

Municipal GIS Mapping

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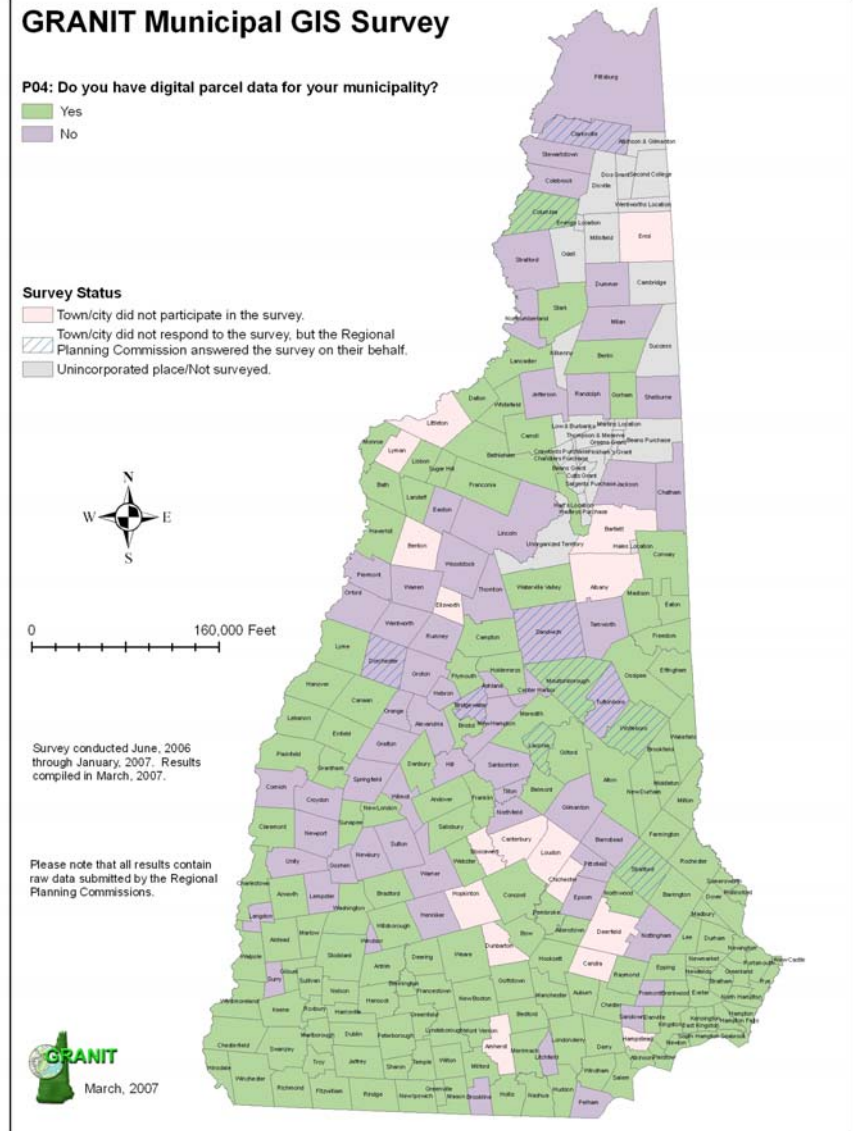
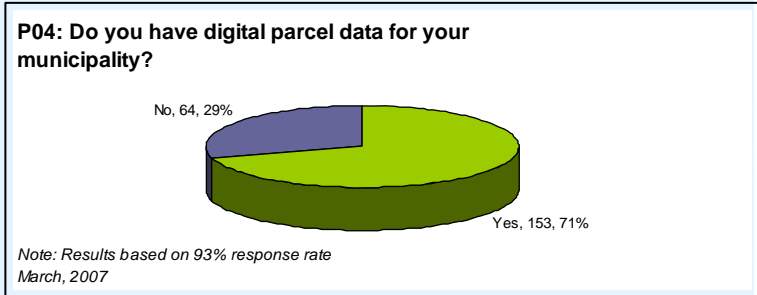
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Bob Strobel, T² Project Director, UNH

