitory**. A building or group of buildings used for the purpose of accommodating students, faculty or members of religious orders with sleeping quarters with or without communal kitchen facilities and administered by a bona fide educational, religious or fraternal institution. The term dormitory includes fraternity and sorority houses, convents, priories, seminaries and monasteries, but does not include clubs. Dormitory shall also include any residential structure in which more than two (2) students reside without another resident adult family member who is a parent, guardian or other legally authorized custodial agent.

Family shall mean any number of persons who are all direct lineal descendants related by blood, marriage, civil union, adoption, guardianship or other duly authorized custodial relationship, and who live together as a single housekeeping unit and share common living, sleeping, cooking and eating facilities. Occupancy in a dormitory, sorority, fraternity, club, tourist home, emergency shelter, rooming or boarding house, group home or similar group occupancy shall not be considered a family.

Owner-occupied. Owner-occupied shall mean that the owner of record occupies a dwelling unit and that if the owner of record of a dwelling unit which is rented or leased is a business entity then the occupancy shall be considered a business use and not a residential use. In addition, all members or shareholders of a business entity must reside in the dwelling unit to be considered owner-occupied.

Student. A student is an adult individual eighteen (18) years or older who is enrolled or has been accepted to an undergraduate degree program at a university, college, community college, technical college, trade school or similar and is enrolled in the upcoming or current session, or was enrolled in the previous term, or is on a scheduled term break or summer break from the institution.

LEASED PROPERTY

Written leases are required for rental of residential properties leased or rented for more than 30 days. A list of tenant vehicle make, model, color and plate number (maximum of one per tenant) and Leases must be provided to the Building Department upon request, and must include the following information regarding Posting Notification, Maximum Occupancy, and Two Times Conviction/Eviction.

Posting Notification

1. Address of rental property
2. Maximum number of unrelated persons who may lawfully inhabit the dwelling
3. Number and location of on-site, off-street parking spaces available for the rental dwelling).
4. Statement of penalties for failure to comply
5. Name and telephone number of the property owner or owner's agent.
6. Telephone number of the Mansfield Building Department

The Posting must be prominently displayed in the dwelling unit, and be readily visible to all tenants residing on the property. Violations or misrepresentations are subject to permit revocation.

Maximum Occupancy of Unrelated Persons

1. The number and names of unrelated persons who may occupy the premises
2. Violation of the allowable number of occupants shall result in termination of the rental lease as it applies to ALL renters of the premises, and ALL renters have no more than 7 days to vacate the dwelling.

Two Times Conviction/Eviction

1. Conviction of any renter who violates Alcoholic Beverage, Noise, or Disorderly Premises Regulations more than one time within a one-year period shall result in termination of the lease as it applies to ALL renters, and ALL renters have no more than 7 days to vacate the dwelling from the date of the second conviction.

2. If it is necessary to evict a tenant, the Landlord shall initiate and follow proceedings for possession under the Connecticut General Statutes.

L. Painter

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

Dear Town Clerk:

Attached you will find a Notice of Tentative Determination Statewide General Permit that has been issued by the Department of Energy and Environmental Protection, Inland Water Resource Division. Please distribute these documents to your staff (Mayor, Inland Wetland Commission, Conservation Commission, Planning & Zoning Commission, Harbor Management Commission, Shellfish Commission and the Harbormaster). The Notice of Tentative Determination and draft permit documents are available for viewing at http://www.ct.gov/deep/ , at the top of the web page click on Publications, then Public Notices.

If you have any questions on this matter, please contact Carol Ladue 860-424-3828.

Thank you

Connecticut Department of
ENERGY &
ENVIRONMENTAL
PROTECTION

79 Elm Street • Hartford, CT 06106-5127 www.ct.gov/deep Affirmative Action/Equal Opportunity Employer

NOTICE OF TENTATIVE DETERMINATION
SECTION 401 WATER QUALITY CERTIFICATION
NOTICE OF FEDERAL COASTAL CONSISTENCY REVIEW
Application #WQC-201607149, Application #FCC-201603722
Department of the Army General Permits for the State of Connecticut
Municipalities: State-wide
Waters: All Waters

The Department of Energy & Environmental Protection ("DEEP") hereby gives notice it has made a tentative determination for applications submitted by United States Army Corps of Engineers, New England District ("Corps") pursuant to Section 401(a)(1) of the Federal Clean Water Act ("CWA") for the Water Quality Certification ("WQC") of state-wide general permits ("GP"). The applicant has also requested a determination pursuant to section 307(c)(1) of the Coastal Zone Management Act to review the proposed GP for consistency with the enforceable policies of Connecticut's federally-approved Coastal Management Program contained in sections 22a-90 to 22a-112 of the Connecticut General Statutes ("CGS").

Specifically, the Corps proposes to issue a new Department of the Army General Permits for the State of Connecticut pursuant to 33 CFR part 325.5(c)(3) for minimal impact activities within the State of Connecticut. The new GP consists of 23 individual general permits, GP 1. through GP 23., with a streamlined review process for activities within Corps jurisdiction under Section 404 of the CWA and Section 10 of the federal Rivers and Harbors Act of 1899 and for activities within the jurisdiction of the State of Connecticut under Section 401 of the CWA. The proposed activities will affect inland and coastal waters and wetlands, and coastal and aquatic resources of the State of Connecticut.

ACTIVITIES IN INLAND WATERS: A tentative determination has been made to grant WQC with conditions and limitations for some activities, deny WQC for some activities, and waive WQC for some activities. WQC for applications filed with DEEP for activities proposed for authorization under the Preconstruction Notification (PCN) process is not valid until the commissioner issues a written eligibility determination for that activity. Upon written determination that an activity proposed by an applicant is eligible, WQC under PCN would be deemed approved.

