



DESKTOP INVENTORY OF WATER WELLS

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NH Geological Survey

OVERVIEW

- **PROGRAM HISTORY**
- **USERS AND USES OF THE DATA**
- **INVENTORY PROCEDURES - THEN AND NOW**
- **DESKTOP METHOD: FIELD INVENTORY WITHOUT THE “FIELD”**

STATUTORY AUTHORITY

RSA 482B NH Water Well Board

Purpose – “... to protect and improve the general health and welfare of the people of the state of New Hampshire; to protect the groundwater resources of the state; to regulate the construction of water wells and installation of well pumps; to license water well contractors and pump installers; **to provide well records**; to create a water well board; and to provide penalties for the violations of this chapter.”

SECTION 482-B10

Record of Wells – Within 90 days after the completion of a well, a water well contractor shall provide the board with a record of the well containing such information as is required by rule.

Well Completion Report Form

Type and Use of Well

Date Completed

Depth to Bedrock

Length of Casing

Total Depth

Well Yield

Static Water Level

Simple Stratigraphic Log

Well Number _____ **State of New Hampshire**
(FOR DRILLER'S USE) **Water Well Board**
 PO BOX 95
 Concord, NH 03302-0095

This report must be submitted to the N.H. Water Well Board no later than 90 days after the completion of the well.

Well Completion Report
 Special Notes on Back

Staff Use Only
 ID# _____ Elev _____
 Quad _____
 25,000 24,000
 Latitude _____
 Longitude _____
 GPS: Auton Corr

1. **Well Owner/Home Owner:** _____
 and/or _____ Name _____ Permanent Mailing Address _____

Building Contractor: _____
 _____ Name _____ Permanent Mailing Address _____

2. **Location of Well:** Town _____ Address _____
 Subdivision Name _____ Street No _____ Road Name _____
 Subdivision Lot No. _____
 Town Tax Map and Lot No: Map No. _____ Lot No. _____

3. **Date Well was Completed:** _____

4. **Proposed Use of Well:** Domestic Other (Explain) _____

5. **Reason for Constructing Well:** New Supply Replace Existing Supply Other _____

6. **Type of Well:** Drilled in Bedrock Drilled in Gravel Dug Other _____
(Screen Details on Back)

7. **Total Depth of Well:** _____ feet below land surface.

8. **Depth to Bedrock:** _____ feet below land surface.

9. **Casing Details:** Length _____ ft., Dia. _____ in., Material _____ Wt. _____ lb./ft.

10. **Method(s) of Sealing Casing to Bedrock:** Drive Shoe Drillings Grout Other _____

11. **Yield Test:** Bailed Pumped Compressed Air, for _____ hrs. at _____ GPM

12. **Static Water Level:** _____ feet below land surface. Date Measured _____

13. **Water Analysis:** Has the water been analyzed? Yes No If yes, where _____

14. **Well Log:**

Depth in Feet From	To	Water Bearing	Formation Description					Type
Ground Surface			<input type="checkbox"/> Sand	<input type="checkbox"/> Gravel	<input type="checkbox"/> Till	<input type="checkbox"/> Clay/Silt	<input type="checkbox"/> Bedrock	
			<input type="checkbox"/> Sand	<input type="checkbox"/> Gravel	<input type="checkbox"/> Till	<input type="checkbox"/> Clay/Silt	<input type="checkbox"/> Bedrock	
			<input type="checkbox"/> Sand	<input type="checkbox"/> Gravel	<input type="checkbox"/> Till	<input type="checkbox"/> Clay/Silt	<input type="checkbox"/> Bedrock	
			<input type="checkbox"/> Sand	<input type="checkbox"/> Gravel	<input type="checkbox"/> Till	<input type="checkbox"/> Clay/Silt	<input type="checkbox"/> Bedrock	
			<input type="checkbox"/> Sand	<input type="checkbox"/> Gravel	<input type="checkbox"/> Till	<input type="checkbox"/> Clay/Silt	<input type="checkbox"/> Bedrock	
			<input type="checkbox"/> Sand	<input type="checkbox"/> Gravel	<input type="checkbox"/> Till	<input type="checkbox"/> Clay/Silt	<input type="checkbox"/> Bedrock	

15. **Tested Yield:**
 If the yield was tested at different depths during drilling, list below.

