YEARLY OPERATIONAL PLAN

EVERSOURCE ENERGY
TRANSMISSION AND DISTRIBUTION
RIGHTS-OF-WAY

WESTERN MASSACHUSETTS

2018

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Attachments (in order at end)

- Map(s) locating the right-of-way and sensitive areas not readily identifiable in the field
- Massachusetts Department of Agricultural Resources' "SENSITIVE AREA MATERIALS LIST" (2017 revision)
- Massachusetts Department of Agricultural Resources approved herbicide fact sheets
- *2018 Environmental Monitor* notice

I. INTRODUCTION

The purpose of 333 CMR 11.00, Rights of Way Management, is to promote the implementation of integrated vegetation management techniques and to establish standards, requirements, and procedures necessary to minimize the risk of unreasonable adverse effects on human health and the environment associated with the use of herbicides to maintain rights-of-way. These regulations establish procedures which guarantee ample opportunity for public and municipal agency review and input on right-of-way maintenance plans.

A Yearly Operational Plan (YOP) must be submitted to the Department of Agricultural Resources every year herbicides are intended for use to maintain rights-of-ways. The YOP provides a detailed program for vegetation management for the year. An approved YOP, in conjunction with the current five-year Vegetation Management Plan (VMP) governs our herbicide application to our rights-of-way for the year.

Upon receipt of this YOP, the Department publishes a notice in the *Environmental Monitor*. The applicant must provide a copy of the proposed YOP and *Environmental Monitor* notice to the Board of Health, Conservation Commission and the chief elected municipal official for the city or town in which the herbicide treatment is proposed. The Department allows a 45 day comment period on the proposed YOP beginning with receipt of the YOP and *Environmental Monitor* notice by each municipality. (A copy of the *Environmental Monitor* notice is attached to this YOP.)

Public notification of herbicide application to the right-of-way is made at least 30 days in advance of the treatment by a mailed notice. Notice is made to the Department of Agricultural Resources, the Mayor, City Manager or chairman of the Board of Selectmen, the Board of Health, and the Conservation Commission of the municipality where the right-of-way lies. Additionally, herbicide applications to rights-of-way in 2018 are subject to a “newspaper-notification” requirement.

Any comments on this YOP should be directed to the contact person(s) listed in section VIII.

II. RIGHTS-OF-WAY COVERED BY THIS YOP

Our electric system consists of transmission, bulk supply distribution, and distribution lines.

- Transmission lines are high voltage (69,000 - 345,000 volts) electrical lines constructed on tall (normally in excess of 80 feet) wood or steel structures, usually on off-road rights-of-way (ROW's). Transmission lines are designated by a "WT" number.

- Bulk supply distribution lines operate at either 13,800 or 23,000 volts, and generally are on wood poles from 30 to 50 feet tall. These lines normally carry power between substations, or to large industrial or commercial customers, and are frequently on off-road ROW's. Bulk supply distribution lines are designated by a "D" number.

- Local distribution lines operate from 2,400 to 23,000 volts, and generally are on wood poles from 30 to 50 feet tall. These lines are located along roads and in off-road ROW's, and carry power to industrial, commercial, or residential customers. There are distribution poles with vines on roadsides scheduled for herbicide work in 2018.

Distribution

2018 Scheduled Vegetation Maintenance Work

Scheduled work by town:

Note: D - #'s designate bulk-supply distribution lines scheduled for work.
"Brush" followed by a street name identifying location of brush.
"Touch-up" designates a touch-up application only
"Vines" treatments specific to vines climbing on poles or equipment

TOWN	Work Locations	Touch-up Locations	Vines
Agawam			Roadsides
Amherst			Roadsides
Ashfield			Roadsides
Becket			Roadsides
Bernardston			Roadsides
Blandford		D34 Blandford to Otis	Roadsides
Buckland			Roadsides
Colrain			Roadsides
Conway	D24 Deerfield - Conway		Roadsides
Chesterfield	D25 Plnfld-Cumingtn Chesfld	D7 Huntington-Chesterfield	Roadsides
Cummington	D25 Plnfld-Cumingtn Chesfld		Roadsides
Dalton	D40 Crane tap-Dalt.sub D35 Doreen-Dalton Sub*		Roadsides
Deerfield	D24 Deerfield - Conway		Roadsides
Easthampton		D70 Gunn S/S-Plain Rd. D2 Midway to NGrid Tie	Roadsides
Erving			Roadsides
Gill			Roadsides
Granville			Roadsides
Greenfield	D12 Cumber.-Gardnerfls D16 Cumber.-Greenfield D68 Greenfield - Main st.		Roadsides

Hinsdale	D43 Berk.-FrankSchnops		Roadsides
Hadley			Roadsides
Hatfield			Roadsides
Huntington		D7 Huntington-Chesterfield	Roadsides
Lanesborough	D28 Partridge-Rt.7		Roadsides
Lee		D41 Pleasant to NGrid Tie	Roadsides
Lenox		D39 Holmes Rd to T-Line	Roadsides
Leverett			Roadsides
Longmeadow			Roadsides
Ludlow			Roadsides
Leyden			Roadsides
Middlefield			Roadsides
Montague			Roadsides
Montgomery			Roadsides
New Ashford			Roadsides
Northfield			Roadsides
Otis		D34 Blandford to Otis	Roadsides
Pittsfield	D28 Partridge-Rt.7 D42 Clark Rd-North St. D65 Partridge-Dalton Ave D40 Crane tap-Dalt.sub D30 Doreen-Dalton Ave.	D37 Oswald to Rte 20 D39 Holmes Rd to T-Line	Roadsides
Pelham			Roadsides
Peru			Roadsides
Plainfield	D25 Plnfld-Cumingtn Chesfld		Roadsides
Richmond			Roadsides
Russell			Roadsides
Savoy			Roadsides
Sandisfield			Roadsides
Shelburne	D12 Cumber.-Gardnerfls		Roadsides
Southampton			Roadsides
Southwick			Roadsides
Springfield			Roadsides
Sunderland			Roadsides
Tolland			Roadsides
Tyringham			Roadsides
Washington			Roadsides
West Springfield			Roadsides
Westfield		D6 Rte 20 to Gravel pit	
Westhampton			Roadsides
Whately			Roadsides
Windsor			Roadsides

Transmission

2018 Scheduled Vegetation Maintenance Work

	TOWN	
Ashfield	WT-03 Northfield – Ashfield, WT-01 Ashfield - Berkshire	
Becket		WT-33 C.T Line – Pleasant JCT
Blandford		WT-33 C.T Line – Pleasant JCT
Cheshire	WT-02 Berkshire – Doreen – N.Y.	
Conway	WT-03 Northfield - Ashfield	
Dalton	WT-02 Berkshire – Doreen – N.Y.	
Deerfield	WT-03 Northfield - Ashfield	
Easthampton		WT-32 Midway S/S –Elm S/S – Granville JCT
Erving	WT-03 Northfield - Ashfield	
Granville		WT-33 C.T Line – Pleasant JCT
Hancock	WT-02 Berkshire – Doreen – N.Y.	
Hinsdale	WT-01 Berkshire – Ashfield, WT-02 Berkshire – Doreen – N.Y.	
Lanesborough	WT-02 Berkshire – Doreen – N.Y.	
Lee		WT-31 Pleasant S/S – Oswald S/S – Doreen S/S, WT-33 C.T Line – Pleasant JCT
Lenox		WT-31 Pleasant S/S – Oswald S/S – Doreen S/S
Montague	WT-03 Northfield - Ashfield	
Northfield	WT-03 Northfield - Ashfield	
Otis		WT-33 C.T Line – Pleasant JCT
Pittsfield	WT-02 Berkshire – Doreen – N.Y.	WT-31 Pleasant S/S – Oswald S/S – Doreen S/S – G.E S/S
Plainfield	WT-01 Berkshire - Ashfield	
Peru	WT-01 Berkshire - Ashfield	
Russell		WT-32 Midway S/S –ElmS/S – Granville JCT, WT-33 C.T Line – Pleasant JCT
Shelburne	WT-03 Northfield - Ashfield	
Southampton		WT-32 Midway S/S –ElmS/S – Granville JCT

III. SENSITIVE AREAS, INCLUDING FLAGGING METHODS TO DESIGNATE SENSITIVE AREAS ON THE R.O.W.

Sensitive areas:

Public Ground Water Supply Wells

No Herbicide Zone	- Zone I designated areas - within 400' of any wellhead
Limited Herbicide Zone	- any Zone II or IWPA - ½ mile radius of wells without the IWPA delineated and with pumping rate of a minimum of 100,000 gpd. - for smaller sources the distance is approved pumping rate in gpm divided by 32 and added to 400’ AND 12 months must elapse between applications and applications made using selective low pressure stem treatments
How identified	- on maps [2] / flagging [3]

Public Surface Water Supplies

No Herbicide Zone	- within 100' of any Class A surface water source - within 100’ of any tributary or associated water body where tributary or associated water body runs within 400’ of a Class A surface water sources. - 10’ from any tributary or associated surface water body where the tributary of associated surface water body is at a distance greater than 400’ of a Class A surface water body - a lateral distance of 100’ for 400 feet upstream on both sides of a river of a Class B drinking water intake
Limited Herbicide Zone	- between 100 feet and 400 feet of any Class A surface water - a distance between 10’ and 200’ of any tributary if associated surface water body where the tributary of surface water body runs outside the Zone A for the Class A surface water source - a lateral distance of between 100’ and 200’ for 400’ upstream, on both sides of the river, of a Class B drinking water intake - a distance between 10’ from the mean annual high-water line of any river and the outer boundary of the Riverfront area AND 24 months must elapse between applications; selective low pressure stem treatments.
How identified	on maps [2] / flagging [3]

Private Wells

No Herbicide Zone	- within 50'
Limited Herbicide Zone	- between 50 feet and 100 feet AND 24 months must elapse between applications; selective low pressure stem treatments.

How identified	- Well List [4] / in field / solicited during permissioning and notification process [6]

Surface Waters

No Herbicide Zone	- within 10' - within 10' of the mean annual high-water line of any river
Limited Herbicide Zone	- between 10 feet and 100 feet AND 12 months must elapse between applications and applications made using selective low pressure stem treatments
How identified	- in field

Wetlands

No Herbicide Zone	- within 10'[5]
Limited Herbicide Zone	- between 10 feet and 100 feet AND 12 months must elapse between applications and applications made using selective low pressure stem treatments
How identified	- field survey / flagging [3]

Certified Vernal Pools

No Herbicide Zone	- within 10'[5]
Limited Herbicide Zone	- between 10' and the outer boundary of any certified vernal pool habitat - between 10' and 100' of the boundary of any certified vernal pool with the habitat boundary not mapped
How identified	- NHESP mapping under 310 CMR 10.57(2)(a)5. and 6. field survey / flagging

Agricultural and Inhabited Areas

No Herbicide Zone	- within area
Limited Herbicide Zone	- between 0 feet and 100 feet; no high pressure foliar applications AND 12 months must elapse between applications and applications made using selective low pressure stem treatments
How identified	- in field

[2] Town map(s) are located at the back or attached to the YOP
[3] flagging methods are shown beginning on the next page
[4] "Well List" follows the flagging methods
[5] Regarding herbicide use in wetlands:

Pursuant to the Rights-of-Way Management regulations [333 CMR 11.04(4)(c)] a study was conducted to evaluate the impact of vegetation management methods on wetlands. After review and evaluation of the study, the Department determined a vegetation program containing the following elements will not pose an unreasonable adverse impact to wetlands:

-- An Integrated Vegetation Management (IVM) system, as described in the Vegetation Management Plan and Yearly Operational Plan, is utilized in wetland areas. The IVM system must, at a minimum, place emphasis on; encouraging low growth plant species to discourage unwanted vegetation; and minimizing the frequency and amount of herbicide use by only controlling specific non-conifer tree species which will impact electric line operation and access to the right-of-way.

-- Herbicides may be applied by basal, cut stump or low volume foliar methods. Foliar applications will include the use of drift reduction agents. Foliar applications will only be conducted in situations where basal and cut stump treatments are not appropriate based on the size of the vegetation and potential for off-target drift.

-- Herbicides will not be applied to conifer species (pine, spruce, fir, cedar and hemlock) in wetlands.

-- Only herbicides recommended by the Departments of Agricultural Resources and Environmental Protection through 333 CMR 11.04(1)(d) may be used in sensitive areas.

-- Carriers for herbicides do not contain any of the following petroleum based products: jet fuel, kerosene or fuel oil. Carriers will be subjected to review by the Department of Agricultural Resources and DEP through 333 CMR 11.04(1)(d).

-- Herbicides will be applied by hand operated equipment containing no more than 5 gallons of herbicide mixture.

-- A minimum of twelve months must elapse between herbicide treatments. Only touch-up applications may be performed between twelve and twenty four months.

NOTE: Eversource Energy is opting to consider both the Limited Herbicide Treatment Zones and the Non-sensitive areas, adjacent to Wetlands, as if they were part of the Wetland. That is, **the entire ROW is being treated as a Wetland**. The above provisions will be followed on all portions of our ROW's.

[6] For applications on "easemented" property:

- Eversource Energy will notify property owners on transmission rights-of-way and all other residents within 200' of the ROW, of the intended herbicide application.
- Notifications will occur at least 30 days prior to the application on transmission projects and at least 7 days for applications on distribution only projects.
- Private well information is solicited as part of the notification process.

For applications on "non-easemented" property:

- Eversource Energy will seek permission from the property owner to perform herbicide application.
- Private well information is solicited as part of the permission process.

FLAGGING METHODS TO DESIGNATE SENSITIVE AREAS:

Off-road lines -- (Refer to Figures 1, 2, and 3) Red flagging will identify the outer boundary of the no herbicide treatment zone surrounding public groundwater supply wells and public surface water supplies, tributaries and associate surface water bodies. If the herbicide treatment within the limited herbicide treatment zone will be different than in the adjacent NON-SENSITIVE AREAS, the outer boundary of the limited herbicide treatment zone will be flagged yellow as in Figures 1, 2, and 3. If sensitive area approved herbicides will be used in the adjacent NON-SENSITIVE AREAS, then NO FLAGGING WILL BE NECESSARY. If the herbicide treatment on or within 10 feet of a wetland will be different than in the adjacent limited herbicide treatment zone, the 10' boundary from the wetland will be flagged yellow and red, as in Figure 3. If the adjacent LIMITED HERBICIDE TREATMENT ZONE and the adjacent NON-SENSITIVE AREA will be treated as a wetland, then NO FLAGGING IS NECESSARY.

Roadside lines -- (Refer to Figures 4, 5, and 6) Public ground water supply wells, public surface water supplies, and wetlands will be designated by recording the pole number(s) corresponding to the outer boundary of the no herbicide treatment zone, limited herbicide treatment zone, and/or the 10 feet from a wetland boundary zone. If the herbicide treatment in the NON-SENSITIVE AREA is the same as in the limited treatment zone, then the boundaries of the limited treatment zone will not be identified. If the herbicide treatment on or within 10 feet from a wetland is the same as in the surrounding limited herbicide treatment zone, then the 10 feet from the wetland boundary zone will not be identified.

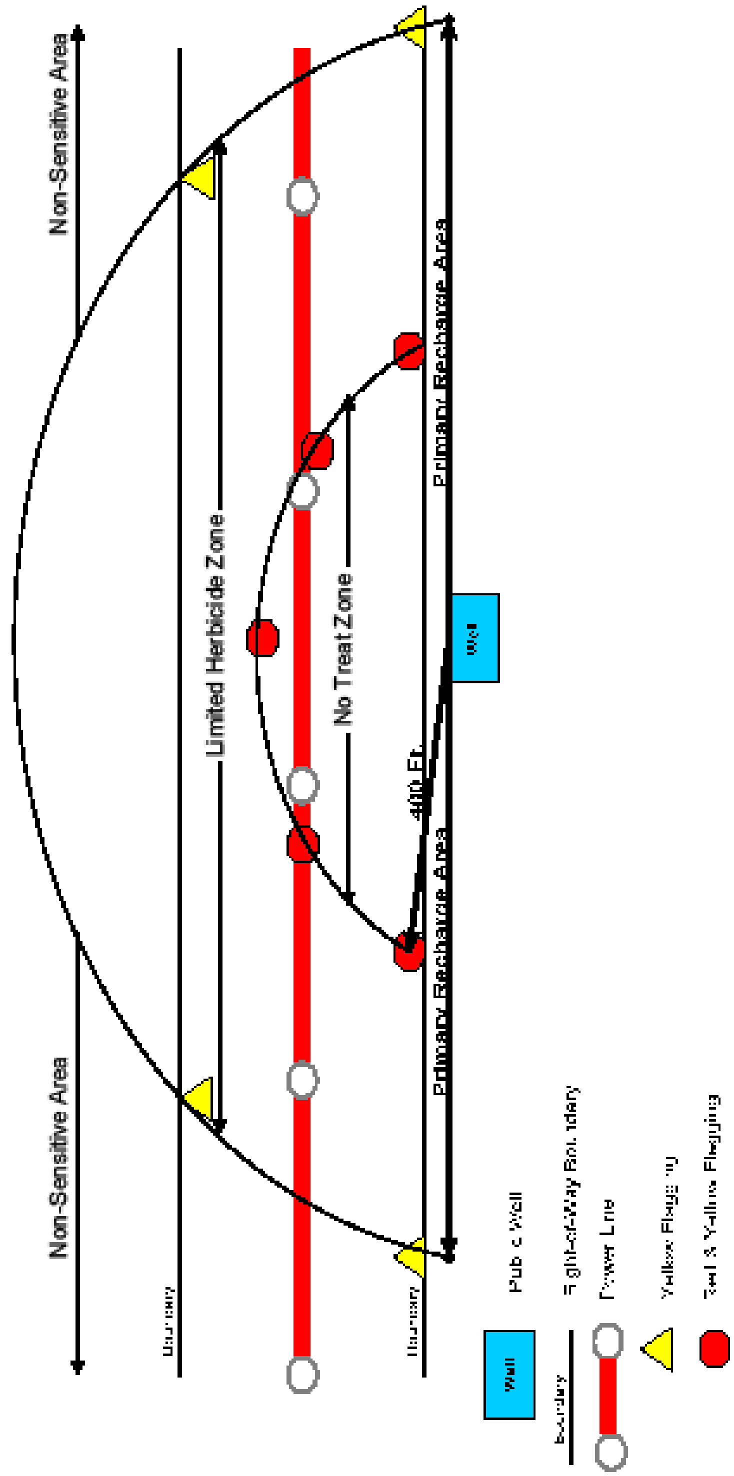
The pole farthest from the SENSITIVE AREA will be used if the outer boundary is located between poles. Pole numbers will be used to indicate where herbicide will not be applied.

Figures **1**, **2**, **3**, **4**, **5**, and **6**, are on following pages.

Figure 1

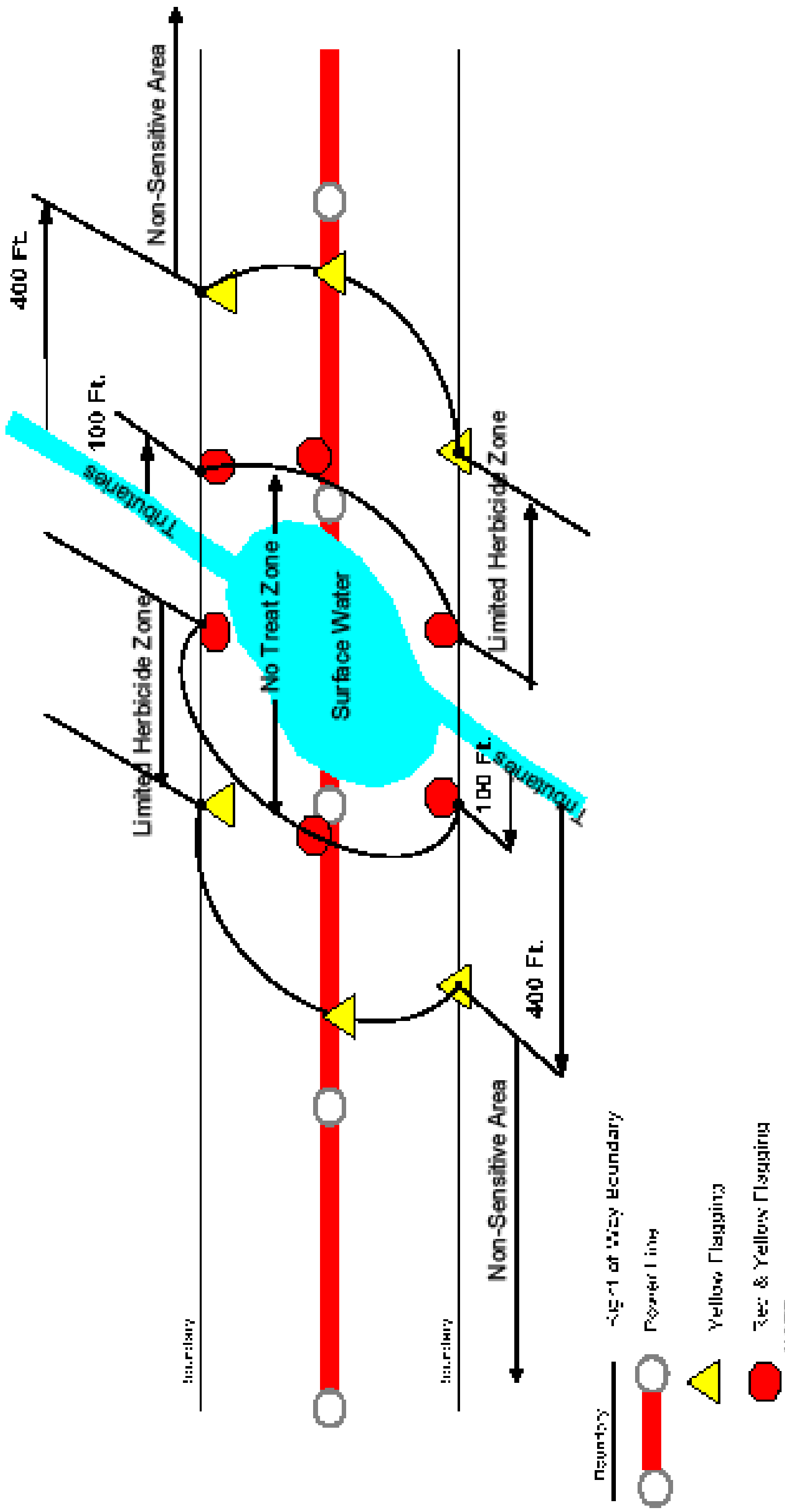
Method to Flag – Public Groundwater Supply Well

(on or near rights-of-way)



NOTE:
Should the DFA's decision concerning the wetland impact study be withdrawn, then the "wetland treatment zone" would become a "No treatment zone" and the red & yellow flagging would become red flagging only. In either case no Herbicides will be applied within 10' of standing or flowing water.

Figure 2
Method to Flag – Public Surface Water Supply
(on or near rights-of-way)

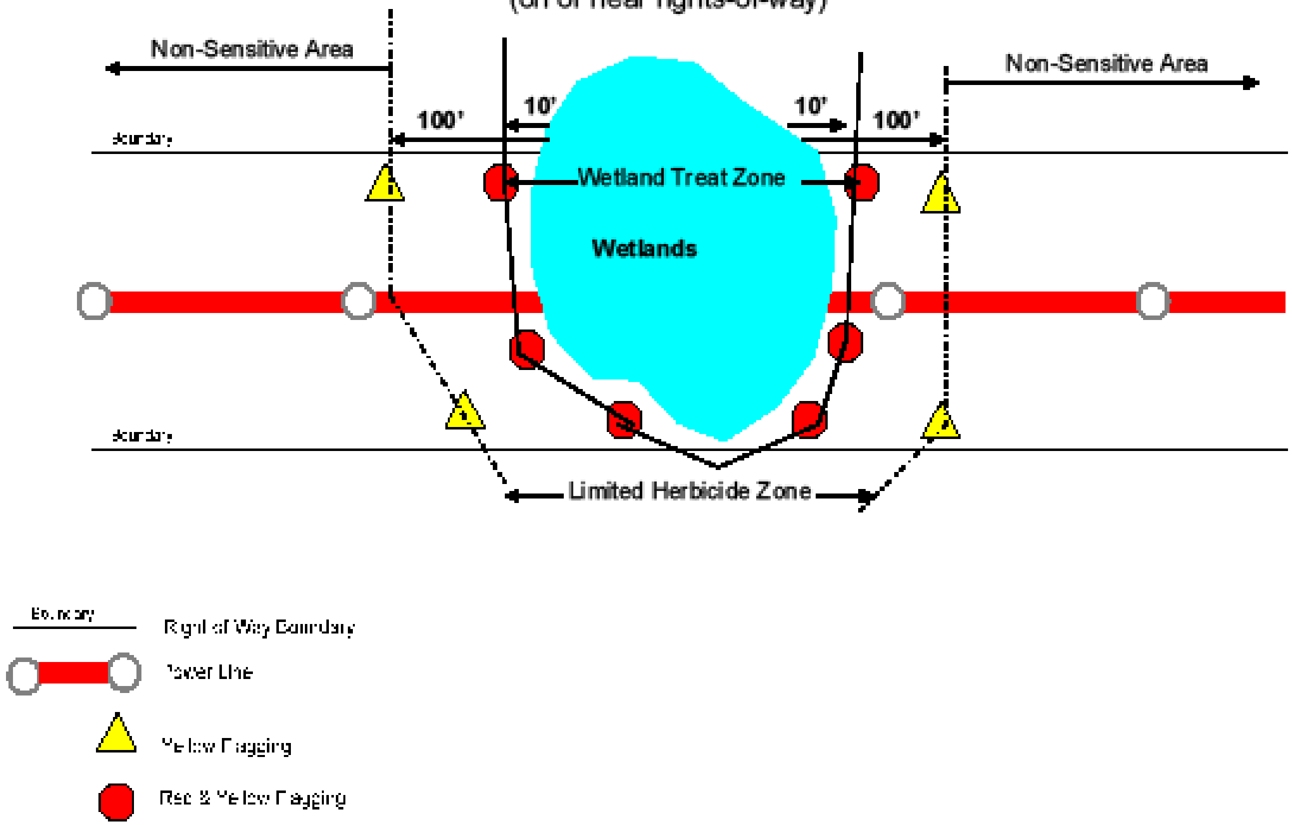


NOTE:
Should the DFA's decision concerning the wetland impact study be withdrawn, then the "wetland treatment zone" would become a "No treatment zone" and the red & yellow flagging would become red flagging only. In either case no Herbicides will be applied within 10' of standing or flowing water.

Figure 3

Method to Flag - Wetlands

(on or near rights-of-way)

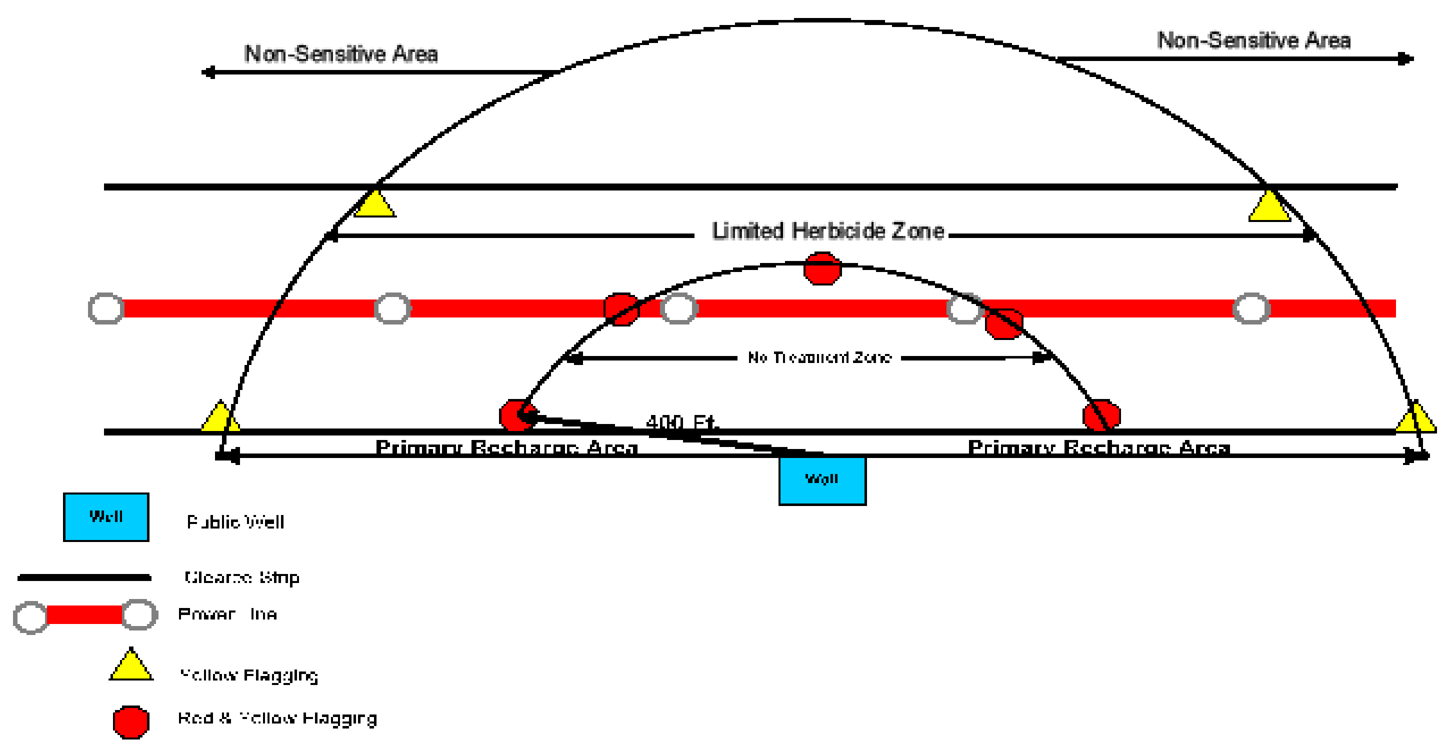


NOTE:
Should the DFA's decision concerning the wetland impact study be withdrawn, then the "wetland treatment zone" would become a "No treatment zone" and the red & yellow flagging would become red flagging only. In either case no Herbicides will be applied within 10' of standing or flowing water.

Figure 4

Method to Flag – Public Groundwater Supply Well

(on or near roadsides)

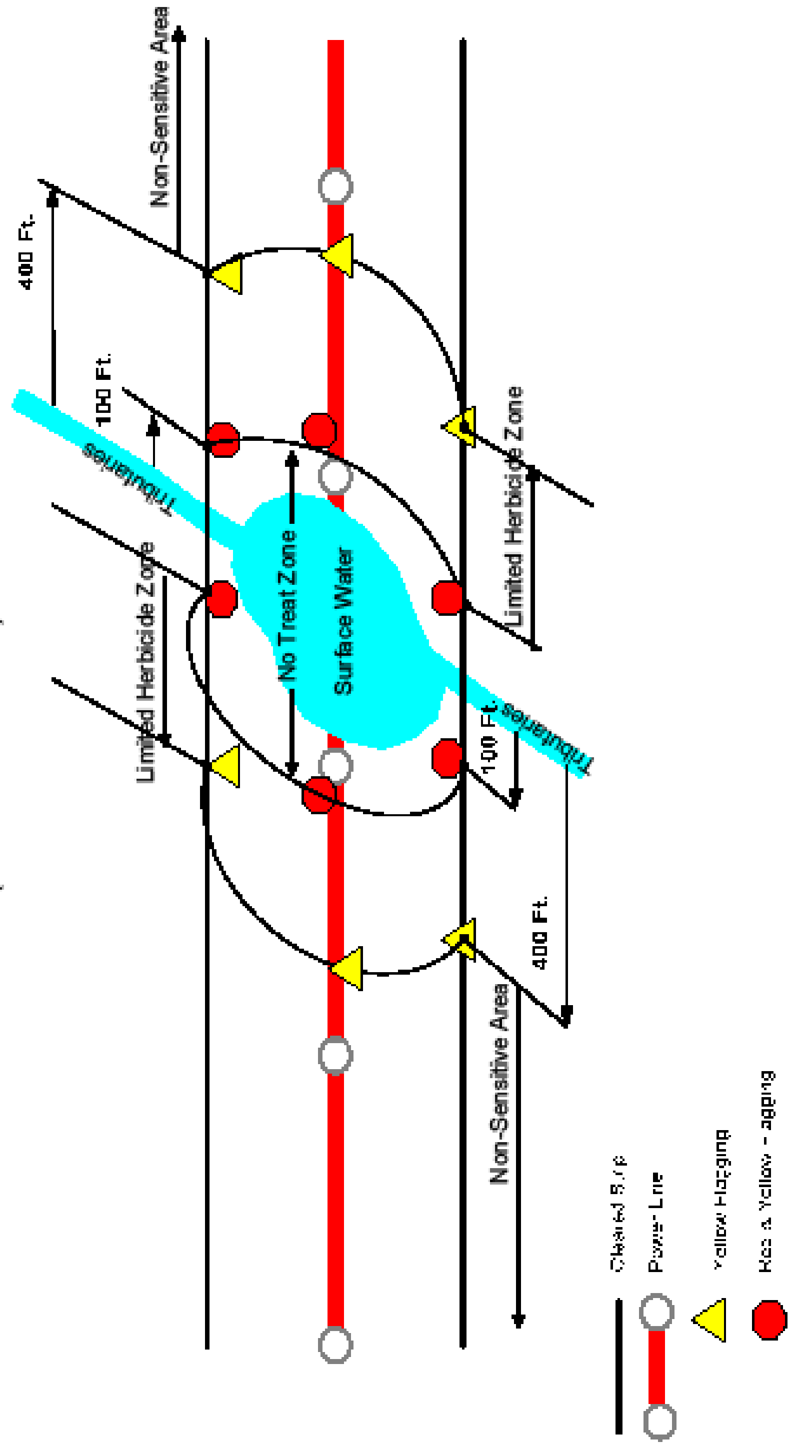


NOTE:
Should the DFA's decision concerning the wetland impact study be withdrawn, then the "wetland treatment zone" would become a "No treatment zone" and the red & yellow flagging would become red flagging only. In either case no Herbicides will be applied within 10' of standing or flowing water.

Figure 5

Method to Flag – Public Surface Water Supply

(on or near roadsides)



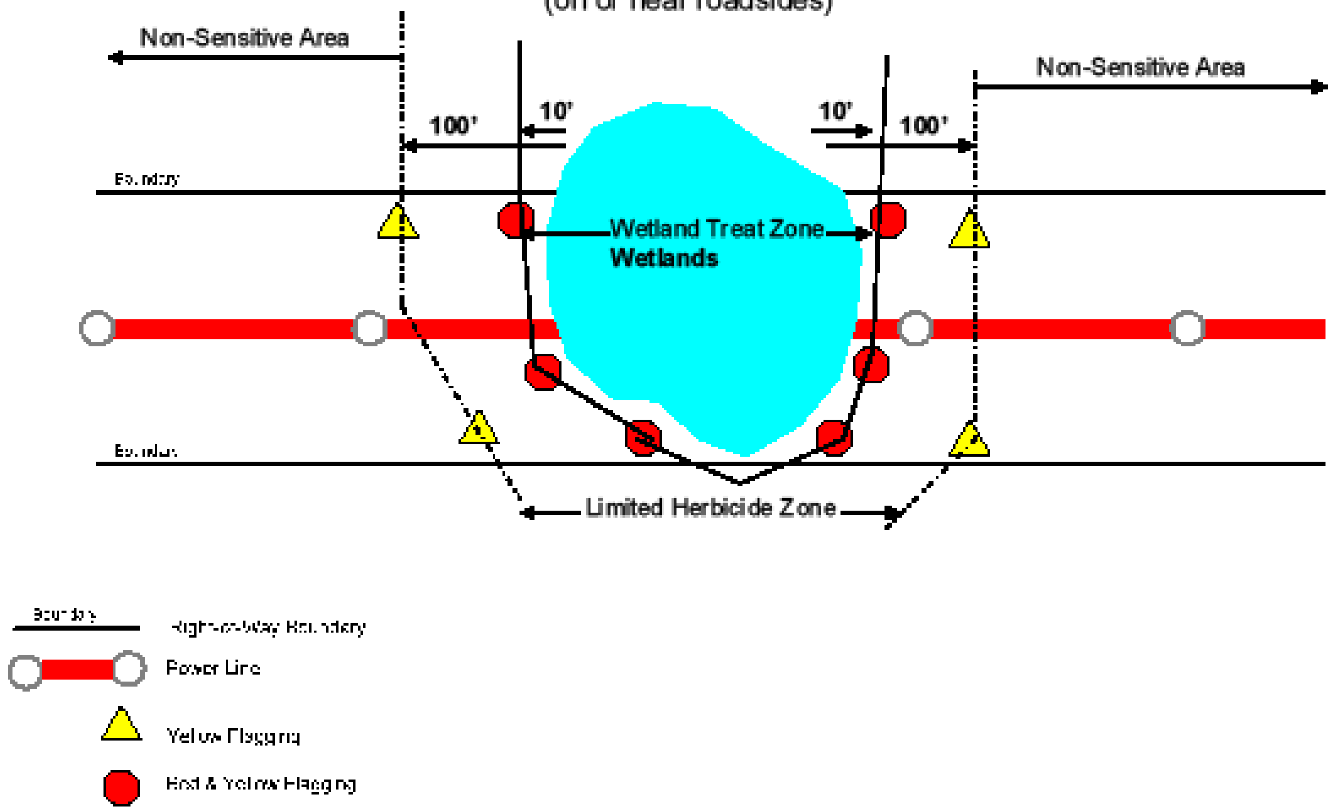
NOTE:

Should the DFA's decision concerning the wetland impact study be withdrawn, then the "wetland treatment zone" would become a "No treatment zone" and the red & yellow flagging would become red flagging only. In either case no Herbicides will be applied within 10' of standing or flowing water.

Figure 6

Method to Flag - Wetlands

(on or near roadsides)



NOTE:
Should the DFA's decision concerning the wetland impact study be withdrawn, then the "wetland treatment zone" would become a "No treatment zone" and the red & yellow flagging would become red flagging only. In either case no Herbicides will be applied within 10' of standing or flowing water.

WELL LIST

(Note-- The location of private drinking water supplies have been obtained from DAR records. Those private drinking water supplies submitted by the towns to the DAR are listed below. Private drinking water supplies submitted to DAR after that date, and affecting municipalities with rights-of-way to be treated in 2018, will be provided to the applicators and included in future Yearly Operational Plans.)

AGAWAM -

Barry Street	341, 349, 405, 413, 423, 551, 563, 671, 676, 679, 684, 694, 760, 770, 792, 816
Cosgrove Street	111
Joanne Circle	13, 14, 22, 30, 45, 48, 56, 57, 67, 72, 75, 82, 85
Kathy Terrace	13, 22, 30, 48, 58
Pine Street	435, 447, 452, 460, 467, 472
Southwick Street	532, Gary Davilli

AMHERST -

500 Sunderland Rd, J. Reid

ASHFIELD -

Hawley Rd., west of, on trans line between structures 31100-31101,
well is under apple tree, on edge of field

BECKET -

Bonnie Rigg Hill, # 41, Stuart Offner;
Bonnie Rigg Hill:
pole 7/13/11; 6' from pole
pole 7/9; 75' from pole
pole 7/13; 12' behind pole
pole 7/10-7/11; mid-span; left side of drive
1986 Fred Snow Road, L. Bacon

BELCHERTOWN -

332 Allen Rd., Harvey Plant
58 Amherst Rd., Rt 9, Wayne Corwin
433 Amherst Rd., A. Lemire
530 Bardwell St., Guy & Deborah Savoie
532 Chauncey Walker St., John B. Officer
8 Diane Dr., A. Lemire
11 Diane Dr., A. Lemire
263 Daniel Shays Highway, M. Waldion
884 Federal St., R. Follette
979 Federal St., Gwendolyn A. Daniels
8 Fox Run Drive, Fred Fellion
6 Gulf Road, Robert & Laurie Falkenba
120 Mountain View Dr., William Wright
574 North Gulf Rd., Christopher & Hilary Woodcock
419 North Liberty Street, Kenneth & Gloria Slate
144 North Washington Street, Norman Stephens
122 Old Bay Rd., L. Herman
12 Old Farm Rd., Virginia Litchfield
176 Rockrimmon Rd., Ben & Susan Perkins
296 South Street, Gregory J. Bowler
201 South Washington Street, John & Elizabeth Gajewski
260 State Street, Gilbert & Hazel Marshall

BERNARDSTON -

73 Merryfield Rd., John Boguslawski

BUCKLAND

34 Cremery Lane, Unk

CHESTER -

148 Round Hill Rd., W. Freedberg
148 Round Hill Rd., W. Freedberg (pump)

CHESTERFIELD -

Pole 62/220-221, Spring/Well Recharge, Dennis LaCourse

COLRAIN -

West Leyden Road, Karen Bell (FKA Karen Bryant)

CONWAY -

94 Main Poland Road, Brice Hereford
2036 Roaring Brook Road, Elsie Landstrom

DALTON -

275 Dalton Division Road, Edward R. Chandler
345 Dalton Division Road, Chas. Messana
503 East Street, Wanda Mason
661 East Street, Richard V. Scott
662 East Street, John Wrzenski
667 East Street, Duane Carr
695 East Street, Francis Phillips
761 East Street, Francis G. Robare
Grange Hall Rd., Allegrone Constr., 273 Newell St.,Pittsfield.
190 Hubbard Avenue, Gaston Robert
236 Hubbard Avenue, Ann Magner
252 Hubbard Avenue, Craig Coons
290 Hubbard Ave., Conway Realty Trust, PO 847, Pittsfield.
F.H. Hassett, 1097 North St. re: 109 Chalet Road
Dennis Wendling, 475 W.Housatonic re: 540 Hinsdale Rd

EAST LONGMEADOW -

51 Forbes Hill Rd., Donald I. Christensen

GILL -

pole 16B/9 Franklin Road, Guy Sibley

GRANBY -

88 Chicopee St., Mr. & Mrs. R. LaBorde
92 Chicopee St., Mr. & Mrs. F. LaBorde
170 West St., Penny G. Gill

GREENFIELD -

Old Albany Road, James O. Ewart
Old Albany Road, Donald S. West
Old Albany Road, David C. Vetter
Old Albany Road, Mark H. Bluver
44 Old Albany Road, Jeffrey S. Roy
South Shelburne Road, Jeffrey Borer
206 South Shelburne Road, James E. Ament
South Shelburne Road, Edward R. Giddings
South Shelburne Road, Herbert F. Barrus
South Shelburne Road, Richard A. Sherburne
South Shelburne Road, Burt Martin
South Shelburne Road, William R. Batty

HAMPDEN - All households have their own private water supply.

HANCOCK -
Rt. 43, A. Rodda, 1/4 mile north of Brodie Mountain Rd., on right, 12' from guard rails.
Whitman Rd., Phillip Farnham, 6/10 of mile from Rt. 43, on west side of road, 100 ft. below power line.

HATFIELD -
22 Pantry Road, West Hatfield, Judith Zatin

HUNTINGTON
80 County Rd., J. Anderson

HOLYOKE -
200 County Road, Walerya Nimchick
130 Mountain Road, M/M Ronald J. Cobb
119 Southampton Road, Alan & Anita Cohen
See map - Figures H1, H2 & H3 at the end of this section

LANESBOROUGH -
Up the hill E. of N. Main St., back of house, Irma A.Cook
37, 86 Goodell Road
E. of N. Main St., top of hill, James K. Barnes
473 N. Main St., Beatrice E. Da Silva
50' E. of Old Cheshire Rd., Camp Mohawk, Bernard Schulman
80' N. of Summer St., 45' E. of Tenneco ROW, William Guidi

LEE -
Cape St. (Rt. 20), James Benzie, well 80' from ROW
Cape St. (Rt. 20), Henry Bragdon, well 90' from ROW
Cape St. (Rt. 20), David Fields, well 100' from ROW
Cape St. (Rt. 20), Sharon Kaufman, well 100' from ROW
Cape St. (Rt. 20), John Kruze, well 100' from ROW
Beldon Tavern, Walter Whitaker, well 100' from ROW
Chestnut St. (Rt. 20), Helen Gage, well 100' from ROW
Fairview Street, Mead Corporation
Landers Rd., Leslie Hickey, well 100' from ROW
Landers Rd., #215, Kenneth MacDowell, well 100' from ROW
Tyringham Rd.,Mildred Michaud Holmes, well 40' from ROW

The Lee "tri-town sanitarians" office has supplied us with a map indicating streets NOT supplied with public water. Treating crews will pay close attention to any houses in these areas to locate any private wells. See map - Figure L.1 at the end of this section

LEVERETT -
823 Juggler Meadow Road, Mary Jo Korfhage-Poret

LEYDEN -
Eden Trail, Wayne & Gloria Fisher, Jr.