ACTIVITIES IN TIDAL, COASTAL and NAVIGABLE WATERS: A tentative determination has been made to grant a WQC with conditions for activities that meet the requirements for Self -Verification (SF) and Preconstruction Notification (PN) under the GP. The GP will not authorize activities in these waters unless state authorization is also granted. Under the proposed GP, applicants will first apply to the DEEP for Structures, Dredging & Fill or Tidal Wetlands permits or certificates, Water Quality Certification, and Coastal Consistency Concurrence, as appropriate. Substantive evaluations of activities for consistency with state water quality standards and coastal management policies will be conducted at the time these activities are evaluated in applications filed with the DEEP for authorization under the authorities identified in Section 2, paragraph II.1. of the GP. Once the DEEP has made a determination to authorize or certify such activities or found such activities to be consistent with the State's Coastal Management Act, any applicable provisions of the GP become valid upon written notification by the Corps pursuant to the provisions of the GP.

Interested persons may obtain copies of the application from the Corps at: United States Army Corps of Engineers, New England Division , 696 Virginia Road, Concord, MA 01742-2751, Attn: Diane M. Ray, phone: (978) 318-8831 or (800) 343-4789.

All interested parties are invited to comment on the tentative determination concerning the application for a WQC or the Coastal Consistency Review. Comments regarding the provisions of the WQC for activities in inland waters should be forwarded to Robert Gilmore, DEEP/Inland Water Resources Division, 79 Elm Street, Hartford, CT 06106-5127; email: Robert.Gilmore@ct.gov. Comments regarding the provisions of the WQC for activities in tidal, coastal or navigable waters or the Coastal Consistency Review should be directed to Brian Golembiewski, DEEP/Office of Long Island Sound Programs, 79 Elm Street, Hartford, CT 06106-5127; email: Brian.Golembiewski@ct.gov. The application and a draft copy of the proposed WQC are available for inspection on the DEEP website (www.ct.gov/deep) or at the office of the Inland Water Resources Division at the above address from 8:30AM to 4:30PM Monday through Friday by contacting Carol Ladue at (860) 424-3828. Written comments on the WQC application and federal Coastal Consistency Review must be submitted to the Department no later than July 14, 2016.

ADA PUBLICATION STATEMENT

The Connecticut Department of Energy and Environmental Protection is an Affirmative Action and Equal Opportunity Employer that is committed to complying with the Americans with Disabilities Act. To request an accommodation contact us at (860) 418-5910 or deep.accommodations@ct.gov.

PPublishing Date: June 14, 2016

DATE: 6/10/16

Betsey C. Wingfield, Chief
Bureau of Water Protection & Land Reuse

UCONN
UNIVERSITY OF CONNECTICUT

2015 Water Quality Report

Main Campus, Storrs and Depot Campus, Mansfield
Public Water System ID No. CT 0780021

Delivering Quality Water

The University of Connecticut is pleased to provide you, our water system customer, with the 2015 Water Quality Report. This report is provided to fulfill the Consumer Confidence Reporting requirement of the federal Safe Drinking Water Act (please see the water quality test results on page 3) and to keep you apprised of important water system developments.

We know the most important thing we do each and every day is to provide clean, safe drinking water so our consumers can trust the water being provided to them. The importance is more evident these days with the recent media coverage of the water quality crisis in Flint, Michigan. The University and its contract operator, New England Water Utility Services (NEWUS), want to assure you that a number of steps are taken in our water treatment and testing so you can have confidence in your water quality.

UConn's 2015 Water Quality Report includes the results of more than 700 samples tested at state certified laboratories for more than 80 potential contaminants and water quality parameters. We are pleased to report the water quality results meet state and federal drinking water standards.

The UConn water system receives its water from gravel-packed wells located near the streambanks of the Fenton and Willimantic rivers. In the near future, the University's well water will be supplemented with water from the Connecticut Water Company's (CWC) Northern-Western water system. This is the result of years of analysis, planning, and permitting that will allow the University to meet its water supply goal of ensuring an adequate quantity of pure drinking water while making efficient use of available resources. The final environmental permit authorizing the construction of the interconnection pipeline was issued by the Department of Energy and Environmental Protection (DEEP), and approximately 50% of the overall project construction was completed in 2015.

You should know lead is rarely found naturally in drinking water sources. The primary way lead can enter drinking water is when it comes in contact with lead service lines or household plumbing (pipes, faucets) made from lead. A critical step in reducing the risk of lead leaching from customers' service lines or internal plumbing is for the water supplier to adjust the pH in the distribution system. Our wellfields provide groundwater that is of very high quality, and we treat the water with low doses of sodium hydroxide to adjust the pH to protect against corrosion. Further, we fully comply with the EPA requirements regarding sampling for lead in drinking water and have provided documentation to the Connecticut Department of Public Health to demonstrate our results.

Like UConn, CWC has a comprehensive corrosion control program that provides treatment based on the source water quality. Extensive water quality testing is also conducted at CWC's sources and within their distribution system and no lead has been detected.

Thank you for taking the time to review this report. If you have questions concerning the drinking water quality results, please call, week days between 8 a.m. and 5 p.m., the University's Department of Environmental Health and Safety at 860-486-3613, or the NEWUS project manager at 860-486-1081. NEWUS is the contract operator subsidiary of CWC.

Regulatory Oversight

The University's Main Campus and Depot Campus systems experienced no water quality or monitoring/reporting violations for this reporting period. To ensure that tap water is safe to drink, the Federal Environmental Protection Agency (EPA) and the State of Connecticut Department of Public Health (DPH) establish and enforce regulations that limit the amount of certain substances in the water provided by public water systems. Water quality testing is an ongoing process, and the frequency of testing for each parameter is prescribed by drinking water regulations. Due to testing schedules, not all of these tests were required during 2015, but the most recent test data is shown in the table located on page 3. Samples from the University's water systems are tested regularly at state-certified laboratories to ensure compliance with state and federal water quality standards. Water samples are collected for water quality analysis from our wells, from entry points into our systems, and from sample locations within our distribution system.

Securing Additional Water Supply for the Long Term

To address the anticipated long term water supply needs of UConn and nearby areas in Mansfield, a detailed study in the form of an Environmental Impact Evaluation was prepared, publicly reviewed, and ultimately approved in 2013 under the state's Environmental Policy Act. Among the alternatives that were studied, an interconnection with CWC was determined to be the most environmentally sound, most consistent with the state plan of conservation and development, and most economical.