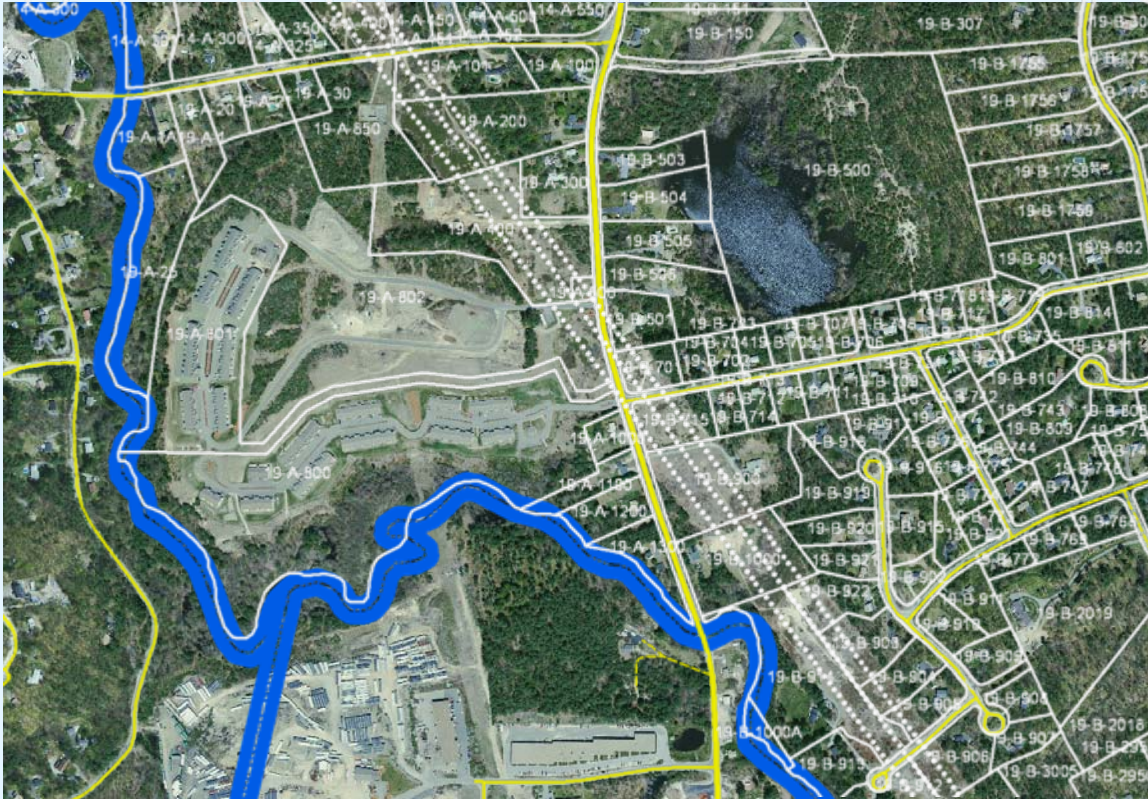
March 30, 2007

Current GIS Usage

- GRANIT survey of 234 municipalities in the state
- 93% of communities responded

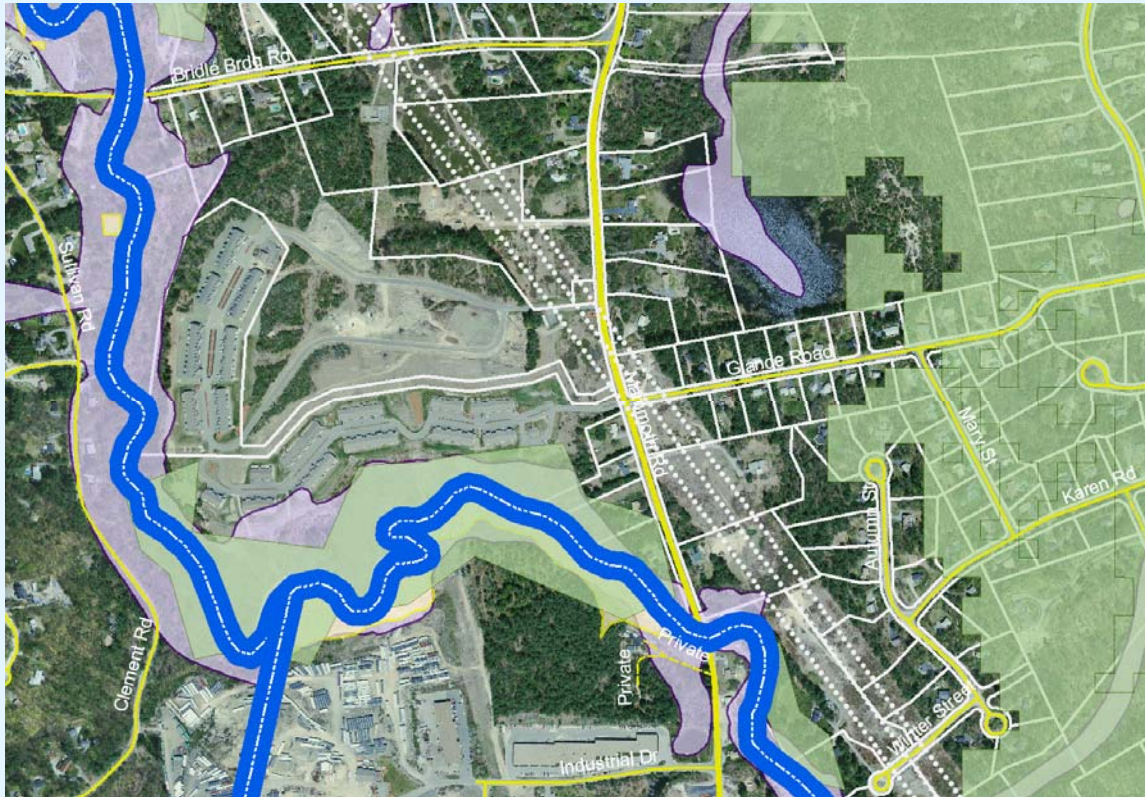


GIS for Municipal Applications







- Base imagery – 1 ft. color
- Town bounds
- Road centerlines
- Parcels
- Infrastructure

Using GIS for Master Planning




Natural Services Network:

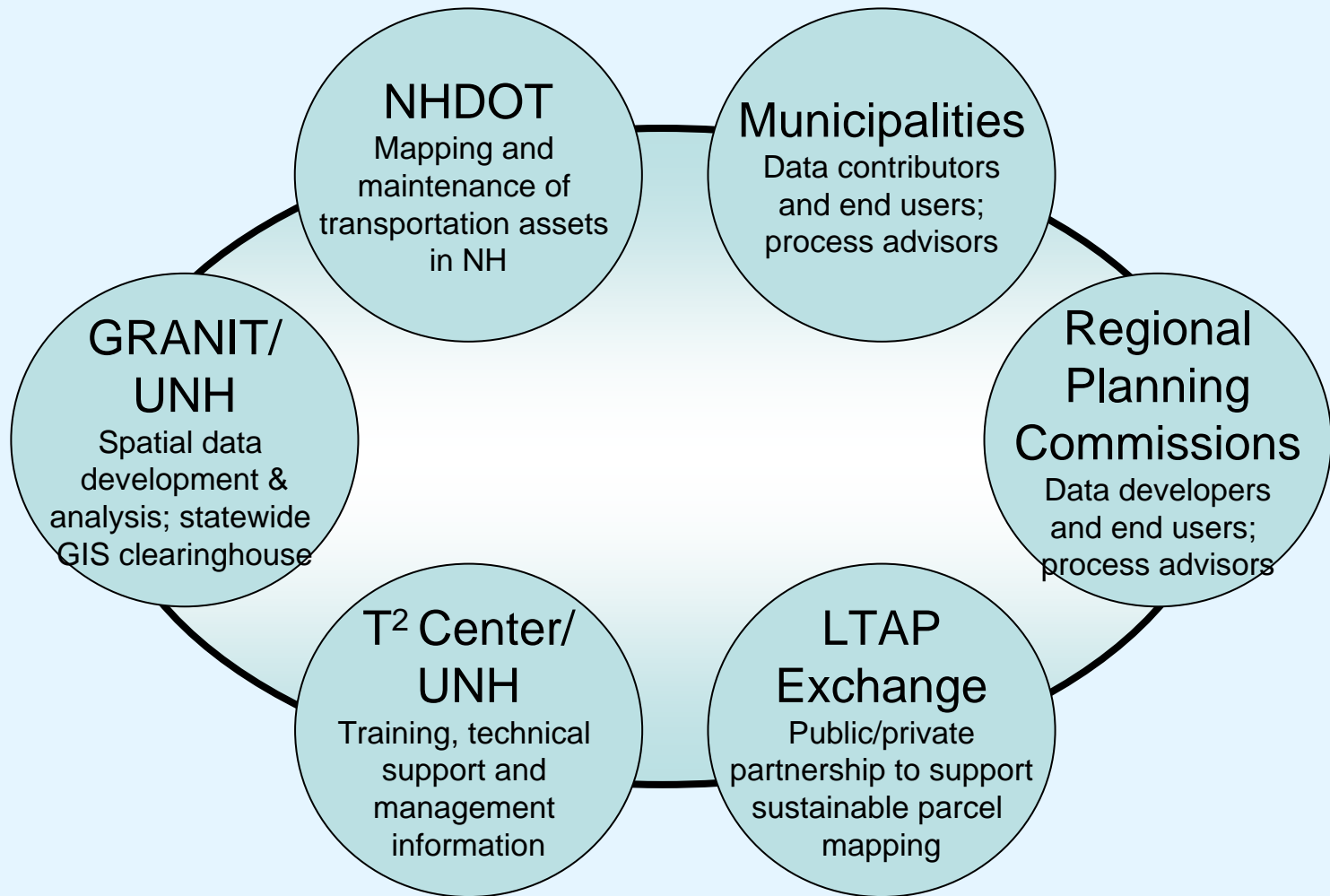
-  Water Supply Lands
-  Flood Storage Lands
-  Economically Important Soils
-  Important Wildlife Habitat

Base Mapping Approaches

1985:	DOT establishes Steering Committee to explore use of CAD; Purchases McDonald Douglas which later became GDS
1989/1990	Agreement signed with USGS to develop 1:24,000 DLG files, including roadway base mapping; +/- 40 feet
1996/1997:	DOT moves to ESRI platform for GIS mapping
1998/1999:	GPS technology introduced into DOT mapping protocols; +/- 10-15 feet
2003/2004:	DOT moves to sub-meter GPS technology; < 3 feet
2006:	High resolution aerial photography used to support mapping; Multiple data assets collected based on visible features



Municipal GIS Project



What is GRANIT?

Mission: To promote the efficient use of New Hampshire's diverse resources by utilizing spatial information in an effective way and by providing geographic information and related tools to citizens and organizations.

To accomplish this mission:

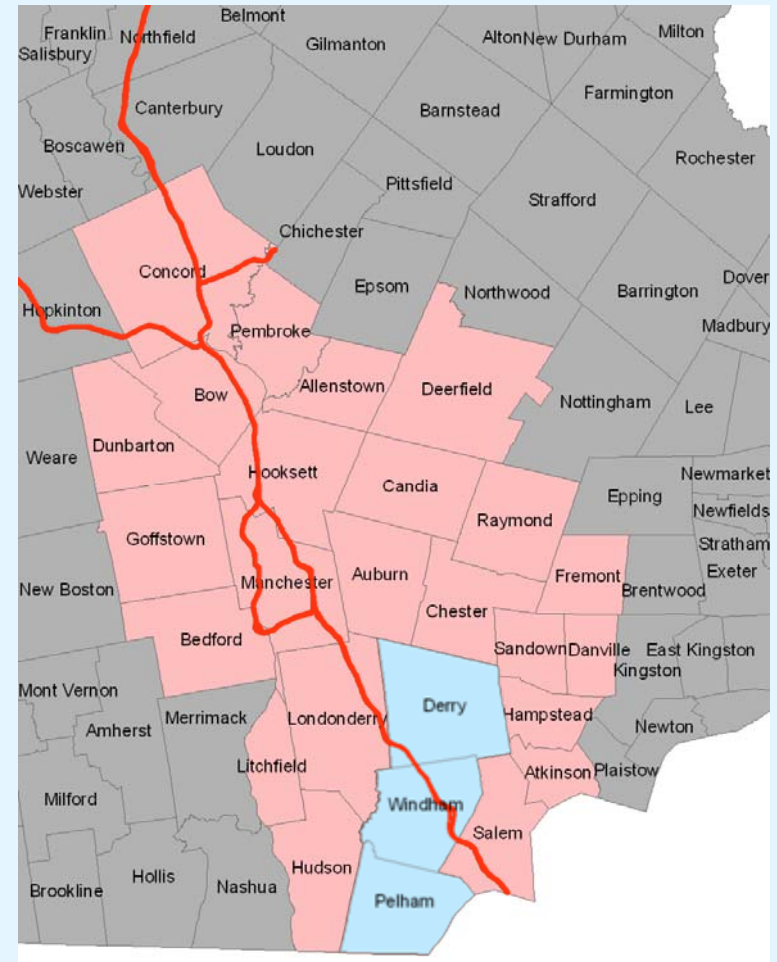
- Data development/archiving/distribution
- Coordination/standards development
- Applications/spatial analysis
- Training and technical support