LONGMEADOW
Anthony Road – 200, 216, 260, 294 and 326
Deerfield Avenue – 41
Dunn Road – 74, 82, 90, 100, 122, 138, 150, 168 and 176
Longmeadow Street – 960
West Road – 186 and 196
Wolf Swamp Road - 750

LUDLOW -

37 Americo Street, Mary & Matthew Condon
47 Americo Street, Charles Lopes
77 Americo Street, Louis Coteau
342 Boundary St., R. Lundstrom
157 Cedar Street, Antonio Mendes
735 Chapin Street,
1613 East Street, Walter Dusza
1615 East Street, Walter Stupak
392 Fuller Street, Brennan
402 Fuller Street, Cotti
456 Holyoke Street, Windmill Farm, Donald Kibbe
35 Karen Drive, Richard Dygon
29 Lafayette Lane, Lafayette
89 Longview Circle, Gurka
1032 Lyon Street, Carreira
418 Moore St., Dan Pereira, near pole 146/33
316 Munsing St., Gover
122 Overlook Drive, James Harrington
50 Poole St., Alfred Hierche
72 Poole St, George Sicard, Poles 14-15
391 Poole St., Presz
26 Prospect Gardens, Paul & Nancy Keyes
36 Prospect Gardens, Slotenik
59 Prospect gardens, Gerard & Joan Lavaie
72 Prospect Gardens, Wojtowicz
110 Tilley St., Hurst
438 Ventura St., LaFountain

MONTAGUE -

59 East Taylor Hill Road, Alice Newth
62 East Taylor Hill Road, Lynne Reynolds
64 East Taylor Hill Road, William Hack
72 East Taylor Hill Road, Alan Parrish
84 East Taylor Hill Road, Montague Center, Pat Hynes
84 East Taylor Hill Road, Jamie Raymond
East of 62 East Taylor Hill Road, R.P. Cartec Memorial Trust, c/o J.L. Reynolds
240 Federal Street (Stoneyside Condo), Resident

242 Federal Street (Stoneyside Condo), Resident
244 Federal Street, Resident
246 Federal Street, Resident
248 Federal Street, Resident
250 Federal Steet, Resident
35 Greenfield Cross Road, Alice Adams
33 Highland Avenue, Janet E. Gezork
Highland Avenue (under high tension lines), George Allis
158 Old Sunderland Road, Robert Weaver
34 School Street, Montague Center, John Farley
3 South High Street, Doris Boulanger
63 Swamp Rd. (30' N. of nearest pole visible from road, John Findley
7 Taylor Hill Road, Paul Lockard
56 Taylor Hill Road, Gerald Joseph
71 Taylor Hill Road, Godry

NORTHFIELD -

58 Elm Street, J. Forde
574 Four Mile Brook Road, H. Mullen
295 Park Street, M. Carriere

355 South Mountain Road, P. Jaques

PELHAM -
75 Amherst Rd., Michaeline Yezierski (west of ROW)
76 Amherst Rd., John Walker (west of ROW)
87 Amherst Rd., Truman Likens (east of ROW)
68 North Valley Road, Kim Keegan (east of line)

PITTSFIELD -
70 Berkshire Blvd., Edward & Erin Weeden
39 Knox Road, M/M Mark Lahey

PLAINFIELD -
48 Summit Street, Mark & Margaret Keller
98 West Hill Road, James Pilgrim

RICHMOND -
44 Canaan Rd., Mary Mace
856 Lenox Rd., Richard Berlin & Susanne King
1105 Lenox Rd., Laurence E. Fairfield
2394 State Rd., Ray & Joan Charland

RUSSELL -
1311 Blandford Rd., Barbara & Don Leja

SHELBURNE - Homes Served by Private Wells
Anderson Road, Steven F. Dole
Anderson Road, Jan Cress
Bardwells Ferry Road, William Cosby, Jr.
Bardwells Ferry Road, #55 Guilford & Marilyn Stephens
Bardwells Ferry Road, west of- on trans. line between structure 31033-31034
well buffer zone extends into ROW, near hemlock hedge
Barnard Road, Philip & Caroline Woodward
Barnard Road, Christine J. Gould
Bassett Road, David & Josephine Aslender
Box 30, RR1, William J. Bohonowicz, Sr.
Box 104, RR #1, Rose Volpe
Box 107, RFD #1, Stanley Garner
Carpenter Road, Mike Duffy & Charlotte McLaughlin
Box 89, Carpenter Road, Betty Jane & James F. Williams, Hillside Farm
Box 23, Center Road, Martha Seward
Center Road, Donald D. & Kathryn M. Roberts
89C Colrain Road, John & Elsie Gilman
93 Colrain Road, Hui-Ming & Anna Wang
95 Colrain Shelburne Road, Conrad & Theresa Peterson
96 Colrain Road, Jeffrey C. Bishop
Colrain-Greenfield Road, Marguerite & Robert Maloy, RR#1
Colrain Shelburne Road, Robert & Maria Kingsley
49A Cooper Lane, Russell M. Davenport
Fiske Mill Road, Francis & Nina Graves
Fiske Mill Road, M/M Richard J. Pulaski
Frank Williams Road, Donald M. Wheeler
Frank Williams Road, Dorothy W. Dyer, "High Hill"
Frank Williams Road, Urban N. Lavine
57A Frank WIlliams Road, Normand & Diane St. Laurent
Box 59, Frank Williams Road, Betty Jane & James F. Williams, Maple Row Farm
Graves Road, Edward & Leona Graves
Greenfield Road, Clara C. Barnard
Guy Manners Road, Harold Manners

Little Mohawk Road, Box 34, Marcel E. Hinkell
Little Mohawk Road, Box 35, Aubrey & Ruby Crocker
Little Mohawk Road, Kenneth W. Digre
Little Mohawk Road, Harry & Mary Gowdy
Little Mohawk Road, Henry Samoriski
Lucy Fiske Road, George W. & Patricia Bank
Mohawk Trail, Ralph E. Blackmar
Mohawk Trail, Box 7, Elzina L. Bousquet
Mohawk Trail, Eugene Butler
Mohawk Trail, Box 74, Robert & Leona Jarvis
Mohawk Trail, William & Beverly Neeley
Mohawk Trail, Box 103, Dorothy E. Sautter
Mohawk Trail, Rick LaPierre
Old Greenfield Road, Box 120, Lawrence A. Pion
121B Old Greenfield Road, Dwight Clark-Conrad
Old Greenfield Road, Erving S. Kendrick
Old Greenfield Road, Valerian Czerwonka
Old Village Road, Philip Hammond
Peckville Road, RFD #1, Box 75H, J. F. Allen Co.
Peckville Road, RFD #1, Harvey E. Peck
Peckville Road, Box 78, William H. Stafford
Peckville Road, Box 80, William Hefner
Peckville Road, Box 82, Mrs. Abner C. Peck
Reynolds Road, Alden H. Dreyer
Reynolds Road, George D. Misak, Jr.
Reynolds Road, Robert & Terri Mitchell, Jr.
Reynolds Road, Hazel S. Truesdell
Rt. 2, William Lowensberg
Rt. 2, Box 543, Raymond C. Morrell
Shelburne Center Rd., Joseph & Linda Judd (HerronHouse)
Shelburne Center Road, Joanne & Bill Wanowich & Family
12E Shelburne Center Road, Duane Hines
Skinner Road, Pearl Churchill
Smead Hill Road, David A. & Dolores M. Harvey
South Shelburne Road, Gordon E. & Marion J. Taylor
Taylor Road, Manning
Zerah Fiske Road, Gwen Van Dorp & William Bekkering

SOUTHAMPTON -
145, 146 Middle Road
Hampton Pond Well, Ross Road

SOUTH HADLEY
44 Abbey Street, Ed Kelley
85 Abbey Street, Ilene Seymour
96 Abbey Street, Roy & Mary Jane Sabourin
77 Alvord Street, Dave Bernier
88 Alvord Street, Judy Davis
Amherst Road, Michael Kamrowski (Granby, 2 wells)
5 Amherst Road, Evelyn Simpson (George Edge)
274 Amherst Road, Michael Pawlishen
385 Amherst Road, Noella Loiselle (Granby)
9 Bach Lane, Gilbert Bach
25 Brainerd Street, Martha Terry
54 Brainerd Street, Dorothy A. Decker
271 Brainerd Street, Walter Panke
289 Brainerd Street, Thomas Spring
111 Brockway Lane, Stanley Mazstal
116 Brockway Lane, Steve & June Carpentar

119 Brockway Lane, Susan & David Macko
Camp Perkins Road, Anthony Hill
100 Canal Street, Louis R. Bergmann
19 Charles Street, Irene Lamontagne
20 Charles Street, J. & Rita Mathiew & Rita Nadeau
14 Columbia Street, William H. Seavey
20 Columbia Street, George Menard
1 Conti Drive, Paul Page (Page's Auto)
12 Cote Boulevard, Paul E. Cote
4 Cove Island Road, Dolly Sypek
6 Cove Island Road, Warren R. Tanguay
8 Cove Island Road, Max Gajda (300 Walnut St., Holyoke)
10 Cove Island Road, Ray Bartosz
14 Cove Island Road, Eugene Francis
26 Cove Island Road, Paul Garvulenski
28 Cove Island Road, Bogumal Nyzio
30 Cove Island Road, Barbara Dupre
12 Edgewater Lane, George Robideau
14 Edgewater Lane, Menge Rossmeisl
16 Edgewater Lane, Claude Stewart
28 Gaylord Street, Rexham Graphics (ATTN: Geoffrey Brown)
402 Granby Road, Mrs. Bach
3 Greenacre Road, James Kriebel
390 Hadley Street, Lizotte
395 Hadley Street, Frank Mendoza
424 Hadley Street, Larry Remillard
490 Hadley Street, Mrs. Bathelt,
2 Harvard Street, Edward Wuttke
7 Lithia Springs Road, Dennis Rochon
Lyman Terrace, Old Dairy (near Notre Dame)
8 Lyman Terrace, Marian Ittner
16 Lyman Terrace, Edward McNulty
50 Lyman Terrace, Carl Zieminski
6 McDowell Drive, John Shea
20 Michael Drive, Dawson Moreau
145 Mosier Street, Elwin Ellison
755 New Ludlow Road, Precision Lithography
605 Newton Street, Pat Spring (33 Fairview St.)
611 Newton Street, Edward Urbanowicz
675 Newton Street (off), Mary Toth
222 North Main Street, Theresa Wright
9 Oak Avenue, Eleanor Dickinson
12 Oak Avenue, Jean Blanchard
Old County Road, South Hadley Swim Club, (P. O. Box 295)
156 Old Lyman Road, Leo F. Mulvaney
11 Parker Street, Greg Kereakoglow
10 Pearl Lane, Olga Weinack
349 Pearl Street, Paul Adams
Pine Grove Condominiums, Theroux Development (2 wells)
5 Pine Street, Howard Wailgum
303 River Road, Karen Wallace
315 River Road, Claire Wallace (2 wells)
323 River Road, Claire Wallace
325 River Road, John Gauthier
327 River Road, Thomas O'Donnell
398 River Road, Michael Hough
408 River Road, Stewart Allyn
410 River Road, Karen Sutherland
505 River Road, Gretchen Flemming

508 River Road, Ceasar Falcetti
510 River Road, Ceasar Falcetti
511 River Road, Leon McClean
512 River Road, Paula Lunney
600 River Road, Peter Lucchesi
17 Sunset Street, Frederick Schulz
69 Sunset Avenue, Mrs. Jenette Tetreault (Pond Road)
14 Titan Pier Road, Barbara Calkins
Upper River Road, Janet Teahan
12 Upper River Road, Robert O'Malley
14 Upper River Road, Patricia & Richard Lucchesi (Box 232)
30 Upper River Road, Donald Hass
36 Upper River Road, Earnest P. Moreau
39 Woodlawn Street, Christine Desforges

WARWICK
21 Quarry Rd., Dorothy McIver

WEST SPRINGFIELD -
735 Amostown Road, Zombick
192 Bosworth Street, Bisiniere
26 Calven Circle, Buffum
138 Cayenne Street, Francouer
98 Clarence Street, Morris
696 Dewey Street, Hanson
714 Dewey Street, Clark
533 Elm Street, Kimball
114 Field Street, Murphy
50 Goosebury Road, Driscoll
37 Hewitt Road, Bisinier
47 Hill Street, Daniele
61 Hill Street, Giroux
54 Maple Street, Krepela
670 Morgan Road, Niemic
107 Norman Street, Perotti
1528 Piper Road, Vose
91 Reynolds Road, Alden H. Dreyer
1578 Riverdale, Dairy Center
1635 Riverdale, Normandeau
222 Sibley Avenue, Boire
31 Stone Path Lane, Poe
240 Wolcott Avenue, DeGrandpre
42 Worthen Street, Narault
1646 Riverdale, Zelazo's Poultry
234 Bear Hole Road
480, 496, 516, 530 Great Plains Road
573 Piper Road (rear), Stevens 573 Piper Road (rear), Boulia
575 Piper Road, Runshaw
686, 774, 824, 840, 852 Prospect Avenue
32, 56, 87, 110, 112 Quarry Road
Interstate Drive Industrial Park, Fountain Plating

WESTFIELD -
40, 43, 51, 54, 47, 49 Jaeger Drive
144 Northwest Rd., Dorothy M. Russell
81 Papermill Rd., Joann Barnes

WILBRAHAM -
7 Red Bridge Rd., Stephen Salamon & Elizabeth Hetzel

412 GlendaleRd., Stephen Makuch
152 Manchonis Rd. , Gary Gates

WINDSOR -

High Street Hill, well 5' from ROW, William Daignault
High Street Hill, well 95' from ROW, Gerald Rose
Shaw Road, well 100' from ROW, Joseph Fallows
835 Windsor Bush Rd. 25’ from power line, Jennifer Lee

IV. HERBICIDE MATERIALS INCLUDING APPLICATION RATES, CARRIERS AND ADJUVANTS

Material	Application method	Percent in solution	Carrier	Application rate per acre[1]
Accord Conc.	foliar	4% – 8%	water	1.0 – 2.5 gal / acre
Accord Conc.	cut-surface	30% - 40%	water / glycol	.25 – 1.5 gal./acre
Glypro-Plus	foliar	4% – 8%	water	1.0 – 2.5 gal / acre
Glypro-Plus	cut-surface	30% - 40%	water / glycol	.25 – 1.5 gal./acre
Rodeo	foliar	4% - 8%	water	1.0 – 2.5 gal / acre
Rodeo	cut-surface	30% - 40%	water	.25 – 1.5 gal./acre
Krenite S	foliar	15% – 30%	water	1.5 – 6 gal / acre
Escort	foliar	0.5 – 6.0 oz./100 gal.	water	1.0 – 1.5 oz./acre
Garlon 4 Ultra	cut-surface	20 – 30%	oil	1 – 3 pints/acre
Garlon 4 Ultra	basal	20 – 30%	oil	1 – 3 pints/acre
Polaris	foliar	0.4% – 1.0%	water	6 oz. – 3 pints/acre
Polaris	cut-surface	6% – 9%	water / glycol	6 oz.–2 pints/acre
Arsenal Powerline	foliar	0.4% – 1.0%	water	6 oz. – 3 pints/acre
Arsenal Powerline	cut-surface	6% – 9%	water / glycol	6 oz.–2 pints/acre
Polaris	foliar	0.4% – 1.0%	water	6 oz. – 3 pints/acre
Polaris	cut-surface	6% – 9%	water / glycol	6 oz.–2 pints/acre

ADJUVANTS - Adjuvants and Drift Control agents included in application mixtures according to label requirements

(1) Application Rate per Acre shows the estimated amount of concentrated herbicide product, as received from the manufacturer that normally would be applied to one brush acre (one acre of target species containing no open areas).

Note: Foliar herbicides listed may be applied alone or in mixtures as allowed by label or manufacturer's guidelines including supplemental labeling. Also, foliar herbicides are normally applied with a water carrier but may be applied in a concentrated solution containing emulsified oil for ultra-low volume applications (i.e Thinvert applications). Unlike Broadcast methods of application, the application rate for the herbicides listed is a variable depending upon the proper coverage of those plant parts applicable to the application method and equipment (i.e., uniform surface wetting of the lower stem for basal applications, uniform coverage of stem and foliage for the stem-foliar applications and wetting the surface of cut stumps, especially the inner bark and root collar for cut surface applications). Application rate varies with the species of woody vegetation treated as well as the target stem densities, stem diameters and average heights.

V. HERBICIDE APPLICATION TECHNIQUES AND ALTERNATIVE CONTROL PROCEDURES

Utility vegetation management will involve mechanical methods (hand cutting, mowing) and chemical control (basal, foliar, and cut stump treatments). The particular method(s) chosen will be based on a variety of factors. The method chosen for a given vegetation problem will attempt to achieve a long term, low maintenance vegetation management program through the encouragement of a stable herbaceous community.

Basal -- The basal technique consists of a dilute oil-borne herbicide mixture. Application is made by wetting the stem on all sides from the root collar (ground line) to a level from 6" to 15" above ground line. A high degree of selectivity is achieved because only the lower portion of each target stem is treated with the application equipment, delivered from within inches of each stem.

Foliar treatments -- Foliar treatments involve the selective application of herbicides diluted in water, to the foliage and stems of the target vegetation. Two types of equipment for foliar treatments are used: low volume and high volume.

Low volume foliar treatments can be made using ready to use products, with hand operated or motorized backpack application equipment. The herbicide solution is applied to lightly wet the target plant. This technique has few limitations with the exception being reduced effectiveness on tall, high density target vegetation.

Low pressure foliar applications will take place when plants are in full leaf and actively growing, or in accordance with the manufacturer's recommendations. Generally speaking, this means that applications can begin approximately June 1st, and terminate around September 15th.

Foliar treatments will only be used on hardwood target species below twelve feet in height and on conifers below six feet in height.

Cut-stump treatment -- Cut stump treatments consist of mechanical cutting of target species using power saws immediately followed by a herbicide treatment of the individual stump, applied with either a squirt bottle, sponge applicator, or brush, onto the freshly cut surface of the stump. The herbicide is limited to the freshly cut surface of the remaining stump. The cutting procedure is identical to that outlined in Hand cutting. Cut stump treatments will only be made to target vegetation that is capable of re-sprouting. Cut stump applications can occur year round.

ALTERNATIVE CONTROL

Hand cutting -- Hand cutting consists of the mechanical cutting of target species using power saws. Target species are cut as close to the ground as practical with stump heights usually not exceeding three inches. Hand cutting is used in order to protect environmentally sensitive sites or on target vegetation where the use of herbicides is prohibited by regulation or on non-sprouting conifer species. Hand cutting is used on those restricted sites where terrain, site size or sensitivity renders mowing impossible or impractical. Hand cutting may be used at any time of the year.

Mowing -- Mowing is practiced where the undesirable brush size and density warrant it as the most cost effective method at locations which provide minimal obstacles to rubber tired or tracked off-road machines fitted with large mowing heads.

VI. COMPANIES WHICH WILL PERFORM HERBICIDE TREATMENT

One or more of the following companies will apply herbicides, under contract to Eversource Energy. The specific companies will be identified in the notification given at least 30 days prior to herbicide treatment in accordance with 333 CMR 11.07: Public Notification.

Asplundh Tree Expert Co.
Asplundh Brush Control Co.
Davey Tree Expert Co.
K.W. Reese
Lewis Tree Service
Lucas Tree Experts
Northern Tree Service
Wright Tree Service
Vegetation Control Service

VII. IDENTIFICATION OF TARGET VEGETATION

For the purposes of electric utility vegetation control, plant species are generally divided into two groups: undesirable species capable of interfering with the conductors or access, and desirable species which normally cannot. It is the contractor's responsibility to be knowledgeable about, and to instruct his crews in, the identification of desirable and undesirable plant species and the various herbicide control techniques necessary for integrated vegetation management. Electric company personnel provide direction to the contractors performing woody vegetation control, and ensure that contract conditions are met. These groups are defined below.

1. Undesirable Species - Undesirable species include trees, tall maturing shrubs, and vines. Trees are woody plants normally maturing at 20 feet or more in height, usually with a single trunk, unbranched for several feet above ground and with a definite crown. Tall maturing shrubs are woody plants maturing over 12 feet but less than 20 feet in height, presenting a generally bushy appearance because of their several erect spreading or prostrate stems. Woody vines are also controlled when they risk electric reliability by climbing structures, poles, and guy wires.

2. Desirable Species - Desirable species include low maturing shrubs, ferns, grasses, and herbs. Low maturing shrubs are woody plants normally maturing no taller than 12 feet in height and presenting a generally bushy appearance because of their several erect spreading or prostrate stems. Most shrubs such as mountain laurel (Kalmia latifolia), highbush blueberry (Vaccinium corymbosum) and hazelnut (Corylus americana) usually cannot grow into the conductors and are normally preserved and encouraged to grow. Non-woody plant species such as ferns, grasses, and herbs benefit from the reduced competition for space and are allowed to flourish.

Target vegetation includes, but is not limited to, the following undesirable trees, tall maturing shrubs and woody vines. Less common and exotic trees, tall maturing shrubs, and woody vines too numerous to mention and not listed here, are also target vegetation. Desirable species are not target vegetation unless low maturing shrubs risk overhead electric supply or interfere with access.

TREES

COMMON NAME	SCIENTIFIC NAME
Ailanthus	Ailanthus altissima
American Basswood	Tilia americana
American Beech	Fagus grandifolia
American Hornbeam	Carpinus caroliniana
Apple	Malus spp.
Ash	Fraxinus spp.
Atlantic White Cedar	Chamaecyparis thyoides
Balsam Fir	Abies balsamea
Birch	Betula spp.
Black Locust	Robinia pseudoacacia
Black Tupelo	Nyssa sylvatica
Black Walnut	Juglans nigra
Butternut	Juglans cinerea
Northern Catalpa	Catalpa speciosa
Cherry	Prunus spp.
Eastern Hemlock	Tsuga canadensis
Eastern Hophornbeam	Ostrya virginiana
Eastern Red Cedar	Juniperus Virginiana
Elm	Ulmus spp.
Hickory	Caria spp.
Honey Locust	Gleditsia triacanthos
Horse Chestnut	Aesculus hippocastanum
Maple	Acer spp.
Oak	Quercus spp.
Pine	Pinus spp.
Poplar	Populus spp.
Sassafras	Sassafras albidum
Spruce	Picea spp.
Tamarack	Larix laricina
Willow	Salix spp.

TALL MATURING SHRUBS

COMMON NAME	SCIENTIFIC NAME
Alternate Leaf Dogwood	Cornus alternifolia
Autumn Olive	Elaeagnus umbellata
Buckthorn	Rhamnus spp.
Flowering Dogwood	Cornus florida
Hawthorne	Crategus spp.
Shadbush	Amelanchier arborea
Speckled Alder	Alnus rugosa
Sumac	Rhus spp.

WOODY VINES

COMMON NAME	SCIENTIFIC NAME
Bittersweet	Celastrus orbiculatus
Clematis	Clematis spp.
Crossvine	Bignonia capreolata
Dutchman's Pipe	Aristolochia spp.
Grape	Vitis spp.
Moonseed	Menispermum canadense
Poison Ivy	Rhus radicans
Poison Oak	Toxicodendron quercifolium
Trumpet Creeper	Campsis radicans
Virginia Creeper	Parthenocissus spp.

INVASIVE SHRUBS

COMMON NAME	SCIENTIFIC NAME
Autumn Olive	*Elaeagnus umbellata*
Glossy Buckthorn	*Frangula alnus*
Common Buckthorn	*Rhamnus cathartica*
Japanese Barberry	*Berberis thunbergii*
Multi-flora Rose	*Rosa multiflora*
Honeysuckle	*Lonicera spp.*
Winged Euonymous	*Euonymus alata*

VIII. INDIVIDUALS REPRESENTING APPLICANT, SUPERVISING YOP

Transmission and Distribution line inquiries:

Eversource Energy
(DBA) Western Massachusetts Electric Company
One Federal Street
Building 111-4
Springfield, MA 01105

Distribution lines	Barry Croke	(413) 585-1802
Transmission lines	Sean Redding	(860) 665-6103

IX. PROCEDURES AND LOCATIONS FOR HANDLING, MIXING, AND LOADING HERBICIDE CONCENTRATES

The following procedures and locations for handling, mixing, and loading herbicide concentrates are taken from the VMP, section titled Operational Guideline for Applicators. Water is not drawn from public water supplies for the herbicide mixing. Also, herbicide concentrates are not handled, mixed, or loaded on a right-of-way within 100 feet of a sensitive area.

1. Follow all label directions
2. Wear protective clothes, rubber gloves, hat, respirator, and goggles or face shield as specified on the label.
3. Change clothes immediately if concentrates are splashed or spilled on clothing.
4. Keep plenty of soap and water at your disposal for cleanup.
5. When pouring herbicides, keep your head well above the opening and position yourself so winds do not carry the pesticide into your face or body.
6. Do not allow the sprayer to run over when filling.
7. Triple rinse empty containers and utilize the rinsate whenever possible.

X. MUNICIPAL EMERGENCY CONTACTS

Notify the following Local Emergency Planning Committees if water bodies are contaminated, and for releases or threatened releases of reportable quantities of hazardous materials or oil as referenced in the VMP, section titled Remedial Plan to Address Spills and Related Accidents.

Municipality	Title	Name	Tel. No.
Agawam	Mayor	Richard Cohen	786-0400 ex. 8200
	Fire Chief	Alan Sirois	786-2662
	Emergency Manager	Chet Nicora	786-0400 ex. 8820
Amherst	Board of Selectmen	Alisa Brewer	259-3001
	Emergency Manager	Tim Nelson	259-3105
	Fire Chief	Tim Nelson	259-3082
Ashfield	Board of Selectmen	Tom Carter	628-4441 ex 7
	Police Chief	Diane Wilder	628-4441 ex 1
	Fire Chief	Delmar Haskins	628-4441 ex 2
	Emergency Manager	Douglas Field	628-3343
Becket	Board of Selectmen	Will Elovirta	623-8934 ex. 10
	Fire Chief	Mark Hanford	627-0397
	Emergency Manager	Tim Sullivan	623-8934
Belchertown	Board of Selectmen	George Archible	323-5556
	Fire Chief	Ted Bock	323-7571
	Emergency Manager	Ted Bock	323-7571
Bernardston	Board of Selectmen	Rob Raymond	648-5401
	Fire Chief	Peter Shedd	648-9757
	Emergency Manager	Peter Shedd	648-9757
Blandford	Board of Selectmen	Bill Levakis	848-2782 ex. 1103
	Fire Chief	Ed Harvey	848-2874
	Emergency Manager	Brad Curry	579-1949
Buckland	Board of Selectmen	John Riggan	413-624-6306
	Fire Chief	Herbert Guyette	625-2302
	Emergency Manager	Herbert Guyette	625-2302
Cheshire	Board of Selectmen	Carole Francesconi	413-743-7106
	Fire Chief	Tim Garner	743-3387
	Emergency Manager	Cory Swistak	743-1690
Chester	Board of Selectmen	Patrica Carlino	354-7760
	Fire Chief	Richard Small	354-6558
	Emergency Manager	Richard Small	354-6558
Chesterfield	Board of Selectmen	Roger Fuller	296-4771 press 1
	Fire Chief	David Hewes	296-4049
	Emergency Manager	Lawrence Holmberg	296-4525

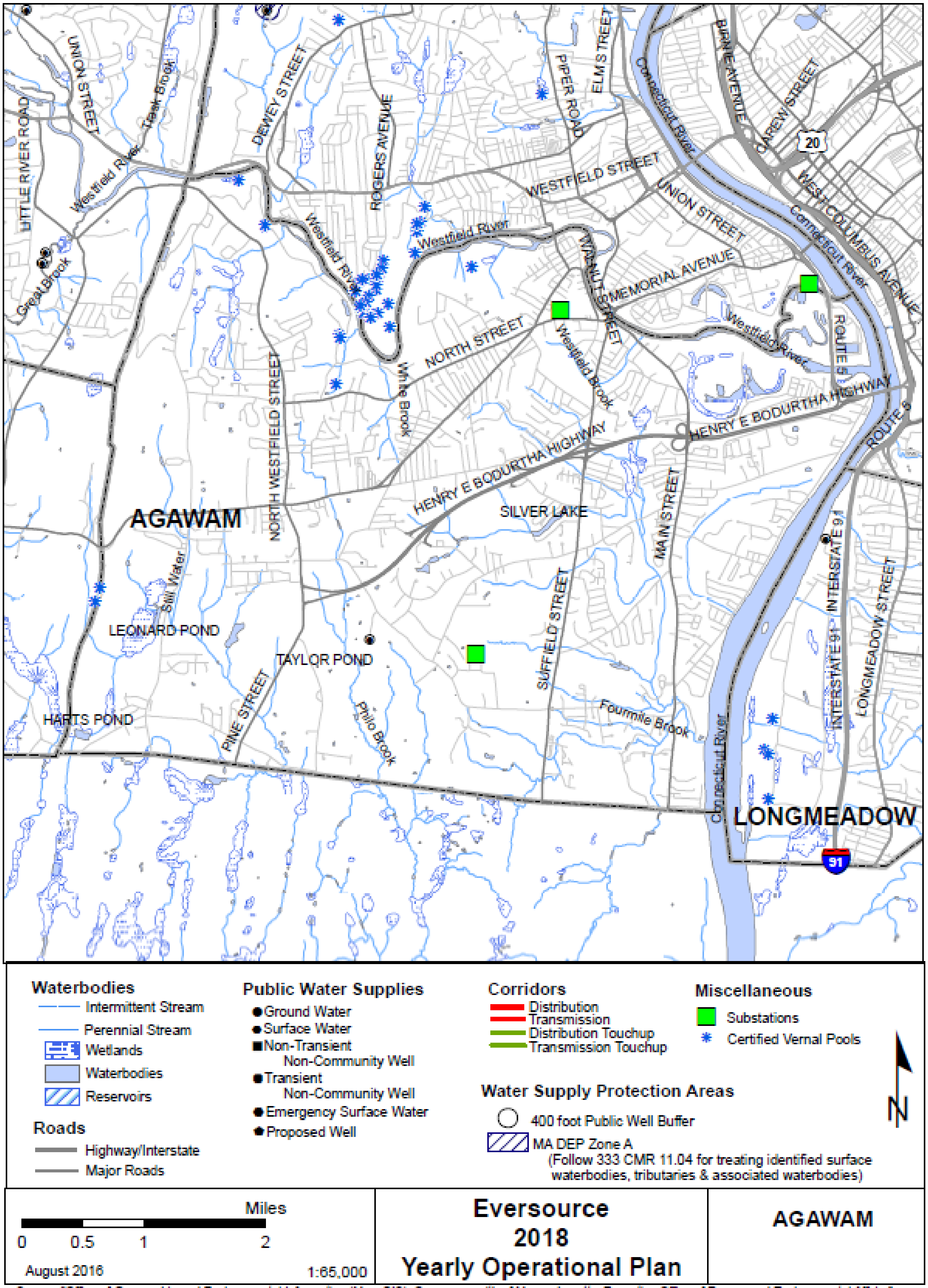
Municipality	Title	Name	Tel. No.
Chicopee	Mayor	Michael D. Bissonnette	594-1500
	Fire Department	Stephen Burkott	594-1630
	Emergency Manager	Stephen Burkett	594-1630
Colrain	Board of Selectmen	Michael Beausoleil	624-3823
	Fire Chief	David Celino	624-5528
	Emergency Manager	Scott Sullivan	624-6454
Conway	Board of Selectmen	John O'Rourke	369-4235 ex 3
	Fire Chief	Robert Baker	369-4087
	Emergency Manager	Richard Bean	625-8207
Cummington	Board of Selectmen	Russell Sears	635-5492
	Fire Chief	Bernie Forgea	634-5458
	Emergency Manager	Bernie Forgea	634-5458
Dalton	Board of Selectmen	John Boyle	684-6111 ext. 13
	Fire Chief	Richard Kardasen	684-0500
	Emergency Manager	Edward Fahey	684-0020
Deerfield	Board of Selectmen	Mark Gilmore	665-1400 ex 104
	Fire Chief	Chet Yazwinski	665-2313
	Emergency Manager	Mark Gilmore	665-4645
Easthampton	Mayor	Michael A. Tautznik	529-1470
	Fire Chief	David Mottor	527-1212
	Emergency Manager	David Mottor	527-4200
	Police Chief	Bruce McMahon	527-1212
E. Longmeadow	Board of Selectmen	Jack Villamaino	525-5400
	Fire Chief	Richard Brady	525-5430
	Emergency Manager	Richard Brady	525-5430
Erving	Board of Selectmen	Eugene Kepaldo	422-2800, Ext. 100
	Fire Chief	Almon Meattey Jr.	422-2809, Ext. 118
	Emergency Manager	Luke Harnet	422-2800 ex 119
Gill	Board of Selectmen	John Ward	863-8952
	Fire Chief	Gene Beaubien	863-8955
	Emergency Manager	Gene Beaubien	626-1237
Granby	Board of Selectmen	Mary McDowell	467-7177
	Fire Chief	Russ Anderson	467-9696
	Emergency Manager	Jeff McPherson	467-9595
Granville	Board of Selectmen	Chris Martin	357-8585
	Fire Chief	Scott Loomis	357-8585 ex 9
	Emergency Manager	Kevin Stromgrem	357-8585 ex 0
Greenfield	Mayor	William Martin	772-1560
	Fire Chief	Micheal Winn	774-4737
	Emergency Manager	Robert Strahan	774-4737

Municipality	Title	Name	Tel. No.
Hadley	Board of Selectmen	David Nixon	586-0221
	Fire Chief	Micheal Spanknebel	584-0874
	Emergency Manager	James Kicza	584-0874
Hampden	Board of Selectmen	Vincent Villamaino	566-2151x101
	Fire Chief	Mike Gorski	566-2151
	Emergency Manager	Richard Green	566-2151
Hancock	Board of Selectmen	Sherman Derby, Sr	738-5225
	Fire Chief	David Rash	738-5446
	Emergency Manager	Steve Traver	531-8837
Hatfield	Board of Selectmen	Marcus Boyle	247-5600
	Fire Chief	William Belden	247-9008
	Emergency Manager	Cindy Doty	247-0480
Hinsdale	Board of Selectmen	Bruce Marshall	655-2245
	Fire Chief	Larry Turner	655-2533
	Emergency Manager	Raymond Bolduc	684-0500
Holyoke	Mayor	Alex Morse	322-5510
	Fire Chief	John Pond	534-2250
	Emergency Manager	John Pond	534-2250
Huntington	Board of Selectmen	Aimee Burnham	667-3500
	Fire Chief	Gary Dahill	667-3368
	Emergency Manager	Melissa Nazzaro	667-3500
	County Dispatch	Fire Station Ctr.	586-1508
Lanesborough	Board of Selectmen	William Prendergast	442-1167
	Fire Chief	Charles Durfee	443-2321
	Emergency Manager	Charles Garrity III	499-8288
Lee	Board of Selectmen	David Consolati	243-2364
	Fire Chief	Ronald Driscoll	243-5537
	Emergency Manager	Ron Glidden	243-5520
Lenox	Board of Selectmen	Ken Fowler	637-5500
	Fire Chief	Daniel Clifford	637-2347
	Emergency Manager	Daniel Clifford	637-5500
Leverett	Board of Selectmen	Richard Brazeau	548-9699
	Fire Chief	John Morruzzi	625-8200
	Emergency Manager	James Field	625-8200
Leyden	Board of Selectmen	William Glabach	774-4111
	Fire Chief	Carey Barton	774-4737
	Emergency Manager	Daniel Galvis	522-3105
Longmeadow	Board of Selectmen	Mark Gold	565-4110
	Fire Chief	Eric Madison	565-4110
	Emergency Manager	Eric Madison	565-4110

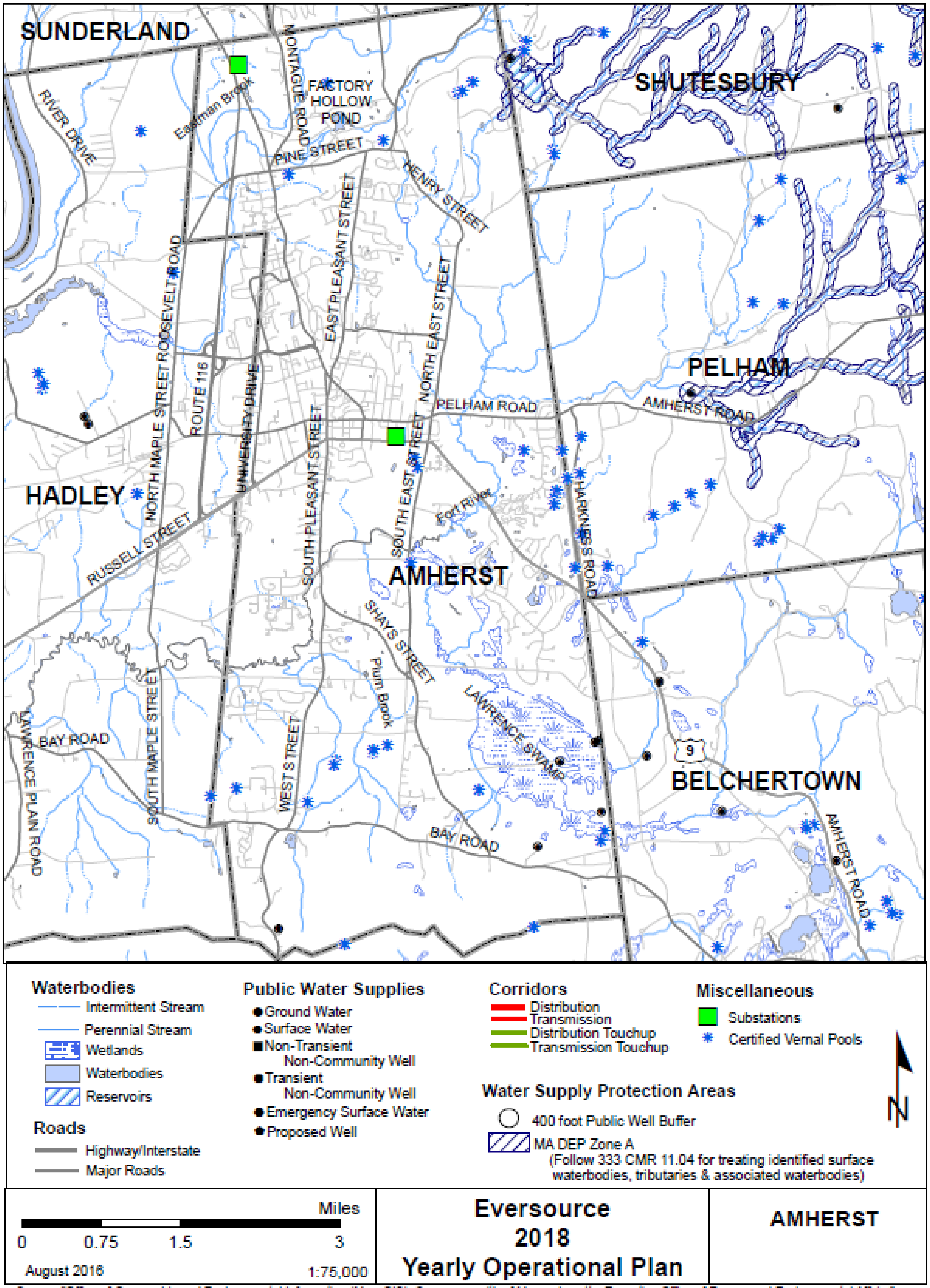
Municipality	Title	Name	Tel. No.
Ludlow	Board of Selectmen	Aaron Saunders	583-5624x295
	Fire Chief	Mark Babineau	583-8332
	Emergency Manager	Mark Babineau	583-8332
Middlefield	Board of Selectmen	Noreen Suriner	623-8788
	Fire Chief	Larry Pease	623-5060
	Emergency Manager	Robert Hoynowski	623-5072
Montague	Board of Selectmen	Mark Fairbrother	863-3200, Ext. 108
	Fire Chief	Bob Escott /John Greene	863-9023 / 367-2757
	Emergency Manager	Bob Escott	863-9023 / 863-8911
Montgomery	Board of Selectmen	Daniel Jacques	862-4526
	Fire Chief	Steve Frye	862-3670
	Emergency Manager	Dan Paradise	862-4797
New Ashford	Board of Selectmen	Maureen Jennings	458-5274
	Fire Chief	Frank Mcalister	458-5401
	Emergency Manager	Hedy Burbank	458-2278
Northfield	Board of Selectmen	Dan Gray	498-2901x15
	Fire Chief	Skip Dunnell	625-8200
	Emergency Manager	Thomas Newton	498-2252
Otis	Board of Selectmen	Donald Hawley	269-0103
	Fire Chief	Sandy Pinkhim	269-4409
	Emergency Manager	Robert Sarnacki	269-0100
Pelham	Board of Selectmen	William Martell	256-0889
	Fire Chief	Ray Murphy	253-3311
	Emergency Manager	Edward Fleury/Rachel Majka	253-0484
Peru	Board of Selectmen	Douglas A. Haskins	655-8312
	Fire Chief	Todd Dewkett	655-8811
	Emergency Manager	Mark Hoag	665-8312
Pittsfield	Mayor	Daniel Bianchi	499-9321
	Fire Chief	Robert Czerwinski	448-9764
	Emergency Manager	Robert Czerwinski	448-9764
Plainfield	Board of Selectmen	Philip Lococo	634-5420
	Fire Chief	Dennis Thatcher	586-1508
	Emergency Manager	Merton Taylor, Jr./Barbara Westwood	634-5620 / 634-5067
Richmond	Board of Selectmen	Alan Hansen	698-3322
	Fire Chief	Paul Sintoni	698-3550
	Emergency Manager	Thomas Grizey	698-2570
Russell	Board of Selectmen	Keith Cortis	862-6211
	Fire Chief	Michael Morrissey	862-6229
	Emergency Manager	Thomas Mulligan	862-3265

Municipality	Title	Name	Tel. No.
Sandisfield	Board of Selectmen	Richard Campetti	258-4711
	Fire Chief	Ralph E. Morrison	258-4742
	Emergency Manager	Jim Burrows	258-4943
Savoy	Board of Selectmen	Scott Koczela	743-4290
	Fire Chief	Larry Ordyna	743-9119
	Emergency Manager	Larry Ordyna	743-9119
Shelburne	Board of Selectmen	Joseph Judd	625-0300
	Fire Chief	Rick Bardwell	625-6392
	Emergency Manager	Terry Don	625-8200
Shutesbury	Board of Selectmen	Elaine Puleo	259-1618
	Fire Chief	Walter Tibbetts	259-1211
	Emergency Manager	Walter Tibbetts	259-1211
South Hadley	Board of Selectmen	John Hine	538-5017
	Fire Chief	Dist. 1 Rob Authier	532-5343
		Dist. 2 David Keef	534-5803
	Emergency Manager	Forest Price	538-8231
Southampton	Board of Selectmen	Michael Phelan	529-0106
	Fire Chief	Stephan Hyde	527-1717
	Emergency Manager	Edward Cauley	527-1120
Southwick	Board of Selectmen	Art Pitman	569-5995
	Fire Chief	Richard Anderson	569-6363
	Emergency Manager	Charles Dunlap	569-0308
Springfield	Mayor	Domenic Sarno	787-6100
	Fire Chief	Joe Contant	787-6411
	Emergency Manager	Robert Hassett	787-6720
Sunderland	Board of Selectmen	Thomas Fydenkeves	665-1441
	Fire Chief	Robert Ahearn	625-8200
	Emergency Manager	Robert Ahearn	625-8200
Tolland	Board of Selectmen	Margret McClellan	258-4794
	Fire Chief	Robert Littlefield	258-2859
	Emergency Manager	Theodore Locke	258-4473
Tyringham	Board of Selectmen	Peter L. Curtin, Sr.	243-2124
	Fire Chief	James Curtin	243-3238
	Emergency Manager	James Curtin	623-3238
Warwick	Board of Selectmen	Dawn Magi	978-544-6315
	Fire Chief	Gunnar Lambert	978 544-3314
	Emergency Manager	James Erviti	978-544-2244
Washington	Board of Selectmen	Mike Case	623-2218
	Fire Chief	Paul Mikanewcz	623-2185
	Emergency Manager	Paul Mikanewcz	623-2185

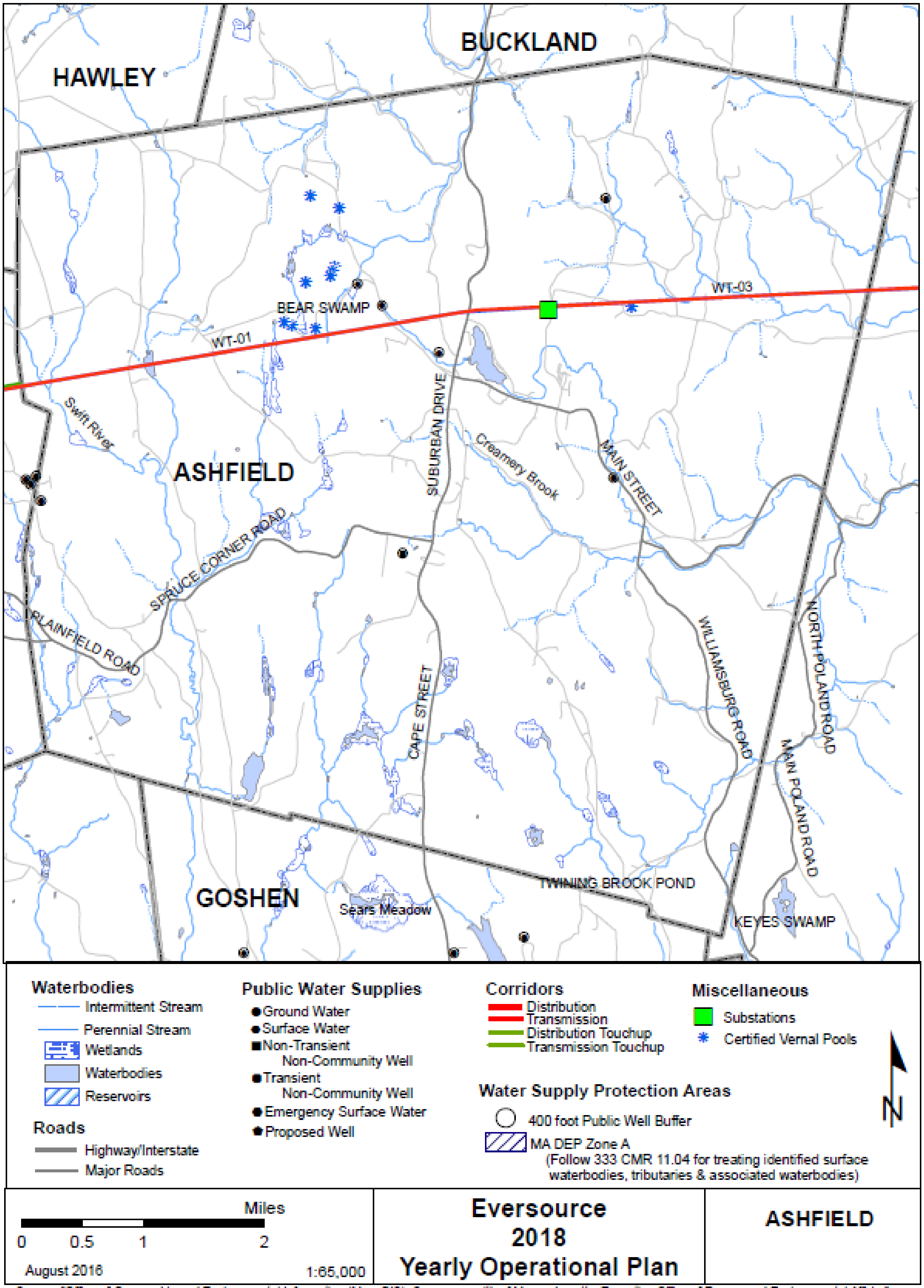
Municipality	Title	Name	Tel. No.
Wendell	Board of Selectmen	Christine Heard	(978)-544-3395
	Fire Chief	Everett Ricketts, Sr.	978-544-3500
	Emergency Manager	Lonny Ricketts	978-544-3500
Westhampton	Board of Selectmen	Charles Norris	527-1678
	Fire Chief	Chris Norris	586-1508
	Emergency Manager	Chris Norris	527-2183
Westfield	Mayor	Daniel Knapik	572-6201
	Fire Chief	Mary Regan	572-6330
	Emergency Manager	Jim Wiggs	568-1222
West Springfield	Mayor	Greg Neffinger	263-3041
	Fire Chief	William Flaherty	263-3223
	Emergency Manager	Sgt. Gerald P. Connor	263-3345
Whately	Board of Selectmen	Joyce Palmer Fortune	665-4400
	Fire Chief	John Hannum	665-4488
	Emergency Manager	Lynn Sibley	665-7734
Wilbraham	Board of Selectmen	Robert Boilard	596-2800
	Town Admin.	Robert Weitz	596-2800
	Fire Chief	Francis Nothe	596-3122
	Emergency Manager	Francis Nothe	596-3122
Windsor	Board of Selectmen	Leslie Bird	684-3811
	Fire Chief	Michael W. Tirrell	684-0838
	Emergency Manager	Peter Pyskaty	684-3811
Worthington	Board of Selectmen	Evan Johnson	238-5556
	Fire Chief	Richard Granger	238-5315
	Emergency Manager	Kathleen Johnson	238-8046



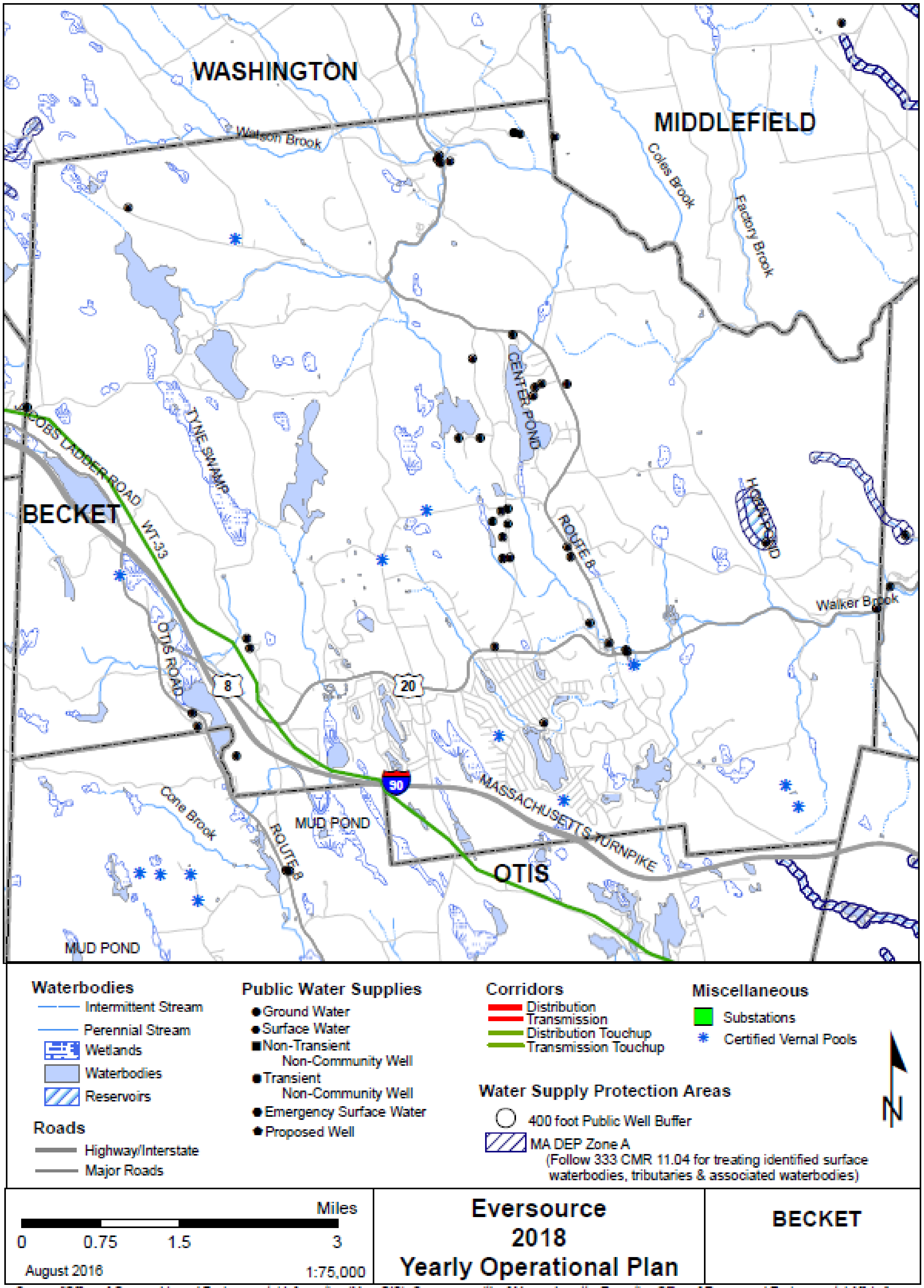
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



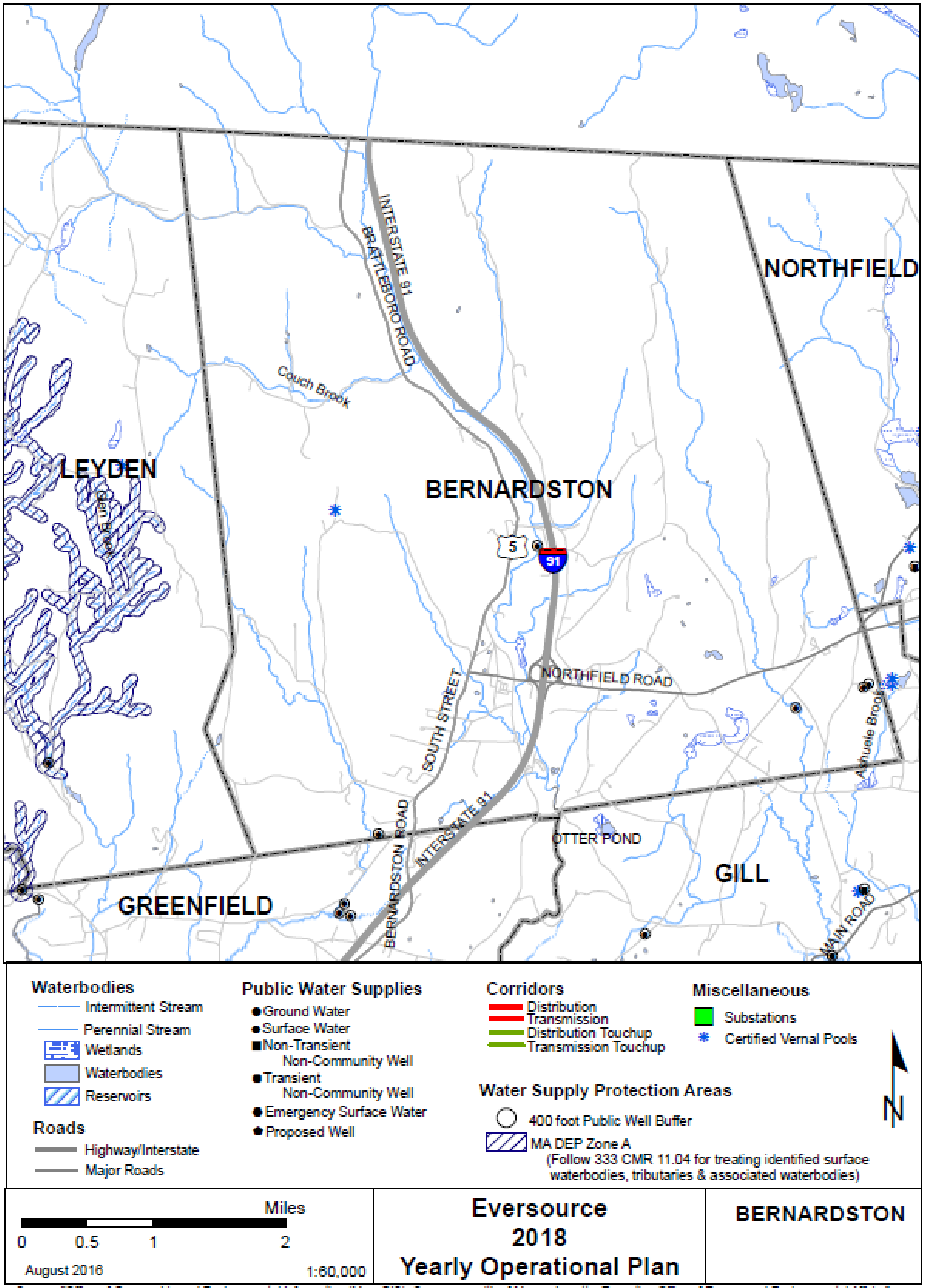
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