In June 2015, the University and Connecticut Water jointly received their permit from the Department of Energy and Environmental Protection (DEEP) approving the interconnection of the two supply systems (the Diversion Permit). Issuance of the permit followed several months of public involvement, including a comment period on the draft permit and public hearings held in Mansfield and at the DEEP's main office. The final permit authorizes CWC over the 25 year period, to provide 1.18 million gallons per day (mgd) on average and a maximum of 1.85 mgd for a peak day.

Upon completion, water will come from the CWC Northern-Western system via a new 5.2-mile pipeline, the construction of which was also authorized in the DEEP permit. Water main installation in and along Rt. 195 in Tolland, Coventry, and Mansfield started in July 2015, and the construction project was 50% complete with 12,260 linear feet having been installed as of the end of the year. An additional 3,131 linear feet was also installed in and along Rt. 44 in the Mansfield Four Corners area.

Working in partnership with the Town of Mansfield, CWC has also established a Water System Advisory Group with representatives from the Town, UConn, nearby communities, and other stakeholders, who have met quarterly to review local input to ensure communication and collaboration relating to CWC's system. The group will also make recommendations about best management practices, including water conservation programs, and the company will work with the Advisory Committee to implement such programs.

Installing Water Main on Rt 195

System Description

The University owns and operates the Main Campus water system in Storrs and the Depot Campus section in Mansfield. Although the Main and Depot systems are interconnected, the source of water within each system can vary. The Main Campus receives water from gravel-packed wells located in the Fenton River and Willimantic River Wellfields. The Depot Campus receives water only from the Willimantic River Wellfield. UConn's wells do not pump directly from the Fenton and Willimantic Rivers; rather, the wells are located near the rivers and pump groundwater from underground aquifers. As groundwater moves very slowly through the fine sands that make up these aquifers, the water is naturally filtered. The result is water of excellent chemical, physical, and bacteriological quality pumped from each wellfield. The only water treatment added is sodium hydroxide for pH adjustment and corrosion control, and chlorine for disinfection.

The University continues to have an ample supply of high quality drinking water to meet the needs of its current on-campus and off-campus users. In addition, it has over 7.6 million gallons of water storage capacity to meet all domestic, process, and fire protection needs. Large booster pumps help maintain adequate system pressures, and emergency generator power ensures continued operation during electric power outages.

Water Quality

As water travels over the land surface and/or through the ground, it dissolves naturally occurring minerals and in some cases, radioactive material, and can pick up substances resulting from the presence of animals or human activity, including:

- viruses and bacteria, which may come from septic systems, livestock and wildlife;
- salts and metals, which can be natural or may result from storm water runoff and farming;
- pesticides and herbicides, which may come from a variety of sources such as agriculture, urban storm water runoff or lawn care;
- organic chemicals, which originate from industrial processes, gas stations, storm water runoff and septic systems; and
- radioactive substances that can be naturally occurring.

To ensure safe tap water, EPA prescribes limits on these substances in water provided by public water systems. The presence of these contaminants does not mean that there is a health risk. The University complies with EPA and DPH water quality requirements to ensure the quality of the water delivered to consumers. There were no water quality violations in the University's systems in 2015.

Stage 2 Disinfectants and Disinfection Byproduct Rule (Stage 2 DBP rule)

The EPA's Stage 2 Disinfectants and Disinfection Byproducts Rule (DBP rule) requires all water systems to evaluate the potential for producing elevated levels of certain "disinfectant by-products" that have potential adverse health effects. These chemical compounds can be produced by the reaction of disinfecting chemicals with naturally occurring chemical compounds found in the water. Water quality test results over eight consecutive quarterly sampling periods showed that none of the samples contained levels of disinfection by-products in excess of allowable levels. Because of these favorable sample results, the University's water system has been designated as in compliance with the DBP rule.

Health Information

Consumer Confidence Reports are required to contain public health information for certain contaminants and compounds, even if the levels detected in the system were less than the Maximum Contaminant Levels (MCL) established for those parameters. The presence of contaminants does not necessarily indicate that the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline (800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk for infections. These people should seek advice about drinking water from their health care providers. EPA and the Federal Center for Disease Control guidelines on reducing the risk of infection by Cryptosporidium and other microbial contaminants are available from EPA's Safe Drinking Water Hotline (800-426-4791).

CRYPTOSPORIDIUM. Cryptosporidium is a microbial parasite found in surface waters throughout the U.S. Since the University uses groundwater (wells) rather than surface water (reservoirs), the University is not required to test for Cryptosporidium.

COPPER & LEAD. The University currently meets regulatory requirements for both lead and copper. Lead and copper samples were collected in 2013 and 2014. The 90th percentiles for both lead and copper were below the EPA Action Level. Nonetheless, the University believes it is important to provide its customers with the following information regarding lead and copper.

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. The University's water systems provide high quality drinking water, but cannot control the variety of materials used in plumbing components. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

Similarly, elevated copper levels can also have health impacts. Copper is an essential nutrient, but like lead, its levels can vary from location to location. Some people who drink water containing copper in excess of the Action Level over a relatively short period of time could experience gastrointestinal distress and may also suffer liver or kidney damage. People with Wilson's disease should consult their personal physician. If you are concerned about elevated copper levels, you may wish to have your water tested.

When your water has been sitting for several hours, you can minimize the potential for lead or copper exposure by flushing your tap water for 30 seconds to 2 minutes before using water for drinking or cooking.

Water Quality Testing

The results of tests conducted on water samples for regulated compounds for our Main and Depot systems are summarized in below. While most of the monitoring was conducted in 2015, certain substances are monitored less than once per year because the concentrations are expected to be relatively constant. If levels were tested prior to 2015, the year is identified in parentheses.

As required by the EPA and the DPH, the University also periodically tests for "unregulated contaminants." Unregulated contaminants are those that do not yet have a drinking water standard set by EPA. The purpose of monitoring for these contaminants is to help EPA decide whether the contaminants should have a standard. The last required samples for those unregulated compounds were collected in October 2014 with all sample results below detection levels.

In addition, since UConn's water comes from groundwater wells and given our water system's treatment capabilities, UConn's water supply is newly subject to the DPH's "Ground Water Rule" requiring routine tests for e. coli bacteria. As of September 2015, UConn tests each active well on a monthly basis for the presence of e. coli. There have been no detections.

