

*Town of Spencer*  
Office of the Board of Selectmen  
&  
Town Administrator

Board of Selectmen:  
*Ralph E. Hicks*  
*Anthony D. Pepe*  
*John F. Stevens*  
*Chris L. Woodbury*  
*Gary E. Woodbury*

Town Administrator:  
*Adam D. Gaudette*  
[agaudette@spencerma.gov](mailto:agaudette@spencerma.gov)

February 28, 2017

Mr. Jonathan Gulliver  
District Highway Director  
MassDOT District # 3  
403 Belmont Street  
Worcester, MA 01604

**Re: PROJECT NEED FORM (PNF)**  
**Meadow Road Reconstruction and Complete Streets Intermodal Enhancements**  
**From W. Main Street (Route 9) to N. Spencer Road (Route 31) / Pleasant Street**

Dear Mr. Gulliver:

The Town of Spencer respectfully submits the enclosed Project Need Form (PNF) for the Reconstruction of Meadow Road with comprehensive intermodal complete streets enhancements, including but not limited to the addition of new pedestrian sidewalks, transit and bicycle accommodations, traffic safety, and drainage and stormwater quality improvements. These improvements are being done for the entire length of Meadow Road in order to confirm eligibility for programming under the State Transportation Improvement Program (STIP).

The proposed design will address the safety improvements recommended by the 2014 CMRPC / CMMPO Holden - Paxton - Spencer Route 31 Corridor Profile. The intermodal access and safety and environmental improvements included in the proposed project are also consistent with Complete Streets priorities of the community and the context of the corridor. The Town looks forward to the programming and construction of the Meadow Road project under the STIP. The Town has paid for the development of survey base plans, copies of which are provided with the attached PNF. We are committed to fully funding the design, permitting, and ROW for the project and further plan to contract with a MassDOT pre-qualified design engineer in 2017. The preliminary 25% design will be submitted to MassDOT for review in early 2018.

Thank you for your consideration in this matter. If you have any questions feel free to contact this office or our U&F Superintendent Steven J. Tyler, P.E., at (508) 885-7525 or [styler@spencerma.gov](mailto:styler@spencerma.gov).

Sincerely,



John F. Stevens  
Chair, Board of Selectmen

Enclosure

CC: Adam Gaudette, Town Administrator  
Steven J. Tyler, P.E., Superintendent, Utilities and Facilities Office  
Sujatha Mohanakrishnan, Transportation Program Manager, CMRPC

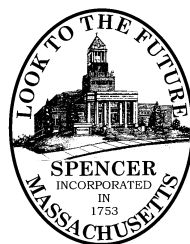


# **Project Need Form (PNF)**

## **Meadow Road Reconstruction & Intermodal Enhancements**



**Submitted By:**  
**Town of Spencer**  
**Board of Selectmen**



**Prepared By:**  
**Town of Spencer**  
**Steven J. Tyler, P.E.**  
**Spencer Utilities & Facilities Office**  
**February 2017**

# **MEADOW ROAD PNF**

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**MASSDOT - HIGHWAY DIVISION**  
**Project Need Form**

This form is intended to provide preliminary information about the proposed project. It is not expected that all information that is asked for is available or known but applicants are encouraged to complete the form as fully as possible.

Proponent: John F. Stevens Title: Chair, Board of Selectman  
Municipality/Organization: Town of Spencer  
PNF completed by: Steven J. Tyler, P.E Title: Superintendent of Utilities and Facilities  
Phone: (508) 885-7525 Email: styler@spencerma.gov  
Date: 1/24/2017

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**Part I – Facility Location and General Information**

Municipality: Town of Spencer  
Route and/or Street(s): Meadow Road  
MassDOT District: 3 MPO Region: Central

Estimated project limits by mile marker, station or other distinguishing landmarks such as cross street(s).  
**Please include a locus map of the project.**

Start: W. Main Street (Route 9)  
End: N. Spencer Rd. (Route 31) / Pleasant St.  
Total Mileage: 1.6 miles

What is the federal functional classification of the road? Identify each section.

<input type="checkbox"/> Interstate	<input type="checkbox"/> Urban Collector	<input type="checkbox"/> Rural Major Collector
<input type="checkbox"/> Urban Principal Arterial	<input type="checkbox"/> Rural Principal Arterial	<input type="checkbox"/> Rural Minor Collector
<input checked="" type="checkbox"/> <b>Urban Minor Arterial</b>	<input type="checkbox"/> Rural Minor Arterial	<input type="checkbox"/> Other Classification <u>                    </u>

Is the proposed project on the National Highway System? **X Yes** ☐ No

Is the proposed project eligible for Transportation Alternatives? **X Yes** ☐ No

Who owns the roadway/facility? Town of Spencer

**Project Need:** Briefly describe or characterize, in general terms, the primary project need or goal (e.g. rehabilitate a roadway, improve safety at an intersection, reduce corridor congestion, improve pedestrian facilities, or provide bike accommodation).

The existing road is in poor condition, heavily cracked, with numerous pot holes and patches. Also, there are no existing pedestrian or bicycle accommodations. Stormwater quality and drainage improvements are also needed. The proposed reconstruction will be comprised of comprehensive intermodal roadway improvements including addition of new bicycle and sidewalk accommodations; MAAB/ADA accessibility; transit; and safety. The roadway enhancements are highly ranked in the Town's Complete Streets Prioritization Plan. The project will also include substantial drainage and stormwater quality improvements. The Town's primary drinking water source and Zone II Aquifer Protection District is located along the entire westerly side on Meadow Road.

Identify the **Primary Asset** included in the project area (e.g. roadway, intersection, bridge, bike trail, structure). Roadway

**Part II: Project or Program Description**

Provide whatever information is available to characterize the existing, general attributes of the facility.

CHARACTERISTIC	DATA	Comments
Number of Lanes	2	The proposed reconstruction will retain 2 lanes for vehicular travel and add bicycle, pedestrian and transit accommodations along the entire length of Meadow Road
Lane Width	11 feet	Field Measurements
Shoulder Width	1-3 feet	Field Measurements
Existing Right of Way	60 feet	Varies – 60 feet or greater
Annual Daily Traffic (ADT)	5,825 VPD	CMRPC Corridor Profile
Percent Truck Traffic	5%	Estimated, CMRPC Corridor Profile
Traffic Control (signal, flash, signs, etc.)	Signal and stop sign	Signalized at W. Main St (Route 9) Intersection
Roadway Lighting	Yes	Street lighting along entire length
Posted Speed Limit	30/40 mph	Police records & existing postings
Transit Routes & Facilities	WRTA rest/start/stop	#33 at 7 Meadow Rd

**In what type of area is the project located?** *Project limits may include more than one type of area. For a definition of areas, please refer to Chapter 3 of the Guidebook.*

- ☐ Rural Natural                      ☐ Suburban High Density  
☐ Rural Village                      ☐ Suburban Village/Town Center  
☒ **Rural Developed**                      ☐ Urban Residential or CBD  
☒ **Suburban Low Density**

**How does the roadway/facility function in the community?**

- ☐ High-speed, primary corridor with limited access  
☒ **Moderate speed, major corridor between towns/regions**  
☐ Low to moderate speed corridor between towns/regions  
☐ Moderate speed, major street connecting residential areas to a town center or major connector  
☒ **Low to moderate speed street connecting residential areas with other streets**  
☐ Primarily or exclusively a residential street  
☐ Exclusive pedestrian/bicycle facility

**Regional Considerations:** Identify any regional use of the roadway (Characterize how neighboring communities use the roadway, what kind of link it provides to major arterials or highways).

Meadow Road links communities from south and west regions to communities in north and east regions, and provides direct access to the Town's commercial and retail facilities on Route 9. Meadow Road services high commercial volumes including the E. Brookfield/Spencer automotive rail yard facility. Each end of project has been identified as a critical evacuation control intersections per the regional emergency plan by CMRPC. Meadow Road is services the only transit route in Spencer and is the primary access to the Spencer Fairgrounds. This project will greatly enhance access to public transit and other intermodal connections.

For additional information please refer to Appendix 2 – Excerpts from Holden - Paxton - Spencer Route 31 Corridor Profile (by CMRPC / CMMPO Sept. 2014).

**Part III: Identification of Problem, Need or Opportunity**

**A. Condition of Existing Facilities - Problem, Need, or Opportunity**

1. Please describe the condition of the roadway, path, or other horizontal facility, such as type and extent of cracking, ride-ability, utility patching or other surface defects such as rutting, raveling, shoving, bleeding, etc. This may be based on visual inspection or automatic detection methods. Are deformations related to the pavement structure, indicating road sub-base issues? Include any PMS (Pavement Management System) ratings, PCI (Pavement Condition Index) data and/or photos, if available.

The roadway is in poor condition. There is significant pot holing/patches, utility patches, depressions and alligator cracking, loss of roadway edges, and limited/poor drainage in some areas. The Pavement Condition Index (PCI) score from the Town's Pavement Management Program is poor. Refer to Appendix 1 – Photographs and Appendix 2 – Corridor Profile Study by CMRPC / CMMPO Sept. 2014.

2. Please describe the condition of facility appurtenances, such as signs, signals, lighting, median barriers, guardrail, pavement markings, curbing, landscaping, fences, ITS components, etc.

Signage on the roadway is limited. There are no barriers, guardrails, fences, or ITS components. There is limited landscaping and curbing near the southerly limits. Existing street lighting is adequate.

3. Please describe any specific concerns related to the existing drainage system. If there is a history of flooding in the project area, describe the potential solutions under consideration, such as increased maintenance, repair/replacement of drainage infrastructure, raising the vertical profile, or culvert replacement, etc. Are there opportunities for improving storm water management, including drainage outfalls, within the project limits?

There is no history of significant flooding, however, Meadow Road is located in the Public Water Supply Well Zone II Aquifer Protection District. An upgraded closed drainage system is need due to new sidewalks/curbing. The Town's primary water supply aquifer and drinking water plant/pump station is on Meadow Road. Stormwater drainage and water quality improvements are warranted and will be included in the proposed project. The Town will begin design and implementation of stormwater quality improvements in advance of this project as part a CWA Section 319 water quality grant in 2017.

4. Please describe the condition of any other structures, or equipment (retaining walls, buildings, noise barriers, bus shelters, bike racks, etc.)

Significant improvements to the existing WRTA stop at the southern end of Meadow Road shall be included. In addition, the Town will be working with the WRTA to expand the existing bus route and include additional new bus stops along Meadow Road servicing the adjacent residential, commercial and retails areas. There is a wastewater pump station located near the Meadow Rd / Fourth Ave intersection.

5. If the project/program includes a bridge or bridges, please describe the condition, such as bridge ratings, dates of inspection, weight restrictions, closings, structural adequacy, functional obsolescence, condition of other bridge elements, etc. Identify the bridge location and ID number (if known).

N/A – There are not any bridges along Meadow Road.

6. Please describe the condition of any existing pedestrian facilities. Include the limits and width of any existing sidewalks and identify any obstructions. Are the existing sidewalks ADA/AAB compliant? In addition, please characterize the pedestrian need, including any indication that pedestrians use the corridor beyond existing sidewalks (rutted paths, pedestrian using the roadway shoulder, etc.). ● GreenDOT

There are no existing pedestrian facilities, however, existing pedestrian use of the roadway shoulder is high. As described above the proposed reconstruction will include considerable intermodal enhancements such as the addition of new bicycle and sidewalk accommodations; full MAAB/ADA accessibility; transit upgrades and new transit accommodations; and safety. The proposed improvements are highly ranked in the Town's Complete Streets Prioritization Plan.

7. Please describe the existing bike accommodation (4' minimum shoulder width, bike lane, or shared use path), including the limits and width of any existing facility. In addition, please characterize existing bike traffic. ● GreenDOT

Currently there are no dedicated bicycle accommodations. The usage of Meadow Road by bicyclist occurs regularly, however, it is limited likely because of poor road conditions and lack of safely traversable shoulder. The proposed improvements include the addition of new shoulders for bicyclists in both directions. A sharp rise in pedestrian and bicycle activity will occur upon completion of the project.

8. Identify and locate any underground utilities (water, sewer, gas, other) and overhead utilities (electric phone, cable). Identify any larger utility appurtenances, above ground or underground, such as cabinets or vaults. Identify any active or inactive railroad crossings.

There is a wastewater pump station located near intersection with Fourth Avenue. There are underground water and sewer as well as overhead electric, phone, and cable utilities. The area is not serviced by natural gas at this time.

9. Describe any repair or preventive maintenance to the roadway or appurtenances. Include the extent of the work (resurfacing, rehabilitation, reconstruction or replacement) and when the last repair was done? ● GreenDOT

In an effort to maintain drivability, recent resurfacing of the Meadow Road at Smithville Road and N. Spencer Road (Route 31) intersections were completed in 2015, along with other surface overlays at select locations. Other than these spot repairs, Meadow Road has not been resurfaced in more than 20 years.

## **B. Mobility - Problem, Need, or Opportunity**

1. Please describe any existing or prospective highway congestion issues. Identify the nature and extent of congestion, including when it occurs and whether there is queuing. Include any traffic analysis, including LOS (Level of Service) data, if available. ● GreenDOT

At the Meadow Road and W. Main Street (Route 9) intersection, northbound vehicle queuing lanes from South Spencer Road are of insufficient length and during peak flow periods drivers have been observed driving over the roadway curbing. Refer to Appendix 2 – Excerpts from Holden - Paxton - Spencer Route 31 Corridor Profile (by CMRPC / CMMPO Sept. 2014) for further information.

2. Please describe any need or opportunity for greater connectivity or improved access along the corridor or to particular points along the facility. Identify any missing connection or constraint in access that could be improved for greater mobility. ● GreenDOT

As described above the proposed improvements include adding new sidewalk / pedestrian and bicycle accommodations to this roadway consistent with the Town's Complete Streets Prioritization Plan. Also, as noted above, the shoulders are used heavily for pedestrian and some bicycle traffic, creating unsafe situations for those users. The proposed sidewalk and bicycle accommodations will connect commercial and shopping areas at southerly limits to high density residential areas to the north and other new Complete Streets priority sidewalk projects on Pleasant Street and Smithville Road. The Meadow Road intersections with W. Main Street (Route 9) and N. Spencer Road (Route 31) are identified as critical intersections in the region's emergency preparedness and evacuation plans.

3. Please identify any mobility issues for pedestrians, bicyclists and transit users. Identify if roadway is included in any local, regional or statewide bicycle routes. Include any obstacles or missing connection of existing pedestrian facilities, as well as any impediments that effect pedestrian access and mobility. Include any pedestrian or bicycle data, including bicycle LOS (Level of Service) analysis, or user count data, if available. ● GreenDOT

The Town will be working with CMRPC to do a walkability study and Roadway Safety Audit for Meadow Road. The addition of sidewalks are part of the Town's sidewalk betterment and connectivity plans and

the Town's Complete Streets Prioritization Plan. In addition to providing safe access for pedestrians to residential areas, it also connects pedestrians to the Spencer Fair Grounds and Powder Mill Park, a heavily used playground facility. The WRTA has an existing bus termination / start /rest stop location on Meadow Road, and this project would like to coordinate with the WRTA for multiple transit improvements along Meadow Road, including expending the WRTA route, providing additional stops; new kiosks and the possibility of a mini hub. There are no designated bicycle facilities currently. This project proposes to have a shared use shoulder in both directions and bike racks at key locations.

### **C. Safety and Security - Problem, Need, or Opportunity**

1. Please describe any safety concerns on the facility. Provide any crash history within the project limits, including number and severity of crashes, type of crashes and whether there have been any fatalities. Include the calculated crash rate, if available.

Safety concerns exist at the N. Spencer Road (Route 31) intersection, which has had high crash rates in the past; and there was a traffic fatality at the intersection with Smithville Road in 2014. Intersection visibility and safety improvements have been made at both of these two intersections over the past few years, which seem to have reduced the number of accidents. Refer to Appendix 2 – Excerpts from Holden - Paxton - Spencer Route 31 Corridor Profile (by CMRPC / CMMPO Sept. 2014) for further information, traffic counts and a summary CMRPC's analysis of a recent 3-year period of accidents. Copies of the actual accident reports are available upon request. This project will incorporate further safety improvements at these and all other intersections along the corridor.

2. Please describe adjacent significant activity centers (schools, senior centers, places of assembly, industrial operations, or parks). Please describe any safety issues for other users such as pedestrians, bicyclists, persons with disabilities, transit riders, trucks, school children, etc. ● GreenDOT

Bond Sand, Gravel & Stone; Spencer Fair Grounds & Agricultural Center; Powder Mill Park; FlexCon, Inc.; W. Main Street (Route 9) Shopping Center (i.e., Big Y Plaza); East Brookfield & Spencer Automotive Facility / Railroad; Mary Queen of Rosary Cemetery; Spencer Water Department; Smalls Farm; and Pine Grove Cemetery. There is presently a lack of pedestrian and bicycle accommodations and no designated harborage for WRTA users. As described above the proposed improvements will provide considerable improvements for multi-modal access to all of these and other nearby resources.

3. Please describe whether there are any known evacuation routes identified at the state, local or private level.

Meadow Road is a designated evacuation route for the Central Massachusetts Region. Also, the Meadow Road intersections with W. Main Street (Route 9) and N. Spencer Road (Route 31) are identified as critical intersections in the region's emergency preparedness and evacuation plans. Refer to Appendix 2 – Excerpts from Holden - Paxton - Spencer Route 31 Corridor Profile (by CMRPC / CMMPO Sept. 2014) for further information.

### **D. Economic Development - Problem, Need, or Opportunity**

1. Please describe any current, planned, or potential economic development opportunities within the project limits, that would be supported by improvements to the facility. Do these developments reflect Smart Growth Development and Sustainable Development principles? ● GreenDOT

The addition of a new pedestrian sidewalks, bicycle accommodations and greatly enhanced WRTA public transit service along Meadow Road will encourage all intermodal users to utilize the Meadow Road connection between origins/destinations to the north via N. Spencer Road (Route 31) and the south via W. Main Street (Route 9). New sidewalks along the facility will promote better access for pedestrians to move from the commercial and retail areas in the south to the urban and recreational area in the north. Improvements to existing and new WRTA transit stops will promote a better connection from other sections of the WRTA transit system to resources and urbanized areas serviced

by Meadow Road. The areas adjoining Meadow Road are currently experiencing commercial/retail growth at this time. It is anticipated that this project will enhance economic opportunities in the commercial, retails and recreational areas and improve access for all modes of transportation.

2. Identify any need or opportunity to improve access to services, promote industry clusters, and facilitate affordable housing or job creation within the area. ● GreenDOT

The goals of this project include substantially improved access to services for all users, including but not limited to, a comprehensive approach to providing intermodal access for pedestrians, bicyclists and transit. This project will greatly improve connections and options for employers/employees, commercial/retail, housing and will certainly promote developmental growth and job creation in the area.

### **E. Environmental - Problem, Need, or Opportunity**

Please describe any need or opportunity associated with environmental aspects, as listed below. Links to guidance clarifying the resource areas are provided in brackets.

1. Wetland(s) [<http://www.mass.gov/dep/water/waterres.htm>]

There are valuable wetlands along the westerly side of Meadow Road associated with the Seven Mile River watershed and the Town's Wellhead Zone II Aquifer Protection District. This project will provide much needed stormwater treatment and water quality improvements that will ensure that the values of the wetland resource areas and associated wildlife habitat values are maintained. The addition of pedestrian and bicycle accommodation will also promote the outdoor experience and enjoyment of these resources for those users. Refer to Appendix 4 – Proposed Stormwater Quality Improvements.

2. Water Supply Watershed(s) [<http://www.mass.gov/dep/water/drinking/sourcewa.htm>]

Adjacent to Meadow Road is the Town of Spencer's Public Water Well Zone II Aquifer Protection District wellhead and water treatment plant. As touched on above, the proposed water quality improvements will be much greater than the typical roadway improvement project approach. Advanced water quality improvement technics will be incorporated into the design of this project. As described above the Town will begin implementing stormwater quality improvements in advance of this project as part a Clean Water Act (CWA) Section 319 water quality improvement grant in 2017. The CWA Section 319 project will also identify and conceptually design additional more extensive stormwater quality measures that will be incorporated into the design of the Meadow Road reconstruction project.

3. Impaired Water Body(ies) [<http://www.mass.gov/dep/water/resources/10list3.pdf>]

The Seven Mile River watershed is located all along the westerly side of Meadow Road has been identified as an impaired water body. The primary impairment is pathogens. As described in greater detail above substantial improvements to stormwater quality shall be included in this project to address these and other water quality degradation concerns.

4. Priority Habitat(s) [[http://www.mass.gov/dfwele/dfw/nhosp/gis\\_resources.htm](http://www.mass.gov/dfwele/dfw/nhosp/gis_resources.htm)]

Meadow Road falls within and adjacent to Priority Habitat 1419. The water quality improvements to be included in this project will promote the long term protection and security of the priority habitat as well as all wetland and wildlife resources adjacent to and downstream of this project.

5. Historic/Cultural/Scenic Resource(s): Are there listed or eligible properties, any archeological resources or scenic by-ways within or adjacent to the project area?

The Mary Queen of Rosary Cemetery, Pine Grove Cemetery, Spencer Fair Grounds and Powder Mill Park are all adjacent to the Meadow Road Project. In addition, the Smalls Farm Preservation area and trails are located adjacent to the northerly terminus of the project at the intersection with N. Spencer Road (Route 31) and Wire Village Road.



6. Air Quality and Greenhouse Gases: Is there a potential to reduce greenhouse gases, through construction methods; operational modifications; changes in connectivity, access, or travel behavior; or other methods? ● GreenDOT

Traffic improvements at the W. Main Street (Route 9) intersection may result in air quality improvements. In addition, it is anticipated that much greater improvements to air quality will result from the substantial intermodal improvements provided by this project as described in greater detail above including new accommodations for pedestrians, bicyclists and much greater improved access to transit. This project will promote reductions in greenhouse gas emissions all along the Meadow Road project corridor.

7. Hazardous Materials: Are there concerns about hazardous materials within the project limits or on any adjacent properties? Could any prior use of adjacent properties be an issue?

There are no known hazardous materials concerns impacted by this project. There is an old DEP BWSC Tier II site (# 2-0017396) near the intersection of Meadow Road and Olde Main Street; however, there are not any anticipated disturbances to potentially contaminated soils anticipated.

## **F. Community - Problem, Need, or Opportunity**

Please provide some background about the area where the facility is located and describe any need or opportunity that may be may address or impact the community or neighborhood, as outlined below.

1. Please characterize the abutting land use in the area surrounding the facility. How does the facility function within the area? Please note if some or all of the area falls within an environmental justice (EJ) area.

There is high commercial/retail use in the southerly limits which transitions to mixed use and residential areas for remainder of the project limits. Beyond project limits the character becomes more commercial/retail to the south, east, west; and more rural to the north. The Project limits are not directly within a local Environmental Justice (EJ) area, however, there are EJ areas are in close proximity to the project limits and the improved access to transit, commercial, retail and environmental resources offered by this project will directly and indirectly benefit EJ areas.

2. Are there opportunities to promote healthy transportation modes of walking, biking or transit use by improving pedestrian, bicycle or public transit infrastructure or operations? ● GreenDOT

As described above the addition of new sidewalk, bicycle and transit accommodations along the entire limits of the Meadow Road project will provide much improved intermodal connections to downtown Spencer to the east, to the commercial/retail areas to the south and west and to the open space areas to the north. These enhancements will surely promote healthy transportation modes of walking, biking and transit by encouraging pedestrians, bicyclists and transit use including, but not limited to, travel to the residential and commercial regions within and adjacent to the project limits. The proposed Complete Street enhancements will also provide much safer forms of travel for many new pedestrians and bicyclists in addition to increased safety for the pedestrians and bicyclists that are currently using the roadway or limited shoulders that are in poor condition. Similarly, enhancements to existing and proposed new WRTA facilities and increased availability will improve transit opportunities and use as well as promoting healthier lifestyles, activities and open space enjoyment.

3. Identify any need or opportunity to improve access to services, jobs, housing, transit or recreation for residents within the area. ● GreenDOT

As described many times above this project will greatly improve access to services, jobs, housing, transit and recreation for residents within the area and for all users going to/from the project area.

### **G. Transportation Enhancements - Problem, Need, or Opportunity**

1. Identify any need or opportunity to incorporate transportation alternatives, such as provisions and programs related to pedestrians, bicyclists or rail trail facilities or education; landscaping; scenic/historic acquisition, beautification, preservation, programs, or facilities; outdoor advertising management; archeological planning and research; environmental mitigation or wildlife mortality reduction efforts.

As described above substantial improvements in all of these areas are offered by and promoted by this project. The project will improve bicycle, pedestrian and transit accommodations and will also include signage along the corridor for further education and enjoyment of the outdoor environment and the priceless wetlands, drinking water supply and wildlife resources located adjacent to the project. The proposed improvements and new accommodations will aid in connecting residential, agricultural, and recreational uses to commercial regions/uses. The project will provide considerable environmental mitigation and improvements through the extensive stormwater quality improvements proposed, which will reduce wildlife mortality short and long term. The project will also enhance and promote pedestrian and bicycle connections to the Spencer Depot Rail Trail located approximately 1 mile south of the project limits on S. Spencer Road. Refer to Appendix 2 – Excerpts from Holden - Paxton - Spencer Route 31 Corridor Profile (by CMRPC / CMMPO Sept. 2014); and Appendix 4 – Proposed Stormwater Quality Improvements for further information.

### **H. Planning and Public Outreach - Problem, Need, or Opportunity**

1. Describe any Public Outreach that has occurred so far on the proposed improvements, including public informational meetings, local mailings, workshops, etc.

The Meadow Road corridor is part of the Route 31 corridor profile by CMRPC, which included public hearings in Spencer and other adjacent communities. The Meadow Road Project was also integral to numerous Public Hearings and meetings for the Town FMPC Roads Bond Program and the Complete Street Prioritization Planning feedback, review and approval hearings.

2. Are there any special needs that need to be accommodated to fully engage the public with respect to public outreach?

None known.

3. Identify any local or regional planning documents that identify the problem, need or opportunity outlined within this PNF.

Refer to Appendix 2 - Holden - Paxton - Spencer Route 31 Corridor Profile (by CMRPC / CMMPO Sept. 2014) for relevant excerpts with respect to the Meadow Road project needs.

4. Identify efforts to coordinate with relevant government agencies, including RTA(s), DCR, regulatory agencies, or neighboring municipalities.

CMRPC Holden – Paxton – Spencer Route 31 Corridor Profile and numerous associated public hearings/meetings in all three communities and with the Central Regional MPO Advisory Committee and CMMPO. Other informal meetings and discussions with CMRPC, WRTA and MassDOT staff also occurred to solicit feedback on transit and intermodal enhancement ideas and long term planning needs.

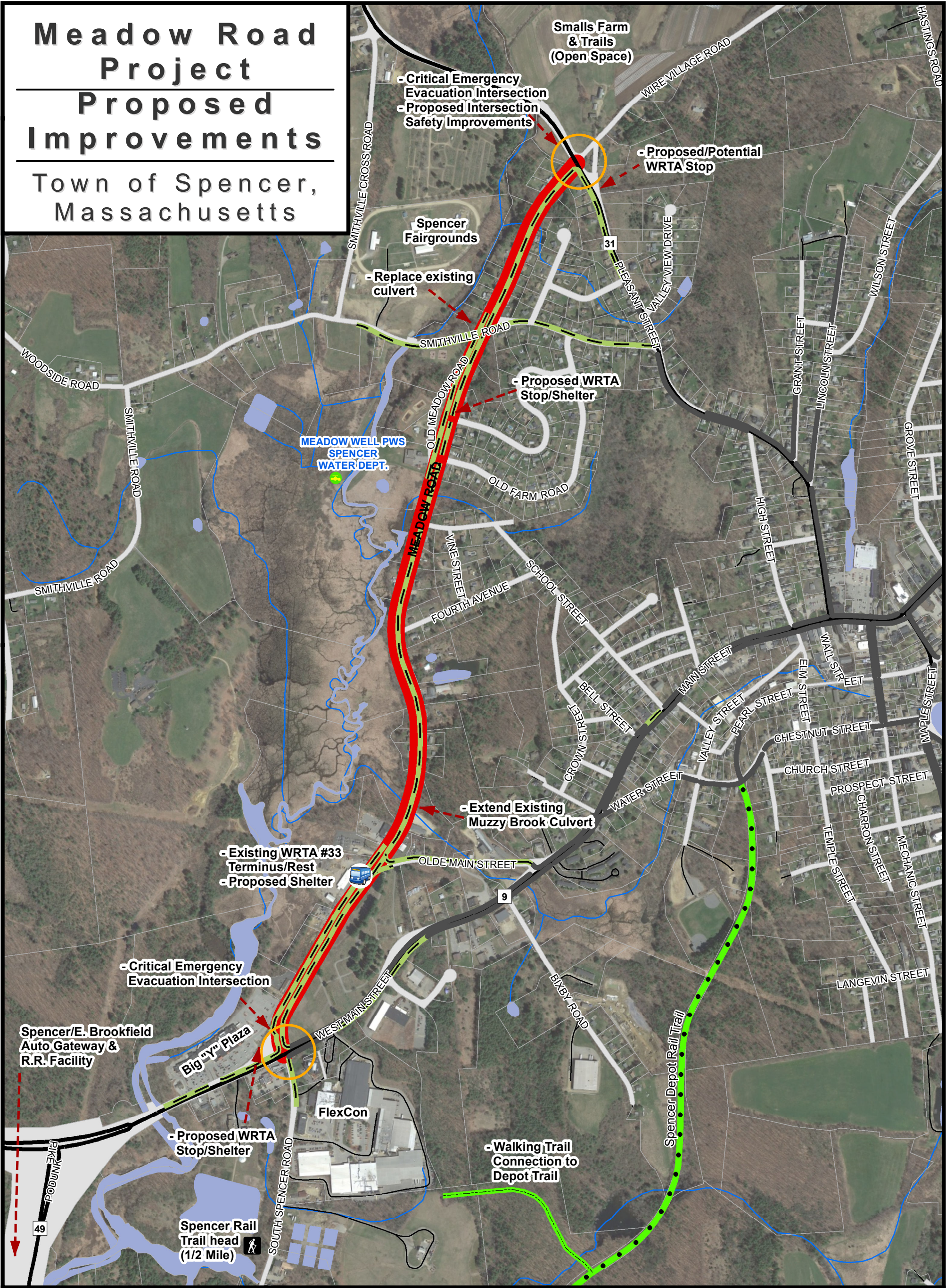
**Thank you for completing this form. Please submit the PNF to the Regional MPO/RPA and the MassDOT Highway Division District office.**



# Meadow Road Project

## Proposed Improvements

Town of Spencer, Massachusetts



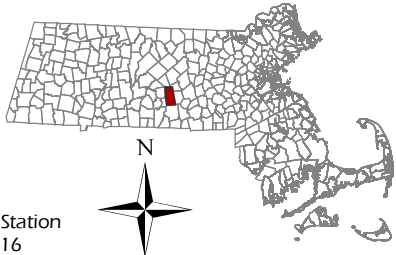
### Legend

- Project Meadow Road
- Proposed Sidewalk
- Hiking/Snowmobile
- Existing Sidewalk
- Depot Rail Trail
- Property Parcel

Source: Data provided by the Town of Spencer, Central Massachusetts Regional Planning Commission (CMRPC), NHESP, massDOT and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division. Information depicted on this map is for planning purposes only.

1 in = 0.15 miles

Produced by  
**CMRPC**  
Central Massachusetts Regional Planning Commission  
2 Washington Square, Union Station  
Worcester, MA 01604-4016





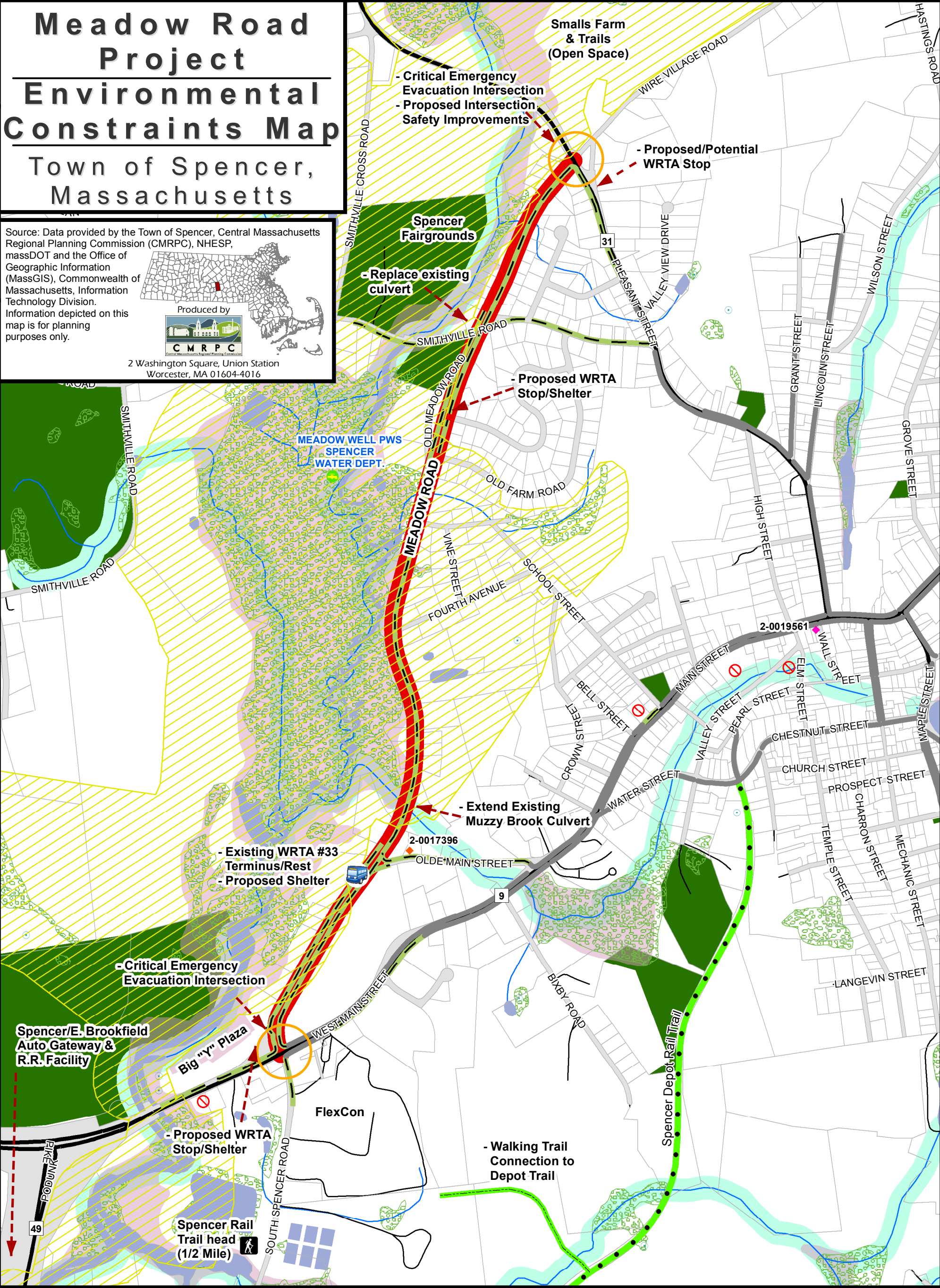
# Meadow Road Project

## Environmental Constraints Map

### Town of Spencer, Massachusetts

Source: Data provided by the Town of Spencer, Central Massachusetts Regional Planning Commission (CMRPC), NHESP, massDOT and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.  
Information depicted on this map is for planning purposes only.