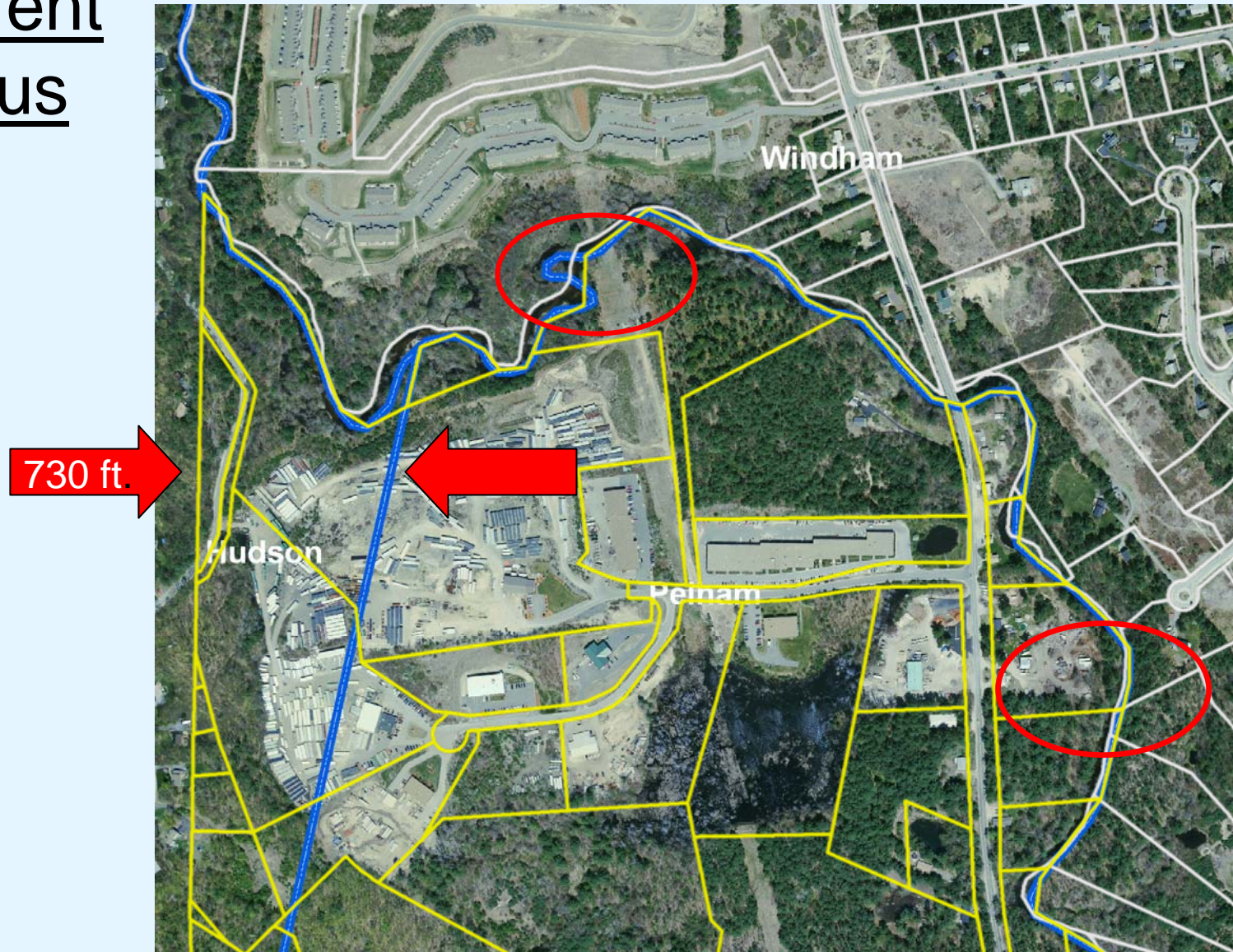
Project Overview

Work with 3 pilots towns to:

- Collect existing data and document “current conditions”
- Facilitate refinement of town boundary mapping
- Reconcile roads/parcels to high resolution imagery
- Create regional parcel mosaic
- Identify and document mapping issues