University of Connecticut Water System — Includes Main and Depot Campuses

Water Quality Test	MCL	MCLG	Highest Level Detected	Range of Detections	MCL Exceeded?	Possible Contaminant Source
Copper (ppm)	AL 1.3	AL 1.3	0.299*	0.006-0.480	No	Corrosion of household plumbing systems
Lead (ppb)	AL 15	AL 15	11*	ND-27	No	Corrosion of household plumbing systems
Barium (ppm)	2	2	0.015	0.015	No	Erosion of natural deposits
Chloride (ppm)	250	NA	25.7	25.7	No	Erosion of natural deposits
Nitrate (ppm)	10	10	0.72	0.60-0.72	No	Runoff from fertilizer use
Sodium (ppm)	NL=28	NA	24.4	24.4	No	Erosion of natural deposits
Sulfate (ppm)	NA	250	10.8	10.8	No	Erosion of natural deposits
Turbidity (ntu)	5 ntu	NA	0.27**	ND-4.52	No	Soil runoff, pipe sediment, or precipitation of minerals or metals
Total Coliform (# of monthly positive samples)	1	0	0	ND	No	Naturally present in the environment
Alpha Emitters (pCi/L) (2013)	15	0	5.1	ND-5.1	No	Erosion of natural deposits
Combined Radium (pCi/L) (2013)	5	0	1.08	ND-1.08	No	Erosion of natural deposits
Chlorine (ppm)	MRDL 4	MRDLG 4	0.83	0.04-0.83	No	Water additive used to control microbes
HAA5 (ppb) [Haloacetic acids]	60	NA	3.8	ND-3.8	No	By-product of drinking water disinfection
TTHMs (ppb) [Total Trihalomethanes]	80	0	17.9	3.8-17.9	No	By-product of drinking water disinfection

* Compliance is based on 90th Percentile Value as listed here.
**Compliance is based on Running Annual Average as listed here.

Definitions and Key Terms

AL (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

MCL (Maximum Contaminant Level): The highest level of a contaminant allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology. Typically when MCLs are exceeded a violation occurs and public notification is required.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected health risk. MCLGs allow for a margin of safety.

MRDL (Maximum Residual Disinfection Level): The highest level of a disinfectant allowed in drinking water.

MRDLG (Maximum Residual Disinfection Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health.

Detected Contaminant: A detected contaminant is any contaminant measured at or above a **Method Detection Level.** Just because a contaminant is detected does not mean that its MCL is exceeded or that there is a violation.

NA: Not applicable.

ND: Not detected.

NL: Notification level.

ppb (parts per billion): One part per billion = ug/L; the equivalent of 1 penny in $10,000,000.

ppm (parts per million): One part per million= 1 mg/l; the equivalent of 1 penny in $10,000.

PCi/L (picocuries per liter): A measure of radioactivity.

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

Managing Demand

Over the past 10+ years, UConn has made major investments in leak detection and repair in order to reduce water losses from our transmission and distribution systems. Also, extensive outreach continues to be done to inform our students, staff, and off-campus customers of the importance of water conservation. During much of that time the result of these investments and efforts had been a year-to-year reduction in water use, or at least sustained levels of water use, despite the fact that the service population was growing little-by-little.

Innovative Partnership Building on Discovery Drive

The most notable reduction in potable water demand was the result of the University's Reclaimed Water Facility (RWF). Since the summer of 2013, the RWF has provided treated non-potable water to UConn's utility plant for make-up water for steam production, process cooling for the heat-and-power producing turbines, and chilled water used for air conditioning in many campus buildings.

The reclaimed water facility produced about 182,000 gallons per day (gpd) on average in 2015 but is capable of processing significantly more. The RWF and utility plant staff are constantly looking for ways to improve the efficiency and effectiveness of reclaimed water production. In fact, a process change suggested by plant staff in early 2015 significantly cut the salt concentration in the reclaimed water, which increased its usage as process water.

Several building projects currently under construction will also use reclaimed water. The STEM Residence Hall, the Tech Park's Innovation Partnership Building, and a new science and engineering building will use reclaimed water for toilet flushing and meeting their cooling needs. By substituting processed wastewater for drinking water for these uses, the University expects to save at least 44,000 gpd of potable water during the cooling season.

The University has also engaged environmental and public health regulators to plan for the eventual use of reclaimed water for irrigation on the campus grounds.

Emergency Notification

UConn and its contract operator, NEWUS, have established a notification system to alert its customers of water supply interruptions. These notifications will be sent when water is planned to be temporarily unavailable due to construction or other improvements or during emergencies such as a broken water main. UConn on-campus consumers are notified through the Building & Emergency Contact (B&EC) system. This enables an email to be sent to the listed contacts of the buildings expected to be affected by the outage. Off-campus customers are notified through NEWUS' emergency notification call system. Notifications will include as much information as possible, including the expected duration of the outage, if known, and any special instructions.

In order for us to promptly notify our customers, it is important that our contact information for you is complete and up to date. Employees can check their B&EC contact information by accessing www.beclist.uconn.edu using their NET ID. Off-campus customers who wish to update their phone number, please call 1-800-286-5700, send an email to customerservice@ctwater.com, or visit www.ctwater.com/notification.

Reliability

New Well Screen Being Installed

The first phase of a project to replace the main transmission pipe connecting the Willimantic wellfield to the Storrs campus's storage and distribution system was completed in early 2015. The cast iron pipe being replaced was originally installed in the 1970s and had been showing signs of deterioration. Leaks were being detected more frequently, and test results indicated the pipe was surrounded by soil that is naturally corrosive to cast iron. About 13,500 linear feet of new 16-inch diameter pipe adjacent to the original supply line had been installed, tested, and put into service. The new pipe is wrapped in polyethylene plastic to prevent contact with corrosive soils. The second phase of the transmission main replacement completed its design and permitting in 2015, and approximately 4,000 feet of pipe will be installed in 2016 as part of this final phase.

While the interconnection with the CWC will provide immediate redundancy to the University water system, UConn's existing sources of water will continue to be its primary source of supply. To ensure that the wellfields remain reliable, productive sources, two Fenton wells had their original brass screens, which were over 65 years old, completely replaced and a third well, that was younger and in better condition, was fully redeveloped to remove the fine-grained material that had built up over time.