Feet	GPM
_____	_____
_____	_____
_____	_____
_____	_____

Doing Business as _____ Company or Business Name _____
 Report Filed by _____ Licensee Signature _____
 Date of Report _____ License No. _____

Well Number _____

(FOR DRILLER'S USE)

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Water Well Board
PO BOX 95
Concord, NH 03302-0095

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 25,000 24,000
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10. Method(s) of Sealing Casing to Bedrock: Drive Shoe Drillings Grout Other _____

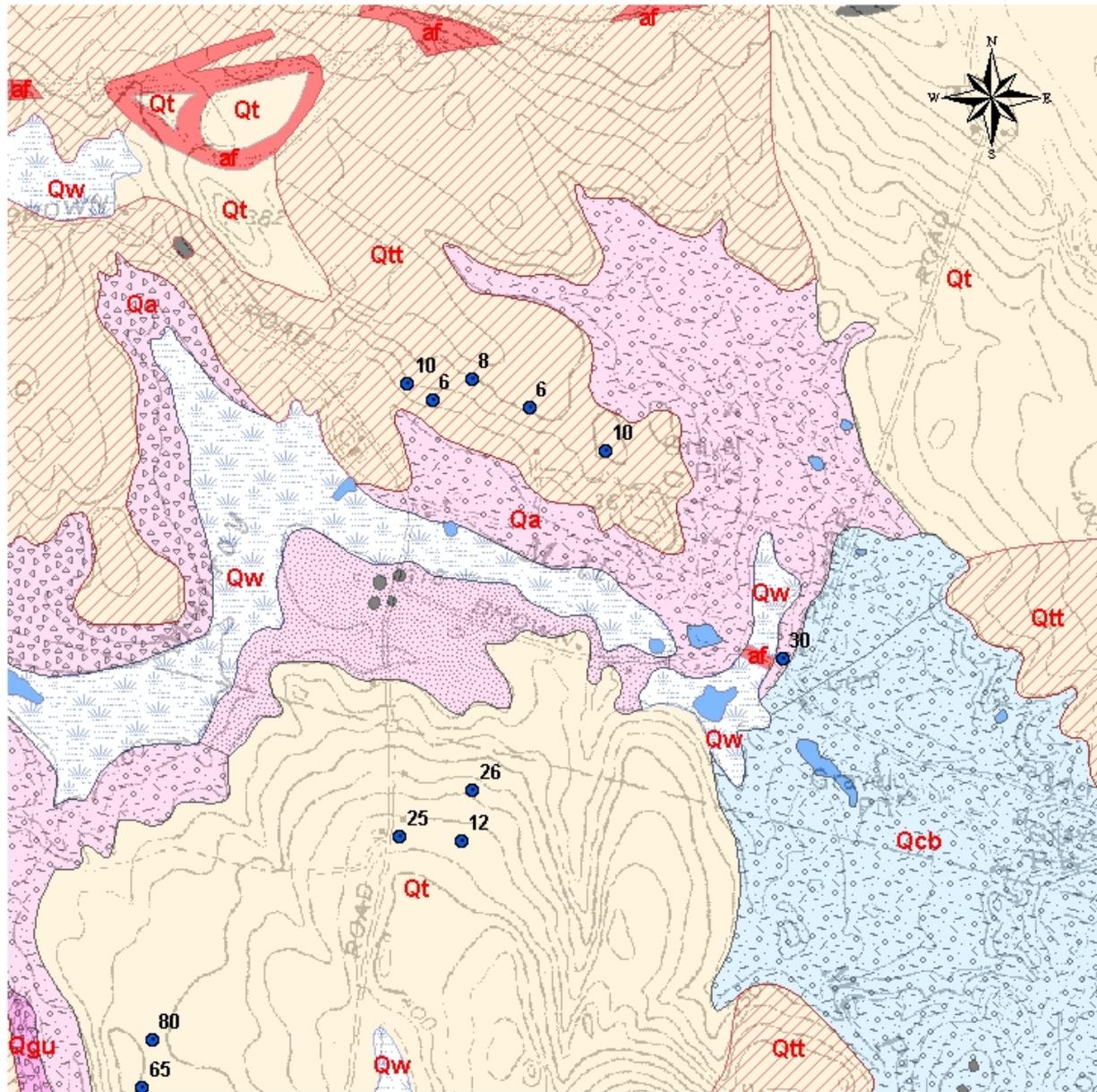
11. Yield Test: Bailed Pumped Compressed Air, for _____ hrs. at _____ GPM