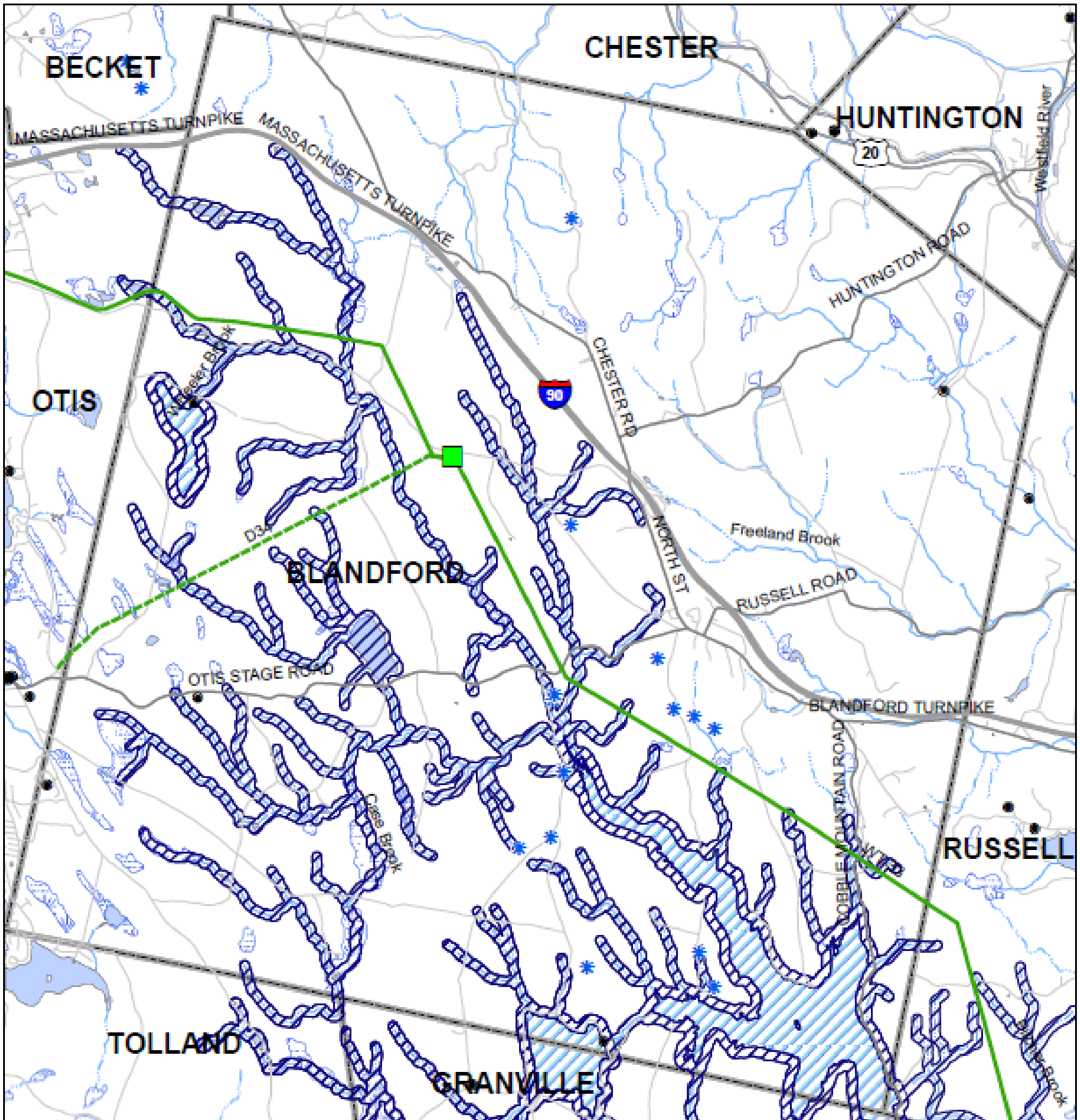
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs". Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Waterbodies
- Intermittent Stream
- Perennial Stream
- Wetlands
- Waterbodies
- Reservoirs

Roads
- Highway/Interstate
- Major Roads

Public Water Supplies
- Ground Water
- Surface Water
- Non-Transient Non-Community Well
- Transient Non-Community Well
- Emergency Surface Water
- Proposed Well

Corridors
- Distribution
- Transmission
- Distribution Touchup
- Transmission Touchup

Water Supply Protection Areas
- 400 foot Public Well Buffer
- MA DEP Zone A (Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)

Miscellaneous
- Substations
- Certified Vernal Pools

N

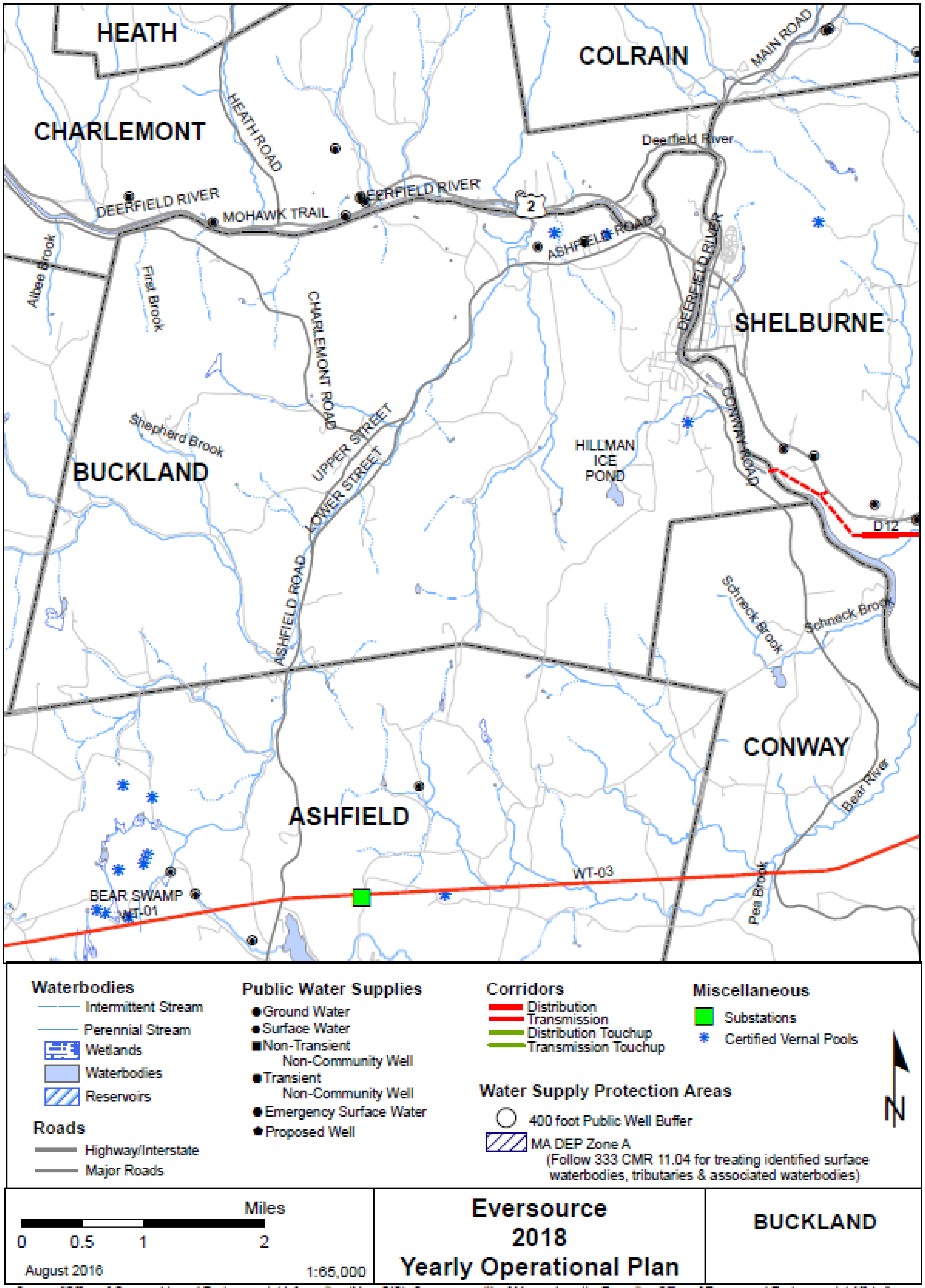
Miles
0 0.75 1.5 3

August 2016 1:75,000

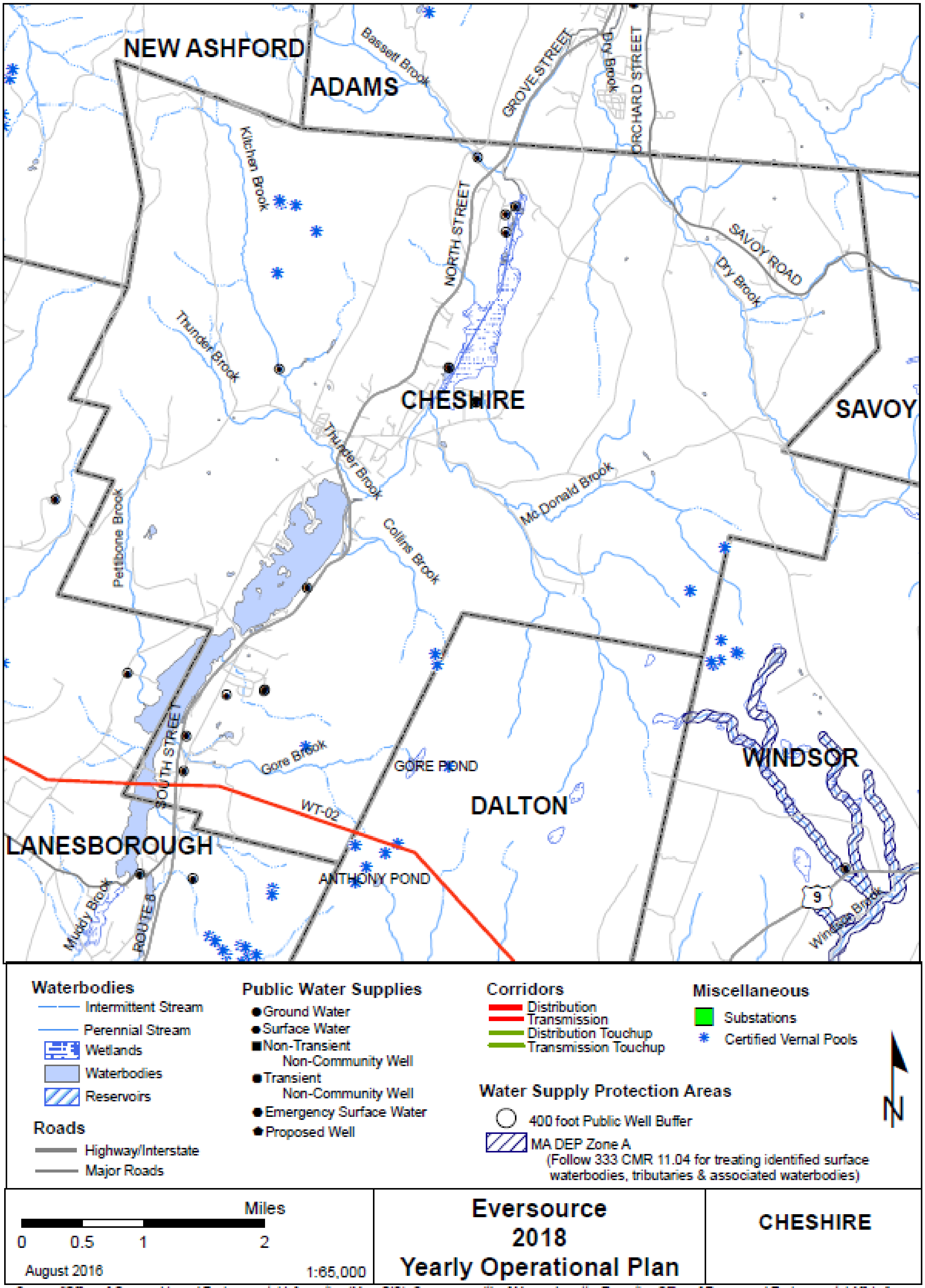
Eversource 2018 Yearly Operational Plan

BLANDFORD

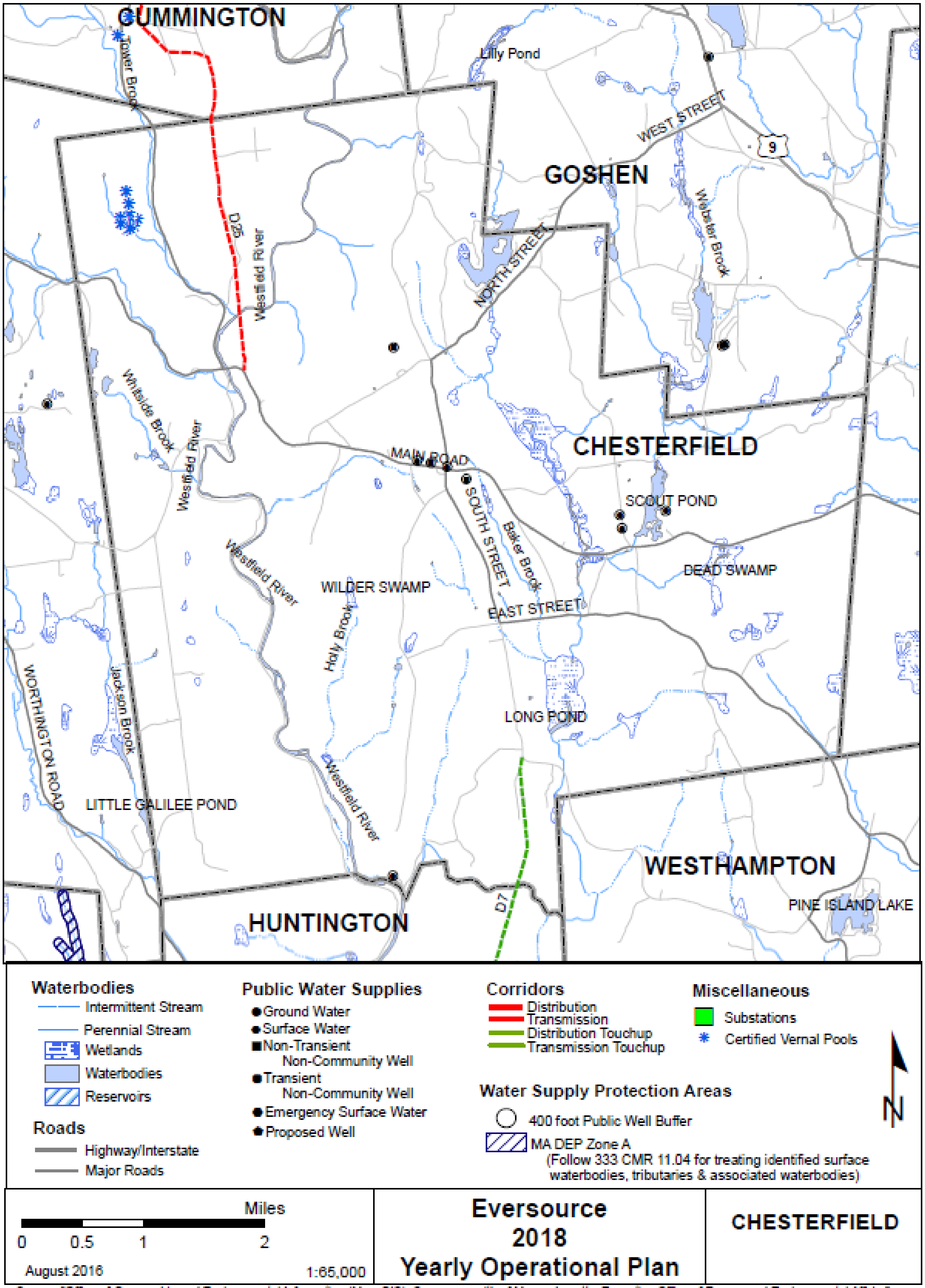
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs". Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



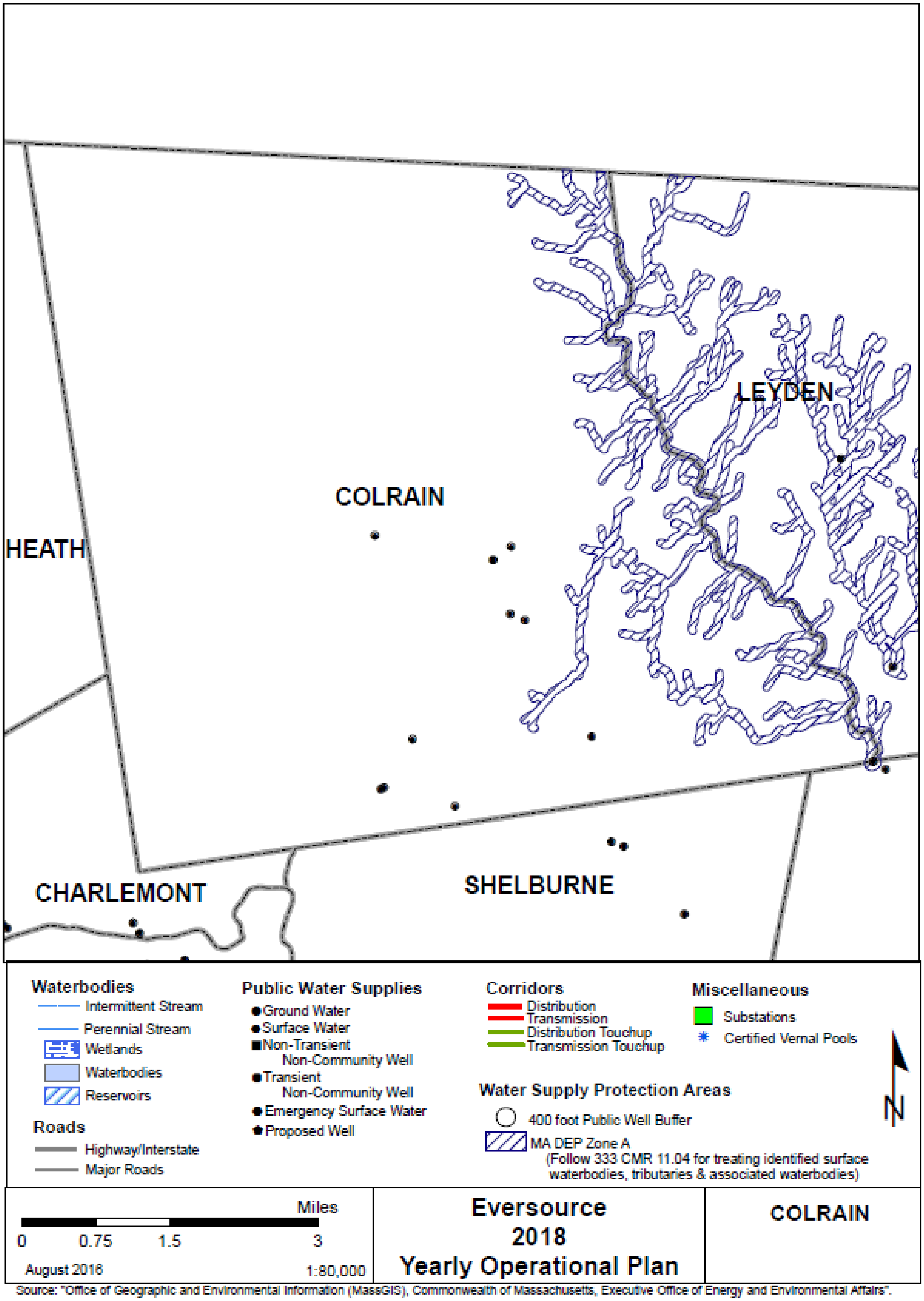
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies

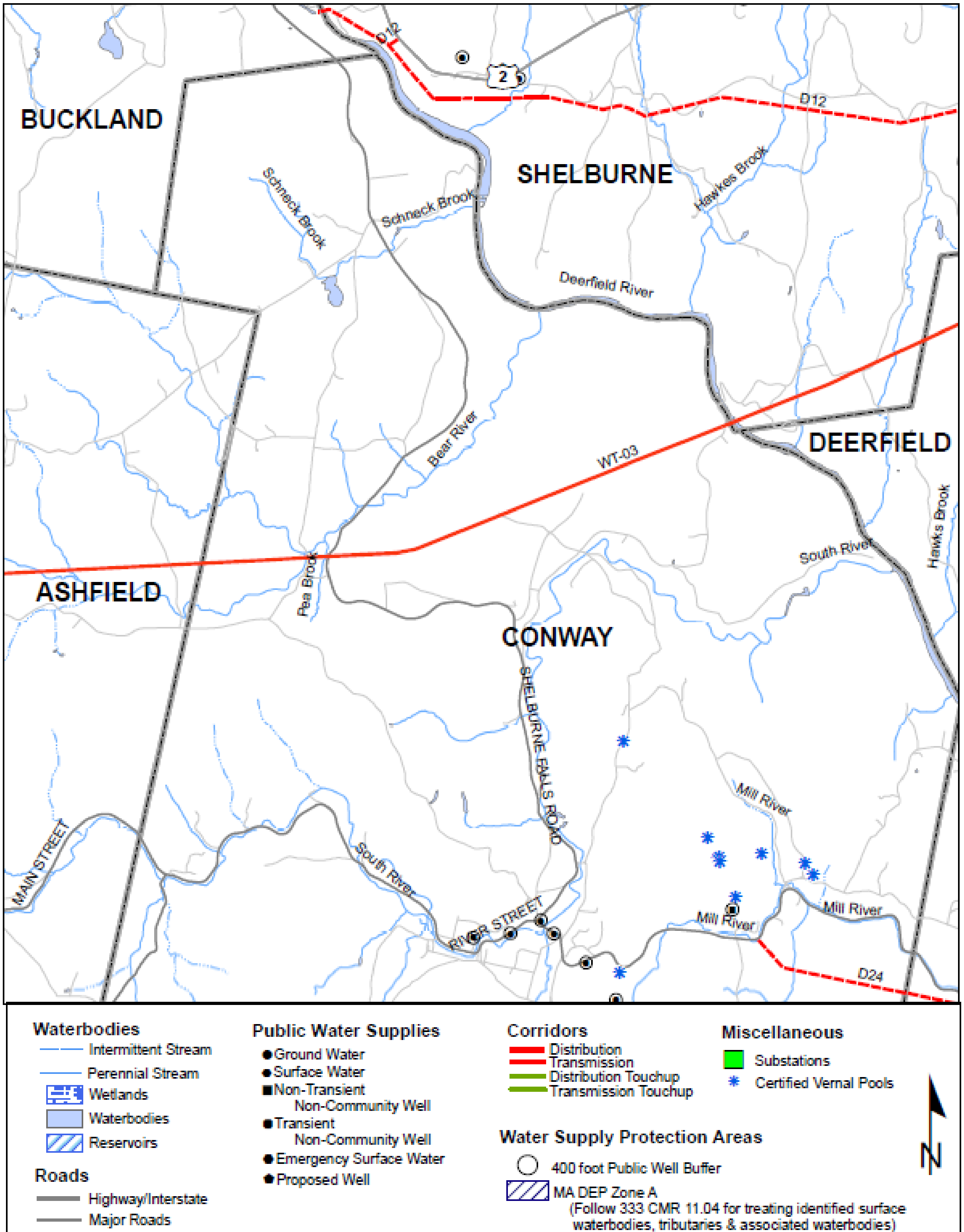


Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies


COLRAIN
HEATH
LEYDEN
CHARLEMONT
SHELBURNE
Waterbodies
Intermittent Stream
Perennial Stream
Wetlands
Waterbodies
Reservoirs
Roads
Highway/Interstate
Major Roads
Public Water Supplies
Ground Water
Surface Water
Non-Transient Non-Community Well
Transient Non-Community Well
Emergency Surface Water
Proposed Well
Corridors
Distribution
Transmission
Distribution Touchup
Transmission Touchup
Miscellaneous
Substations
Certified Vernal Pools
Water Supply Protection Areas
400 foot Public Well Buffer
MA DEP Zone A
(Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)
N
Miles
0 0.75 1.5 3
August 2016
1:80,000
Eversource
2018
Yearly Operational Plan
COLRAIN
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Miles

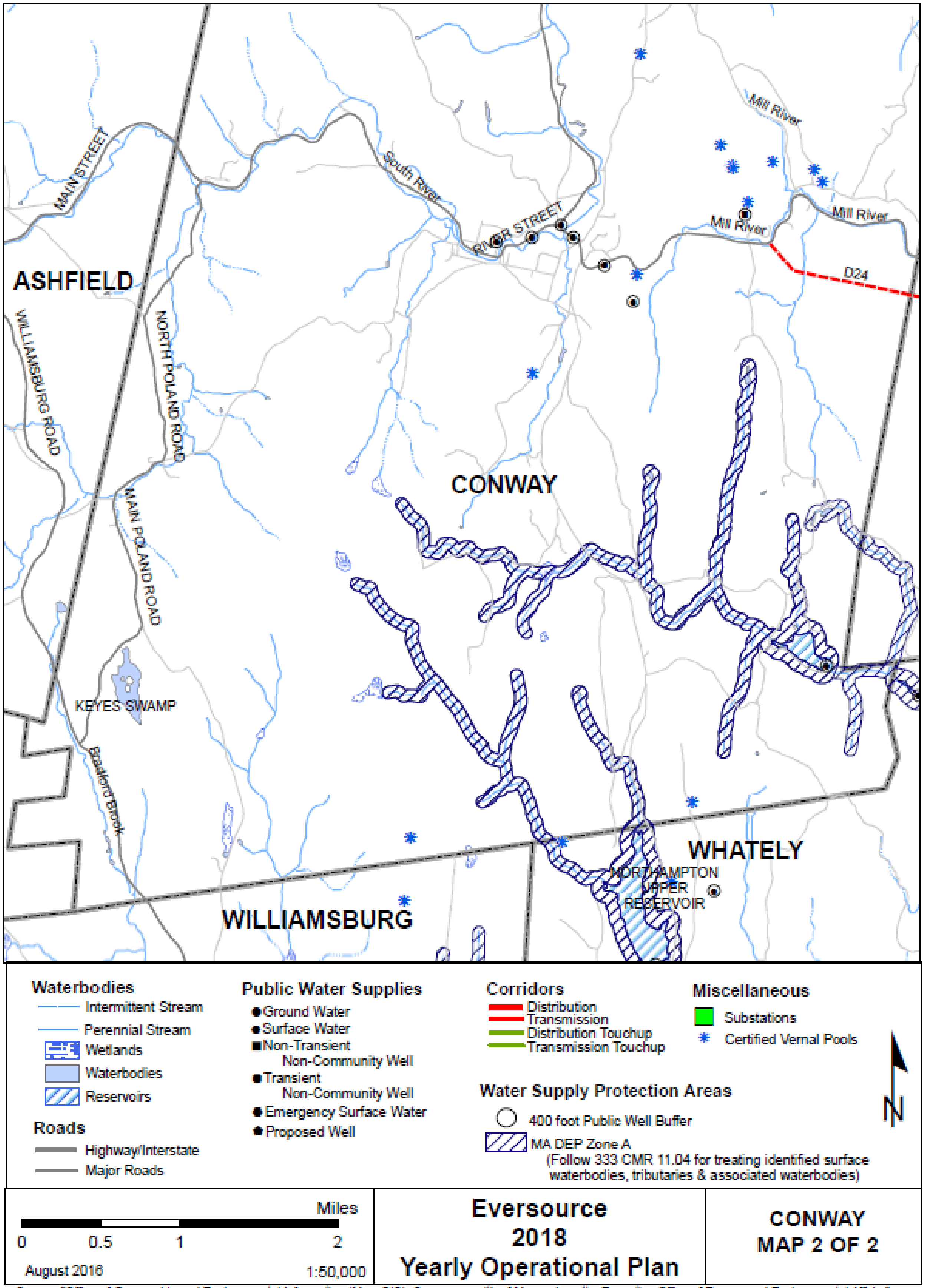
0 0.5 1 2

August 2016 1:50,000

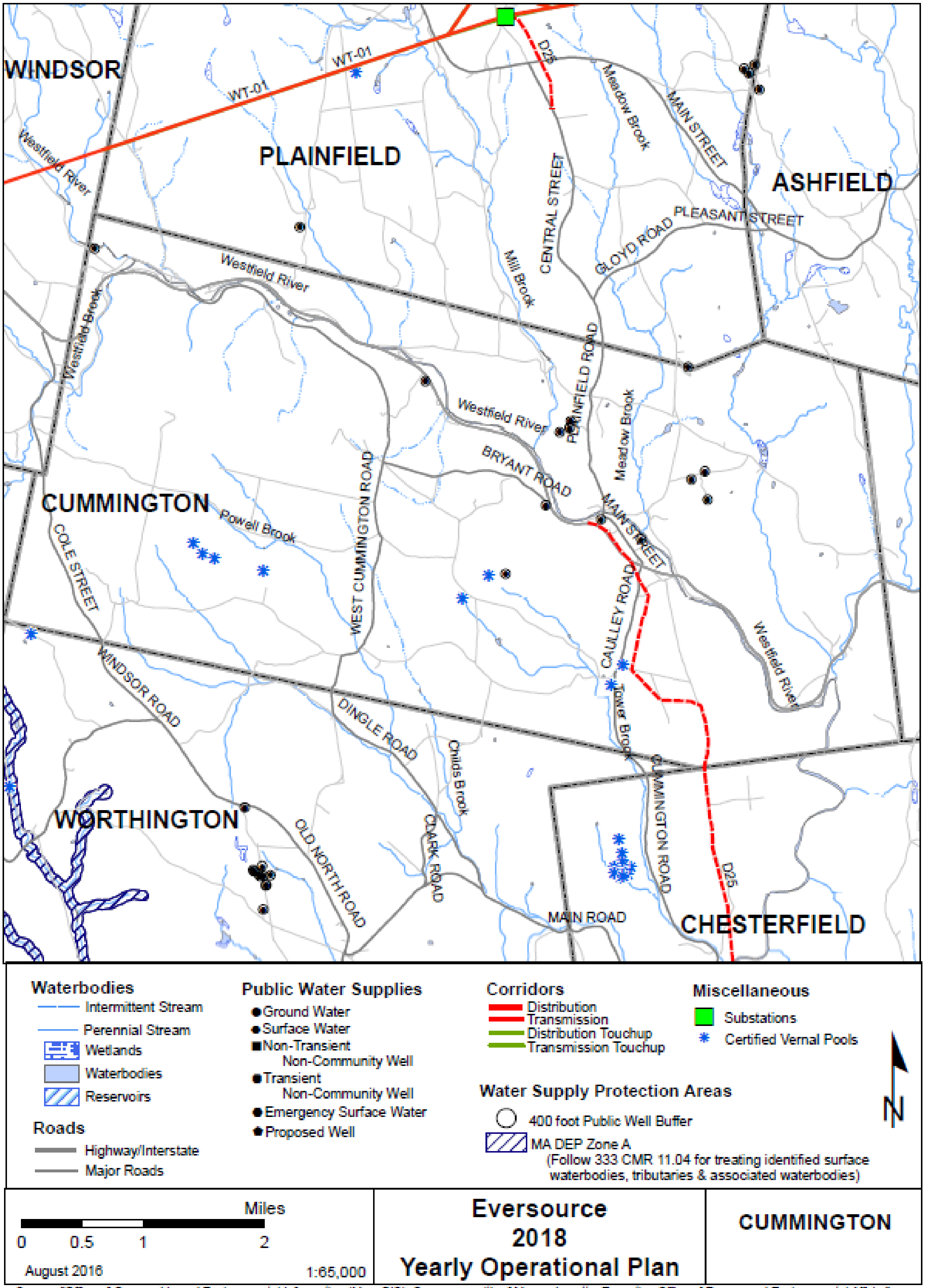
Eversource
2018
Yearly Operational Plan

CONWAY
MAP 1 OF 2

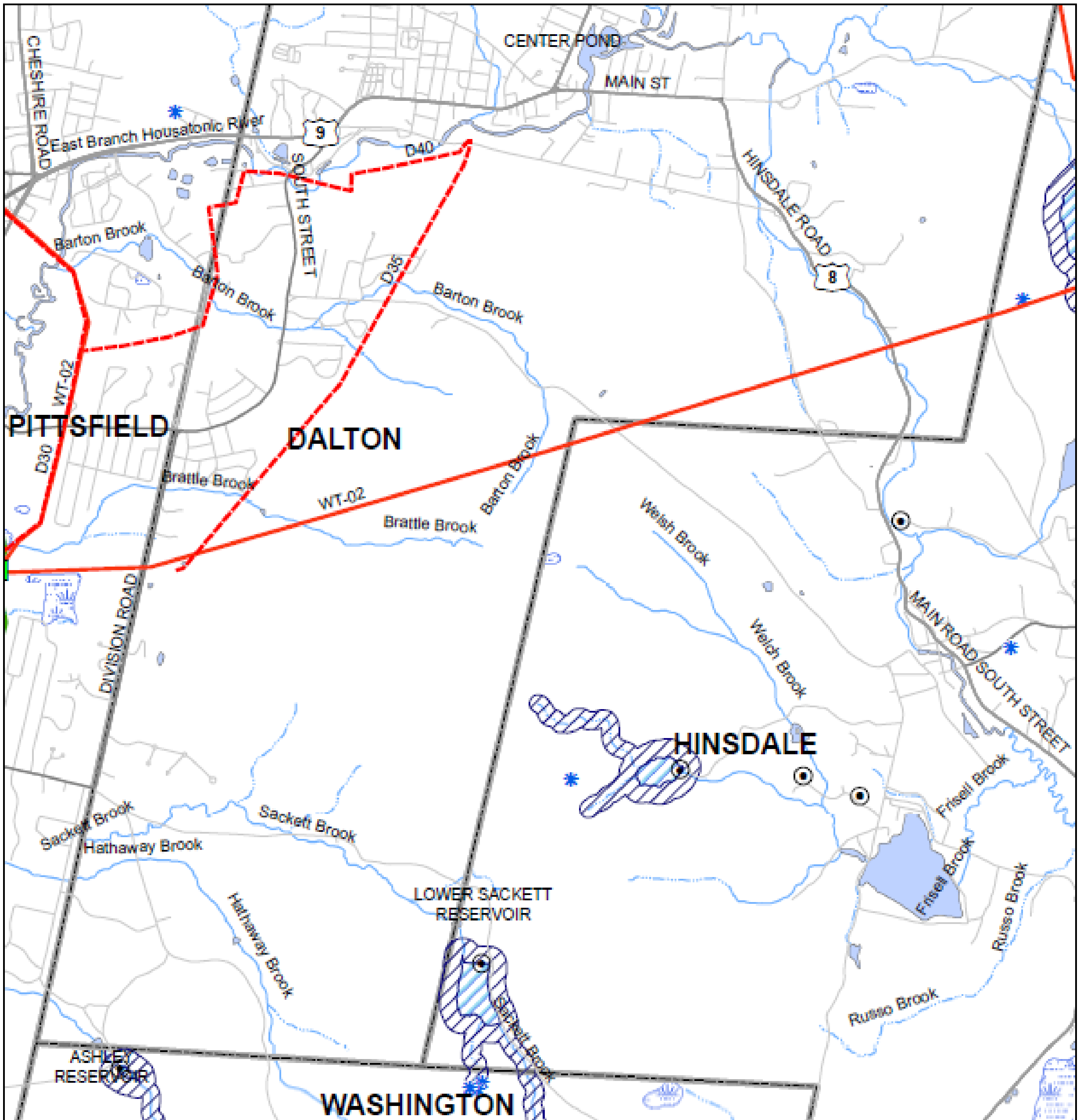
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Waterbodies
- Intermittent Stream
- Perennial Stream
- Wetlands
- Waterbodies
- Reservoirs

Roads
- Highway/Interstate
- Major Roads

Public Water Supplies
- Ground Water
- Surface Water
- Non-Transient Non-Community Well
- Transient Non-Community Well
- Emergency Surface Water
- Proposed Well

Corridors
- Distribution
- Transmission
- Distribution Touchup
- Transmission Touchup

Miscellaneous
- Substations
- Certified Vernal Pools

Water Supply Protection Areas
- 400 foot Public Well Buffer
- MA DEP Zone A (Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)

N

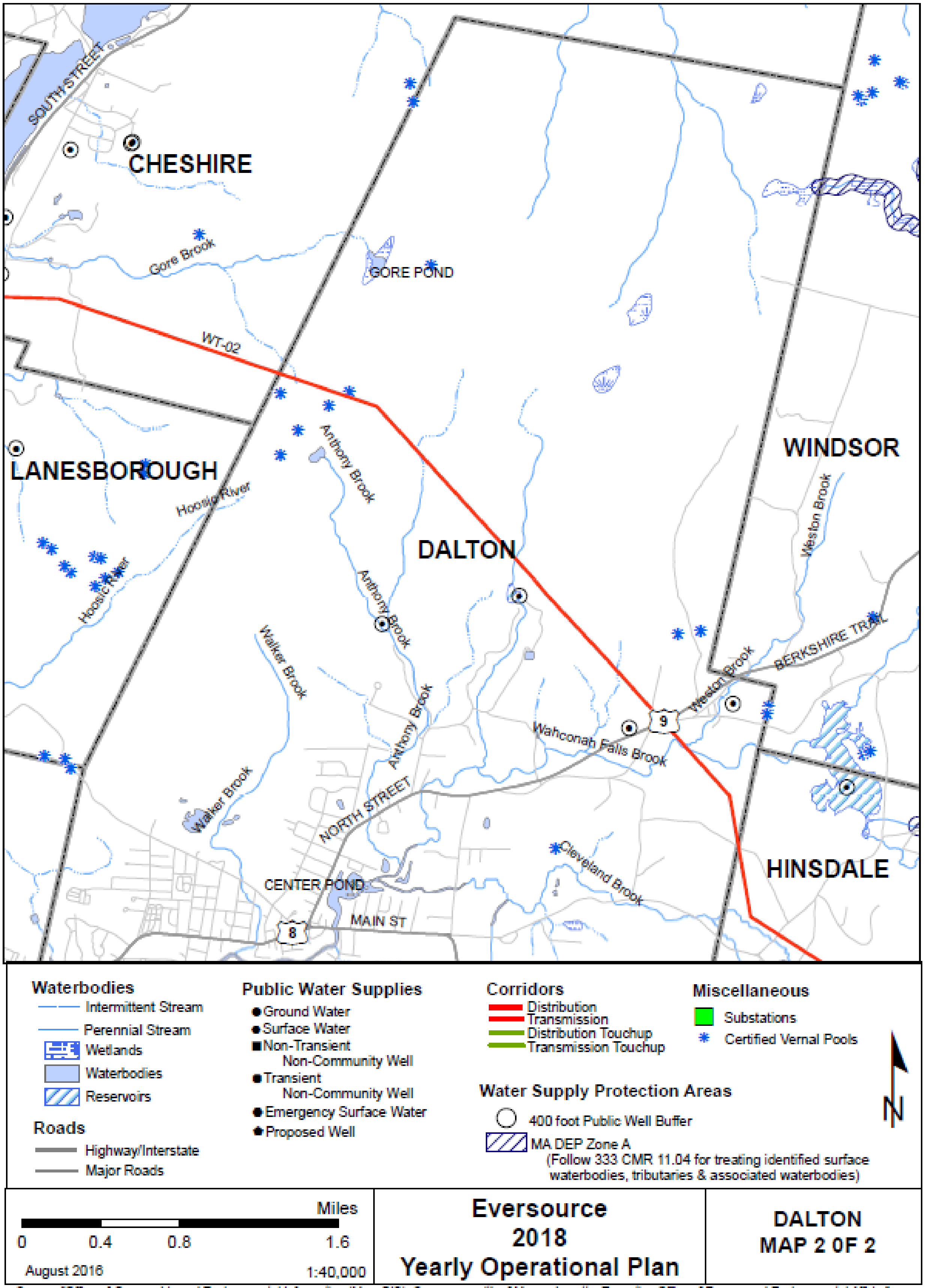
Miles
0 0.4 0.8 1.6

August 2016 1:40,000

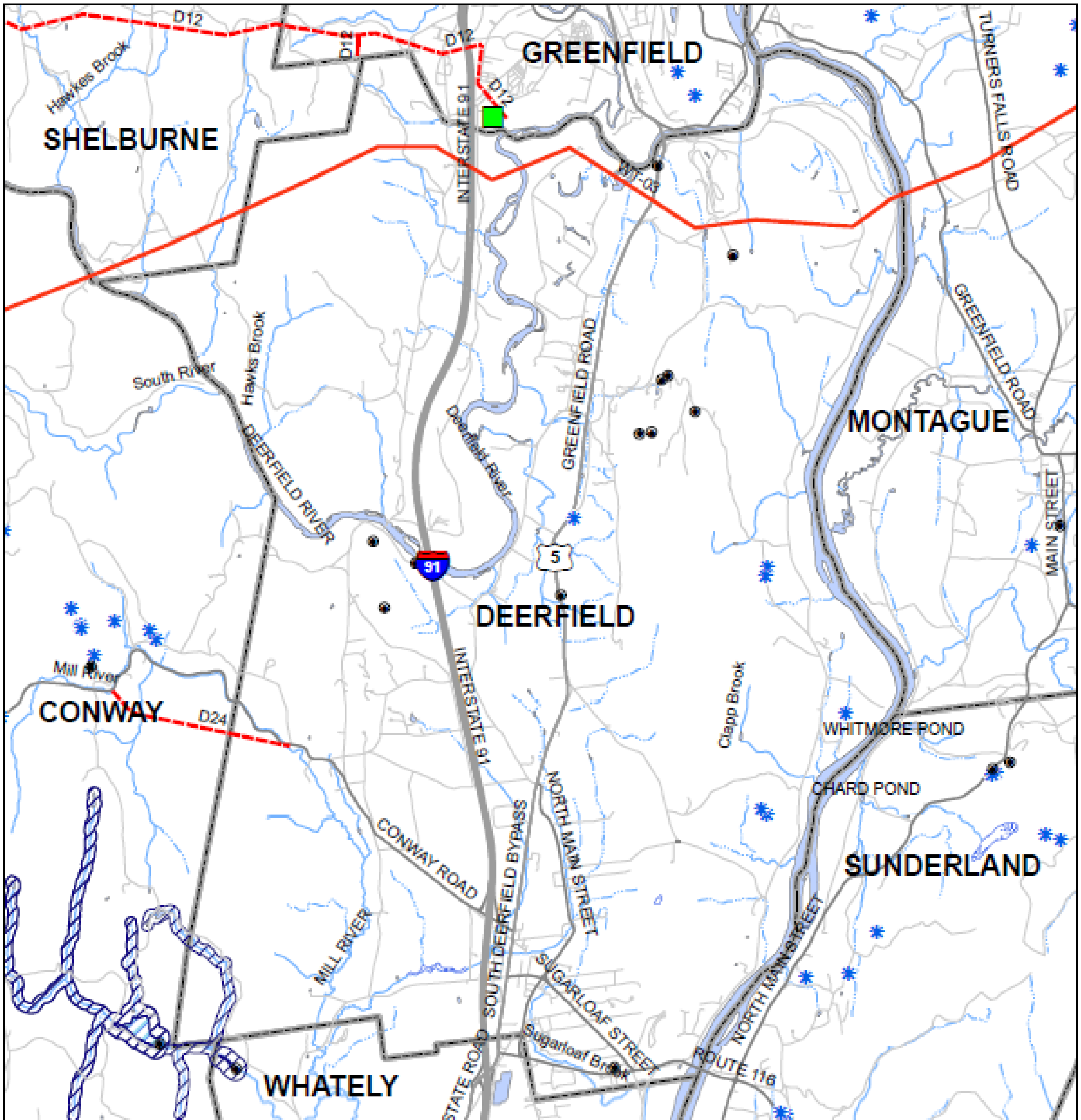
Eversource 2018 Yearly Operational Plan

DALTON MAP 1 0F 2

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Waterbodies
- Intermittent Stream
- Perennial Stream
- Wetlands
- Waterbodies
- Reservoirs

Roads
- Highway/Interstate
- Major Roads

Public Water Supplies
- Ground Water
- Surface Water
- Non-Transient Non-Community Well
- Transient Non-Community Well
- Emergency Surface Water
- Proposed Well

Corridors
- Distribution
- Transmission
- Distribution Touchup
- Transmission Touchup

Water Supply Protection Areas
- 400 foot Public Well Buffer
- MA DEP Zone A (Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)

Miscellaneous
- Substations
- Certified Vernal Pools

N

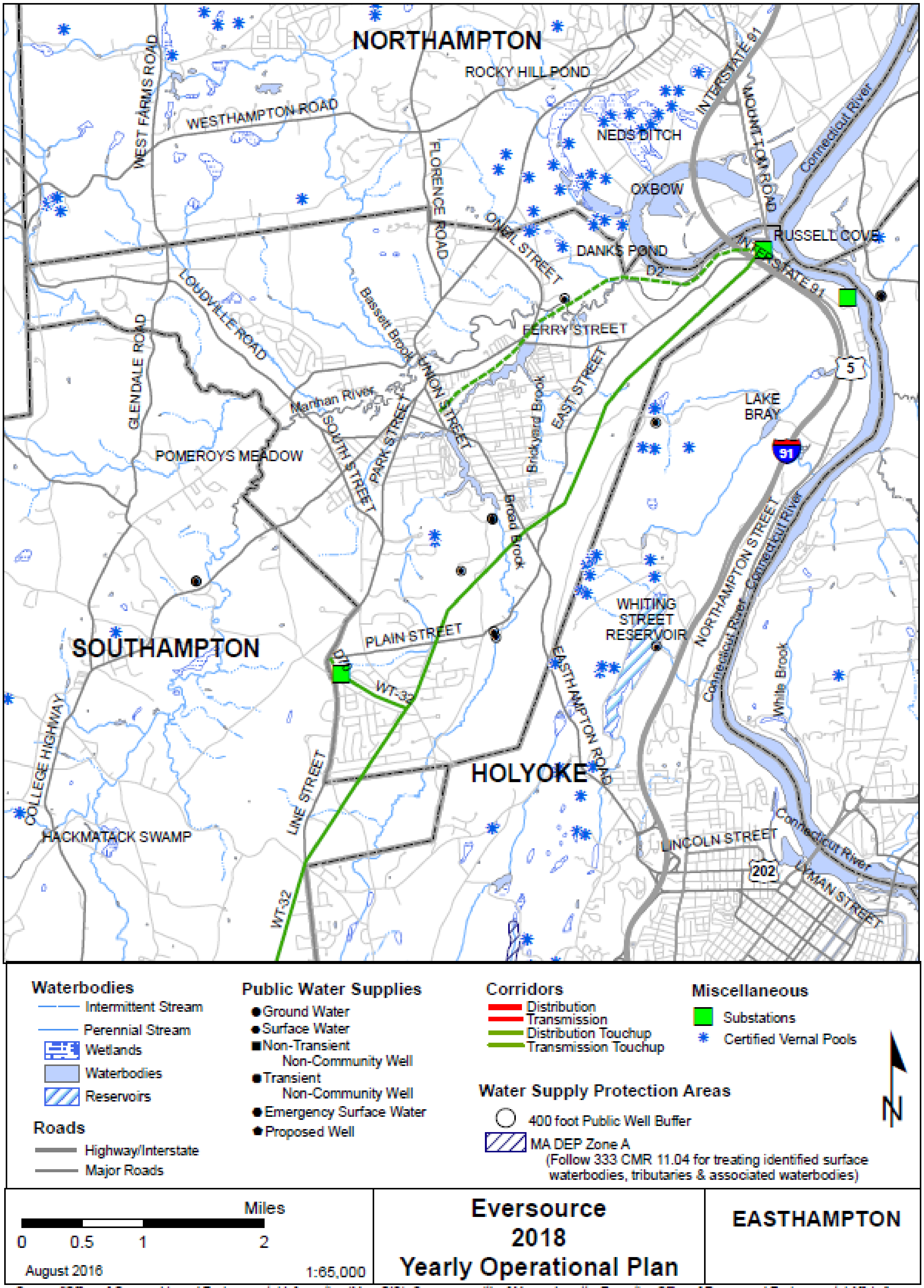
Miles
0 0.5 1 2

August 2016 1:70,000

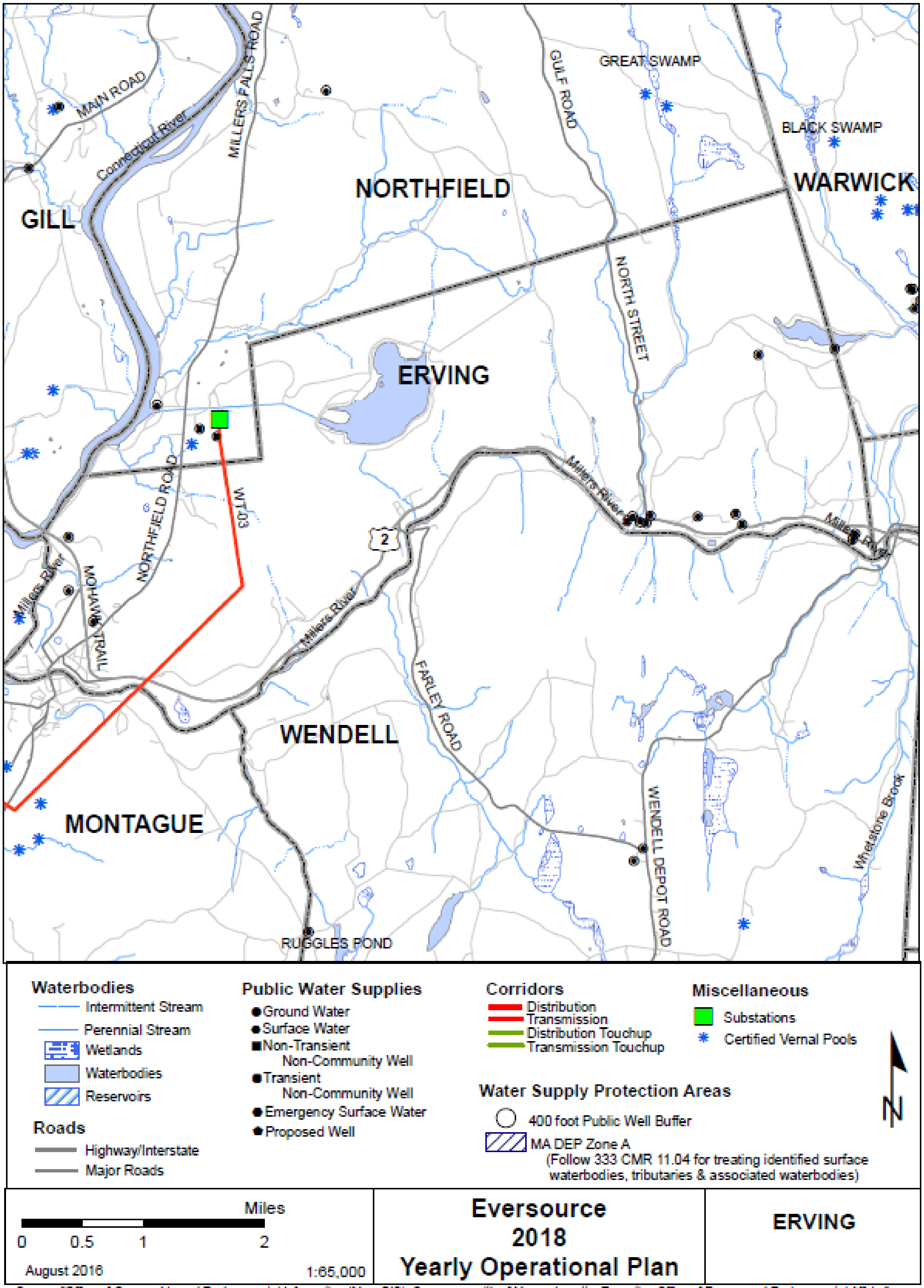
Eversource 2018 Yearly Operational Plan

DEERFIELD

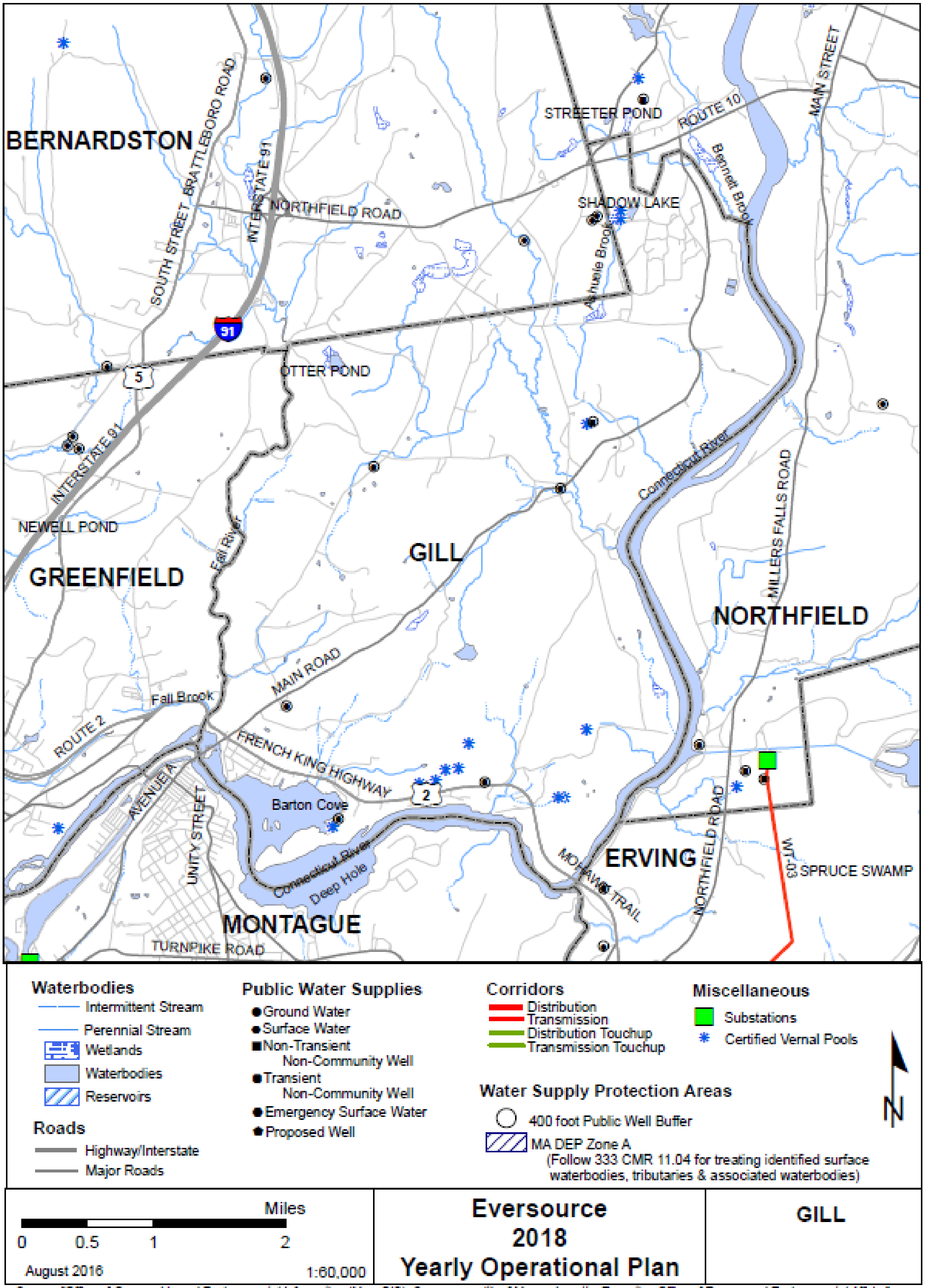
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