Source Protection

Willimantic River

The University actively protects its wells, wellfields, and the Fenton and Willimantic Rivers, which are valuable water resources. Pursuant to the Connecticut Environmental Policy Act (CEPA), the University undertakes Environmental Impact Evaluations for construction projects based on their size, location, cost or other factors. This process, administered through the State Office of Policy and Management (OPM), provides state agencies, the town of Mansfield, environmental organizations, and interested citizens an opportunity to participate in the review process on a project regarding its potential environmental impact. The University also cooperates with Windham Water Works regarding watershed inspections on the Main Campus. These inspections are designed to protect the Fenton River Wellfield and the Fenton River, as well as the downstream reservoir that serves the Windham Water system.

The University utilizes its aquifer mapping information to delineate the areas of groundwater recharge for its wellfields. This technical evaluation, required by DEEP, shows the critical areas of direct recharge that must be protected from certain development. DPH, in conjunction with DEEP, maintains Source Water Assessment Program (SWAP) reports on the Fenton River and Willimantic River wells. These reports evaluate potential threats of contamination to our wells. The University's wellfields have an Overall Susceptibility Rating of "LOW," the best possible rating. To ensure continued source protection, however, the University will remain vigilant in protecting all of its water supply sources in the years to come. For more information regarding the SWAP report, visit the DPH's Web site at www.ct.gov/dph.

Water Usage

Overall, the total potable water usage in 2015 increased slightly compared to 2014 but was in line with the growth in service population and was still 4 percent less than what it was in 2012, before the reclaimed water was being used at the UConn utility plant. From 2005 to 2015, the average daily demand on the UConn water system has decreased from 1.49 million gallons per day (mgd) to 1.19 mgd. While the on-campus service population increased by 23 percent over that time, the average daily water demand decreased by more than 22 percent.

To accomplish that reduction, the University made many water system changes to the actual infrastructure and its operations, which has helped to increase our overall water use efficiency. We continue to build on the progress made in previous years by renewing our program to replace water fixtures in campus buildings with water-saving devices, and the University remains diligent about reducing wasted water through routine leak detection and repair.

In recent years, several of the campus's older buildings had been renovated with water-conserving fixtures. However, a robust program to retrofit fixtures in all buildings began in earnest in 2014 and continued throughout 2015. All residence halls faucet aerators and shower heads had been replaced with low flow fixtures, and we've witnessed a reduction of as much as 50,000 gallons per day in water use of those buildings. As toilets are replaced and as academic buildings are also addressed, the University expects to see an overall 20 percent reduction in its peak day water demand.

In addition to reclaimed water and other improvements made to the water system, the cooperation from our consumers about conserving water certainly helped contribute to our overall drop in water usage. Much of the summer and fall months of 2015 were particularly dry, and the resulting lower streamflows led to our requests for voluntary and, for several weeks, mandatory water conservation. We appreciate your efforts to conserve water when we issue our conservation requests and throughout the year.

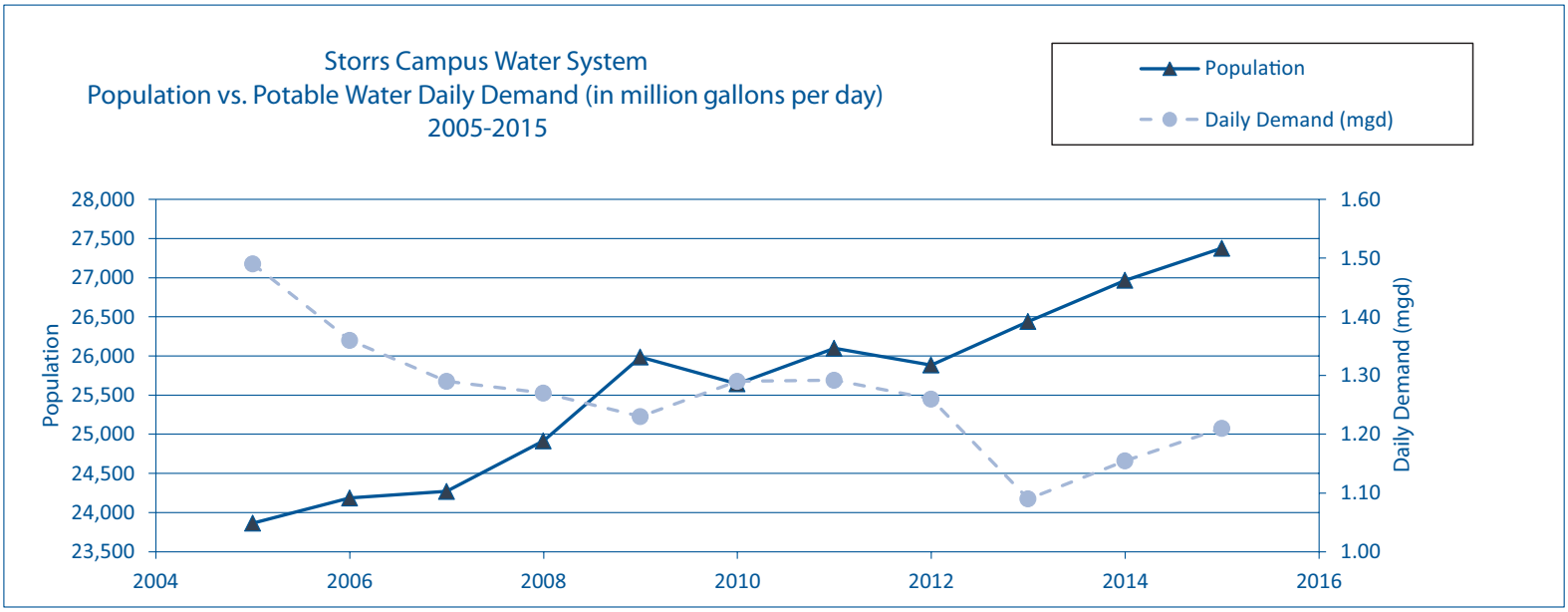
Water Conservation

While our water system does not pump water directly from the local rivers, it does extract groundwater from local aquifers that help sustain them. Extended dry weather naturally reduces streamflow which, in turn, may stress fish and other biotic stream habitat. That's why we respond with conservation measures of our own and request our customers to conserve water during these periods. UConn and NEWUS appreciate your cooperation and encourage the wise and efficient use of water at all times by applying the following tips:

- Install water-efficient fixtures and equipment, such as water-saving shower heads and toilets.
- Take shorter showers.
- Turn off faucets and showers when not in use.
- Wash full loads in washing machines/dishwashers.
- Limit running water in food preparation.
- Limit outdoor watering to early mornings or evenings, and do not water on windy days.
- Mulch around plants to reduce evaporation.
- Limit running water time when washing a car, or use a car wash.