12. Static Water Level: _____ feet below land surface. Date Measured _____

WELL INVENTORY DATA USERS

- **Home Owners**
- **Real Estate Agents/Mortgage Lenders**
- **Well Drillers and Pump Installers**
- **State Regulators**
- **Private Hydrogeologic Consultants**
- **Researchers**

Surficial Geology for Part of the Candia (166) Quad



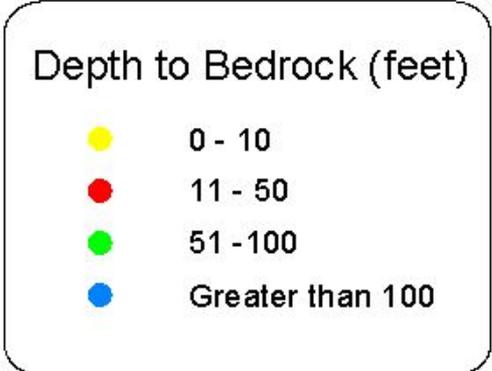
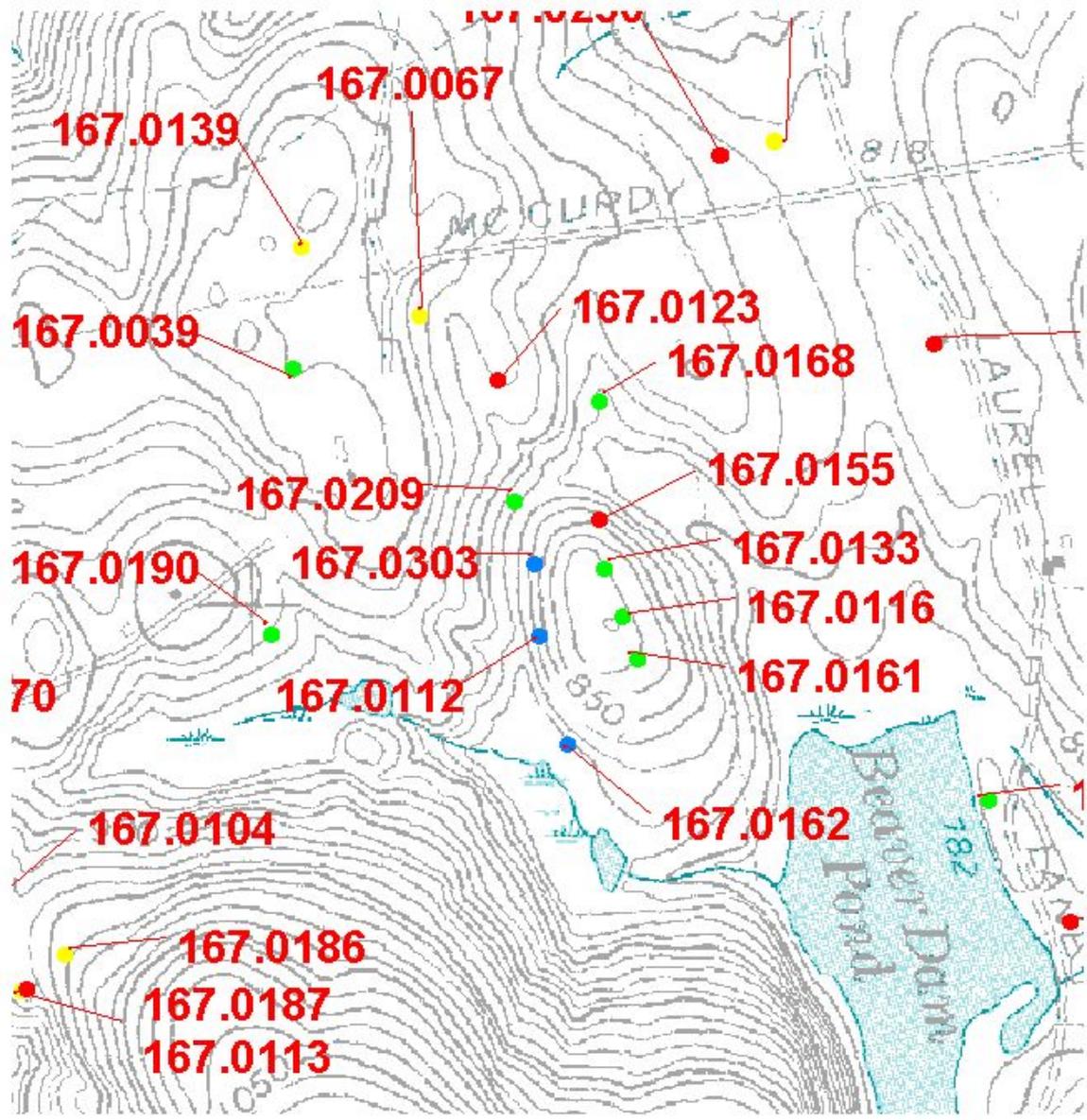
TEXTURE