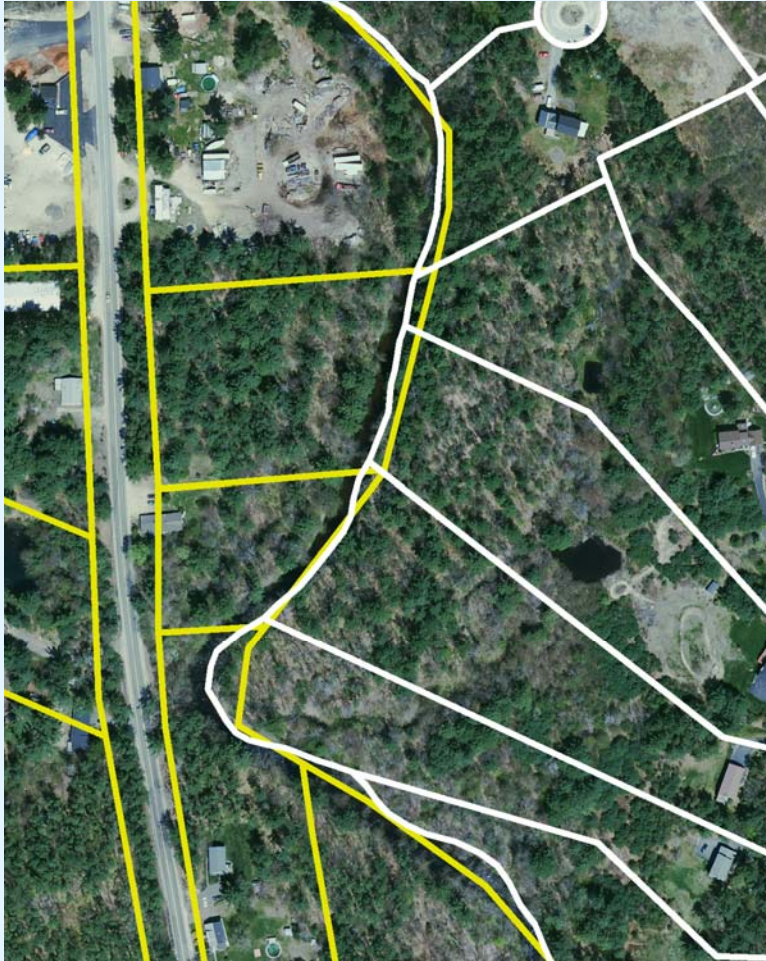


Current
Status



Parcel Mosaic

Before Edgematching



After Edgematching



GRANIT Town Boundary Monument Catalog

Home View Data Submit Data Related Resources Login

I forgot my user name...

Welcome to the NH GRANIT Town Boundary Monument Catalog, a statewide inventory of spatially referenced town monuments.

Objectives:

- Build, document, and maintain a GIS-based inventory of town boundary monuments in New Hampshire.
- Improve the accuracy of town boundary mapping in the state.

(c) National Oceanic and Atmospheric Administration/Department of Commerce

Please note that coordinates are required for all monuments.

Date of data collection: -
Please provide a 4 digit year.

Were you the original field data collector? Yes M

Method used to collect data: GPS M

GPS information:

GPS unit used: - Select GPS - M

Type of processing conducted: - Process Type - M

Estimated Positional Error (EPE) as reported on your receiver: - EPE - M

Towns sharing this monument: Hudson
Salem
Windham
Hold down the control key (PC) or option key (Mac) to select multiple towns.

Enter the local identification number for the monument, if any: M

Enter the local name for the

Data Mapper: <http://mapper.granit.unh.edu>

The screenshot displays the NH GRANIT DATA MAPPER web application. The interface includes a map, navigation tools, a 'TRANSPORTATION' theme selector, a 'Summary Road Report' window, and an 'Identify Results' window showing location coordinates and road data for Loudon Rd.

Summary Road Report
Date Generated: 03/27/2007

TRANSPORTATION
SELECT A THEME

Layer Menu

VISIBLE	ACTIVE	LABEL	LAYER NAME
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	Political Boundaries
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Roads
<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Bridges

Identify Results

Location

NEW HAMPSHIRE STATE PLANE COORDINATES	
X (FT)	Y (FT)
1030186	263206

Roads

RECORD	ROAD NAME	FUNCTIONAL CLASS	SYSTEM CLASS	LEGISLATIVE CLASS	PAVEMENT WIDTH	SURFACE TYPE	LENGTH (MI)
1	Loudon Rd	16	14	IV	60	4	0.4

LTAP Exchange:

Mission: To create innovative partnerships between the public and private sectors to create and provide affordable and sustainable solutions for municipal GIS mapping and public works asset management.

- **Sustainability Partners**

- Private: Software and website developers, field hardware suppliers, GIS and tax assessment professionals, road / traffic / safety consultants
- Public: DOT, GRANIT, T² centers, RPCs, CTAP, partner towns, other state and federal agencies

- Sustainable Municipal GIS Services
 - LTAP Exchange has put together partnerships with several providers to offer affordable, easy to use, online, municipal GIS services
 - Municipal GIS website acts as the central hub for up-to-date parcel and tax card data
 - Online permit systems provide trigger for map updates whenever parcel boundaries are modified or change ownership
 - Custom query / reporting features reduce repetitive “in house” town hall tasks and allow GIS system to be used as a central database application

- Municipal GIS Interface

Town of Epping (FEET)

Overview Map

Auto-Reporting

Automatic Reporting

Reporting Mode:
Smart Reporting

Selection Sets

Filter Show All

Show Available Reports

Zooms Create New Selections

Query Portal

Map Legend

Google Earth

Google Earth

System Menu

--- Quick Site Selection Tool ---

Layers




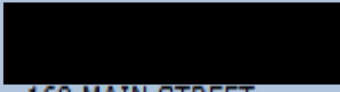



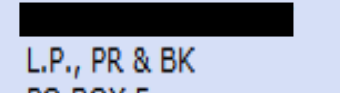



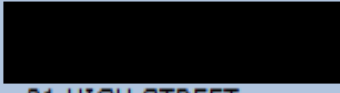



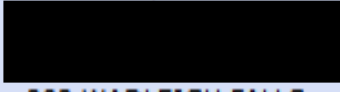
- Physical
 - MiscPlani
 - Walls and Fences
 - Building Footprint
- Utility-Easement
- Political
- Parcel
- Transportation
 - Driveways
 - Right of Way
 - Major Highways
 - Trails
- Hydrology
 - rivers

Properties

Name	Value
AREA	11101.728456
BLDG_NUM	
BLOCK	
FEATURE_ID	
FeatId	1182
LOT_NUM	158
MAP_NUM	22
PARCEL_	1183.000000
PARCEL_ID	7681.000000
PERIMETER	423.180216

X: 1144766.619958, Y: 199049.8912 | 1 feature selected | 1: 5224.39 | 3718.75 x 2095.20 (ft) | Powered by MapGuide

- Sustainable Municipal GIS Services
 - Map selections (e.g. individual parcels or buffer zones) allow for quick queries, links to tax card data (towns can limit user rights), generation of abutters lists to auto-fill permit applications