Repair leaks:

- In UConn dorms, promptly report leaks to your Resident Advisor.
- In other campus buildings, report leaks to Facilities Operations at 860-486-3113.



University of Connecticut
Facilities Operation Building
25 LeDoyt Road, Unit 3252
Storrs, CT 06269

2015
Annual Water Quality Report

Proudly Presented By

UCONN
UNIVERSITY OF CONNECTICUT

TOWN OF MANSFIELD
OFFICE OF THE TOWN MANAGER

Matthew W. Hart, Town Manager

AUDREY P. BECK BUILDING
FOUR SOUTH EAGLEVILLE ROAD
MANSFIELD, CT 06268-2599
(860) 429-3336
Fax: (860) 429-6863

July 7, 2016

Commissioner James P. Redeker
Connecticut Department of Transportation
P.O. Box 317546
2800 Berlin Turnpike
Newington, CT 06131-7546

Dear Commissioner Redeker:

The Mansfield Town Council received a citizen petition (attached) regarding a proposal by Global CNG Holdings (also known as Pentagon Energy) to convoy high pressure, natural gas by truck and to pump it into the Algonquin Pipeline via an infusion station to be located on Route 6 in Andover, Connecticut. Residents are concerned with the implications such an operation may have on traffic and safety and have asked the Council to request the Connecticut Department of Transportation (CTDOT) to conduct a safety study.

In response to the petition, at its meeting on June 27, 2016 the Town Council voted affirmatively to request that the CTDOT conduct a safety study in regards to the operation of the infusion station to be proposed by Global CNG Holdings/Pentagon Energy. Please let me know if this is an action that the CTDOT would be willing to pursue.

You can reach me with any questions regarding this matter at 860-429-3336, ext. 5 or townmngr@mansfieldct.org.

Sincerely,

M W. Hart

Matthew W. Hart
Town Manager/LTA

CC: Mae Flexer, State Senator
Gregory Haddad, State Representative
Linda Orange, State Representative
Town Council
Conservation Commission
Traffic Authority

Petition to Ensure the Safety of Route 6

Mansfield Town Council:

- Whereas Global CNG Holdings (also known as Pentagon Energy) plans to convoy high pressure, natural gas by truck from eastern Pennsylvania to Andover, CT, where it will be pumped into the Algonquin Pipeline, a natural gas transmission pipeline,
- Whereas the company plans to have 5 to 8 trucks an hour, 24 hours a day, 7 days a week coming into an infusion station on Rte. 6 where it will be pumped into the Algonquin Pipeline,
- Whereas the trucks will haul a trailer with four tubes filled with compressed natural that are 42 inches in diameter and 45 feet long,
- Whereas the gas in these tubes will pressurized at 4500 pounds per square inch (psi).
- Whereas 4500 psi is a pressure much higher than the gas pressure in the Algonquin Pipeline which is between 600 and 800 psi,
- Whereas the company plans to run this operation for five months a year, November through March, which would increase truck traffic by over 120,00 loaded truck trips and over 120,000 empty truck trips on Rte. 6,
- Whereas Rte. 6 has several accidents per year. From 2010 to 2014, 190 accidents in Andover, 111 accidents in Columbia, and 211 accidents in Bolton,
- Whereas it is quite likely, with this increase in traffic, the accident rate will increase, and one or more of these trucks will be in an accident,
- Whereas transmission pipeline (600 to 800 psi) ruptures lead to explosions with a hazard radius of about 800 feet,
- Whereas a rupture of a trailer tube (4500 psi) would create a hazard radius well over 1000 feet,
- Whereas radioactive lead-210 and polonium-210 builds up inside the trailer tube over multiple trips,
- Whereas this radioactive material would be spread over the hazard area in an explosion,

We the undersigned ask the Town of Mansfield to request the Connecticut Department of Transportation to make a safety study of the effect of increased truck traffic on Rte. 6 because of the operation of an infusion station in Andover, particularly the explosive and radioactive hazards. Further that the Town ask our State legislators to request such a safety study.

Petition to Ensure the Safety of Route 6

Mansfield Town Council:

We the undersigned ask the Town of Mansfield to request the Connecticut Department of Transportation to make a safety study of the effect of increased truck traffic on Rte. 6 because of the operation of an infusion station in Andover, particularly the explosive and radioactive hazards.. Further that the Town ask our State legislators to request such a safety study.

Name	Phone	Email	Address	Town
Daniel Rosado		dmrosado3@yahoo.com	Circle Dr.	Mansfield
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Lisa Peterson-Blinn	860-377-6832	lisajpb@gmail.com	STAFFORD Rd	STORRS CT.
Quinn Duclos			Olsen Dr.	Mansfield Center
Susan Sandall		susiesandall@charter.net	84 Cranethill	Storrs, CT
Almat Ken Cordner			Edgewood Lane	Mansfield Ctr. CT
Gregory Norris			Middle TPKe	Mansfield CT
Andrea Ames	860-942-0224	aandyames@pocketmail.com	12 Old Mill Court	Storrs CT
Mary Bent	860-423-8208	gdbent@earthlink.net	97 Mansfield Hollow	Mansfield

Petition to Ensure the Safety of Route 6

Mansfield Town Council:

We the undersigned ask the Town of Mansfield to request the Connecticut Department of Transportation to make a safety study of the effect of increased truck traffic on Rte. 6 because of the operation of an infusion station in Andover, particularly the explosive and radioactive hazards.. Further that the Town ask our State legislators to request such a safety study.