Produced by  
**CMRPC**  
Central Massachusetts Regional Planning Commission  
2 Washington Square, Union Station  
Worcester, MA 01604-4016



1 in = 0.15 miles

	Project Meadow Road		NHESP Potential Vernal Pools		NHESP Priority Habitats of Rare Species
	Proposed Sidewalk		AUL Sites		MASS. DEP Wetlands
	Existing Sidewalk		DEP Tier I Classified Site		FEMA 100-year Flood Area
	Hiking/Snowmobile		DEP Tier II Classified Site		River Protection Act (0-100ft)
	Depot Rail Trail		Property Parcel		Protected Open Space



# **MEADOW ROAD PNF**

## **LIST OF APPENDICES**

**APPENDIX 1 - EXISTING PAVEMENT CONDITIONS &  
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**APPENDIX 2 - EXCERPTS FROM HOLDEN - PAXTON -  
SPENCER ROUTE 31 CORRIDOR  
PROFILE (BY CMRPC / CMMPO  
SEPT. 2014)**

**APPENDIX 3 - PROPOSED PROJECT AND AREA  
CONTEXT / GIS MAPS**

**APPENDIX 4 - PROPOSED STORMWATER QUALITY  
IMPROVEMENTS**

**APPENDIX 5 - EXISTING DRAINAGE SYSTEM &  
CULVERT FIELD INSPECTION FORMS**

**APPENDIX 6 - SURVEY BASE PLANS**





# **APPENDIX 1**

## **EXISTING PAVEMENT CONDITIONS & AERIAL CONTEXT PHOTOGRAPHS**





2017 01 21 Meadow Rd 006



2017 01 22 Meadow Rd 005



2017 01 22 Meadow Rd 006



2017 01 22 Meadow Rd 007





2017 01 21 Meadow Rd 001



2017 01 21 Meadow Rd 003



2017 01 21 Meadow Rd 004



2017 01 21 Meadow Rd 005





2017 01 22 Meadow Rd 010



2017 01 22 Meadow Rd 012

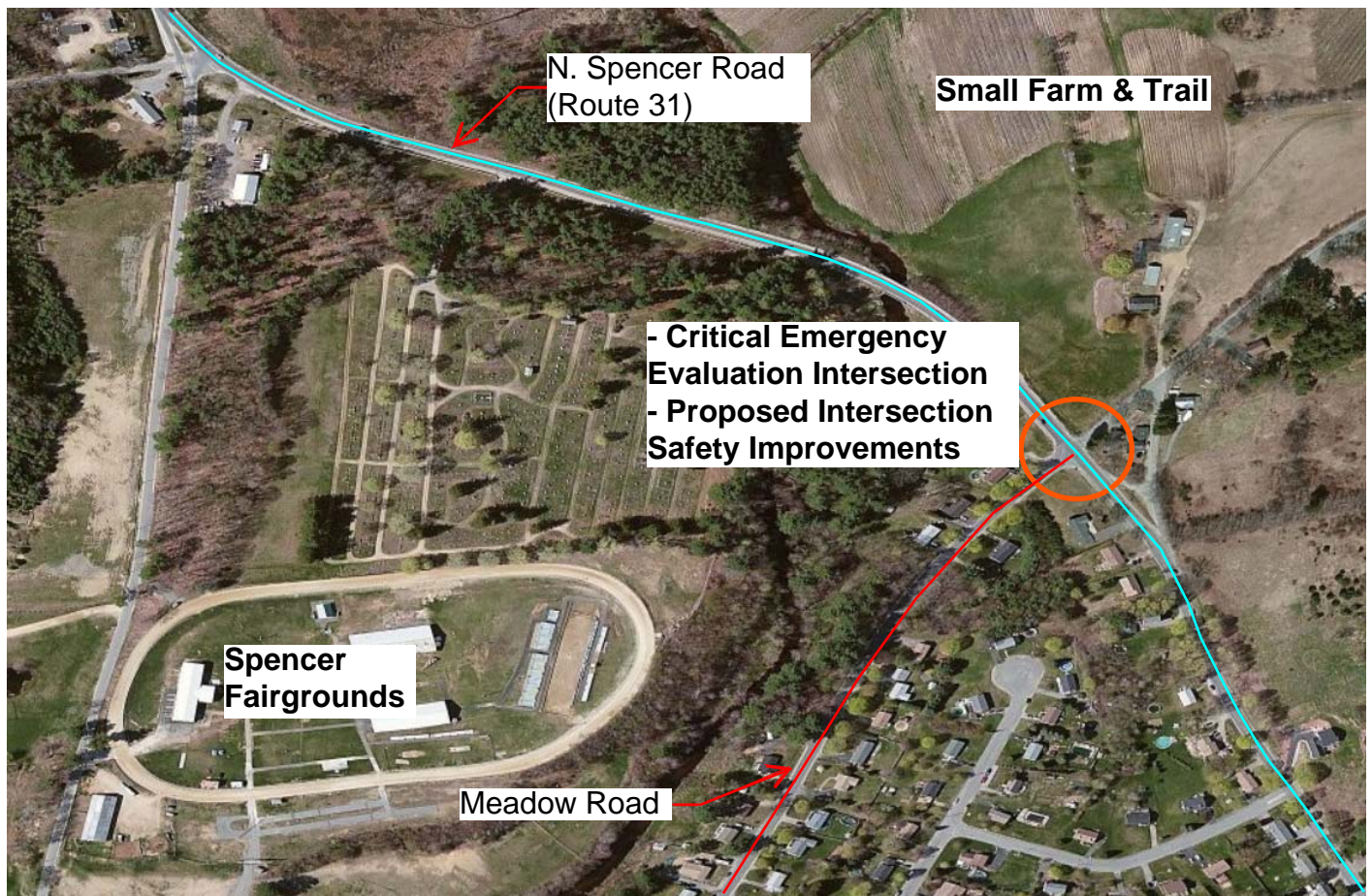


2017 01 22 Meadow Rd 015



2017 01 22 Meadow Rd 016





Meadow Rd Context Photos (North to South) 001

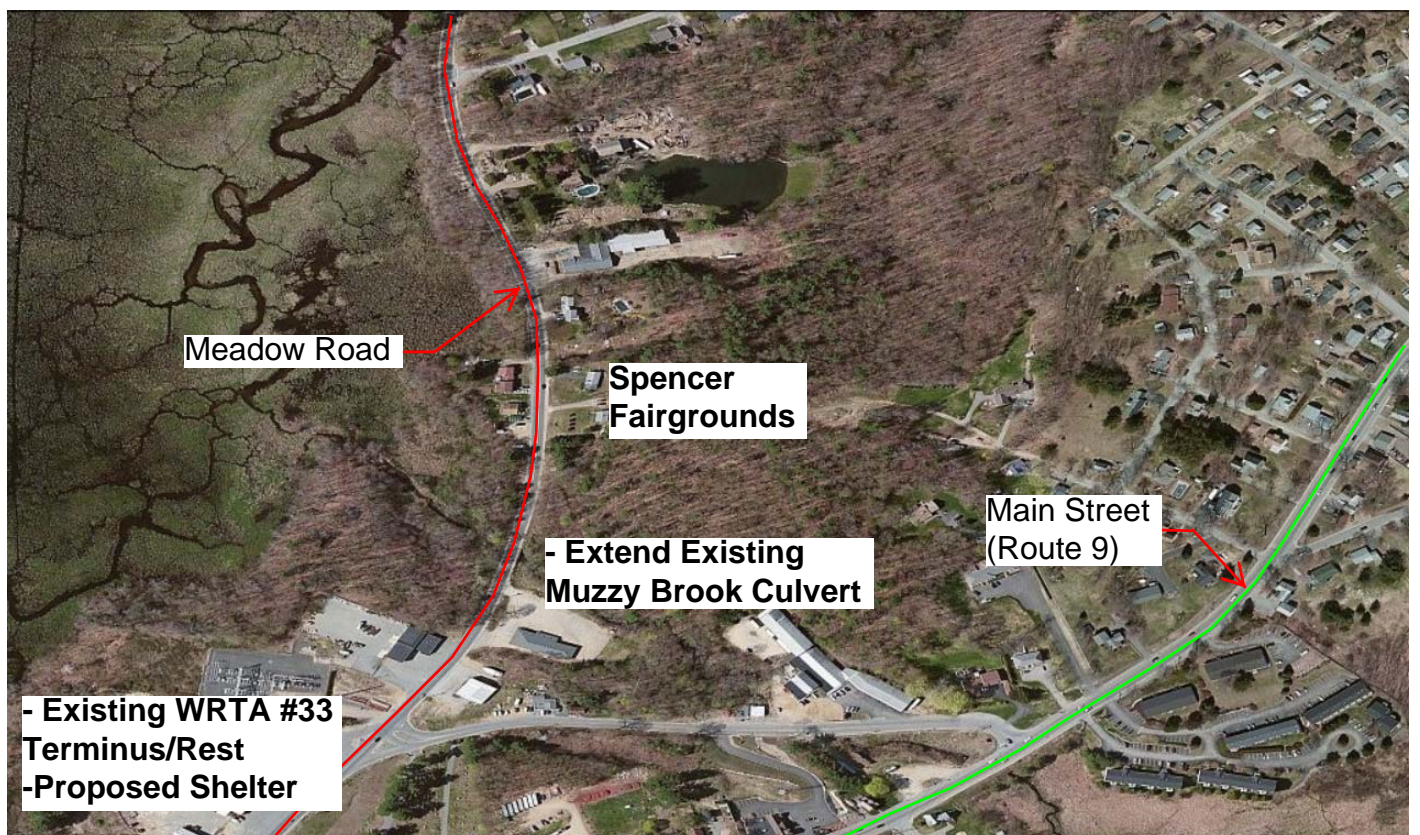


Meadow Rd Context Photos (North to South) 002



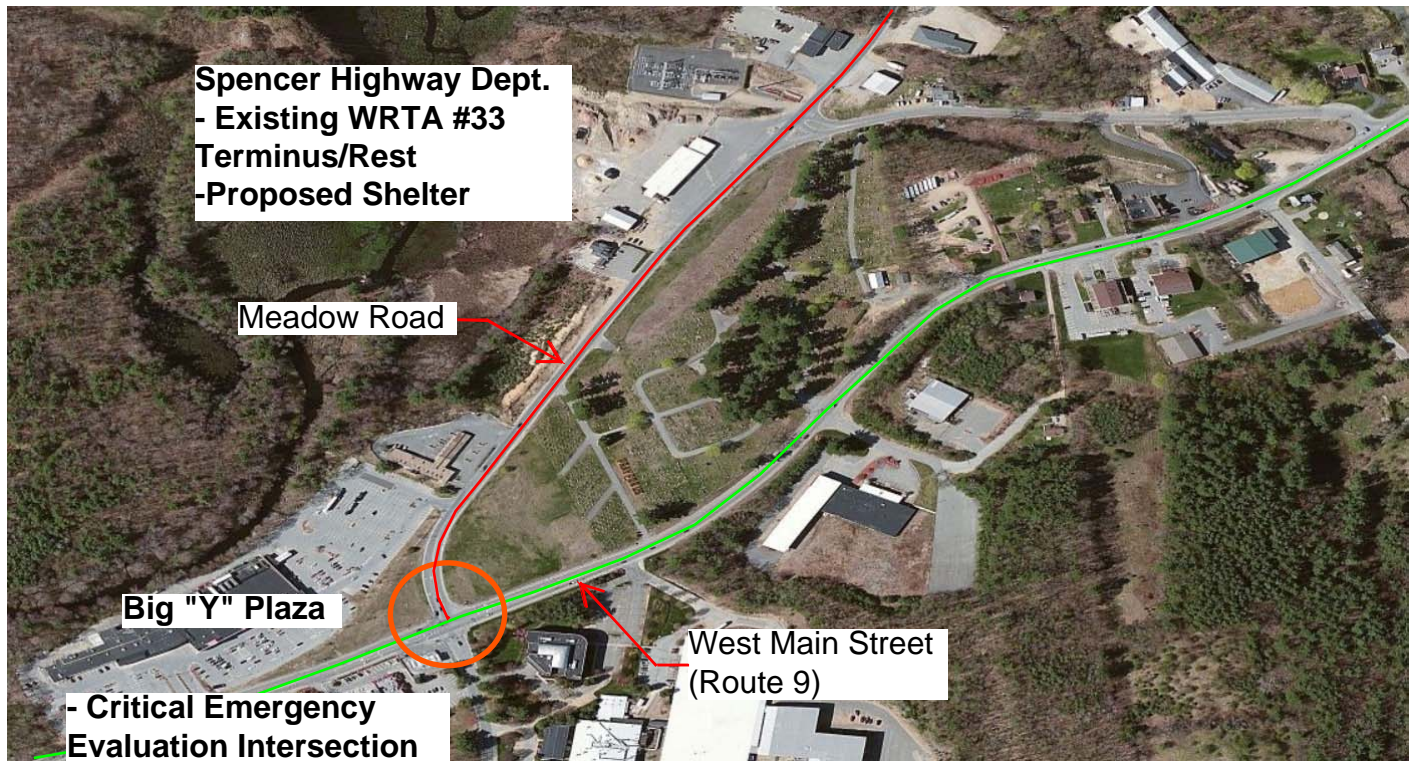


Meadow Rd Context Photos (North to South) 003



Meadow Rd Context Photos (North to South) 004





Meadow Rd Context Photos (North to South) 005



Meadow Rd Context Photos (North to South) 006

## **APPENDIX 2**

**EXCERPTS FROM HOLDEN - PAXTON -  
SPENCER ROUTE 31 CORRIDOR PROFILE  
(BY CMRPC / CMMPO SEPT. 2014)**





# **CENTRAL MASSACHUSETTS METROPOLITAN PLANNING ORGANIZATION (CMMPO)**

## **Holden - Paxton - Spencer Route 31 Corridor Profile**



**INCLUDES  
EXCERPTS  
RELEVANT TO  
MEADOW ROAD,  
SPENCER ONLY**

*Prepared by the transportation staff of the*



**September 2014**

Prepared in cooperation with the Massachusetts Department of Transportation and the U.S. Department of Transportation – Federal Highway Administration and the Federal Transit Administration. The views and opinions of the Central Massachusetts Regional Planning Commission expressed herein do not necessarily reflect those of the Massachusetts Department of Transportation or the U.S. Department of Transportation.





### Other concerns

- General heavy vehicle (truck) traffic volumes using Route 31.
- Automotive carrier trucks, many originating in Spencer/East Brookfield. *(Reference NEAG operator observations from earlier meeting.)*

## **1.9 Town of Spencer**

### Intersection Congestion

- At the Route 9/Meadow Road/South Spencer Road intersection, northbound vehicle queuing lanes are of insufficient length. It is suggested to expand/lengthen the South Spencer Road northbound approach vehicle queuing lanes. This improvement is necessary to accommodate FLEXcon generated traffic, especially during peak flow periods. Currently, vehicles have been observed to drive over the existing roadway curbing. In addition, the community has requested an access and accident study for Big Y plaza. *(This location is outside the CMMPO established CP study area.)*

### Intersection Safety

- The Route 31 (North Spencer Road)/Route 31 (Pleasant Street)/Meadow Road/Wire Village Road study intersection has caused safety concerns due to its recent crash history. In late 2013, this intersection completed FHWA-funded “STOP” sign improvements that feature new signs and advanced warning on all approaches. These improvements were screened and approved by MassDOT. *(A statewide summary of this work has been obtained for the Technical Appendix.)* Supplemental advisory signs noting street names have also been installed on the Route 31 approaches to this study location. One of the new signs is obstructed by S-12-002 bridge posting. This just happens to be the highest speed approach.

### Roadway Condition

- Deteriorating pavement conditions worsen on Spencer’s northern most segments of Route 31. Along these northerly segments approaching the Paxton town line, the magnitude and extent of severe alligator cracking and rutting becomes increasingly larger.

### ~~Roadway Geometry~~

- ~~Address the sharp curve in Route 31 just south of the Spencer/Paxton town line. Substandard roadway geometry, can it be *moderated or straightened* in some manner? This site exhibits low travel speeds due to the extremely limited lines of sight.~~

Vegetation is also encroaching upon the roadway. Potential improvement options include:

- Do nothing
  - Spot improvement
  - Structure relocation
  - Roadway realignment, short and long. *Need to examine parcel map.*
- The Meadow Road vertical approach to Route 31 needs to be raised to improve visibility approaching and at the intersection.

#### Access Management

- Curb cut consolidation and other Access Management improvements suggested for local roads and abutting private properties along length of Spencer study section.

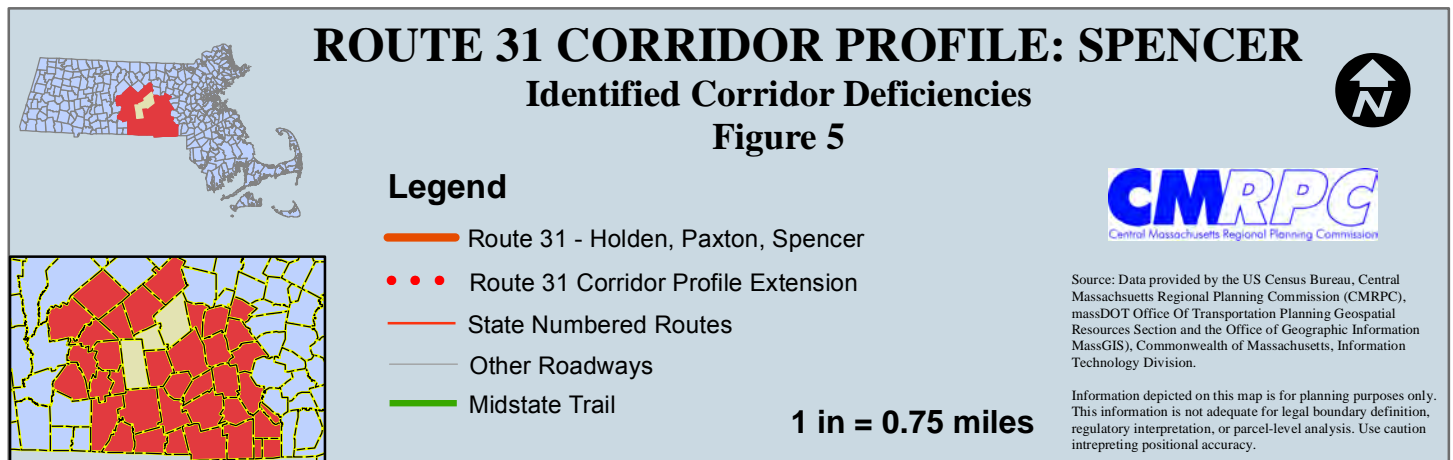
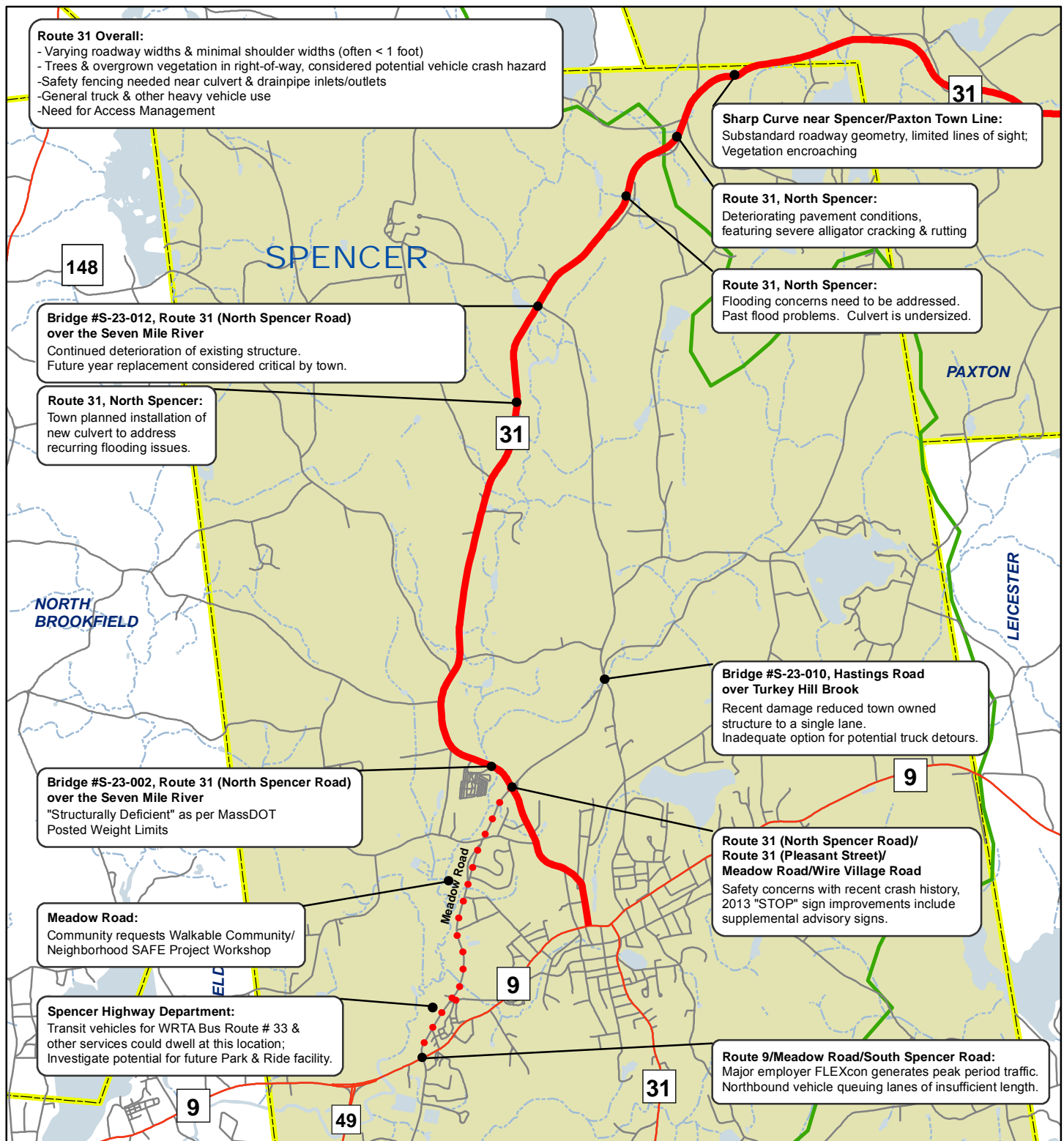
#### Bridge

- Bridge Number S-23-002, Route 31 (North Spencer Road) over Seven Mile River: Identified by MassDOT as “Structurally Deficient”, weight limits are posted for this bridge. *(Refer to 4/5/2012 MassDOT bridge inspection report.)*
- Bridge Number S-23-012, Route 31 (North Spencer Road) over Seven Mile River: Continued deterioration of existing structure; will require future year replacement, considered critical by town.
- A related topic, the recently damaged Bridge Number S-23-010, Hastings Road over Turkey Hill Brook has caused that crossing to be reduced to a single lane and therefore is now an even worse option for an alternate truck detour (including NEAG generated trucks) when more significant deterioration and loading problems eventually occur on the Route 31 bridges. *The need to use limited town funds to repair this structure further reduces the likelihood that the town could address deterioration on the above summarized Route 31 bridges.*
- Route 31 North Spencer, undersized culvert structures with past flooding issues; there exists potential for future flooding occurrences. At one location, town plans the installation of a new culvert to address recurring flooding issues. *(See plan provided by community.)*

#### Public Transit

- It has been suggested that Spencer Highway Department property on Meadow Road could be used for a long-term future “Fastcharger” location for electric buses or

potential Park & Ride facility. The Worcester Regional Transit Authority (WRTA) Bus Route #33 could serve such a PNR lot. Further, WRTA buses and other transit vehicles could dwell, or wait between trips, at this location away from residential areas. At a minimum, the Meadow Road improvement project should include revised transit accommodations







## ROUTE 31 CORRIDOR PROFILE: SPENCER

### Environmental Profile

Figure 12

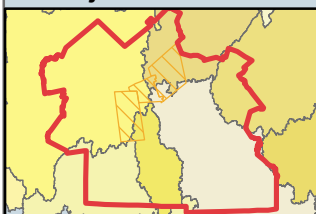
#### Legend

- Route 31 - Holden, Paxton, Spencer
- - - Route 31 1-Mi Buffer Zone
- Streams Intersecting Rt 31
- Rivers & Streams
- \* NHESP Certified Vernal Pools
- ★ Potential Vernal Pools

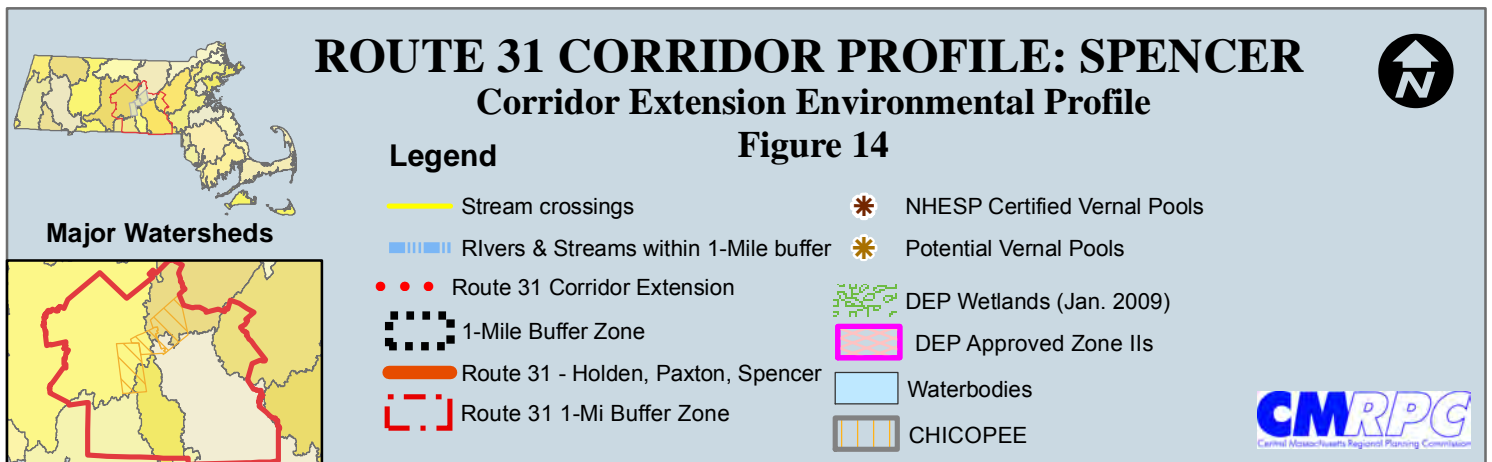
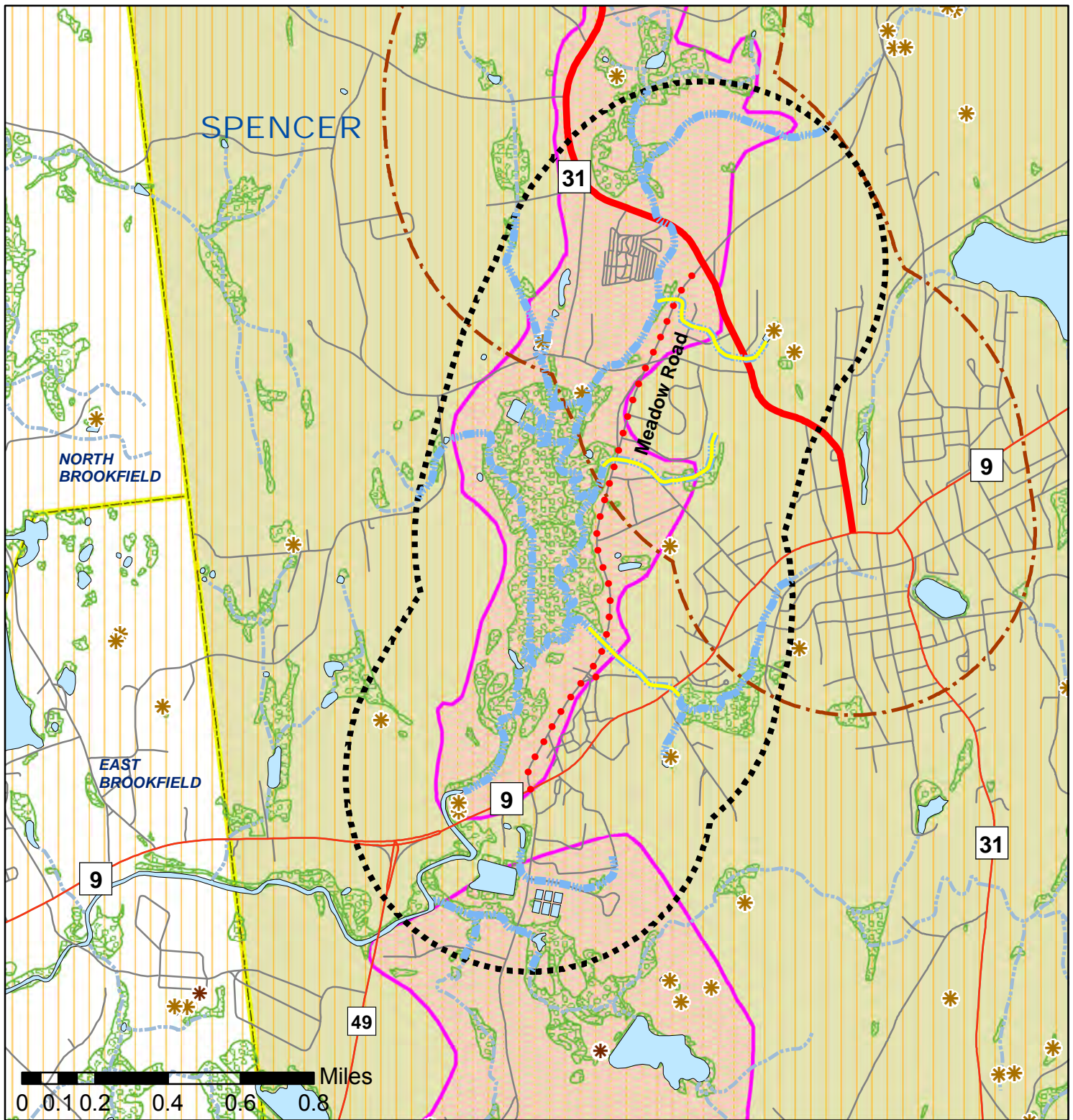
- DEP Approved Zone IIs
- DEP Wetlands (Jan. 2009)
- Waterbodies Intersecting Rt 31
- Waterbodies
- CHICOPEE
- FRENCH
- Towns

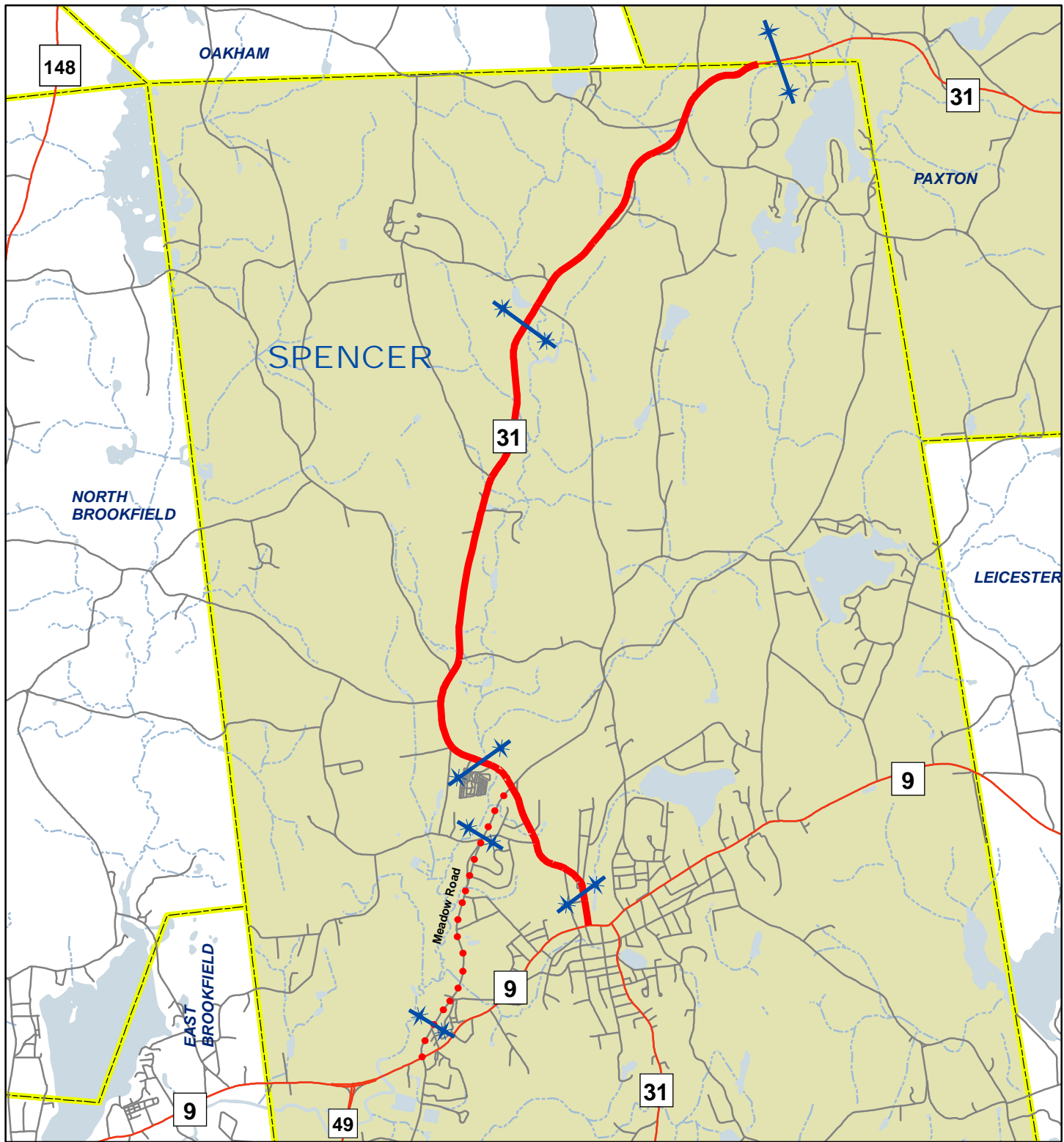


Major Watersheds









## ROUTE 31 CORRIDOR PROFILE: SPENCER

Traffic Count Locations

Figure 17

### Legend

★ — ★ ATR

— Route 31 - Holden, Paxton, Spencer

• • • Route 31 Corridor Extensions

— Roads

— State Route

1 in = 0.75 miles



Source: Data provided by the US Census Bureau, Central Massachusetts Regional Planning Commission (CMRPC), massDOT Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information MassGIS), Commonwealth of Massachusetts, Information Technology Division.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.



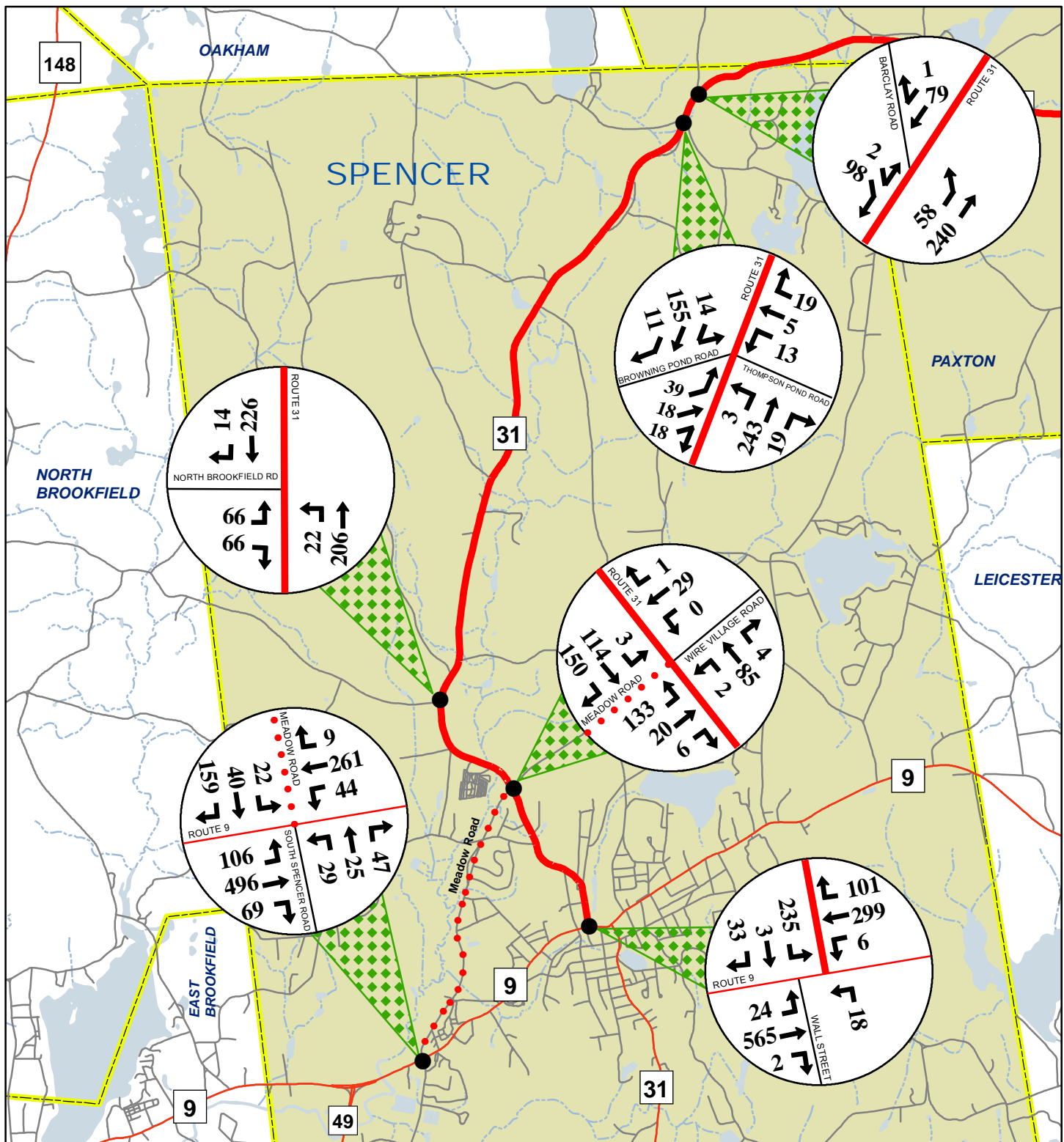
**Table 2**  
**Route 31 Corridor Profile**  
**Existing Daily Traffic Volumes**

<u>Town</u>	<u>ATR Location</u>	<u>Date</u>	<u>Volume*</u>
<b>Holden</b>	Manning Street @ West Boylston Town Line**	5/2/2013	7,050
	Route 31 north of Route 122A	5/2/2013	7,950
	Route 31 south of Route 122A	5/2/2013	12,550
	Route 31 north of Reservoir Street	5/7/2013	7,750
	Route 31 @ Paxton Town Line	5/7/2013	5,575
<b>Paxton</b>	Route 31 (Grove Street) between Holden Rd & Maple St	5/7/2013	6,375
	Route 31 east of Route 56	5/7/2013	3,950
	Route 31 west of Route 122	5/7/2013	5,925
	Route 31 west of Route 122***	4/9/2013	5,900
	Route 31 @ Spencer Town Line	5/21/2013	3,525
<b>Spencer</b>	Route 31 south of Hastings Road	6/6/2013	5,450
	Route 31 north of Wire Village Road	5/21/2013	7,000
	Route 31 north of Wire Village Road***	4/9/2013	6,925
	Route 31 north of Route 9	5/23/2013	5,900
	Meadow Road south of Route 31**	5/23/2013	4,600
	Meadow Road north of Route 9**	5/23/2013	5,825

\*Vehicles Per Day (VPD)

\*\*Additional ATR Locations Requested By Host Communities

\*\*\*Recent MassDOT Conducted Counts - Statewide Traffic Monitoring Effort



## ROUTE 31 CORRIDOR PROFILE: SPENCER

Existing Traffic Flows  
AM Peak Hour Period  
Figure 30



### Legend

- Route 31 - Holden, Paxton, Spencer
- ... Route 31 Corridor Profile Extension
- State Numbered Routes
- Other Roadways



Source: Data provided by the US Census Bureau, Central Massachusetts Regional Planning Commission (CMRPC), massDOT Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information MassGIS), Commonwealth of Massachusetts, Information Technology Division.