-  Gravel
-  Mixed sand and gravel
-  Predominately sand, may include gravel
-  Sand, minor silt

SURFICIAL MATERIAL

-  Qa: Glacial Lake Auburn Deposits
-  Qcb: Cohas Brook meltwater stream deposits
-  Qgu: Uncorrelated stratified glacial deposits
-  Qt: Till
-  Qtt: Thin Till
-  Qw: Fresh water wetlands deposits
-  af: artificial fill
-  water
-  bedrock
-  Well Locations (Depth to bedrock - feet)



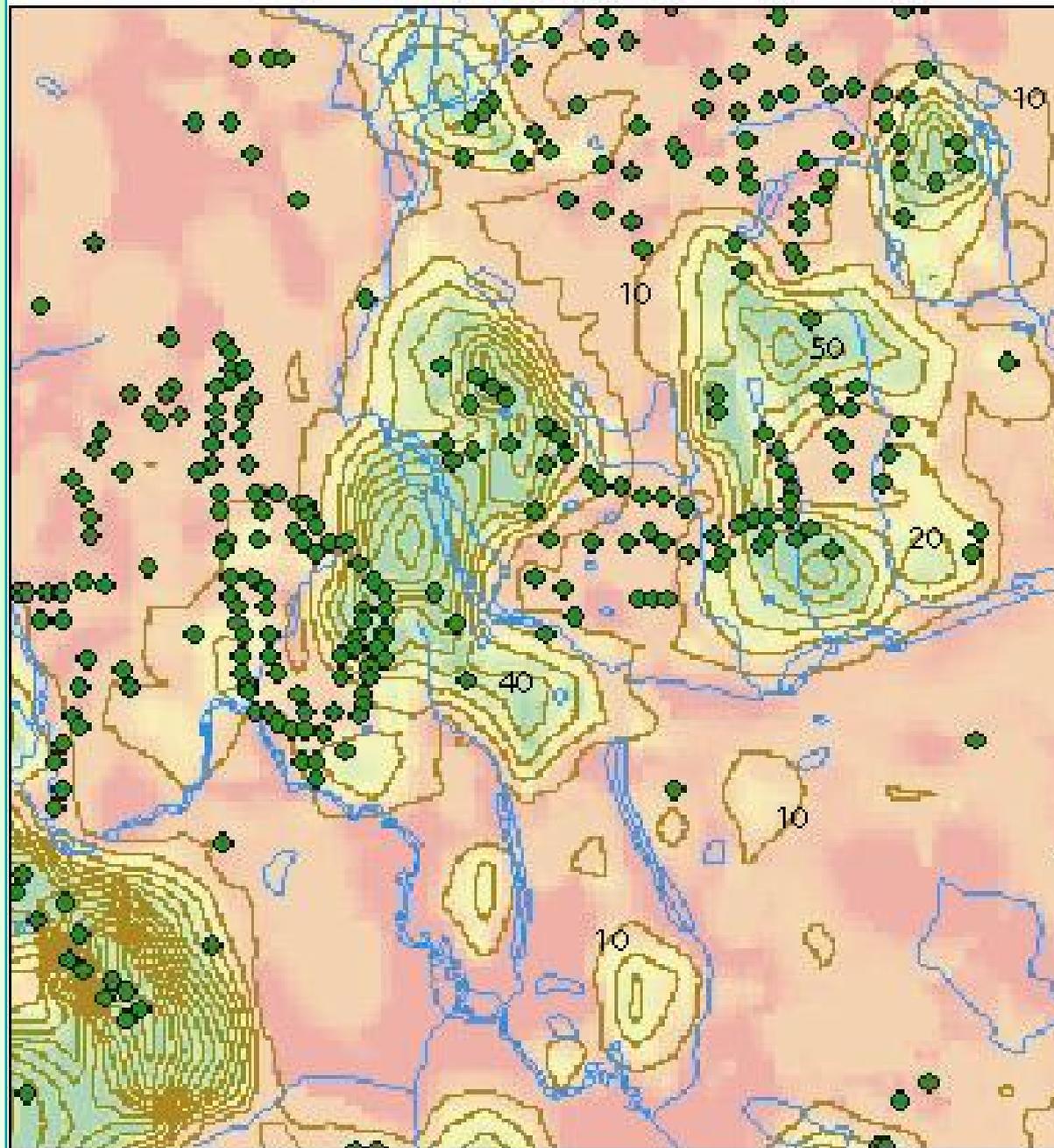


167.0095 - WRB#
(unique well identifier)