Name	Phone	Email	Address	Town
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Christa Blanchard	8606423-3656		19 Brown Rd Mansfield Ct	
Pamela Bridgeford	860-456-1058	pdb112@charter.net	112 Bassetts Bridge Rd	Mansfield Ct. 06250
Jim McGaughey	860 992-8375	jdmcgaughey@sbcglobal.net	184 Browns Rd.	Storrs Mansfield CT 06268
Donald Hayes	860-423-6141	DONTHELE@AOL.COM	126A BASSETTS BRIDGE	MANSFIELD CT 06250
George Rawitscher	860 429 3107	georgerawitscher@gmail.com	343 cod fish falls Rd	STORRS CT 06268

Petition to Ensure the Safety of Route 6

Mansfield Town Council:

We the undersigned ask the Town of Mansfield to request the Connecticut Department of Transportation to make a safety study of the effect of increased truck traffic on Rte. 6 because of the operation of an infusion station in Andover, particularly the explosive and radioactive hazards.. Further that the Town ask our State legislators to request such a safety study.

Name	Phone	Email	Address	Town
[illegible]	487-1381		74 Knowlton	MSfld
Laura Cisneros	734-678-3859	cisneros32@gmail.com	101 Forest Rd.	Mansfield
[illegible] Barnett	820429-7725	jvl.cm.barnett@charter.net	295 Wormwood Hill Rd	Mansfield
Margaret Rubega	860-487-3954		470 So. Eagleville Rd.	Mansfield
[illegible]	862-432-5329		145 Highland Rd	Mansfield
[illegible]	860456 1281	[illegible]	98 Mansfield Hollow Rd.	Mansfield
John [illegible]			48 Fern Rd	Storrs
George Bailey	423 8136		75 Grove Hill Rd	06268
Donna Clauson	8604230638	d.clauson@snet.net	48 Fern Rd	Mansfield
Helen L Bosco	487-1136		1634 STAFFORD RD	"
Norman D Hawkins	423 3658		79 Browns Rd	"

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Name	Phone	Email	Address	Town
Jerome Fazzalo	860-456-8149		393 Southwood Acres, Mansfield, CT	06250
Christina Walsh Brahaney	860-617-0207	brahaney@charter.net	30 Lorraine Dr Storrs	06268
PAULA SCHARFF	860-940-7148	PAULAVSCHARFF@GMAIL.COM	154 HANKS HILL RD STORRS	06268
J. CONOVER	8049868338		148 Coventry Rd Mansfield CT	06250
Jennifer Stone	8604298784	jstone77@charter.net	657 Chaffeeville Rd Storrs	06268
ROBERT PIRRIE	" "	rpirrie&784@charter.net	" "	" "
Lynne McPhee	860-456-2450	l.mcphee@charter.net	236 Puddin Lane Mansfield, CT	06250
BETHANY JAVIDI	8604285029	bethany.javidi@att.net	13 QUAIL RUN RD STORRS CT	06268
Ariana Javidi	860 617 8441	aejavidi@gmail.com	13 Quail Run Rd Storrs CT	06268
MONICA VAN BEUSEKOM	8604236857	monica.vanbeusekom@gmail.com	98 Candide Lane Storrs, CT	06268
Lawrence Ash-Mayo	860-429-8664	lgln53@hotmail.com	377 Wormwille Rd Mansfield Center	06250

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Name	Phone	Email	Address	Town
JACK BOYKO	860 429-0051		119 Brookside Ln	mansfield Cntr
Maureen Crowley	860 429-0057		119 Brookside Lane	Mansfield Center
SHARON STOKELAND	6464164257		135 Mansfield Hollow Rd	mnsfld Ctr CT.
KARA FRANCIS	~~860~~		68 Independence Dr Mansfield CT →	
Helen J Fried	860-933-3298	HJF205@earthlink.net		
Joan Buck	860-771-5252	buckj300@quail.com	72 Independence Dr.	Mans. Center 06250
Shawn Santaniere	860.428.4380	ssantaniere@eosmithorg	11 Blake Lane	Storrs
Kathy Fratoni	860-477-0585	katie@myoffmail.com	25 Valley View Dr	Storrs.

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Name	Phone	Email	Address	Town
David R Feken	860-423-6727	davencathy@charter.net	1 Ft. Griswold Lane	Mansfield Center
Catharen M. White	8604236727	"	1 Ft. Griswold la.	mansfield ctr. 06250
Eva Csejtey		e_csejtey@hotmail.com	351 Browns Rd.	Mansfield CT 06268
Susan G. Brome	860-429-0490	susan.brome@gmail.com	70 Davis Rd.	Storrs/Mans. CT 06268
Ann Kowalty	860-423-2975	annkowalty@charter.net	98 Fern Rd	Storrs, CT 06268

Petition to Ensure the Safety of Route 6

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Name	Phone	Email	Address	Town
Laurie Cooper	860-423-4896	natchaug@earthlink.net	100 Mansfield Hollow Rd.	Mansfield Ctr, CT 06250
Don Kujelmass	860 428-6160	[redacted]	100 Mansfield Hollow Rd.	Mansfield Ctr. CT 06250

Petition to Ensure the Safety of Route 6

Mansfield Town Council:

- Whereas Global CNG Holdings (also known as Pentagon Energy) plans to convoy high pressure, natural gas by truck from eastern Pennsylvania to Andover, CT, where it will be pumped into the Algonquin Pipeline, a natural gas transmission pipeline,
- Whereas the company plans to have 5 to 8 trucks an hour, 24 hours a day, 7 days a week coming into an infusion station on Rte. 6 where it will be pumped into the Algonquin Pipeline,
- Whereas the trucks will haul a trailer with four tubes filled with compressed natural that are 42 inches in diameter and 45 feet long,
- Whereas the gas in these tubes will pressurized at 4500 pounds per square inch (psi).
- Whereas 4500 psi is a pressure much higher than the gas pressure in the Algonquin Pipeline which is between 600 and 800 psi,
- Whereas the company plans to run this operation for five months a year, November through March, which would increase truck traffic by over 120,00 loaded truck trips and over 120,000 empty truck trips on Rte. 6,
- Whereas Rte. 6 has several accidents per year. From 2010 to 2014, 190 accidents in Andover, 111 accidents in Columbia, and 211 accidents in Bolton,
- Whereas it is quite likely, with this increase in traffic, the accident rate will increase, and one or more of these trucks will be in an accident,
- Whereas transmission pipeline (600 to 800 psi) ruptures lead to explosions with a hazard radius of about 800 feet,
- Whereas a rupture of a trailer tube (4500 psi) would create a hazard radius well over 1000 feet,
- Whereas radioactive lead-210 and polonium-210 builds up inside the trailer tube over multiple trips,
- Whereas this radioactive material would be spread over the hazard area in an explosion,

We the undersigned ask the Town of Mansfield to request the Connecticut Department of Transportation to make a safety study of the effect of increased truck traffic on Rte. 6 because of the operation of an infusion station in Andover, particularly the explosive and radioactive hazards. Further that the Town ask our State legislators to request such a safety study.