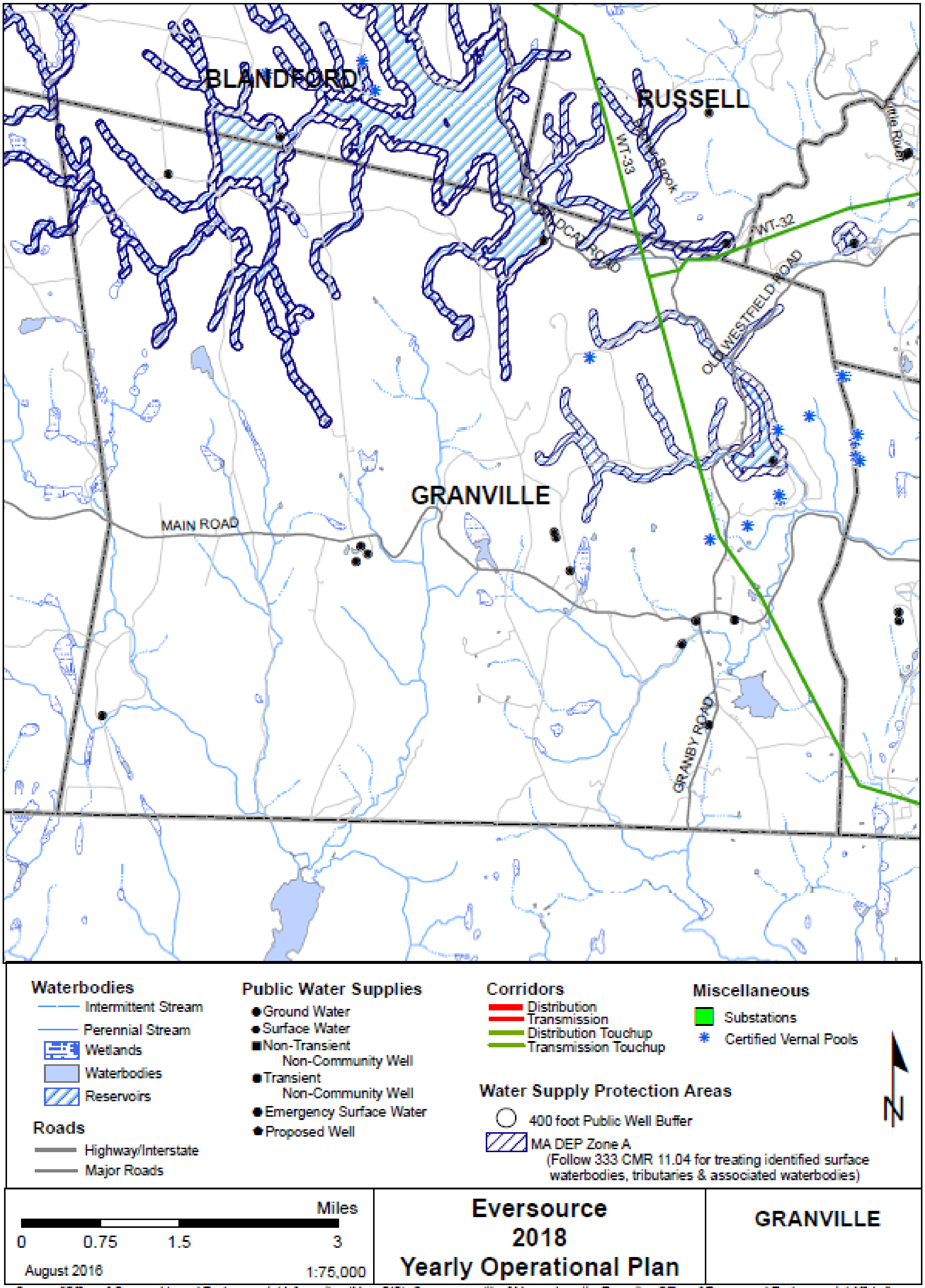
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



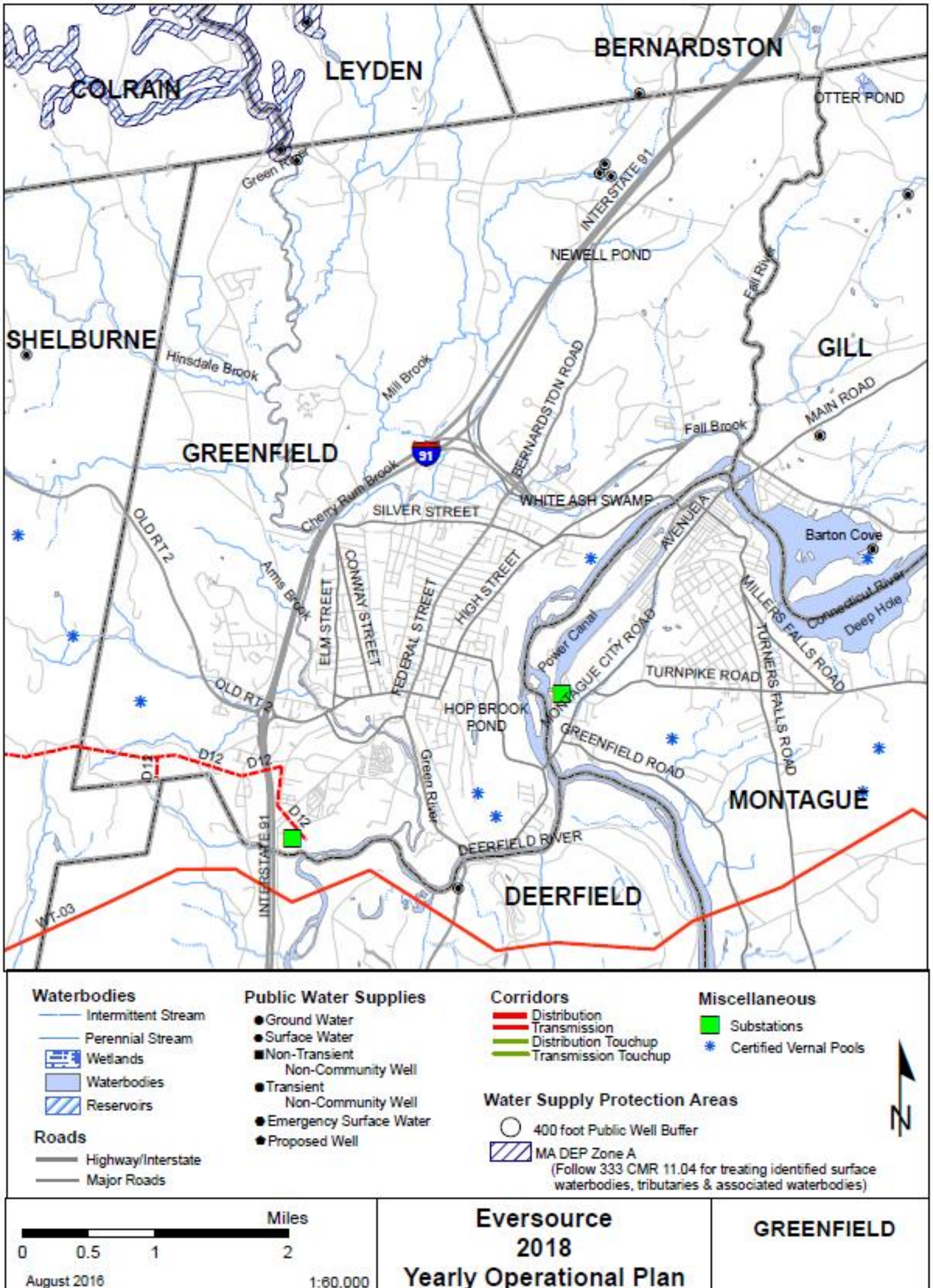
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



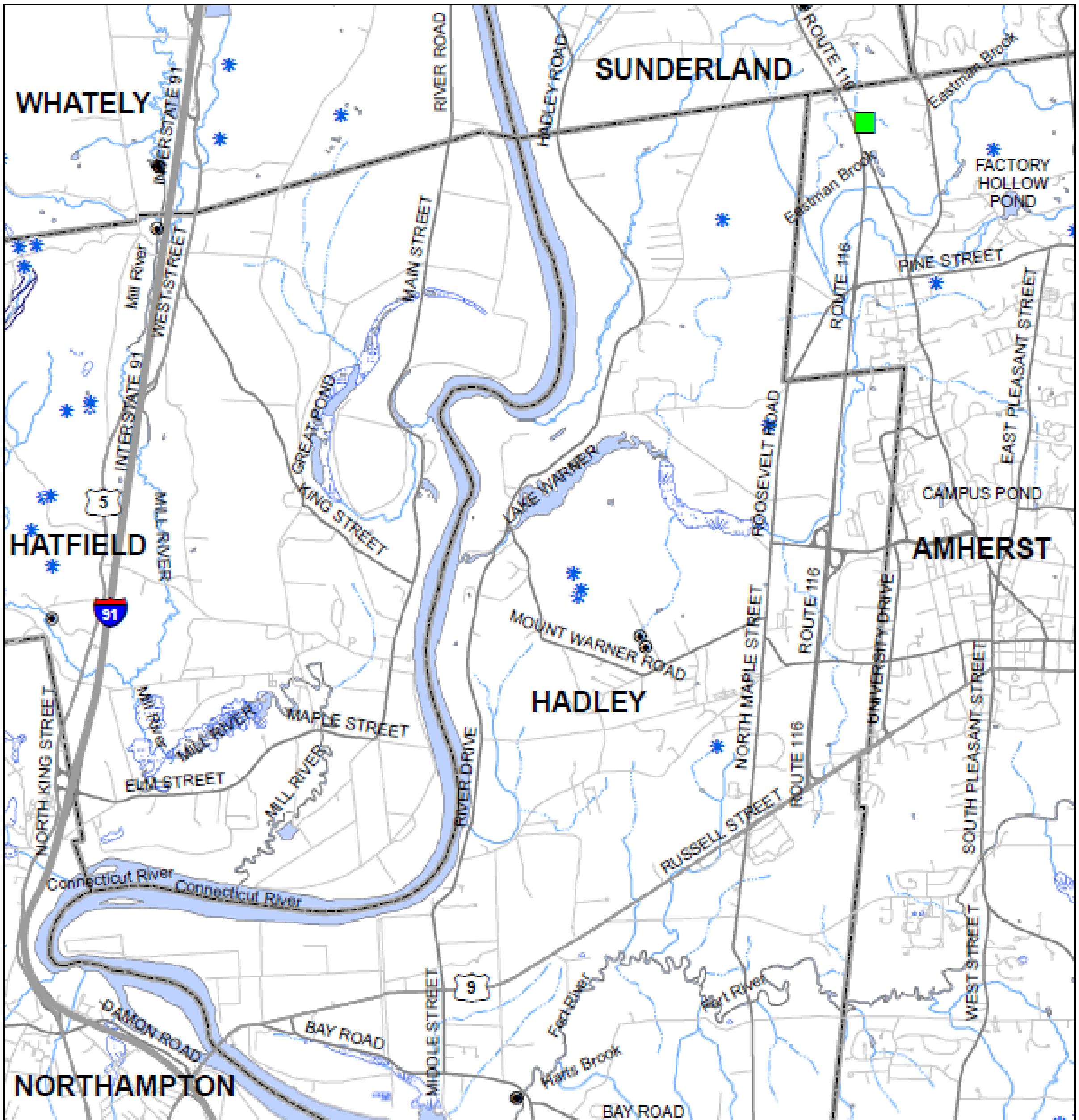
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Waterbodies
- Intermittent Stream
- Perennial Stream
- Wetlands
- Waterbodies
- Reservoirs

Roads
- Highway/Interstate
- Major Roads

Public Water Supplies
- Ground Water
- Surface Water
- Non-Transient Non-Community Well
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- Emergency Surface Water
- Proposed Well

Corridors
- Distribution
- Transmission
- Distribution Touchup
- Transmission Touchup

Water Supply Protection Areas
- 400 foot Public Well Buffer
- MA DEP Zone A (Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)

Miscellaneous
- Substations
- Certified Vernal Pools

N

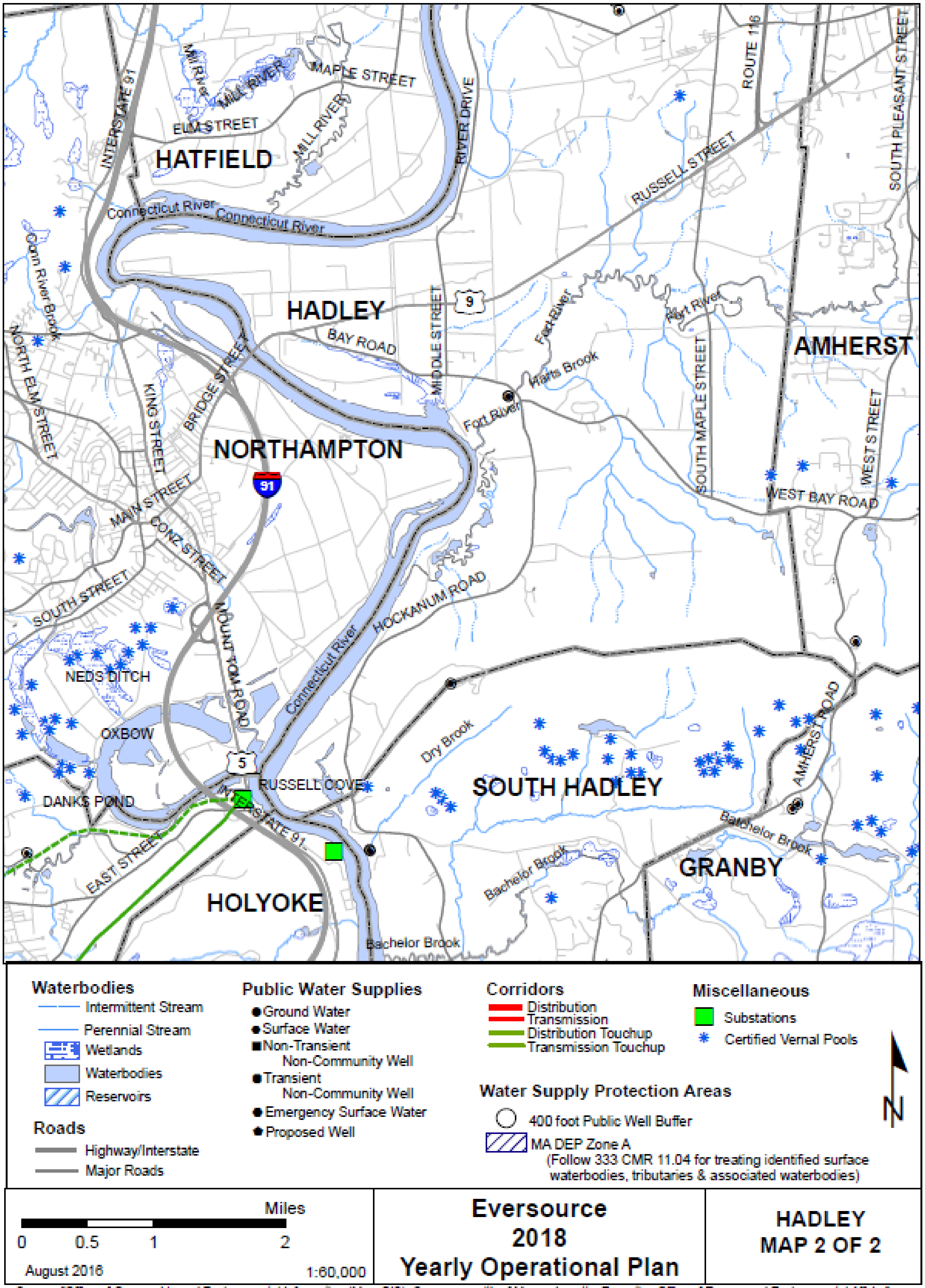
Miles
0 0.5 1 2

August 2016 1:60,000

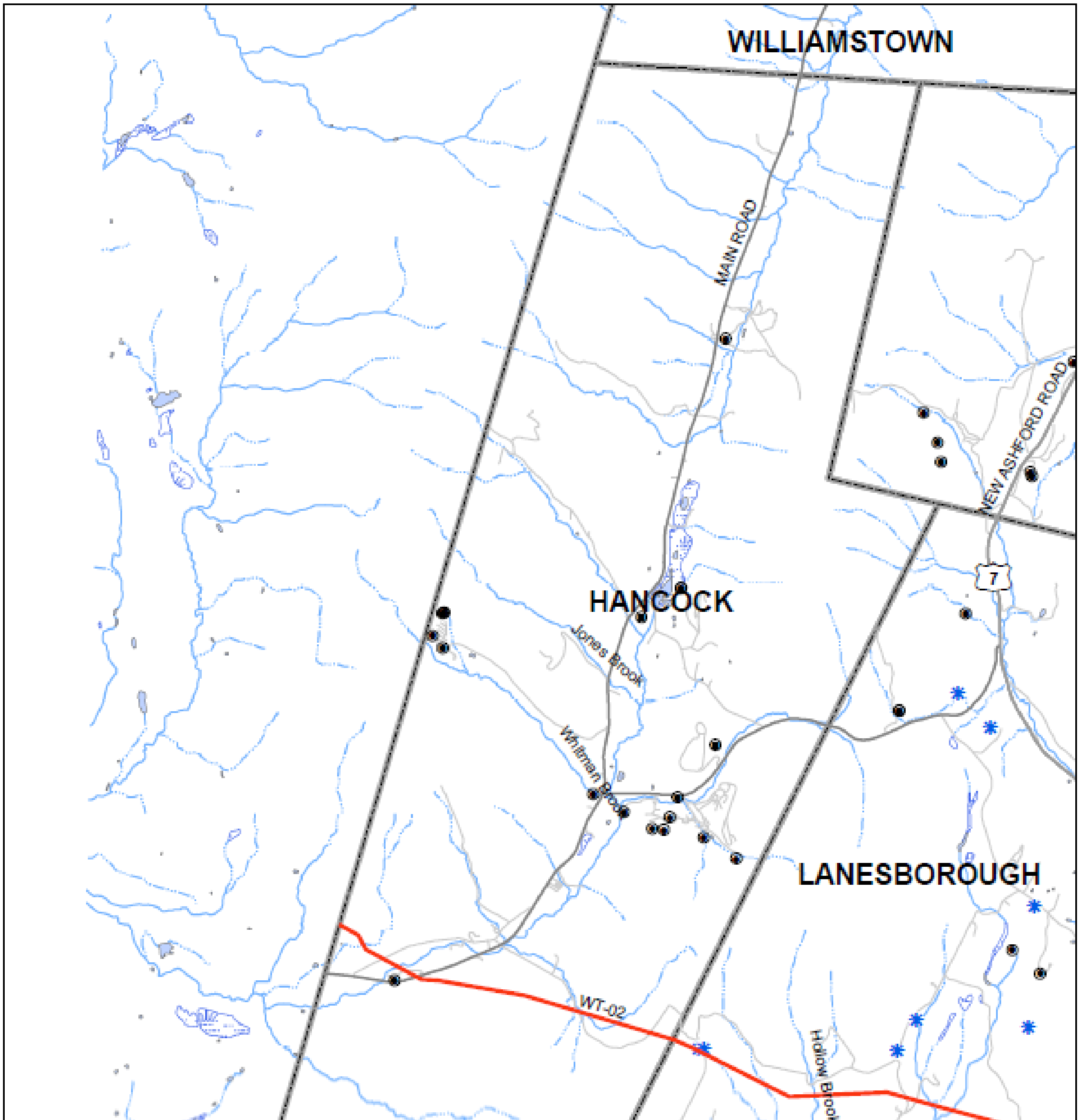
Eversource 2018 Yearly Operational Plan

HADLEY MAP 1 OF 2

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Waterbodies
- Intermittent Stream
- Perennial Stream
- Wetlands
- Waterbodies
- Reservoirs

Roads
- Highway/Interstate
- Major Roads

Public Water Supplies
- Ground Water
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Corridors
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- Transmission Touchup

Water Supply Protection Areas
- 400 foot Public Well Buffer
- MA DEP Zone A (Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)

Miscellaneous
- Substations
- Certified Vernal Pools

N

Miles
0 0.5 1 2

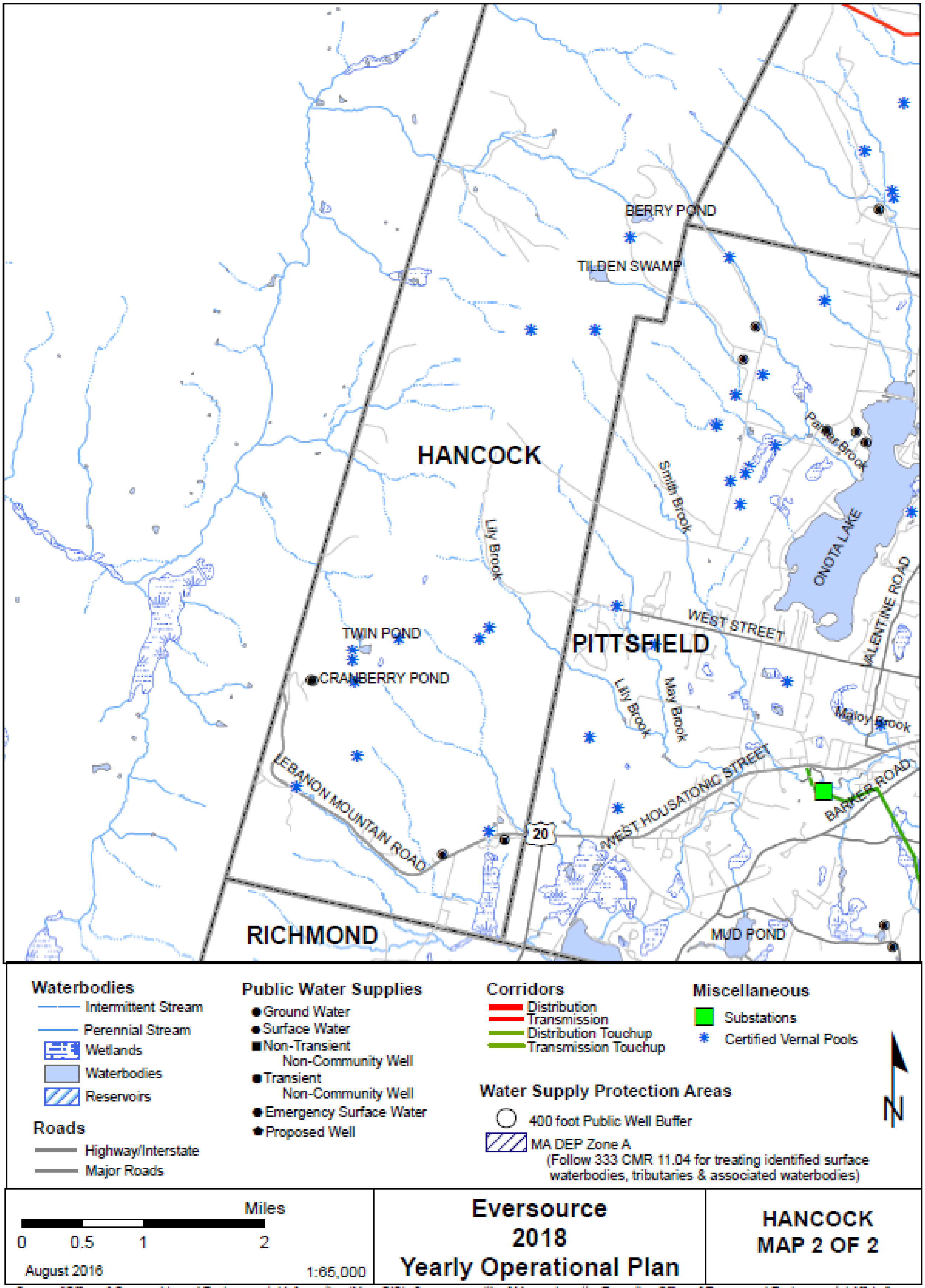
August 2016

1:65,000

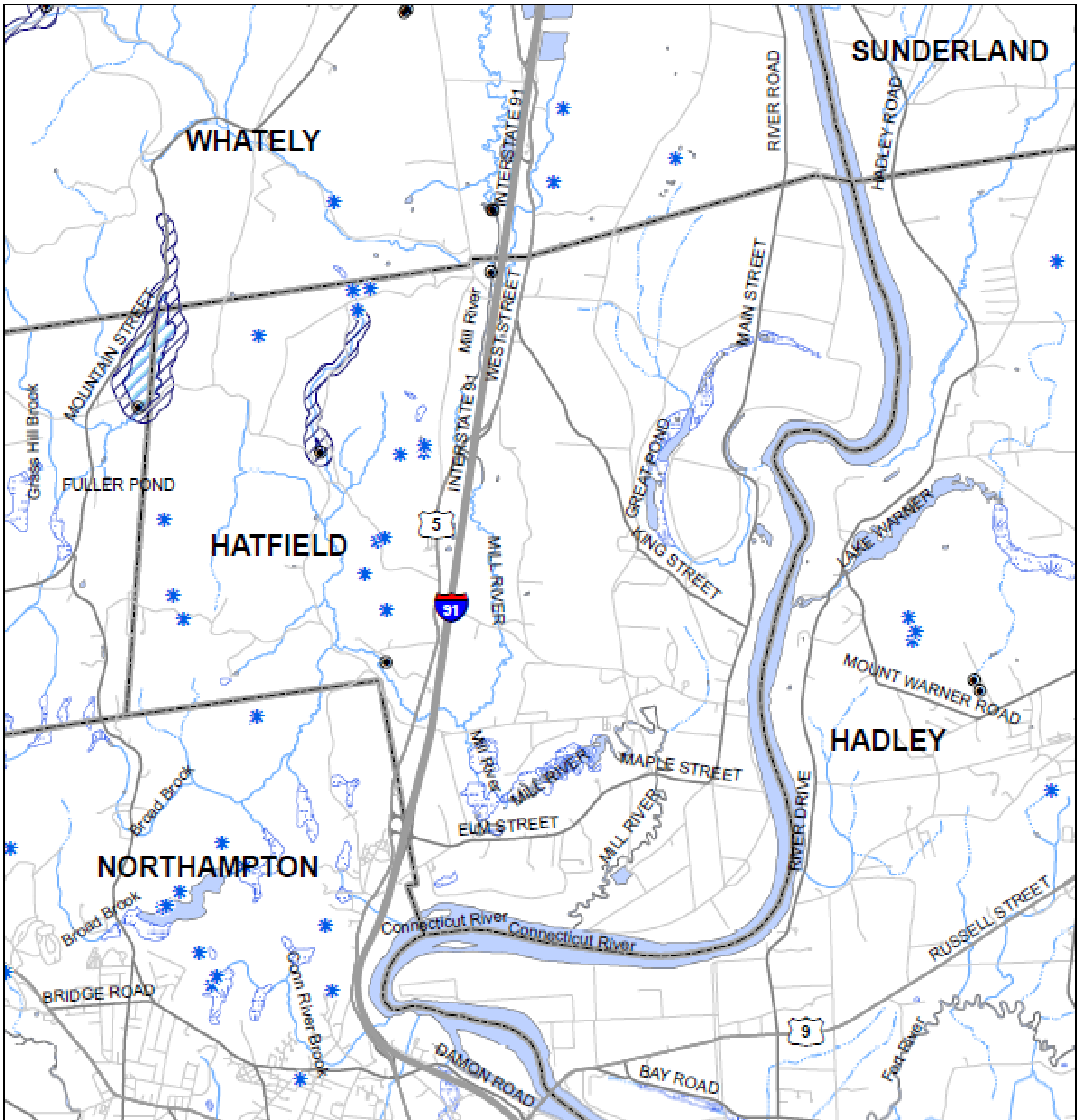
Eversource 2018 Yearly Operational Plan

HANCOCK MAP 1 OF 2

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Waterbodies
- Intermittent Stream
- Perennial Stream
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- Waterbodies
- Reservoirs

Roads
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Public Water Supplies
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Corridors
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- Distribution Touchup
- Transmission Touchup

Miscellaneous
- Substations
- Certified Vernal Pools

Water Supply Protection Areas
- 400 foot Public Well Buffer
- MA DEP Zone A (Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)

N

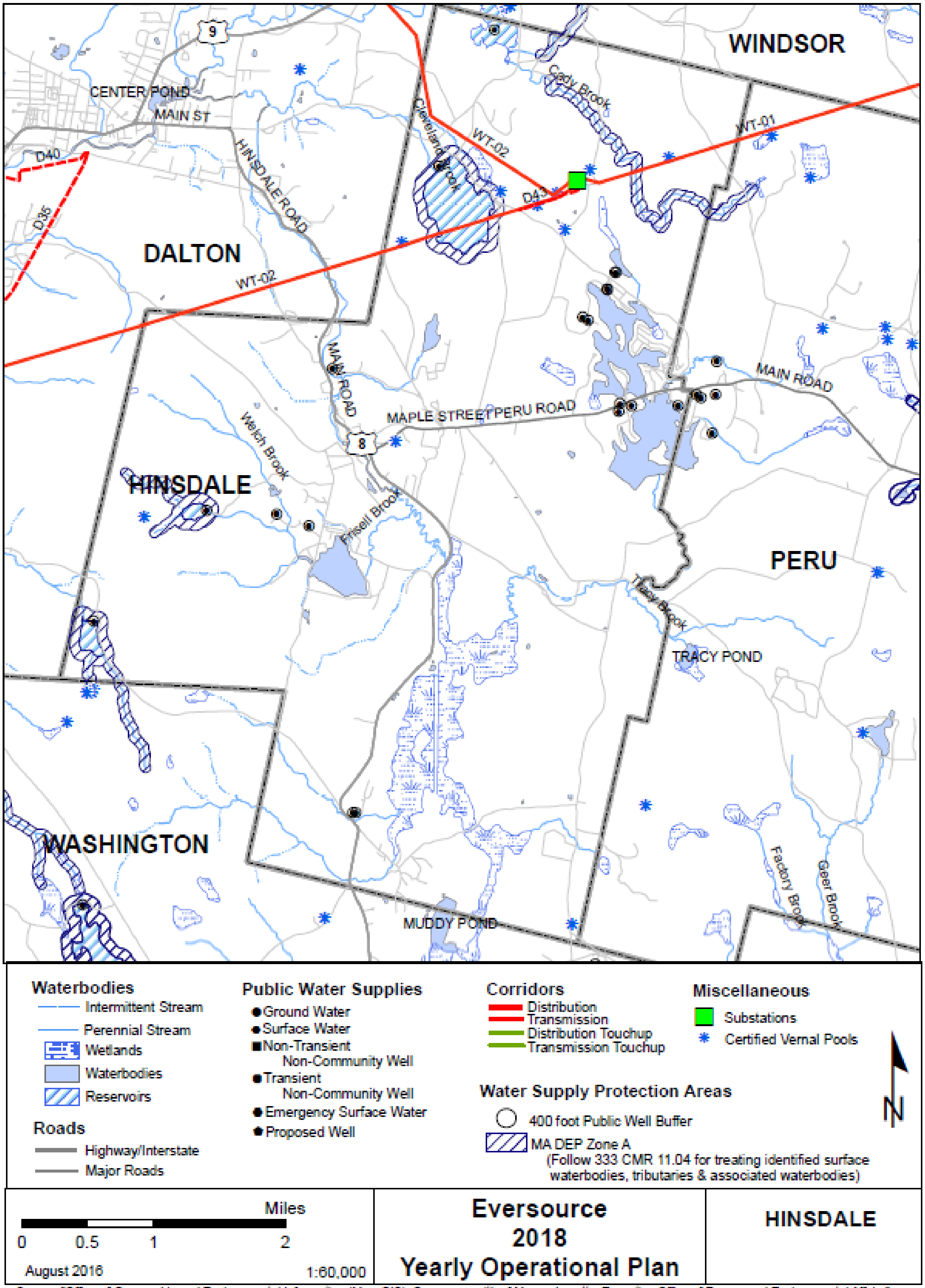
Miles
0 0.5 1 2

August 2016 1:60,000

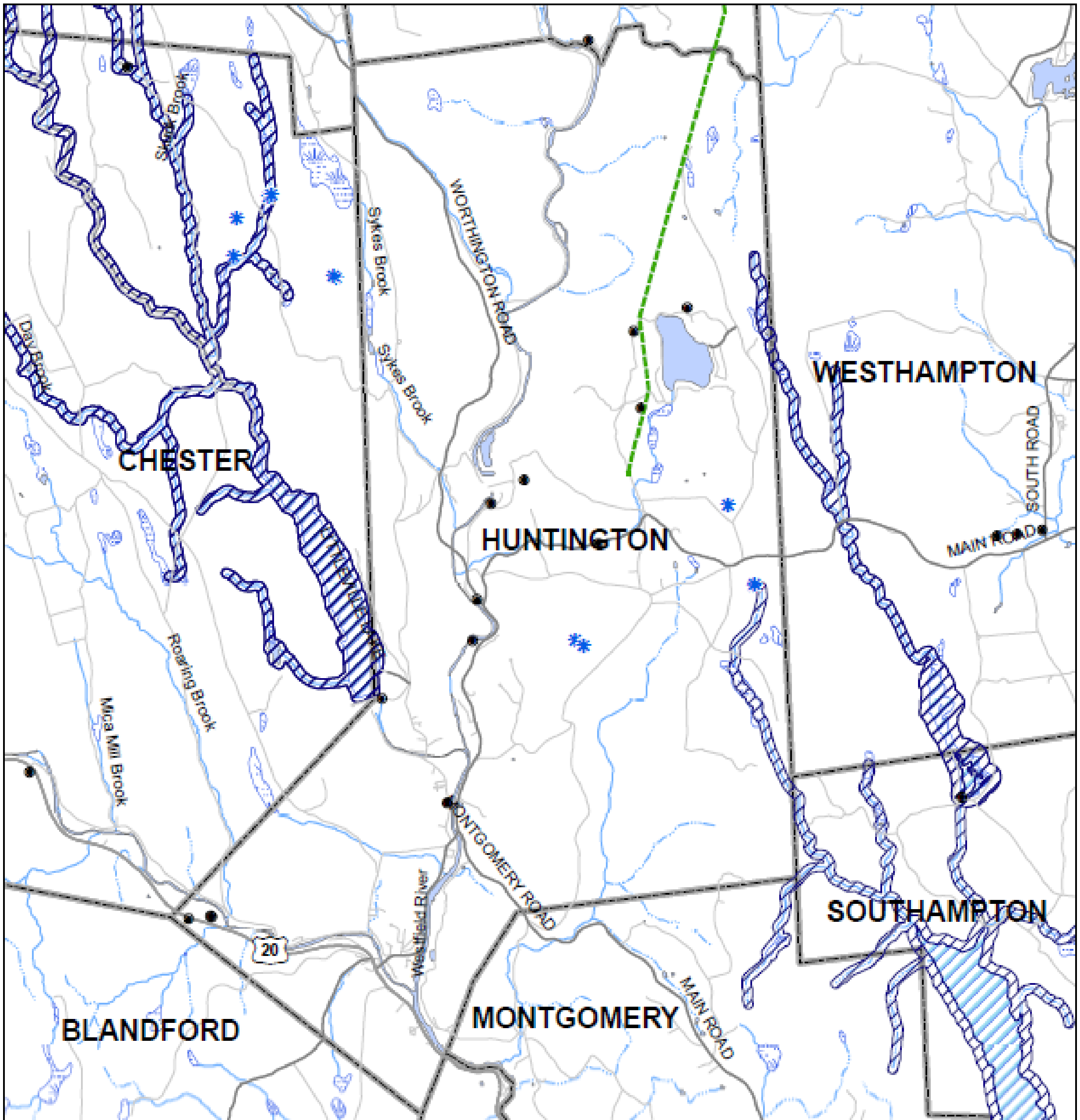
Eversource 2018 Yearly Operational Plan

HATFIELD

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Waterbodies
- Intermittent Stream
- Perennial Stream
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- Waterbodies
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Roads
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Public Water Supplies
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Corridors
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- Transmission Touchup

Water Supply Protection Areas
- 400 foot Public Well Buffer
- MA DEP Zone A (Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)

Miscellaneous
- Substations
- Certified Vernal Pools

N

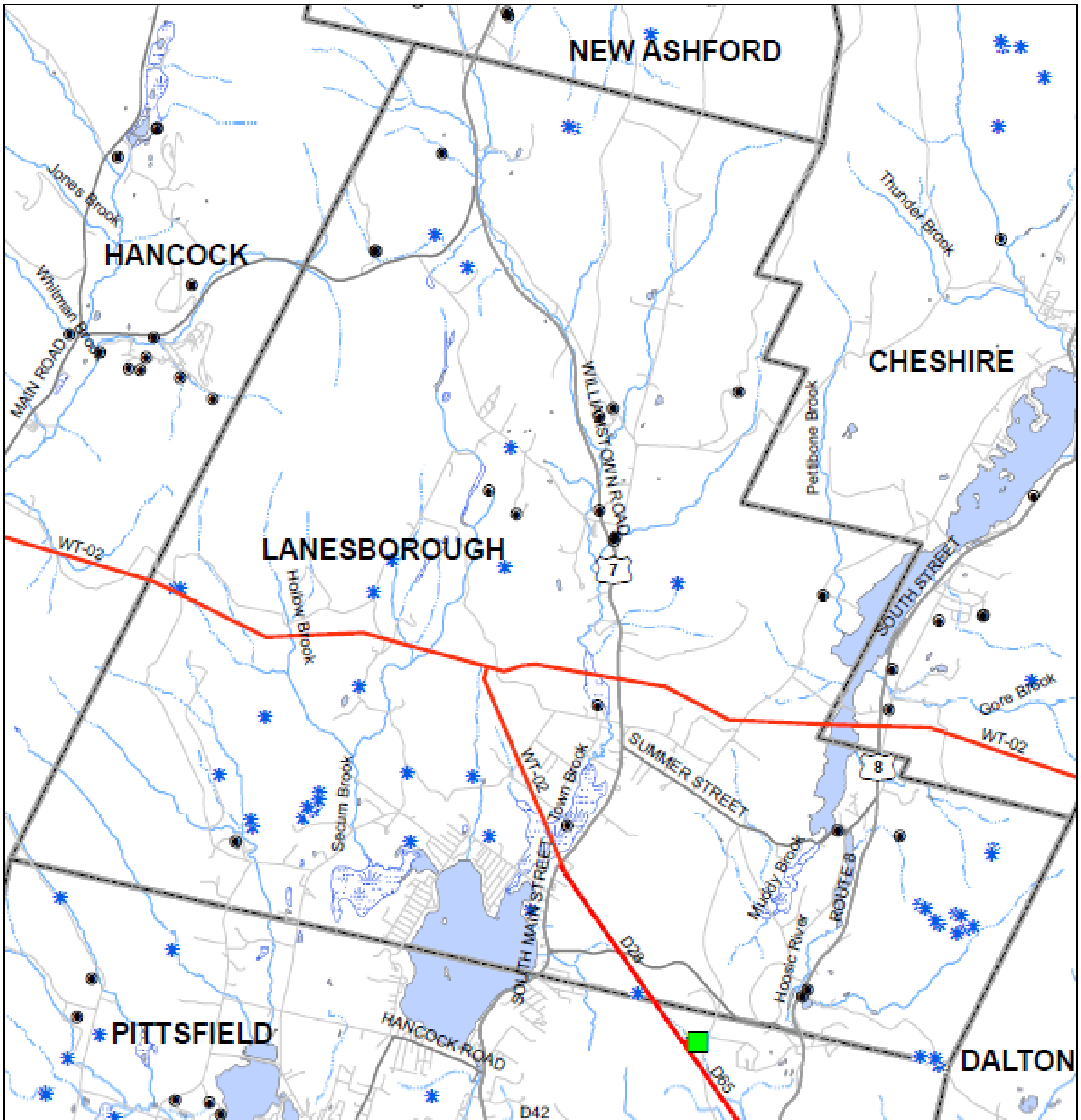
Miles
0 0.75 1.5 3

August 2016 1:75,000

Eversource 2018 Yearly Operational Plan

HUNTINGTON

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Waterbodies
- Intermittent Stream
- Perennial Stream
- Wetlands
- Waterbodies
- Reservoirs

Roads
- Highway/Interstate
- Major Roads

Public Water Supplies
- Ground Water
- Surface Water
- Non-Transient Non-Community Well
- Transient Non-Community Well
- Emergency Surface Water
- Proposed Well

Corridors
- Distribution
- Transmission
- Distribution Touchup
- Transmission Touchup

Miscellaneous
- Substations
- Certified Vernal Pools

Water Supply Protection Areas
- 400 foot Public Well Buffer
- MA DEP Zone A (Follow 333 CMR 11.04 for treating identified surface waterbodies, tributaries & associated waterbodies)

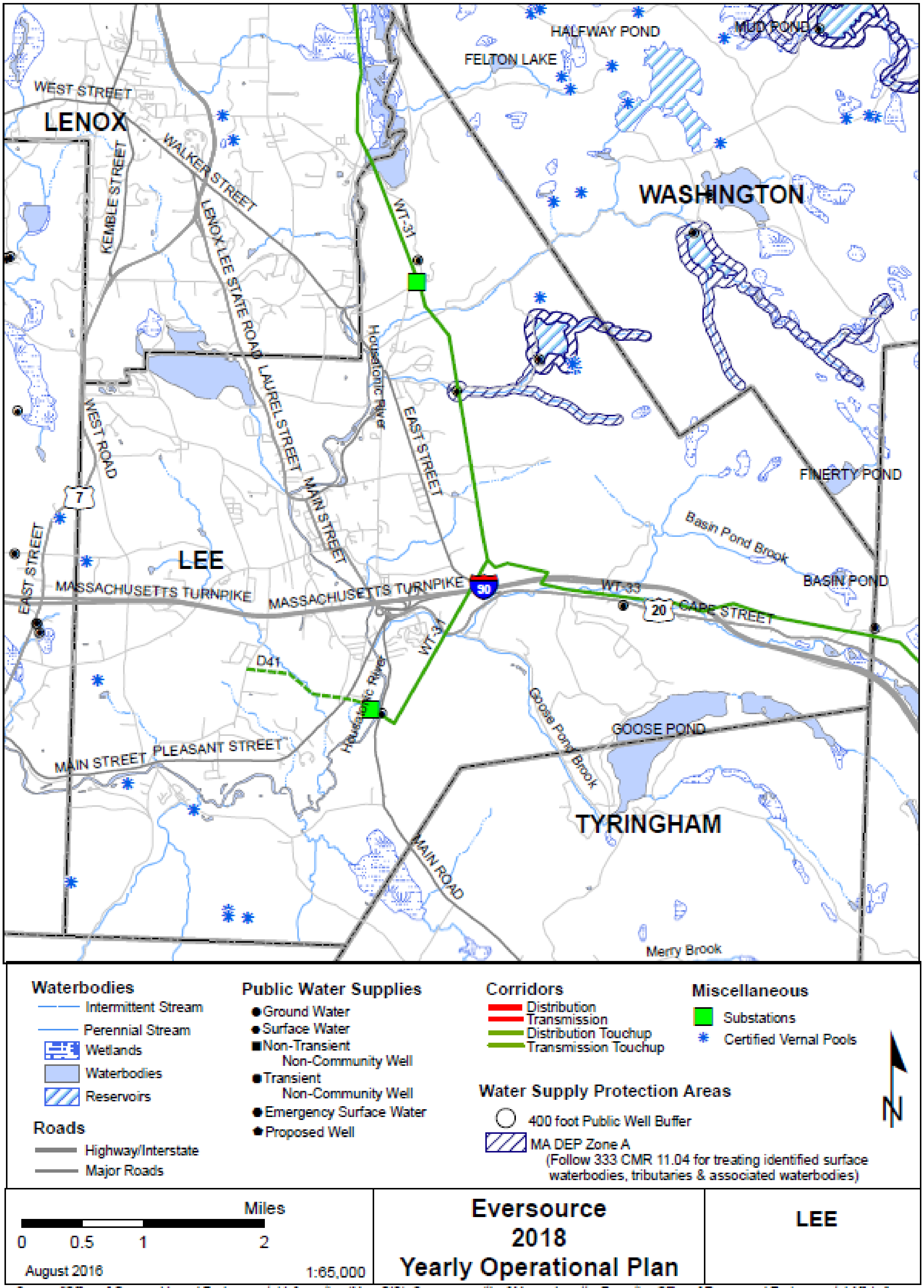
N

Miles
0 0.5 1 2
August 2016 1:65,000

Eversource 2018 Yearly Operational Plan

LANESBOROUGH

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



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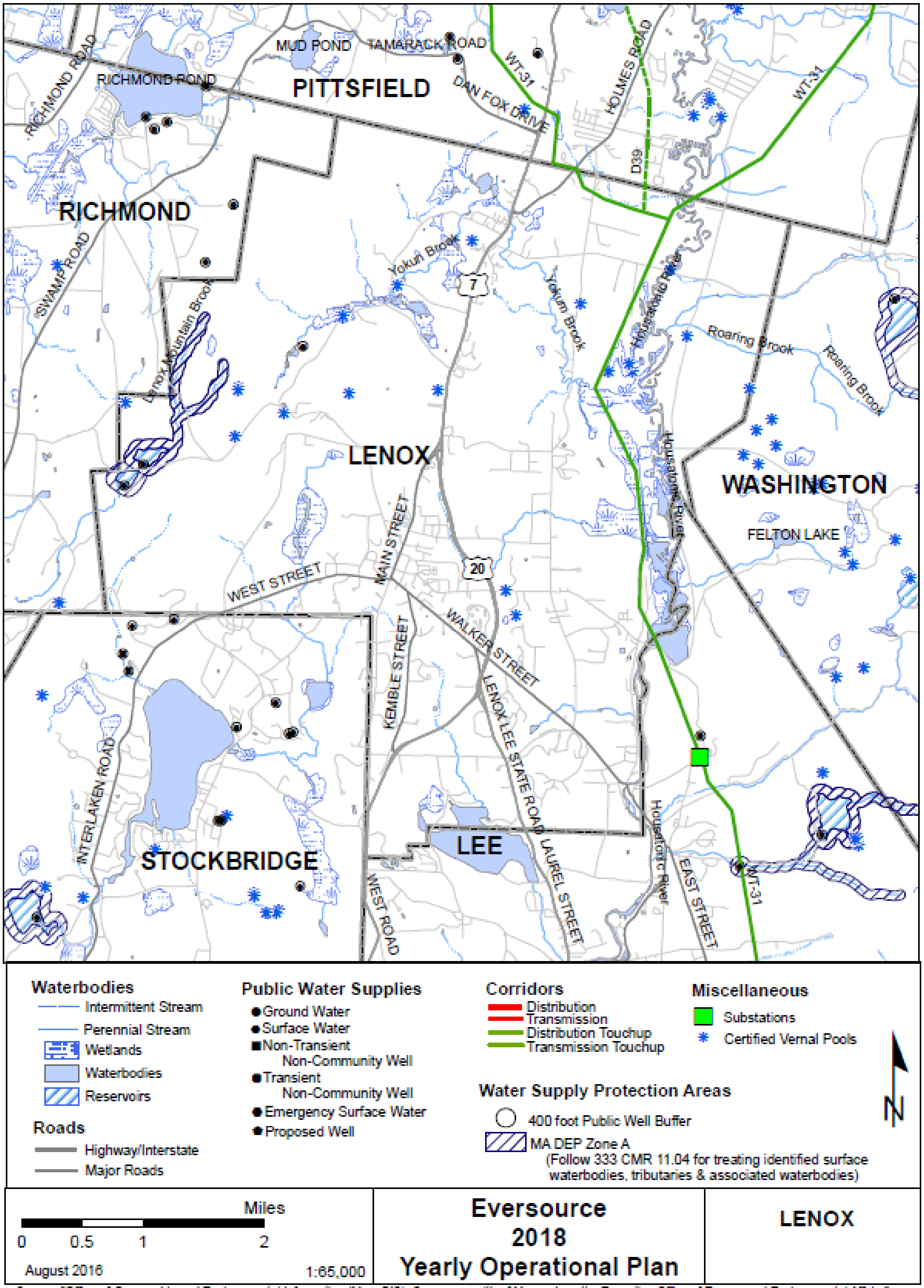