NH Geological Survey
Water Well Inventory
New Boston 7.5' Quadrangle



Estimated Overburden Thickness in part of the Pinardville, NH, quadrangle



Overburden Thickness

LEGEND

-  Thickest
- 
- 
-  Thinnest
-  Stream/pond
-  10-ft contour
-  Water well

SELF-REPORTED WELL LOCATIONS USING HANDHELD GPS RECEIVERS



SELF-REPORTING OF GPS COORDINATES

ADVANTAGES

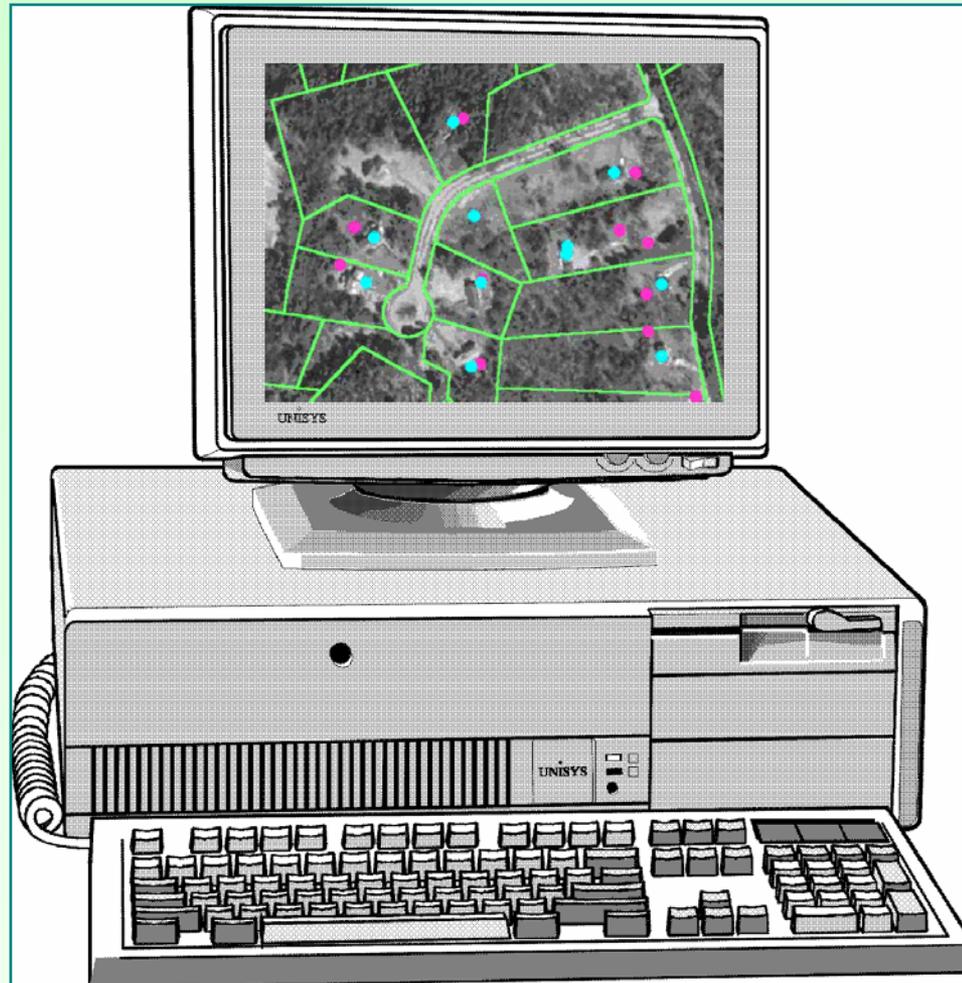
- **No cost to NHGS Well Inventory Program**
- **Minimum effort and expense required of water well contractors**
- **Potentially very accurate, assuming no selective availability**
- **No time lag between well reporting and georeferencing of well locations**