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1 in = 0.75 miles

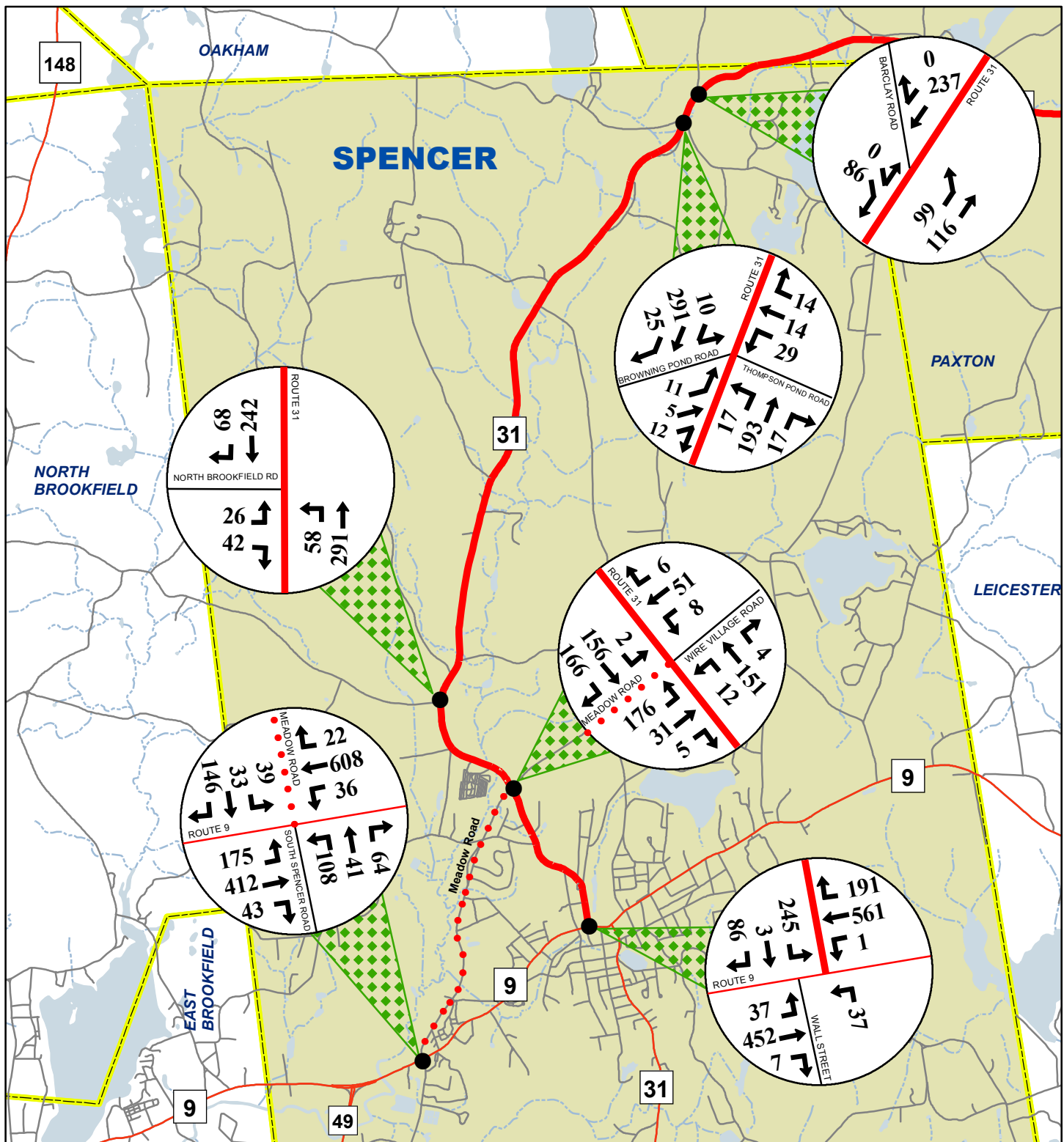
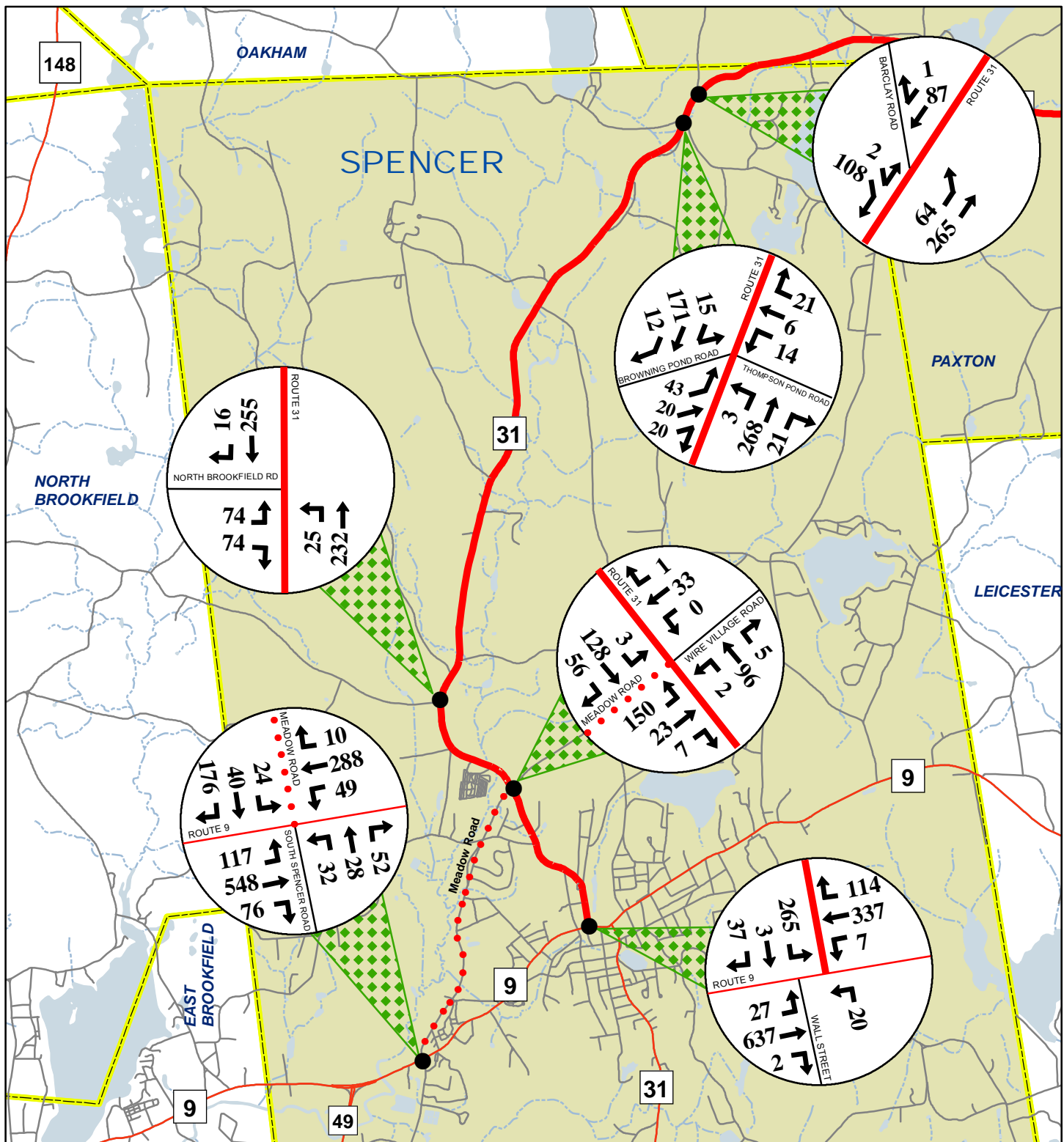




TABLE 4

**Percentage of Heavy Vehicles  
Utilizing Route 31 Focus Intersections**

	<u>Study Intersection</u>	<u>Date of Count</u>	<u>Morning Peak Hour %</u>	<u>Evening Peak Hour %</u>
<del>Holden</del>	Route 31 / Route 122A	May '13	5.7%	1.1%
	Route 31 / Holden Commons	June '13	2.5%	1.0%
	Route 31 / Mixer Rd / Reservoir St	May '13	4.3%	1.5%
<b>Paxton</b>	Route 31(Holden Rd) / Grove St	May '13	3.4%	2.7%
	Route 31(Maple St) / Grove St	May '13	2.8%	1.7%
	Route 31 / Route 56	August '12	3.9%	1.9%
	Route 31 / Route 122	August '12	1.7%	1.6%
	Route 31 / Suomi St	June '13	2.7%	1.8%
<b>Spencer</b>	Route 31 / Barclay Rd	June '13	3.5%	2.0%
	Route 31 / Browning Pond Rd / Thompson Pond Rd	June '13	4.5%	2.5%
	Route 31 / North Brookfield Rd	July '11	3.5%	0.4%
	Route 31 / Meadow Rd / Wire Village Rd	July '11	3.5%	0.4%
	Route 31 / Route 9 / Wall St	April '11	6.8%	1.5%
<b><u>Additional Town Requested Locations</u></b>				
<del>Holden</del>	<del>Route 31 / Manning St</del>	<del>May '13</del>	<del>4.8%</del>	<del>2.6%</del>
<b>Spencer</b>	Route 31 / Route 9 / South Spencer Rd	August '13	5.4%	1.5%
<b>Peak Hour Averages</b>			3.9%	1.6%



## ROUTE 31 CORRIDOR PROFILE: SPENCER

Projected 2023 Traffic Flows

AM Peak Hour Period

Figure 36

### Legend

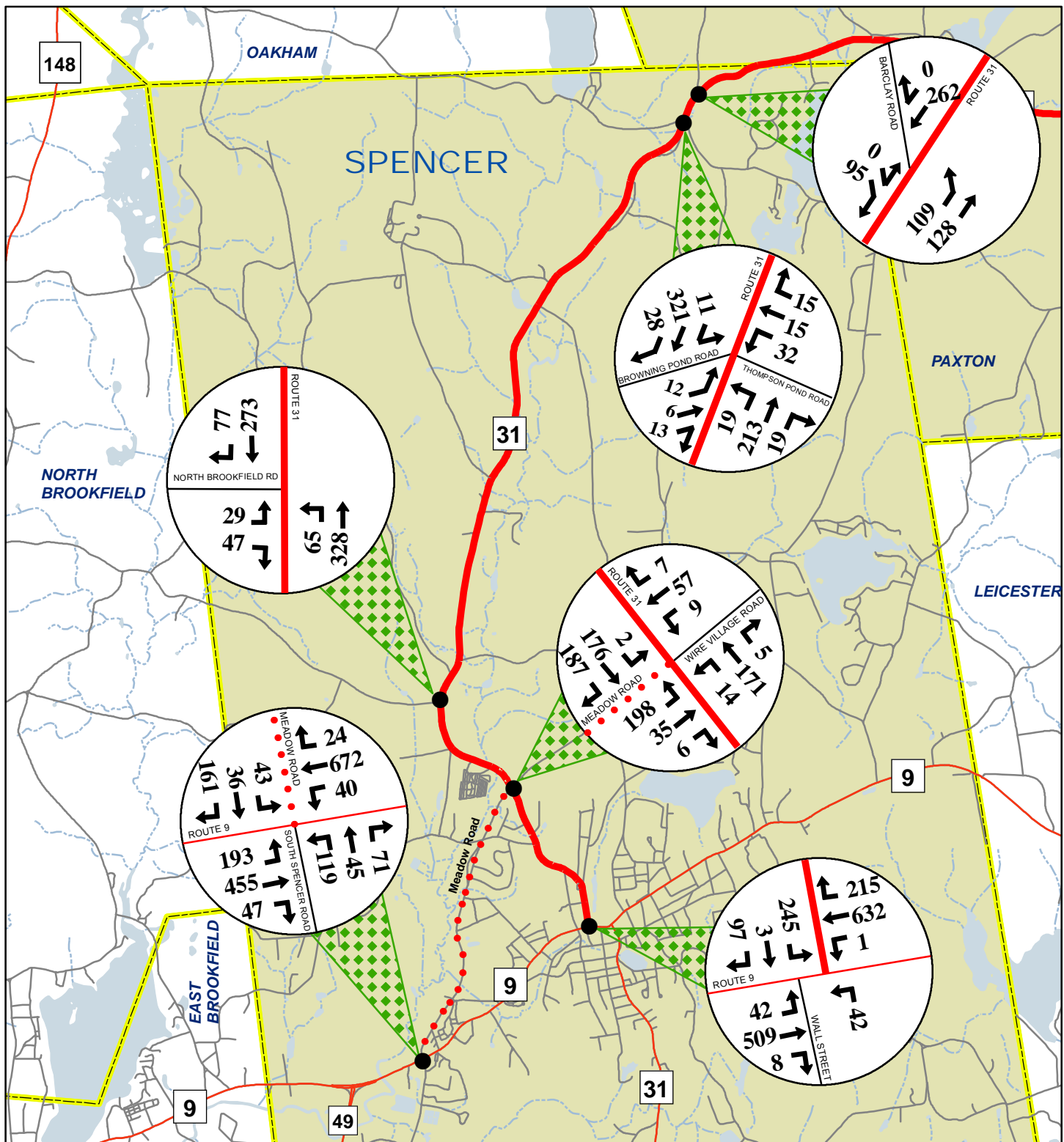
- Route 31 - Holden, Paxton, Spencer
- ... Route 31 Corridor Profile Extension
- State Numbered Routes
- Other Roadways



Source: Data provided by the US Census Bureau, Central Massachusetts Regional Planning Commission (CMRPC), massDOT Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information MassGIS), Commonwealth of Massachusetts, Information Technology Division.

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1 in = 0.75 miles



## ROUTE 31 CORRIDOR PROFILE: SPENCER

Projected 2023 Traffic Flows

PM Peak Hour Period

Figure 37

### Legend

- Route 31 - Holden, Paxton, Spencer
- ... Route 31 Corridor Profile Extension
- State Numbered Routes
- Other Roadways



Source: Data provided by the US Census Bureau, Central Massachusetts Regional Planning Commission (CMRPC), massDOT Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information MassGIS), Commonwealth of Massachusetts, Information Technology Division.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

1 in = 0.75 miles



#### 4.4 Town of Spencer Additional Study Segment: Meadow Road

Requested from the town of Spencer, Meadow Road was an additional roadway segment that was studied for the Route 31 Corridor Profile. Similar to Route 31, vehicle crash records were analyzed for a three-year period. All crashes along Meadow Road from Route 31 to Route 9 were tabulated. However, crashes at the Route 31/Meadow Road/Wire Village Road were not included as part of this additional analysis as they have been already analyzed elsewhere. Crashes on minor streets that were close to or at Meadow Road were also included. All important information from the crash reports was organized and included in the various tables and figures that follow.

As shown in **Table 14**, there were a total of 29 crashes reported during the three-year study period. The Route 9 intersection had the most with a total of 13. There were only three crashes that caused a personal injury and the rest was property damage only. Angle crashes were the most common occurrence with a total of nine, followed by sideswipes and rear-ends with five each. The crashes were evenly distributed between the four seasons with a range of six to nine crashes in each. The top two days that vehicle crashes occurred most frequently were Friday and Sunday. Both days accounted for at least 20% of the overall crashes. Only seven crashes occurred during the AM or PM peak periods, with the remaining 22 the rest of the time. The majority of crashes were during clear weather, during the daytime hours, with dry roadway conditions, but not always occurring at the same time.

**Figure 43** is a crash diagram of the Meadow Road/Route 9/South Spencer Road intersection. This diagram displays the location of each of the 13 crashes that occurred at this location. There were four sideswipe crashes and three each of angle, rear-end, and cross movement crashes. Two of the angle crashes occurred at the Hess gas station at the southwest corner of the intersection. This could have happened when the exiting vehicle did not see the vehicle in the second travel lane while a vehicle in the first travel lane was stopped. The other angle crash was caused by a vehicle that drove through the red light. Fortunately, only one of the 13 crashes resulted in personal injury. All but three crashes were during the daylight hours and only three were not on a dry roadway surface.

In **Table 15**, all 29 of the Meadow Road crashes are listed. The crashes are ordered by the location starting with 100 Meadow Road and then heading south towards Route 9. The details about each crash are listed along with any violations or comments. Out of the 29 crashes, 19 occurred at intersecting streets and the remaining ten crashes happened between the minor streets. The lines shaded in gray are non-intersection crashes. There were 7 crashes that the driver of at least one of the vehicles involved was cited for a violation. Also, there were two vehicle crashes in which the driver lost control of the vehicle and hit a tree.

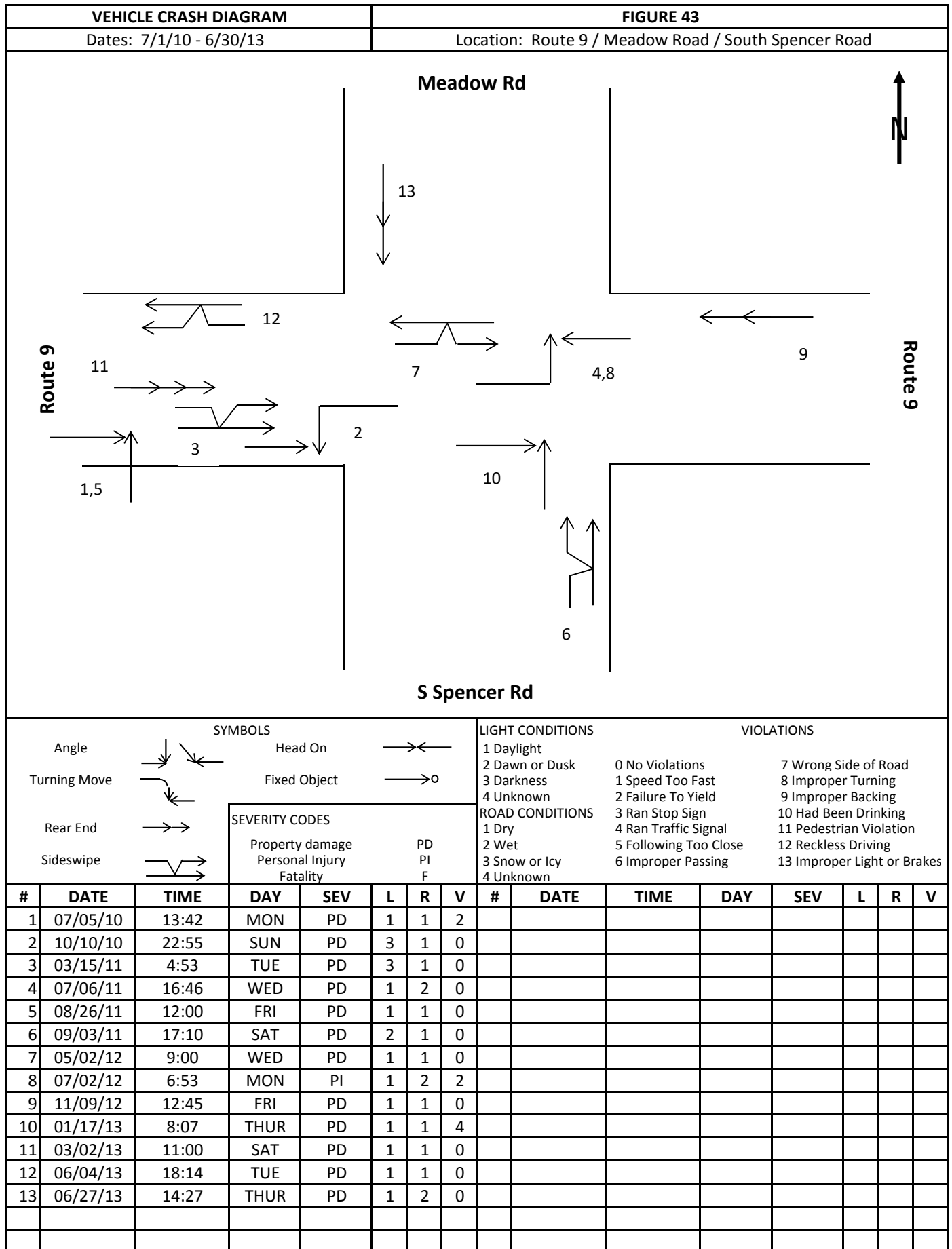
**Table 14**

**SUMMARY OF REPORTED VEHICLE CRASHES  
ON MEADOW ROAD IN THE TOWN OF SPENCER  
JULY 1, 2010 - JUNE 30, 2013**

<u>Meadow Rd Location</u>	<u>July '10-June '13</u>		<u>Day of the Week:</u>	
Smithville Road	3		Monday	4 14%
School Street	1		Tuesday	2 7%
Fourth Avenue	1		Wednesday	5 17%
Olde Main Street	1		Thursday	2 7%
<b>Route 9</b>	<b>13</b>		Friday	6 21%
Other Roadway Segments	10		Saturday	3 10%
Total	29		Sunday	7 24%
				29 100%
			<u>Time of Day:</u>	
			7 - 9 AM	4 14%
Property damage only	26	90%	4 - 6 PM	3 10%
Personal injury	3	10%	Remainder	22 76%
Fatality	0	0%		29 100%
	29	100%	<u>Weather Conditions:</u>	
			Clear	12 42%
			Cloudy	9 31%
Angle	9	31%	Rain	5 17%
Sideswipe	5	17%	Snow	3 10%
Rear End	5	17%		29 100%
Cross Move	3	10%	<u>Light Conditions:</u>	
Fixed Object	3	10%	Daylight	20 68%
Hit Parked Car	2	7%	Dark	7 24%
Hit Deer	1	4%	Dusk	1 4%
Other	1	4%	Dawn	1 4%
	29	100%		29 100%
			<u>Road Conditions:</u>	
Winter	8	27%	Dry	15 51%
Spring	6	21%	Wet	12 42%
Summer	9	31%	Snow	2 7%
Fall	6	21%		29 100%
	29	100%		

(Bold text indicates crash diagram compiled)





**TABLE 15 Spencer - Meadow Road Vehicle Crash Inventory**

#	SPD ID #	Meadow Road Location	Date	Day of Week	Time of Day	Type	Severity	Conditions			
								Weather	Light	Road	Violations/Comments
1	459078	100 Meadow Rd	03/09/13	Saturday	18:40	Fixed Object	Property Damage	Clear	Dark	Dry	Hit Pole
2	411283	97 Meadow Rd	10/04/10	Monday	7:00	Angle	Property Damage	Cloudy	Daylight	Wet	Car Backing Out of Driveway
3	418672	91 Meadow Rd	02/21/11	Monday	10:19	Hit Parked Car	Property Damage	Snow	Daylight	Wet	None
4	463737	90 Meadow Rd	06/02/13	Sunday	23:03	Hit Parked Car	Property Damage	Cloudy	Dark	Wet	Hit and Run Accident
5	437626	Meadow Rd/Smithville Rd	02/01/12	Wednesday	20:29	Angle	Personal Injury	Cloudy	Dark	Wet	Ran Stop Sign
6	449954	Meadow Rd/Smithville Rd	09/16/12	Sunday	20:30	Angle	Property Damage	Clear	Dark	Dry	None
7	456414	Meadow Rd/Smithville Rd	01/16/13	Wednesday	8:49	Angle	Property Damage	Snow	Daylight	Snowy	Slid Thru Stop Sign
8	425003	Meadow Rd/School St	06/17/11	Friday	9:56	Angle	Property Damage	Rain	Daylight	Wet	Failure to Yied Right of Way
9	415163	Meadow Rd/Fourth Ave	12/15/10	Wednesday	18:10	Hit Deer	Property Damage	Cloudy	Dark	Wet	None
10	449917	Near Sewer Pumping Station	09/16/12	Sunday	6:45	Hit Sewer Station	Property Damage	Clear	Dawn	Dry	None
11	457626	34 Meadow Rd	02/08/13	Friday	14:52	Fixed Object	Personal Injury	Snow	Daylight	Snowy	Lost Control & Hit Tree
12	416466	30 Meadow Rd	01/09/11	Sunday	9:22	Fixed Object	Property Damage	Cloudy	Daylight	Wet	Lost Control & Hit Tree
13	456103	Meadow Rd/Olde Main St	01/11/13	Friday	14:15	Angle	Property Damage	Rain	Daylight	Wet	Failure to Yield Right of Way
14	422362	1 Meadow Rd	05/01/11	Sunday	11:58	Rear End	Property Damage	Clear	Daylight	Dry	None
15	422718	1 Meadow Rd	05/08/11	Sunday	10:30	Sideswipe	Property Damage	Rain	Daylight	Wet	None
16	426688	Meadow Rd/Big Y Plaza Entrance	07/15/11	Friday	17:20	Rear End	Property Damage	Clear	Daylight	Dry	None
17	405649	Meadow Rd/Route 9	07/05/10	Monday	13:42	Angle	Property Damage	Clear	Daylight	Dry	Failure to Yield Right of Way
18	411606	Meadow Rd/Route 9	10/10/10	Sunday	22:55	Cross Move	Property Damage	Clear	Dark	Dry	None
19	419897	Meadow Rd/Route 9	03/15/11	Tuesday	4:53	Sideswipe	Property Damage	Cloudy	Dark	Dry	None
20	425068	Meadow Rd/Route 9	07/06/11	Wednesday	16:46	Cross Move	Property Damage	Rain	Daylight	Wet	None
21	428867	Meadow Rd/Route 9	08/26/11	Friday	12:00	Angle	Property Damage	Clear	Daylight	Dry	None
22	429453	Meadow Rd/Route 9	09/03/11	Saturday	17:10	Sideswipe	Property Damage	Clear	Dusk	Dry	None
23	442287	Meadow Rd/Route 9	05/02/12	Wednesday	9:00	Sideswipe	Property Damage	Cloudy	Daylight	Dry	None
24	445682	Meadow Rd/Route 9	07/02/12	Monday	6:53	Cross Move	Personal Injury	Cloudy	Daylight	Wet	Failure to Yield While Turning
25	452875	Meadow Rd/Route 9	11/09/12	Friday	12:45	Rear End	Property Damage	Clear	Daylight	Dry	None
26	456468	Meadow Rd/Route 9	01/17/13	Thursday	8:07	Angle	Property Damage	Clear	Daylight	Dry	Ran Red Light
27	458688	Meadow Rd/Route 9	03/02/13	Saturday	11:00	Rear End	Property Damage	Cloudy	Daylight	Dry	None
28	463888	Meadow Rd/Route 9	06/04/13	Tuesday	18:14	Sideswipe	Property Damage	Clear	Daylight	Dry	None
29	465150	Meadow Rd/Route 9	06/27/13	Thursday	14:27	Rear End	Property Damage	Rain	Daylight	Wet	None

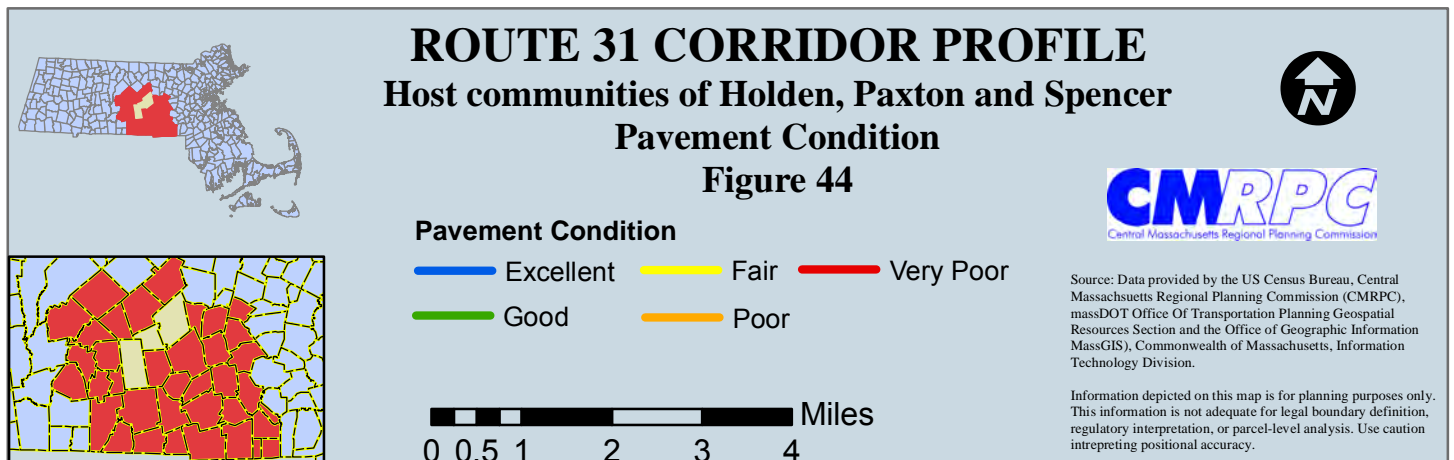
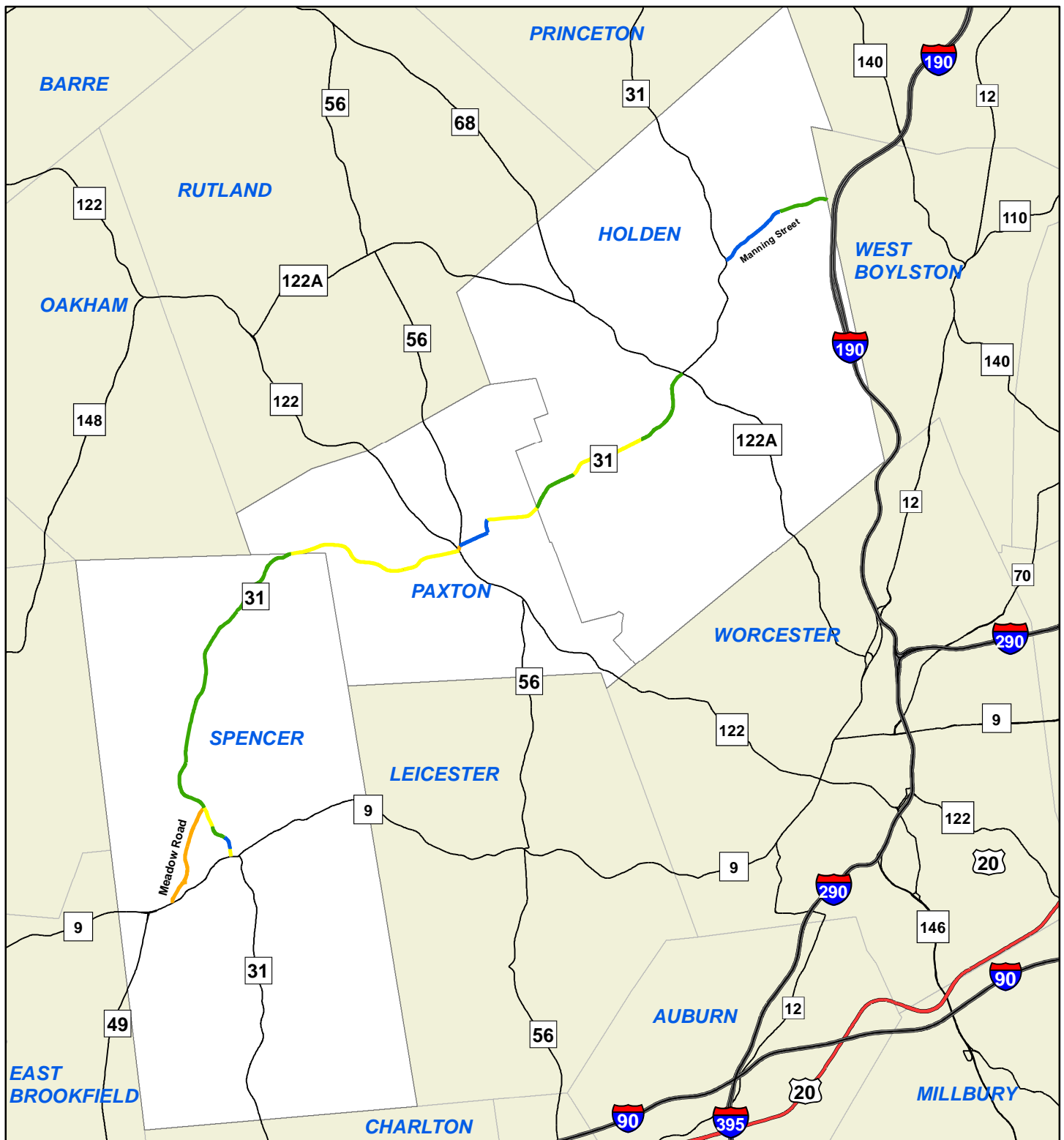




Table 16

## Route 31 Pavement Analysis Recommendations

Town	Street	From	To	Length	Plan Activity	OCI
Holden	MANNING STREET*	WEST BOYLSTON TOWN LINE	NORTH STREET	0.75 mi	ROUTINE MAINTENANCE	83.2
Holden	MANNING STREET	NORTH STREET	GENERAL HOBBS ROAD	0.71 mi	DO NOTHING	94.4
Holden	MANNING STREET	GENERAL HOBBS ROAD	WACHUSETT STREET	0.40 mi	DO NOTHING	94.4
Holden	RESERVOIR STREET	MAIN STREET	AVERY HEIGHTS DRIVE	0.61 mi	ROUTINE MAINTENANCE	87.2
Holden	RESERVOIR STREET	AVERY HEIGHTS DRIVE	SOUTH ROAD	0.68 mi	ROUTINE MAINTENANCE	84.0
Holden	SOUTH ROAD (EB/WB)	RESERVOIR STREET	PAXTON ROAD	1.20 mi	PREVENTATIVE MAINTENANCE	61.3
Holden	PAXTON ROAD	SOUTH ROAD	PAXTON TOWNLINE	0.79 mi	ROUTINE MAINTENANCE	81.7
Paxton	HOLDEN ROAD	GROVE STREET	HOLDEN TOWNLINE	0.70 mi	PREVENTATIVE MAINTENANCE	48.5
Paxton	GROVE STREET	MAPLE STREET	HOLDEN ROAD	0.40 mi	DO NOTHING	99.2
Paxton	MAPLE STREET	RICHARDS AVENUE	GROVE STREET	0.40 mi	DO NOTHING	98.4
Paxton	CHURCH STREET	PLEASANT STREET	RICHARDS AVENUE	0.10 mi	STRUCTURAL IMPROVEMENT	25.3
Paxton	WEST STREET	SUOMI STREET	PLEASANT STREET	0.80 mi	PREVENTATIVE MAINTENANCE	64.0
Paxton	WEST STREET	BLACKHILL ROAD	SUOMI STREET	0.70 mi	PREVENTATIVE MAINTENANCE	57.2
Paxton	WEST STREET	SPENCER TOWNLINE	BLACKHILL ROAD	1.00 mi	PREVENTATIVE MAINTENANCE	49.1
Spencer**	NORTH SPENCER ROAD	PAXTON TOWNLINE	BARCLAY ROAD	0.69 mi	ROUTINE MAINTENANCE	69.6
Spencer	NORTH SPENCER ROAD	BARCLAY ROAD	PLEASANT STREET	4.53 mi	DO NOTHING	88.2
Spencer	PLEASANT STREET	MEADOW ROAD	200' N OF SMITHVILLE ROAD	0.50 mi	PREVENTATIVE MAINTENANCE	51.5
Spencer	PLEASANT STREET	200' N OF SMITHVILLE ROAD	100' N OF HIGH STREET	0.42 mi	ROUTINE MAINTENANCE	80.2
Spencer	PLEASANT STREET	100' N OF HIGH STREET	400' N OF MAIN STREET	0.53 mi	DO NOTHING	99.7
Spencer	PLEASANT STREET	400' N OF MAIN STREET	MAIN STREET	0.14 mi	PREVENTATIVE MAINTENANCE	64.2
Spencer	MEADOW ROAD*	PLEASANT STREET	WEST MAIN STREET	1.98 mi	STRUCTURAL IMPROVEMENT	33.6

\*The towns of Holden & Spencer requested that these two additional roadways be analyzed.

\*\*The pavement in the town of Spencer was collected and analyzed by Fay, Spofford & Thorndike.

alligator and transverse/longitudinal cracks, low severity surface wear, and high severity rutting.

In addition, the combined OCI of Manning Street is 90.7, which is in the “Do Nothing” category. Low severity distortions, alligator cracks, and rutting that were observed in the field.

### **5.3 Town of Paxton Overall Condition Index (OCI)**

For the town of Paxton the pavement data was collected in 2011. Conditions might thus be worse now; this depends how much road maintenance has been done by the town over the last few years. The map shows that Route 31 is mainly in the “Preventative Maintenance” category, but there are a couple of sections such as Grove Street and Maple Street that are in the “Do Nothing” category. Lastly, the Church Street segment is in the “Structural Improvement” category. The Holden Road segment has an OCI of 48.5 and thus categorized as “Preventative Maintenance”, but it could as easily be considered “Structural Improvement” since the OCI of 48.5 is right on the border of the categories.

Holden Road was found to have medium severity of distortions, alligator cracking, block cracking, and rutting. Distortions are bumps in the road, often a result of other distresses. Distortions affect the rideability of the road and may cause drivers to slow their traveling speed or even prevent them from traveling the posted speed. All of these distresses have an extent of either low or medium along this segment. Extent means the amount of the roadway that a distress occupies within a given segment. Church Street is another poor section of Route 31 with an OCI rating of 25.3. “Structural Improvement” is recommended for this section. This segment has medium severity of alligator cracking, block cracking, and rutting. It also has low severity distortion, but these occur along a good extent of the roadway. The remaining portion of Route 31 from Route 122 to the Spencer town line falls in the “Preventative Maintenance” category. The average OCI for this section is 56.8. Distortions, alligator and transverse/longitudinal cracking, rutting, and surface wear were observed in the field. Rutting has the highest extent along this section with nearly 50%. Rutting is a dip or trough-like feature found in the vehicular wheel-paths of a road. These troughs are the result of a sub-base degradation resulting from inappropriate base mix or poor drainage. Ruts are caused by the road’s inability to consistently handle the weight of traveling vehicles.

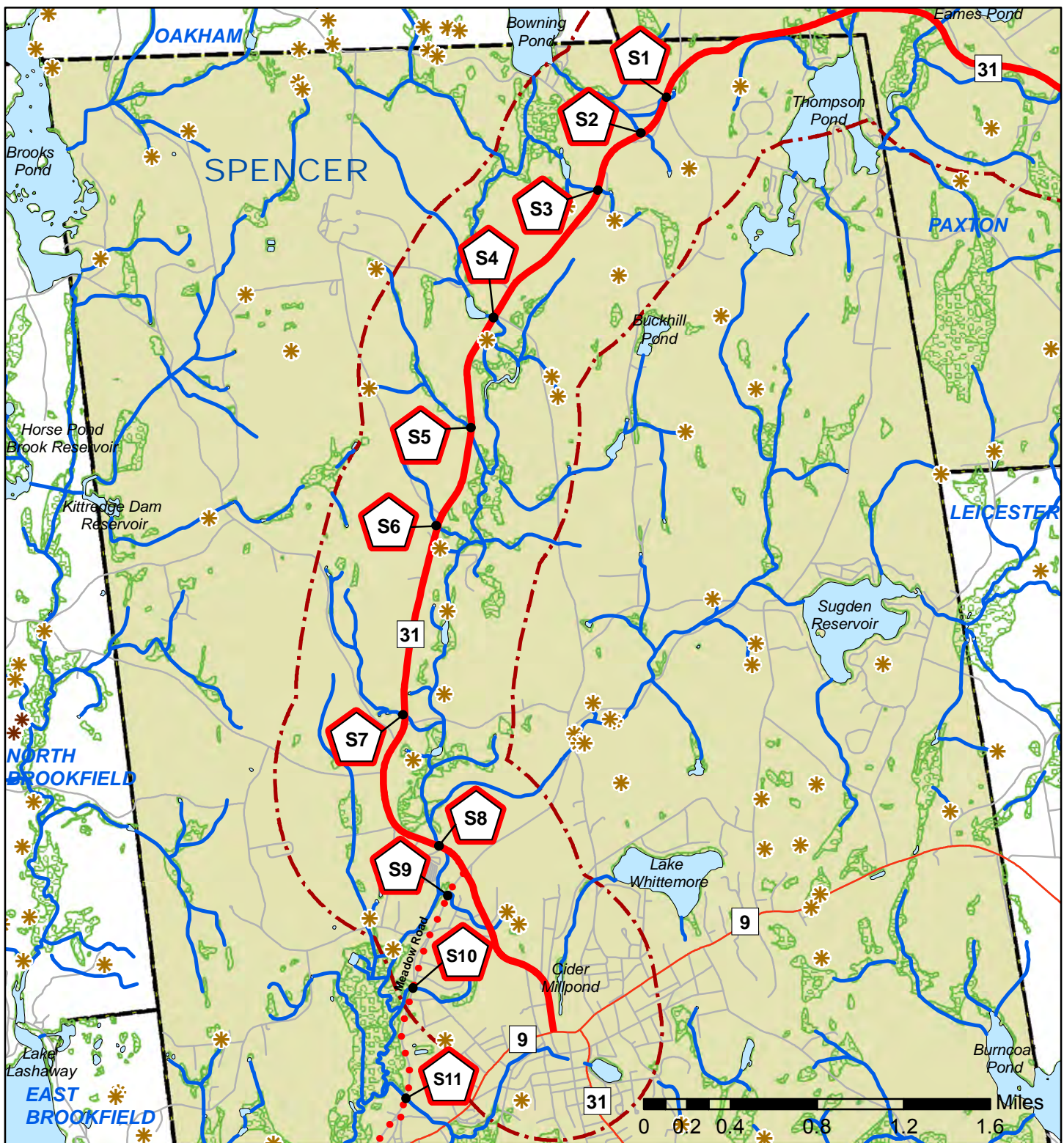
### **5.4 Town of Spencer Overall Condition Index (OCI)**

The pavement data in the town of Spencer was collected and analyzed in 2012 by the engineering firm Fay, Spofford & Thorndike. Route 31 was split into six segments. There were four segments for Pleasant Street and two segments for North Spencer Road. Most of North Spencer Road is considered in excellent condition with an OCI of 88.2 corresponding to the “Do Nothing” category. This part of North Spencer Road was a 4.53 mile segment. A short section from Barclay Road to the Paxton town line has an OCI of 69.6 and is in the “Routine Maintenance” category. The rest of Route 31 is called Pleasant Street. It was split up into four

segments for the purpose of pavement data collection and analysis. The Pleasant Street segments all had an OCI of 50 or higher. There was one segment that was a half mile long which was in the “Do Nothing” category. The remaining three segments were either in the “Routine Maintenance” or “Preventative Maintenance” categories.

In addition, Meadow Road is just less than two miles in length; it starts at Route 31 and heads southeast to meet Route 9. Its OCI rating was 33.6 corresponding to “Structural Improvement” category.





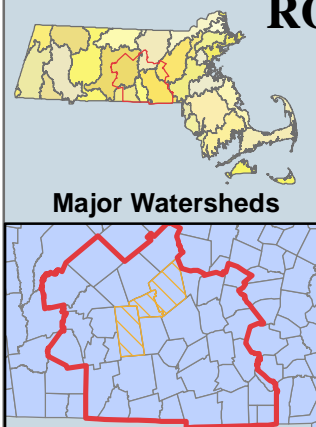
## ROUTE 31 CORRIDOR PROFILE: SPENCER

### Major Drainage Structures

Figure 47

#### Legend

- Route 31 - Holden, Paxton, Spencer
- - - Route 31 1-Mi Buffer Zone
- Streams Intersecting Rt 31
- Rivers & Streams
- \* NHESP Certified Vernal Pools
- \* Potential Vernal Pools
- ◡ Drainage structure or bridge
- DEP Wetlands (Jan. 2009)
- Waterbodies Intersecting Rt 31
- Waterbodies
- Towns



**Table 18**  
**Route 31 & Meadow Road**  
**Inventory of Major Drainage Structures**

Assigned Map #	Host Community	Primary Materials	General Condition	Approx. Pipe Size	Approx. Length	Field Observations	Additional Notes
<del>S8 S-23-002</del>	<del></del>	<del>Concrete &amp; steel bridge structure Built 1952 Last painted 1995</del>	<del>Good/Fair</del>	<del>Open box</del>	<del>34' deck roadway width</del>	<del>Nearby catch basin pipe blocked near cemetery  POSTED 20, 25, 40 depending on # axles  Substandard concrete railing</del>	<del>Safety fencing suggested for top of bridge wing walls  Scour noted adjacent to SE ing wall, fairly significant</del>
<del>S9</del>	<del></del>	<del>Granite cap with concrete &amp; stone  Corrugated steel</del>	<del>Good/Fair</del>	<del>1'</del>	<del>50'</del>	<del>Recent maintenance activities noted  Areas adjacent to pipe inflow and outflow clear of all debris</del>	<del>Home made headwall failing</del>
<del>S10</del>	<del></del>	<del>Stone &amp; mortar headwall Loose granite cap slab, acts like see-saw  Concrete pipe</del>	<del>NB is poor, failing headwall noted  SB is fair, some deterioration</del>	<del>2'</del>	<del>57'</del>	<del>NB headwall could collapse Fair amount of erosion eroded 1' connecting drain  SB better than NB, fair condition  SB siltation, some blockage</del>	<del>Woodland animal tracks noted for potential for wildlife X-ing</del>
<del>S11</del>	<del></del>	<del>Concrete</del>	<del>Good</del>	<del>3' dual pipe arrangement</del>	<del>40'</del>	<del>Lots of brush on sides  Some sediment on NB side in front of pipes</del>	<del>Pipes exhibit minimal wear</del>

## **7.2 Town of Holden**

### Existing Service

Currently there is no fixed route service to Holden and thus no complementary paratransit in general. The WRTA paratransit zone does encompass part of a corner of the community which is adjacent to the city of Worcester.

Paratransit service is however offered to all elders and people with disabilities town-wide. This service is in effect on weekdays between 9 AM-4 PM. It is provided by the Holden Council on Aging through a contract with the WRTA. The WRTA provides a van and reimburses the Council on Aging for operating costs. The WRTA also has a grant through Community Transit Grants to extend additional service to all elders and people with disabilities for travel between Holden and Worcester between 6-9 AM and 4-6 PM.

### Future Outlook

There is potential for the return of fixed route service on Main Street. Such a route did formerly exist, terminating in Jefferson. The completion of a “comprehensive service analysis” document by WRTA consultant URS Corporation may shed further light on this possibility. The report is due in June of 2015.

## **7.3 Town of Paxton**

### Existing Service

Paxton recently joined the WRTA service area in July 2013. On December 11, 2013, flex route service was established with a WRTA vehicle for two days a week. It begins near the town center area and nearby Anna Maria College and terminates at Worcester’s Union Station. Service runs from about 6-9 AM and 3-6 PM on Wednesdays and Fridays.

### Future Outlook

There may be an opportunity for increased frequency of flex route service along with increased local commitments for funding. The completion of a “comprehensive service analysis” document by WRTA consultant URS Corporation may shed further light on this possibility. The report is due in June of 2015.

## **7.4 Town of Spencer**

### Existing Service

Fixed route service is currently provided by two routes. Weekday service from Worcester to Brookfield runs from early morning to early evening, including stops at Spencer Center and the



Spencer DPW. There is similar service on Saturday which ends in Spencer on its western leg. ADA paratransit service is available within ¾ mile of these fixed routes.