  	 169 MAIN STREET EPPING, NH 3042	MAIN STREET 2045 Map 29 Block 132 Lot Unit3400 4477/0737	05/09/2005 \$65,000.00
  	 L.P., PR & BK PO BOX F EPPING, NH 3042	MAIN STREET 2044 Map 29 Block 131 Lot Unit1040 4179/1836	10/24/2003 1A \$0.00
  	 21 HIGH STREET HAMPTON, NH 3842	MAIN STREET 2043 Map 29 Block 130 Lot Unit1050 3513/0853	10/23/2000 \$0.00
  	 283 WADLEIGH FALLS	MAIN STREET 2042 Map 29 Block 129 Lot Unit1110 4400/1841	11/24/2004 \$318,000.00

- Online Permit Applications (coming soon)

LTAP Exchange

[Home](#) [Permits](#) [Administration](#)

[Home](#) / [Submit Permit](#) / [Submit Permit Application](#)

Submit Work Permit - Electrical

Please fill out all pertinent data regarding the permit. Required fields are marked with (*)

The City/ Town of Epping, New Hampshire Application:

Owner Info

Date Submitted: Mar 30, 2007

Permit Number

Owner Name

Phone number

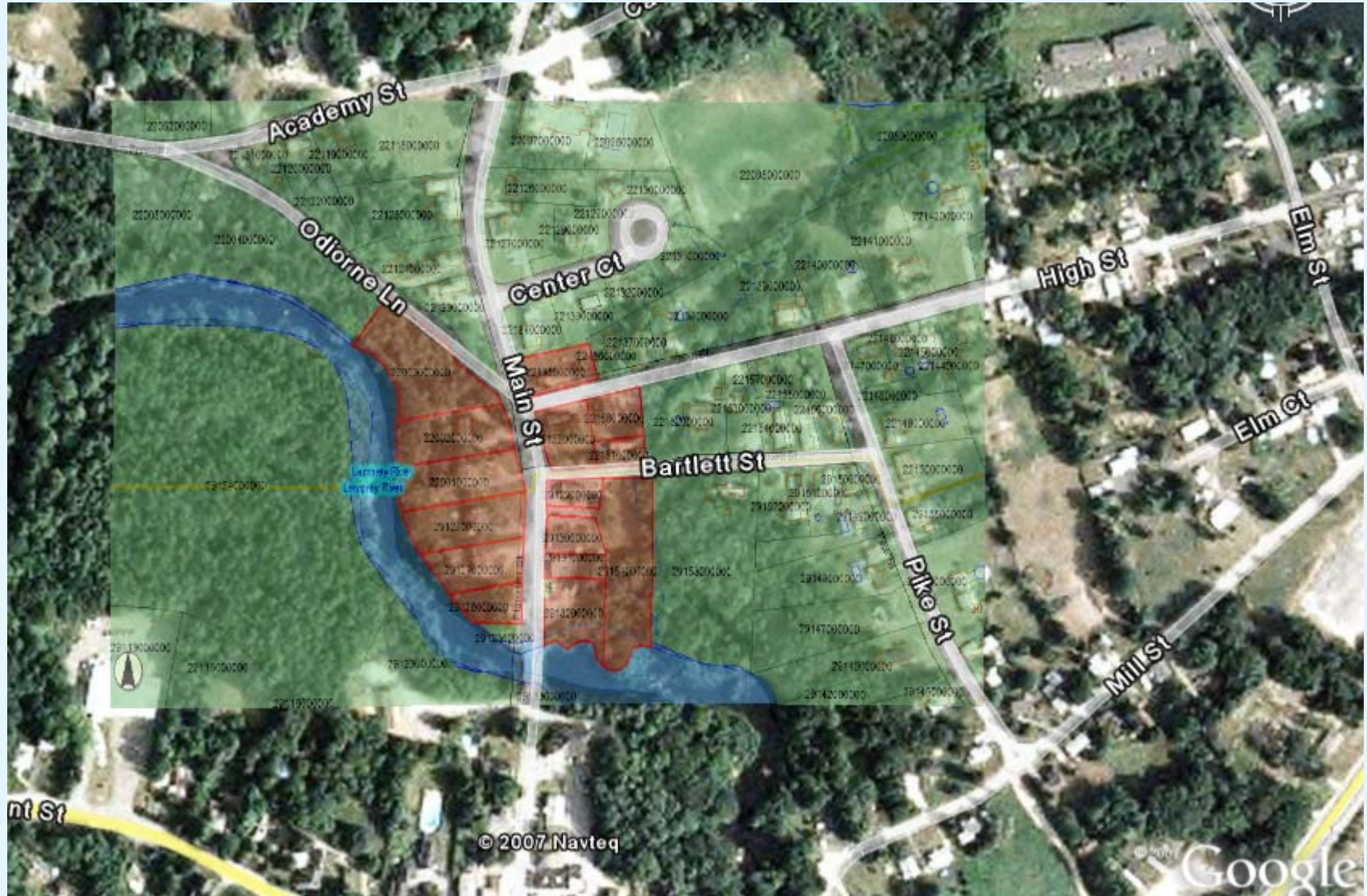
Email (for your receipt)

Address

- [Permit Forms](#)
- [Building Permit](#)

- Online GIS Services – Other Features
 - Town sites can act as an online kiosk for consumers, retailers, citizens, real estates
 - Search for recently sold properties, properties for sale
 - Add in searches for specific retailers
 - Links to Google Earth
 - Online asset condition storage for public works managers and town administrators
 - Use in conjunction with LTAP Exchange PWS data collection and assessment software (next)
 - Create presentations showing roadway, drainage, and other conditions, current and pending work areas

- Google Earth link example



- **Online GIS Services – Overall Goals**
 - Provide affordable, easy to use, services that:
 - Pay for themselves through increased efficiency
 - Promote data consistency and sustainability within towns and at regional and state level
 - Provide online tools that benefit municipal managers, employees, citizens, consumers
 - Ease town, regional, and state level planning

 - Next: Public Work Asset Management Tools
 - Developed by LTAP Exchange in partnership with UNH T² Center

UNH Technology Transfer Center:

Mission: To improve road managers' and crews' knowledge of technology and management through education and training, a quarterly newsletter, technical assistance, and other forms of technology transfer.