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
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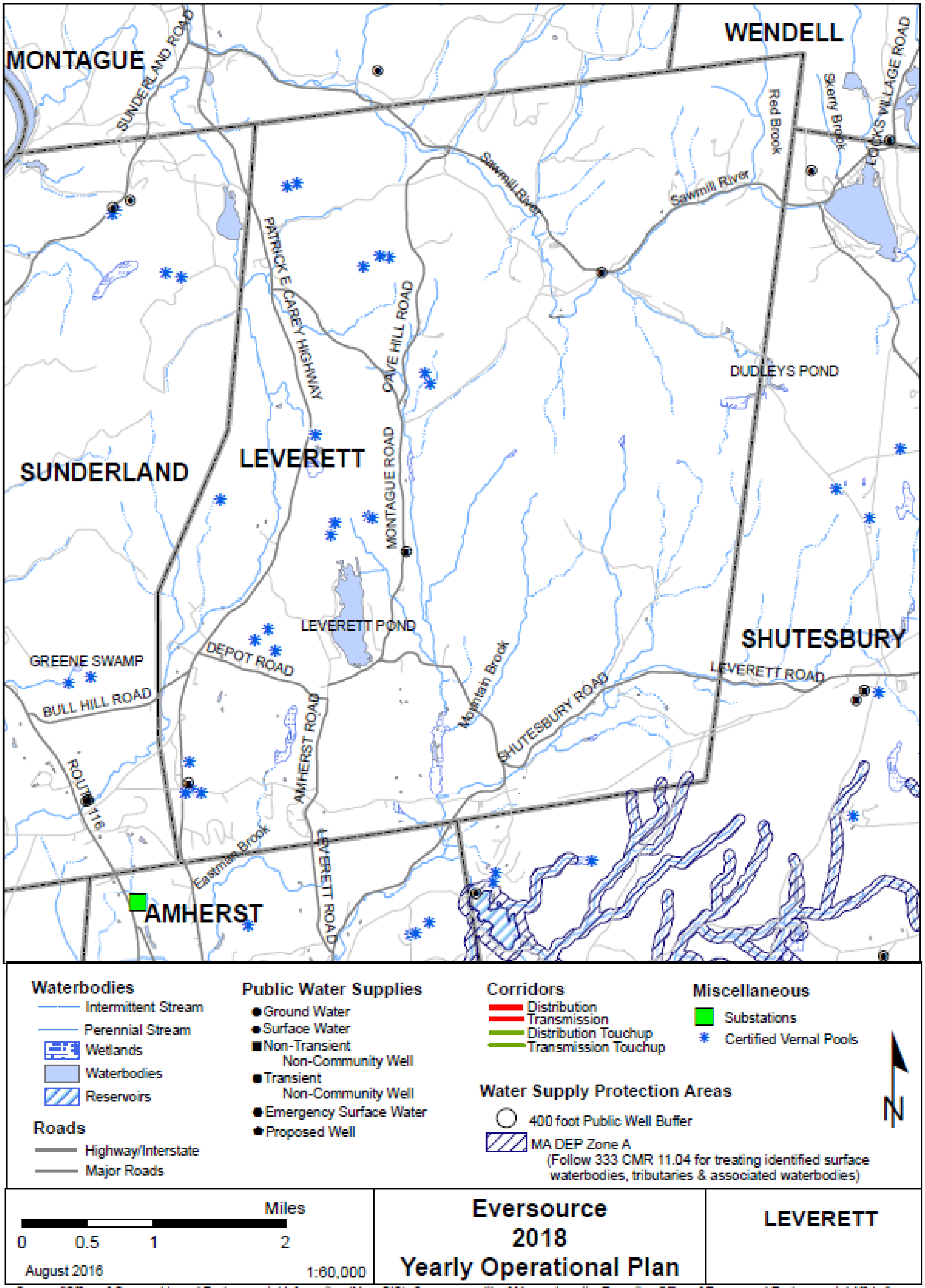
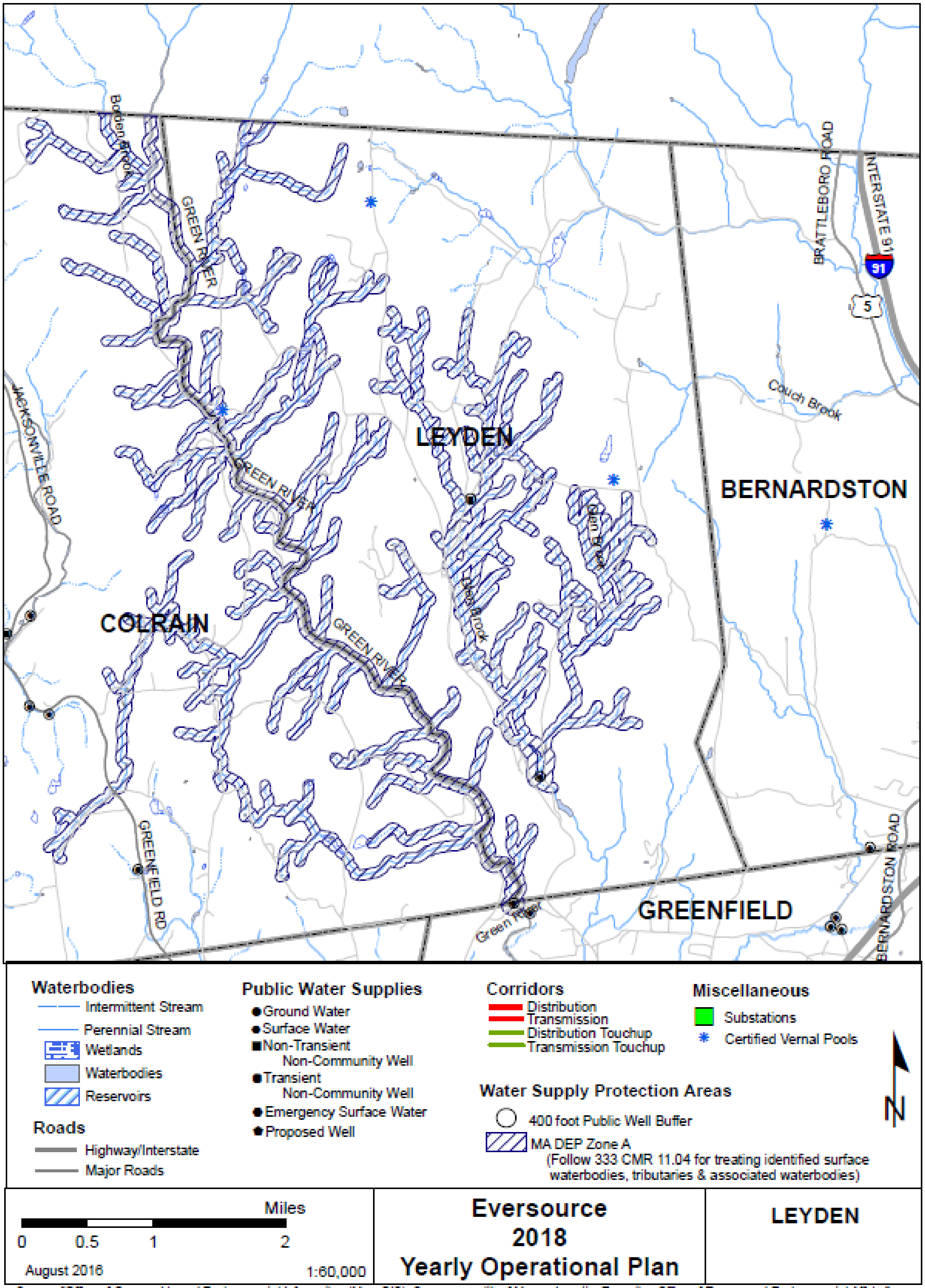
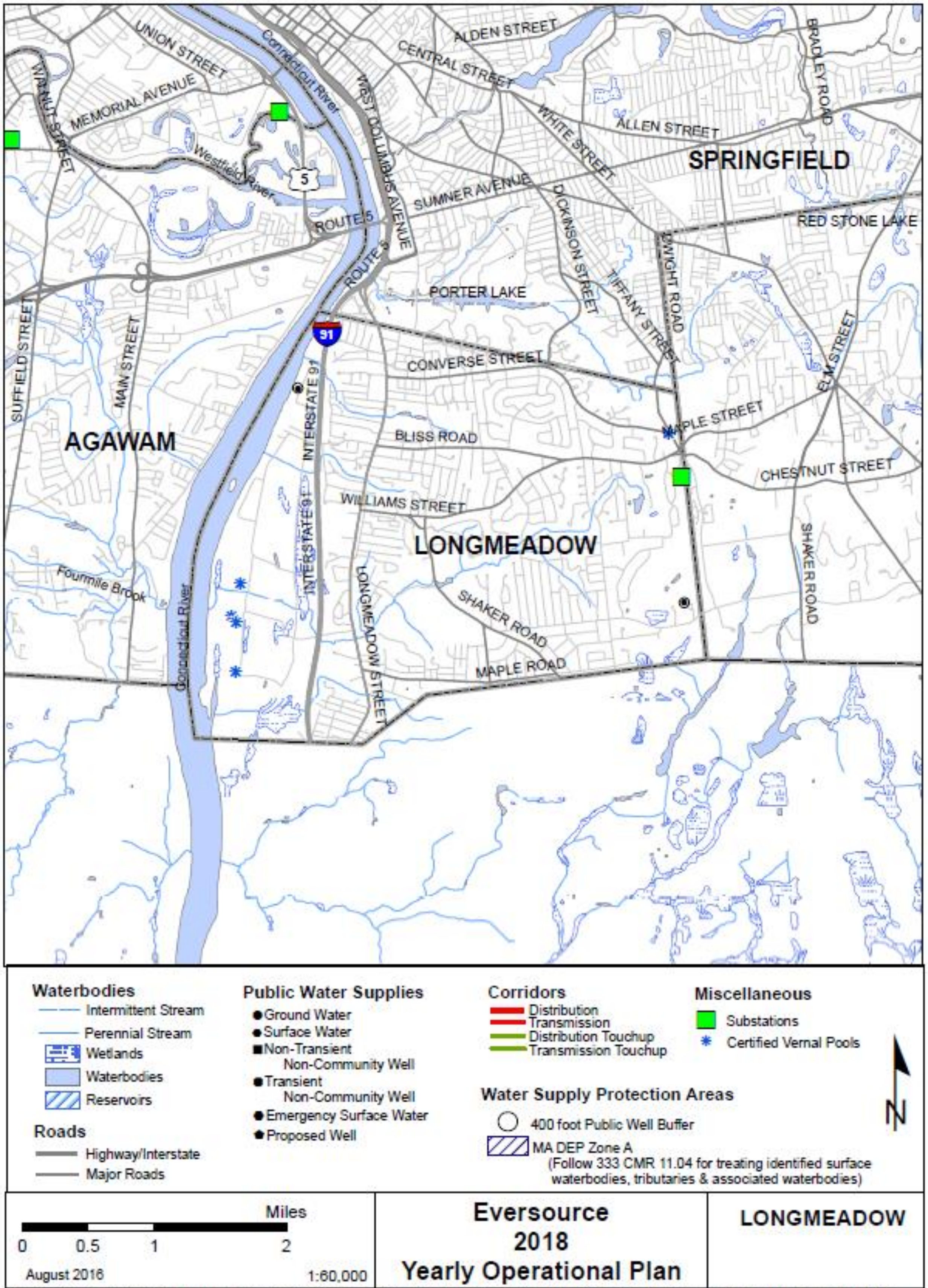


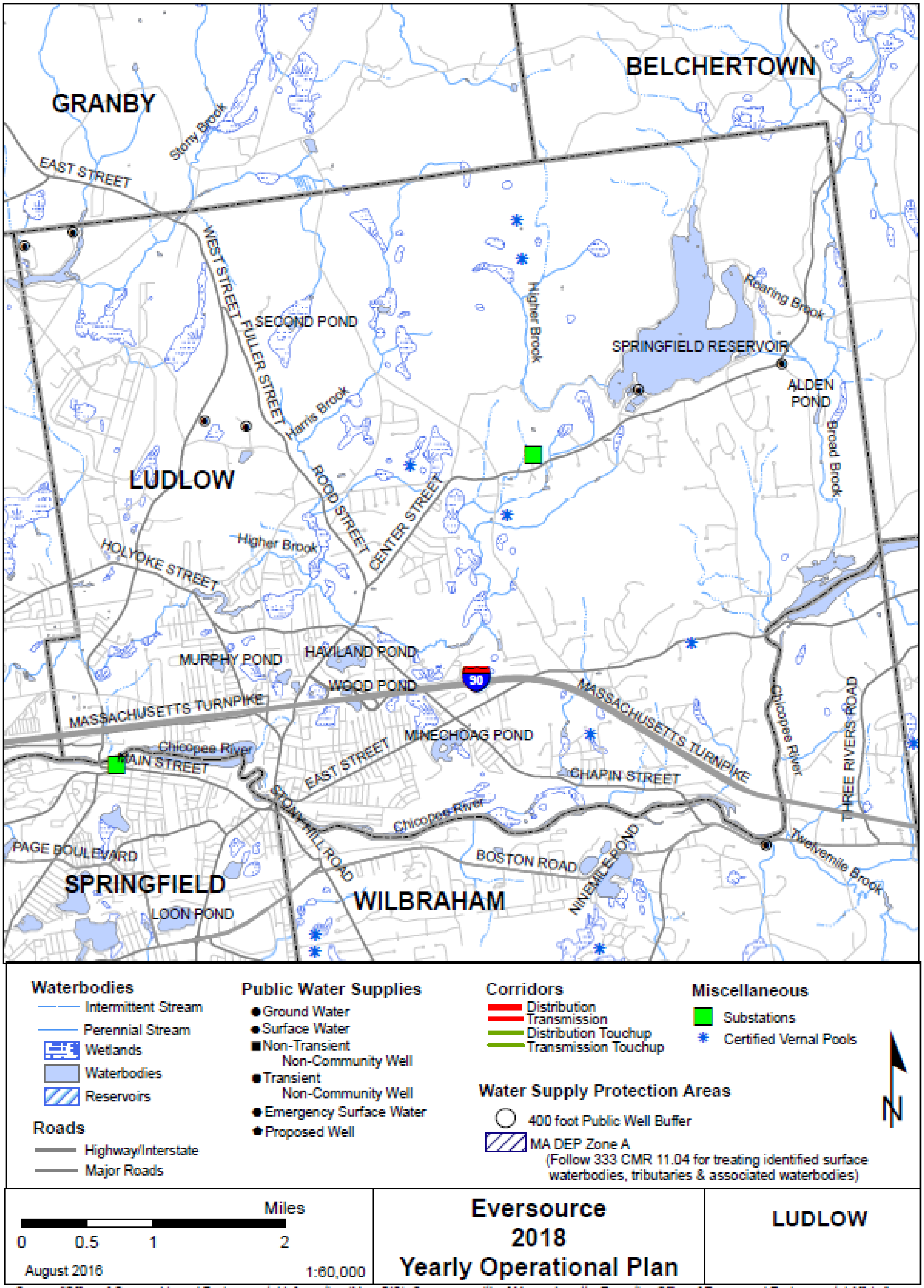
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



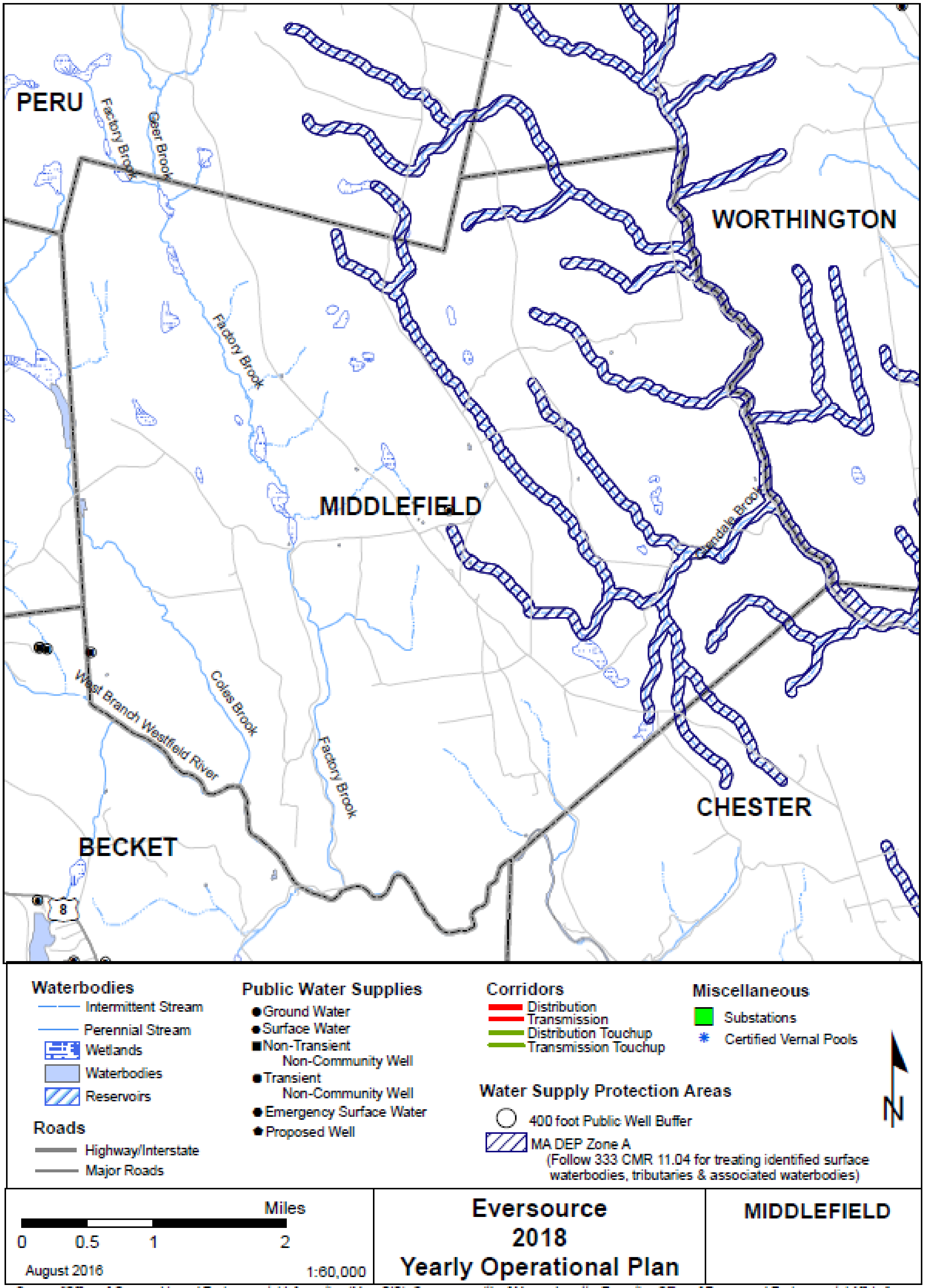
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



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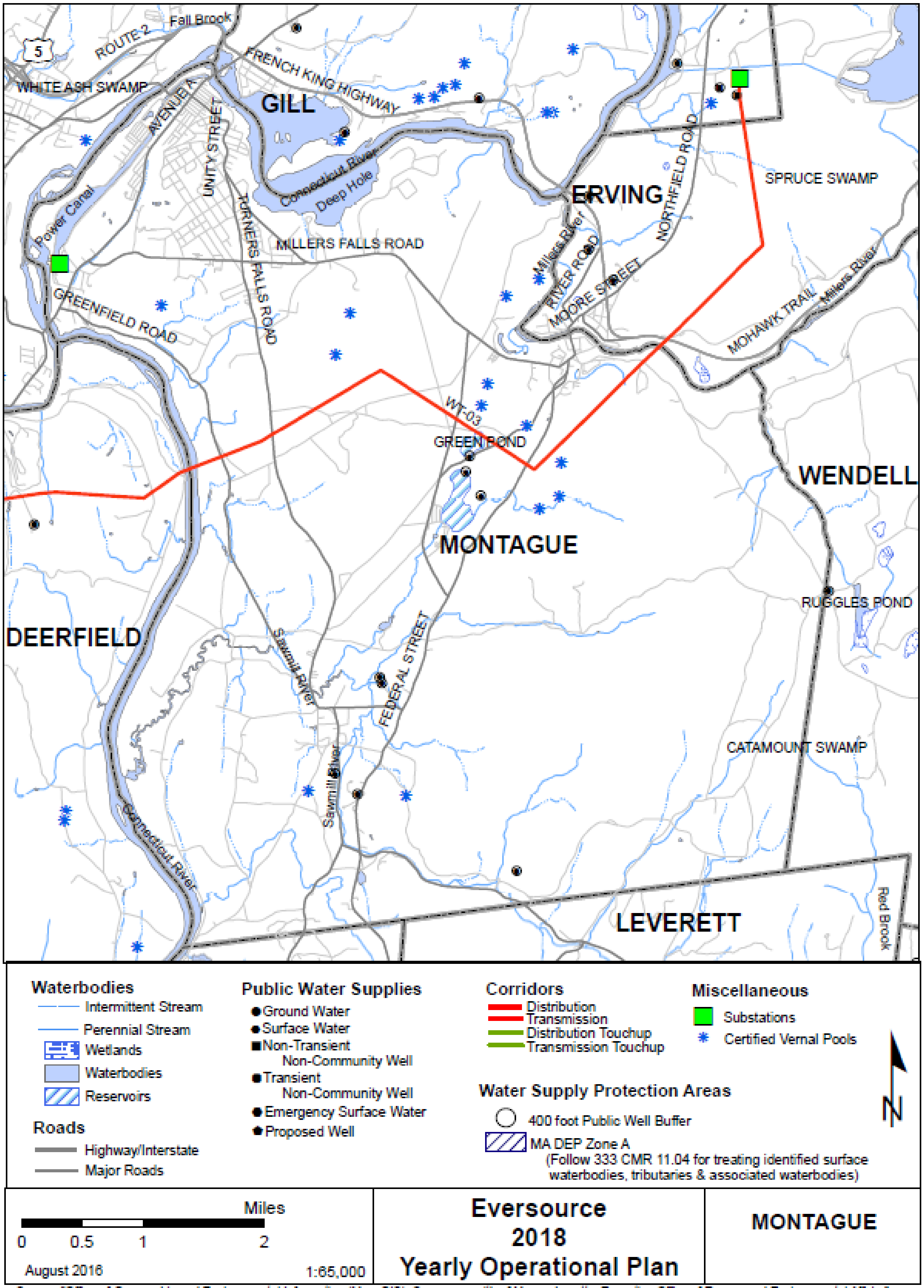

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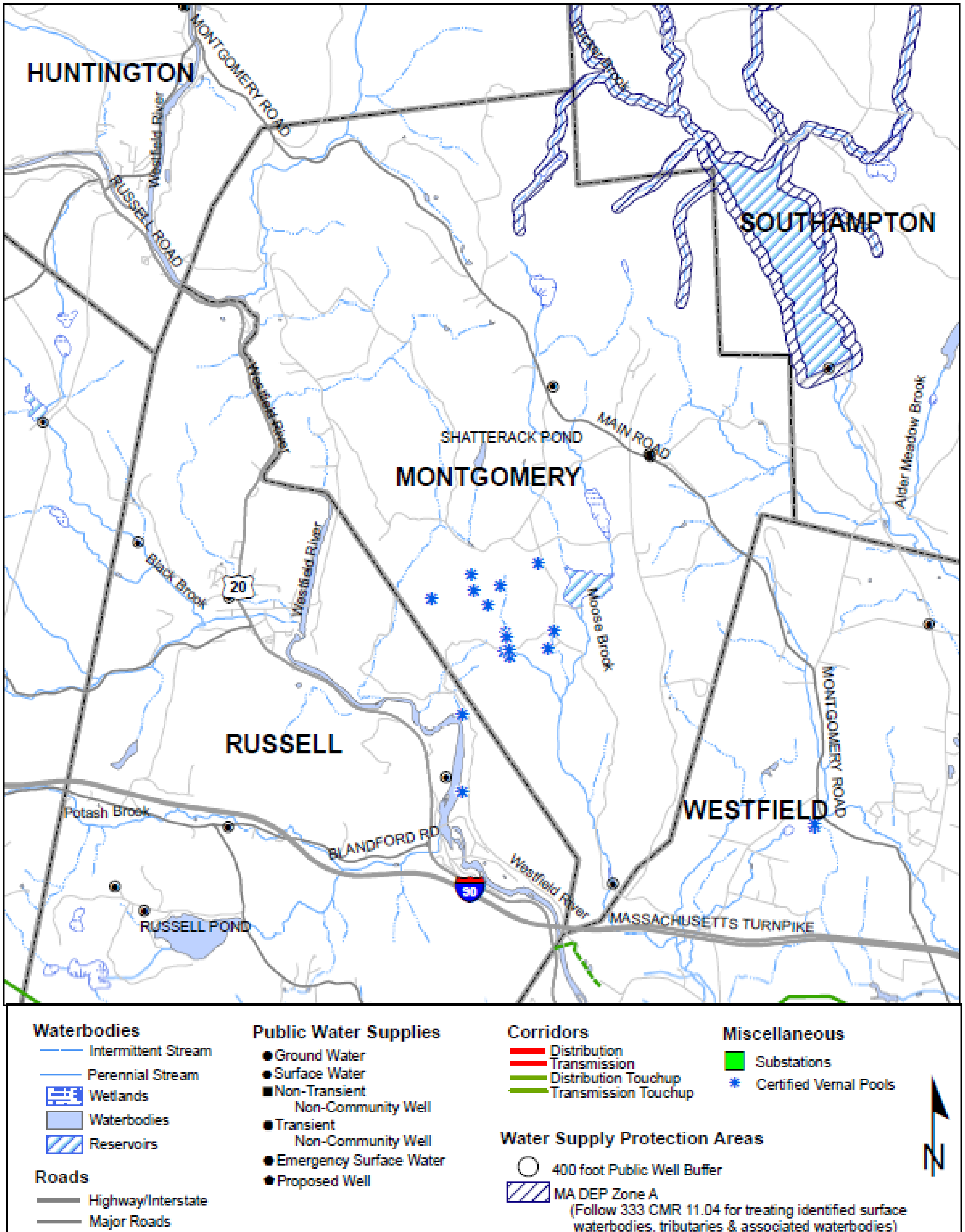

Miles
0 0.5 1 2

August 2016 1:60,000

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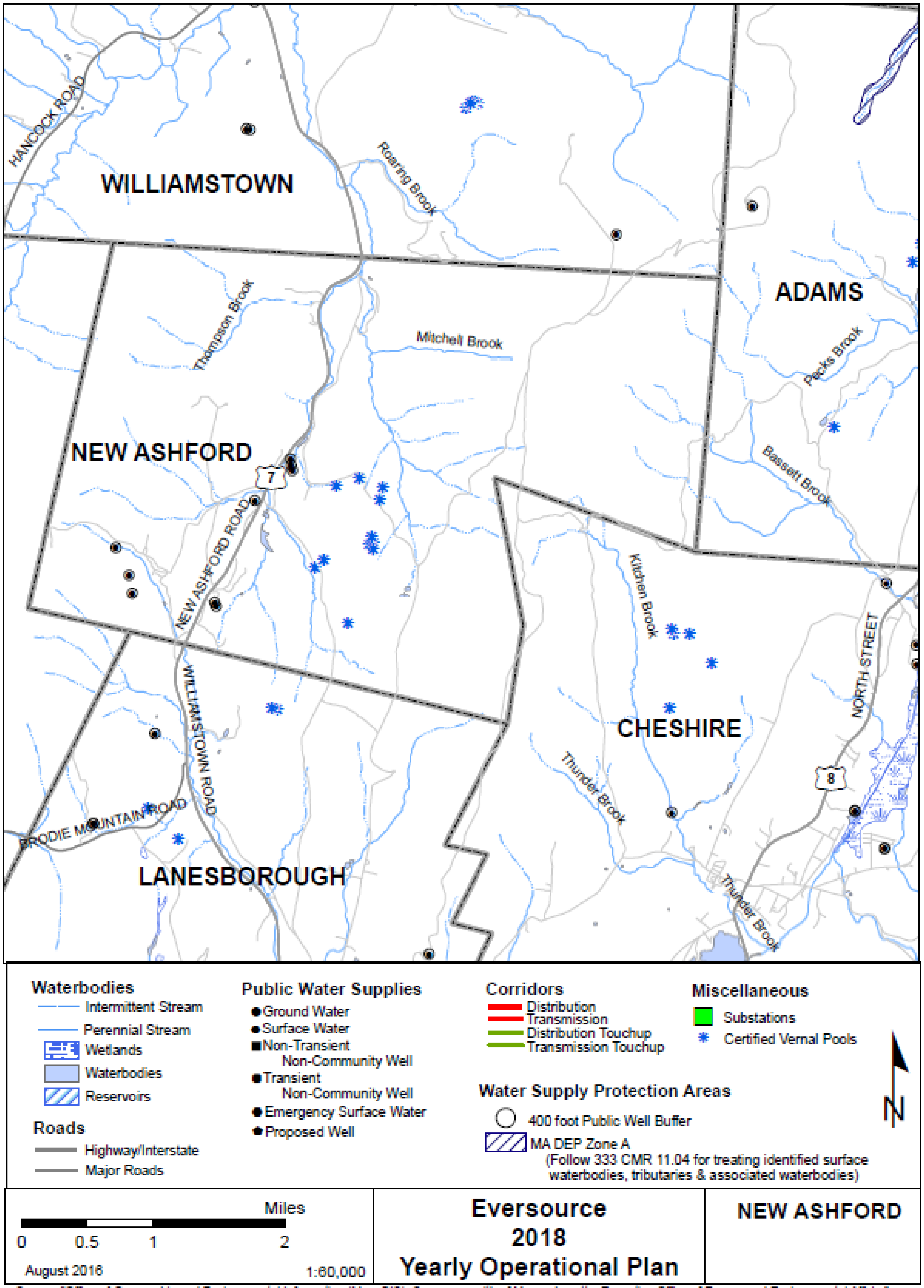
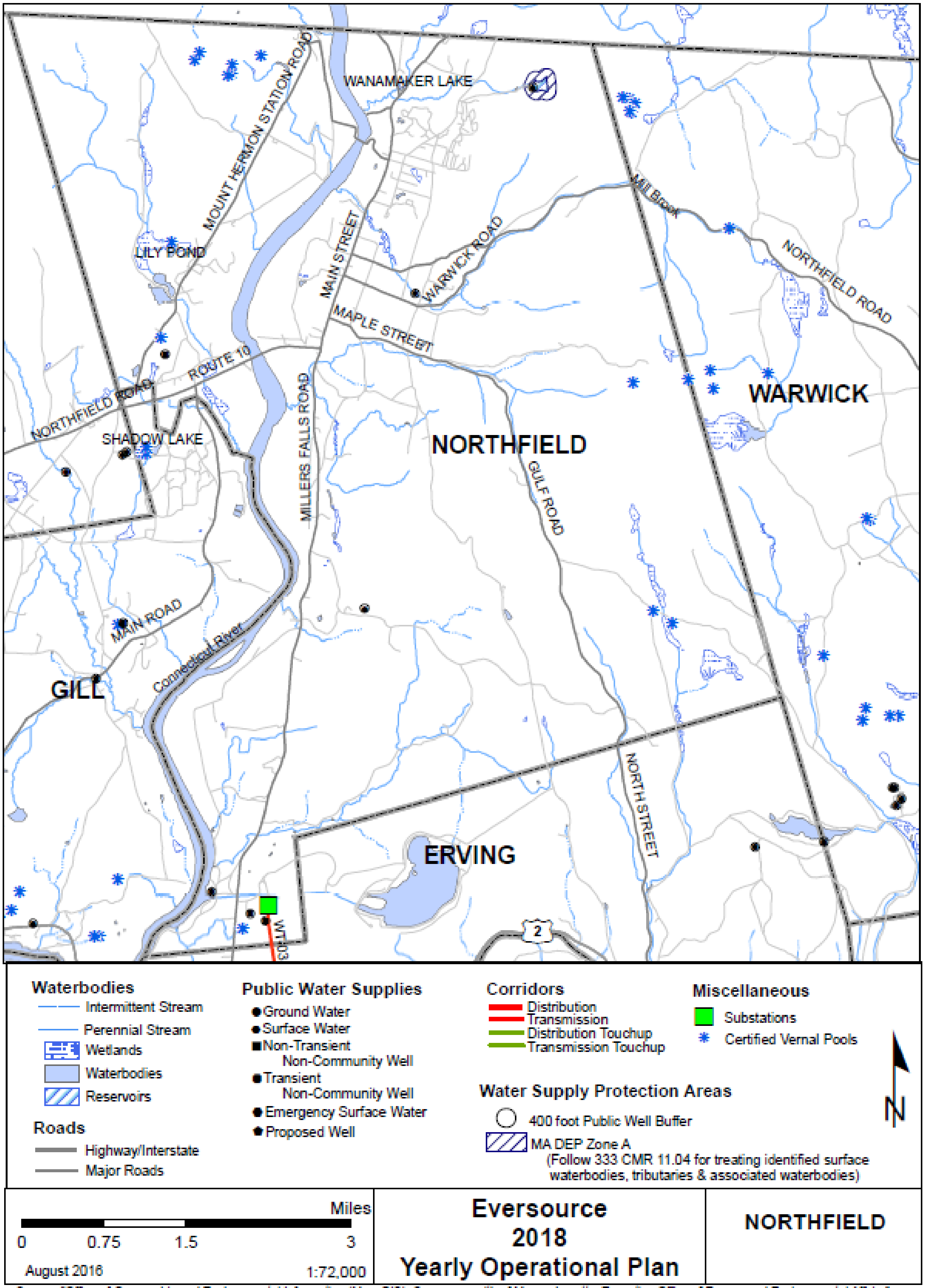
MONTGOMERY

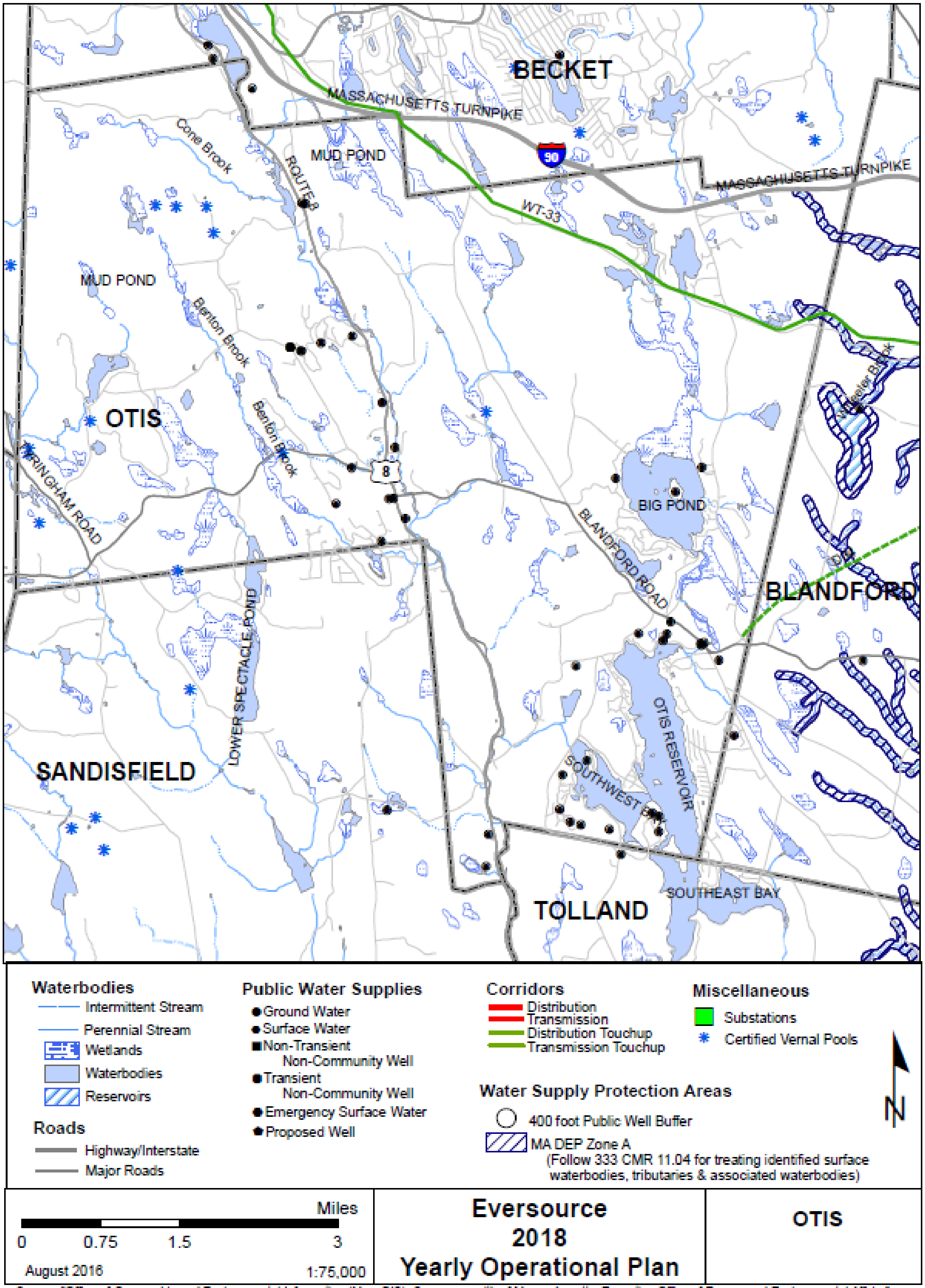
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



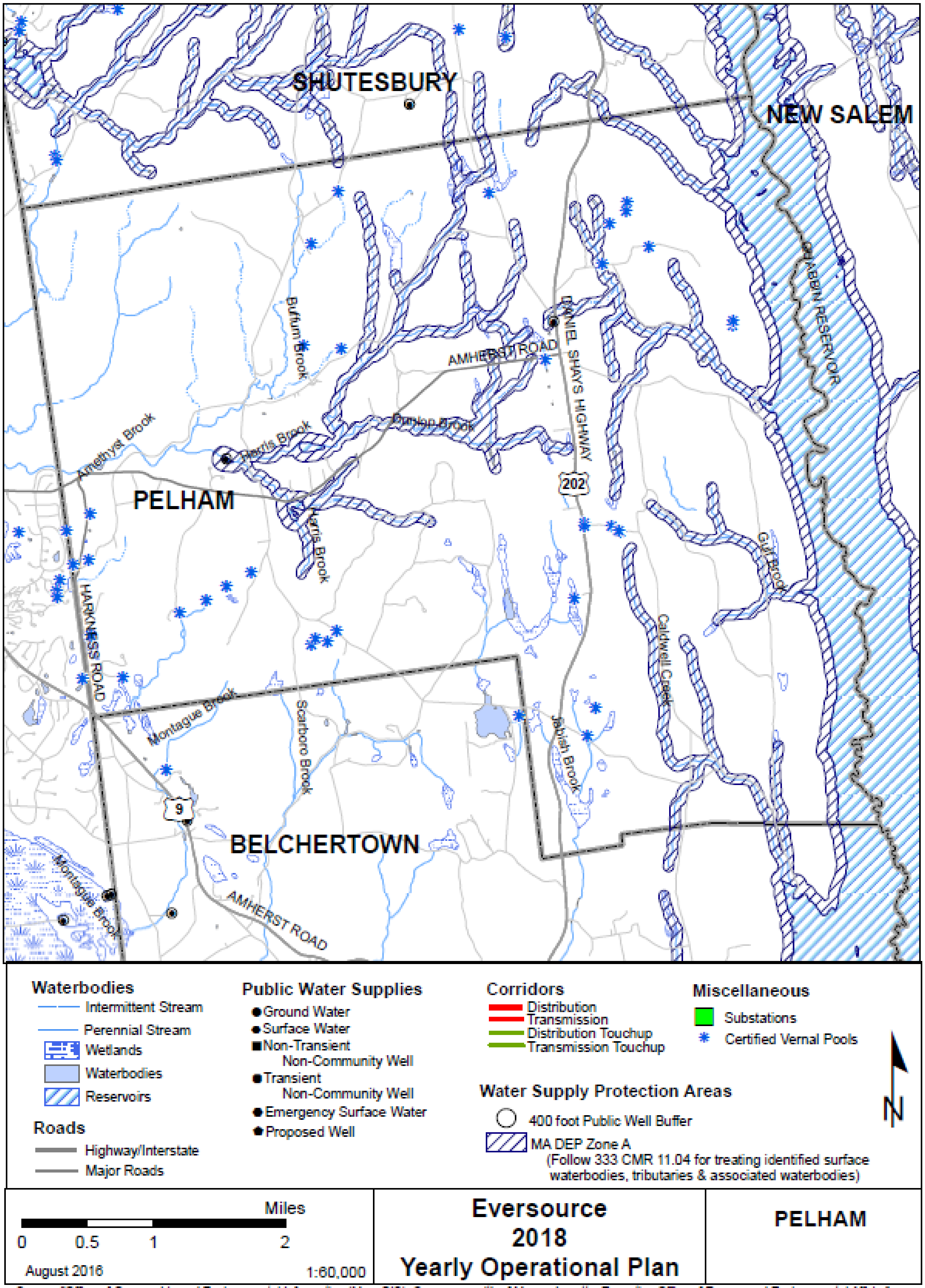
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
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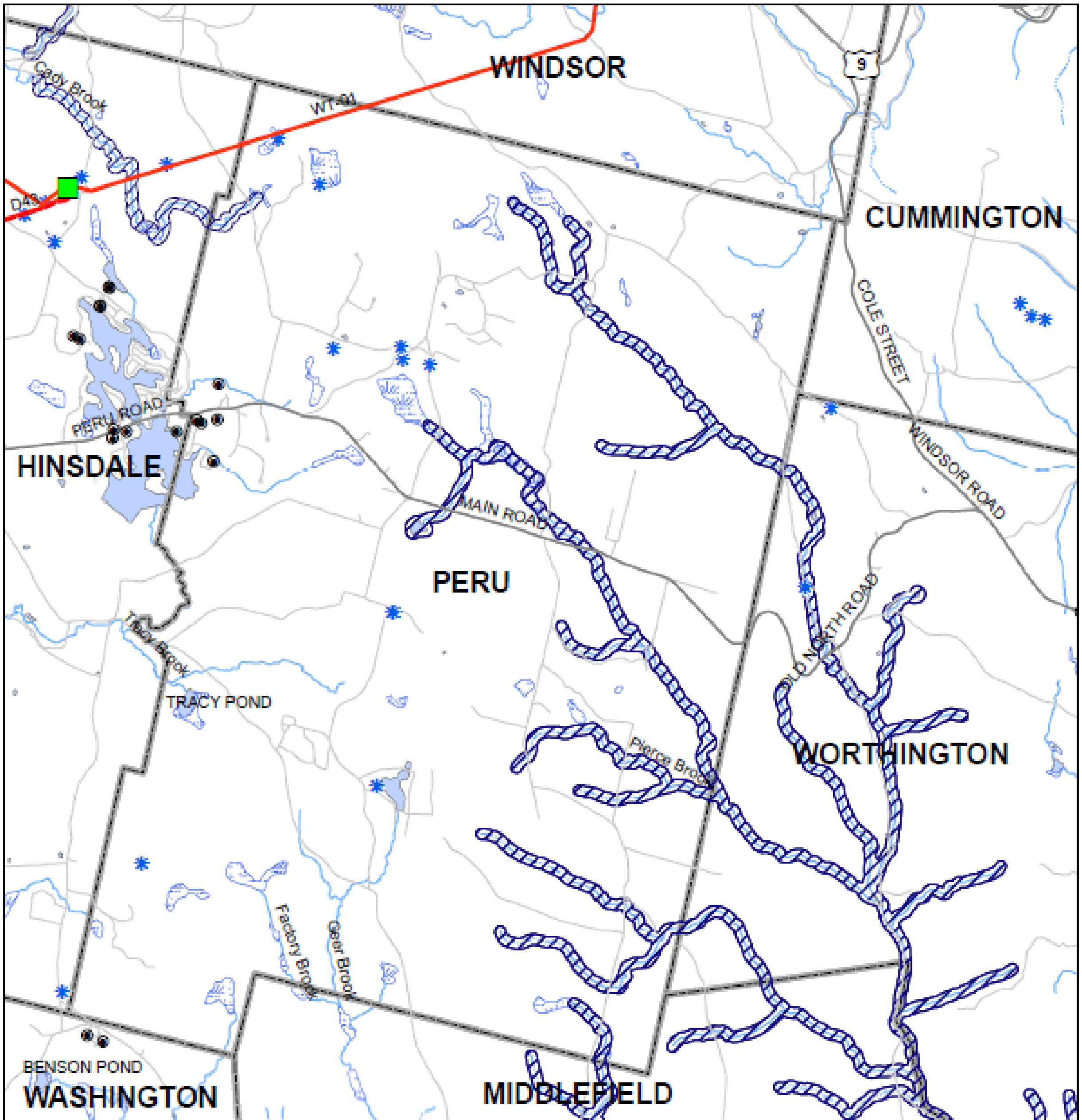

Waterbodies
- Intermittent Stream
- Perennial Stream
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- Reservoirs

Roads
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- Substations
- Certified Vernal Pools