Additional paratransit service is offered to all elders and people with disabilities in Spencer on weekdays between 8 AM-3 PM. This service is operated by SCM Elderbus. The WRTA provides a van and reimburses Elderbus for operating costs.

### Future Outlook

There may be an opportunity for increased frequency of service. The completion of a “comprehensive service analysis” document by WRTA consultant URS Corporation may shed further light on this possibility. The report is due in June of 2015.

The Spencer Highway Department property is currently used by the WRTA as a bus dwelling/parking area. The host community of Spencer has recently indicated the potential for an electric “fast charge” station or in the long term a Park & Ride Lot at this site. Commuters could drive to the lot, leave their cars and utilize the fixed route service to travel on to Worcester. This potential site use may be investigated further as a future Park & Ride activity under the region’s Congestion Management Program (CMP).

## **8.0 ALTERNATIVE MODES**

### **8.1 Introduction**

Various state initiatives, compacts and design criteria revisions have served to raise awareness about alternative modes of transportation including primarily public transit (detailed in another section of the CP), bicycling and walking. Specifications for this Route 31 Corridor Profile effort also included long distance hiking trails – namely, the Mid-State Trail – as well as traditional pedestrian access.

### **8.2 GreenDOT**

The GreenDOT initiative is MassDOT’s sustainability policy which supports the implementation of existing state laws, Executive Orders and other MassDOT policies.<sup>1</sup> The policy overreaches all MassDOT activity, from planning to construction and systems operations. GreenDOT’s three primary objectives are to reduce greenhouse gas (GHG) emissions, to promote the healthy transportation options of walking, bicycling and public transit, and to support smart growth development.

Among GreenDOT’s core planning goals related to mode shift and healthy transportation are the design of a multimodal transportation system, the promotion of healthy transportation and livable communities, and an increase in the use of bicycling, public transit and walking. In particular, a specific goal exists to triple the overall trip share of alternative modes. All goals are associated with specific strategies to be applied within reasonable timeframes. GreenDOT seeks to make real mode shift feasible by increasing the access and connectivity of all modes, improving transit performance, expanding commuter options, and by increasing the number of Complete Streets designed projects.

### **8.3 MassDOT Healthy Transportation**

The Transportation Reform Law (2009) established the Healthy Transportation Compact (HTC) which promotes improved public health through active transportation. Active transportation refers to walk, bike and transit. The HTC is an interagency initiative co-chaired by the Secretary of Transportation and the Secretary of Health and Human Services, including the Secretary of Energy and Environmental Affairs, MassDOT Highway Administrator, MassDOT Transit Administrator, the Commissioner of Public Health and the Secretary of Housing and Economic

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<sup>1</sup> The State policy includes: Climate Protection and Green Economy Act (Mass. Gen. L. c. 21N); Green Communities Act (Chapter 169 of the Acts of 2008); Healthy Transportation Compact (section 33 of Chapter 25 of the Acts of 2009); Leading by Example (Executive Order of Governor Patrick, no. 488); MassDOT’s youMove Mass planning initiatives; and the “Complete Streets” design standards of the 2006 MassDOT Highway Division Project Development and Design Guide, as amended.

Development. The HTC goals are to facilitate transportation decisions that balance the needs of all users, expand mobility, improve public health, support a cleaner environment and create stronger communities. GreenDOT healthy transportation strategies were built upon the HTC spirit. The intent is to adopt best practices to increase efficiency in achieving positive health outcomes through the coordination of land use, transportation and public health policy.

Some of the programs and or initiatives promoted by MassDOT and its partners that are currently in place and make the connection between health and transportation are: Mass in Motion, Safe Routes to School, and the Healthy Transportation Policy Directive, among other initiatives.

#### **8.4 Healthy Transportation Policy Directive**

MassDOT's Healthy Transportation Policy Directive requires all state transportation projects to increase bicycling, transit and walking options. This new Directive is intended to promote multimodal access for all transportation customers. MassDOT has made it clear that everyone in Massachusetts must be given the opportunity to bike, walk, or take transit instead of driving.

All MassDOT facilities will consider adjacent land uses and be designed to include wider sidewalks, landscaping, crossing opportunities and other features to enhance healthy transportation options. Reviews will be conducted of cluster sites where incidents have occurred with healthy-mode transportation users. MassDOT will also develop a guide to assist communities proposing shared use paths on or along rail beds in order to accelerate the path design process.

#### **8.5 Community Health Improvement Plan (CHIP)**

The City of Worcester Division of Public Health in collaboration with community partners has released a Community Health Improvement Plan (CHIP). The CHIP identifies major health priorities for the Greater Worcester region and includes specific objectives and strategies. The Town of Holden is part of the Central Massachusetts Regional Public Health Alliance. One of the topics included in the CHIP is Healthy Eating/Active Living; one of the strategies within this domain is to increase the consideration of pedestrian and bicycle accommodation in routine decision making through the adoption of Complete Streets transportation policy throughout the region.

Goals include an increase in the number of municipalities adopting Complete Streets policies and the number of completed assessments for parks/open spaces, including the development of prioritization criteria. Additionally, the partners seek an increase in miles of bicycle lanes and in the number of schools that have adopted a Safe Routes To School policy.



## **8.6 Complete Streets**

What is now known as the Complete Streets approach was first included in the 2006 *Project Development and Design Guide*. Multimodal design guidelines are part of MassDOT's current policy for Context Sensitive Design. In a Complete Streets approach, roadway projects accommodate all users, not only auto traffic. All highway projects shall, from the earliest design stages, provide safe access and connectivity for pedestrians and bicyclists. The Healthy Transportation Policy Directive expands on how, when and where these accommodations should be provided, including ADA design compliance. The *Complete Streets initiative*, which requires roadway designs that accommodate all users, calls for bicycle & pedestrian accommodation as part of most highway projects, a major exception being limited access highways.

## **8.7 Bicycling in the Corridor**

Paved shoulders reduce passing conflicts between motor vehicles and bicyclists and pedestrians and make the crossing pedestrian more visible to motorists. They also provide for storm water discharge farther from the travel lanes, reducing hydroplaning, and splash and spray to following vehicles, pedestrians and bicyclists. In rural areas, they provide space for bicyclists to ride at their own pace.

Existing Route 31 conditions include roadway shoulders with minimal width that are too narrow to serve as breakdown lanes and recovery/clearance areas. In the future, five foot shoulders would be preferable along the entire corridor. In some areas this goal would admittedly be a challenge due to existing narrow roadway footprints and the existence of various roadside features such as large trees and historic stonewalls.

In Paxton, planned improvements to the Holden Road segment of Route 31 call for 11 foot travel lanes with 5 foot shoulders. This typical roadway cross section specification could perhaps be utilized along other segments of the study corridor.

## **8.8 Pedestrian Facilities and Activity in the Corridor**

Limited sidewalks currently exist in the corridor area. They are mostly in the vicinity of town center areas. Spencer has a sidewalk betterment program which includes both proposed new sidewalks and improvements to existing sidewalks that primarily connect schools, shopping and the downtown area. Similar efforts could be considered as appropriate in the other towns.

With regard to crossing the primary corridor roadway, Route 31, triggered pedestrian phases to traffic signals are available at Route 122A in Holden and Route 122 in Paxton. In Spencer, the intersections of Route 9 with Meadow Road & South Spencer Road and Route 9 with Route 31 provides for pedestrian call time. Crosswalks could be considered at other key locations along the study corridor where demand appears to be high.

Walkable Community Workshops are short interactive courses that involve learning the basics, touring an area on foot to identify issues, and cooperatively determining a plan for making improvements. Special topics may include schools, major roads, land use, neighborhood design and the needs of the mobility impaired. CMRPC also conducts Neighborhood SAFE studies that provide communities with small area infrastructure assessments from a pedestrian and bicyclist safety perspective.

Host communities are at various stages in the use of these informative tools. Holden and Paxton have both completed a Neighborhood SAFE program for their town centers, while Spencer plans to utilize the Neighborhood SAFE program for the Meadow Road area. They are also requesting a Road Safety audit for the roadway itself.

## **8.9 Regional Trails in the Corridor**

The Midstate Trail is a scenic footpath which runs 92 miles through Worcester County from the Rhode Island border to the New Hampshire border. The trail is considered highly accessible, scenic, and remarkably rural despite its proximity to urban areas. The trail includes the summits of Mount Wachusett and Mount Watatic, as well as many interesting geologic, historic, and natural features. Central portions of the trail climb the flanks and summits of drumlins such as Moose Hill and Buck Hill in Spencer.

In the host community of Spencer, the Mid-State Trail crosses Route 31 in North Spencer in vicinity of the landmark Black & White Restaurant. **Figure 52** indicates the location of the Mid-State Trail in the town of Spencer using a green line. From the adjacent communities of Leicester and Paxton, the Mid-State Trail continues on to skirt Spencer state forest in North Spencer before crossing Route 31. The trail then essentially parallels Browning Pond Road before entering the town of Oakham.

The Midstate Trail Committee, under the auspices of the Worcester chapter of the Appalachian Mountain Club, continues the administration and maintenance of the Trail. The Committee is augmented by a larger group of resident volunteer maintainers who are invaluable to the survival of the Midstate Trail. Local mountain club chapters assist with hike publicity and recruitment of maintainers. The Committee welcomes anyone willing to help maintain a part of this “close to home” trail. The Department of Environmental Management has provided support, map printing, and publicity over the years.

We note here also that the long distance MassCentral Rail Trail crosses Route 31 in host community Holden, north of the defined Corridor Profile study area.

Table 21

**Town of Spencer**  
**Route 31(& Meadow Rd) Focus Intersections:**  
**Overall Corridor Profile Findings**

Study Intersection Location	CMP Intersection Level-of-Service(LOS)*	Safety Analysis**	Public Transit***	Freight Movement Heavy Vehicle %	Environmental Consultation Analysis	Other Considerations
<del>Route 31/Barclay Rd</del>	<del>AM = A (A) PM = B (A)</del>	<del>Total = 2 PI - 1, PD - 1</del>	<del>SCM Elderbus provides service to elders and disabled in the town of Spencer</del>	<del>AM = 3.5% PM = 2.0%</del>	<del>Recreation, potential vernal pools, species of conservation concern, wooded swamp</del>	<del>"Y"-type intersection</del>
Route 31/Browning Pond Rd/ Thompson Pond Rd	AM = B (B) PM = B (C)	Total = 3 PI - 1, PD - 2	SCM Elderbus	AM = 4.5% PM = 2.5%	Recreation & conservation, potential vernal pools, species of conservation concern, wooded swamp	Expansive pavement area
<del>Route 31/North Brookfield Rd</del>	<del>AM = B (C) PM = B (B)</del>	<del>Total = 3 PI - 0, PD - 3</del>	<del>SCM Elderbus</del>	<del>AM = 3.5% PM = 0.4%</del>	<del>Agriculture, potential vernal pools, wooded swamp</del>	<del>Limited lines of sight, northbound road approach is steep</del>
Route 31/Meadow Rd/ Wire Village Rd	AM = B (B) PM = C (D)	Total = 16 PI - 9, PD - 7	SCM Elderbus	AM = 3.5% PM = 0.4%	Historical/cultural, recreation, potential vernal pools, wooded swamp	Limited lines of sight, adjacent Eagleton St
<del>Route 31/Route 9/ Wall St</del>	<del>AM = C (C) PM = C (C)</del>	<del>Total = 10 PI - 0, PD - 10</del>	<del>SCM Elderbus</del>	<del>AM = 6.8% PM = 1.5%</del>	<del>Historical/cultural, recreation, potential vernal pools, deep marsh</del>	<del>Off set geometry planned for improvement</del>
Meadow Rd/Route 9/ South Spencer Rd****	AM = B (B) PM = B (B)	Total = 13 PI - 1, PD - 12	SCM Elderbus / WRTA Fixed Route #33 serves a portion of Meadow Rd	AM = 5.4% PM = 1.5%	Historical/cultural, water protection land, potential vernal pools, species of conservation concern, wooded swamp	Commercial area, need for bicycle & pedestrian connectivity

\*Intersection Level-of-Service Existing (Projected 2023)

\*\*PI = Personal Injury, PD = Property Damage

\*\*\*WRTA Fixed Route service has no stops on Route 31, but Route #33 ends at Spencer DPW on Meadow Road.

\*\*\*\*This additional intersection was added per request by the town of Spencer



**Table 24**  
**Town of Spencer**  
**Route 31 (& Meadow Rd) Roadway Segments:**  
**Overall Corridor Profile Findings**

Route 31 Roadway Segments	Safety Analysis*	Pavement Condition**	Bridge/Culverts Observed Condition	Public Transit***	Freight Movement Daily % of Heavy Vehicles	Environmental Consultation Analysis	Other Considerations
<del>Paxton Town Line to Barclay St</del>	<del>None</del>	<del>OCI = 69.6 Routine Maintenance</del>	<del>None</del>	<del>SCM Elderbus provides service to elders and disabled in the town of Spencer</del>	<del>8.0%</del>	<del>Recreation, potential vernal pools, wooded swamp</del>	<del>Substandard roadway geometry</del>
<del>Barclay St to Browning Pond Rd</del>	<del>Total = 1 PI - 1, PD - 0</del>	<del>OCI = 88.2 Do Nothing</del>	<del>Culvert S1 - good/fair condition</del>	<del>SCM Elderbus</del>	<del>8.0%</del>	<del>Recreation, potential vernal pools, species of conservation concern, wooded swamp</del>	<del>Need to maintain lines of sight</del>
<del>Browning Pond Rd to North Brookfield Rd</del>	<del>Total = 16 PI - 5, PD - 11</del>	<del>OCI = 88.2 Do Nothing</del>	<del>Culvert S2 - unknown condition Culvert S3 - good/fair condition Bridge S4 - fair condition Culvert S5 - fair/poor condition Culvert S6 - fair/poor condition Culvert S7 - fair condition</del>	<del>SCM Elderbus</del>	<del>6.3%</del>	<del>Conservation, agriculture, potential vernal pools, species of conservation concern, wetland buffer, wooded swamp</del>	<del>Roadway widths vary, town-owned bridge over Seven Mile River</del>
<del>North Brookfield Rd to Meadow Rd</del>	<del>Total = 6 PI - 1, PD - 5</del>	<del>OCI = 88.2 Do Nothing</del>	<del>Bridge S8 - good/fair condition Functionally obsolete</del>	<del>SCM Elderbus</del>	<del>6.7%</del>	<del>Historical/cultural, potential vernal pools, wooded swamp</del>	<del>Need to maintain lines of sight</del>
<del>Meadow Rd to Route 9</del>	<del>Total = 13 PI - 6, PD - 7</del>	<del>OCI = 73.9 Routine Maintenance</del>	<del>None</del>	<del>SCM Elderbus</del>	<del>5.2%</del>	<del>Recreation, potential vernal pools, deep marsh</del>	<del>State-owned bridge over Seven Mile River</del>
Route 31 to Route 9 (Meadow Road)	Total = 16 PI - 2, PD - 14	OCI = 33.6 Structural Improvement	Culvert S9 - good/fair condition Culvert S10 - fair/poor condition Culvert S11 - good condition	SCM Elderbus / WRTA Fixed Route #33 serves a portion of Meadow Rd	6.5%	Historical/cultural, water protection land, potential vernal pools, species of conservation concern, wooded swamp	Roadway widths vary

\*PI = Personal Injury, PD = Property Damage

\*\*OCI = Overall Condition Index, Ranging From 0 - 100 / Data was collected by Fay, Spofford & Thorndike (FST)

\*\*\*WRTA Fixed Route Service has no Stops on Route 31, but Route #33 ends at Spencer DPW on Meadow Road.

## 10.4 Town of Spencer

**Figure 57** shows where and what type of improvements could be made along Route 31 in Spencer. A summary of these suggested improvement options are provided below:

- Considered a longer-term recommendation, realign/straighten the Route 31 curve in Spencer just south of the Paxton town line. This improvement would supplement earlier realignments to Route 31 made in the 1960's/1970's. Evidence of various realignments can be seen between Northwest Road and the Browning Pond Road/Thompson Pond Road intersection. Various options for consideration:
  - Same alignment (relocate house and garage)
  - New alignment, north
  - New alignment, south

Depending on the preferred alignment selected by the host community, there would be the need to acquire the necessary right-of-way for the project, mindful of any environmental challenges. The alignment options are shown in **Figure 58**.

- Tighten the intersection of Route 31 with Browning Pond Road/Thompson Pond Road in North Spencer. Provide for improved intersection definition, reducing the fairly large area of open, unmarked pavement. Improve traffic control signage and pavement markings. As observed in the field, there is an extensive closed drainage system in this area.
- Replace Route 31 bridge over Seven Mile River adjacent to Hastings Road, estimated at nearly \$1 million (S-23-012). Various levels of corrosion to both concrete and steel noted on structure. The deck has numerous areas of cracking and the concrete bridge railings are deteriorating as it is approaching the end of useful service. Town's consultant has recommended that the bridge be replaced with a butted deck beam bridge type with crash approved steel bridge rails. The existing abutments and wing walls can be modified and included in the reconstruction. Advantages of this design include fairly rapid construction while minimizing environmental impacts by reducing costly work in the waterway.
- Drainage improvements in North Spencer are planned to be implemented in 2014. New culvert installation is meant to alleviate observed recurring Route 31 flooding. This local project will add another culvert to complement two existing that become overwhelmed in various storm events. The new culvert is considered an overflow culvert designed to *not* change riparian conditions, that is, when the existing culverts are flooded beyond capacity the water will flow down a newly constructed drainage ditch and into the new

culvert under Route 31. It will drain to the same area it went to when it flooded the roadway. Also, continue regular culvert inspection and maintenance.

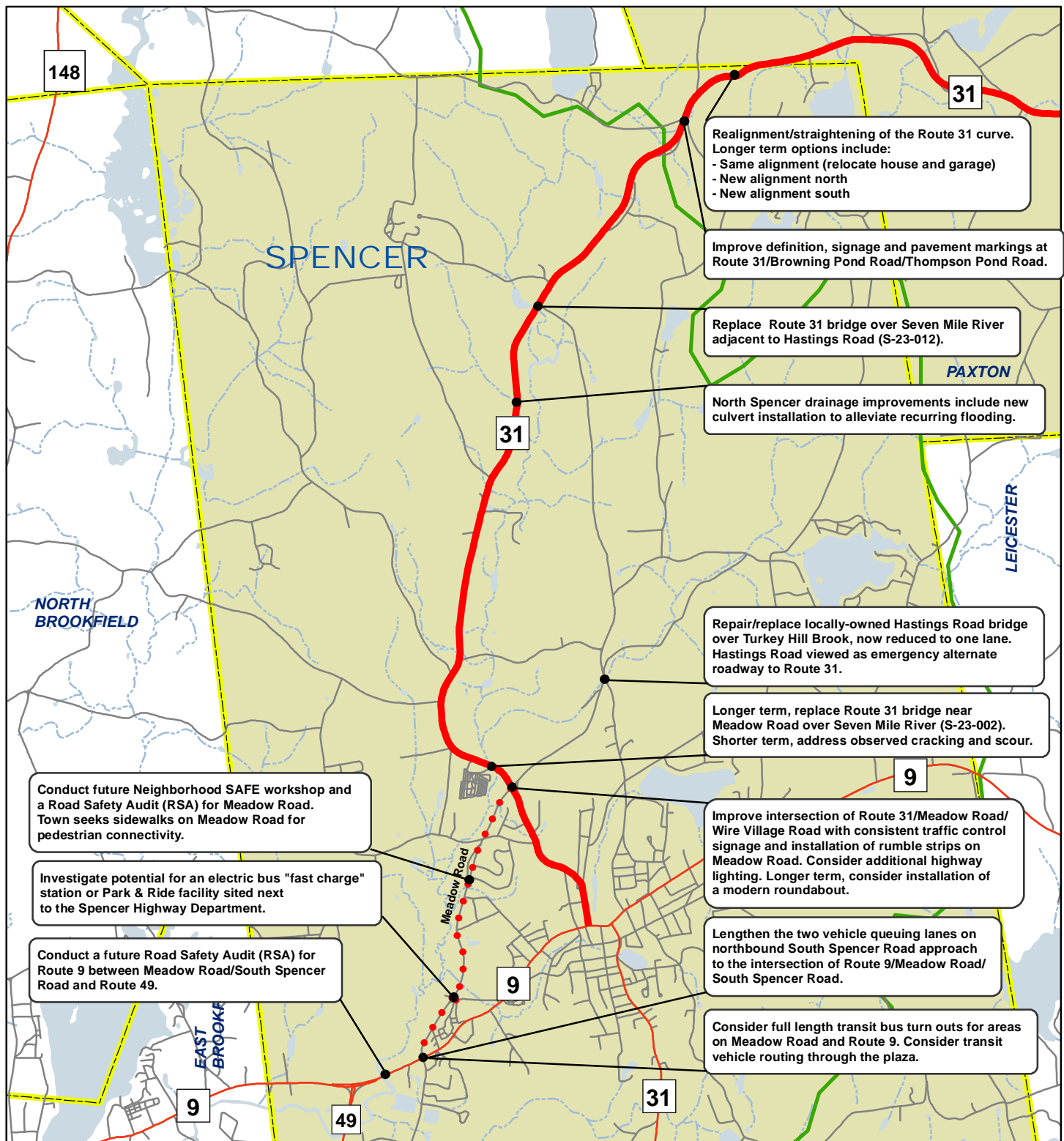
- Replace Route 31 bridge near Meadow Road over Seven Mile River (S-23-002). Currently posted at a 20/25/40 weight rating for 2, 3 and 4 axles, respectively, the host community requests that the bridge be added to the TIP project listing. Various observed deficiencies with the deck and superstructure, concrete cracks and deteriorating steel. Structural cracks in substructure abutments and wing walls. In the field, various levels of erosion were observed around the wing walls. (*MassDOT-owned structure.*)
- Implement improvements at the Route 31/Meadow Road/Wire Village Road intersection. In the short term, track effectiveness of recently installed advance warning signs on each approach to the intersection. Selectively trim/remove trees and other vegetation within the roadway right-of-way. As a further basic improvement, consider the installation of rumble strips on the Meadow Road approach supplementing traffic control signage, indicating the need to stop ahead. Review lane widths and consider minor geometric improvements. Consider additional overhead highway lighting at this study location.

In the longer term, consider installation of a modern roundabout at the Route 31/Meadow Road/Wire Village Road intersection. For a single lane roundabout, calculations show a level of service grade of “A” for the AM and PM time periods. For the existing geometry, the level of service is a “B” in the AM and “D” in the PM.

- Host community requests “Neighborhood SAFE” workshop for Meadow Road as well as a Road Safety Audit (RSA). Town seeks sidewalks on Meadow Road for pedestrian connectivity, part of a larger effort by the community to improve sidewalks radiating from the downtown “urban” area. In addition, town seeks RSA for Route 9 (West Main Street) between Meadow Road/South Spencer Road and Route 49.
- Further investigate the potential for an electric bus “fast charge” station or Park & Ride facility to potentially be sited adjacent to the Spencer Highway Department. WRTA vehicles already stop/dwell at this location. Perhaps consider other transit rider sidewalk/accessibility improvements.
- At the intersection of Route 9/Meadow Road/South Spencer Road, the town has suggested improvements to the South Spencer Road northbound approach. Improve vehicle queuing lanes by lengthening and widening, providing two approach lanes with a paved shoulder. The community intends to work with adjacent employer FLEXcon to implement this improvement.



- Mindful of Flexcon generated traffic volumes, consider full length transit bus turn outs or similar in the location of the Big Y plaza. Options include the existing grassy areas on Meadow Road as well as in front of Flexcon on Route 9. Further, perhaps a transit vehicle routing through the Plaza could be considered.
- Repair/replace locally-owned Hastings Road bridge over Turkey Hill Brook, now reduced to one lane. Hastings Road viewed as emergency alternate roadway to Route 31.



## ROUTE 31 CORRIDOR PROFILE: SPENCER

### Suggested Improvement Options

Figure 57

#### Legend

- Route 31 - Holden, Paxton, Spencer
- ... Route 31 Corridor Profile Extension
- State Numbered Routes
- Other Roadways
- Midstate Trail



Source: Data provided by the US Census Bureau, Central Massachusetts Regional Planning Commission (CMRPC), massDOT Office Of Transportation Planning Geospatial Resources Section and the Office of Geographic Information MassGIS), Commonwealth of Massachusetts, Information Technology Division.

Information depicted on this map is for planning purposes only. This information is not adequate for legal boundary definition, regulatory interpretation, or parcel-level analysis. Use caution interpreting positional accuracy.

1 in = 0.75 miles

radius in front of the town library. Improve pavement markings and also consider four-way “Stop” control signage for improved safety.

**Preliminary Estimated Cost: \$150,000**

*(Local DPW or hired contractor)*

### #3 Priority

Route 31 (West Street) water mainline replacement and deepening must proceed prior to most improvements suggested for this roadway segment. At this time, the town’s plan is to install 6,700 feet, or 1.3 miles, of pipe between Route 122 at the town center and South Street.

**Preliminary Estimated Cost: \$1.5 million**

*(Includes engineering and contingencies, hired water line contractor)*

## **11.3 Town of Spencer**

### #1 Priority

Town seeks sidewalks on Meadow Road for pedestrian connectivity, part of a larger effort by the community to improve sidewalks radiating from the downtown “urban” area. Also, the town envisions the reconstruction and modernization of Meadow Road as a “Complete Street” as a long-term goal. Host community Spencer requests a “Neighborhood SAFE” workshop for Meadow Road as well as a Road Safety Audit (RSA). Further, town seeks RSA for Route 9 between Meadow Road/South Spencer Road and Route 49.

Estimated linear length of sidewalks envisioned for Meadow Road:

- 1<sup>st</sup> Phase: Route 31 to Spencer Highway Department (1.27 miles or 6,705 feet)
  - 2<sup>nd</sup> Phase: Spencer Highway Department to Route 9 (0.34 miles or 1,795 feet)
- Totals for sidewalk installation: 1.61 miles or 8,500 feet

**Sidewalks Installation Preliminary Estimated Cost: \$700,000**

*(Estimate provided by MassDOT)*

**Meadow Road (1.61 miles) Reconstruction Preliminary Estimated Cost: \$2.5+ Million**

*(Estimate provided by the town of Spencer Utilities & Facilities Superintendent)*

### #2 Priority

Replace Route 31 bridge over Seven Mile River adjacent to Hastings Road, estimated at nearly \$1 million (S-23-012). Various levels of corrosion to both concrete and steel noted on structure. The deck has numerous areas of cracking and the concrete bridge railings are deteriorating as it is approaching the end of useful service. Town’s consultant has recommended that the bridge be replaced with a butted deck beam bridge type with crash approved steel bridge rails. The



existing abutments and wing walls can be modified and included in the reconstruction. Advantages of this design include fairly rapid construction while minimizing environmental impacts by reducing costly work in the waterway.

***Preliminary Estimated Cost: \$1 million***  
*(Hired bridge contractor)*

Replace Route 31 bridge near Meadow Road over Seven Mile River (S-23-002). Currently posted at a 20/25/40 weight rating for 2, 3 and 4 axles, respectively, the host community requests that the bridge be added to the TIP project listing. Various observed deficiencies with the deck and superstructure, concrete cracks and deteriorating steel. Structural cracks in substructure abutments and wing walls. In the field, various levels of erosion were observed around the wing walls. *(MassDOT-owned structure.)*

***Preliminary Estimated Cost: \$2 million***  
*(Hired bridge contractor)*

Repair/replace locally-owned Hastings Road bridge over Turkey Hill Brook, now reduced to one lane. Hastings Road viewed as emergency alternate roadway to Route 31.

***Preliminary Estimated Cost: \$400,000***  
*(Hired bridge contractor)*

### #3 Priority

Pavement preservation should be strongly considered and the resurfacing of Route 31 (5.6 miles) should be completed as soon as possible to avoid further pavement deterioration and higher reconstruction costs. The pavement condition varies for Route 31 as well as the roadway width, which ranges from 24 feet to 28 feet.

Consider including the realignment/straightening of the Route 31 curve in Spencer just south of the Paxton town line. This improvement would supplement earlier realignments to Route 31 made in the 1960's/1970's. Evidence of various realignments can be seen between Northwest Road and the Browning Pond Road/Thompson Pond Road intersection. Various options for consideration:

- Same alignment (relocate house and garage)
- New alignment north
- New alignment south

Depending on the preferred alignment selected by the host community, there would be the need to acquire the necessary right-of-way for the project, mindful of any environmental challenges. *Considered a longer-term recommendation.*

***Route 31 Resurfacing Preliminary Cost Estimates***  
*(MMA/MassDOT Current \$ Values)*

- 2" overlay = **\$680K**
- 4" overlay = **\$1.7 Million**
- Full Depth Reconstruction = **\$4.3 Million**

***Route 31 Curve Realignment/Straightening Preliminary Estimated Cost: \$4 Million***  
*(Based on similar CMMPO TIP cost estimates)*

#### **11.4 Potential Funding Sources**

In large part, Route 31 is locally-maintained by the host communities. Depending on cost, some suggested improvements can be perhaps be implemented by host community public works or highway department personnel. Locally accomplished, some basic Route 31 improvement options could be funded by the state's Chapter 90 Program which provides local aid for highway purposes.

For more costly improvements, beyond local funding capabilities, the Route 31 host communities have the opportunity to seek funding for multi-modal improvements through the Transportation Improvement Program (TIP) developed by the Central Massachusetts Metropolitan Planning Organization (CMMPO). A process carried out annually by the CMMPO, the TIP provides funding for improvements on federal-aid eligible highways, including Route 31. MassDOT-Highway Division oversees and takes a major role in improvements suggested and eventually implemented along the federal-aid highway system.

The Route 31 study was modeled after a similar multi-community effort that focused on Route 140 in the host communities of Princeton, Sterling and Westminster. The Route 140 effort led to multi-modal highway improvements in the town of Princeton that are programmed for funding on the region's CMMPO TIP. Planned improvements are anticipated to benefit not only the host community but the greater region as well.

## **APPENDIX 3**

# **PROPOSED PROJECT AND AREA CONTEXT / GIS MAPS**

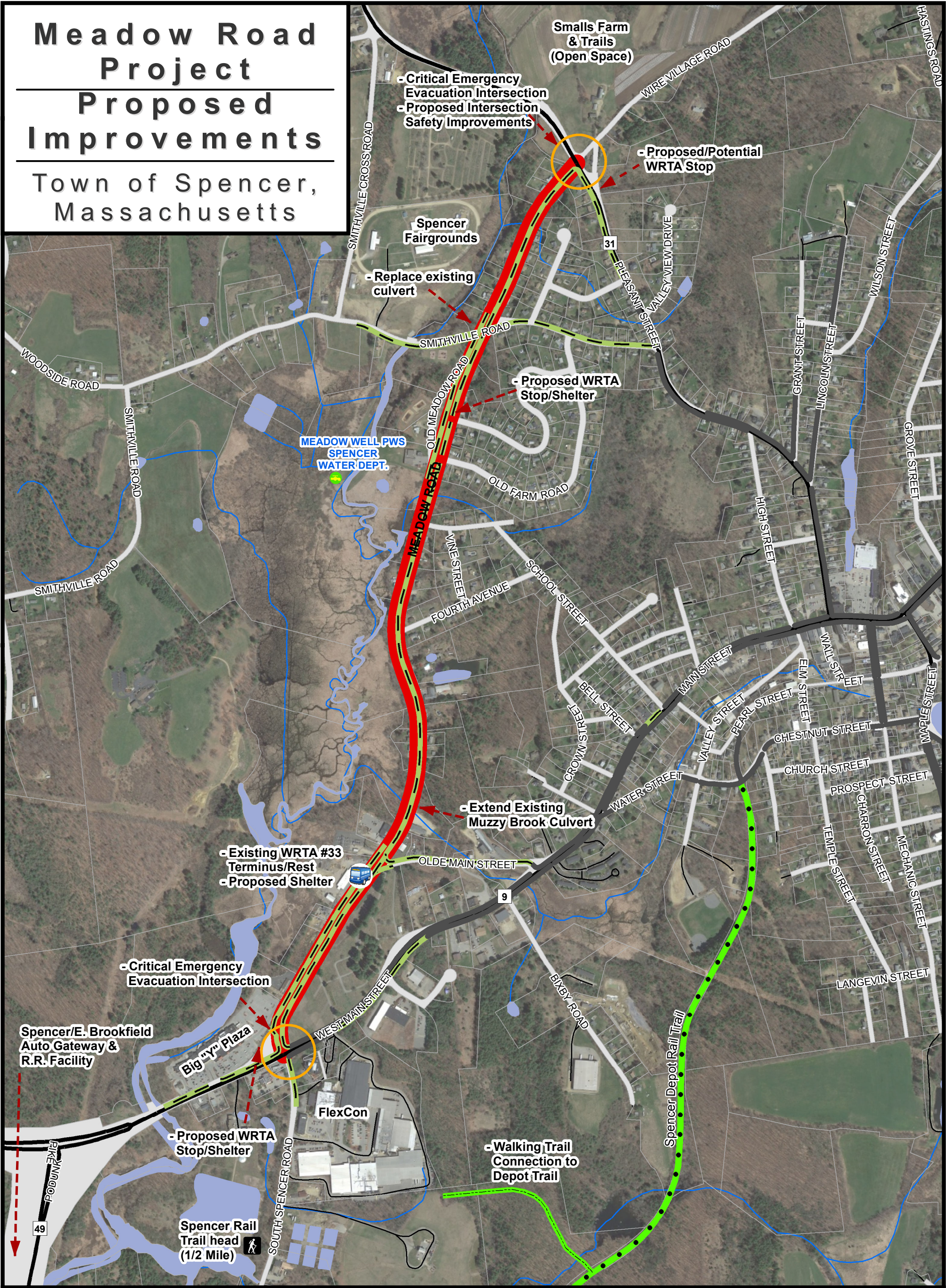




# Meadow Road Project

## Proposed Improvements

Town of Spencer, Massachusetts



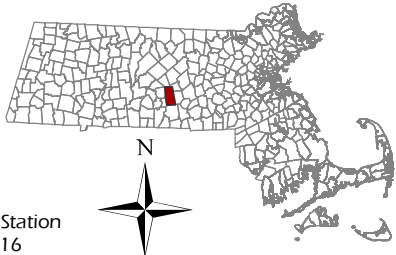
### Legend

- Project Meadow Road
- Proposed Sidewalk
- Hiking/Snowmobile
- Existing Sidewalk
- Depot Rail Trail
- Property Parcel

Source: Data provided by the Town of Spencer, Central Massachusetts Regional Planning Commission (CMRPC), NHESP, massDOT and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division. Information depicted on this map is for planning purposes only.

1 in = 0.15 miles

Produced by  
**CMRPC**  
Central Massachusetts Regional Planning Commission  
2 Washington Square, Union Station  
Worcester, MA 01604-4016





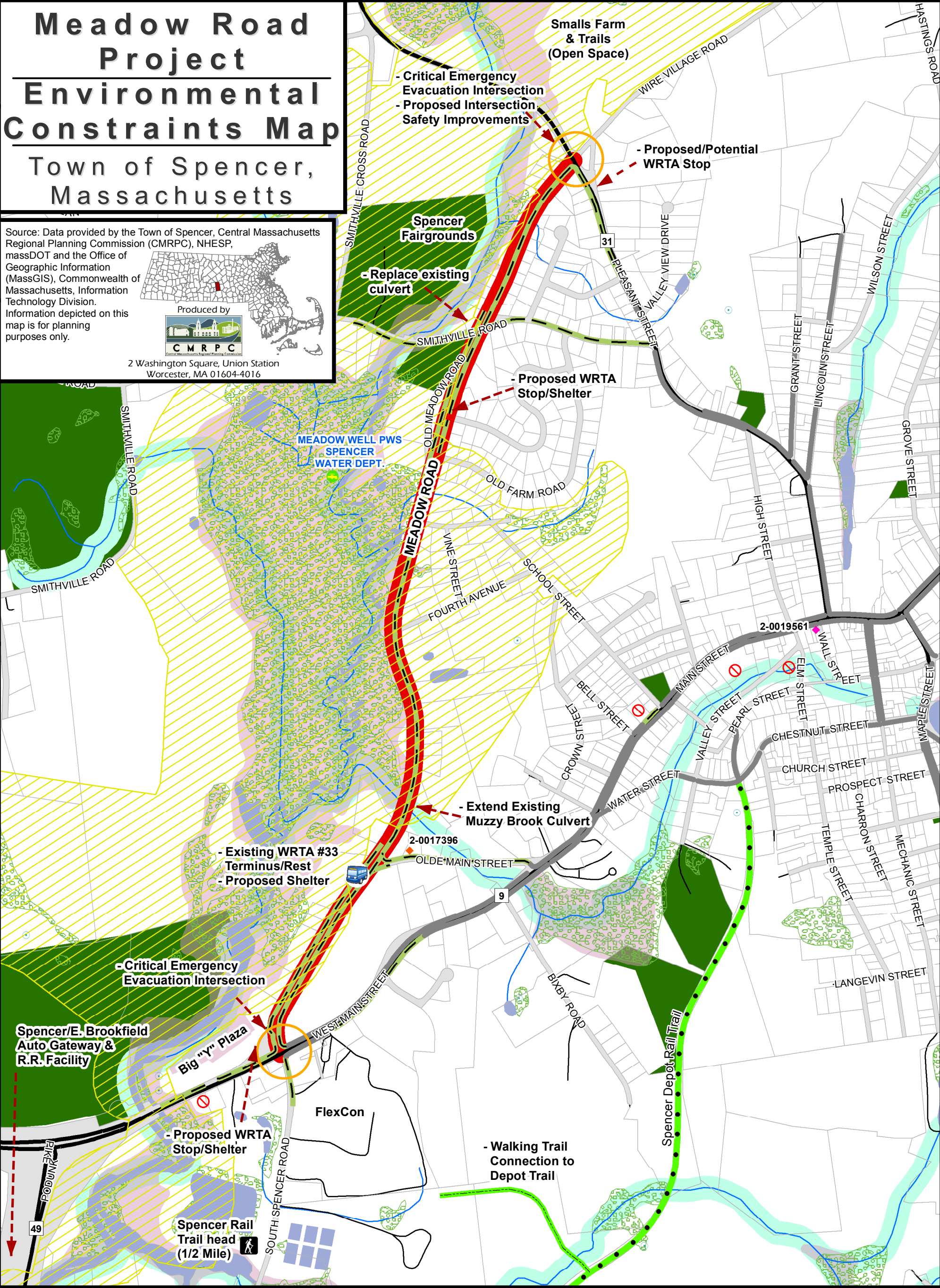
# Meadow Road Project

## Environmental Constraints Map

### Town of Spencer, Massachusetts

Source: Data provided by the Town of Spencer, Central Massachusetts Regional Planning Commission (CMRPC), NHESP, massDOT and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division.  
Information depicted on this map is for planning purposes only.