- Training: Workshops and Seminars
 - Over 3000 people have taken classes
 - Roads Scholar Program
- Quarterly Newsletter
 - Over 1100 readers
- Information Services
 - Library & other formats

Public Works Town Services:

- Roads
- Road Signs
- Stormwater drainage

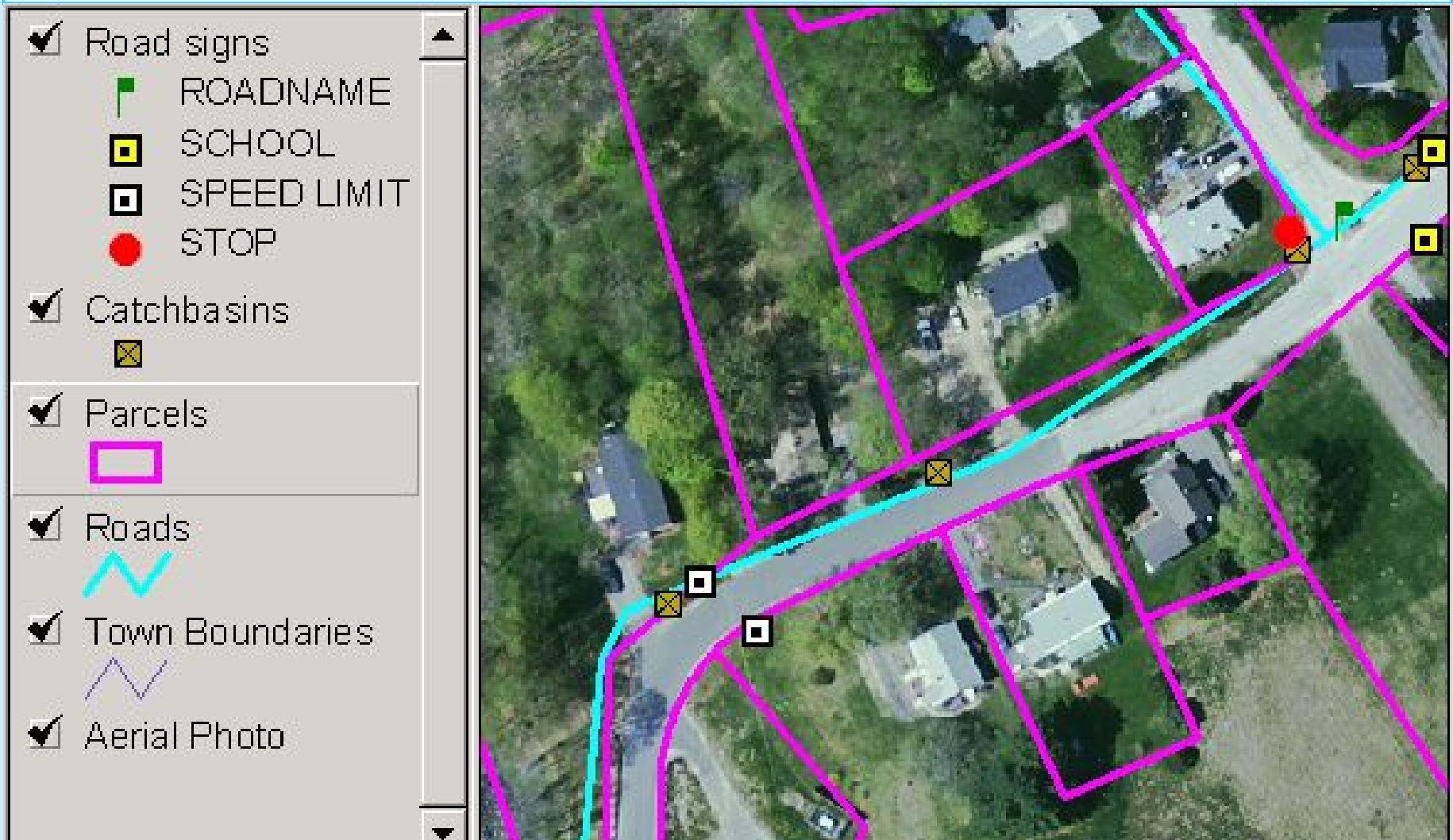
Assets

Each is an interconnected system (network) within itself AND with each other.

- They work together to provide safe and effective transportation to the public.
- They need to be managed together to be cost effective and with the lowest impact to users.









How to manage 3 systems together?

Use a map to tie them together by location



The screenshot displays a GIS mapping application interface. On the left is a legend panel with a scroll bar, and on the right is an aerial photograph map with various data layers overlaid.

Legend:

- Road signs
 -  ROADNAME
 -  SCHOOL
 -  SPEED LIMIT
 -  STOP
- Catchbasins
 - 
- Parcels
 - 
- Roads
 - 
- Town Boundaries
 - 
- Aerial Photo

Map:

The map shows an aerial view of a residential area with several houses and trees. Overlaid on the map are:

- Parcels:** Pink outlines delineating property boundaries.
- Roads:** Cyan wavy lines representing road networks.
- Road Signs:** A green flag (ROADNAME), a red circle (STOP), and several yellow squares with black borders (SCHOOL).
- Catchbasins:** Yellow squares with black borders and a cross (CATCHBASINS).
- Town Boundaries:** Purple wavy lines.