N

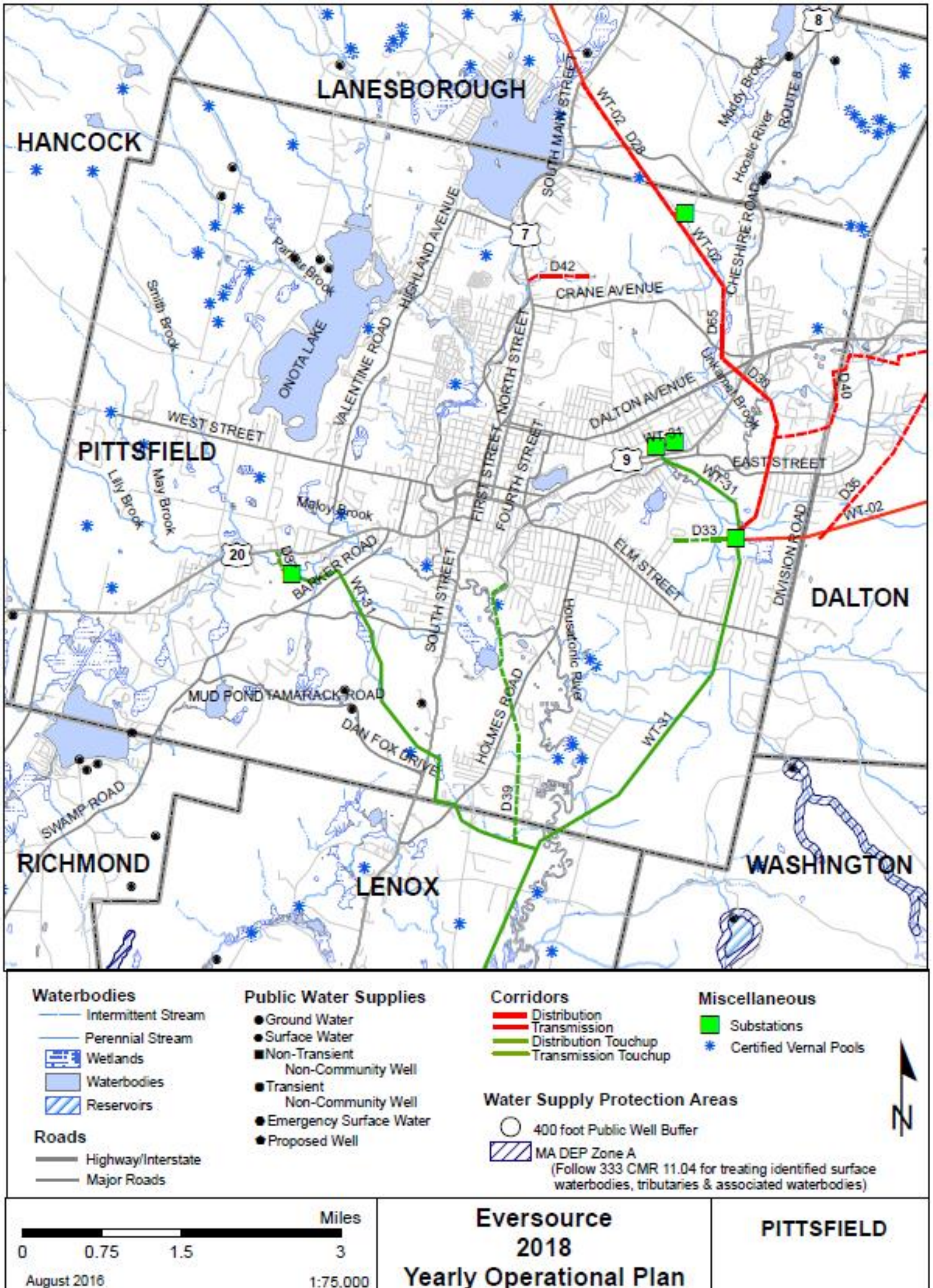
Miles
0 0.5 1 2

August 2016 1:65,000

Eversource
2018
Yearly Operational Plan

PERU

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
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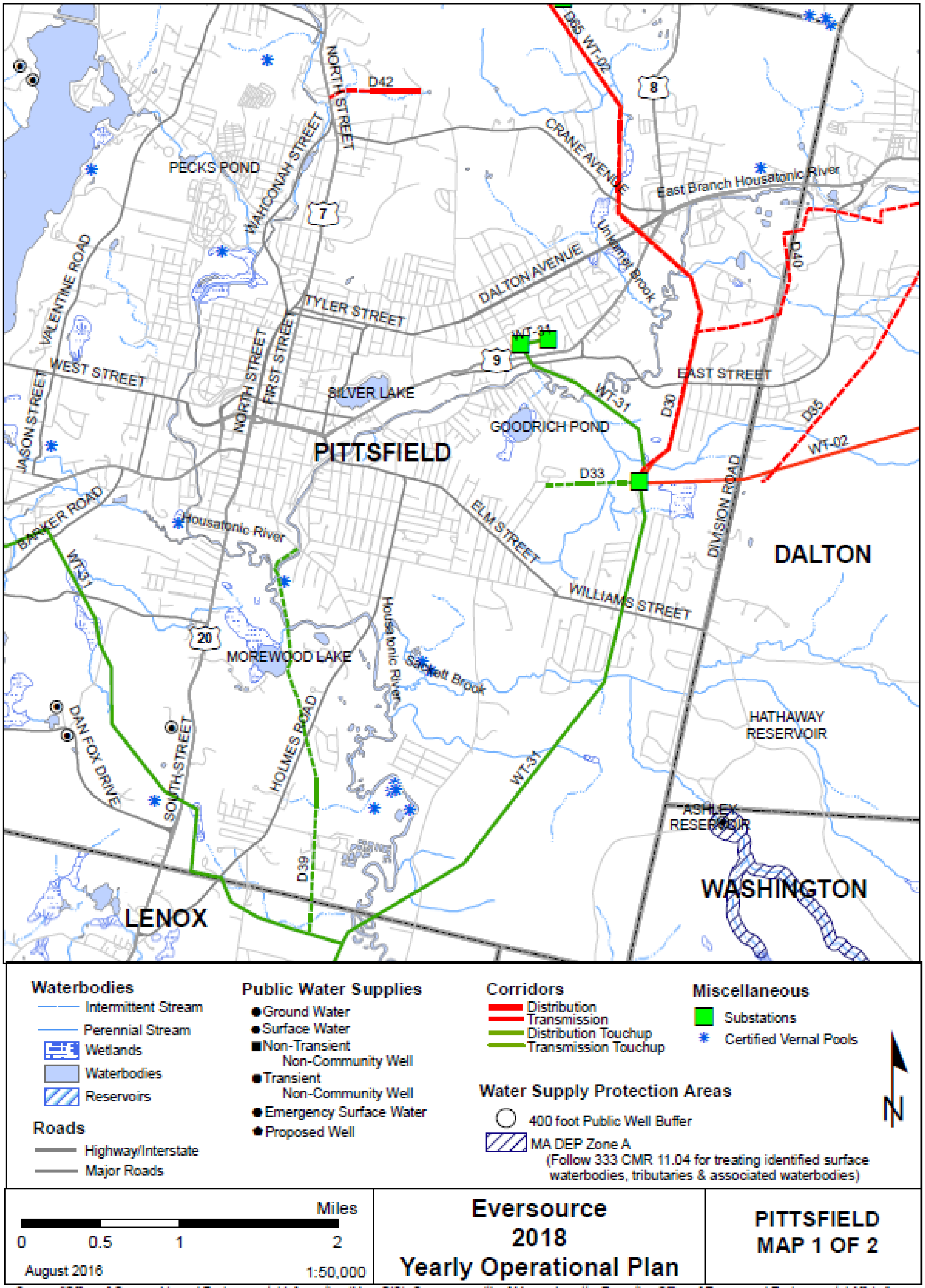
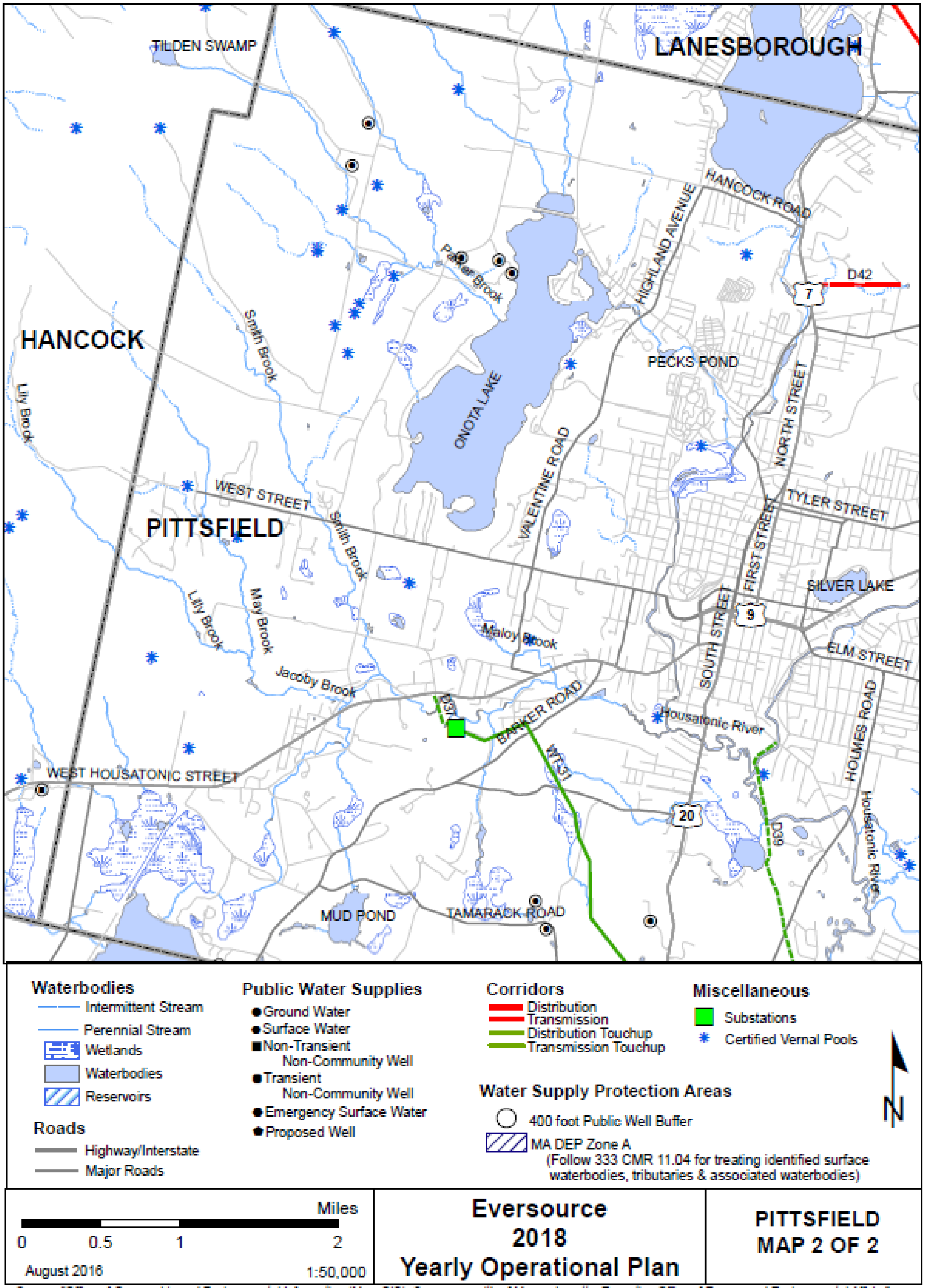
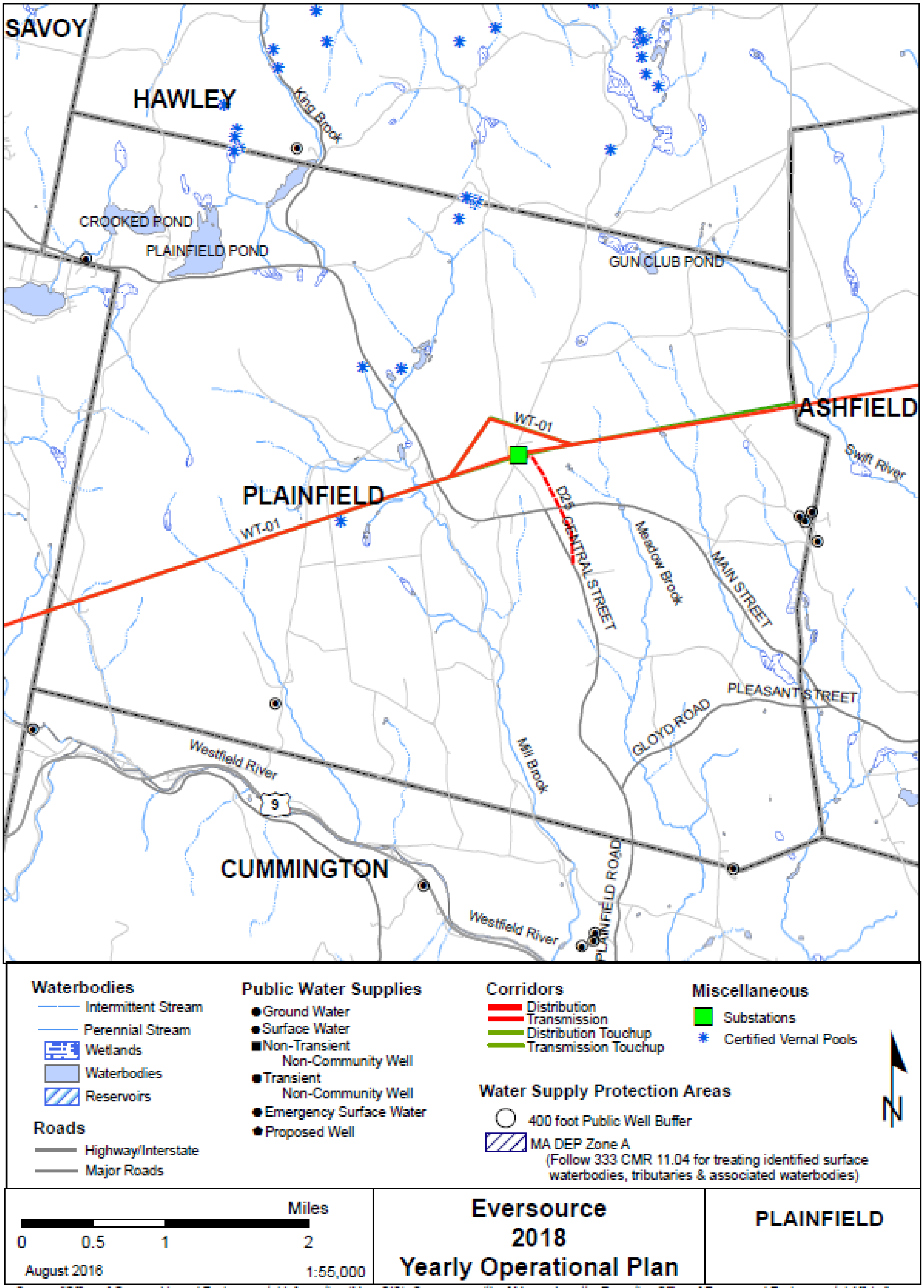


Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



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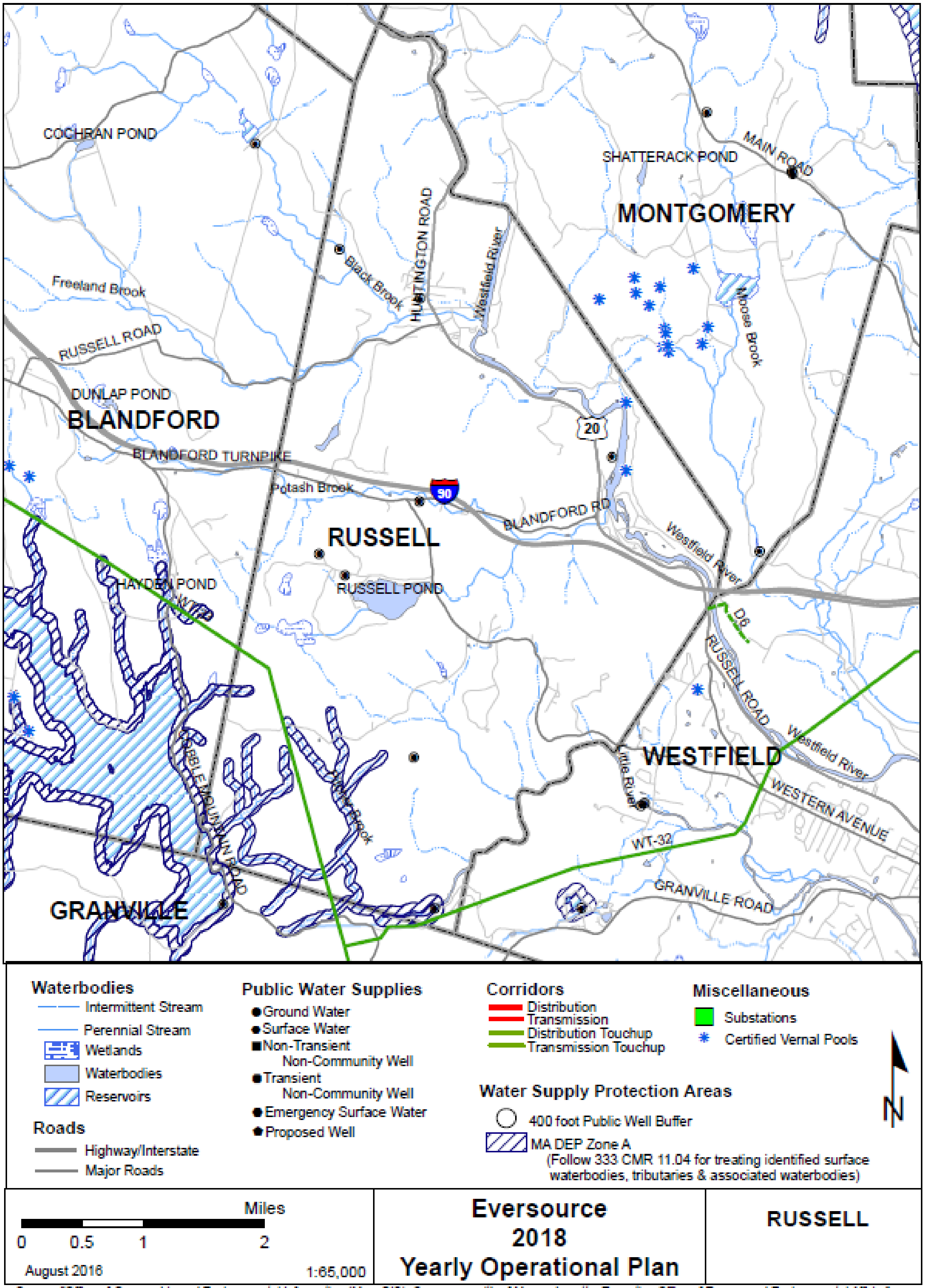

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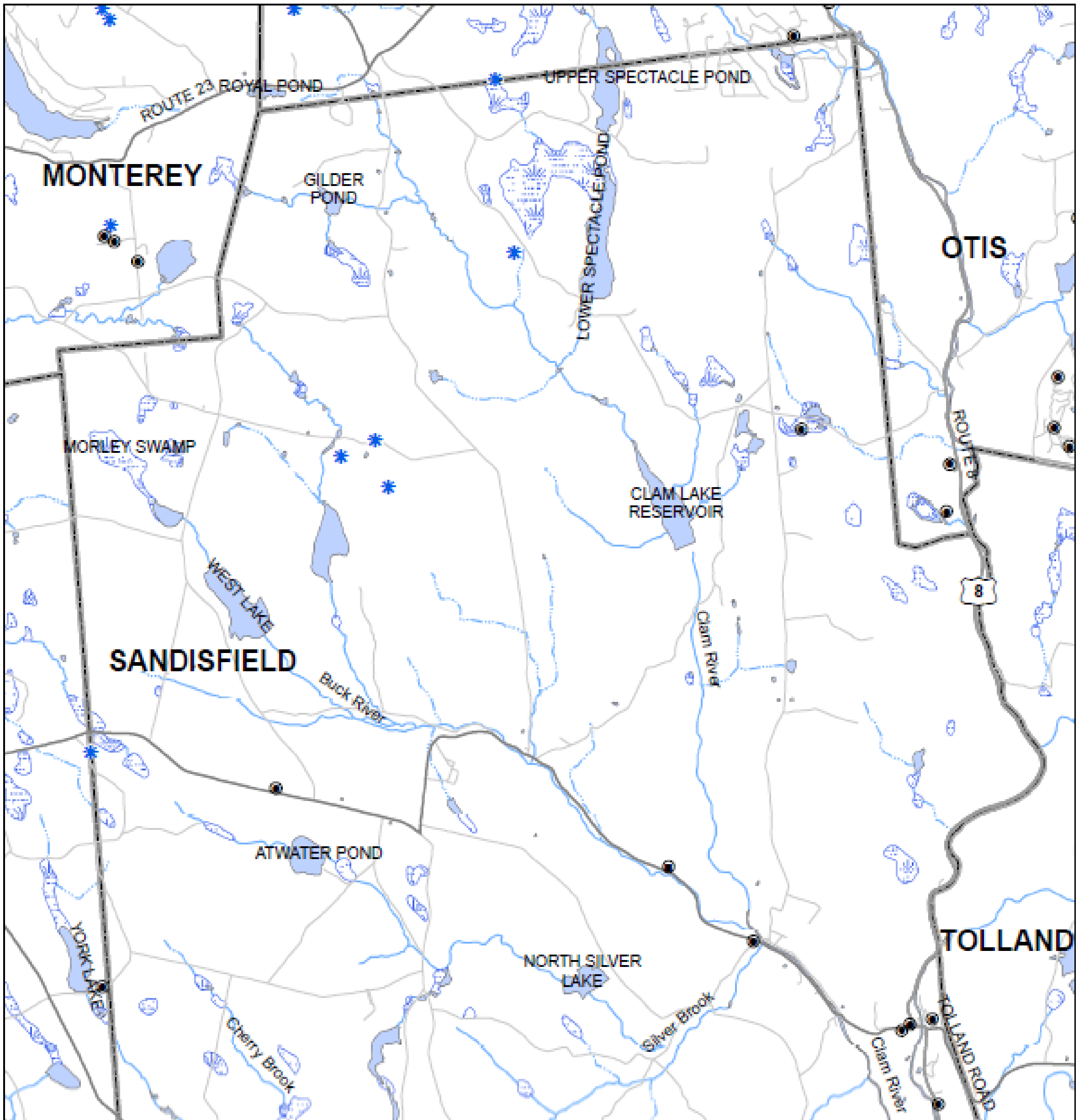

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N

Miles
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August 2016 1:60,000

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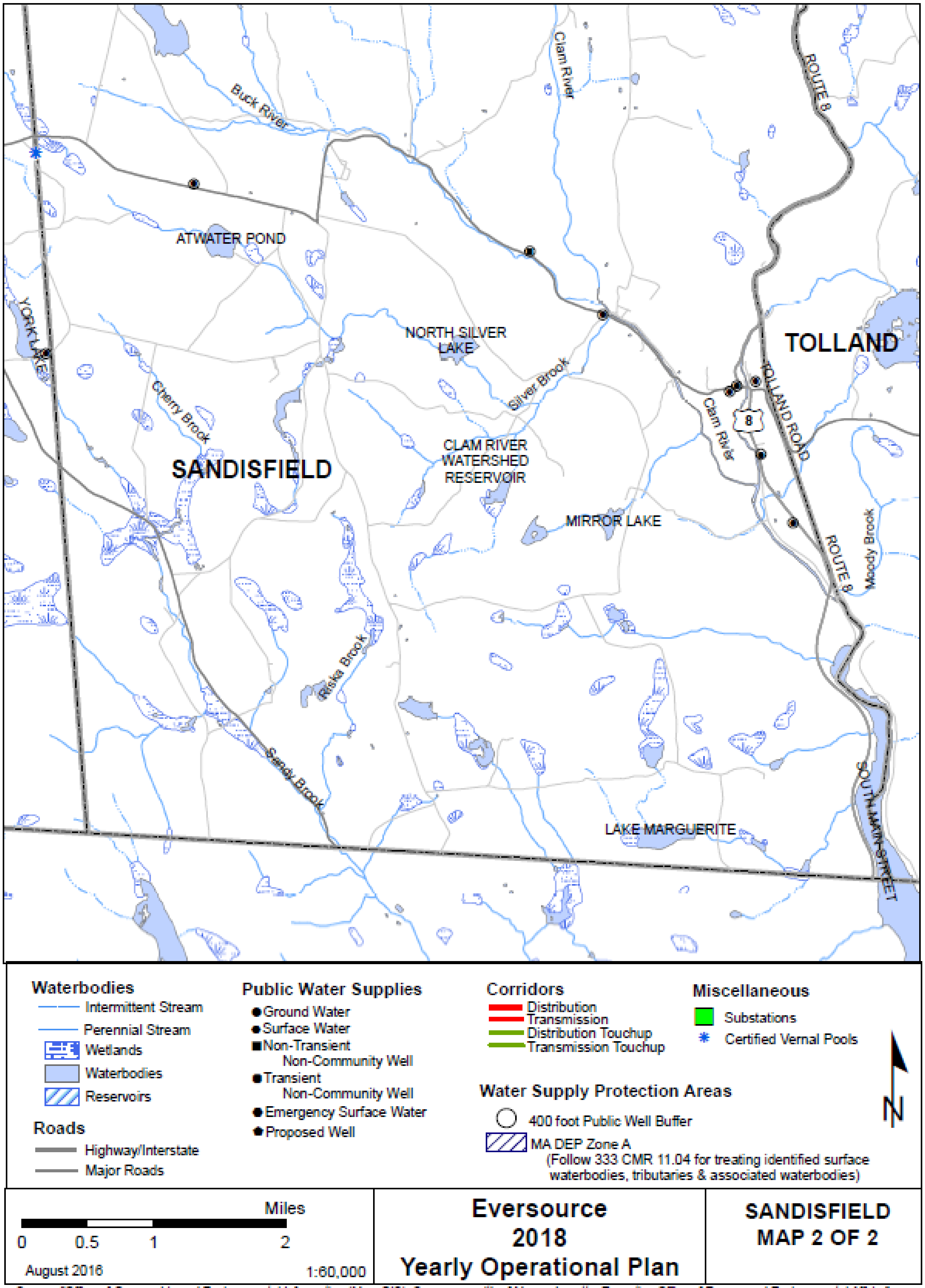
SANDISFIELD MAP 1 OF 2

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



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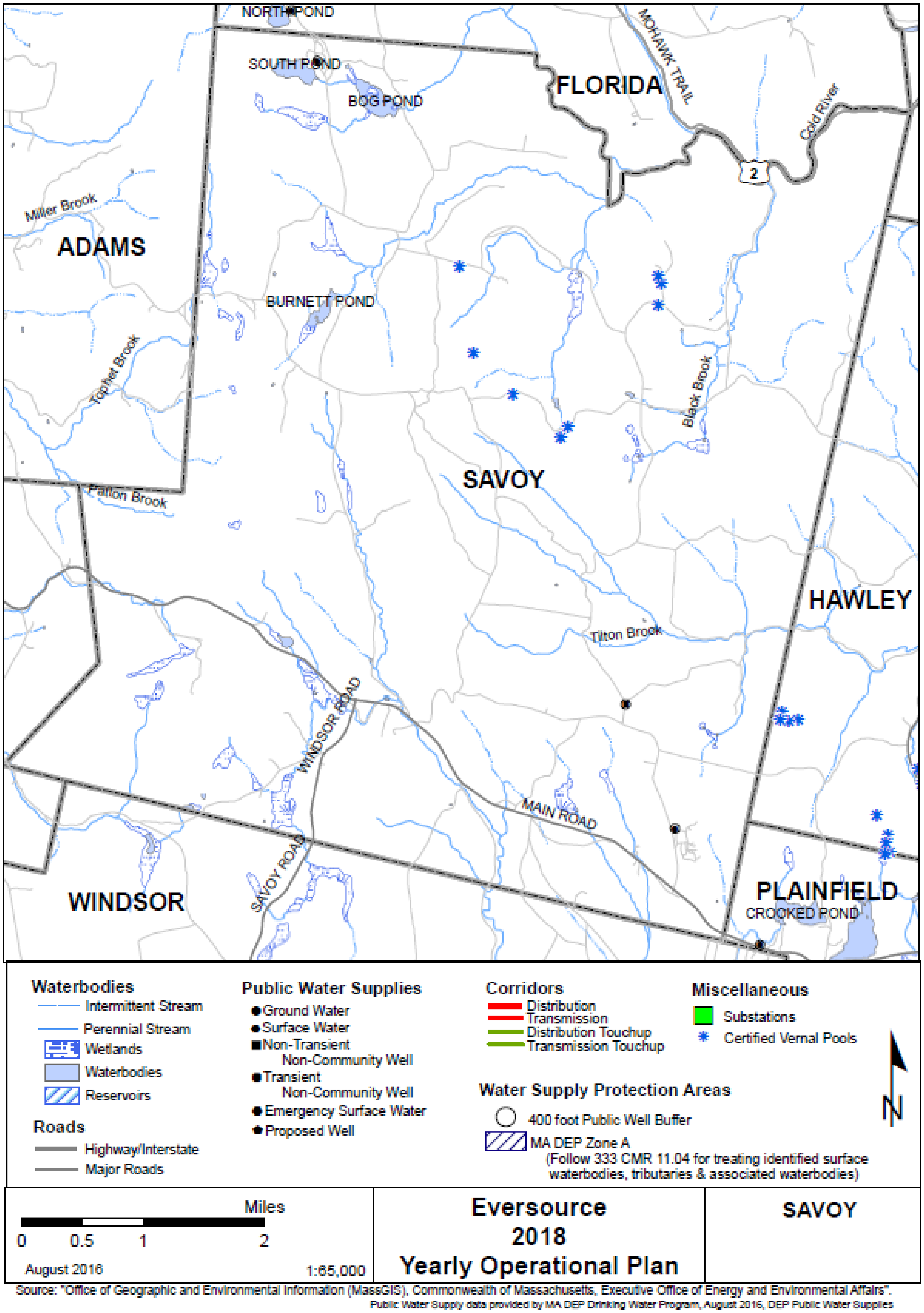
NORTH POND
SOUTH POND
BOG POND
FLORIDA
MOHAWK TRAIL
Cold River
2
Miller Brook
ADAMS
BURNETT POND
Tophet Brook
Black Brook
SAVOY
Fallon Brook
HAWLEY
Tilton Brook
WINDSOR ROAD
MAIN ROAD
SAVOY ROAD
WINDSOR
PLAINFIELD
CROOKED POND
Waterbodies
Intermittent Stream
Perennial Stream
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Roads
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N
Miles
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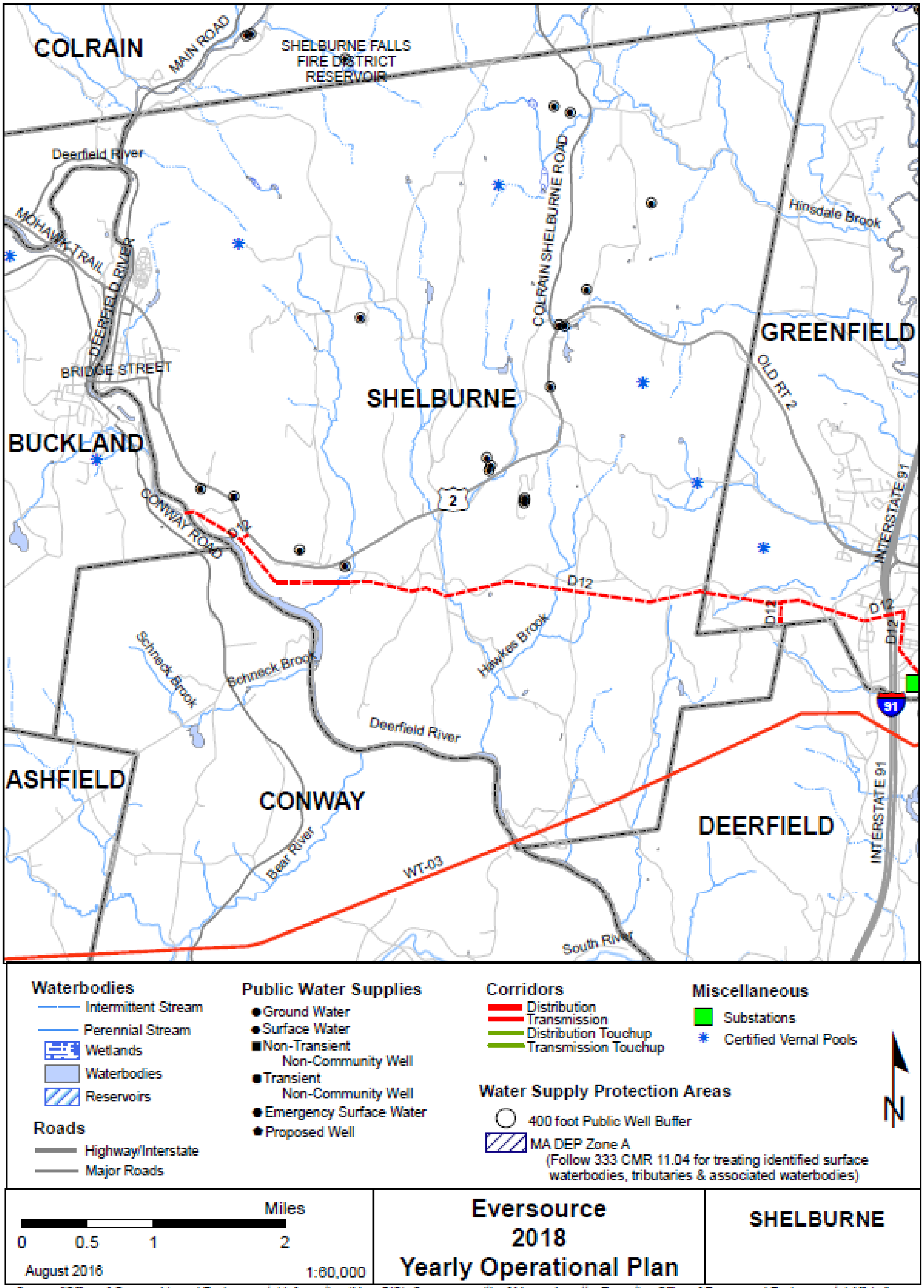
August 2016
1:65,000
Eversource
2018
Yearly Operational Plan
SAVOY
Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



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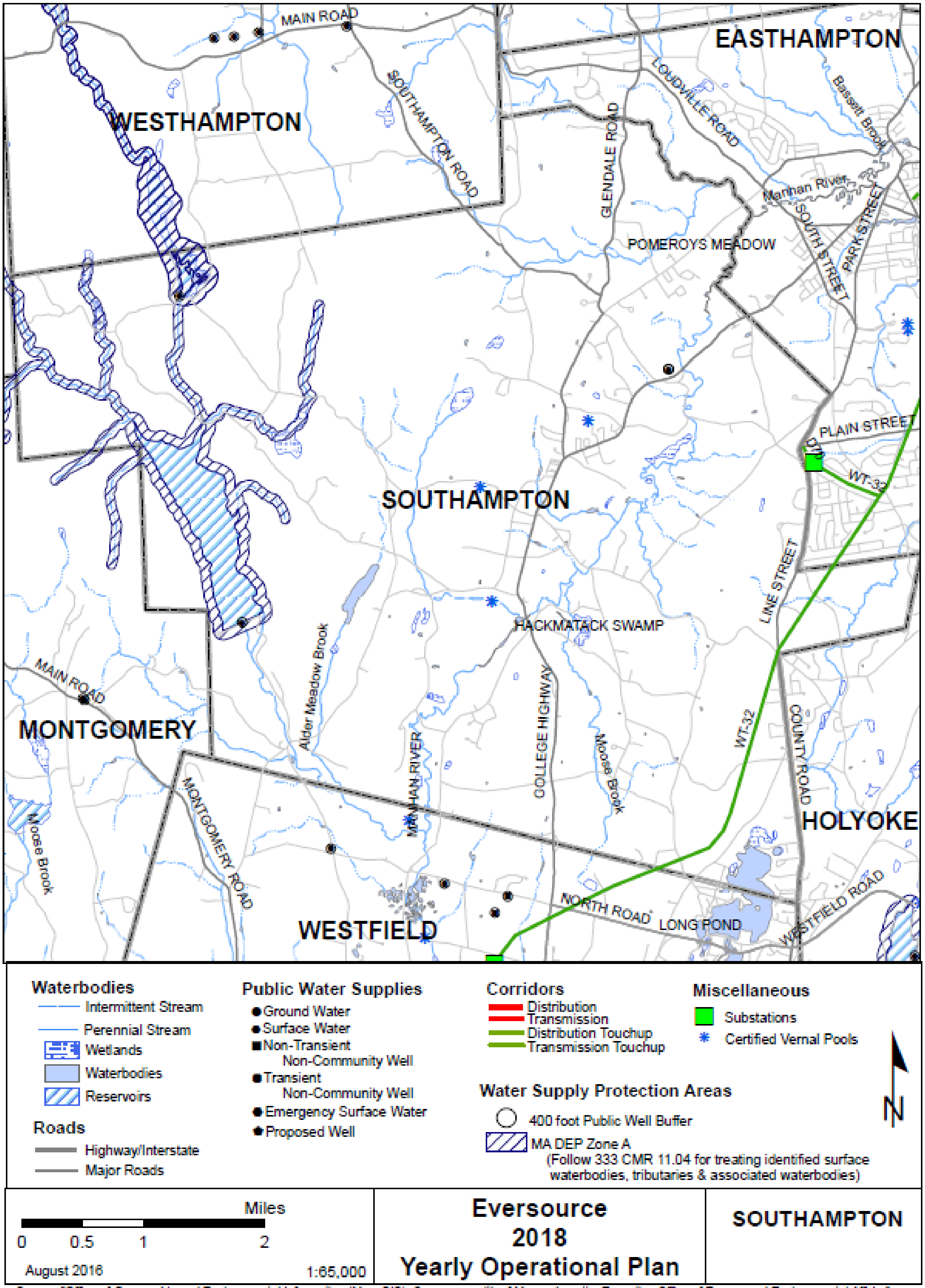

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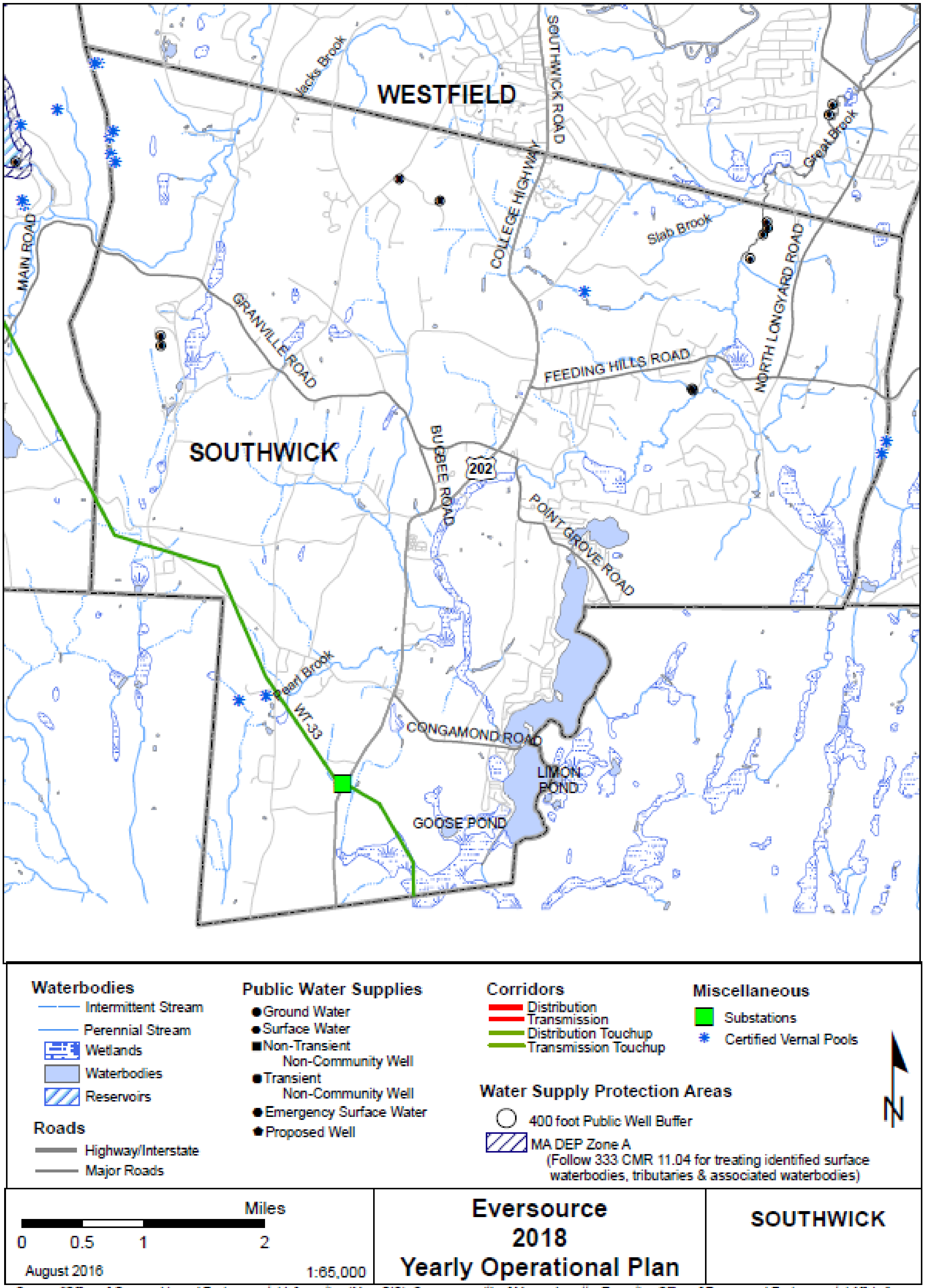

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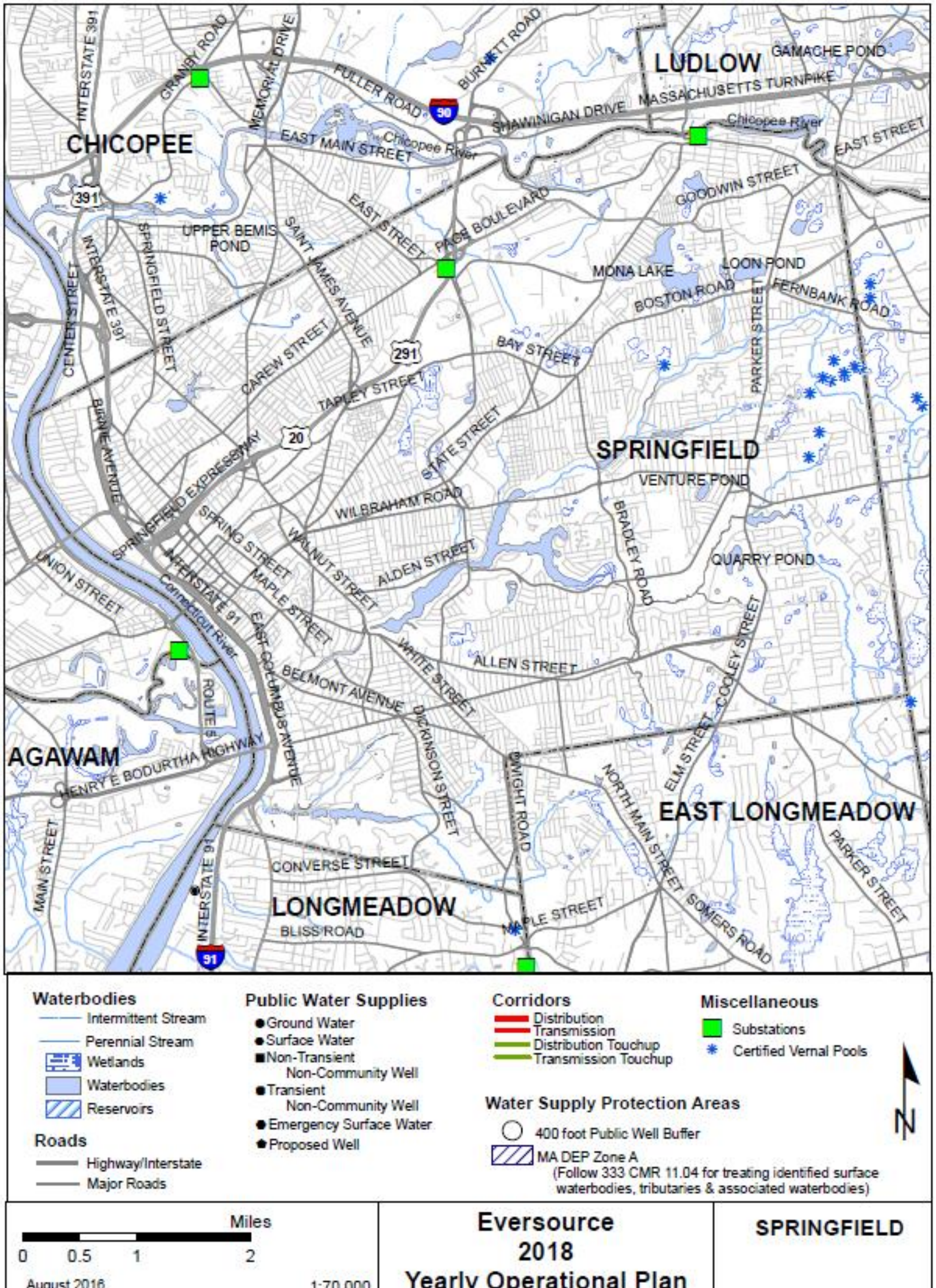

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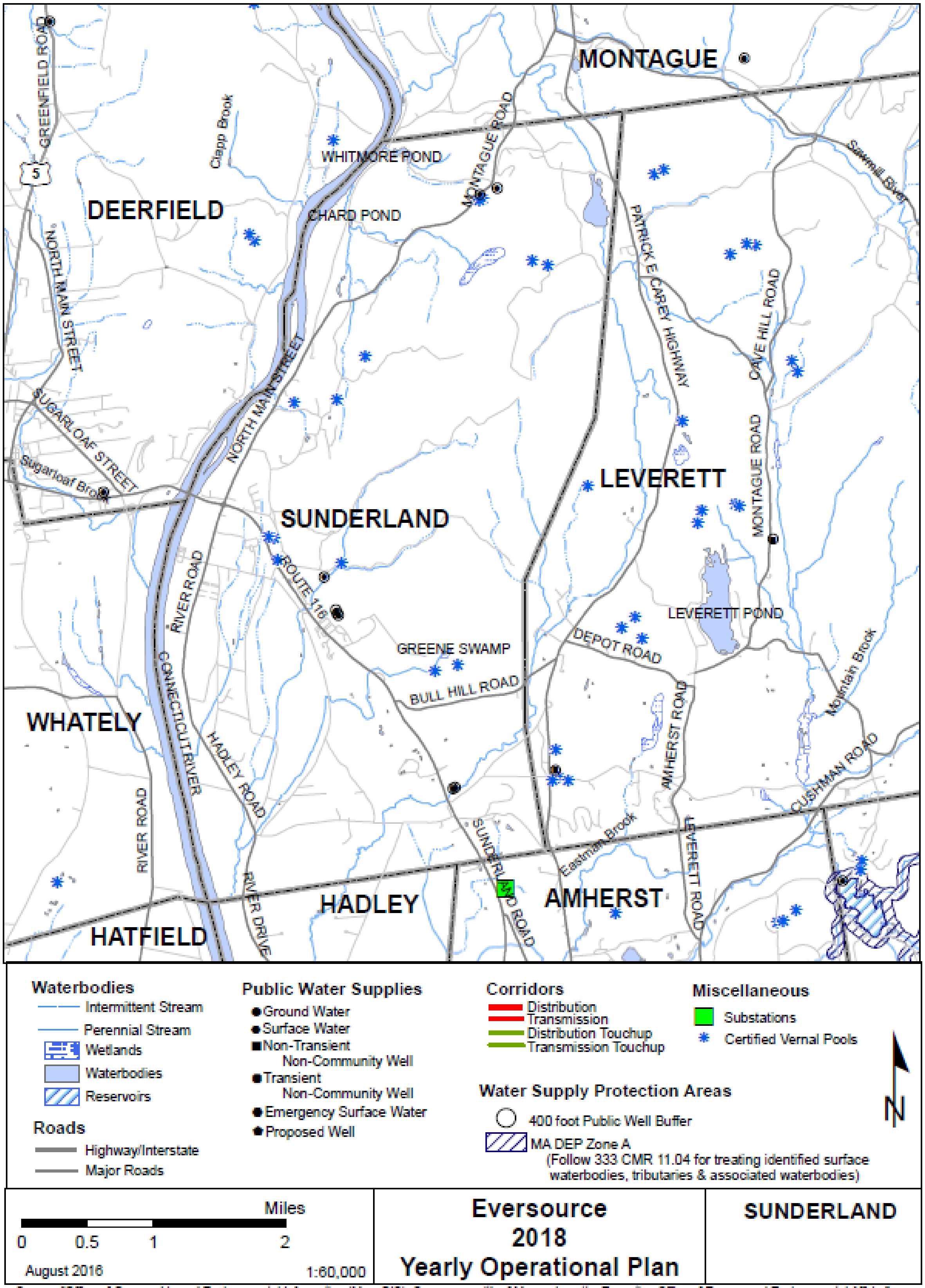

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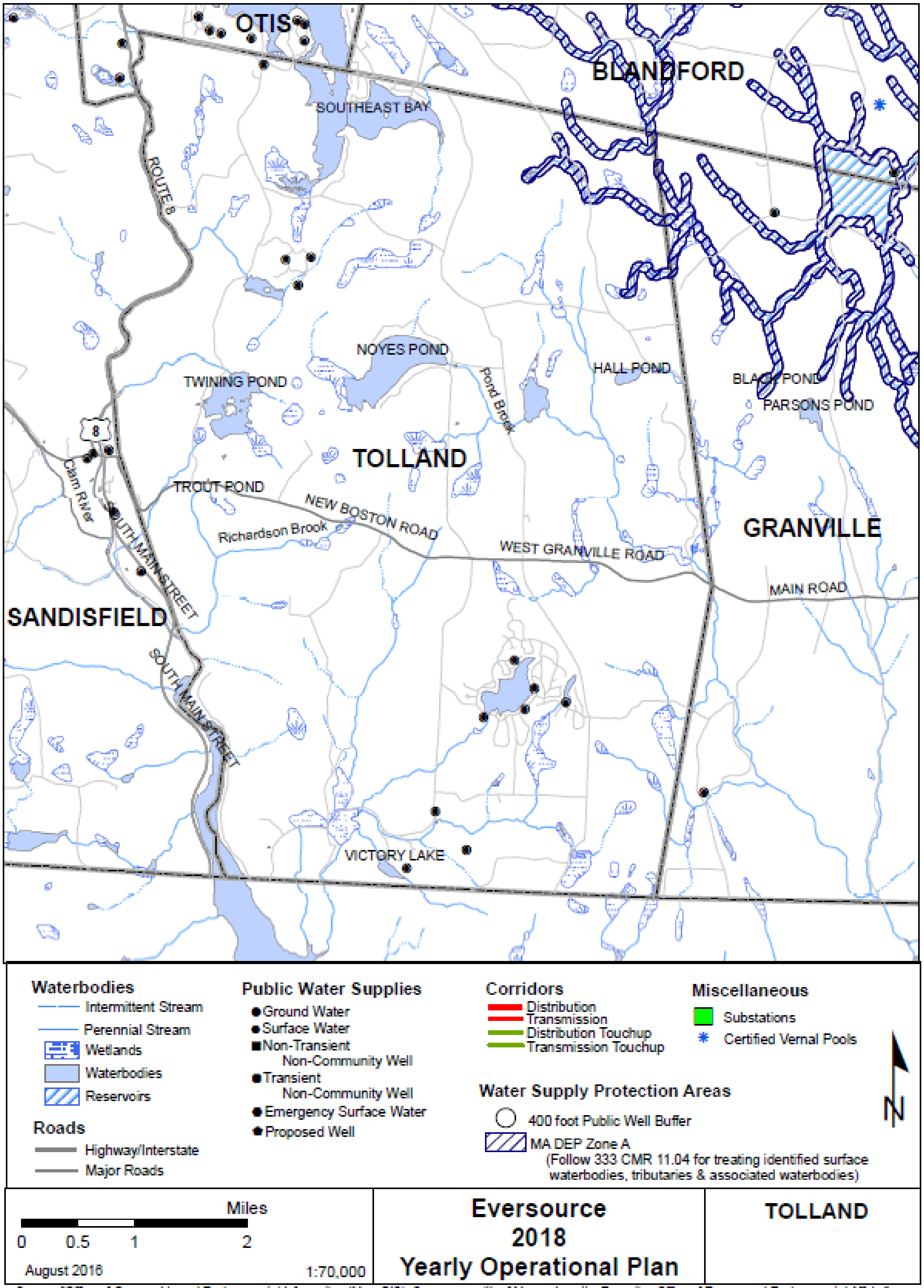

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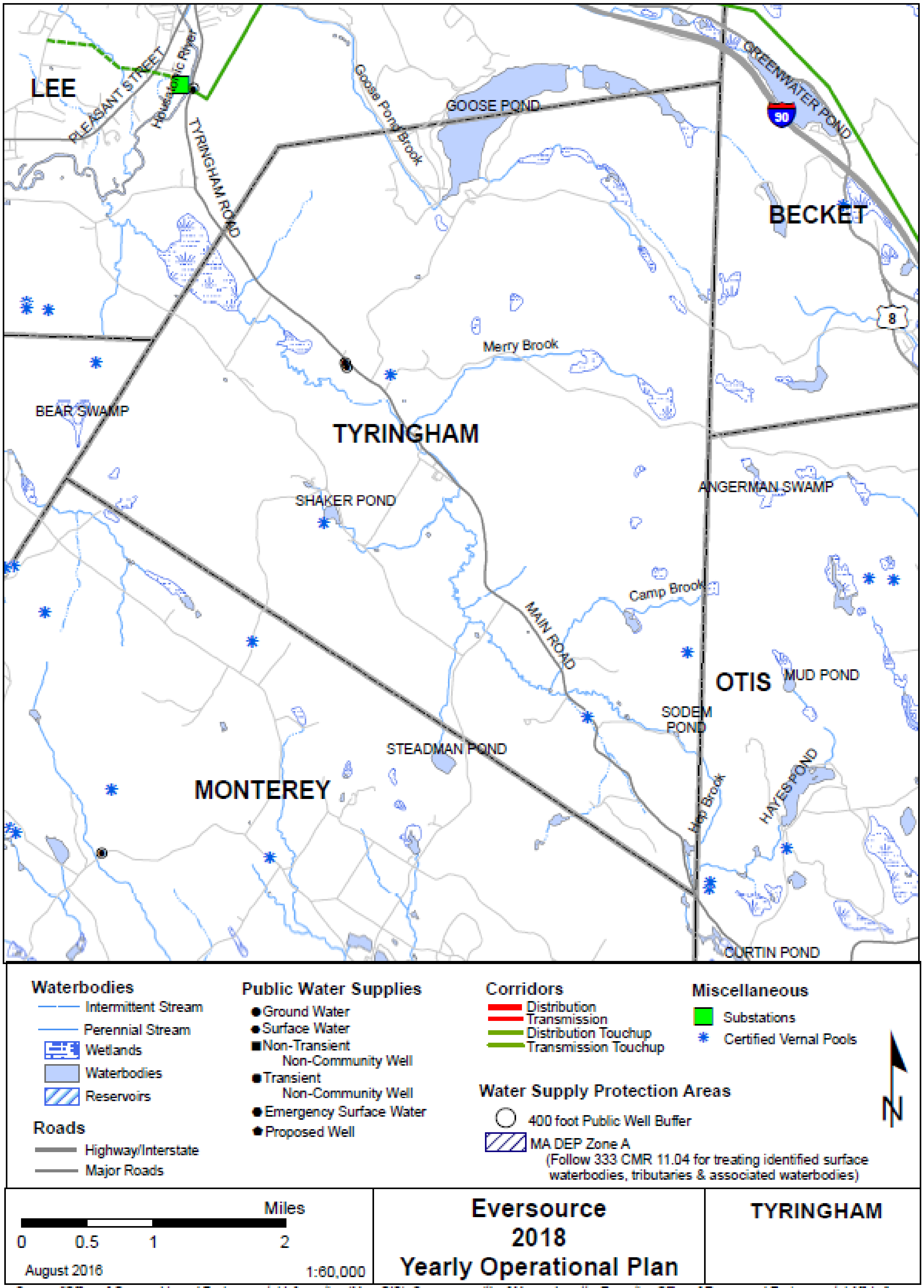