Produced by  
**CMRPC**  
Central Massachusetts Regional Planning Commission  
2 Washington Square, Union Station  
Worcester, MA 01604-4016



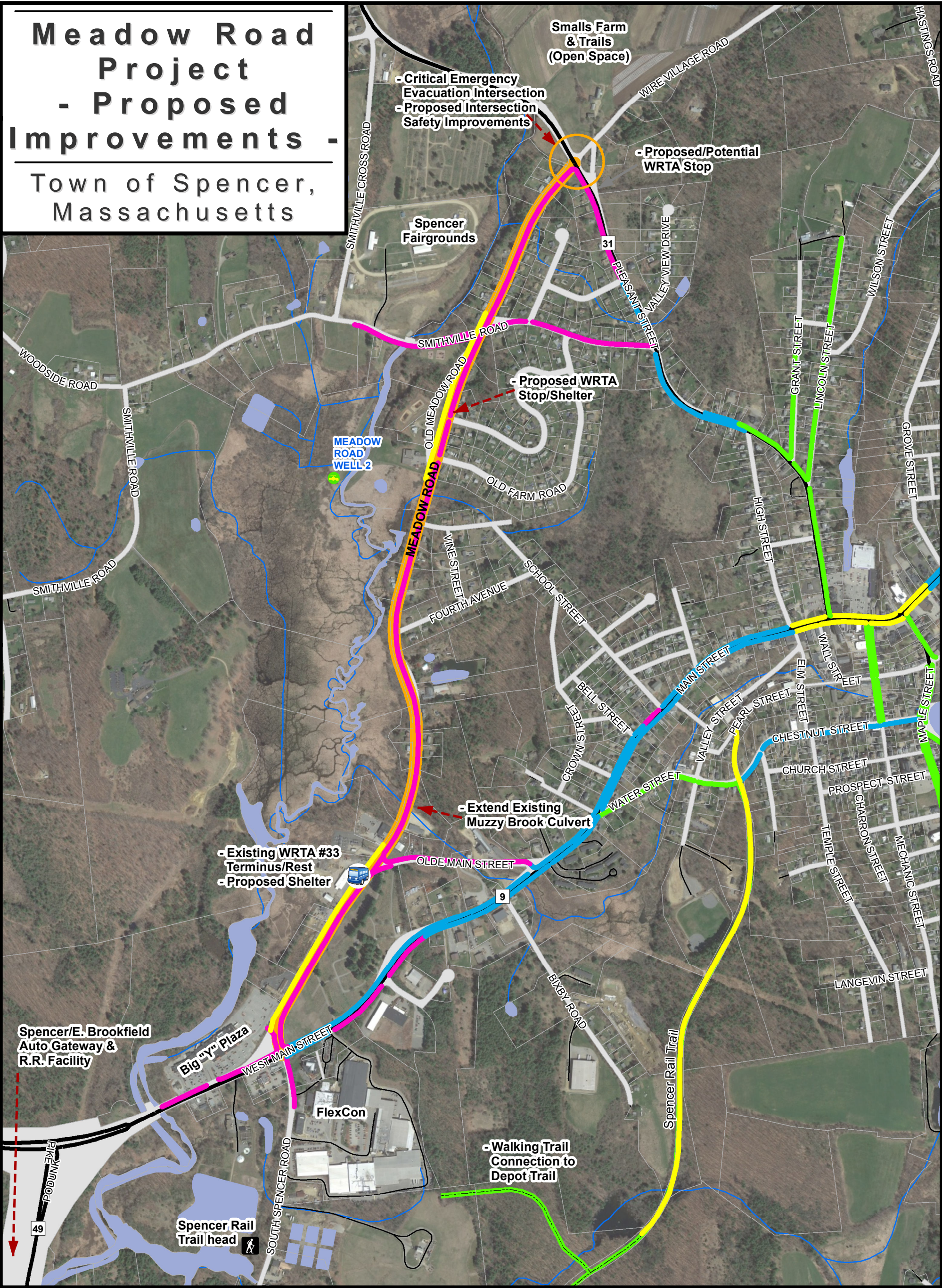
1 in = 0.15 miles

- Legend**
- |  |                     |  |                              |  |   |
|--|---------------------|--|------------------------------|--|---|
|  | Project Meadow Road |  | NHESP Potential Vernal Pools |  | NHESP Priority Habitats of Rare Species |
|  | Proposed Sidewalk   |  | AUL Sites                    |  | MASS. DEP Wetlands                      |
|  | Existing Sidewalk   |  | DEP Tier I Classified Site   |  | FEMA 100-year Flood Area                |
|  | Hiking/Snowmobile   |  | DEP Tier II Classified Site  |  | River Protection Act (0-100ft)          |
|  | Depot Rail Trail    |  | Property Parcel              |  | Protected Open Space                    |





Meadow Road  
Project  
- Proposed  
Improvements -  
Town of Spencer,  
Massachusetts



Legend

- Property Parcel

Project Road

Trail

FUTURE/DESIRED PROPOSED NEW SIDEWALKS

CURRENTLY PROPOSED SIDEWALK IMPROVEMENTS

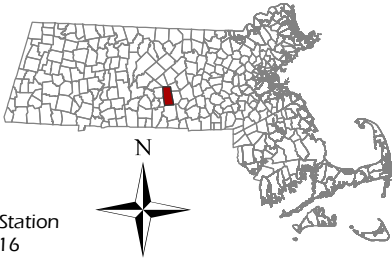
RECOMMENDED PRIORITY SIDEWALK IMPROVEMENTS

COMPLETED SIDEWALK IMPROVEMENT (INCLUDES MAAB/ADA)

Source: Data provided by the Town of Spencer, Central Massachusetts Regional Planning Commission (CMRPC), NHESP, massDOT and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division. Information depicted on this map is for planning purposes only.

1 in = 0.15 miles

Produced by  
CMRPC  
Central Massachusetts Regional Planning Commission  
2 Washington Square, Union Station  
Worcester, MA 01604-4016





# Meadow Road Project

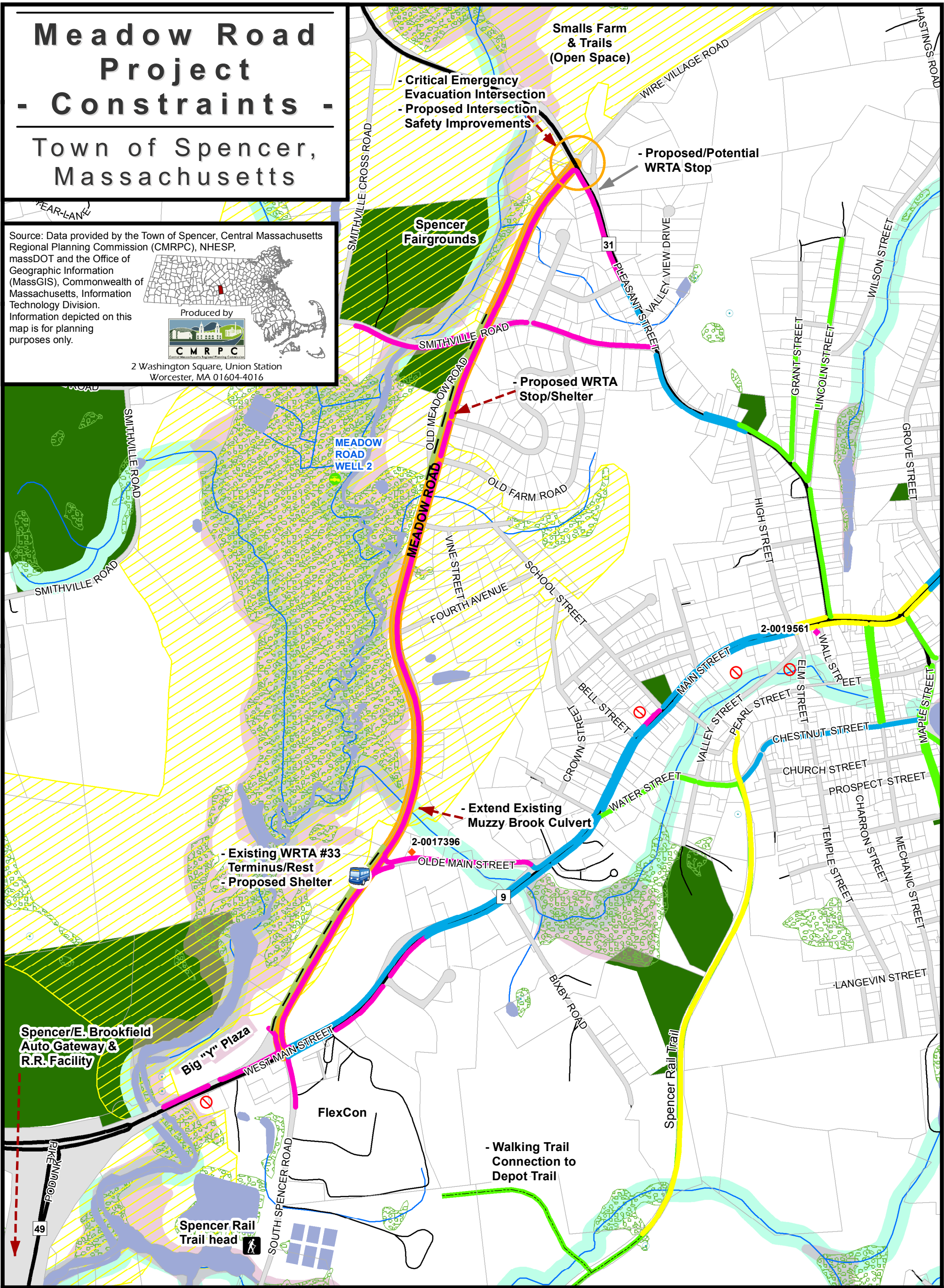
## - Constraints -

### Town of Spencer, Massachusetts

Source: Data provided by the Town of Spencer, Central Massachusetts Regional Planning Commission (CMRPC), NHESP, massDOT and the Office of Geographic Information (MassGIS), Commonwealth of Massachusetts, Information Technology Division. Information depicted on this map is for planning purposes only.



2 Washington Square, Union Station  
Worcester, MA 01604-4016



Legend

Proposed Sidewalk

Future/Desired Proposed New Sidewalks

Currently Proposed Sidewalk Improvements

Recommended Priority Sidewalk Improvements

Completed Sidewalk Improvement (Includes MAAB/ADA)

Project Road

Trail

NHESP Potential Vernal Pools

AUL Sites

DEP Tier I Classified Site

DEP Tier II Classified Site

Property Parcel

NHESP Priority Habitats of Rare Species

MASS. DEP Wetlands

FEMA 100-year Flood Area

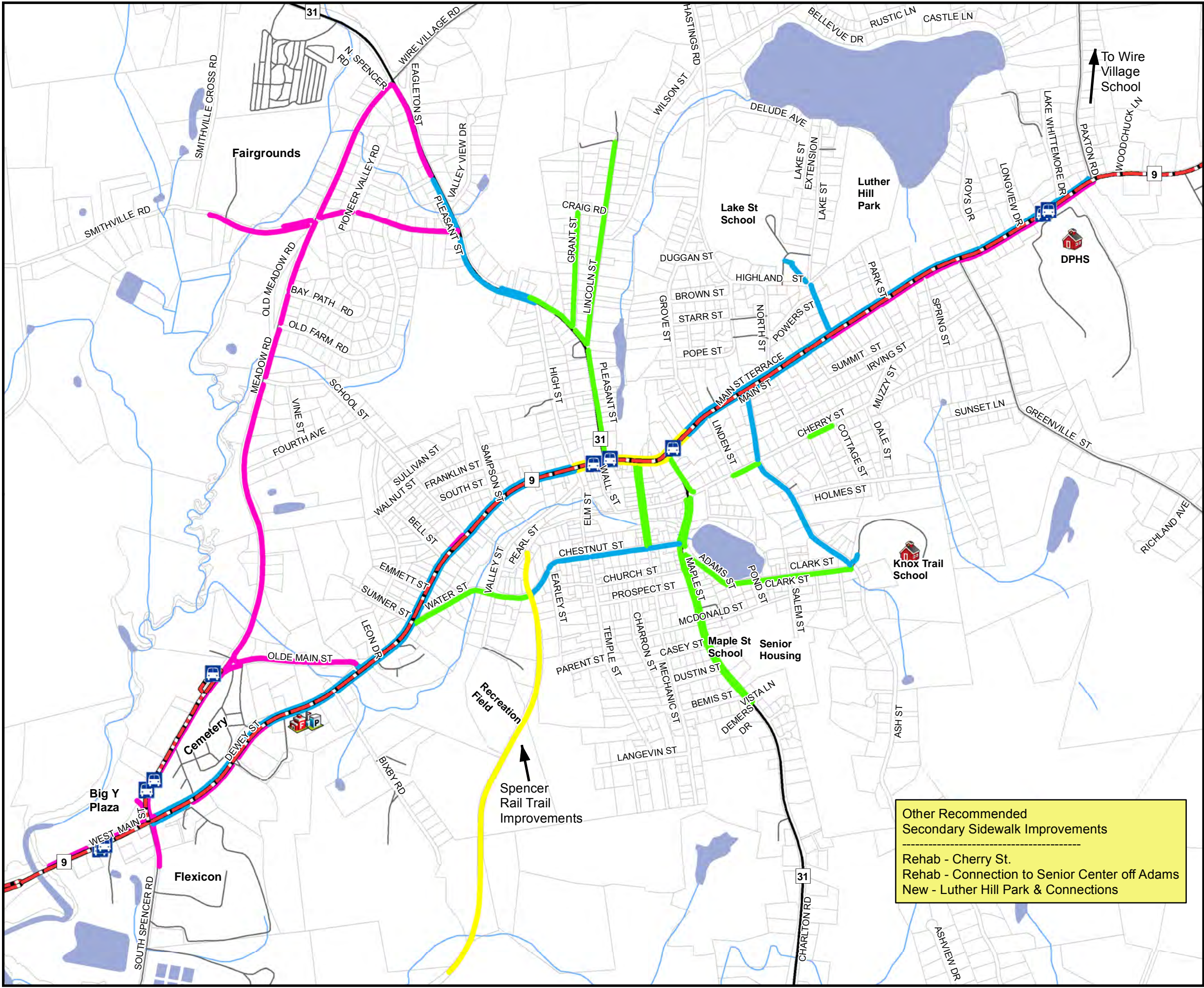
River Protection Act (0-100ft)

Protected Open Space

1 in = 0.15 miles

Date: 1/31/2017 Path: H:\Projects\O\_Spencer\_GIS\Subprojects\m280\_Misc\_2017\m280\_MeadowRd\_Constraints\_1 1x17.mxd



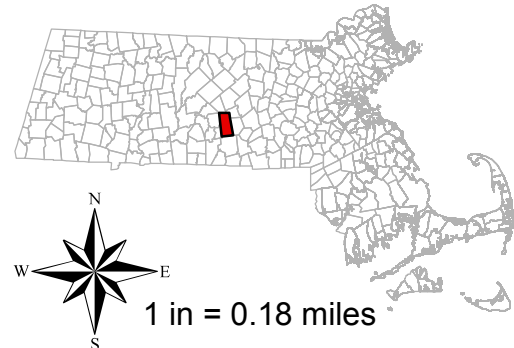


# SPENCER SIDEWALK BETTERMENT PROGRAM

## Legend

- Town Boundary
- Water Bodies
- Streams
- School
- Fire Station
- Police Station
- Major Road
- Local Road
- Active Railroad
- WRTA Bus Stops
- WRTA Route
- FUTURE/DESIRED PROPOSED NEW SIDEWALKS
- CURRENTLY PROPOSED SIDEWALK IMPROVEMENTS
- RECOMMENDED PRIORITY SIDEWALK IMPROVEMENTS
- COMPLETED SIDEWALK IMPROVEMENT (INCLUDES MAAB/ADA)

\* Sidewalk betterment plan as presented and approved and Public TIP Hearing at the Wednesday, January 23, 2013 Meeting of the Board of Selectmen.  
Plan Status Update: 12/23/2015



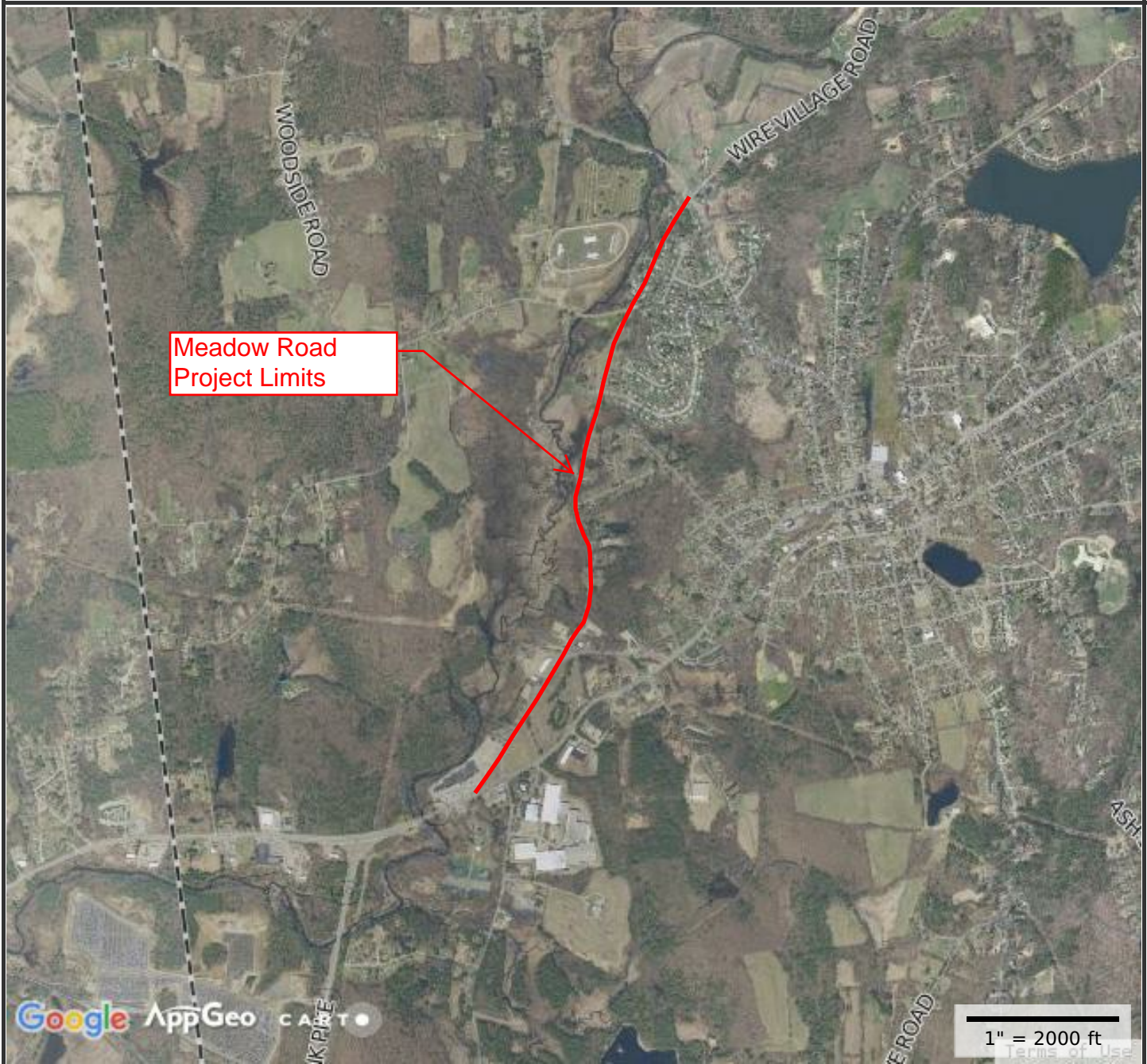
**Other Recommended Secondary Sidewalk Improvements**

- Rehab - Cherry St.
- Rehab - Connection to Senior Center off Adams
- New - Luther Hill Park & Connections





## USGS 2014 Color Aerial - Meadow Road, Spencer



### MAP FOR REFERENCE ONLY NOT A LEGAL DOCUMENT

Town of Spencer, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 1/1/2016  
Properties updated 1/1/2016



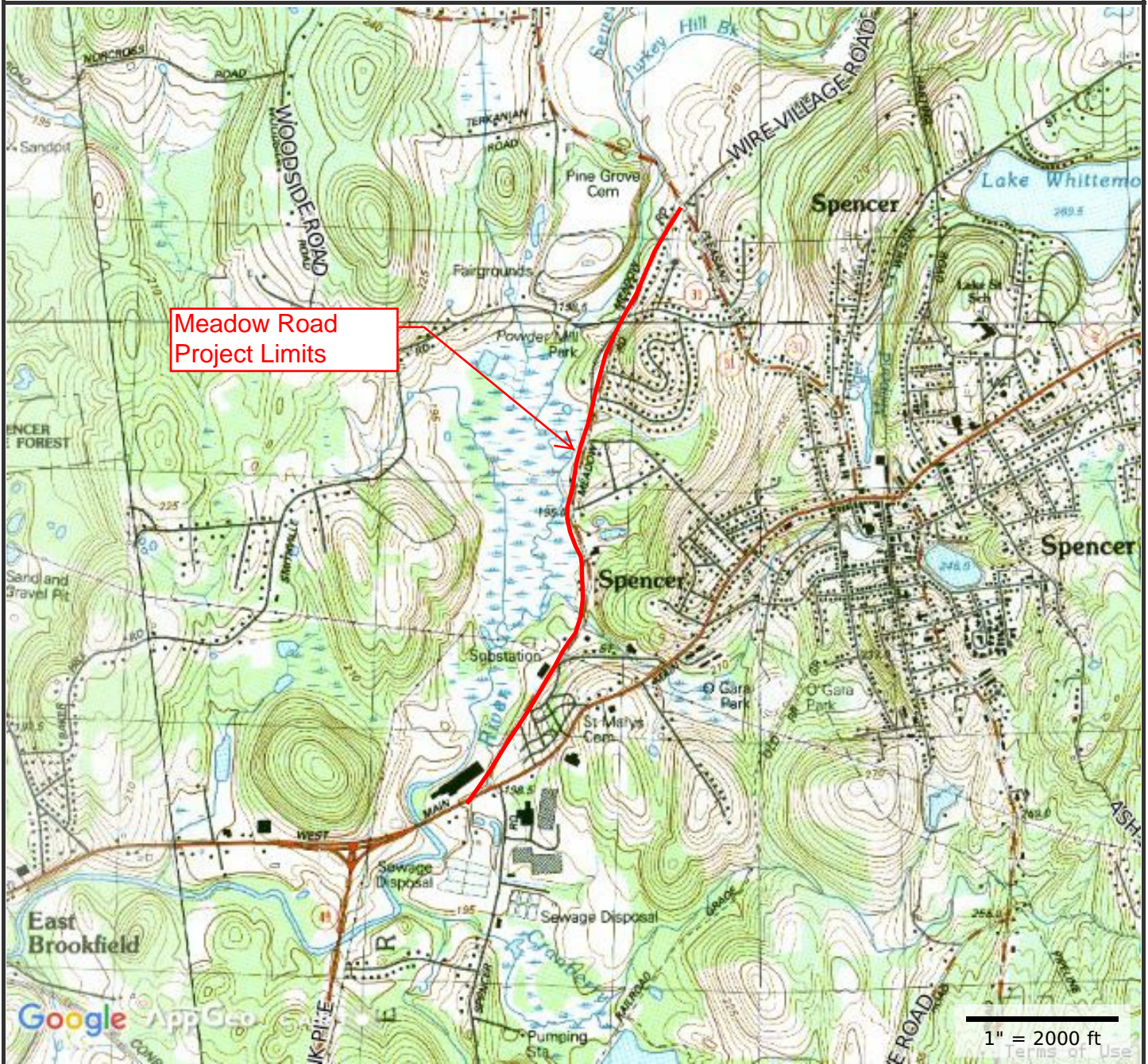
## Map Theme Legends

USGS Color Aerial Photo, 2014



Imagery - USGS Color Ortho Imagery,

# USGS Topo Quad - Meadow Road, Spencer



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Parcels updated 1/1/2016  
Properties updated 1/1/2016





# Wetlands - Meadow Road, Spencer



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Parcels updated 1/1/2016  
Properties updated 1/1/2016

## Map Theme Legends

### Aerial Photo, 2011-2012

□  
Aerial Imagery & copy; Digital Globe, Inc. All Rights Reserved and c/o MassGIS,

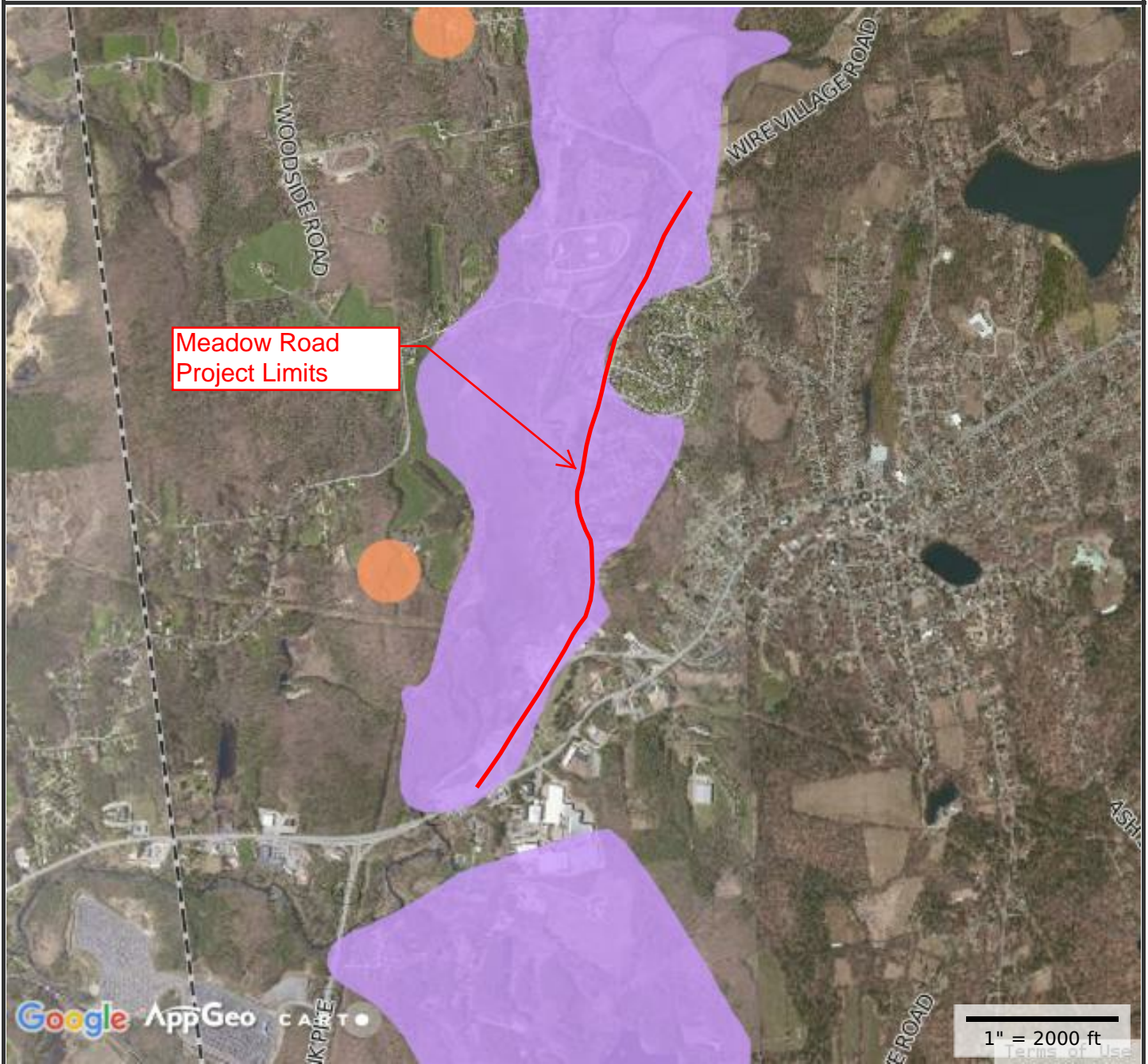
### Wetlands

- Shoreline
- Hydrologic Connection
- Mean Low Water Line
- Wetland Limit
- Closure Line
- Reservoir (with PWSID)
- Marsh/Bog
- Wooded Marsh
- Cranberry Bog
- Salt Marsh
- Tidal Flats
- Beach/Dune

MassDEP Wetlands, MassDEP Wetlands



# Zone II Wellhead Protection Area - Meadow Road, Spencer



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Parcels updated 1/1/2016  
Properties updated 1/1/2016



# Map Theme Legends

Aerial Photo, 2011-2012

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## Water Resource Protection

Watershed

Zone II Wellhead Protection Areas

Interim Wellhead Protection Area

Surface Water Protection Zones

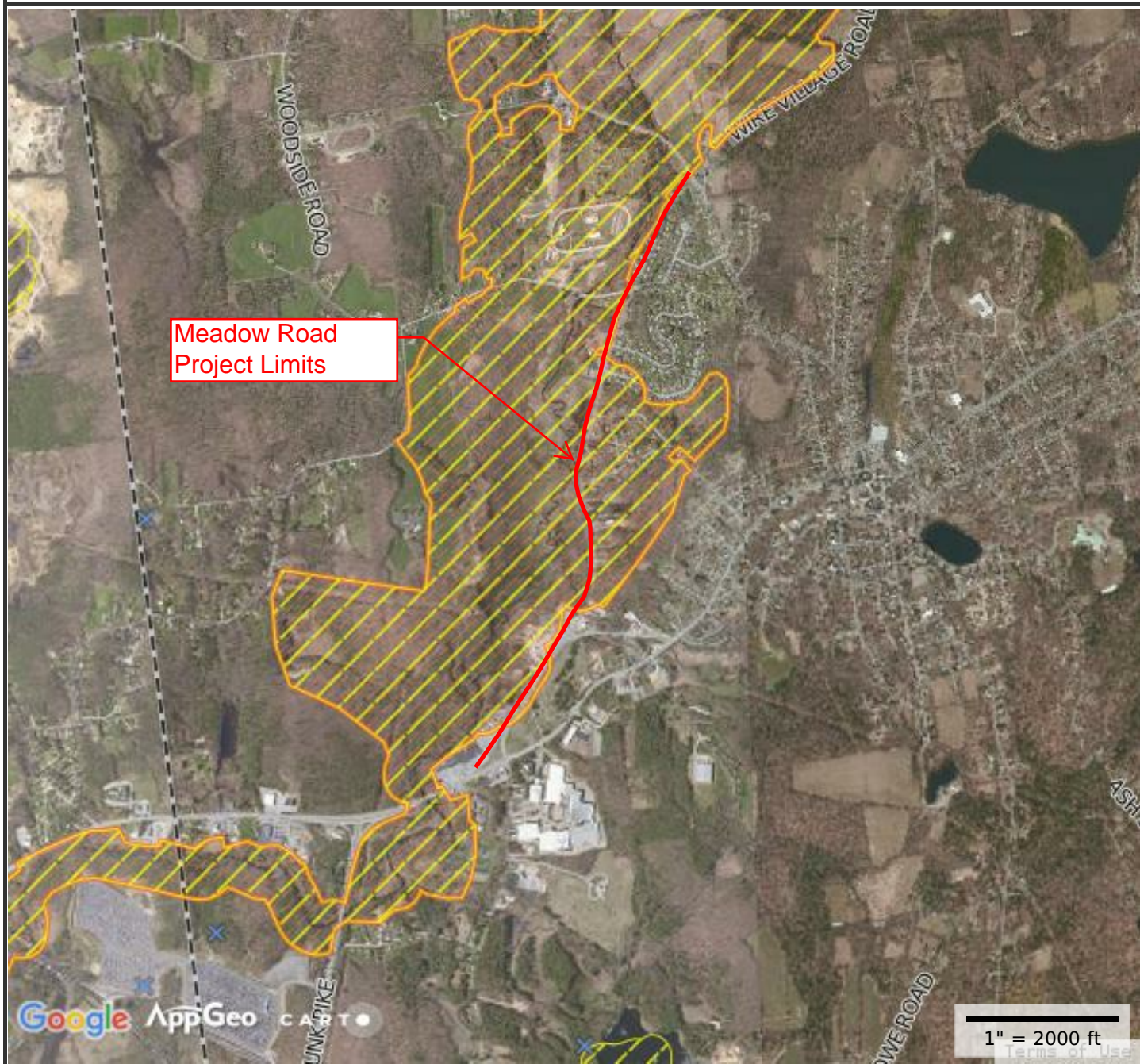
ZONE A

ZONE B

ZONE C

MassGIS

# NHESP Habitat Areas - Meadow Road, Spencer



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Parcels updated 1/1/2016  
Properties updated 1/1/2016

Map Theme Legends

Aerial Photo, 2011-2012

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Natural Resource Protection

NHESP Certified Vernal Pools



NHESP Priority Habitats of Rare Species



NHESP Estimated Habitats of Rare Wildlife



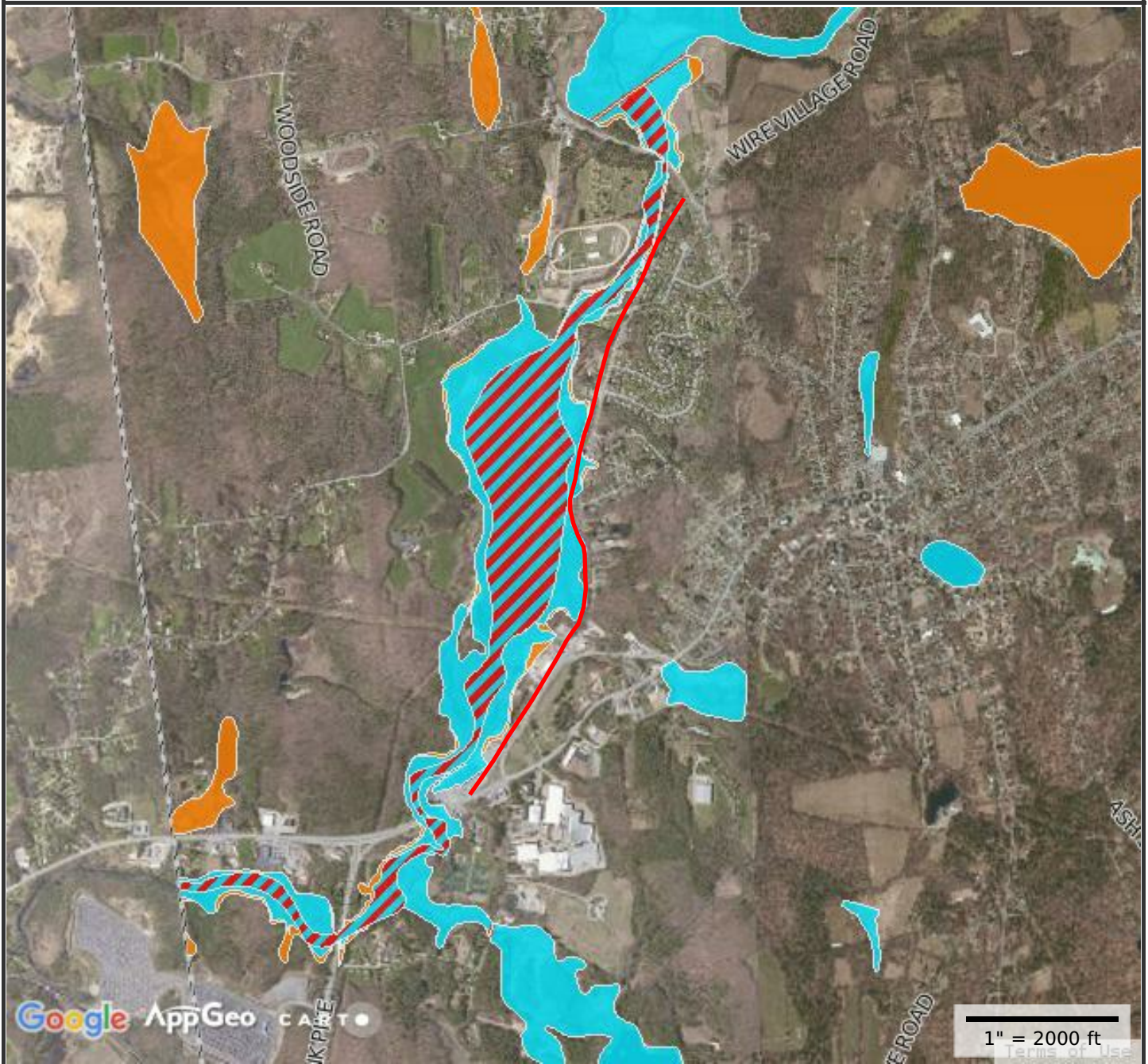
Areas of Critical Environmental Concern



Massachusetts DCR, Natural Heritage and Endangered Species Program



# FEMA Flood Zones - Meadow Road, Spencer



**MAP FOR REFERENCE ONLY  
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Parcels updated 1/1/2016  
Properties updated 1/1/2016








## Map Theme Legends

Aerial Photo, 2011-2012

□

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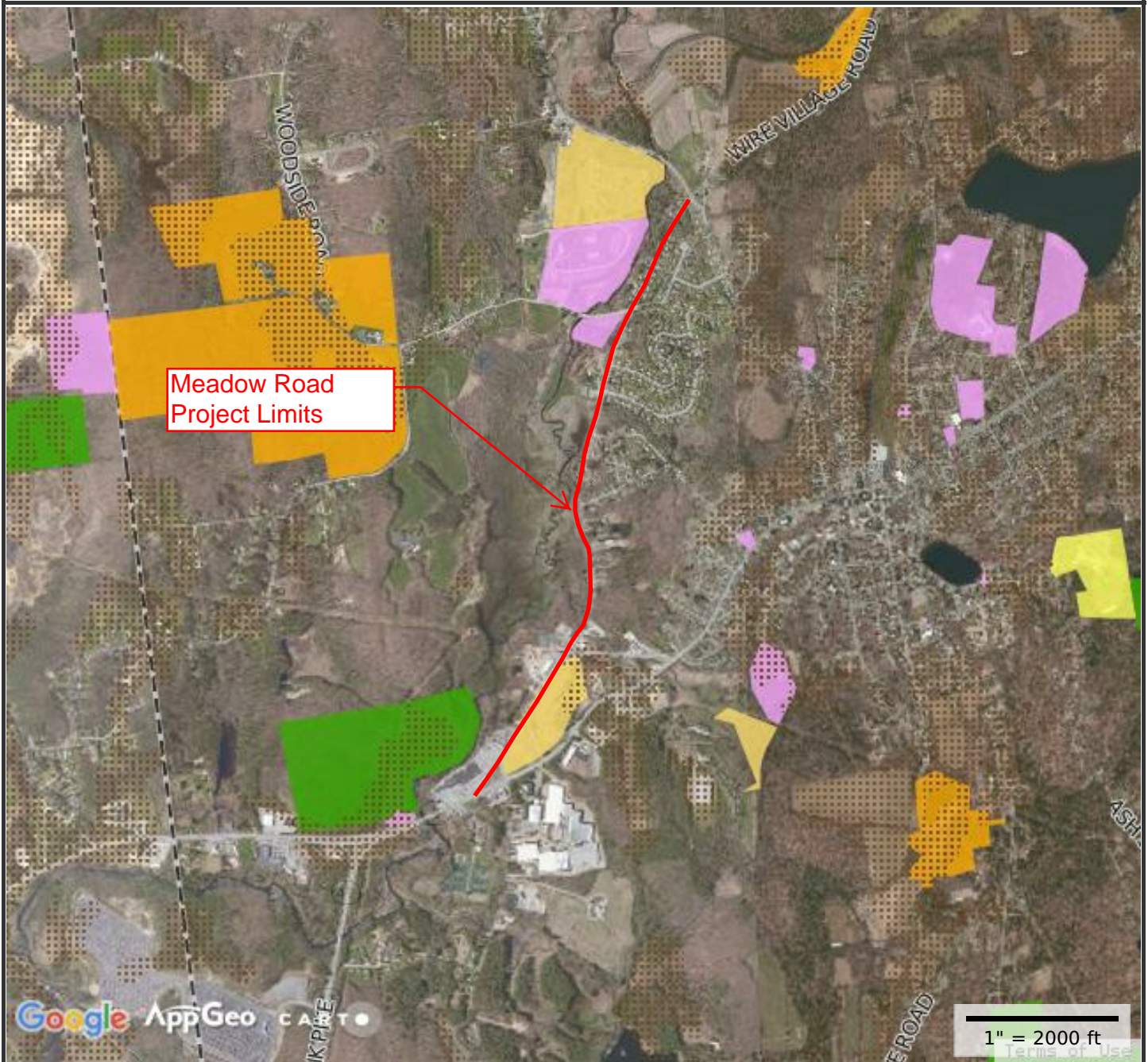
## FEMA Flood Zones

- Cross-Sections
  - • Coastal Transects
  - Limit of Moderate Wave Action
  - ☐ Coastal Barrier Resources System Area
  - ~ Base Flood Elevations
- Flood Hazard Zones
-  1% Annual Chance Flood Hazard
  -  Regulatory Floodway
  -  Special Floodway
  -  Area of Undetermined Flood Hazard
  -  0.2% Annual Chance Flood Hazard
  -  Future Conditions 1% Annual Chance Flood
  -  Area with Reduced Risk Due to Levee

FEMA Map Service Center - See FEMA FIRM Panels theme for Effective Date



# Land Conservation - Meadow Road, Spencer



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Parcels updated 1/1/2016  
Properties updated 1/1/2016