With parcel data:

- Obtain the owner info for access permission or notification of upcoming work.
- Show the address of adjacent owners.

The screenshot displays a GIS application interface. On the left is a legend with the following items checked:

- Road signs
 - ROADNAME (green flag icon)
 - SCHOOL (yellow square icon)
 - SPEED LIMIT (black square icon)
 - STOP (red circle icon)
- Catchbasins (yellow square with 'X' icon)
- Parcels (pink rectangle icon)
- Roads (cyan wavy line icon)
- Town Boundarie (purple wavy line icon)
- Aerial Photo

The main map area shows an aerial view with pink parcel boundaries. Parcel numbers 29142 and 29143 are visible in yellow. A cyan road line is also present. A light blue speech bubble points to parcel 29143 with the text: "Owner has granted a right-of-way for storing snow piles".

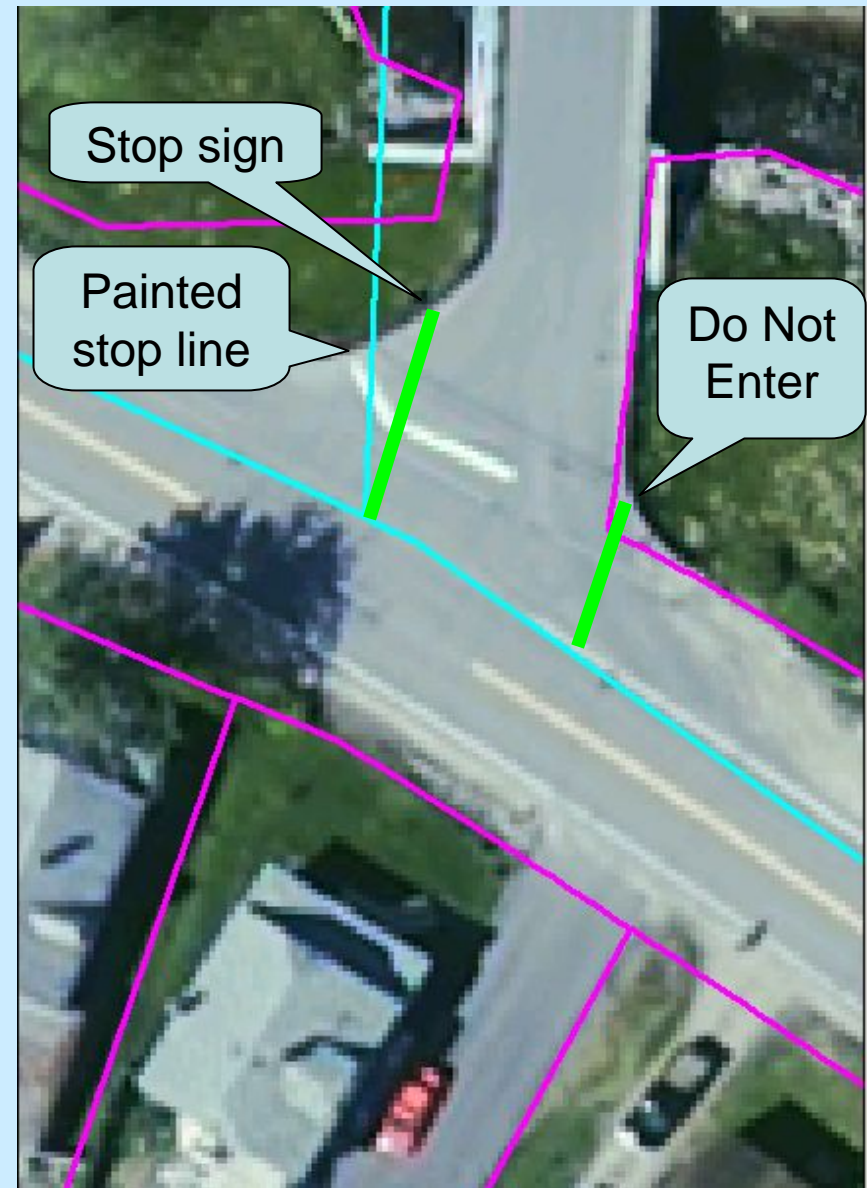
An "Identify Results" window is open in the foreground, showing the following information:

Layer	Feature Name	Attributes
1: Parcels - 29143	GERRY DONNAL	Map 29 Block 143 Lot Unit 29143

Buttons for "Clear" and "Clear All" are visible at the bottom of the Identify Results window.

Locating Assets:

- 1) Use the aerial photos
- 2) Use the distance to the road centerlines (state then local):
- 3) Use the parcel data ('at edge of driveway to 323 Mill St')



Tools for Asset Management:

- RSMSvis – road surfaces (July 2007)
 - Inventory roads and their conditions
 - Create a 10 yr budget plan comparing different funding levels and road network condition
 - Record maintenance history
- SIMSvis – road signs (Summer 2007)
 - Sign inventory, conditions, maintenance history
- DrainVis – stormwater management (June 2007)
 - Inventory, condition, maintenance history
- PWS Tracker – custom data collector (June 2007)
 - Collect the data you want, not what the program tells you

All work on a common map-based framework

T² provides:

- User training and technical support
 - Workshops for
 - PWMS suite: RSMSvis, SIMSvis, Drainvis, Tracker
 - Permitting system training for:
 - Town employees and Boards
 - Public users (live, recorded, and online)
 - Power Users (realtors, developers)
 - Technical support by:
 - Visit
 - Email
 - Telephone

Questions??

Contact	Phone	Email
Glenn Davison	603-271-7145	gdavison@dot.state.nh.us
Fay Rubin	603-862-4240	fay.rubin@unh.edu
Sean McNamara	603-817-5775	smcnamara@ltapexchange.net
Bob Strobel	603-862-4348	robert.strobel@unh.edu