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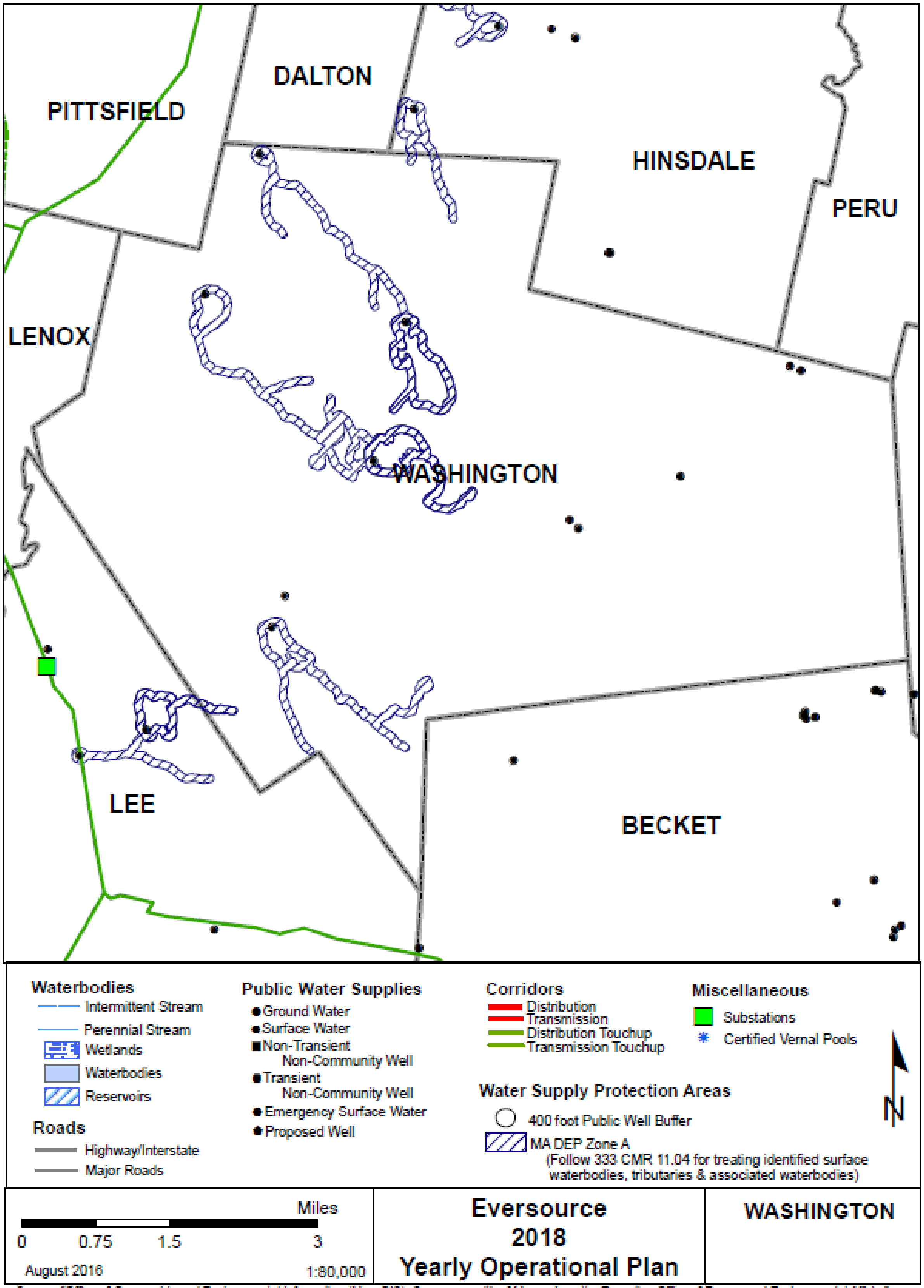

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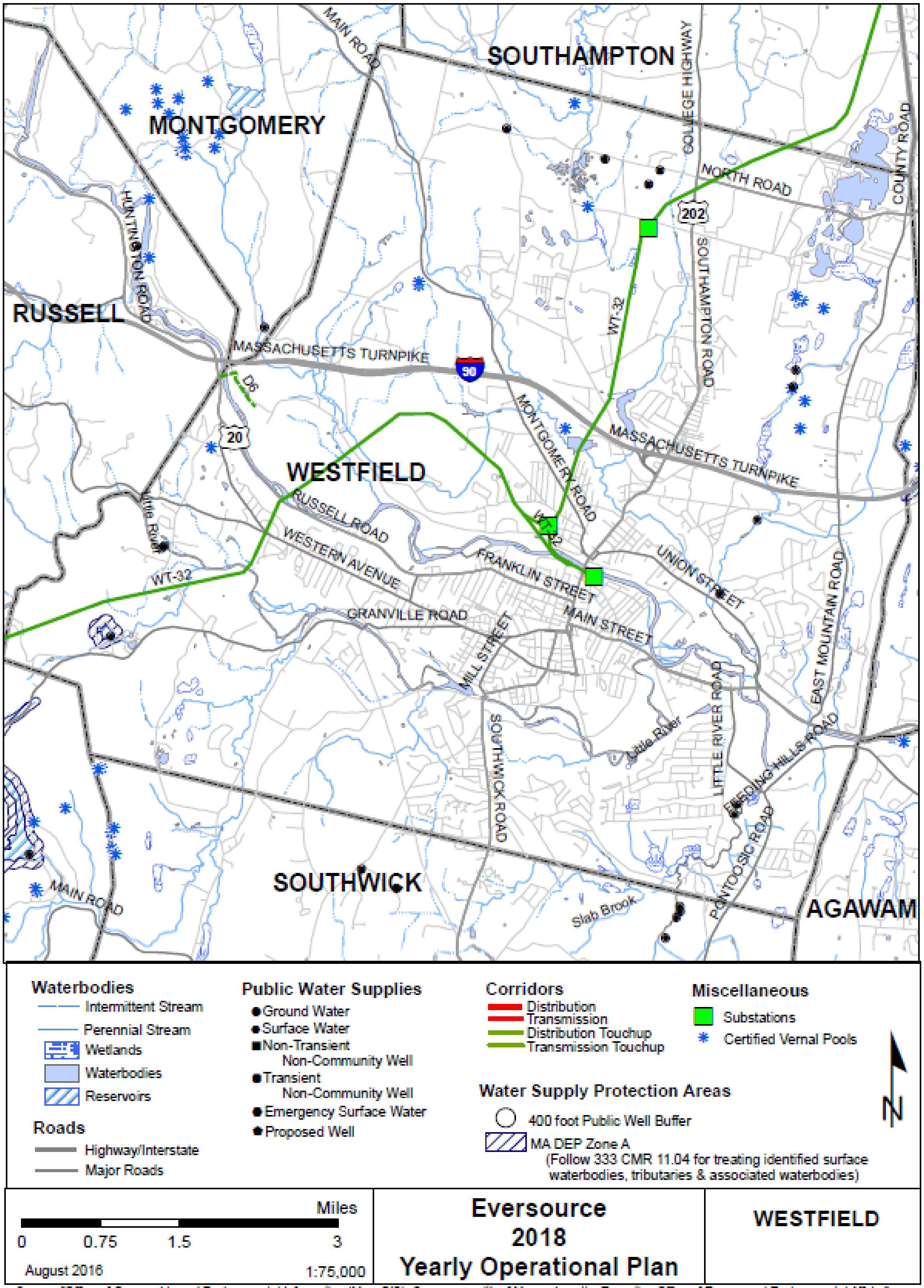

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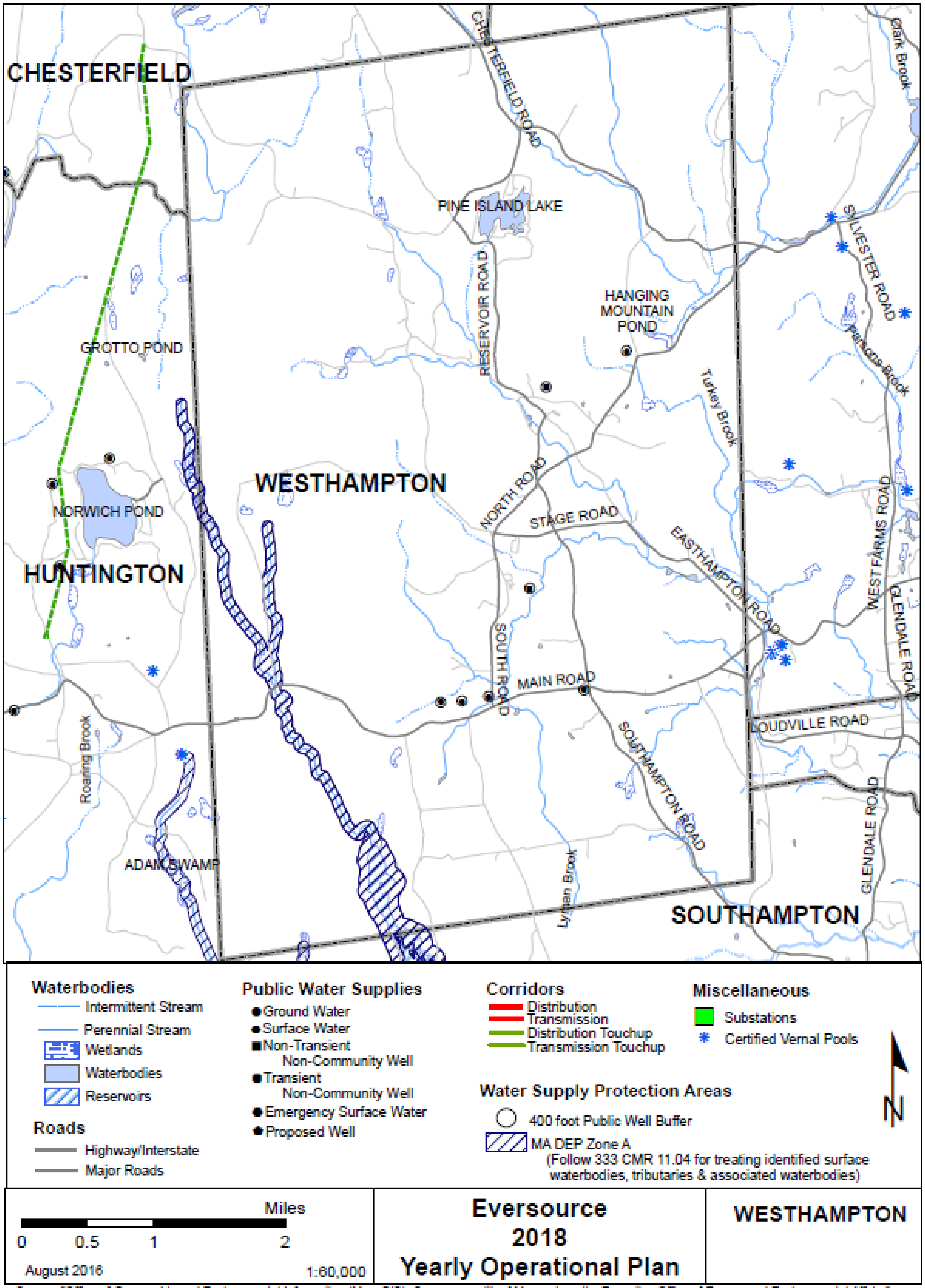

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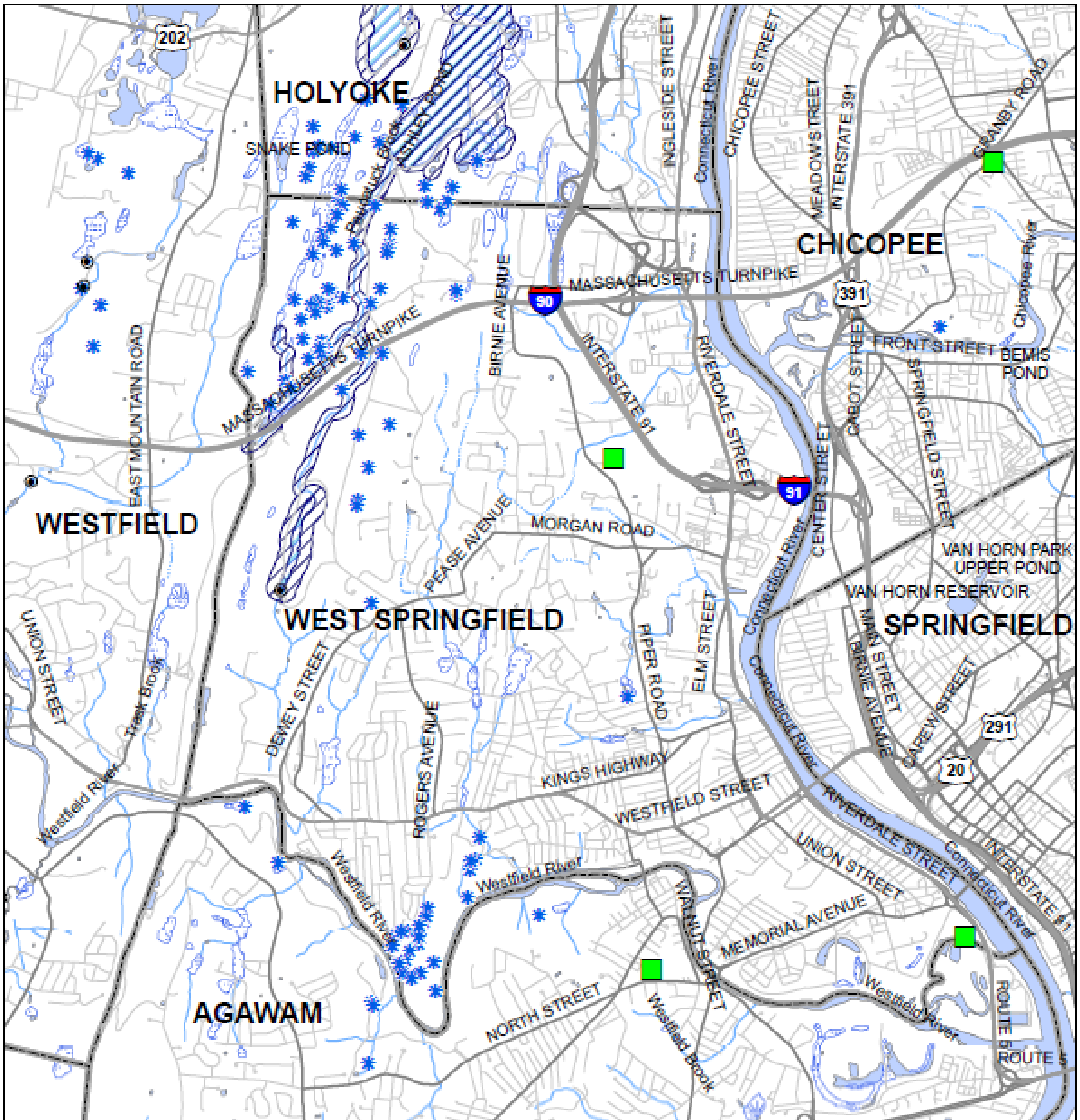

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Miscellaneous
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N

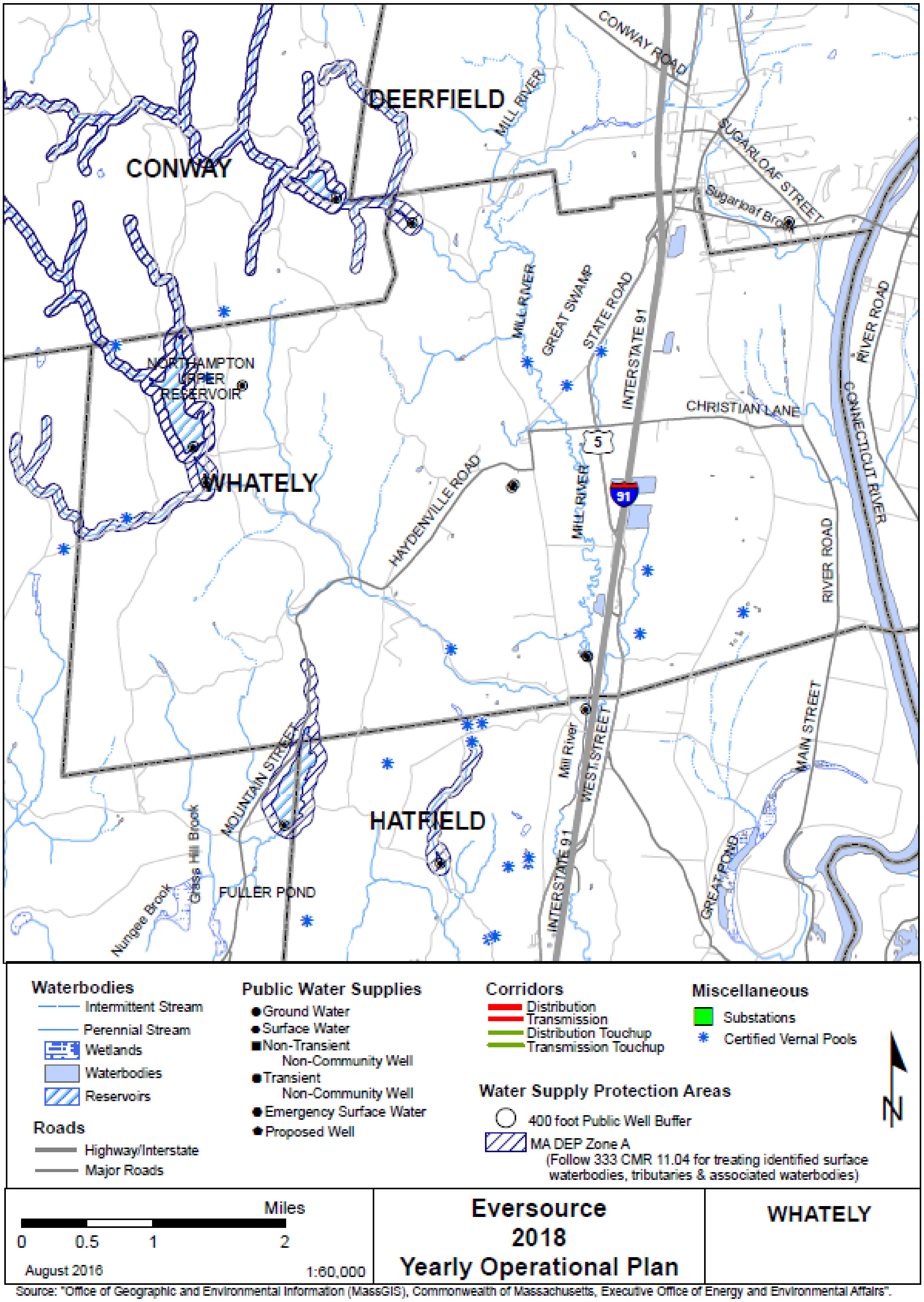
Miles
0 0.5 1 2

August 2016 1:60,000

Eversource 2018 Yearly Operational Plan

WEST SPRINGFIELD

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies



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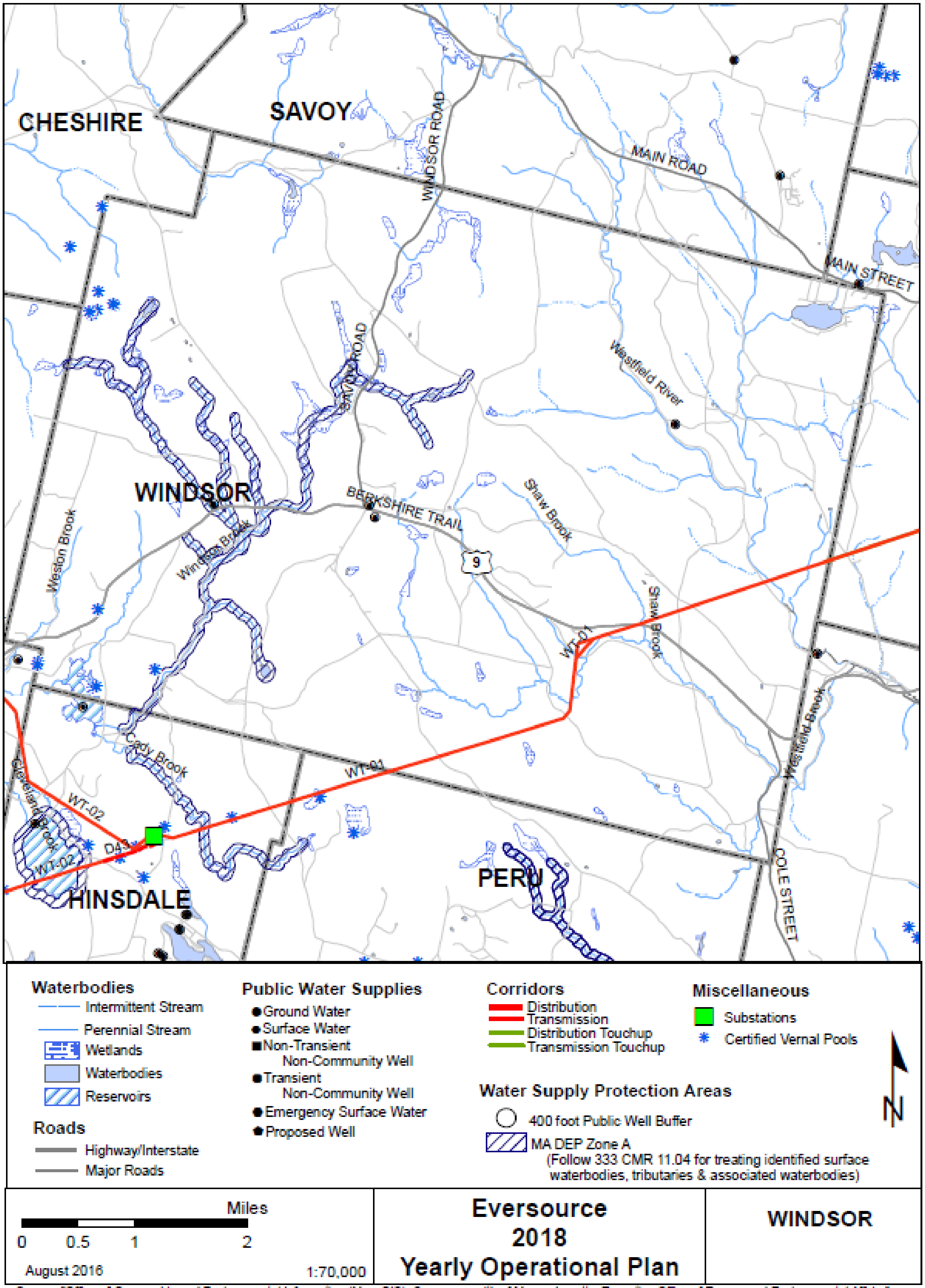

Source: "Office of Geographic and Environmental Information (MassGIS), Commonwealth of Massachusetts, Executive Office of Energy and Environmental Affairs".
Public Water Supply data provided by MA DEP Drinking Water Program, August 2016, DEP Public Water Supplies

Rights of Way Sensitive Area Materials List

<table>
<tr><td>Active Ingredient
Use Restrictions</td><td colspan="2">Product Names (EPA #)
Registrant</td></tr>
<tr><td>Aminopyralid</td><td colspan="2">Milestone (62719-519) (Product Review)
Opensight (62719-597) (Product Review)
DOW AgroSciences</td></tr>
<tr><td rowspan="3">Glyphosate
Lowest Labeled Rate for all Glyphosate products</td><td>Round Up Pro (524-475)
Monsanto</td><td rowspan="2">Glypro-Plus (62719-322)
Accord Concentrate or Rodeo (62719-324)
DOW AgroSciences</td></tr>
<tr><td>Aquaneat Aquatic Herbicide (228-365)
Razor (228-366)
Razor-Pro (228-366)
Nu Farm Americas</td></tr>
<tr><td colspan="2">While Accord Concentrate, Rodeo, Glyphosate VMF and Aquaneat all have aquatic uses, approval for their use as sensitive materials does NOT mean that they can be used for aquatic weed control, or directly applied to water, as part of a rights of way management program. Products are subject to the no-spray and limited spray provisions of 333 CMR 11.04.</td></tr>
<tr><td>Metsulfuron Methyl
Lowest Labeled Rate for all Metsulfuron Methyl Products*</td><td>Escort XP (432-1549)
Bayer CropScience

Escort XP (352-439)
EI Dupont</td><td>Patriot Selective Herbicide, (228-391)
Nu Farm Americas</td></tr>
<tr><td>Sulfometuron Methyl
Lowest Labeled Rate for all Sulfometuron-Methyl Products*</td><td>Oust XP (432-1552)
Bayer CropScience

Oust XP (352-601)
EI Dupont</td><td>Spyder Selective Herbicide (228-408)
Nu Farm Americas</td></tr>
<tr><td>Metsulfuron Methyl
Sulfometuron Methyl
Lowest Labeled Rate*</td><td>Oust Extra (432-1557)
Bayer CropScience

Oust Extra (352-622)
EI Dupont</td><td></td></tr>
</table>

Ammonium Salt of Fosamine Lowest Labeled Rate*	Krenite S (352-395) EI Dupont	Krenite S (42750-247) Albaugh, Inc.
Imazapyr 3 pints/acre every 3rd year OR 2 pints/acre every other year for all Imazapyr Products	Arsenal (241-346) Arsenal Powerline (241-431) Arsenal Railroad Herbicide (241-273) BASF	Polaris AC Complete Herbicide (228-570) (Product Review) Polaris Herbicide (228-534) Nu Farm Americas
Triclopyr, Butoxy Ethyl Ester The lowest of the following rates: 1. Between 10 feet and 50 feet of the resource: Lowest labeled rate* or 0.5 pints per acre 2. Between 50 feet and the boundary of the limited spray zone: Lowest labeled rate* or 3 pints per acre	Garlon 4 (62719-40) Dow AgroSciences Garlon 4 Ultra (62719-527) Dow AgroSciences	
Paclobutrazol Lowest Labeled Rate*	Cambistat (74779-3) Rainbow Tree care	

* **Lowest labeled rate** the minimum labeled rate of the pesticide product for the appropriate site, pest and application method

Disclaimer
The Massachusetts Department of Agricultural Resources (MDAR) makes no endorsement of any companies, organizations, persons, products, trade or brand names referenced in this Rights of Way Sensitive Area Materials List ("the list"). Active Ingredients on the list are reviewed pursuant to a Cooperative Agreement between MDAR and the Massachusetts Department of Environmental Protection. Only environmental fate and toxicological data, including eco-toxicological data, are reviewed when evaluating an active ingredients suitability for inclusion on the list. Inclusion on the list does not represent any endorsement by MDAR as to the efficacy of the active ingredient for rights-of-way vegetation management.

THE COMMONWEALTH OF MASSACHUSETTS
EXECUTIVE OFFICE OF ENVIRONMENTAL AFFAIRS
Department of Agricultural Resources
251 Causeway Street, Suite 500, Boston, MA 02114
617-626-1700 fax 617-626-1850 www.Mass.gov/DFA

MITT ROMNEY
Governor

KERRY HEALEY
Lieutenant Governor

ELLEN ROY HERZFELDER
Secretary

DOUGLAS P. GILLESPIE
Commissioner

IMAZAPYR

Common Trade Name(s):	Arsenal
Chemical Name:	Imazapyr! 2-(4-isopropyl-4-methyl--5-oxy-2-imidazolin-2-yl) nicotinic acid with isopropyl amine (2)
CAS No.:	81510-83-0

GENERAL INFORMATION

Imazapyr is effective against and provides residual control of a wide variety of annual and perennial weeds, deciduous trees, vines and brambles in non—cropland situations. It also provides residual control and may be applied either pre or postemergence. Postemergence is the preferred method especially for the control of perennial species. Imazapyr is readily absorbed by the foliage and from soil by the root systems. Imazapyr kills plants by inhibiting the production of an enzyme, required in the biosynthesis of certain amino acids, which is unique to plants (10, 100).

ENVIRONMENTAL FATE

Mobility

There are few studies which have investigated the mobility of Imazapyr in soil, but available reports indicate that Imazapyr does not leach and is strongly absorbed to soil (100). Imazapyr has a high water solubility (1 — 1.5%) which could generally indicate a high leaching potential, but as with other organic acids Imazapyr is much less mobile than would normally be expected (100). No soil partition coefficients have been reported, but they may be expected to be quite high (100).

One field study investigated Imazapyr mobility in a sandy loam soil (0.9% organic matter, 8.0% clay; 38.8% silt). Imazapyr did not leach below the 18—21 inch layer after 634 days and 49.6 inches of rain. The levels found below the 12 inch layer were just above the 5 ppb detection limit. In addition, this study investigated the off—target mobility of Imazapyr and found no residues further than 3 inches from the sprayed area after 1 year (102).

Although low levels of Imazapyr did move to the 18 to 21 inch layer this was only after nearly 2 years and fifty inches of rain. This indicates that imazapyr is relatively non-mobile and does not leach through the soil profile. Imazapyr remains near the soil surface and heavy precipitation may cause some off target movement from surface erosion of treated soils.

Persistence

The main route of Imazapyr degradation is photolysis. In a study of photodegradation in water, the half—life of Imazapyr was calculated as 3.7, 5.3 and 2.5 days in distilled water, pH 5 and pH 9 buffers respectively (101). A soil photolysis study for Arsenal on sandy loam calculated a half—life of 149 days (101).

Studies have investigated the persistence of Imazapyr in soil under aerobic and anaerobic conditions. The half-life of Imazapyr in soil has been reported as varying from 3 months to 2 years (100). A laboratory study found the half-life to be 17 months (101). Detectable residues were found in a field study in all soil layers to 21 inches at 634 days (102). Vegetation was sprayed with radio-labelled Imazapyr at a rate of 1 lb. a.i./acre. The soil was a sandy loam (0.9% organic matter) which received 49.6 inches of rain during 634 days. The highest level of radioactivity (0.234 ppm Imazapyr) was found in the top 3 inches of soil at 231 days after application and there were detectable levels in the 9-12 inch layer. The concentrations in the top layer increased steadily from day 4 to 231 when they reached their maximum (0.234 ppm) and then declined. At day 634 the level in the top layer (0-3 inch) was 0.104 ppm (102). These data indicate that Imazapyr is persistent in soil and, most importantly, that Imazapyr is translocated within plants from the plant shoots back to the roots and released back into soil. Very little of the Imazapyr actually reached the soil during application. The soil residues may be due to the decay of plant material containing Imazapyr in the soil (102).

TOXICITY REVIEW

Acute (Mammalian)

The acute oral LD5O in both male and female rats was greater than 5000 mg/kg using technical Imazapyr. The acute dermal LD5O in male and female rabbits was greater than 2000 mg/kg. The compound was irritating to the rabbit eye but recovery was noted 7 days after application of 100 mg of the test substance. It was classified as mildly irritating to the rabbit skin following application of 0.5 grams of the material on abraded or intact skin (103).

Arsenal product formulation was tested in a similar battery of tests. The rat oral LD5O value was greater than 5000 mg/kg and the rabbit dermal LD5O was greater than 2148 mg/kg. The irritation was observed following installation of 0.5 ml of the test substance in the skin study and 0.1 ml in the eye study (104).

Technical Imazapyr was administered to rats as an aerosol for four hours at a concentration of 5.1 mg/L. There were ten rats per sex and the animals were observed for 14 days after treatment before they were sacrificed. Slight nasal discharge was seen in all rats on day one but disappeared on day two (105).

The inhalation LC5O is greater than 5.0 mg/L for both the formulation and the technical product (105,106).
Technical Imazapyr was applied dermally at the following dosages: 0, 100, 200 and 400 mg/kg/day (109). Arsenal was used at 0, 25, 50 and 100% of the formulated solution in sterile saline. Each dose group consisted of 10 male and 10 female rabbits and the test substance was applied to either intact or abraded skin and occluded for 6 hours each day.

The result of the dermal studies with Imazapyr as well as Arsenal were non remarkable with regard to body weights, food consumption, hematology, serum chemistry, clinical observations, necropsy observations and histopathology. It was noted that Arsenal, undiluted, was locally irritating (109).

Subchronic and Chronic Studies (Mammalian)

In the subchronic tests a NOEL for systemic toxicity with dermal administration in rabbits was 400 mg/kg/d (2,109). After dietary administration for 13 weeks in the rat, there was no effect at 10,000 ppm (571. mg/kg/d) which was the highest dose tested (141).

A bioassay is currently underway to evaluate the potential oncogenicity of technical Imazapyr. Groups of 65 rats per sex per dose group have received 0, 1000, 5000 or 10,000 ppm in the diet. Hematology, clinical chemistry and urinalysis tests were conducted at 3, 6 and 12 months and will also be done at 18 months and at study termination. At the 12 month sacrifice the only effect noted was a slight increase in mean food consumption in all treated female groups. Most of the increases were statistically significant, but they did not always exhibit a dose response. The oncogenicity test is due to be submitted to the EPA in the spring of 1989 (115).

Oncogenicity Studies

Chronic bioassays as discussed in the subchronic/chronic section are underway.

Mutagenicity Testing

Five different bacterial strains of Salmonella typhimurium (TA1535, TA98, TAlOO, TA1537, and TA1538) and one of Escherichia coli (WP-2 uvrA-) were used to evaluate the mutagenicity of Imazapyr. It is unclear whether the compound used was technical or formulated Imazapyr. Dose levels up to 5000 micrograms/plate were used and each strain was evaluated both in the presence or absence of PCB—induced rat liver 5—9 microsomes. Negative results were noted in all assays. The six tester strains were designed to detect either base-pair substitutions or frameshift mutations (113).

Developmental Studies (Mammalian)

Two teratology studies have been done and both of these studies evaluated technical Imazapyr. One study used rats as the test species and the other utilized rabbits (111,112).

Pregnant rats received dosages of 0, 100, 300 or 1000 mg/kg/d of Imazapyr during days 6—15 of gestation. There were 22 rats in the control group and 24, 23 and 22 in the low, mid and high dose groups. All doses were administered orally by gavage. Salivation was noted only during the dosing period in 6 of the 22 females in the highest dose group (1000 mg/kg). No other adverse observations were noted in the treated dams (111). Fetal body weight and crown-rump length data for the treated groups were comparable to controls. Fetal development (external, skeletal and visceral) "revealed no aberrant structural changes which appeared to be the result of the exposure to Imazapyr" (111). The NOEL for maternal toxicity was 300 mg/kg and the NOEL for teratogenicity and fetoxicity was 1000 mg/kg (116).

Four groups of 18 pregnant rabbits were exposed on days 6-18 of gestation to doses of 0, 25, 100, 400 mg/kg/d Imazapyr. There was no statistically significant difference between control and treated groups at any dose (112).

Avian

Acute oral LD5Os of Imazapyr in bobwhite quail and mallard duck were 2150 mg/kg. The 8 day dietary LC5O in the bobwhite quail and mallard duck were greater than 5000 ppm (101).

Invertebrates

The dermal honey bee LD5O for Imazapyr is greater than 100 mg/bee (101). The LD5O (48 hr) was greater than 100 mg/L for the water flea (100).

Aquatic

The LC50s of Imazapyr in the rainbow trout, bluegill sunfish and channel catfish were greater than 100 mg/L (101).

SUMMARY

Imazapyr is a relatively immobile herbicide in the soil profile even when used in sandy and low organic content soils. It is also persistent in soils. The low mobility and persistence may result in off-target movement of Imazapyr from surface erosion of treated soils.

The atypical soil—plant flux characteristics of Imazapyr and delayed maximum soil concentrations indicate that repeated annual applications may result in build—up of Imazapyr in soil. Consequently, an interval is required to allow for the degradation of soil residues before a repeated application is made.

The oral LD5O of Imazapyr in rats is greater than 5000 mg/kg and the dermal LD5O is greater than 2000 mg/kg in rabbits. The oncogenicity bioassay is currently underway and the only effect reported in the interim study was an increase in food consumption in the treated females. No mutagenic effects were observed.

The acute oral LD5Os of Imazapyr and the Arsenal formulation are greater than 5000 mg/kg. In the subchronic 13 week rat study there was no effect observed at the highest dose tested 10,000 ppm. The oncogenicity study is currently underway.

REFERENCES

2. Farm Chemicals Handbook: 1985 Dictionary, buyer's guide to trade names and equipment. Pub. by Meister Pub. Co.

101. American Cyanamid Arsenal Herbicide Environmental and Toxicological Data Summary.

102. AC 243,997 [2—(4-isopropyl-4—methyl-5-oxo-2-imidazolin-2-71)nicotinic acid): Weed & Soil Metabolism in a field plot. American Cyanamid Company, POM Vol. 23-32. 1986 (Confidential Information).

103. Acute Toxicology of AC 243,997 to Rats and Rabbits. American Cyanamid Company, A83-24.

104. Acute Toxicology of AC 252,925 22.6% to Rats and Rabbits. American Cyanamid Company, A83-67.

105. Acute Inhalation Toxicity of AC 243,997 in Sprague-Dawley Rats. Food and Drug Research Laboratories, Inc. Study No. 7624.

106. Acute Inhalation Toxicity of AC 252,925 in Sprague-Dawley Rats. Food and Drug Research Laboratories, Inc. Study No. 7607.

107. Evaluation of the Sensitization Potential of AC 243,997 in Guinea Pigs. Toxicology Pathology Services, Inc. Study No. 186A—201-231-83.

108. Evaluation of the Sensitization Potential of AC 252,925 in Guinea Pigs. Toxicology Pathology Services, Inc. Study No. 186A—201-231-83.

109. Twenty-one Day Dermal Toxicity Study with AC 243,997 in Rabbits. Toxicology Pathology Services, Inc. Study No. 186B—301-230-83.

110. Twenty—one Day Dermal Toxicity Study with AC 252,925 in Rabbits. Toxicology Pathology Services, Inc. Study No. 187B-230-83.

111. Teratology Study in Albino Rats with AC 243,997. ToxiGenics Study No. 450-1222.

112. Teratology Study in Albino Rabbits with Ac 243,997. ToxiGenics Study No. 450-1224.

113. Bacterial/Microsome Reverse Mutation (Ames) Test on CL 243,997. American Cyanamid Company GTOX Volume 3, Number 13.

114. Herbicide AC 243,997: The Absorption, Excretion, Tissue Residues and Metabolism of Carboxyl Carbon—14 Labeled AC 243,997 Nicotinic acid, 2-(4—isopropyl—4-methyl—5—oxo—2-imidzolin—2-yl) in the Rat. American C~anamid Company Report No. PD-M Volume 20—3.

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METSULFURON METHYL

Common Trade Names:	Escort, Escort XP (2)
Chemical Name:	Methyl 2 E[C[(4-Methoxy—6-methyl-l,3,5-Triazifl—2-yl) aminolcarbonyl] amino] sulfonyl.]benzoate] (9)
CAS NO.:	74223-64-6

GENERAL INFORMATION

Metsulfuron methyl is a sulfonyl urea herbicide initially registered by E.I. DuPont in 1986. It is a foliar herbicide registered for use on wheat and barley and non-cropland sites such as Right of Way (9).

ENVIRONMENTAL FATE

Mobility

Metsulfuron methyl is a relatively new herbicide. The studies reviewed here have been provided by the registrant, EI DuPont.

The soil water partition coefficients (Kd) of Metsulfuron Methyl have been determined in four different soils: Cecil sand, Flanagan silt loam, Fallsington silt loam, and keyport silt loam. The Kd values range from 0.36 for Cecil sand to 1.40 for Flanagan silt loam, and Kom values ranged from 29 for Fallsington silt loam to 120 for Cecil sand (100). The values for Kd and Kom indicate that metsulfuron methyl is not adsorbed well to soil and that the organic content of the soil is not the only adsorption component. The silt and clay contents appear to influence adsorption, but there are probably other factors also involved.

The previous study also determined the Rf values for soil. Thin layer chromatography was performed on four soils for metsulfuron methyl. The Rf values ranged from 0.64 to 1.00; only one value was less than 0.90 (100). This result confirms the validity of the Kd values, indicating that metsulfuron methyl is mobiie and that the organic matter content of the Soil is a significant component of adsorption.

Metsulfuron methyl was applied to tops of 12 inch columns [containing four different soils], and eluted with 20 inches of water in 20 hours. Following the percolation of the total volume of water, 106% of the metsulfuron methyl was eluted from the Fallsington sandy loam, 96% from the Flanagan silt loam, 81% for Keyport silt loam and 93% for Myakka sand (100). The breakthrough volumes for the Fallsington, Flangan, Keyport and Myakka soils were 6.5, 4.5, 6.9 and 5.8 inches of water respectively (101).

Metsulfuron methyl is relatively mobile in most soils, but will be retained longer in soils with higher percentages of organic matter.

Persistence

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There are two studies which have reviewed the persistence of metsulfuron methyl in the soil. One study was conducted in the southern United States and the second was in the northern United States and Canada. The results of the studies indicate a somewhat contradictory picture of the persistence of metsulfuron methyl.

The soil half-lives in Delaware, North Carolina, Mississippi and Florida were 1 week, 4 weeks, 3 weeks and 1 week respectively following an application in mid to late summer (102). The results are varied and indicate that either climatic or soil factors determine the persistence. The climate is sufficiently similar to be able to discount that as a factor. However, both of the locations where the shortest half-lives were observed had the highest organic matter content in the soils. Furthermore, the half—lives correspond with the organic matter content.

The half—lives following spring applications were 4 and 56 weeks for two sites in Colorado, 6 weeks in North Dakota and 28 weeks in Idaho (103). In contrast to the southern United States study there does not appear to be any correlation with climatic or soil characteristics. There appears to be a slightly shorter half—life in acidic soils in the same location.

Metsulfuron methyl was also applied in the fall and the half-lives determined in two sites in Colorado, North Dakota and Idaho. These half—lives were 8 weeks, 12 weeks, 42 weeks and 28 weeks respectively. As was expected there were longer half—lives following fall applications in North Dakota (6 weeks vs. 42 weeks) however, in Idaho there was no change at all, which is unexpected.

In Canada following spring applications the reported half-lives were 10 weeks, 4 weeks, 4 weeks and 6 weeks for Alberta, 2 locations in Saskatchewan and Manitoba (103). One would expect longer half lives in Northern locations due to the effects of temperature on degradation rates. The results from Canada are generally shorter than those in the U.S. locations, which is unexpected.

Therefore, the half-life of Metsulfuron methyl in the soil is variable and dependent on the location. It is shorter when applied in the spring but appears independent of other environmental factors in most locations.

TOXICITY REVIEW

Acute (Mammalian)
The toxicology database for Metsulfuron methyl has been reviewed and accepted by the EPA (9). DuPont supplied excerpts from their monograph on Ally herbicide (112). Summaries of studies were supplied by DuPont for subchronic, chronic and reproductive studies.

Technical metsulfuron methyl has been tested in two acute oral LD50 studies in Crl:CD Rats. In the first study the LD5O was greater than 5,000 mg/kg and in the second it was greater than 25,000 mg/kg (the maximum feasible dose) (112). Clinical signs included salivation, chromodacryorrhea, stained face, stained perineal area and weight loss (112).

In a 10—dose subacute study using male rats, a single repeated dose of 3,400 mg/kg/day for 10 days over a 2 week period was administered. This was followed by a two week recovery period. No deaths occurred and slight weight loss was the only clinical sign observed. In addition, no gross or microscopic changes were observed (112). The dermal LD50 is greater than 2,000 mg/kg in male and female rabbits (112). Technical metsulfuron methyl caused mild erythema as a 40% solution in guinea pigs. There was no reaction observed at the 4% concentration. No response occurred when treated animals were challenged (112).

In rabbits, moderate areas of slight corneal clouding and severe to moderate conjunctivitis were observed in both washed and unwashed eyes following treatment with technical metsulfuron methyl. The unwashed eyes were normal in 3 days and the washed eyes in 14 days (112).

Metabolism
Elimination of metsulfuron methyl in the rat is rapid, with 91% of a radioactive dose excreted over 96 hours (9). The routes of elimination were not specified within the report.

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Subchronic/Chronic (Mammalian)
Ninety day feeding studies have been done with metsulfuron methyl in rats and mice. The rat study was done in conjunction with a one generation reproduction study (see Developmental Study Section). In this study rats received 0, 100, 1000, or 7500 ppm (0, 5.7, 57, 428 mg/kg/d) (a) in their diets. Effects observed at the high dose were: a decrease in body weight and an increase in total serum protein in the females, and a decrease in liver weight and a decrease in cytoplasmic clearing of hepatocytes in the males the NOEL in this study was 1000 ppm (104).

The 90 day mouse study was done in conjunction with the 18 month mouse study. Groups of 90 mice per sex per dose received 0, 5, 25, 500, 2500 or 5000 ppm (0, 0.66, 3.3, 66.6, 333.3, 666.6 mg/kg/d) in their diets. Clinical evaluations were made at 1, 2, 3, 6, 12 and 18 months. Ten animals per group were sacrificed at the 90 day time point for pathological evaluation. The 2500 ppm group was sacrificed at 12 months. Sporadic effects were observed on the body weight, food consumption, and organ weights. These were not dose related, resulting in a NOEL of 5000 ppm in diet for mice (111).

In the twenty-one day dermal rabbit study, the intact skin of male and female New Zealand White Rabbits received doses of 0, 125, 500 and 2,000 mg/kg for 6 hrs/day for 21 days. Clinical signs observed were sporadic weight loss and diarrhea in a few rabbits. These effects were not dose related. Non dose related histological effects were observed in male rabbits. This effect was characterized as mild testicular atrophy occurring sporadically at all doses (112, 108).

Feeding studies in dogs have been done with purebred beagles. The animals received metsulfuron methyl in diets at dose levels of 0, 50, 500 and 5000 ppm (0, 0.2, 2, 20 mg/kg/d) for one year. There was a decrease in food consumption in the high dose males. There was a decrease in serum lactate dehydrogenase in all groups of both sexes at two or more doses these values were within the historical controls. The NOEL was 500 ppm in the males and 5000 ppm in females (112).

In a chronic feeding study in rats, the animals received metsulfuron methyl at doses of 0, 5, 25, 500, 2500 or 5000 ppm (0, 0.28, 1.4, 28.6, 143 or 286 mg/kg/d. Interim sacrifices were done at 13 and 52 weeks (105).

At the 13 week sacrifice there was a decrease in body weight in the 2500 and 5000 ppm groups; there was a decrease in absolute liver weight at 2500 and 5000 ppm males. There was a decrease in the relative liver weights in the 2500 and 5000 ppm females.

(a) In these discussions the assumptions made for estimated conversion of ppm (diet) to mg/kg/D were:

Species	Body weight (kg)	Intake (kg)
Rat	0.35	0.020
Mouse	0.03	0.004
Dog	10	0.4

When data were presented as ppm, the dose was estimated in mg/kg and is presented in parenthesis.

Findings at the 52 week sacrifice included increase in kidney weight (2500 ppm males) and increased absolute brain weights (at doses of 25, 500, 2500 and 5000 ppm) in males and at doses of 2,500 and 5000 ppm in females. There was an increase in absolute heart weight at 2500 ppm in males and at 2500 and 5000 ppm in females. The absolute organ weights were back to normal at termination. Relative brain weights of the 2500 and 5000 ppm groups were increased (105)

Oncogenicity Studies
There were no gross or histopathological changes observed in mice receiving up to 5000 ppm metsulfuron methyl in their diets (112. 111). Similar results were obtained in the 104 week rat study; there were no histopathological changes observed which were attributable to metsulfuron methyl (105, 112). EPA concludes that there were no oncogenic effects in rats or mice at the highest dose tested; 5000 ppm in both cases (9).

Mutagenicity Testing
Metsulfuron methyl was negative in the unscheduled DNA synthesis assay; in vivo bone marrow

cytogenic assay in rats (doses were 500, 1,000, and 5,000 mglkg bw); CHO/HGPRT Assay; Salmonella typhimurium reverse mutation assay four strains with and without S9 metabolic activation; and also in the in vivo mouse micronucleus assay at doses of 166, 500, 1666, 3000 and 5000 mg/kg (112). 'T¶e only positive mutagenicity assay was in the in vitro assay for chromosome aberrations in Chinese Hamster Ovary at high doses (greater than 2.63 mM, 1.0 mg/mL)). In this assay no increases in structural aberrations were observed at 0.13 or 1.32 mM(0.05 or 0.5 mg/mL) (112).

Developmental Studies

Several studies have been done to investigate the effects of Metsulfuron methyl on reproduction and development in rats and rabbits.

Pregnant Crl: COBS CD(SD) BR rats received metsulfuron methyl at doses of 0, 40, 250 or 1000 mg/kg by the oral route on days 5 to 14 of gestation. There were 25 rats per group. Maternal toxicity was observed at doses of 250 and 1000 mg/kg/d. The maternal toxicity NOEL was 40 mg/kg/d. There was no evidence of "teratogenic" response or embryo fetal toxicity (112).

In the rabbit study, New Zealand white rabbits received 0, 25, 100, 300 or 700 mg/kg/d on days 6 to 18 gestation. There was a dose related increase in maternal deaths; 1, 2 and 12 deaths at doses of 100, 300 and 700 mg/kg respectively. The maternal toxicity NOEL was 25 mg/kg/d and there was no evidence of teratogenic or embryolethal effects observed in this study (112).

Several multigenerational studies have been done with Metsulfuron methyl. A four litter reproduction study was done concurrently with the chronic bioassay. Rats from each treatment were separated from the main study and bred. The doses were 0, 5, 25, 500, 2500, and 5000 ppm (0, 0.28, 1.4, 28.6, 143 and 286 mg/kg/d). There was a dose dependent decrease in body weight in the parental (P1) generation at doses of 25 ppm and greater in males and females. This effect was not present in dams during gestation or lactation (106).

Overall fertility in the P1 and filial (FI) matings was low in both control and treated groups with no apparent cause. There was a decrease in pup size in the Fla but not the Flb, F2a, or F2b litters. The gestation index was 100% for all groups in both filial generations with the exception of F2a when it was 90%. On the basis of the lower body weights and lower growth rates, the NOEL was 25 ppm for this study (106).

In a 90 day, 2 generation 4 litter protocol, rats received 0, 25, 500 or 5000 ppm (0, 1.4, 28.6, 286 mg/kg/d) Metsulfuron methyl in their diets for 90 days prior to mating. In this protocol the parental generation was bred twice first to produce the Fla and then the FiB. The FiB rats were then fed the appropridte diet for 90 days (after weaning). There was a decrease in litter size in the 5000 ppm group in the F2a generation, but not in any other generation. The NOEL for this study was 500 ppm (107).

In a 90 day feeding, one generation rat study, 16 male and 16 female rats received 0, 100, 1000 or 7500 ppm in their diet prior to mating. There were no differences observed in reproduction and lactation performance or litter survival among groups. There was an overall low fertility in the control and treated groups. This result made the effects of metsulfuron methyl on fertility difficult to assess from this study (104).

Tolerances and Guidelines

Tolerances have been set for metsulfuron methyl in barley wheat (from 0.05 to 20 ppm, depending on the commodity) and in meat and meat byproducts (0.1 ppm). The tolerance in milk is 0.05 ppm (8, 9). The acceptable daily intake is 0.0125 mg/kg/d based on a one year dog NOEL of 1.25 mg/kg/d using a safety factor of 100 (9).

Avian

Metsulfuron methyl has been tested in two species of birds, the mallard duck and the bobwhite quail. The acute oral LD5O is greater than 2150 mg/kg in the duck. Two, 8 day dietary studies have been done. The 8 day LC5O is greater than 5620 ppm in both the duck and the quail (9).

Invertebrates

The 48 hour LC5O for Daphnia is greater than 150 ppm and the acute toxicity in the honeybee is greater than 25 mg/bee (9).

Aquatic
Metsulfuron methyl has acute LC5O of greater than 150 ppm in both the rainbow trout and the bluegill sunfish (9).

Summary
Metsulfuron methyl has a moderate to high mobility in the soil profile and is relatively persistent in the environment, especially when applied in the fall. These factors would be of concern under most circumstances. However, metsulfuron methyl is applied at very low rates (3-4 ozs./A) and therefore the amounts which reach the soil are quite low. Consequently, Metsulfuron methyl should not impact groundwater as a result of leaching or migrate from the target area. Metsulfuron methyl has low toxicity (EPA Toxicity Category III) for acute dermal exposure and primary eye irritation and is category IV for all other acute exposures. The chronic studies indicate no oncogenicity response and the systemic NOEL's are 500 ppm in rats and 5000 ppm in mice. There was no evidence of teratological effects in the rat or the rabbit at the highest dose tested in both species. While there was evidence of maternal toxicity at 40 mg/kg/d in the rat and 100 mg/kg/d in the rabbits.

REFERENCES

2. Farm Chemicals Handbook: 1985
   Dictionary, buyer's guide to trade names and equipment. Pub. by Meister Pub. Co.

9. EPA Pesticide Fact Sheet Metsulfuron methyl: 1986 Collection of pesticide chemistry
   Pub. by US Government Printing Office 461-221/24041

100. DuPont Soil Column Leaching Studies with [14C] DPX-T6376] (AMR 82-82).

101. DuPont Adsorption of 14C DPX-T6376 on Soil (AI'IR-66-82).

102. DuPont Field Soil Dissipation Study of DPX-T6376 in Delaware, North Carolina, Florida, and Mississippi (AMR 66—82).

103. DuPont Field Soil Dissipation of [Phenyl (U) - 14C] Metsulfuron Methyl on United States and Canadian Soils (AMR 476-86).