# Map Theme Legends

Aerial Photo, 2011-2012

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## Land Conservation

Prime Farmland Soils

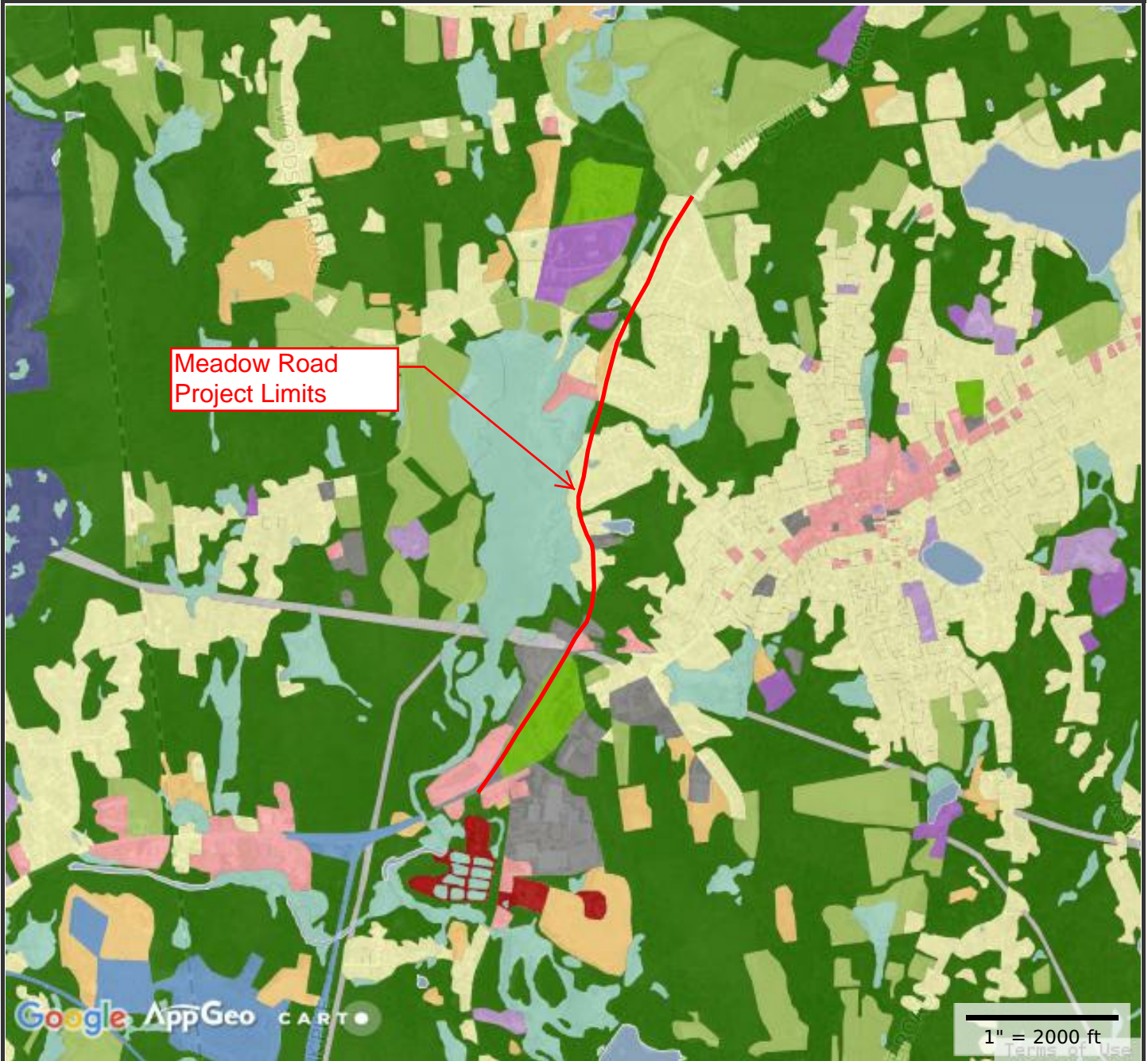


Open Space

- Federal
- State
- County
- Municipal
- Public Non-Profit
- Land Trust
- Conservation Organization
- Non-Profit
- Private
- Other
- Unknown

EOEEA: MassGIS, USDA: NRCS, MA Dept of Agricultural Resources

## Land Use - Meadow Road, Spencer



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Parcels updated 1/1/2016  
Properties updated 1/1/2016

## Map Theme Legends

Aerial Photo, 2011-2012

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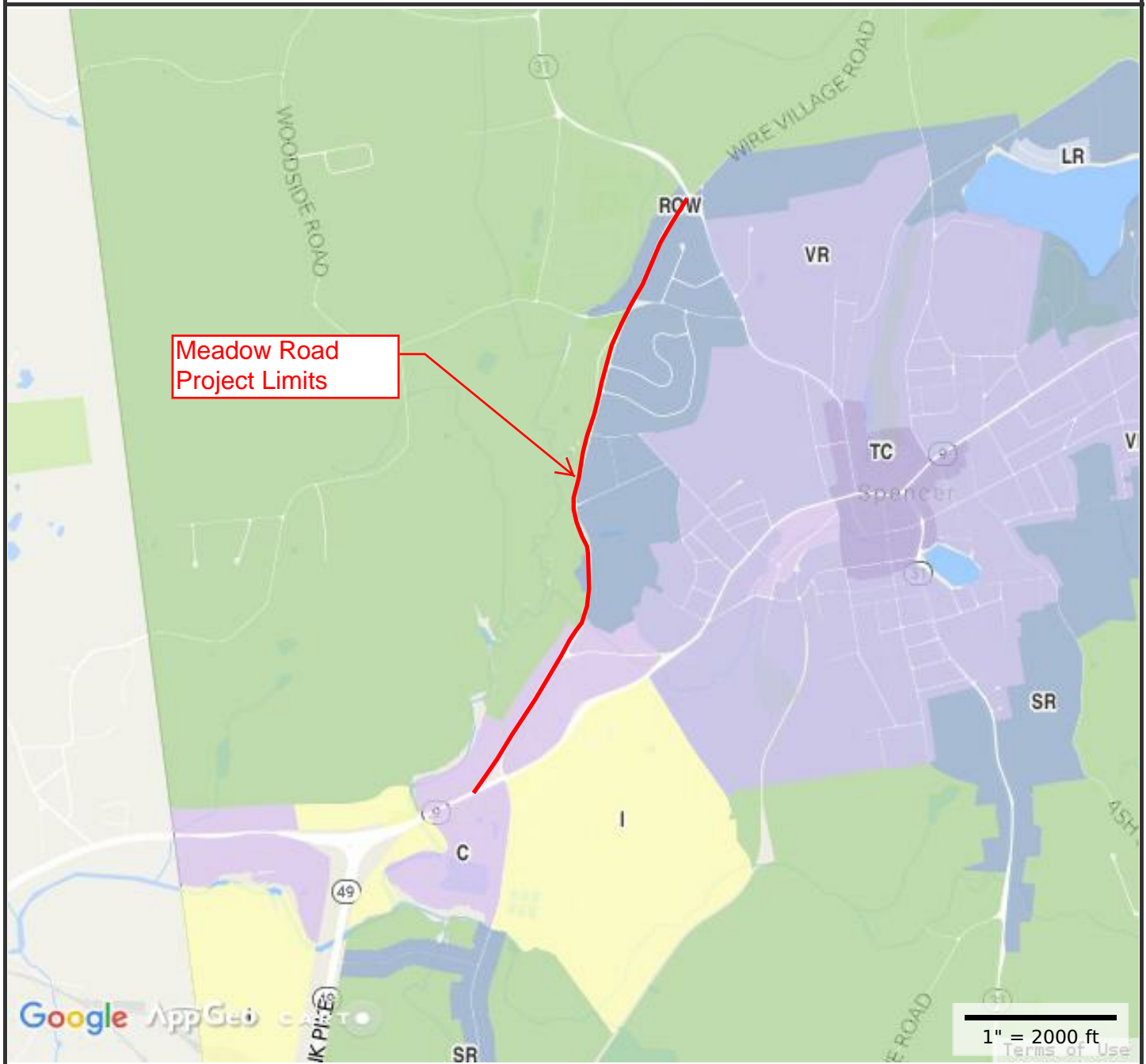
### Land Use

- Brushland/Successional; Forest
- Cemetery
- Commercial
- Wetlands
- Agricultural
- Recreation
- Residential
- Industrial
- Junkyard; Waste Disposal
- Mining
- Open Land; Transitional
- Powerline/Utility
- Transportation
- Urban Public/Institutional
- Water

MassGIS



# Zoning - Meadow Road, Spencer



## MAP FOR REFERENCE ONLY NOT A LEGAL DOCUMENT

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Parcels updated 1/1/2016  
Properties updated 1/1/2016

Map Theme Legends

Zoning

- C - Commercial
- I - Industrial
- LR - Lake Residential
- RR - Rural Residential
- SR - Suburban Residential
- TC - Town Center Mixed Use
- VR - Village Residential

Town of Spencer

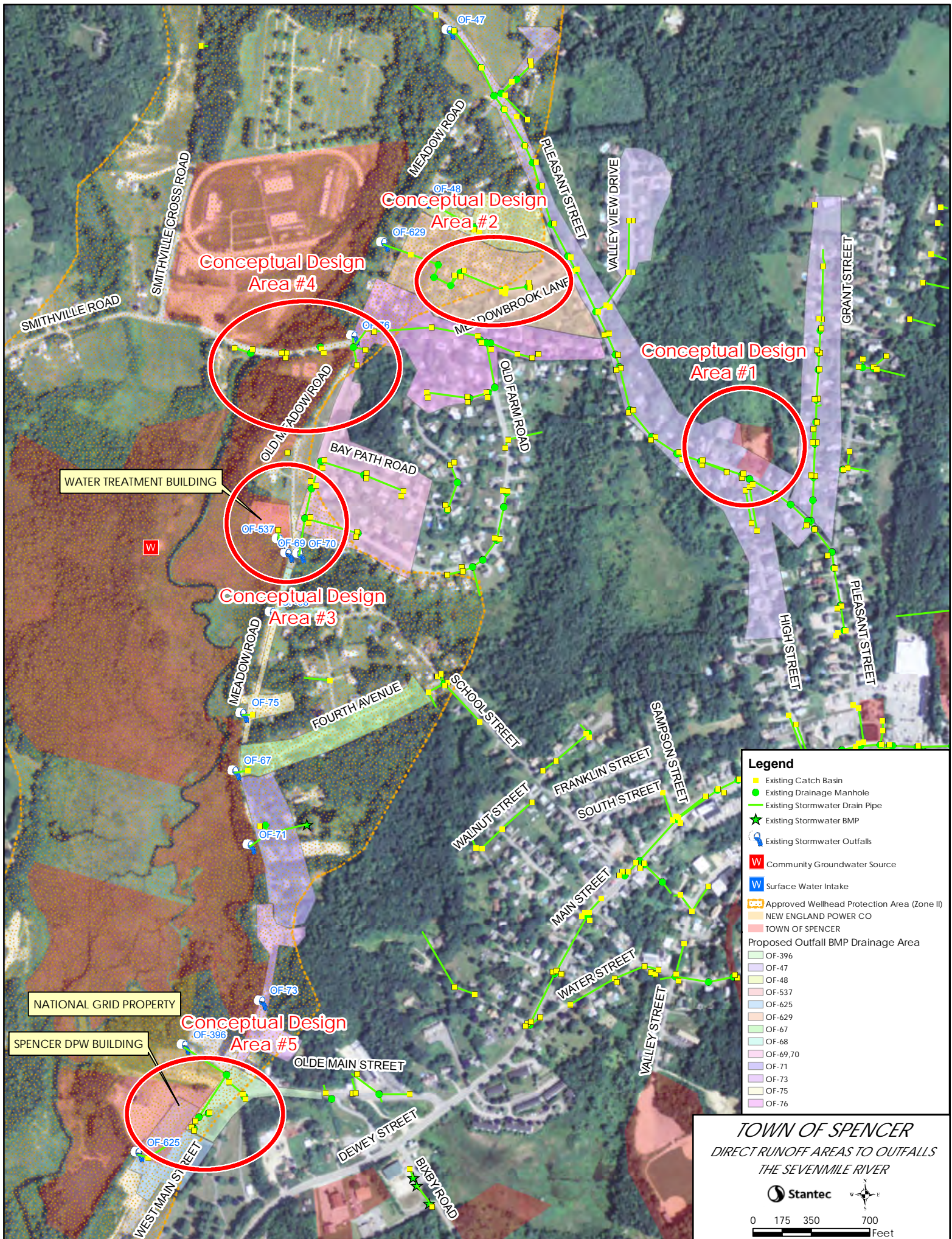
## **APPENDIX 4**

# **PROPOSED STORMWATER QUALITY IMPROVEMENTS**











**Discharge ID:** OF-47

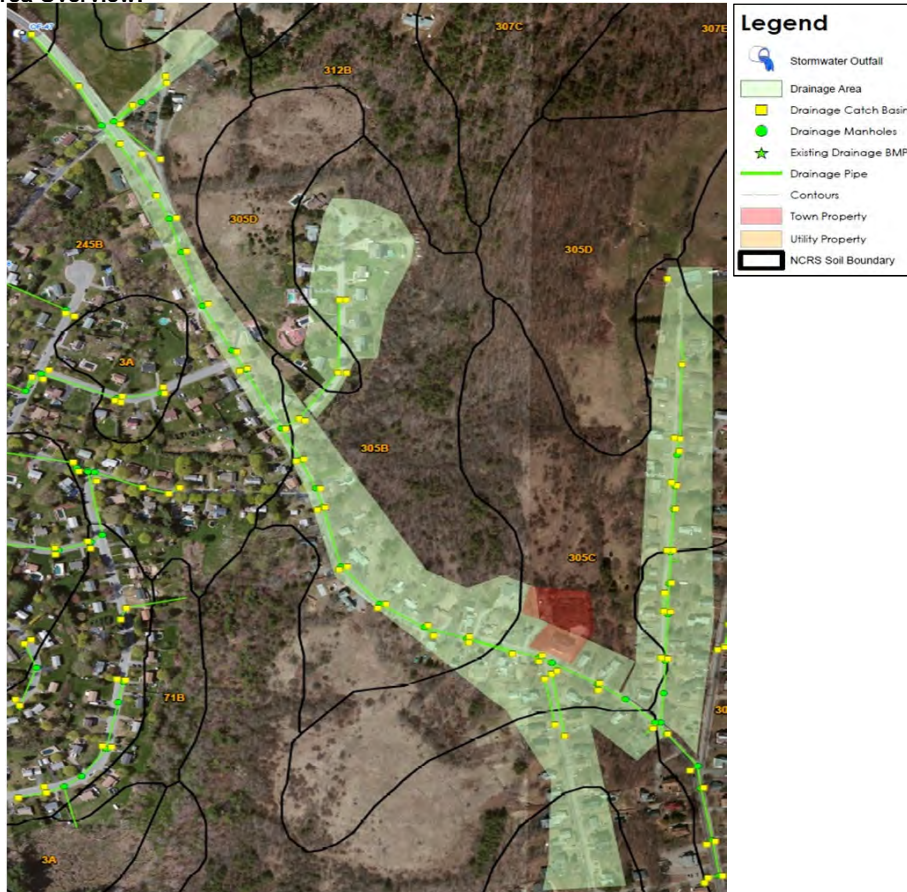
**Location:** Off Pleasant Street north-west of the intersection with Wire Village Road

**Soil Description:**

245 B, C Hinckley loamy sand

305B, C, D Paxton fine sandy loam

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GW <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Material <sup>(2)</sup>	Outfall Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup> :	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
305B,C, 305D; 245B,C	18-37 inches >80 inches	C, A	Concrete	30	River	35.7	64%	36%	23,022	46,044	64,714	129,428	73	117

**Structural BMP Options:**

**Option 1:** At intersection of Pleasant St. and High St. the installation of a bioretention system on Town land appears feasible to capture and treat the stormwater first flush with an overflow into the existing stormwater system. Onsite soil testing will be required to determine the feasibility of adding additional infiltration systems due to the Paxton soil type.

**Option 2:** Areas along Pleasant St. with Hinckley soil identified would be suitable for implementation of infiltration practices at multiple points along the existing stormwater drainage system. These infiltration system can be installed within the Town road layout and will be sized to handle portions of the stormwater runoff.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

**Notes:**

(1) Information obtained from NCRS soil web survey

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.



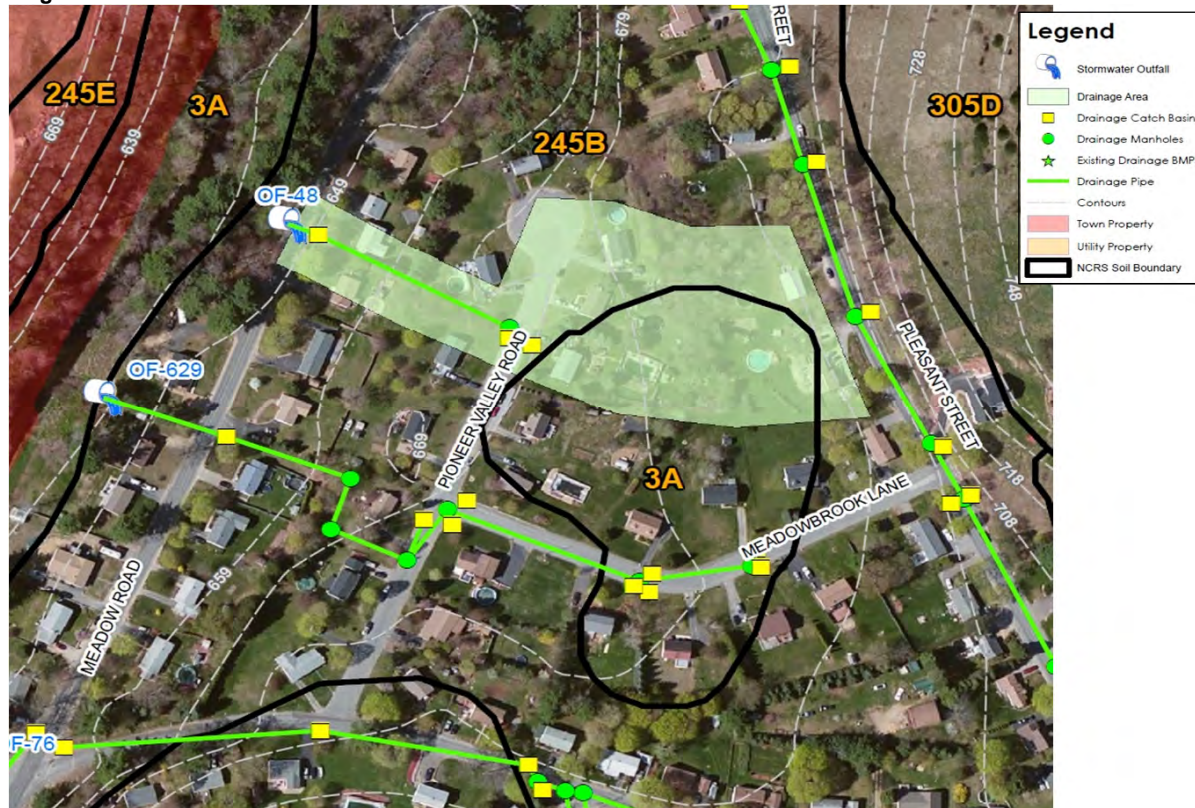
**Discharge ID:** OF-48

**Location:** Off Meadow Road across road from property #84

**Soil Description:**

Majority of drainage area is 245B Hinckley loamy sand, 3-8 percent slopes. South east corner is 3A Scarboro and walpole soils, 0-3 percent slope with hydrologic soil group A/D. Depth to gwt between 0-12 inches.

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Material <sup>(2)</sup>	Outfall Pipe Diameter (Inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245B, 3A	>80 inches; 0-12 inches	A; A/D	unk	unk	unk	3.0	61%	39%	2,180	4,360	5,530	11,060	61	8.41

**Structural BMP Options:**

An area along Meadow Drive with Hinckley soil identified would be suitable for the implementation of an infiltration system in the road as there is no Town land available nearby and the soil changes to type 3A near the outfall outlet, which would not be a suitable soil for infiltration.

Onsite testing will be required to determine the feasibility of an infiltration system.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

**Notes:**

(1) Information obtained from NCRS soil web survey

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.

**Discharge ID:** OF-67

**Location:** Off Meadow Road across from intersection with 4th Avenue

**Soil Description:**

245B Hinckley loamy sand, 3-8 percent slopes for the western two thirds of the drainage area. 245C Hinckley loamy sand 8-15 percent slopes for eastern third of drainage area.

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Pipe Material <sup>(2)</sup>	Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245B; 245C	>80 inches	A	CM	12	Wetland	4.4	64%	36%	2,865	5,731	8,061	16,122	59	12

**Structural BMP Options:**

Hinckley soil is suitable for infiltration and there is Town land available from the roadway to the river. Infiltration systems could be installed within the road prior to the outfall and / or utilize available Town land for a longer treatment train, such as bioretention area with overflow to infiltration system, then excess overflow to the river. Onsite testing will be required to determine the feasibility of an infiltration system.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

**Notes:**

(1) Information obtained from NRCS soil web survey

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.



Discharge ID:   OF-68

Location: Off Meadow Road near intersection with School Street

Soil Description:  
245C Hinckley loamy sand,8-15 percent slopes.

Drainage Area Overview:



Summary of Existing Conditions:

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Pipe Material <sup>(2)</sup>	Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup> :	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245C	>80 inches	A	CM	15	Wetland	0.8	13%	87%	1,209	2,418	1,389	2,779	88	3

Structural BMP Options:

An area along Meadow Drive where the Hinckley soil is identified would be suitable for the implementation of an infiltration system in the road since there is no Town land available. Excess runoff could be diverted to the existing stormwater system.

Onsite testing will be required to determine the feasibility of an infiltration system.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

Notes:

(1) Information obtained from NCRS soil web survey

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.



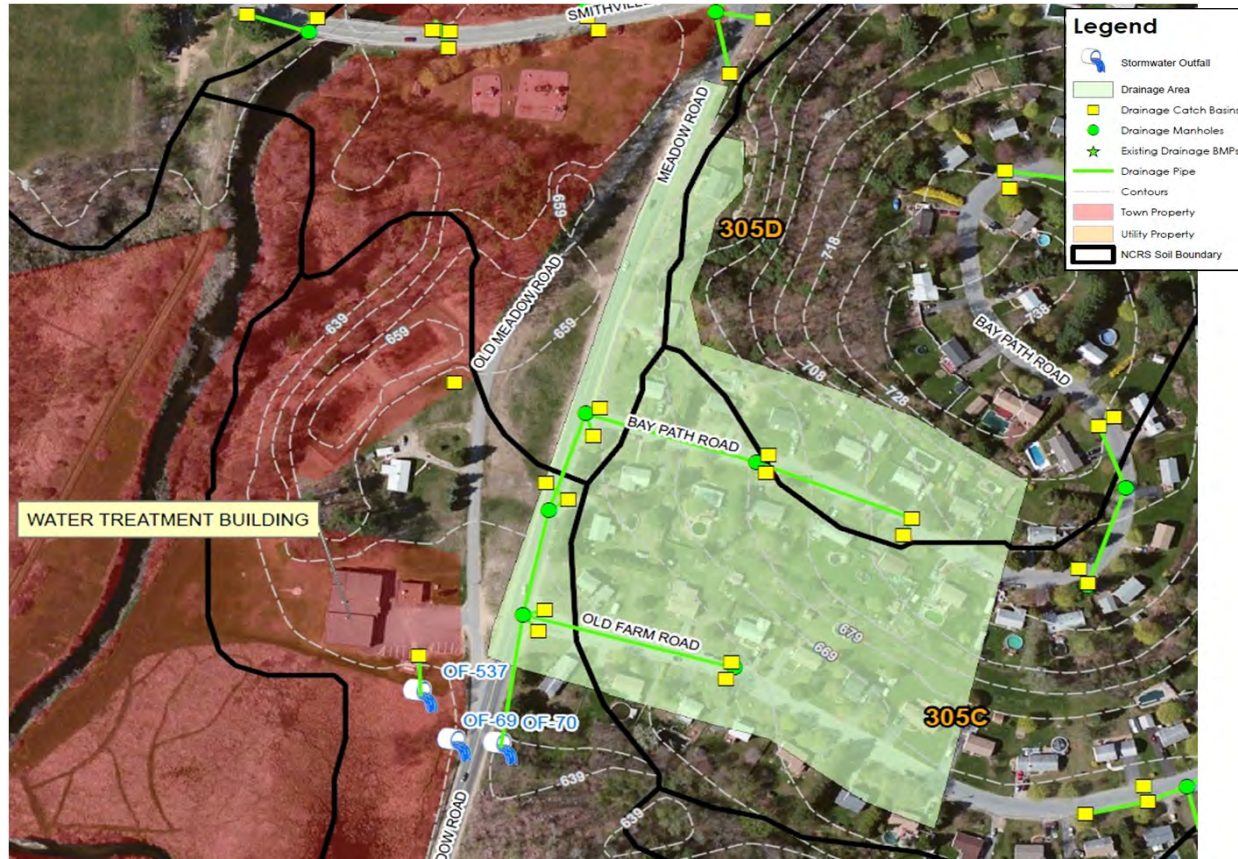
**Discharge ID:** OF-69, 70

**Location:** Off Meadow Road, south of the intersection of Meadow Road and Old Meadow Road

**Soil Description:**

The outfall is located in 245C Hinckley loamy sand, 8-15 percent slopes which is suitable for infiltration. The drainage area is 305C mostly 305C Paxton fine sandy loam, 8 to 15 percent slopes with a small portion to the north of 305D and 245B soils.

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Pipe Material <sup>(2)</sup>	Outfall Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup> :	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value for Drainage Area	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
305C, D; 245B, C	18 to 37 inches; >80 inches	C; A	CM	12; 36	Stream; detention area	11.1	68%	32%	6,414	12,828	20,090	40,181	57	28

**Structural BMP Options:**

OF-69 borders Town owned property and is located in the 245C hinckley soil. A larger bioswale followed by an exfiltration system is proposed.

Could be sized provide treatment for drainage outfall OF-537 which handles flow from the Spencer Water Treatment Plan site.

Flow from OF-70 could be handled by a smaller infiltration system located in the roadway layout. Onsite testing will be required to determine the feasibility of an infiltration system in either location.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

**Notes:**

(1) Information obtained from NCRS soil web survey for drainage area

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.

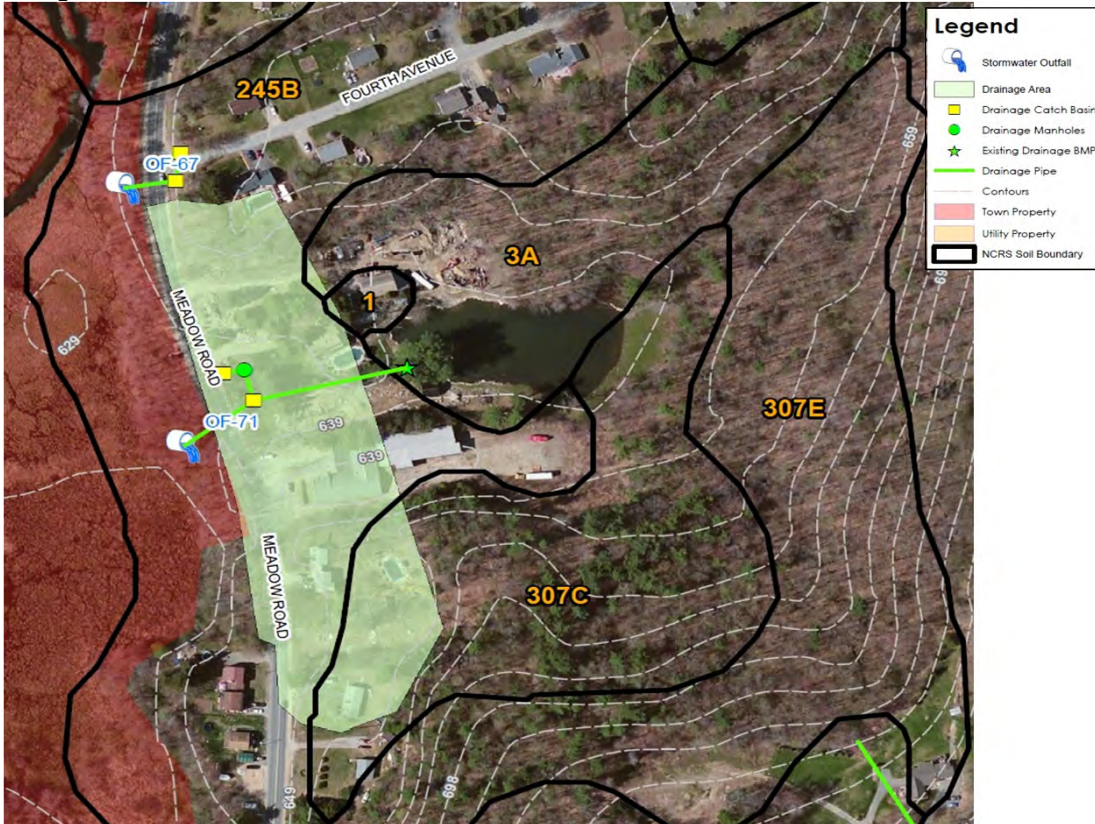
**Discharge ID:** OF-71

**Location:** Off Meadow Road across from property #38

**Soil Description:**

Drainage area is mostly 245B Hinckley loamy sand, 3-8 percent slopes with an area of 307C to sw corner, and soils 1 and 3A to north east corner. OF-245B is located in soil 245B.

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GW <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Pipe Material <sup>(2)</sup>	Outfall Pipe Diameter (Inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245B 307C 1 3A	>80 inches	A	CM	36	Wetland	5.0	78%	22%	2,041	4,081	9,152	18,305	52	12

**Structural BMP Options:**

OF-71 is located on Town property and is within the hinckley loamy sand soil type. A bioswale followed by exfiltration and overflow is proposed near outfall pipe location.

Onsite testing will be required to determine the feasibility of an infiltration system in either location.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

**Notes:**

(1) Information obtained from NCRS soil web survey

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.



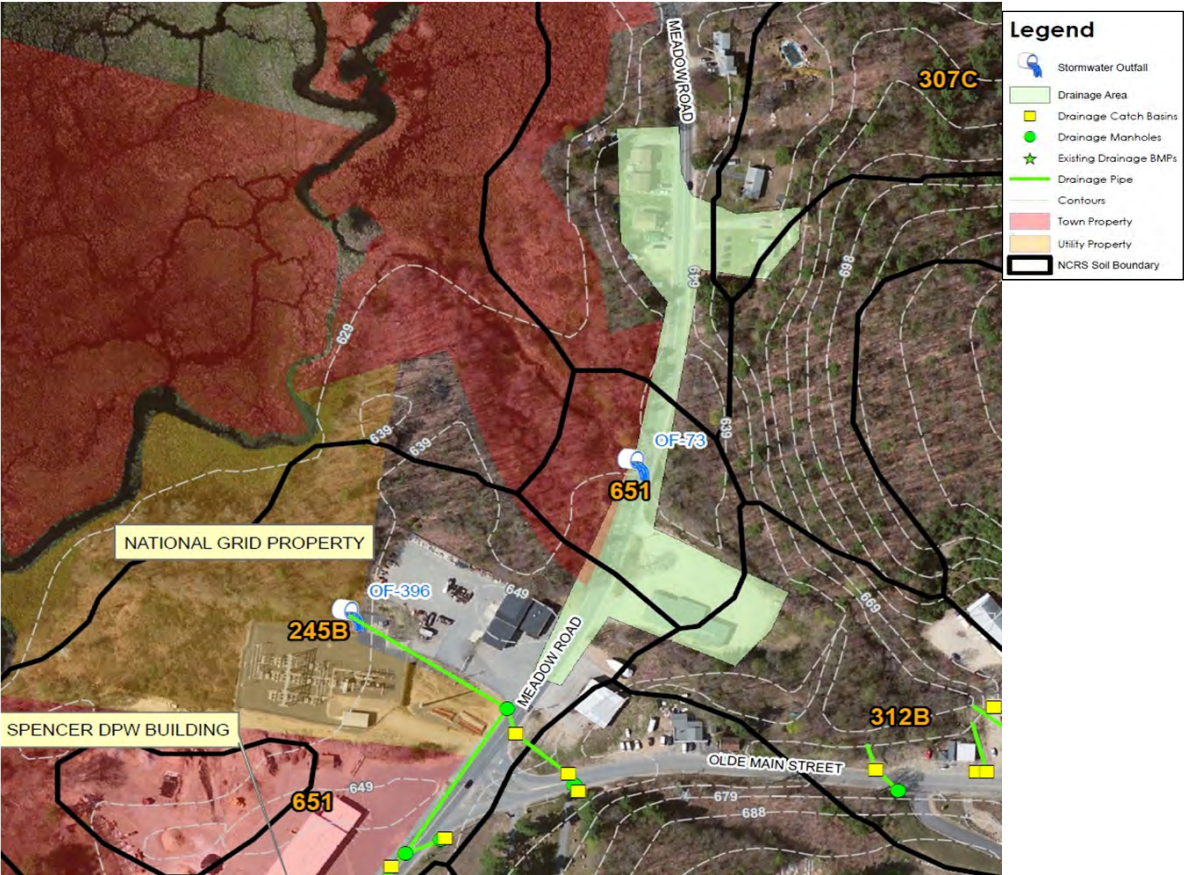
Discharge ID:   OF-73

Location: Off Meadow Road north of property #9 Meadow Road

Soil Description:

Drainage area is mostly a combination of 651 Udorthents, smoothed soil to the south and at the outfall location as well as hinckley loamy sand to the north.

Drainage Area Overview:



Summary of Existing Conditions:

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Pipe Material <sup>(2)</sup>	Outfall Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
651 245B 307C	>80 inches	A	unk	unk	unk	3.0	39%	61%	3,350	6,699	5,503	11,007	73	10

Structural BMP Options:

A bioswale followed by exfiltration and an overflow in the Town property past OF-73 is proposed. Onsite soil testing will be required to determine the extent of the Udorthents soil and the native soil type. If the depth of the ground water table is close to the surface a subsurface gravel wetland will be proposed.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

Notes:

- (1) Information obtained from NRCS soil web survey
- (2) Information taken from Town outfall GIS database
- (3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.
- (4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.



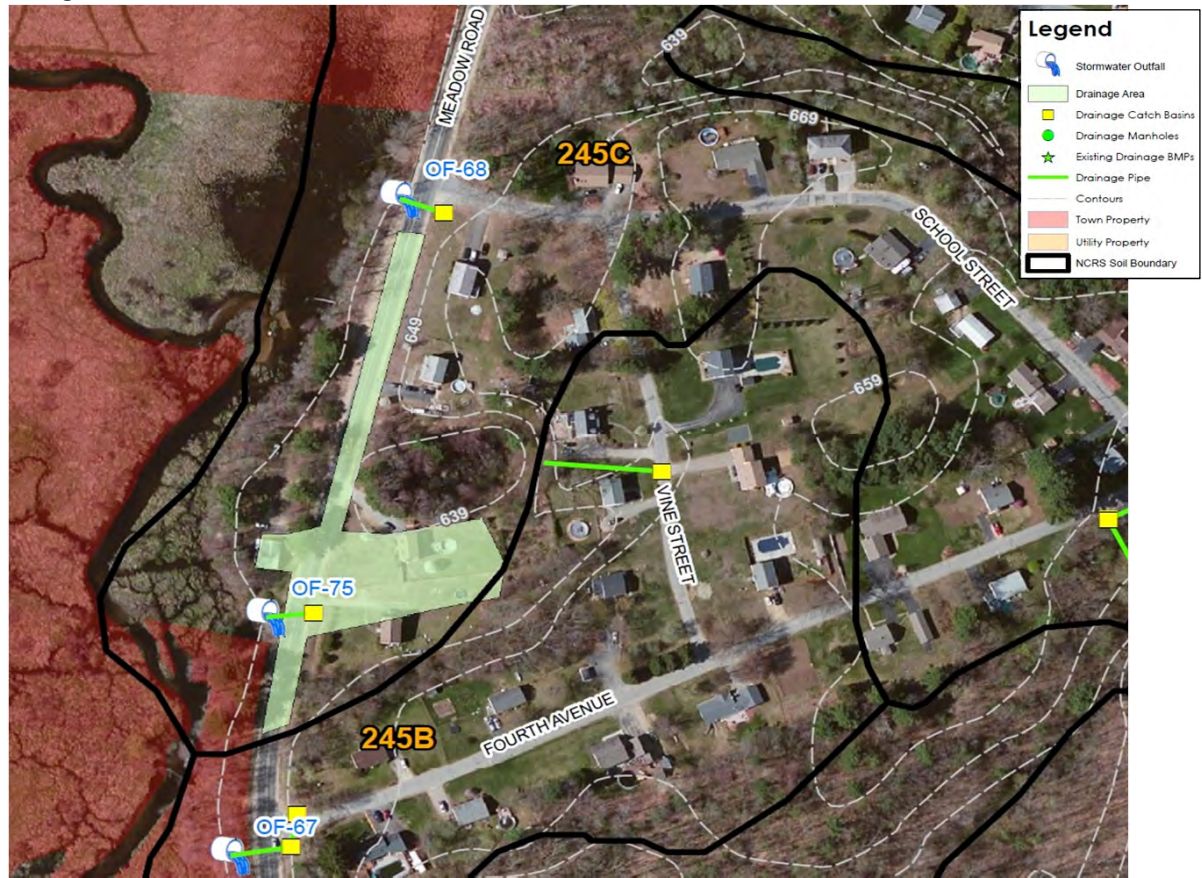
Discharge ID:   OF-75

Location: Off Meadow Road near property #53, north of intersection with 4th Avenue

Soil Description:

The drainage area and outfall are located in 245C Hinckley loamy sand, 8-15 percent slopes which is suitable for infiltration.

Drainage Area Overview:



Summary of Existing Conditions:

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Pipe Material <sup>(2)</sup>	Outfall Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245C	>80 inches	A	CM	12	Wetland	1.3	49%	51%	1,232	2,464	2,433	4,865	68	4

Structural BMP Options:

Areas along Meadow Rd. with the hinckley soil identified would be suitable for implementation of infiltration practices at multiple points along the roadway. These infiltration system can be installed within the Town road layout and will be sized to handle portions of the stormwater runoff. of the stormwater runoff. Onsite testing will be required to determine the feasibility of an infiltration system.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

Notes:

- (1) Information obtained from NCRS soil web survey
- (2) Information taken from Town outfall GIS database
- (3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.
- (4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.

Discharge ID:     OF-76

Location: Near intersection of Smithville Road and Meadow Road

Soil Description:

The outfall as well as the western and eastern portions of the drainage area are located in 245C hinckley loamy sand, 8-15 percent slopes. The middle half of the drainage area is located in 305C, D paxton fine sandy loam.

Drainage Area Overview:



Summary of Existing Conditions:

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Pipe Material <sup>(2)</sup>	Pipe Diameter (Inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup> :	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245B 305C,D	>80 inches	A	CM	12	Swale	11.6	70%	30%	6,273	12,545	21,110	42,220	56	29

Structural BMP Options:

Town property is near OF-76. A proposed bioswale on Town property followed by exfiltration and an overflow structure to the nearby land would be suitable for the hinckley loamy sand. Infiltration basins could be used alongside the roadway in areas to the west and east where the 245B soil is present. Onsite testing will be required to determine the feasibility of an infiltration system in either location to reduce the flow to OF-76. All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

Notes:

- (1) Information obtained from NRCS soil web survey
- (2) Information taken from Town outfall GIS database
- (3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.
- (4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.



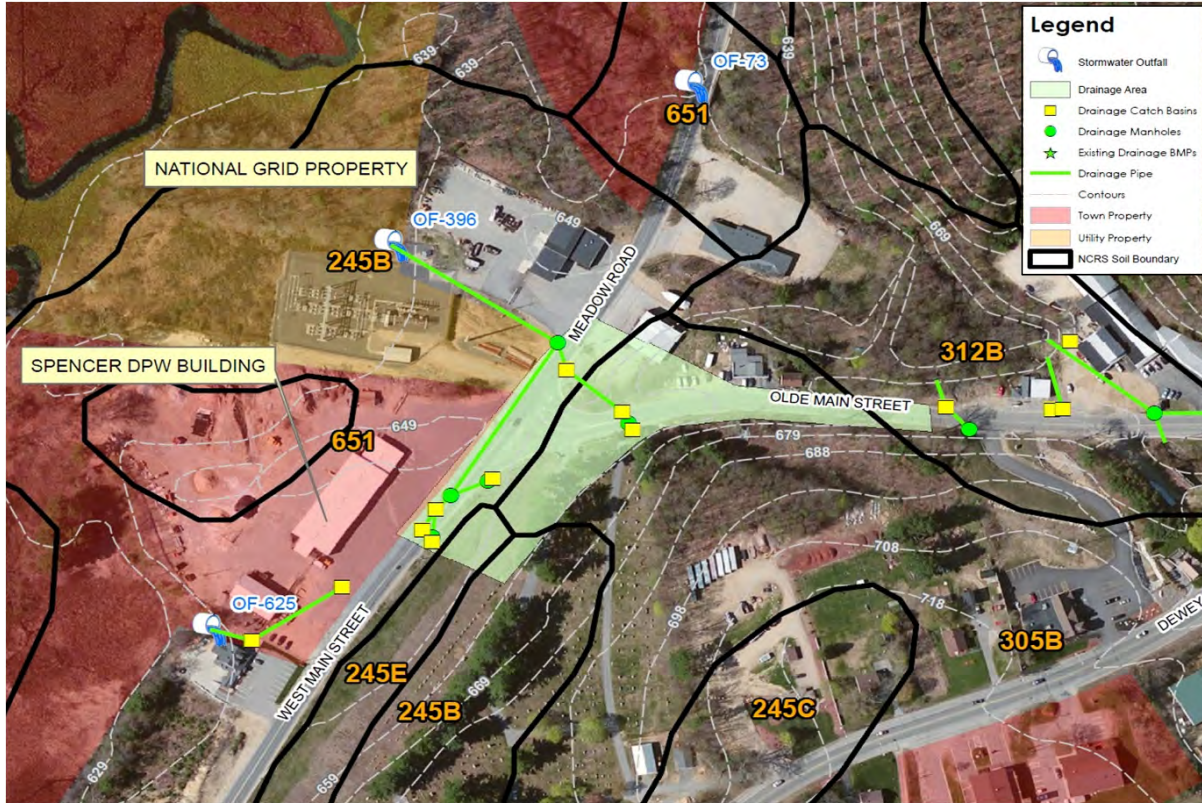
**Discharge ID:** OF-396

**Location:** Located to west, behind the National Grid property near intersection of Olde Main St and Meadow Rd

**Soil Description:**

The outfall and the western half of the drainage area shows 245B hinckley loamy sand with 3-8 percent slopes. The eastern half of the drainage area is mostly 305B with 312B at the eastern tip and 245B, E at the southern tip.