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Name	Phone	Email	Address	Town
Galadriel Chilton	608-780-8556	galadriel.chilton@gmail.com	8 Mansfield Hollow Rd Ext Mansfield Center, CT	Mansfield Center
Mary Snyder	860-429-0293	rls.mary@gmail.com	82 Brookside Ln.	Mansfield Ctr.
David Morse	860 942-8692	dmorse@david-morse.com	~~44~~ 6 150 Crane Hill Rd	Mansfield
Brenda Shaw	860 456 8567	brenda_c_shaw@sbcglobal.net	22 Fort Hill Rd Ashford Ln	Mansfield
Joan Terry			40 Sycamore Dr Storrs, CT	Mansfield
Jane Jackman	860-429-2037	janejkymaker@gmail.com	23 Silo Rd W. Storrs, CT.	Mansfield.
Jeanne Haes	860-577-1152	jeannehaes85@gmail.com	10 B Sycamore Dr Storrs, CT	Storrs
Susanna M. Thomas	860-429-2522		9 C Sycamore Dr.	Storrs
Mary Dean	860 429-9172	maryfdean@gmail.com	11 Westwood Rd Storrs, CT 06268	
Edith S Jones	860 487-3909		201 Separatist Rd STORRS, CT	06268
Doris Masterton	860-429-5490		1 Ridge Rd. Storrs Ct.	06268

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Petition to Ensure the Safety of Route 6

Mansfield Town Council:

Name	Phone	Email	Address	Town
Yan Wu	860-423-6587	yanhwu@yahoo.com	15 Sawmill Brook	Mansfield Tolland
Olga Rozman			697 Mansfield City Center, CT 06268	Storrs
[illegible]	860-[illegible]		241 Mulberry Rd Mansfield	Center
[illegible]			283 Atwoodville Rd Mansfield Center CT	Mansfield Center
Heike Boeckner			439 Northwoods Village Rd.	Storrs, CT
Jennifer Squires			63E Eastbrook Heights	Mansfield ctr ct
Robert Brandon			Philip Dr.	Storrs CT
Jiayu Wang			27 clear view Dr.	Mansfield Ctr, CT
Sarah McLaughlin		mclaughlinsa@my.easternct.edu	576 Browns Rd	Mansfield, CT

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Name	Phone	Email	Address	Town
Janis Hoyle	860-423-6141	Donhoyle@aol.com	125A Bassetts Bridge Rd	Mansfield, 06250
Carol McMillan	860 423 3774		100 Wormwood Rd	Mansfield Ctr 06250
STEVE LANE	860-208 5039	jmenard224@SBCGLOBAL.NET	131 BROOKSIDE LN	MANSFIELD CTR. CT 06250

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Name	Phone	Email	Address	Town
Julia R. Sherman	860-423-8111	julsherman@hdwail.com	43 Pinewoods	Mansfield
GEOFFREY M. KERN	860-423-8542	gkern@cosmik.org	58 Cemetery	Mansfield
David B. Stimple	860-429-7022	dstrimple@eosmith.org	3 Beebe Ln	Storrs-Mansfield
Tirza Roda	860-456-1110	tirza_roda@live.com	13 Derek Dr	Mansfield

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Name	Phone	Email	Address	Town	Zip
Margaret Hynes	860 933-7428	hynesmm@sbcglobal.net	35 Woodmont Dr.	Mansfield	

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Name	Phone	Email	Address	Town
Mike & Miriam Kurland	860-933-4924	mimbck@yahoo.com	269 Wormwood Hill Rd	Mansfield Ctr
Kathleen Narowski	(860)456-7886	musics_broken_angel@hotmail.com	164 Storrs Rd.	Storrs
Roberta Schwarz			11 Woodmont Dr	Mansfield
[illegible]			"	"
[illegible]			16 Jacobs Hill	Mansfield
Julie Mcnaul				
EJ Smith	860-[illegible]413			
Rhonda Brouillard	"	"		
Valerie Oliver		nanny-snow@hotmail.com	525 Storrs Rd	Mansfield
Barbara A. Straub			38 Boulder Lane	Mansfield

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Name	Phone	Email	Address	Town
Charles E. Straub	860-429-5358	chuck@chuckstraub.com	38 Boulder Lane	Mansfield 06250
Laura Clements			~~Man~~ Circle Dr.	mansfield
Maximilian Kort		maximilian.kort@gmail.com	20 Edgewood Lane	Mansfield Center
Brad Goodwin			11 Centre St.	Mansfield Center, CT
Donald Berry			67 CIRCLE DR	MANSFIELD CT
Anita B. Egan			67 Circle Dr.	mansfield CT
Kenneth Polk			63 Highland Rd	Mansfield
Jamie Polk			63 Highland Rd	Mansfield
Barbara Giardina			48 Storrs Hgts Rd.	Storrs, CT
Karen DiSala	860-456-2883		16 Jacobs Hill Rd	Mansfield, CT
Hif Rukin	8604207478	atif.m.rukin@gmail.com	4 Max Felix Dr	Storrs CT

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Name	Phone	Email	Address	Town
Jill Lillis	860 429 8223			Mansfield
Lois Happe	860-455-5593	Lkhappe@yahoo.com		Storrs
Marj Molter	860-230-5010	marjm59@yahoo.com		Storrs
DON BAXTER	860-429-3936	SND.BAXTER@JUNO.COM		STORRS
Sandra Baxter	860-429-8936	" " "		Storrs