104. DuPont HL 180-82; 90 day feeding one generation Reproduction Study in Rats.

105. DuPont HLO-61-85; Chronic Feeding Study with Concurrent Two Generation Reproduction Study in Rats - Chronic.

106. DuPont HLO-65-85 Chronic Feeding Reproduction Phase.

107. DuPont HLR-524-84 Two generation, Four Litter Reproductive Study in Rats.

108. DuPont HLR 137-83 Subchronic Dermal Study (21 Days) in Rabbits.

111. DuPont HLR 463-84 Ninety-Day and Long Term Feeding Study in Mice.

112. Ally Herbicide Product Monograph.

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FOSAMINE AMMONIUM

Common Trade Name: Krenite, Krenite UT

Chemical Name: Ammonium ethyl carbamoylphosphate

CAS No.: 25954—13—6

GENERAL INFORMATION

Fosamine ammonium is usually applied to plants in the late summer and early fall. It is systemically absorbed by buds, stems and foliage. In most plants, effects of herbicide treatment are not evident until the following spring when buds fail to develop, or develop into miniature spindly leaves that do not provide adequate photosynthesis. The plant consequently dies. Although it is translocated within plants, effective treatment requires the complete coverage of all parts of woody plants. In some species of non-deciduous plants, such as pines and bindweed, leaves may turn brown immediately after application.

ENVIRONMENTAL FATE

Mobility

Fosamine ammonium is a low mobility herbicide and is not readily leached from soil. Soil adsorption coefficients (Kd) for Fosamine ammonium are reported as ranging from 0.22 (low organic sandy barns) to 350 (silt barns) (103). The organic matter adsorption coefficients are more variable and range from 20 to 62, with one adsorption coefficient reported at 7400 (103). There does not appear to be a good correlation between the soil adsorption coefficents and organic matter, clay or silt content of the soil.

In a study using soil thin layer plates to assess mobility, the Rf values (ratio of the compound mobility versus the leading edge of the water movement) for Fosamine ammonium ranged from 0.92 to 0.98 on the four soils tested (103). These Rf values indicate a high mobility pesticide, in contrast to the soil adsorption coefficients and leaching studies which indicate low mobility. This information may reflect the solubility of fosamine ammonium and not its mobility characteristics.

Fosamine arnmonium is strongly adsorbed to soil particles and it is not carried away in precipitation, in spite of its high water solubility. In a laboratory study using inclined soil flats (Fallingston sandy loam), Fosamine ammonium was applied at the rate of 15 lbs a.i/acre followed by simulated rainfall. The Fosamine ammonium remained near the surface of the soil and in the upper part of the flat, thus indicating no appreciable downward or lateral mobility (105). Field studies conducted in Florida, Delaware and Illinois have confirmed the laboratory results and indicate very little or no downward movement in soil of the herbicide or its degradation products (15, 104, 105).

Field studies indicate that Fosamine ammonium has low vertical mobility but, soils with higher adsorption capacities will tend to retard movement more than soil with lower adsorption capacities (15). However, Fosamine ammonium may move with the soil during erosion (14). Due to strong adsorption of fosamine ammonium to soil particles, there is little tendency for ground water contamination or for surface waters to become contaminated without direct application of the material (14, 15).

In the field studies, the Delaware soil (Keyport silt loam) was the most representative soil of Massachusetts conditions. However, the Fallsington sandy loam which was used in the greenhouse studies represents a close approximation to Massachusetts soils. In these studies Fosamine ammonium exhibited slight tendency to leach in both those soils. Consequently, it is expected that fosamine ammonium will exhibit slight leaching in Massachusetts soils.

Persistence

The major route of Fosamine ammonium degradation is metabolism by soil microorganisms. Fosamine ammonium is stable to degradation by hydrolysis at pH values 5, 7, and 9; it is also stable to photodegradation (10, 14, 101, 102).

Fosamine ammonium is not considered a persistent compound in soils. Under field conditions in Florida, Delaware and Illinois, the half-life of Fosamine ammonium in soils was approximately one week following the application of 10 Ibs/acre (104).

In the field, the metabolite carbamoylphosphonic acid (CPA) was found several days after initial soil treatment. All Fosamine ammonium and CPA had disappeared completely by 3 to 6 months (14, 15).

Greenhouse soil studies indicate a half-life of about 10 days, which is in close agreement with the field study half—life (15,104). In the field, Fosamine ammonium was metabolized to CPA more quickly in fine sand than in two silt barns (14, 104).

There is little persistence information in the literature for Fosamine ammonium and the only reported field degradation rates are from one study. This might be a cause for concern were it not for the close agreement in soil half-lives reported, not withstanding the varied location and soils used in the field studies. Moreover, the greenhouse degradation study was also in close agreement with the reported field half-life.

It is assumed that the half-lives reported in the previous study have been obtained in spring to summer conditions, since they were not stated. The degradation of fosamine ammonium was investigated for a one year period in the previous study but, because of the short half-life complete degradation had occurred before the winter. It is expected that fosamine ammonium will be applied in summer or fall only since it must be applied to full foliage for control. Consequently, the lack of winter degradation rates is not a major concern.

With most herbicides soil characteristics and local climatic factors have a pronounced effect on soil half—life. This study suggest that degradation of Fosamine ammonium by soil microorganisms is not influenced by soil characteristics or local climate to any appreciable extent.

Due to the similar persistence of Fosamine ammonium in all locations and soils there is no most representative location. In this case, all sites represent expected persistence. Therefore, the half-life of Fosamine ammonium under Massachusetts condition is expected to be approximately one week.

TOXICITY REVIEW

Acute (Mammalian)

The oral LD5Os have been determined for both the formulated product and the formulated product plus surfactant (41.1 to 42% active ingredient (ai) in both cases). The LD5Os in the male rat were 24,400 mg (ai) (formulated product)/kg and 7,295 mg (ai) (formulated product with surfactant)/kg. Female rats had an LD50 of 5,000 (ai) mg (formulated product with surfactant)/kg. The formulated product has an LD50 of 7,380 mg(ai)/kg (formulated product) in male guinea pigs (107).

Fosamine ammonium was tested in an acute dermal study. 10 ml of the formulated product at a dose of 1,683 mg(ai)/kg resulted in no mortalities and no clinical signs of toxicity (107). The formulation plus surfactant was tested in rabbits and was not a primary eye irritant. There was mild transient erythema in tested skin. No sensitization was found in Guinea pigs (107).

The formulation plus surfactant (0.1 ml) produced transient mild corneal opacity and transient conjunctual irritation. The formulation without the surfactant was not an irritant (107).

Metabolism

The metabolism of Fosamine ammonium in the rat is rapid with 86% in feces and 11% in urine after 48 hrs (103,15). Compounds identified in the feces included 14C radiolabelled fosamine ammonium (86%) and 14C Carbamoylphosphonic Acid (CPA) diammonium salt (14%). The compounds identified in the urine were also fosamine ammonium and CPA (103).

Subchronic and chronic feeding studies have been performed using several species, for various time periods.

The No Observable Effect Level (NOEL) for Fosamine Ammonium in diet studies for rats (90 day), dog (6 month), and sheep (90 day) were: 5,000/10,000 ppm, (286/572 mg/kg); 1,000 ppm (40 mg/kg) and 2,000/2,500 ppm highest dose tested (HDT) respectively (107). In the feeding studies the dose was increased after a certain time point when effects were not observed at the lower dose. These dose groups are written first dose/increased dose. In the six month dog study, the female dogs receiving 5000/7500/10000 ppm had increased stomach weights (107).

Oncogenicity Studies

Long term carcinogenicity studies are not available. These studies have not been required by EPA as there are no food uses proposed for Krenite.

Mutagenicity Studies

Mutagenicity testing has been done using Fosamine Ammonium formulated product. It was negative in 5 strains of the Ames assay, and negative both with and without activation in Chinese Hamster ovary point mutation assay. Chromosome damage was produced in the in vitro cytogenetic assay using Chinese Hamster ovary cells at 1.6% and 3.2 formulation (nonactivated) and 1.4, 2.8 and 5.7% formulation (activated) (107). There were no compound related increases in chromosomal aberrations in an in vivo bone marrow study and no changes in unscheduled DNA synthesis in rat hepatocytes (107).

Developmental Studies

The developmental studies that have been performed using fosamine ammonium include a one generation/two litter rat study and a rat oral teratogenicity study. The doses in the 90 day reproduction study were 0, 200, 1,000 and 5,000/10,000 ppm (0, 11, 57 and 285/570 mg/kg/d). There were no effects observed on reproduction and lactation in the reproduction study (NOEL = 5,000/10,000 ppm HOT). The doses in the teratogenicity study were 0, 200, 1,000 and 5,000/10,000 ppm (0, 11, 57 and 285/570 mg/kg/d). There were no effects observed on teratogenicity and fetoxicity at the 1,000 ppm dose level(107).

(a) In these discussions the assumptions made for conversion of ppm (diet) to mg/kg/D were:

Species	Body weight (kg)	Intake (kg)
Rat	0.35	0.020
Mouse	0.03	0.004
Dog	10	0.4

Avian

Unformulated Fosamine ammonium was administered to Mallard ducks and bobwhite quail by intubation in acute toxicity studies. Five birds per species-sex group received doses of 0, 312.5, 625, 1,250, 2,500, and 5,000 mg/kg. The LD50 was greater than 5,000 mg/kg in both the ducks and quail (15, 107).

Ducks and quail were also used in subacute dietary studies at doses of 0, 625, 1,250, 2,500, 5,000 and 10,000 ppm in the diet for 5 days. Basal diet was given for the last three days of the 8 day exposure. The 8 day LC50 in the diet was greater than 10,000 ppm. There was no increase in duck mortality: food consumption was depressed but body weight gain was normal. There was variable quail mortality and food consumption and body weight were decreased as compared with control (15, 107).

Invertebrates:

Fosamine ammonium toxicity has been determined for only a very few microorganisms and invertebrates. The available studies indicate that Fosamine ammonium has a very low acute toxicity to those organisms tested (15):

Fosamine ammonium salt (42% formulation): 48 hr LC5Os range from 1,524 mg/L for Daphnia to 10,000 mg/L for bees sprayed with the herbicide.

Aquatic Species (fish):

Fosamine ammonium has a very low toxicity to those fish species tested.

Fosamine ammonium salt (42% formulation): 96 hr LC5Os range from 670 mg/L for bluegill sunfish to 8,290 mg/L for coho salmon (15).

Except for the LC5O of 670 mg/L for the bluegill sunfish, reported adult fish LC5Os are all in excess of 1000 mg/L. (15) The yolk-sac fry stage in salmonids was the most sensitive to Fosamine ammonium.

Threshold-effect concentrations of Krenite for salmonids in partial life-cycle studies are less than 75 times the maximum theoretical concentration of Krenite that would be found in shallow waters due to direct overhead spray application (15).

SUMMARY

Fosamine ammonium is not persistent in the environment and is a low mobility herbicide in soil. Fosamine ammonium has a low potential to leach to groundwater or to reach surface waters from surface runoff. With acute oral LD5Os in rats of greater than 5,000 mg/kg, Fosamine ammonium is considered to be of low acute and subchronic mammalian toxicity. Subchronic exposures to Fosamine ammonium resulted in NOELS of greater than 1,000 ppm in a 6 month dog study. Mutagenicity test were negative in all but one case and there are no carcinogenicity data for this active ingredient. Fosamine ammonium is also considered to have very low aquatic and invertebrate acute toxicity.

REFERENCES

1. The Agrochemicals Handbook: 1983
Reference manual to chemical pesticides
Pub. by The Royal Society of Chemistry
The University, Nottingham NG7 2RD, England

10. The Herbicide Handbook: 1983 Fifth Ed.
Handbook of the Weed Science Society of America

Pub. by the Weed Science Society of America, Champaign, Ill.

14. GIER Generic Environmental Impact Report: 1985
Control of vegetation of utilities & Railroad Right of Way Pub. by Harrison Biotec, Cambridge, MA

15. Pesticide Background Statements: Aug. 1984
USDA Forest Service Agriculture Handbook #633 Vol. 1

100. Octanol/Water Partition Coefficient (Kow) of Fosamine Ammonium. Berus, J.S. and Breaux, E.J., DuPont Report.

101. Hydrolysis of [Carbonyl—14C] Fosamir~e Animonium. M Koeppl, Mary K., Dupon Report No. AMR-567-86.

102. Photodegradation of [Carbonyl-14C] Fosamine Ammonium on Soil. Scott, Martin T., DuPont Report No. AMR-560-86.

103. Batch Equilibrium (Adsorption/Desorption) and Soil Thin—Layer Chromatography Studies with [Carbonyl-14CJ Fosamine Ammonium.
Priester, Thomas, M. and Sheftic, George D., DuPont Report No. AMR-632 -86.

104. Han, Jerry C-Y. (1979) Stability of [C] Fosamine Ammonium in Water and Soils.
3. Agr. Food Chem. 27, 3

105. TRW. (1981) Environmental Fates and Impacts of Major FOrest Use Pesticides. USEPA. Office of Pesticides and Toxic Substances. Contract No. 68-02—3174., Washington D.C.

107. Schneider, P.W. and Kaplan, A.M. (1983 Toxicological Information Fosamine Arimonium Dupont).

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TRICLOPYR

Common Trade Name(s): Garlon 3A, Garlon 4

Chemical Name: Triclopyr [(3 ,5,6-Trichloro-2-pyridinyl) oxy] acetic acid

CAS No: 55335—06—3

GENERAL INFORMATION

Triclopyr is a picolinic acid derivative and is marketed as Garlon 3A the triethylamine (TEA) salt (CAS #057213-69-1) and Garlon 4 the butoxyethyl ester ***(CAS#*** 008008-20-6).

Triclopyr is effective against a wide variety of woody plants as a foliar spray, basal spray and when applied to cut surfaces. Triclopyr is absorbed by both plant leaves and roots and is readily translocated throughout the plant. It produces an auxin-type response in growing plants in that it appears to interfere with normal growth processes. Thus, maximal plant response occurs when applications are made soon after full leaf development and when there is sufficient soil moisture for plant growth.

ENVIRONMENTAL FATE

Mobility

Most laboratory and field studies indicate that Triclopyr is a relatively mobile herbicide under most conditions. Soil organic carbon partition coefficients K(oc) were determined for the TEA salt in 12 soils which ranged from 0.081% to 21.7% organic carbon. The K(oc) values range from 12 to 78 (14), indicating that Triclopyr should be mobile in most soils. In the same study the K(oc) values of trichloropyridinol, the major metabolite, were reported to range from 114 to 156 in three soils which were not identified. This indicates that trichloropyridinol is less mobile than Triclopyr and should have moderate mobility in soil(14).

In a laboratory study using sandy loam soil with a low organic matter content (0.62%), 75-80% of the applied Triclopyr leached through a 12 inch soil column between days 11 and 15. Water was applied at the rate of 0.5 inches/day for 45 days. The major degradation product, tricloropyridinol required 13 inches of applied water to elute, nearly twice as much (7.5 inches) as Triclopyr(14).

In a field study, Garlon 3A was applied at the rate of 3 gallons/ acre (9 lbs/acre) to six soils ranging from clays to loamy sands in six states. Rainfall was reported to be normal, but not given. Small amounts of Triclopyr and its metabolites were found in the 6—12 inch and 12-18 inch layers of soil 28 to 56 days after application (14,15). Although an application rate of 9 lbs per acre is rather high, the presence of Triclopyr at those depths should be noted especially since there is a correlation with the previous laboratory studies.

In other studies, Triclopyr exhibited significantly lower mobility than had been previously reported. In a field study conducted in Massachusetts, Triclopyr was applied to sandy loam soil at a rate of 0.6 lb/acre. Rainfall was reported as normal, but not given. Triclopyr was never detected below the top ten inch layer of soil at any time during the three month study (100). As part of the same study, Triclopyr was applied to soil columns containing the same soil as in the field study at the rate of 0.6 and 6.0 lbs/acre. Simulated rainfall was applied to the soil columns at a rate of 1 inch per week for a total of 5 inches. Triclopyr was not detected below the top 4 inch layer of soil (100). These results indicate lower mobility than previously reported, but they may reflect the short persistence of Triclopyr in soil rather than its mobility through the soil profile.

Persistence

Soil

Microbial degradation is the primary mechanism by which Triclopyr is degraded in soils to two metabolites (15). Degradation under anaerobic conditions (i.e. saturated soils) is reported to be 5 to 8 times slower than under aerobic conditions (14). Triclopyr in soils is not thought to be degraded to any appreciable extent by chemical hydrolysis and, due to its low volatility, is not thought to volatilize from soil to any great extent (15).

A review by TRW states that Triclopyr "is not considered to be a persistent compound in soils" (95). Studies indicate that under certain conditions the half-life of Triclopyr can be relatively short. The Dow Chemical Company has reported a half-life of 10 days in silty clay loam (96). In a small West Virginia watershed the half-life was estimated as between 14 and 16 days (15). Triclopyr was applied aerially at the rate of 10 lbs/acre, but much of the Triclopyr was intercepted by foliage. Average Triclopyr residues in soil from the treated area of this study, measured on the day of the treatment, were non—detectable in densely wooded areas, 4.4 ppm in lightly wooded areas, and 18 ppm in open areas (15). In a Massachusetts field study, the half—life of Triclopyr was reported as 10 days after the applications of 0.6 and 6.0 lbs/acre Triclopyr to non-target vegetation (100).

Most other studies suggest a much longer persistence for Triclopyr in soil. In a laboratory study, Dow reported a half-life of 46 days for Triclopyr in loam. The loam was maintained in the laboratory at **95 deg** F with moisture at field capacity for the duration of the study (96). A **95 deg** soil temperature and moisture at field capacity are both quite high and indicate that the persistence at less than ideal conditions would be longer. Dow also reports the average half-life of Triclopyr in soil to be 30 days (101). An average half-life of 46 days is reported in the Herbicide Handbook (10) and by Ghassemi et al. (95). In addition, other investigators have reported a half—life in soil of "less than 50 days" at temperatures between 25-35 deg C, and between 79 and 156 days at 15deg C (14). In a field study conducted in Sweden, Garlon 3A was applied at the rate of 2 lbs (a.i.)/acre to eight different forest soils. Residues of Triclopyr persisted for 1 to 2 years, and in some cases in excess of 2 years, at levels approximately 10 percent or less of initial soil residue levels (15). It must be noted that soil temperature levels never exceeded 14deg C (57 deg F) and these temperatures are not favorable to microbial degradation (15). These low maximum temperatures are not typical of year round Massachusetts temperatures, but indicate the increased persistence that may occur when applications are made in the fall and are followed by cold weather.

The variable half-lives reported for Triclopyr indicate that soil half-life may be dependent on the soil and climatic conditions. As in most situations of microbial degradation; cold and, dry or saturated soils decrease the decomposition rate, while warm moist soils increase it.

Aquatic

The fate of the butoxyethyl ester of Triclopyr (TBEE) in water is summarized in Figure 1. This diagram shows the major degradation pathways for the ester in water, but does not include processes such as sediment and particulate adsorption. The fate of the ester in water has also been simulated with a modelling technique by McCall et al., 1988 (115). A recent study by Woodburn (116) with the triethylamine salt of Triclopyr experimentally applied to a lake in Florida also provides useful comparative data on the persistence of Triclopyr degradation products. The degradation path is believed to be TBEE to Triclopyr acid to 3,5,6—trichloro-2-pyridinol (TCP) to non-halogenated organic acids.

TBEE degrades quite rapidly in water to Triclopyr acid. Laboratory studies indicate that photolysis is the principal degradation pathway with hydrolysis also contributing (117, 118). Several studies indicate that the half-life of the ester in water can range from 1.5—2 days as a result of photolysis (117, 119). Hydrolysis half—lives are dependent upon water pH and temperature and range from 0.06 d to 208 d in natural waters. They decrease with increasing temperature and increasing pH. Acidic conditions increase the persistence of the ester substantially. The 208 d half—life was observed in natural unbuffered water at pH 5 and 15 °C. Waters with this pH level occur in Massachusetts. One laboratory study has produced contradictory results where the ester was stable to hydrolysis, and little photodegradation of the ester occurred over 9 months (120). This study however was performed with buffered, sterile water. Modelling results for the dissipation of the ester indicate that decay should be fairly rapid with a half-life of 12-18 hours (115).

The acid is short-lived in the aquatic environment with reported half—lives of from 2.1 hours at the water's surface in summer at **40deg** N latitude to 14 hr at 1m water depth in winter (117). The principal decay product of the acid is 3,5,6-trichloro-2-pyridinol (TCP), a transient metabolite in water with half—lives ranging from minutes to one day (121). TCP rapidly degrades into nonhalagenated, low molecular weight organic acids (116,121), with phototransformation playing a larger role than hydrolysis in this process.

Salomon et al. (118) demonstrated a half—life of 3.8-4.3 days at l6-17 deg C for the ester to TCP step in an Ontario Lake. Woodburn (116) added Triclopyr salt to a Florida lake and determined a half—life of 0.5—3.6 d at 300 C for the salt to organic acid step. The time scales of both of these studies are in general agreement with the other data on the time course of breakdown for the ester (or salt) to organic acids. With the exceptions of the Hamaker (120) study and a slow breakdown at pH 5, most studies indicate that TBEE in water is degraded relatively rapidly.

TOXICITY REVIEW

Acute (Mammalian)

The Triclopyr toxicity database has been reviewed in several places including the GEIR on the Control of Vegetation on Utility and Railroad Rights-of-Way in Massachusetts (14), Herbicide Handbook Weed Science Society of America (10), and by the U.S. Forest Service (15). Several Dow Publications review the Triclopyr information (101) and Garlon products (102 and 103).

The oral LD5O for Triclopyr in rats is 729 mg/kg in males and 630 mg/kg in females (15, 101). The rat oral LD5O for combined sexes has been reported as 713 mg/kg (10, 14). Rabbits and guinea pigs are more susceptible to oral administration of Triclopyr with LDSOs of 550 and 310 mg/kg respectively (14, 15, 10). The Garlon products have oral LD5Os of greater than 2000 mg/kg (10, 14, 15, 101, 103, 103).

The dermal LD5Os are greater than 2000 mg/kg in rabbits (Triclopyr), and greater than 3980 mg/kg in rabbits for Garlon 4 and Garlon 3A (101, 102, 103)

The effects of Triclopyr on the eye are dependent on the chemical derivative involved: the butoxyethyl ester found in Garlon 4 is essentially non—irritating (102, 15, 14, and 101), while the triethylamine salt is not only an irritant but can cause serious injury (101, 14, 15). These eye injuries include conjunctival irritation, moderate internal redness and moderate to severe corneal damage which may be permanent (14). An inhalation study showed that 100% of the test rats survived a 1 hour exposure to 3 to 20 dilutions of Garlon 3A in air. Transitory nasal irritation to rats was noted after a 4 hour exposure to Garlon 4 aerosol (14).

Metabolism

Two studies, one dermal and one oral have been done in humans to determine pharmacokinetic and metabolic profiles. Five mg/kg acid equivalent (ae) was applied to the forearm of 5 volunteers in the dermal study. One point five eight percent to 1.11% of the applied dose was absorbed and the percutaneous absorption half -life was 16.8 hours (108). In the oral study, 6 volunteers received 0.1 or 0.5 mg/kg Triclopyr (acid equivalent) in apple juice. The excretion half—life is 5 hours and 80% of the dose is recovered as unchanged Triclopyr in the urine (109). The 20% which was unaccounted for could be attributed to one of several explanations including incomplete collections of urine, incomplete absorption of material or metabolism to an unknown metabolite.

Subchronic/Chronic Studies (Mammalian)

Long—term bioassays have been done using Triclopyr in rats (107) and mice (106). Summaries of these studies, provided by Dow Chemical Company have been reviewed for this discussion.

Fischer 344 rats received 5, 20, 50 or 250 mg/kg/d in a preliminary 13 week study. There was a decrease in body weight gain at 50 and 250 mg/kg/d and kidney effects were observed in both sexes at doses of 20 mg/kg or greater (107). In the full two year study, the doses were 0, 3, 12 and 36 mg/kg/d. The dose related effects in the males were increased body weight at 12 and 36 mg/kg/d, and in females there was an increase in pigmentation in the proximal tubules at 3, 12 and 36 mg/kg/d. Neither the weight increase in the males nor the increased pigmentation in the females were accompanied by morphological, histological or functional changes. The NOAEL for males and females was reported to be 3 mg/kg/d (107).

In the mouse bioassay, ICR mice received Triclopyr in their diets for twenty-two months. The doses were 0, 50, 250, 1250 ppm (0, 5, 55, 28.6 and 143 mg/kg/d in males and 0, 5.09, 26.5 and 135 mg/kg/d in females). The range finding study included doses of 0, 200, 400, 800, 1600 or 3200 ppm. At the high dose there were decreases in body weight, anemia, changes in urine, increase in cholesterol levels and multiple changes in liver functions. Some of the liver changes were also observed in the 1600 and 800 ppm groups. There were decreases in body weights, changes in kidney and urine (at various doses and points in time) and liver effects at the 1250 ppm dose. At 250 ppm there were mild kidney effects and the NOEL was reported as 50 ppm (5.55 and 5.09 mg/kg/d for males and females respectively) (106).

In subchronic studies, the 90 day dietary NOELs were 30 mg/kg/d and 20 mg/kg/d for rats and mice, respectively. Dogs were more sensitive to dietary administration of Triclopyr, with kidney effects (decrease in excretion) at 2.5 mg/kg/d (14, 101). Dogs refused to eat food that would result in doses of 30 and 100 mg/kg (104). In a one year study, dogs received doses of 0. 0.5, 2.5 or 5.0 mg/kg/d. Minimal kidney effects were observed at 2.5 and 5.0 mg/kg/d. These findings were considered non—adverse by Dow making the NOAEL 5.0 mg/kg/d and the NOEL 0.5 mg/kg/d (105).

Two monkey studies were done to investigate kidney effects in primates. In one study, the monkeys received 0, 10, 20 or 30 mg/kg/d in diet for 28 days. There was no effect on urinary excretion or other responses observed (101, 104). In a second study, 4 monkeys received Triclopyr at 5 mg/kg/d for 28 days, the dose was then increased to 20 mg/kg/d for 102 days. The effects observed in this study were stool softening and diarrhea (104).

Oncocrenicitv Studies

There have been two chronic bioassays done for Triclopyr. Rats received 0, 3, 12 or 36 mg/kg/d and mice received 0, 50, 250 or 1250 ppm (0, 5.55, 28.6, 143 mg/kg/d for males and 0, 5.09, 26.5 and 135 mg/kg/d for females). The only positive result was an increase in combined incidence of mammary adenomas and adenocarcinomas in the female rats at the high dose. There was no evidence of multiple tumors and the effect was not dose related (107, 106).

Mutagenicitv Testing

Triclopyr has been tested for mutagenicity in a variety of test systems and found to be weakly positive in one, the dominant lethal study in rats. Triclopyr was non-mutagenic in bacterial assay systems, cytogenic assays, and mouse dominant lethal studies (15).

Developmental Studies

The teratology of Triclopyr was investigated using the rabbit model. Doses in the range finding study were 0, 25, 50, 100 and 200 mg/kg. There was 50% and 71% mortality in the 100 and 200 mg/kg groups respectively. The doses used in the full study were 0, 10, 25 and 75 mg/kg/d for days 6 to 18 of gestation. There were 16 rabbits per dose group. One dam in the 25 mg/kg/d group aborted and one dam in the 75 mg/kg/d group died. In the 25 mg/kg group one fetus had hyperplasia of the aortic arch with pulmonary arterial semilunar valve stenosis. Another fetus had a missing gall bladder. There was a statistically significant but non-dose related increase in resorptions at 10 mg/kg/d. This increase was within historical control variability. The developmental NOEL was reported as 75 mg/kg/d with a slight increase in maternal mortality (110)

Tolerances and Other Guidelines

Tolerances are set for Triclopyr on 5 raw agricultural commodities:
grasses, forage (500 ppm); grasses, forage, hay (500 ppm); milk (0.01 ppm); meat, fat and meat by products (except liver and kidney) of cattle, goats, hogs, horses, and sheep (0.05 ppm); and liver and kidney of cattle, goats, hogs, horses, and sheep (0.5) ppm (8).

The Dow internal guideline for inhalation exposure to Triclopyr is 10 milligrams/cubic meter (102, 103).

Avian

The toxic effects of Triclopyr on birds have been investigated in a small number of studies conducted by the Dow Chemical Company. For mallard ducks, acute oral LCSOs are reported at 1,698 mg/kg for unformulated Triclopyr, 3,176 mg/kg for Garlon 3A, and 4,640 mg/kg for Garlon 4. Eight day subchronic oral LC5Os are reported as follows for the various triclopyr formulations:

Triclopyr	
	mallard duck LC50 = 5,000 ppm bobwhite quail LC50 = 2,935 ppm Japanese quail LC50 = 3,278 ppm
Garlon 3A	mallard duck LC50=10,000 ppm bobwhite quail LC50=11,622 ppm
Garlon 4	mallar d duck LC50=l0,000 ppm bobwhite quail LC50=9,026 ppm

Source: (15)

The data summarized above indicate low acute and subchronic toxicity to the bird species tested. No field studies on the toxic effects of Triclopyr or its formulations in birds have been reported (15).

Invertebrates

Very little data were available on the invertebrate and microorganism toxicity of Triclopyr. The data reported are primarily for the triethylamine salt (Garlon 3A) and were generated by the Dow Chemical Company.

The data indicate low acute lethal toxicity* to organisms tested, with a 96 hr LC5O of 895 ppm in shrimp, 96 hr LC5O greater than 1000 ppm in crabs, and 48 hr LC5Os ranging between 56 and 87 ppm in oysters (15). The 48 hr LC5O for Daphnia is reported as 1,170 ppm (15). After 72 hours of incubation with 500 ppm of Triclopyr, no apparent effects on growth were observed in six soil microorganisms when compared to a control (15).

No information was obtained on the invertebrate toxicity of Garlon 4, the butoxyethyl ester of Triclopyr.

Aquatic

The available information on Triclopyr toxicity to fish indicate a wide response of fish to the two formulations of Triclopyr and to unformulated Triclopyr. The butoxyethyl ester of Triclopyr (Garlon 4) is "highly toxic to fish", based upon the Clarke et al. criteria. The 96 hour LC5O values for rainbow trout and bluegill sunfish are 0.74 and 0.87 ppm respectively (15). The corresponding value for juvenile Coho salmon is 1.3 ppm (122).

The triethylamine salt formulation (Garlon 3A) is "slightly toxic" to fish with 96 hour LC5Os of 552 and 891 ppm for rainbow trout and bluegills respectively. The corresponding values for unformulated Triclopyr are 117 ppm for rainbow trout and 148 ppm for bluegill. Both fish species were less sensitive to Garlon 3A than to the active ingredient (15).

No fish toxicity data are available for 3,5,6—trichloro—2—pyridinol (TCP), the intermediate breakdown product from the Triclopyr acid to the non—halogenated organic acid end product.

Dow Chemical Company reports that in natural soil and aquatic environments, both amine and ester formulations rapidly convert (photodegrade) to Triclopyr acid, which in turn is neutralized to a salt at normal environment pH (5.5-6.5)(15). No information is provided with any of the fish toxicity data on the actual form of Triclopyr present in the test water. The persistence data summarized in a previous section and the simulation results of McCall et al. (115), however provide a description of the probable fate of Triclopyr in the toxicity test tanks. The majority of the fish mortalities during the toxicity tests with bluegill sunfish and rainbow trout exposed to the ester occurred during the first 24 hours of the test: a pattern consistent with the change of the toxic ester form to less toxic breakdown products during this period (124).

EXPOSURE ASSESSMENT

For the exposure assessment, we have chosen to analyze the fate of the butoxyethyl ester form of Triclopyr (Garlon 4) in water because of its reported high aquatic toxicity in laboratory studies. Garlon 4 would be applied basally at an average application rate of 0.5 pints per acre for the proposed utility program.

In aquatic organisms, LC5Os greater than 10 ppm are considered to be indicative of only slight toxicity and LC5Os less than 1 ppm are considered to reflect high acute toxicity (Clarke et al., 1970 as referenced in [15]).

Since Garlon 4 contains 61.6% of the active ingredient, this application could distribute 37 mg Triclopyr BEE/m^2. The requested maximum application rate is 2 pints per acre.

Two aquatic exposure scenarios have been constructed to evaluate the potential contamination of non-target surface waters with Garlon 4 from a typical land application. The first, most extreme, and very unlikely scenario is for the case of a static stream traversing a treated acre with a percentage of all of the herbicide applied to the acre running into the water. The second represents a more shallow, static stream or standing water body of much less volume with runoff from a portion of the bordering land.

SCENARIO (1)

ASSUMPTIONS:

Application rate = 0.5 pint/acre

0.47 L/pint

61.6% active ingredient
20% of herbicide applied to acre runs off
density of applied herbicide = 1.0 g/ml

RUNOFF:

0.20 x 0.5 pt/acre x 0.47 L/pt x 0.616 = 0.03 L/acre

RECEIVING WATER:

Static stream crossing a treated acre
Dimension: 0.3 x 1.22 x 64 m = 23.4 **in**^{3} (volume)

DILUTION:

0.03L into 23.4 m = 1.3 mL/m^3

1.3 mL/m^3 x 1 m^3 /10^3 L = 1.3 x 10 mL/L

1.3 x l0^{-3} mL/L x 1 g/ml x l0^3 mg/g = 1.3 mg TBEE/L

SCENARIO (2)

ASSUMPTIONS:

Application Rate = 0.5 pt/acre
0.47 L/pt
61.6% active ingredient **2**
20% of herbicide applied to 3m^2 runs off
density of applied herbicide = 1.0 g/ml

RUNOFF:

0.2 x 0.5 pt/acre x 0.47 L/pt x 0.616 x 2.47 x 10^{-4} acre/m^2 x 10 mL/L x 3 m^2 = 0.02 mL

RECEIVING WATER:

Static stream,
Dimensions: 0.15 x 1 x 5 m = 0.75 m^3 (volume)

DILUTION:

0.02 mL into 0.75 m3 = 0.03 mL/m^3

0.03 mL/ m^3 x 10^{-3} m /L x 10^3 mg/g x 1 g/ml = 0.03 mg/L

The calculations presented above illustrate that the probable immediate post—runoff concentrations of TBEE in static water bodies will be in the sub-parts per million range. At maximum application rates (2 pts/acre), these concentrations would range from about 0.1 to 5.2 mg/L. The concentrations for the worst exposure scenario (#1) are greater than (7x) the 96 hour LC5O concentrations for freshwater fish; those for the other scenario are almost an order of magnitude less. The no effect level for TBEE with juvenile Coho salmon is ≤1.0 mg/L (122). Therefore, under the worst exposure scenario with the maximum application rate of herbicide, the 96 hour LC5O could be exceeded. Under other, less extreme conditions at average application rates, predicted concentrations of the active ingredient would be substantially less than the reported no effect level in Coho salmon. The persistence characteristics of TBEE are such that the ester form of Triclopyr would not likely persist in surface waters for longer than a couple of days, except in those waters in Massachusetts which are acidic where the ester may persist for up to several months. It is also very unlikely that rainbow trout would be impacted at application rates of 0.5 pts/acre based on the reasonable scenario (#2) which predicts water concentrations of Garlon 4 less than toxic concentrations.

The following factors would also tend to reduce the exposure concentrations that fish would experience: flowing waters would provide greater dilution than assumed for static conditions; the Massachusetts Right-of-Way Management Act mandates an application setback of 10 feet from standing or flowing waters or from wetlands (33 CMR 1l.04:(l) and (4) (a)); and actual runoff of the applied herbicide would probably be less than used for these sample calculations. Scenario 1 represents an extremely unlikely event where 20% of all the herbicide applied to an acre runs off into a small water course. The conditions which would foster this type of runoff across setbacks (i.e. heavy rains) would tend to turn static stream systems into flowing water courses and hence increase dilution.

The application rate used in the previous non—target species assessment (June 23, 1990) was 0.5 pints per acre applied basally. The utilities involved in managing rights-of-way and the manufacturer of Garlon 4 have since indicated that the required application rate may range as high as 2-3 quarts of Garlon 4 per acre for effective control of vegetation. The following addition to the exposure assessment examines the resultant changes in the predicted exposure concentrations that might occur in freshwater fish habitats when Garlon 4 is applied at the 2-3 quarts /acre rate.

The change in the application rate will result in the following differences in predicted exposure concentrations from those originally predicted for 0.5 pts/acre:
2 at/acre x 2pt/ qt = x 8 0.5 pt/acre

3at/acre x   2pt/qt = x 12 0.5 pt/acre

Application rates will therefore be 8-12 times greater than for the 0.5 pts/acre case. The probable concentrations in water after runoff as previously predicted were 1.3 (Scenario 1) and 0.03 mg/L (Scenario 2) ing butoxyethyl ester of Triclopyr / L. These concentrations would therefore range from 0.24 — 15.6 ing/L for application rates between two and six quarts.

These predicted concentrations encompass and substantially exceed the reported LCSO concentrations for fish (in range of 0.7 - 1.3 mg/L and the NOEL of 1 mg/L for juvenile Coho salmon. The more realistic exposure scenario (#2) predicts exposure concentrations of the same order of magnitude as the LC5O values.

Given that the higher application rates required for vegetation control in some areas have the potential to produce potentially lethal concentrations of the butoxyethyl ester of Triclopyr to fish in water as a result of runoff, a setback greater than the mandated 10 feet from standing or flowing waters (333 CMR 11.04: (1) and (4) (a)) will provide an additional level of protection when application rates exceed 0.5 pts/acre.

SUMMARY

Triclopyr exhibits moderate mobility in most of the soils tested. Soils with higher organic carbon content would be expected to retard the mobility of Triclopyr. Trichloropyridinol, the major breakdown product, is less mobile than Triclopyr.

Microbial degradation is the primary mechanism by which Triclopyr is degraded in soils. Degradation rates are variable and appear to be dependent on the soil and climatic conditions. In Massachusetts conditions, Triclopyr can be expected to have moderate persistence when applied in warm weather (late spring —early fall), and slightly longer persistence in colder weather.713 mg/kg. Rabbits and guinea pigs have oral LDSOs of 550 and 310 mg/kg respectively. The target organ for Triclopyr is in the liver. The only positive result in the oncogenicity studies was an increase in the combined incidence of mammary adenomas and adenocarcinoinas in the female rats at the high dose. Mutagenicity tests were negative. The developmental NOEL was reported as 75 mg/kg/d with a slight increase in maternal mortality. Using EPA's carcinogen classification scheme, Triclopyr may be considered a group C carcinogen (possible human carcinogen: limited animal evidence).

RECOMMENDATION

The herbicide Garlon 4, containing the butoxyethyl ester of Triclopyr (EPA Reg. No. 464-554), is recommended for use in sensitive areas only at application rates of 0.5 pt/acre pursuant to 333 CMR 11.00. Applications at rates up to three quarts per acre are permitted with a setback of 50 feet from standing or flowing waters suitable for fish habitat. The set back restriction may be waived upon demonstration to both the Departments of Food and Agriculture and Environmental Protection that runoff concentrations from applications of Garlon 4 with setbacks less than 50 feet do not pose a threat to fish.

REFERENCES

8. BNA Chemical Regulation Reporter: Starts 1977 A weekly view of activity affecting chemical users and manufacturers. Pub. by the Bureau of National Affairs Inc. 0148—7973

10. The Herbicide Handbook: 1983 Fifth Ed. Handbook of the Weed Science Society of America; Pub. by the Weed Science Society of America, Champaign, Ill.

14. GEIR Generic Environmental Impact Report: 1985 Control of vegetation of utilities & Railroad Rights of Way Pub. by Harrison Biotec, Cambridge, MA

15. Pesticide Background Statements: Aug. 1984 USDA Forest Service Agriculture Handbook #633 Vol. 1

95. TRW, 1981. Environmental Fates and Impacts of Major Forest Use Pesticides. US Environmental Protection Agency. Office of Pesticides and Toxic Substances. Contract No. 68—02—3174., Washington, D.C.

96. The Dow Chemical Company, 1983a. Technical Information on Triclopyr, The Active Ingredient of Garlon Herbicides; Technical Data Sheet No. 137—859—483. The Dow Chemical Company, Agricultural Products Department, Midland, Michigan. As cited by Pesticide Background Statements, (1984)

100. Soil Residues of Picloram and Triclopyr after Selective Foliar Application on Utility Rights of Way. Deubert, Karl H. and Corte—Real, I., Journal of Arborculture, 12 (11) 269.

101. Dow Environmental and Toxicology Profile of Garlon Herbicides. Technical Data Sheet.

102. Dow MSDS Sheet for Garlon 4.

103. Dow MSDS Sheet for Garlon 3A.

104. Personal communication with Dr. David Eisenbrandt 12/30/88.

105. Quast, J.F., et al., 1988. Triclopyr: A One-Year Dietary Toxicity Study in Beagle Dogs. The Dow Chemical Company Study ID: K—042085—036.

106. Tsuda, S., et al., 1987. Triclopyr: 22-Month Oral Chronic Toxicity and Oncogenicity Study in Mice. The Institute of Environmental Toxicity, Tokyo, Japan.

107. Eisenbrandt, D.L., et al., 1987. Triclopyr: 2-Year Dietary Chronic Toxicity-Oncogenicity Study in Fischer 344 Rats. The Dow Chemical Company Study ID: HET K-042085-026.

108. Carmichael, N.G., et al., 1988. Human Dermal Absorption Study of GARLON 4. The Dow Chemical Ltd., Letcombe, England. Laboratory Project ID: 87/DCSO4l/835.

109. Carmichael, N.G., et al., 1988. A Study of the Oral Absorption and Excretion of Triclopyr in Human Volunteers The Dow Chemical Ltd., Letcombe England. Laboratory Project ID: 87/DCSO31/808.

110. Kirk, H.D., et al., 1988. DOWCO* 233: Oral Teratology Study in New Zealand White Rabbits. The Dow Chemical Company Study ID: HET—K—042085—042.

111. Bruce, R.J., et al., 1985. Evaluation of 3,5,6-trichloro-2-pyridinol in the Mouse Bone Marrow Micronucleus Test. The Dow Chemical Company Study ID: TXT:K—038278—008.

115. McCall, P.J., D.A. Laskowski, and H.D.Bidlack. 1988. Simulation of the aquatic fate of Triclopyr butoxyethyl ester and its predicted effects on Coho salmon. Envtl. Tox. and Chein. 7:517—527.

116. Woodburn, K.B. n.d. The aquatic dissipation of Triclopyr in Lake Seminole, Georgia. Unpublished Report. 9/12/88. Dow Chemical USA, Midland, MI. 76pp.

117. McCall, P.J., and P.D. Gavit. 1986. Aqueous photolysis of Triclopyr and its butoxyethyl ester and calculated environmental decomposition rates. Envtl. Tox. and Chem. 5:879—885.

118. Solomon, K.D., C.S. Bowhey, K. Liber and G.R. Stephenson. 1988. Persistence of Hexazinone (Velpar), Triclopyr (Garlon), and 2,4—D in a northern Ontario aquatic environment. J. Agric. Food Chem. 36:1314-1318.

119. Dow Chemical USA. Letter from Dr. Frank A. Kidd to Mr. Lee Corte Real, MA DFA. Dated 9/21/89.

120. Hamaker, J.W. 1977. Photolysis of Triclopyr ((3,5,6-trichloro-2-pyridinyl) oxyacetic acid) in aqueous solution. GS-1467. Unpublished data of Dow Chemical USA referenced in Woodburn, n.d.

121. Dilling, W.L., L.C. Lickly, T.D. Lickly, and P.G. Murphy.1984. Organic Photochemistry. 19. uantum yields for o ,o-diethyl o- (3,5, 6-trichloro-2-pyridinyl) phosphorothioate (Chlorpyrifos) and 3,5, 6-trichloro-2 pyridinol in dilute aqueous solutions and their environmental phototransformation rates. Environ. Sci. Technol. 18:540—543.

122. Mayes, M.A., P.G. Murphy, D.L. Hopkins, F.M. Gersich, and F.A. Blanchard. 1986. The toxicity and metabolism of Triclopyr butoxyethyl ester: Coho salmon. Toxicologist 6:26 (Abstr.).

123. Bidlack, H.D. 1978. The hydrolysis of Triclopyr EB ester in buffered, deionized water, natural water, and selected soils. GH-C 1106. Unpublished data of the Dow Chemical Co.

124. McCarty, W.M., and H.C. Alexander. n.d. Toxicity of Triclopyr, ethylene glycol butyl ether ester to freshwater organisms. Unpublished report. Environmental Sciences Research Laboratory, Dow Chemical USA

Environmental Monitor Notice

NOTICE

Pursuant to the provisions of the Rights-of-Way Management Regulations, 333 CMR 11:00, in order to apply herbicides to control vegetation along electric utility rights-of-way, a 5-year Vegetation Management Plan (VMP) and a Yearly Operational Plan (YOP) must be approved by the Department of Agricultural Resources (DAR). Therefore, notice of receipt of a YOP and procedures for public review is hereby given as required by Section 11.06(3).

A Yearly Operational Plan for Eversource Energy - Western Massachusetts has been submitted to the Department.

Eversource Energy has submitted the following summary of their Yearly Operational Plan (YOP):

> The YOP describes vegetation maintenance work to be done on transmission line rights-of-way and distribution line rights-of-way. Maps identify the location of rights-of-way scheduled for treatment in 2018. Sensitive areas not readily identifiable in the field are located on these maps including public surface water supplies, and public ground water supply wells and their primary recharge area. Private drinking water supply wells reported by the municipality and made available to the applicant are specified in the YOP.

Herbicide methods including application rates, carriers and adjuvants are presented according to the herbicide application technique and appropriate location. Alternative woody vegetation control procedures are designated as cutting without herbicide treatment and options precluding herbicide use. The companies which will perform the herbicide treatment are listed and identified in the notification given at least 30 days prior to herbicide treatment. Additionally, herbicide applications to rights-of-way in 2018 are subject to a "newspaper-notification" requirement. Target vegetation capable of interfering with the conductors or access is described in terms of desirable and undesirable species. The individual(s) representing the applicant supervising the YOP are provided. Flagging methods to designate sensitive areas on the right-of-way are described with corresponding sketches for public groundwater supply wells, public surface water supplies and wetlands. Herbicide fact sheets as approved by the Department, as well as procedures and locations for handling, mixing, and loading herbicide concentrates are included. Local emergency planning committees are listed for emergency notification of municipal officials.

Municipalities and sites identified in the Eversource Energy YOP as locations where treatment of rights-of-way with herbicides will be carried out during the calendar year 2018 are:

SCHEDULED WORK by TOWN

2018 Scheduled Vegetation Maintenance Work

Scheduled work by town:

Note: T - #'s designate transmission lines scheduled for work.
D - #'s designate bulk-supply distribution lines scheduled for work.
"Brush" followed by a street name identifying location of brush.
"Touch-up" designates a touch-up application only
"Vines" treatments specific to vines climbing on poles or equipment

Distribution

Transmission

	TOWN	
Ashfield	WT-03 Northfield – Ashfield, WT-01 Ashfield - Berkshire	

Becket		WT-33 C.T Line – Pleasant JCT
Blandford		WT-33 C.T Line – Pleasant JCT
Cheshire	WT-02 Berkshire – Doreen – N.Y.	
Conway	WT-03 Northfield - Ashfield	
Dalton	WT-02 Berkshire – Doreen – N.Y.	
Deerfield	WT-03 Northfield - Ashfield	
Easthampton		WT-32 Midway S/S –Elm S/S – Granville JCT
Erving	WT-03 Northfield - Ashfield	
Granville		WT-33 C.T Line – Pleasant JCT
Hancock	WT-02 Berkshire – Doreen – N.Y.	
Hinsdale	WT-01 Berkshire – Ashfield, WT-02 Berkshire – Doreen – N.Y.	
Lanesborough	WT-02 Berkshire – Doreen – N.Y.	
Lee		WT-31 Pleasant S/S – Oswald S/S – Doreen S/S, WT-33 C.T Line – Pleasant JCT
Lenox		WT-31 Pleasant S/S – Oswald S/S – Doreen S/S
Montague	WT-03 Northfield - Ashfield	
Northfield	WT-03 Northfield - Ashfield	
Otis		WT-33 C.T Line – Pleasant JCT
Pittsfield	WT-02 Berkshire – Doreen – N.Y.	WT-31 Pleasant S/S – Oswald S/S – Doreen S/S – G.E S/S
Plainfield	WT-01 Berkshire - Ashfield	
Peru	WT-01 Berkshire - Ashfield	
Russell		WT-32 Midway S/S –ElmS/S – Granville JCT, WT-33 C.T Line – Pleasant JCT
Shelburne	WT-03 Northfield - Ashfield	
Southampton		WT-32 Midway S/S –ElmS/S – Granville JCT

Public Review

The Department of Agricultural Resources (DAR), in particular, seeks the verification of sensitive area locations reported in the YOP. The Department itself has a limited ability to survey the geography, land use, and the water supplies in all the communities through which the rights-of-ways are located. Municipalities, however, have most of this information readily available, and the particular knowledge with which to better certify the sensitive areas in their communities. Therefore, the Department requests and urges the assistance of the "affected" municipalities in reviewing the completeness and accuracy of the maps contained in the submitted document. The DAR has established the following procedures for this review.

Yearly Operational Plans (YOP's) and a copy of this notice will be sent by the applicant to the Conservation Commission, Board of Health (or designated health agent) and to the head of government (mayor, city manager, chair of the board of selectmen) of each municipality where herbicides are to be applied along the rights-of-ways during the calendar year 2018. Municipal agencies and officials will have forty-five (45) days following receipt of the YOP to review the maps contained in the document that indicate the location of "sensitive areas not readily identifiable in the field" for inaccuracies and omissions. "Sensitive areas" will be defined as in Section 11.02, and exclude wetlands which are to be delineated "in the field" as described in the applicant's approved Vegetation Management Plan (VMP).

Municipal agencies and officials are requested to forward the YOP to the appropriate official(s) in the municipality qualified to certify the accuracy of sensitive area locations as indicated on the maps. The maps should be corrected and returned to the applicant, also a copy of the maps with these corrections indicated should be sent to the DAR to the addressed listed below, within the forty-five day review period. If a city or town needs more time to carry out this review, it should send a written request for an extension to the DAR and cite why there is "good cause" for requesting additional time.

All corrections will be required to be made by the applicant, and corrected maps sent back to the city/town before the YOP can be considered "approved" by the Department for vegetation maintenance in that municipality. Any dispute on the part of the applicant regarding corrections made by municipal authorities should be indicated in writing to the Department and to the city/town which requested the disputed changes within fifteen (15) days of receipt of that request. The Department will decide whether or not the YOP should be approved without the requested changes. The DAR will consider the "final approval" of the YOP individually for each municipality.

A failure by the city/town to respond to the applicant's submission of this YOP within the forty-five day public review period will be considered by the DAR to indicate agreement by municipal officials with the sensitive area demarcations as provided by the applicant in their YOP.

Any questions or comments on the information provided in this Notice and the procedures established for the municipal review as outlined above should be addressed to:

Rights-of-Way Program
Pesticide Bureau
Massachusetts Department of Agricultural Resources
251 Causeway Street, Suite 500
Boston, MA 02114

Any additional questions or comments on any information provided as part of the proposed YOP should be addressed in writing to:

Sean D. Redding
Manager—Transmission Vegetation Management
Eversource Energy
107 Selden Street
Berlin, CT 06037

A copy should also be sent to the Rights-of-Way Program at the above address.