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Pipe Material <sup>(2)</sup>	Outfall Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245B 245E 305B, 312B	>80 inches	A; A; C; C/D	unk	unk	unk	2.6	13%	87%	4,119	8,239	4,724	9,449	94	11

**Structural BMP Options:**

**Option 1:** The outfall is located on the National Grid property and has suitable soils and space assuming National Grid will allow the Town to construct a stormwater system on their property. Proposed would be the installation of a bioswale on the National Grid property followed by exfiltration and overflow structure. Onsite testing will be required to determine the feasibility of the soils and the depth to groundwater.

**Option 2:** The 245B-E soils along and adjacent to West Main St. are suitable for infiltration. If National Grid does not consent to the construction of a stormwater system on their property infiltration basins could be installed at multiple points along West Main St. within the suitable soils.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater best management practice.

**Notes:**

(1) Information obtained from NRCS soil web survey

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.



**Discharge ID:** OF-537

**Location:** OF-537 is located on the western side of the Water Treatment Plan property at 3 Old Meadow Rd.

**Soil Description:**

Drainage area and outfall location are within 245C hinckley loamy sand, 8-15 percent slopes.

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Pipe Material <sup>(2)</sup>	Outfall Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245C	>80 inches	A	Concrete	48	River	1.2	44%	56%	1,170	2,340	2,094	4,189	85	4

**Structural BMP Options:**

**Option 1:** OF-537 is on Town owned property and is located within the 245C hinckley soil type. A bioswale followed by an exfiltration system is proposed and could be upsized to handle the flow from drainage outfalls OF-69 and OF-70 which handle flow from the adjacent drainage area. Overflow would discharge into the existing stormwater collection system.

**Option 2:** If the depth to the existing groundwater table is low a gravel wetland is proposed to handle the stormwater runoff from OF-537 and OF-69 / 70. gravel wetland with overflow routed to the existing stormwater system.

Onsite testing will be required to determine the feasibility of the proposed stormwater systems and depth to groundwater.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater BMP.

**Notes:**

(1) Information obtained from NCRS soil web survey

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.

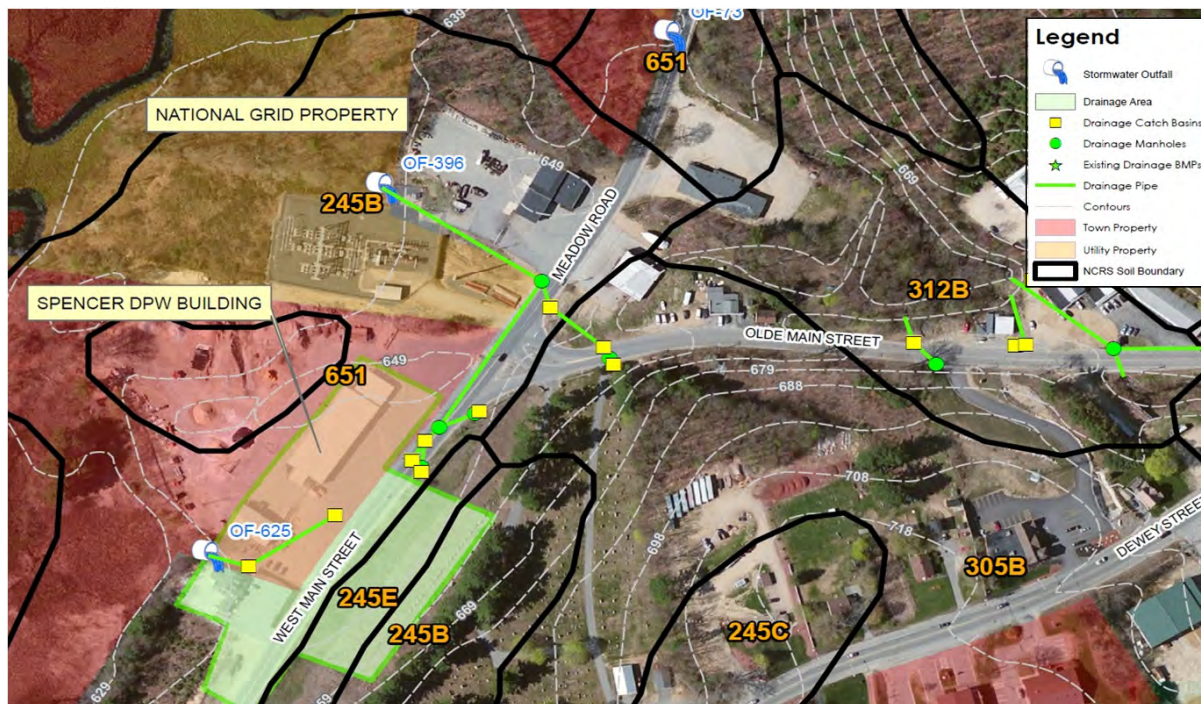
**Discharge ID:** OF-625

**Location:** Off West Main St to the south of the Spencer DPW Building at 157 Main St.

**Soil Description:**

245B and 245E hinckley loamy sand, 3-8 percent slopes and 15-35 percent slopes.

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Pipe Material <sup>(2)</sup>	Outfall Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245B 245E	>80 inches	A	CM	6	Swale	3.6	62%	38%	2,467	4,935	6,578	13,156	79	13

**Structural BMP Options:**

The outfall is located on Town property and soils appear suitable. A bioswale followed by exfiltration and overflow into the existing stormwater system could be installed. Raingardens both to the south of the DPW building and centered in the parking lot could be installed to capture runoff from the parking area and the building rooftops. Onsite testing will be required to determine the feasibility of the soils and the depth to groundwater. All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater BMP.

**Notes:**

(1) Information obtained from NCRS soil web survey

(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.



**Discharge ID:** OF-629

**Location:** Off Meadow Road near property #91.

**Soil Description:**

The drainage area is mostly 245B hinckley loamy sand, 3-8 percent slopes with a portion of soil 3A near the eastern half of the drainage area and at / west of the OF-629 location.

**Drainage Area Overview:**



**Summary of Existing Conditions:**

NCRS Soil Identifier Code <sup>(1)</sup>	Approximate Depth to GWT <sup>(1)</sup>	Hydrologic Soil Group <sup>(1)</sup>	Outfall Pipe Material <sup>(2)</sup>	Outfall Pipe Diameter (inches) <sup>(2)</sup>	Discharge to <sup>(2)</sup>	Drainage Area (Acres)	Surface Area Pervious (%)	Surface Area Impervious (%)	Impervious Runoff Volume <sup>(3)</sup> (ft <sup>3</sup> )		Total Runoff Volume (ft <sup>3</sup> )		Weighted Cn Value	10 yr Storm <sup>(4)</sup> (cfs)
									0.5"	1"	0.5"	1"		
245B 3A	>80 inches	A	Concrete	48	River	12	81%	19%	4,239	8,478	22,080	44,159	71	39

**Structural BMP Options:**

**Option 1:** Along Pioneer Rd. and Meadow Rd. the hinckley soil identified would be suitable for infiltration practices at multiple points along the existing stormwater drainage system and within the road layout to capture the first flush and to release excess overflow into the existing stormwater system.

Onsite soil testing will be required to determine the feasibility of infiltration in the proposed locations.

**Option 2:** If there is a stormwater drainage easement for the drainage pipe leading to OF-629 outlet a bioretention system could be installed at the outlet to handle the runoff. Onsite testing and further investigation into the stormwater drainage easement will be required.

All proposed stormwater treatment systems will be designed to provide adequate pretreatment prior to the stormwater BMP.

**Notes:**

(1) Information obtained from NCRS soil web survey

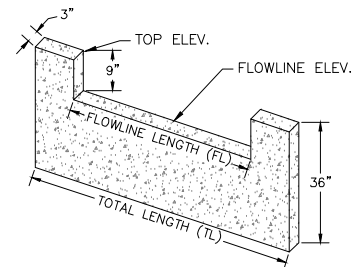
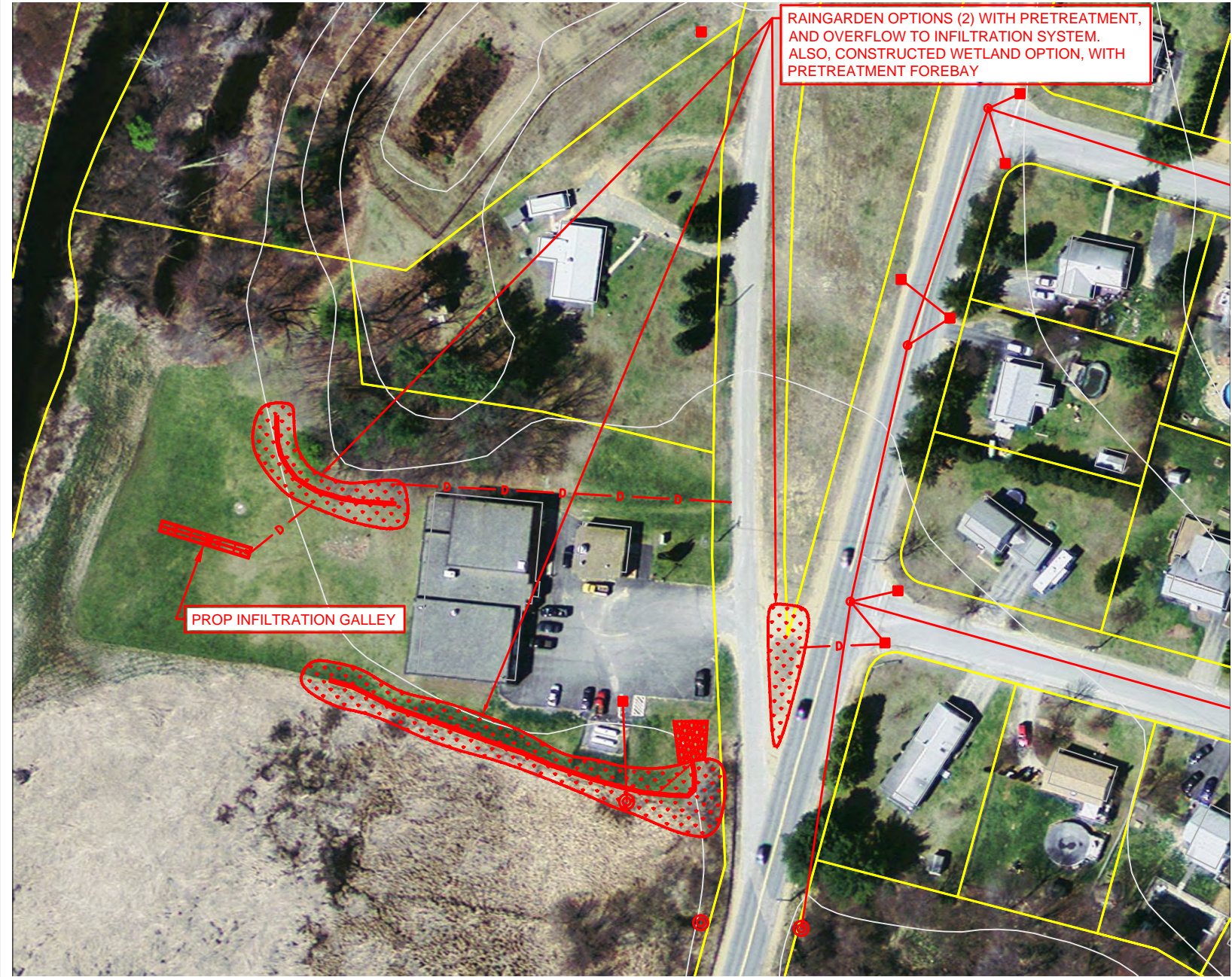
(2) Information taken from Town outfall GIS database

(3) Impervious runoff includes approximate areas from rooftops, driveways, and roadways.

(4) 10 year storm runoff assumes a rainfall intensity of 4.5 inches per hour.

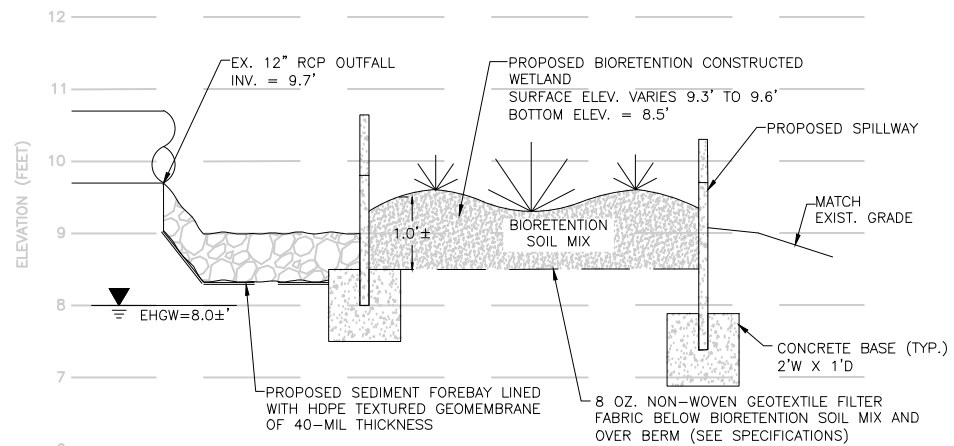


S:\1951\Active\195150313\CAD\195150313 Stormwater Layouts\_Fig 3-5.dwg  
2016/05/31 4:40 PM By: Stackpole, Ryan



SPILLWAY LOCATION	TL	FL	FLOWLINE ELEV.
FOREBAY #6B OVERFLOW	10'	6'	ELEV.=9.2'
BMP #6B OVERFLOW	8'	3'	ELEV.=9.0'

PRECAST CONCRETE LEVEL SPREADER DETAIL  
NOT TO SCALE



CROSS SECTION OF CONSTRUCTED WETLAND  
NOT TO SCALE (ELEVATIONS SHOWN ARE RELATIVE AND NOT SITE SPECIFIC)

ORIGINAL SHEET - ANSI B

JUNE, 2016  
195150313



5 Burlington Woods Drive  
Burlington, Massachusetts  
www.stantec.com

Client/Project  
TOWN OF SPENCER  
319 NONPOINT SOURCE POLLUTION  
SEVEN MILE RIVER WATERSHED

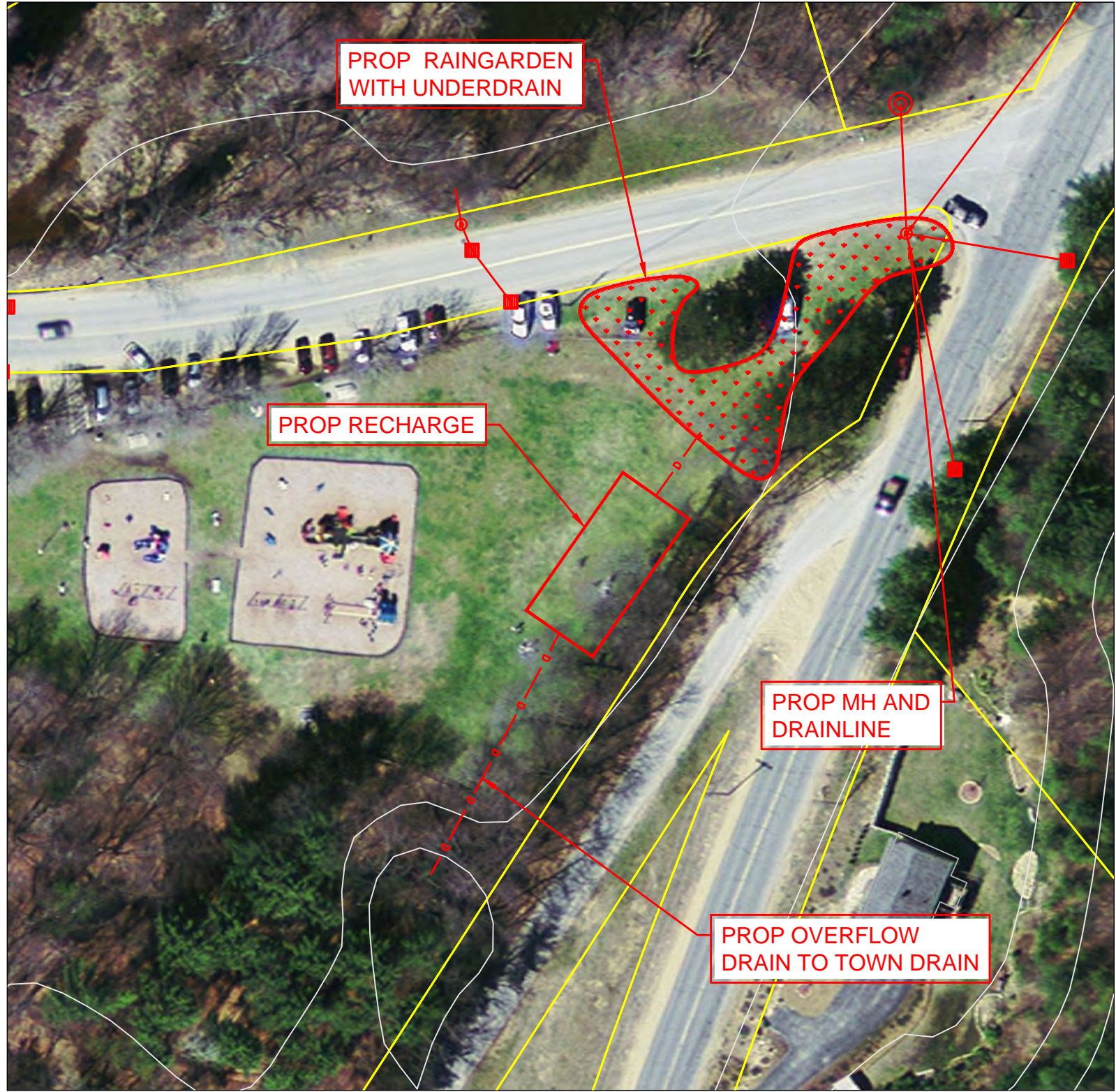
Figure No.

Title

CONCEPTUAL DESIGN 3  
WATER TREATMENT PLANT



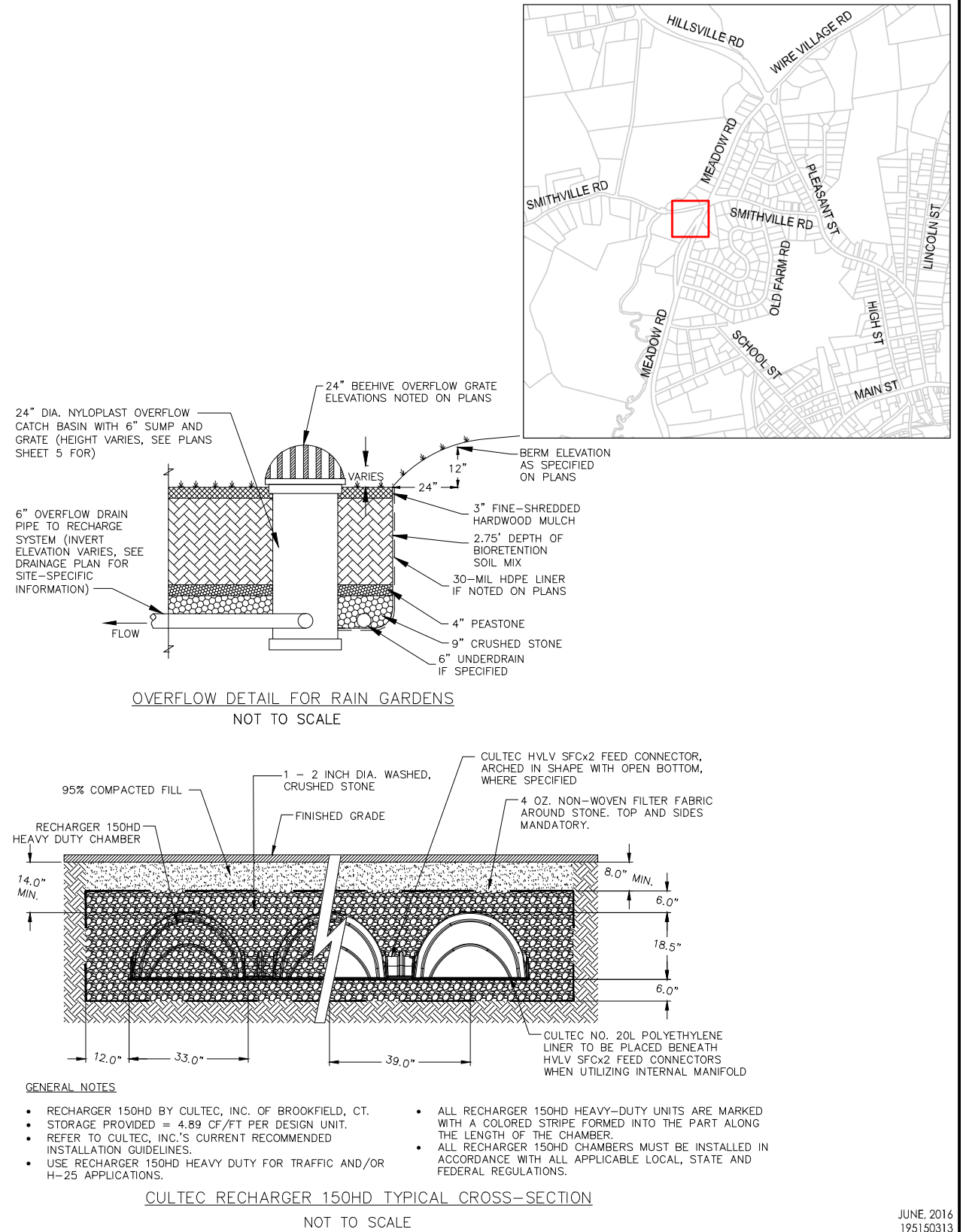
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2016/05/31 3:09 PM By: Stockpole, Ryan



ORIGINAL SHEET - ANSI B



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Burlington, Massachusetts  
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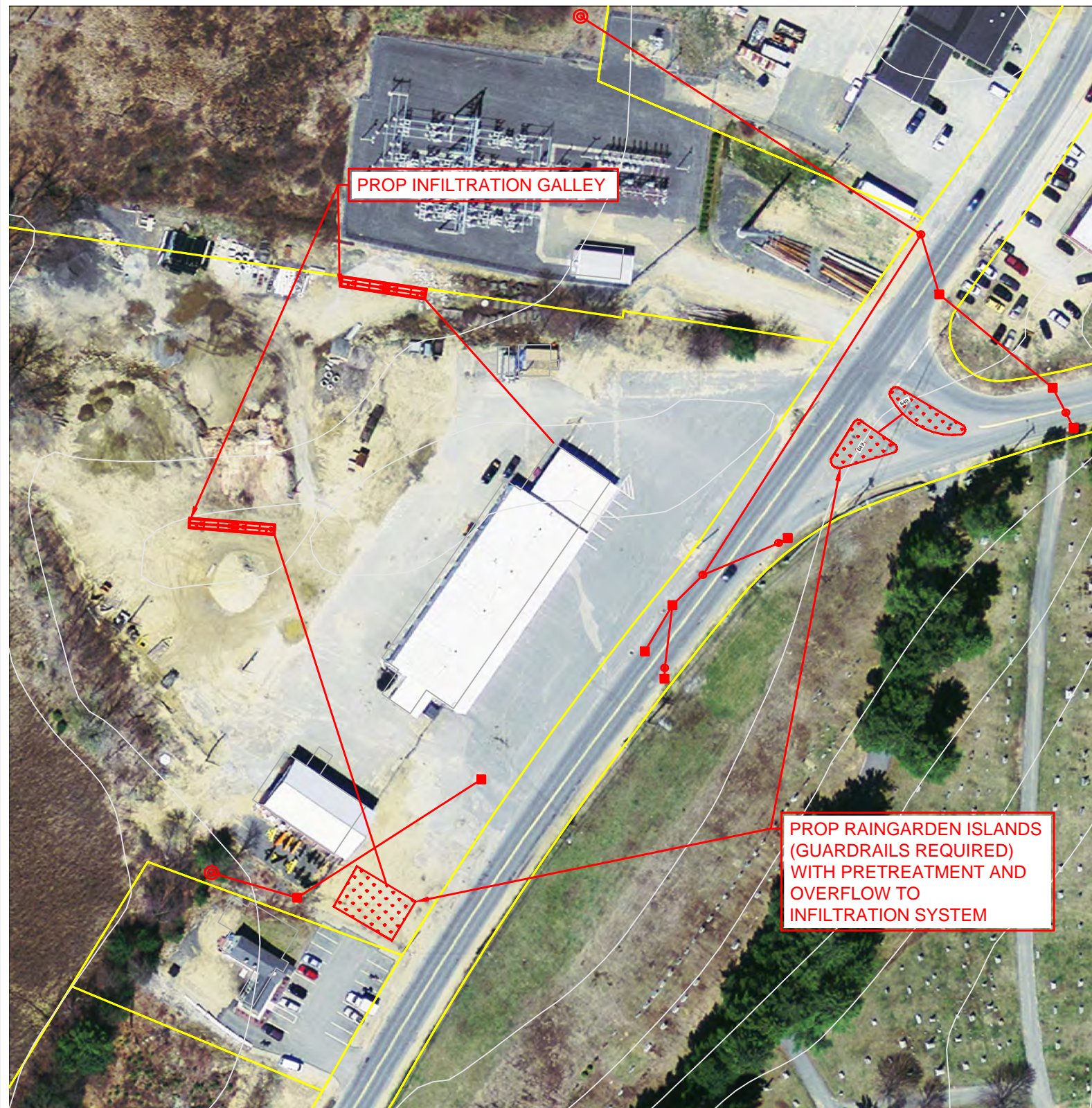


JUNE, 2016  
195150313

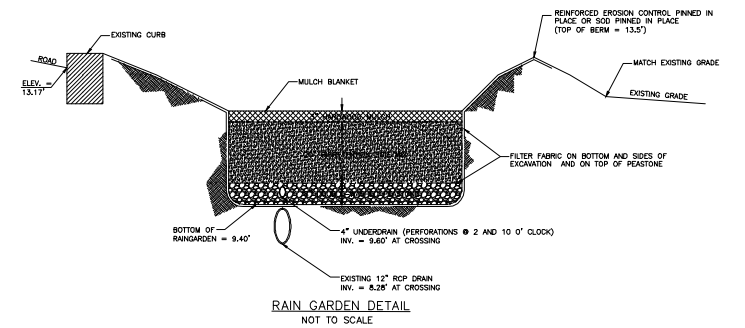
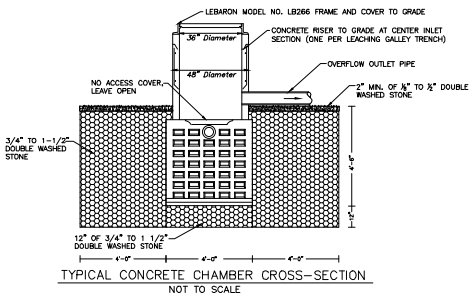
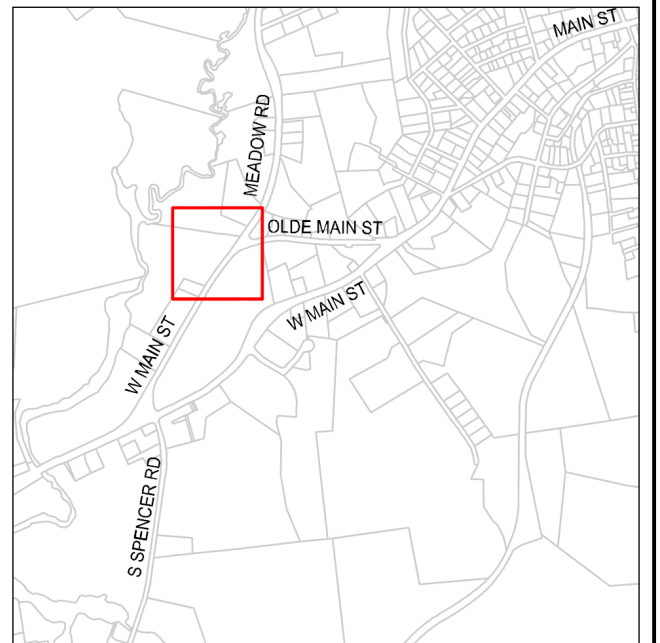
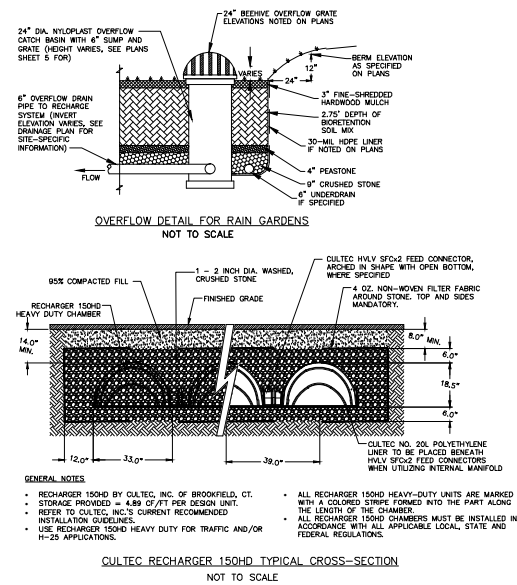
Client/Project  
TOWN OF SPENCER  
319 NONPOINT SOURCE POLLUTION  
SEVEN MILE RIVER WATERSHED  
Figure No.  
Title  
**CONCEPTUAL DESIGN 4  
POWDER MILL PARK**



S:\1951\Active\195150313\CAD\195150313 Stormwater Layouts\_Fig 1.2. 5.dwg  
2016/05/31 2:50 PM By: Stackpole, Ryan



ORIGINAL SHEET - ANSI B



JUNE, 2016  
195150313



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Client/Project  
TOWN OF SPENCER  
319 NONPOINT SOURCE POLLUTION  
SEVEN MILE RIVER WATERSHED  
Figure No.

Title  
CONCEPTUAL DESIGN 5  
DPW PARKING LOT





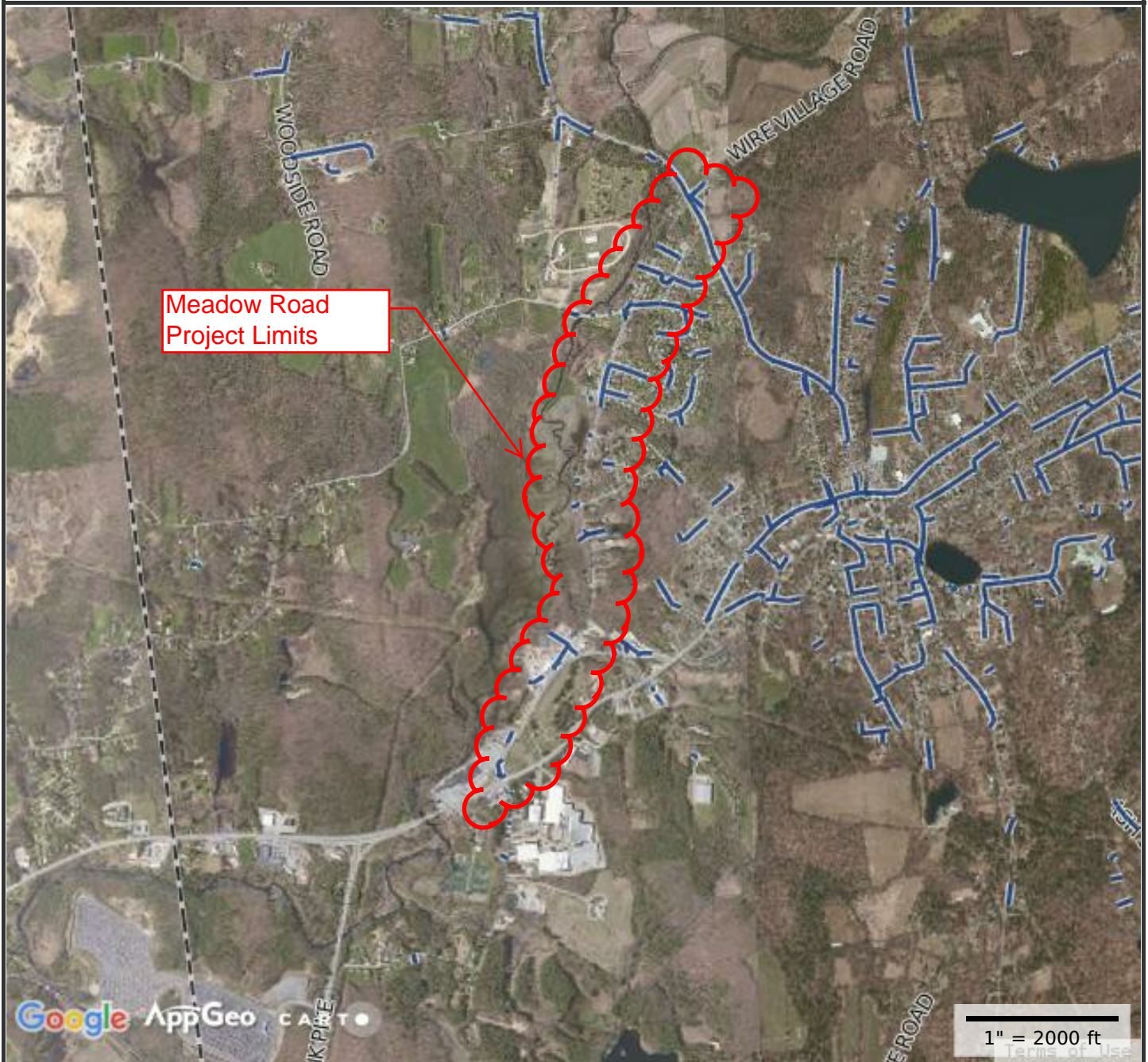
## **APPENDIX 5**

# **EXISTING DRAINAGE SYSTEM & CULVERT FIELD INSPECTION FORMS**





# Stormwater System - Meadow Road, Spencer



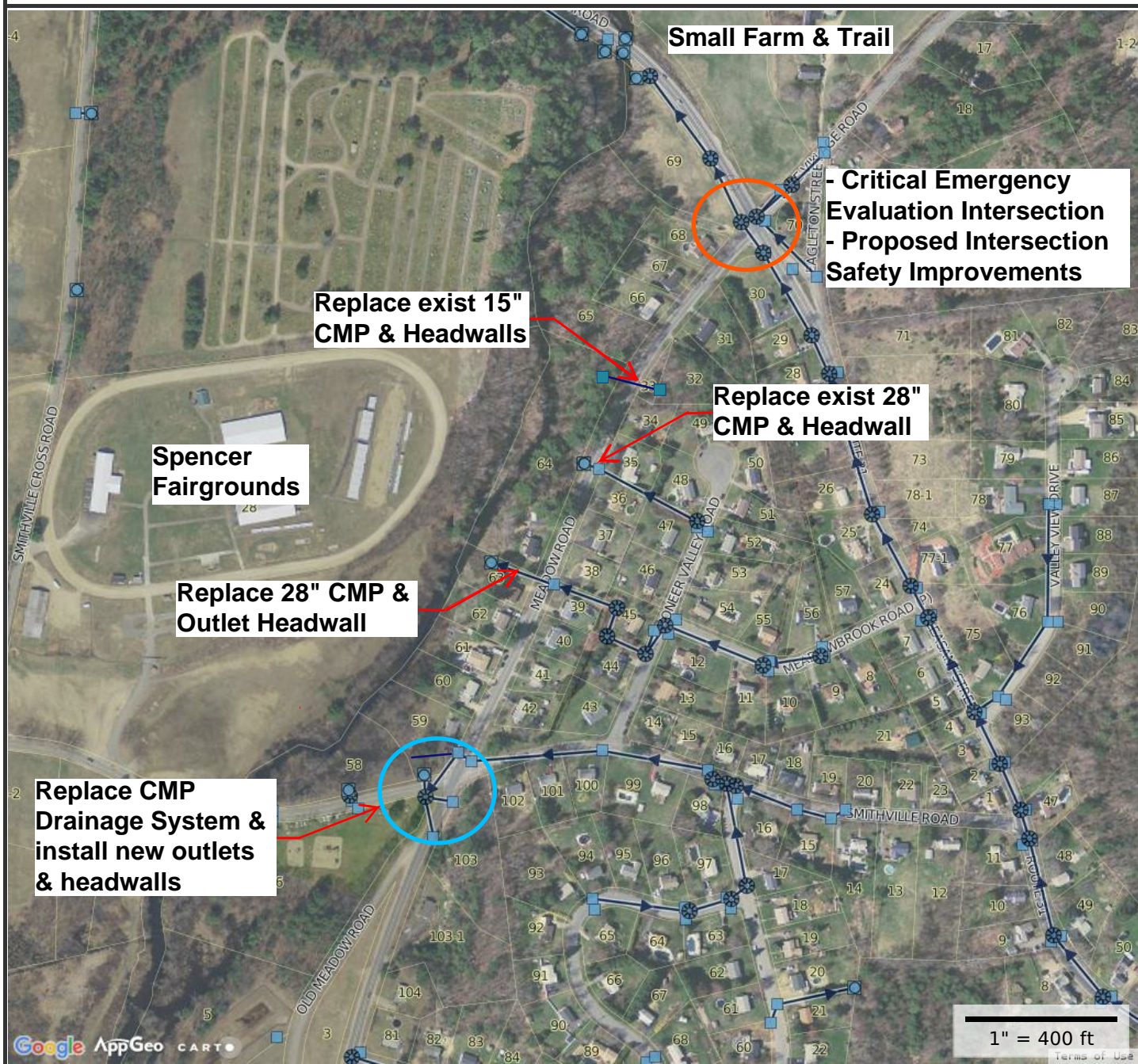
## MAP FOR REFERENCE ONLY NOT A LEGAL DOCUMENT

Town of Spencer, MA makes no claims and no warranties, expressed or implied, concerning the validity or accuracy of the GIS data presented on this map.

Parcels updated 1/1/2016  
Properties updated 1/1/2016



## Meadow Road Drainage System



**MAP FOR REFERENCE ONLY**  
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Parcels updated 1/1/2016  
Properties updated 1/1/2016



## Meadow Road Drainage System

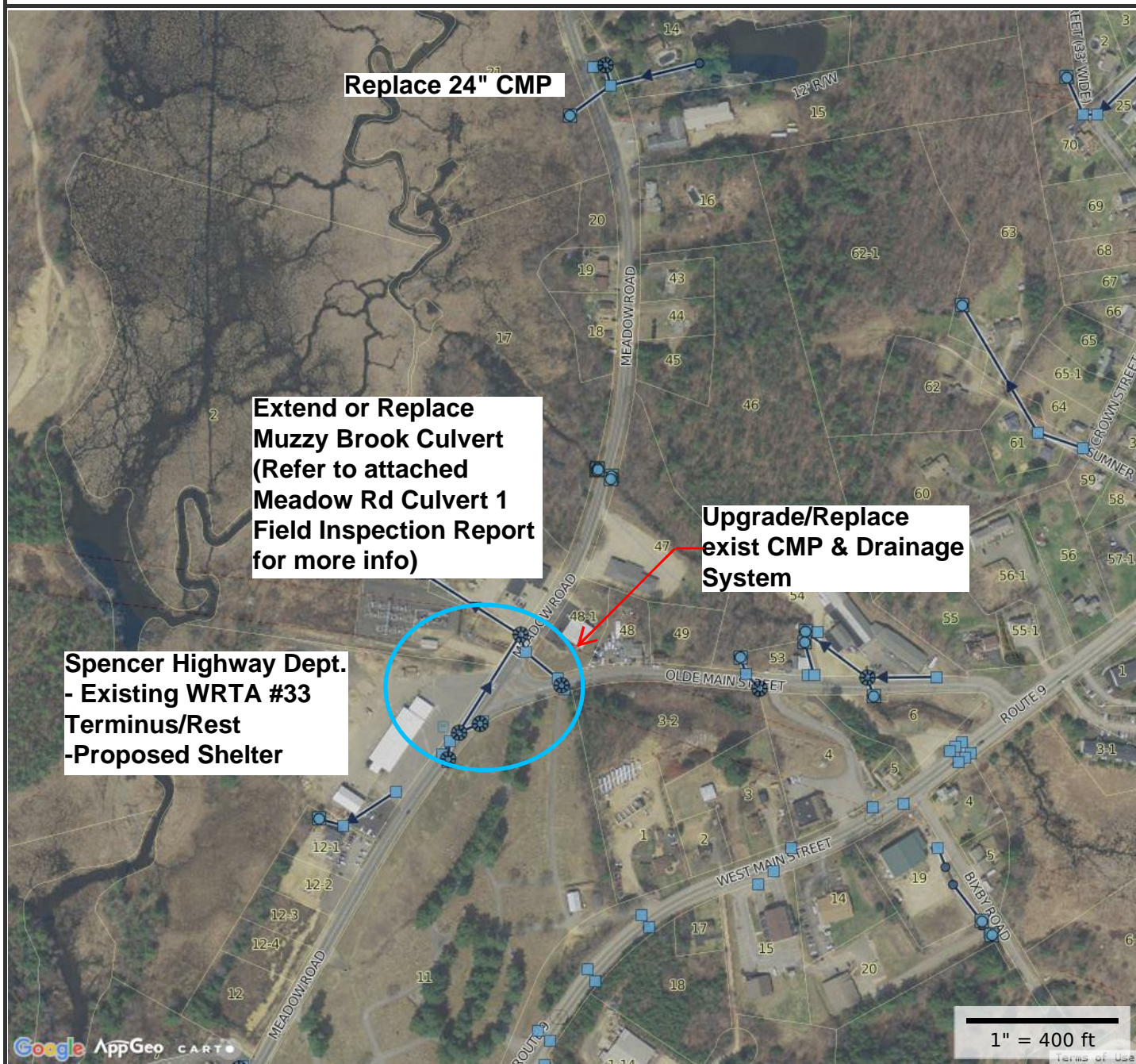
**MAP FOR REFERENCE ONLY  
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Parcels updated 1/1/2016  
Properties updated 1/1/2016



## Meadow Road Drainage System



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Parcels updated 1/1/2016  
Properties updated 1/1/2016



# Meadow Road Drainage System



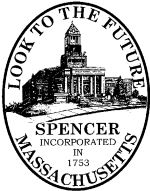
**MAP FOR REFERENCE ONLY  
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Parcels updated 1/1/2016  
Properties updated 1/1/2016







## TOWN OF SPENCER CULVERT ASSESSMENT FIELD DATA FORM

Date: 11/22/2014 Inspection: Seamus Gallagher Weather: \_\_\_\_\_

Road: Meadow Road: Culvert 1 Town: Spencer GPS Coordinates: \_\_\_\_\_

Other Location Notes: Muzzy Brook. Water 18" deep during inspection.

**\*NOTE THIS FORM SHOULD BE COMPLETED USING THE CULVERT ASSESSMENT GUIDE AS A REFERENCE\***

	Good (1.00)	Fair (0.67)	Poor (0.33)	Critical (0.00)	Unknown	N/A
Invert Deterioration	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Joints & Seams	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cracking	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Headwall/Wingwall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apron	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pipe Damage	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scour	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cross-section deformation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Longitudinal alignment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Footing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Roadway over Culvert	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blockage at Inlet	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Embankment	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Culvert Condition Score (Average of Scores Given):

Structural assessment results: good condition (0.89/1)

Aquatic assessment results: moderate barrier (0.70/1)

Performance Problems:

Erosion/scouring observed on downstream side. Wood/branches and debris tend to accumulate on upstream side.

Additional Comments:

Improvement Considerations: Short term: Address scouring on outlet side; Long Term: consider box replacement for aquatic/stream/wildlife passage and flood prevention. Extension or replacement required for Meadow Road project.



# SPENCER



INLET

Characteristic	Field Observation
Date observed	11/22/2014
Type	Double Pipe
Diameter	48"
Length	44'
Funding	Town
Stream Name (Tributary)	Muzzy Brook
Water Depth	18"
Outlet Drop	N/A

## Meadow Road: Culvert 1

Structural assessment results:  
**good condition (0.89/1)**

Aquatic assessment results:  
**moderate barrier (0.70/1)**

Major Problems:

- Erosion/scouring

### Improvement Considerations

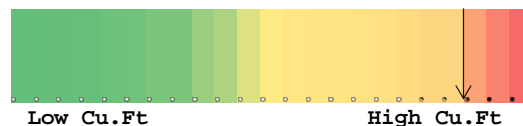
Short Term:

- Address scouring on outlet side

Long Term:

- Box replacement

Relative Fill Needed:



\*ranked relatively against observed culverts



OUTLET

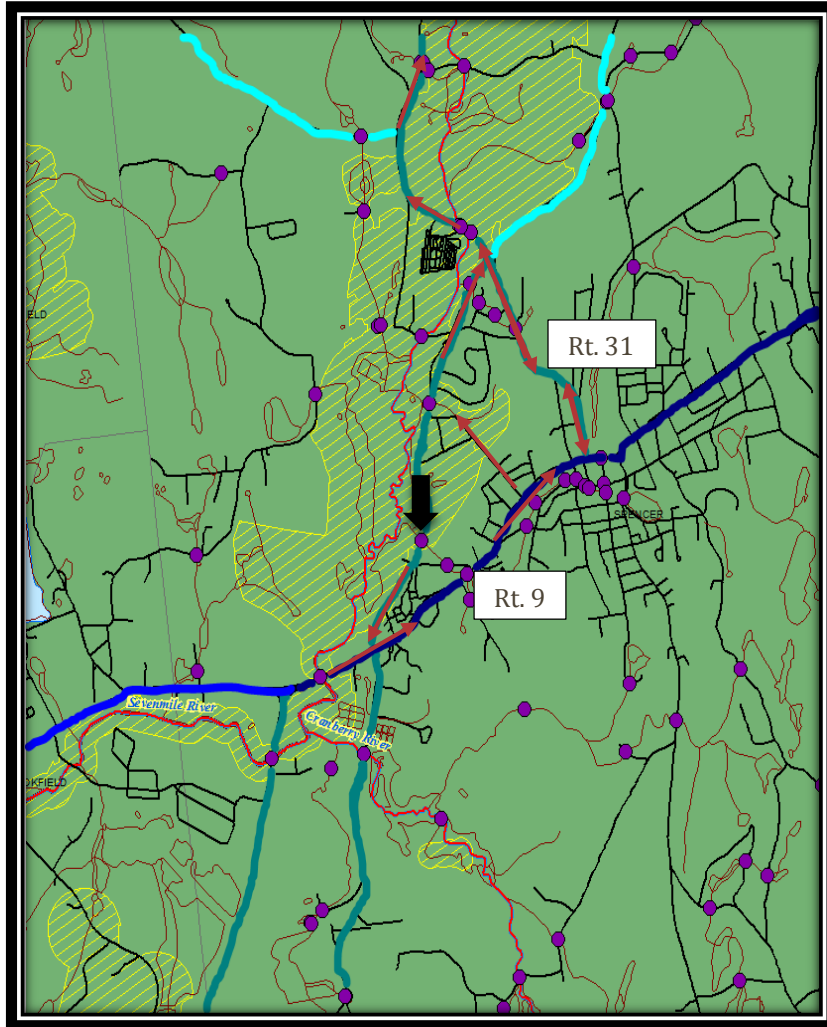
### [FIELD NOTES]

- ❖ Large scour pool on outlet side
- ❖ Small scouring at inlet
- ❖ Culvert constricts stream natural bank width

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## Impact

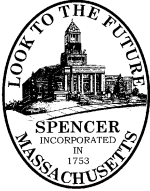
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Meadow Road 1

- ❖ Meadow Rd. is a highly depended upon collector road leading from Rt. 9 to Rt. 31, the major arterial roads running through Spencer. According to CMRPC's latest traffic counts (5/24/13) the ADT is +/- 4500 with little variance between NB and SB.
- ❖ The peak hours calculated were 7 a.m. and 5 p.m. and the count shows consistent traffic during business hours. Construction on a culvert on Meadow Rd. will ultimately take away a time saving route for commuters from the West (Brookfield, East Brookfield, Warren...) to their destination in the North (Paxton, Oakham...) or vice versa.
- ❖ Depending on conditions of downtown Spencer the nearest detour doubles the time that would be spent on Meadow Rd.





## TOWN OF SPENCER CULVERT ASSESSMENT FIELD DATA FORM

Date: 12/18/2014 Inspection: Seamus Gallagher Weather: \_\_\_\_\_

Road: Meadow Road: Culvert 2 Town: Spencer GPS Coordinates: \_\_\_\_\_

Other Location Notes: \_\_\_\_\_

**\*NOTE THIS FORM SHOULD BE COMPLETED USING THE CULVERT ASSESSMENT GUIDE AS A REFERENCE\***

	Good (1.00)	Fair (0.67)	Poor (0.33)	Critical (0.00)	Unknown	N/A
Invert Deterioration	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Joints & Seams	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Cracking	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Headwall/Wingwall	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Apron	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Pipe Damage	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scour	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Cross-section deformation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Longitudinal alignment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Footing	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Roadway over Culvert	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Blockage at Inlet	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Embankment	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Culvert Condition Score (Average of Scores Given):

Structural assessment results: fair condition (0.63/1)

Aquatic assessment results: minor barrier (0.80/1)

Performance Problems:

Scouring and Erosion; Road Condition; Submerged Outlet.

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Additional Comments:

Improvement Considerations: Short term: Watch for flooding in area; Long Term: consider replace  
headwalls for aquatic/wildlife passage.

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INLET

Characteristic	Field Observation
Date observed	12/18/2014
Type	Concrete Pipe
Diameter	36"
Length	60'
Funding	Town
Stream Name (Tributary)	unknown
Water Depth	22"
Outlet Drop	N/A

## Meadow Road: Culvert 2

Structural assessment results:  
**fair condition (0.63/1)**

Aquatic assessment results:  
**minor barrier (0.80/1)**

### Major Problems:

- Scouring and Erosion
- Road Condition
- Submerged Outlet

### Improvement Considerations

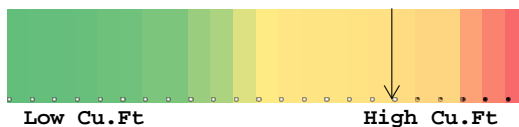
#### Short Term:

- Watch for flooding in area

#### Long Term:

- Box replacement

#### Relative Fill Needed:



\*ranked relatively against observed culverts



OUTLET

### [FIELD NOTES]

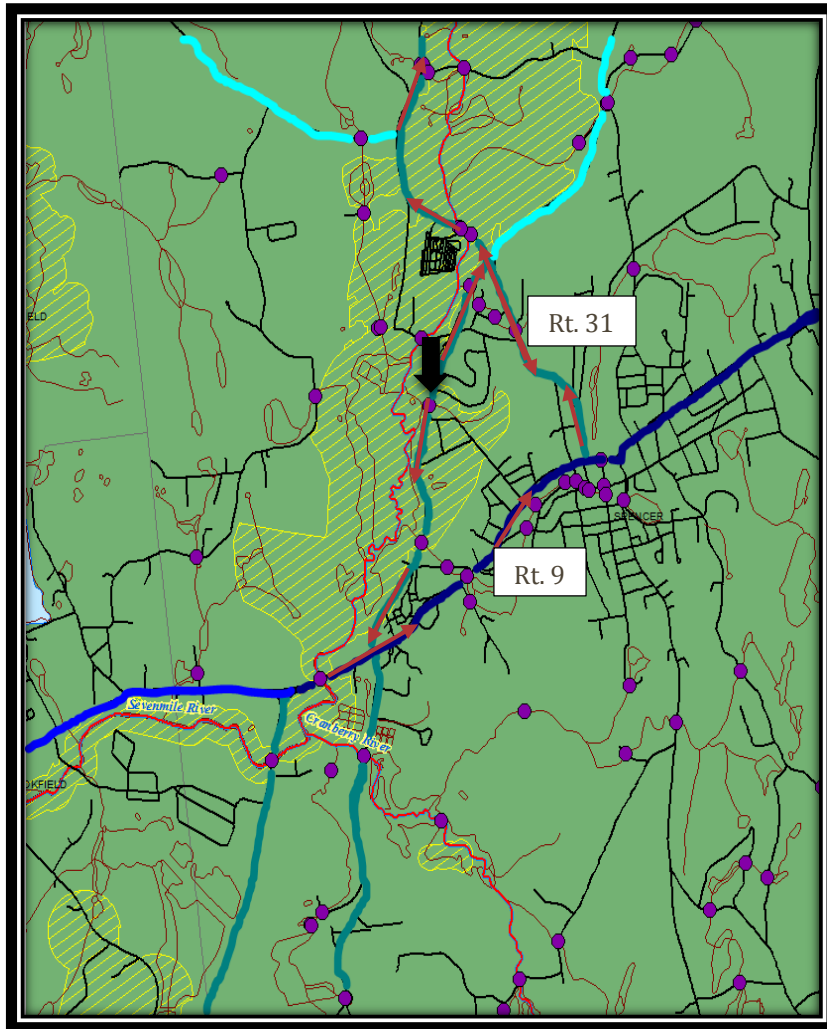
- ❖ Lots of litter in area
- ❖ Outlet is almost submerged
- ❖ Water is very deep and widening outlet area
- ❖ Turns into wetland area downstream



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## Impact

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Meadow Road 2

- ❖ Meadow Rd. is a highly depended upon collector road leading from Rt. 9 to Rt. 31, the major arterial roads running through Spencer. According to CMRPC's latest traffic counts (5/24/13) the ADT is +/- 4500 with little variance between NB and SB.
- ❖ The peak hours calculated were 7 a.m. and 5 p.m. and the count shows consistent traffic during business hours. Construction on a culvert on Meadow Rd. will ultimately take away a time saving route for commuters from the West (Brookfield, East Brookfield, Warren...) to their destination in the North (Paxton, Oakham...) or vice versa.
- ❖ Depending on conditions of downtown Spencer the nearest detour doubles the time that would be spent on Meadow Rd.

## **APPENDIX 6**

### **SURVEY BASE PLANS**





LEGEND

- SYMBOLS
- BENCH MARK
  - BOUND
  - BUSH
  - ⊙ CATCH BASIN
  - ⊙ DRAIN MANHOLE
  - ELECTRIC HANDHOLE
  - ⊕ GAS GATE
  - ⊕ GAS METER
  - GATE POST
  - × GUY ANCHOR
  - GUY POLE
  - HANDHOLE
  - ⊕ HYDRANT
  - IRON PIPE
  - ✱ LIGHT POLE
  - ✱ MAIL BOX
  - MISCELLANEOUS MANHOLE
  - PDST, C=CDNC W=WOOD
  - ⊙ SEWER MANHOLE
  - SIGN
  - ×151.42 SPOT GRADE
  - STUMP
  - ⊕ TELEPHONE MANHOLE
  - ✱ TRAFFIC SIGNAL
  - ✱ TRAFFIC SIGNAL POLE
  - TREE
  - UTILITY POLE V/LIGHT
  - UTILITY POLE
  - VENT PIPE
  - ⊕ WATER GATE
  - ⊕ WATER METER
  - WETLAND

LEGEND

- ABBREVIATIONS
- BE BOSTON ELECTRIC  
BIT BITUMINOUS  
C CONCRETE (POST)  
CS CARBON STEEL  
CB CATCH BASIN  
CDNC CONCRETE  
CB/DH CONCRETE BOUND/DRILL HOLE  
CMP CORRUGATED METAL PIPE  
CND COULD NOT MEASURE  
CNS COULD NOT OPEN  
CNS COULD NOT SEE  
DMH DRAIN MANHOLE  
IP IRON PIPE  
IR IRON ROD  
M METAL (POST)  
MH MANHOLE  
MECO MASSACHUSETTS ELECTRIC COMPANY  
NET NEW ENGLAND TELEPHONE  
PCKF PICKET FENCE  
PL PLANTER  
PVC POLYVINYL CHLORIDE  
PRF POST & RAIL FENCE  
W/F WOOD FRAME  
STKF STOCKADE FENCE

BOUNDARY LINES

- STATE LAYOUT  
COUNTY LAYOUT  
CITY OR TOWN LAYOUT  
ABUTTERS LINES

LEGEND

- LINES
- EDGE OF PAVEMENT
  - DRAIN PIPE
  - ELECTRIC PIPE
  - GAS PIPE
  - SEWER PIPE
  - TELEPHONE PIPE
  - WATER PIPE
  - OVERHEAD WIRE
  - EDGE OF WATER
  - EDGE OF TREES
  - FENCE LINE
  - WETLAND LINE
  - 100' WETLAND BUFFER LINE

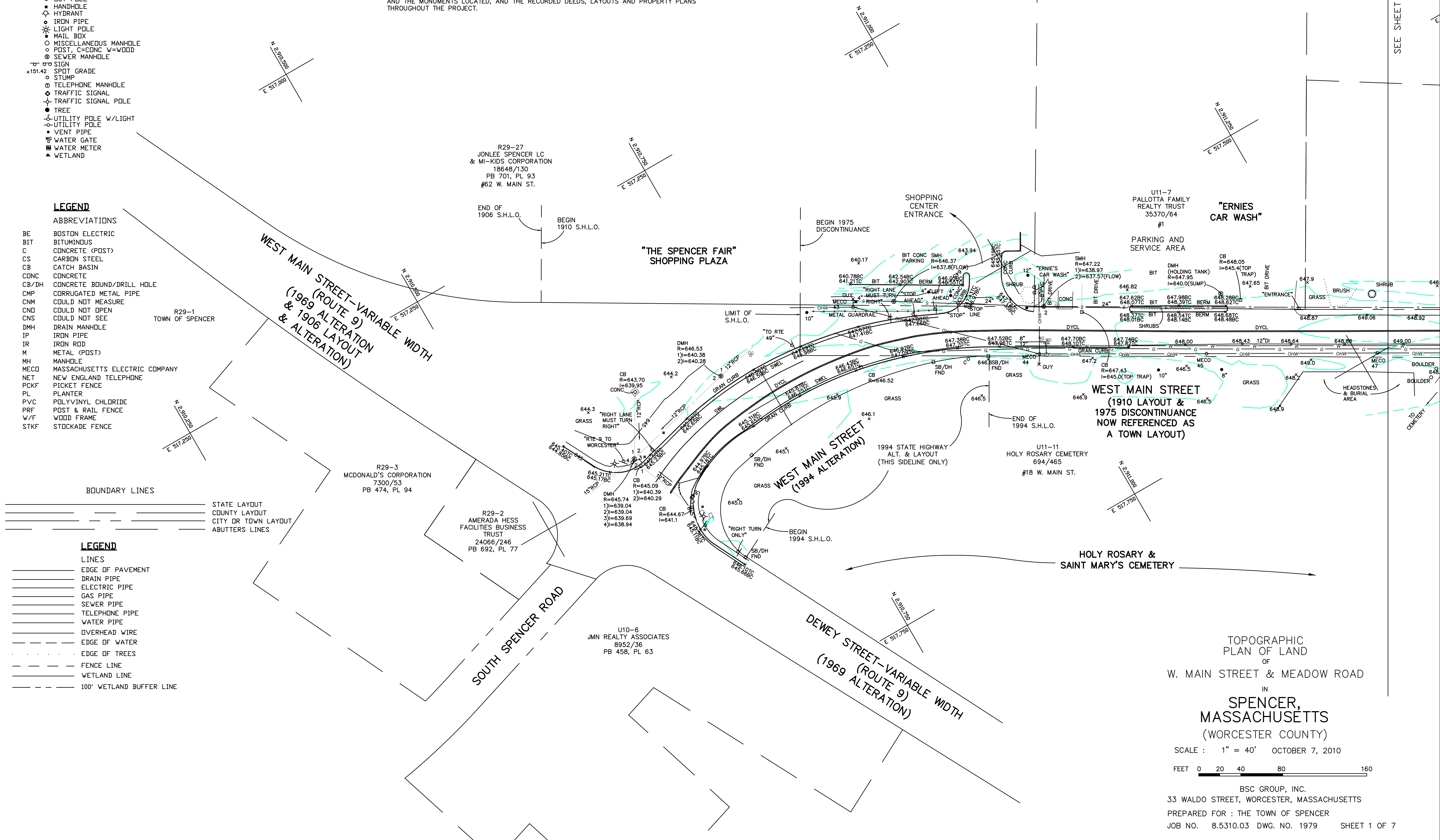
GENERAL NOTES:

- 1.) THIS PLAN WAS PREPARED FROM AN ACTUAL ON-THE-GROUND SURVEY PERFORMED BY BSC GROUP, INC. BETWEEN MAY 20, 2010 AND JULY 6, 2010. COORDINATES ARE BASED ON NAD 83 AND ARE A RESULT OF GPS OBSERVATIONS USING TRIMBLE GPS EQUIPMENT.
- 2.) THE PROPERTY LINES SHOWN HEREON ARE BASED ON PLANS AND DEEDS RECORDED AT THE WORCESTER DISTRICT REGISTRY OF DEEDS. PRIVATE PROPERTY OWNERSHIPS ARE BASED ON ASSESSOR'S MAPS ONLY. SEE PLAN FOR DEED REFERENCES.
- 3.) WEST MAIN STREET, MEADOW ROAD, SMITHVILLE ROAD AND PLEASANT STREET LAYOUTS ARE BASED ON PLANS RECORDED AT WORCESTER DISTRICT REGISTRY OF DEEDS. THE LINES SHOWN HEREON ARE THE RESULT OF A COMPILATION OF THE RESULTS OF THE FIELD SURVEY AND THE MONUMENTS LOCATED, AND THE RECORDED DEEDS, LAYOUTS AND PROPERTY PLANS THROUGHOUT THE PROJECT.

- 4.) ELEVATIONS SHOWN HEREON ARE BASED NAVD 88 AS A RESULT OF GPS OBSERVATIONS REFERRED TO IN GENERAL NOTE 1.

TBM'S SET: SEE PLAN

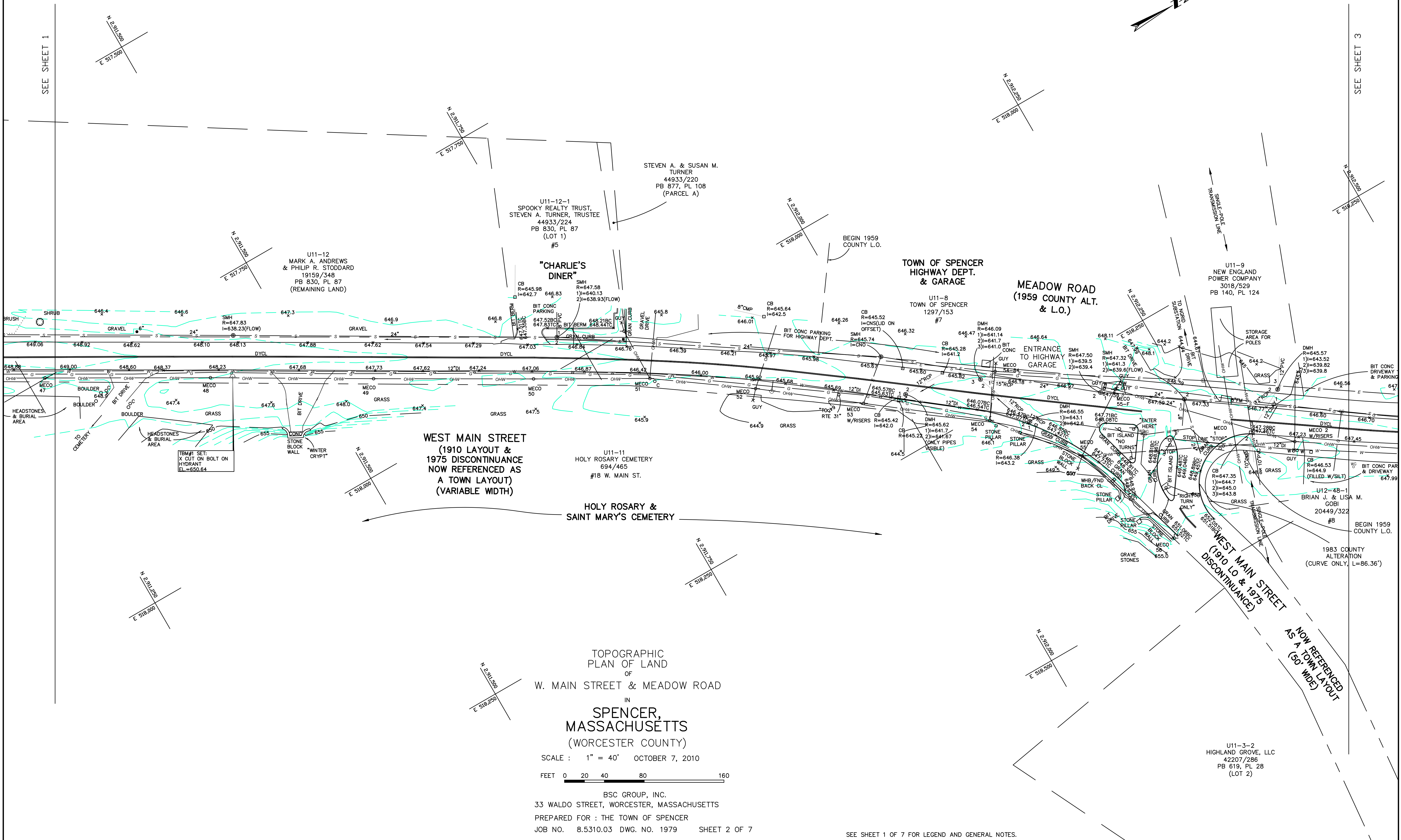
- 5.) ALL UNDERGROUND UTILITIES SHOWN ARE APPROXIMATE ONLY. SEE CHAPTER 370 ACTS OF 1963, MASSACHUSETTS GENERAL LAWS. BSC GROUP, INC. ASSUMES NO RESPONSIBILITY FOR DAMAGES INCURRED AS A RESULT OF UTILITIES OMITTED OR INACCURATELY SHOWN. BEFORE PLANNING FUTURE CONNECTIONS, THE APPROPRIATE PUBLIC UTILITY ENGINEERING DEPARTMENT MUST BE CONSULTED. NOT ALL UTILITIES ARE SHOWN.





SEE SHEET 1

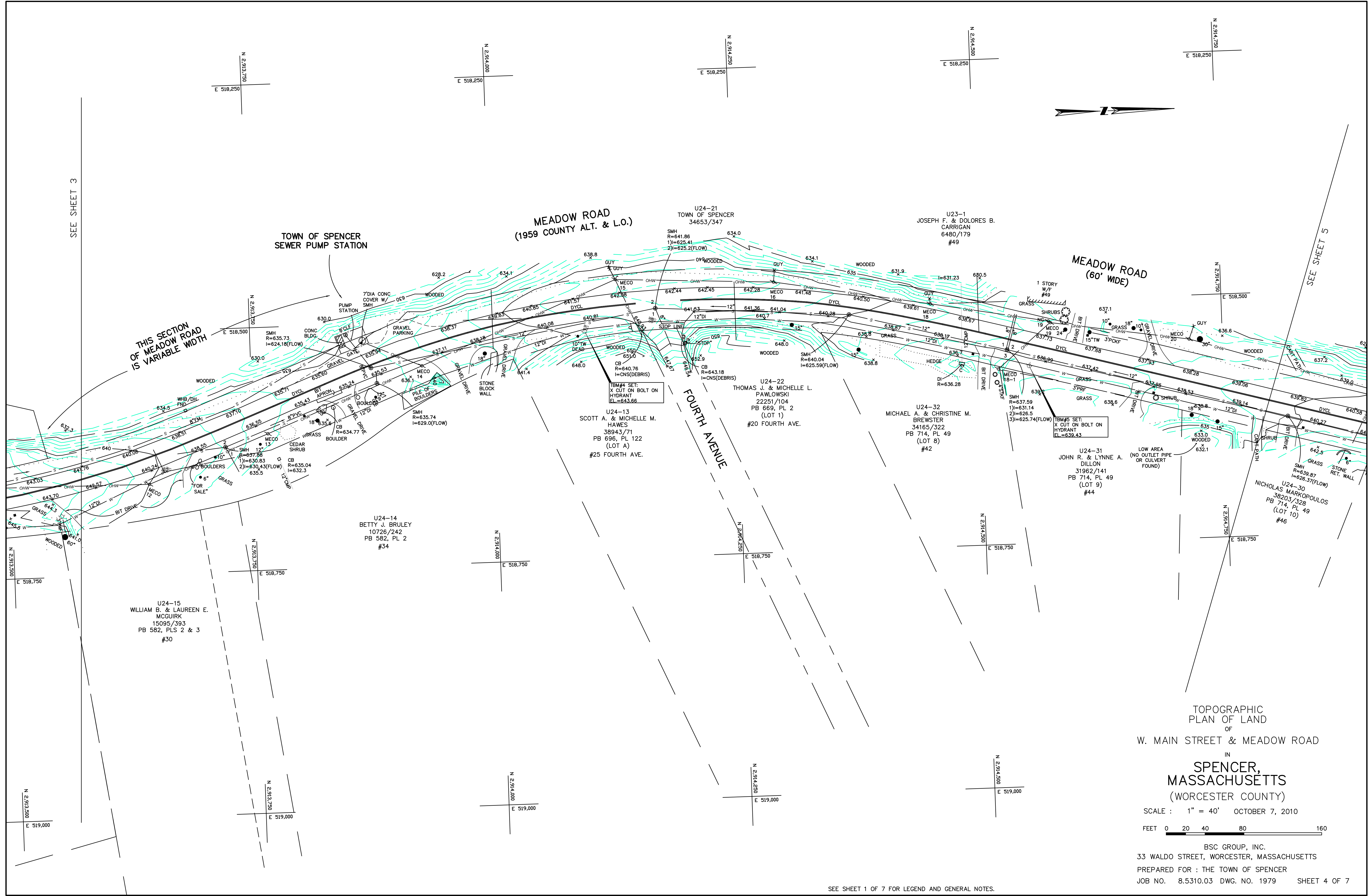
SEE SHEET 3











MEADOW ROAD  
(1959 COUNTY ALT. & L.O.)

TOWN OF SPENCER  
SEWER PUMP STATION

U24-21  
TOWN OF SPENCER  
34653/347

U23-1  
JOSEPH F. & DOLORES B.  
CARRIGAN  
6480/179  
#49

MEADOW ROAD  
(60' WIDE)

FOURTH AVENUE

U24-13  
SCOTT A. & MICHELLE M.  
HAWES  
38943/71  
PB 696, PL 122  
(LOT A)  
#25 FOURTH AVE.

U24-22  
THOMAS J. & MICHELLE L.  
PAWLOWSKI  
22251/104  
PB 669, PL 2  
(LOT 1)  
#20 FOURTH AVE.

U24-32  
MICHAEL A. & CHRISTINE M.  
BREWSTER  
34165/322  
PB 714, PL 49  
(LOT 8)  
#42

U24-31  
JOHN R. & LYNNE A.  
DILLON  
31962/141  
PB 714, PL 49  
(LOT 9)  
#44

U24-30  
NICHOLAS MARKOPOULOS  
38203/328  
PB 714, PL 49  
(LOT 10)  
#46

U24-14  
BETTY J. BRULEY  
10726/242  
PB 582, PL 2  
#34

U24-15  
WILLIAM B. & LAUREEN E.  
MCGUIRK  
15095/393  
PB 582, PLS 2 & 3  
#30

TOPOGRAPHIC  
PLAN OF LAND  
OF  
W. MAIN STREET & MEADOW ROAD  
IN  
SPENCER,  
MASSACHUSETTS  
(WORCESTER COUNTY)

SCALE : 1" = 40' OCTOBER 7, 2010

FEET 0 20 40 80 160

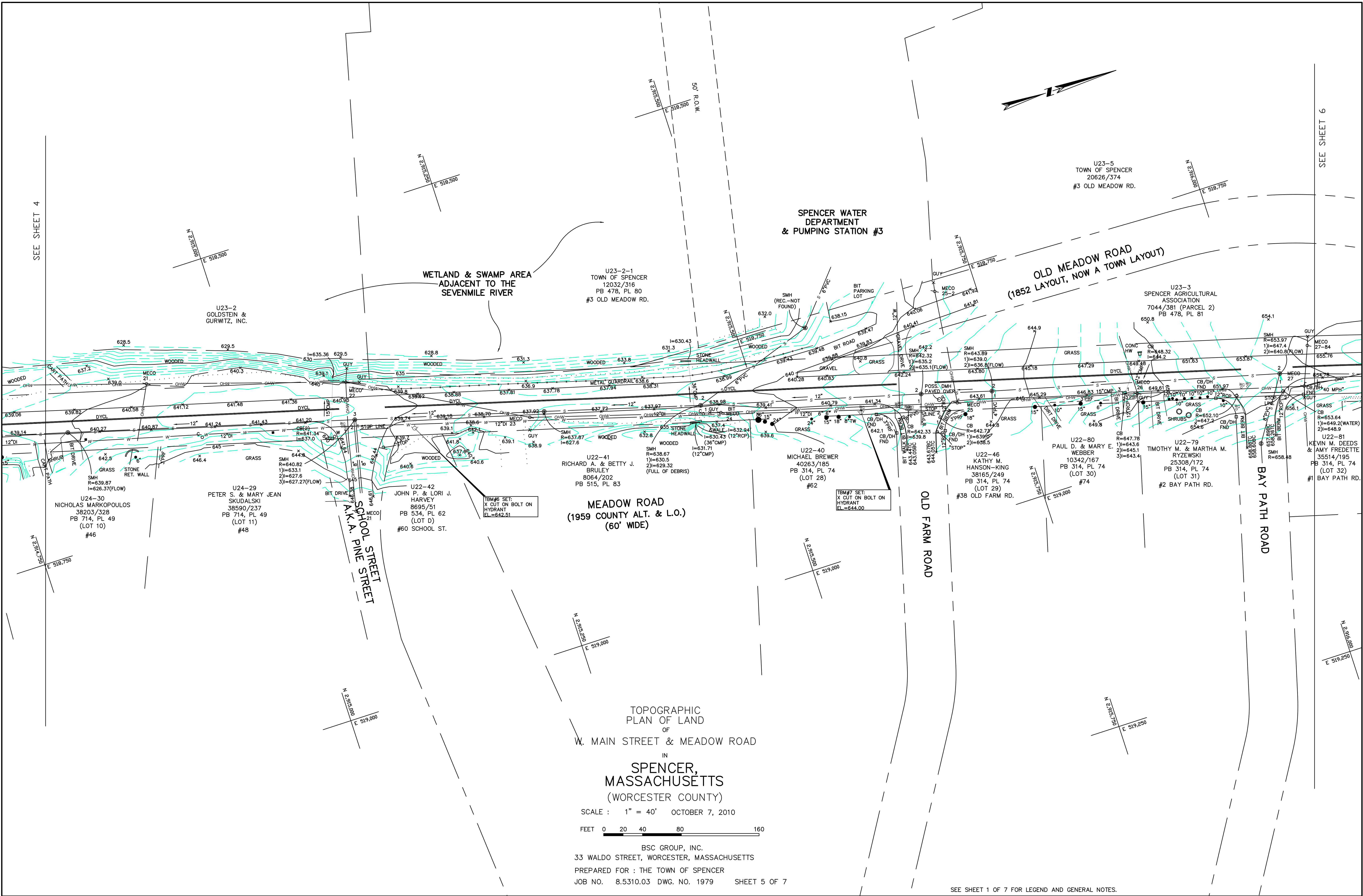
BSC GROUP, INC.  
33 WALDO STREET, WORCESTER, MASSACHUSETTS  
PREPARED FOR : THE TOWN OF SPENCER  
JOB NO. 8.5310.03 DWG. NO. 1979 SHEET 4 OF 7

SEE SHEET 1 OF 7 FOR LEGEND AND GENERAL NOTES.

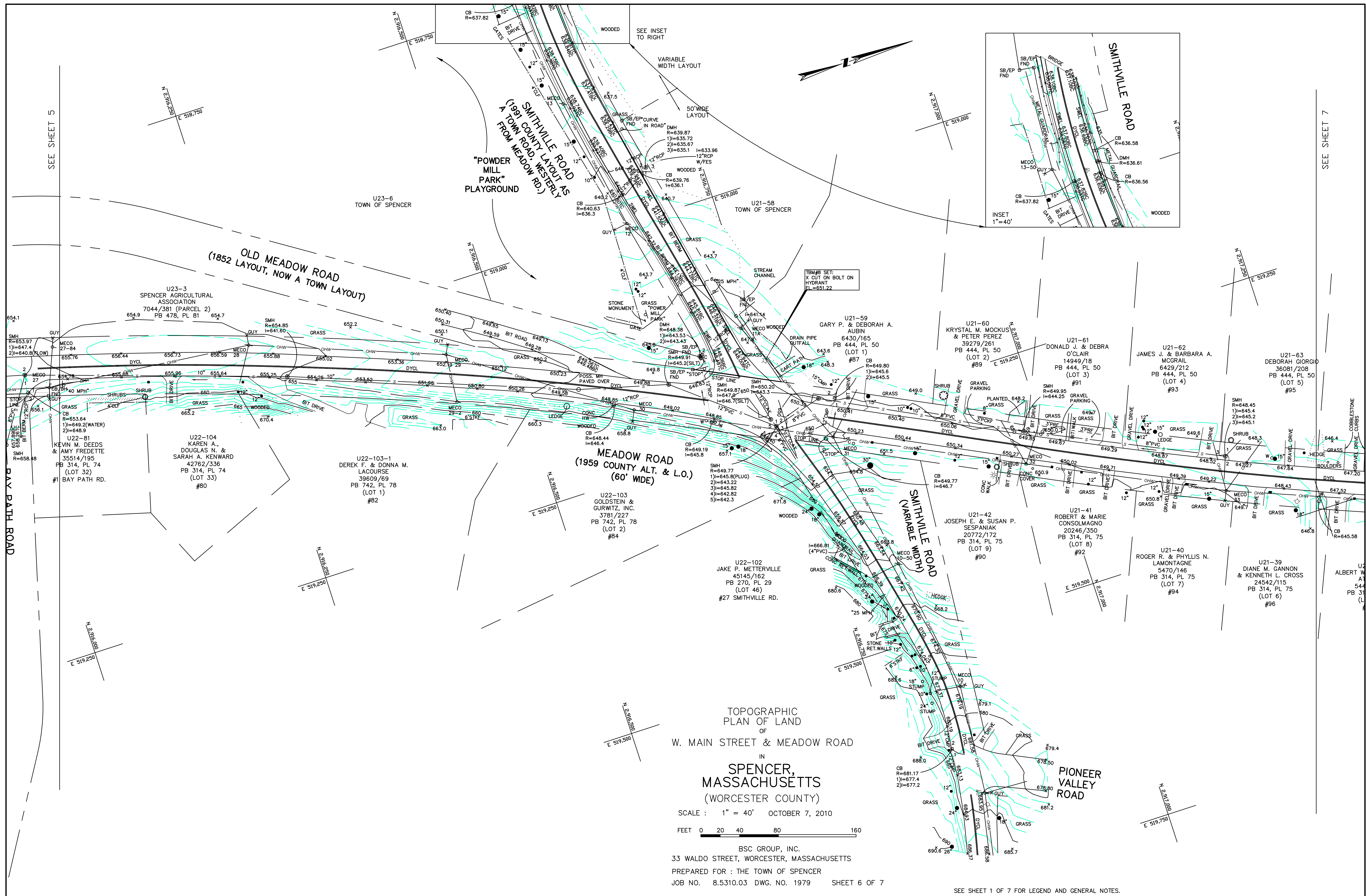


SEE SHEET 4

SEE SHEET 6









9,250

U21-64  
KEVIN M. & CAMELLA G.  
SHERRY  
41664/68  
PB 368, PL 48  
#97

U21-65  
JOSEPH P. JOHNSON  
16421/387  
PB 257, PL 2

U21-66  
CHRISTOPHER REYNOLDS  
& STEPHANIE SMITH  
43338/298  
PB 312, PL 101  
(LOT 3)

U21-67  
CARL J. & JANE M.  
KWIATKOWSKI  
5049/222  
PB 312, PL 101  
(LOT 2)  
#113

U21-65  
JOSEPH P. JOHNSON  
16421/387  
PB 257, PL 2

U21-69  
ELEANOR S. DOWNEY,  
JAMES W. SMALL,  
LESLEY E. ZORABEDIAN  
& EDWARD M. SMALL  
16415/100

PLEASANT STREET  
(ROUTE 31)  
(1952 COUNTY LAYOUT  
VARIABLE WIDTH)

021-39  
M. GANNON  
ETH L. CROSS  
542/115  
314, PL 75  
LOT 6)  
#96

U21-38  
ALBERT W. & DIANE S.  
ATCHUE  
5448/284  
PB 314, PL 75  
(LOT 5)  
#98

U21-37  
KATHLEEN M. BESHAI  
40774/333  
PB 314, PL 75  
(LOT 4)  
#100

U21-36  
CHRISTOPHER J. & SHERRI L.  
PERRY  
17233/234  
PB 314, PL 75  
(LOT 3)  
#102

U21-35  
N W. & JEAN M.  
MULHALL  
6207/298  
B 314, PL 75  
(LOT 2)  
#104

U21-34  
J. & HEATHER L.  
GLADWIN  
43783/373  
314, PL 75  
(LOT 1)  
#106

U21-32  
RICHARD J. & MARIE A.  
DEPATIE  
5216/414

U21-31  
RICHARD J. & MARIE A.  
DEPATIE  
4867/140  
#112

U38-20  
ELEANOR S. DOWNEY  
16415/100  
#3 WIRE VILLAGE RD.

SCALE : 1" = 40'      OCTOBER 7, 2010

FEET	0	20	40	80	160
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BSC GROUP, INC.  
33 WALDO STREET, WORCESTER, MASSACHUSETTS  
PREPARED FOR : THE TOWN OF SPENCER  
JOB NO. 8.5310.03 DWG. NO. 1979 SHEET 7 OF 7

SEE SHEET 1 OF 7 FOR LEGEND AND GENERAL NOTES.