SELF-REPORTING OF GPS COORDINATES

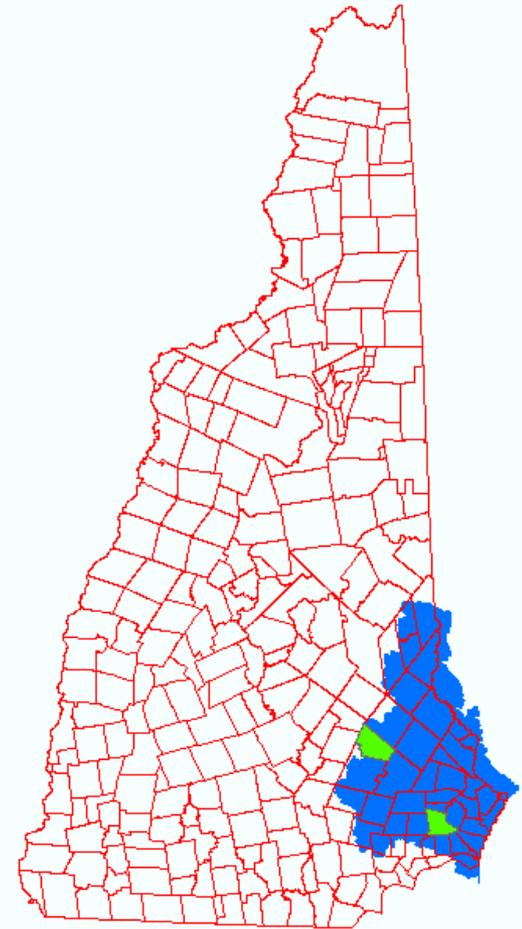
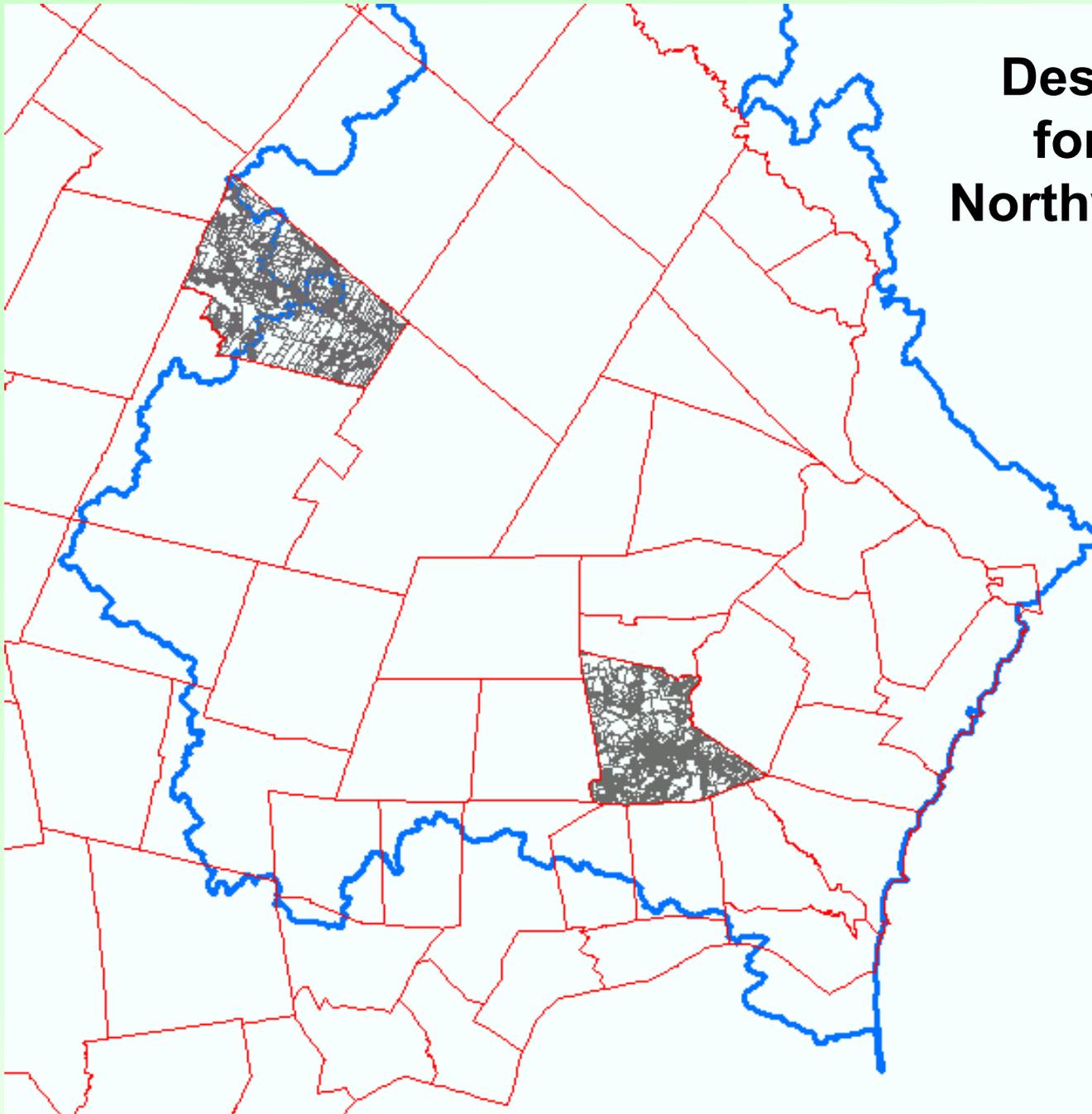
DISADVANTAGES

- **Requires all GPS receivers to have identical settings for datum and units**
- **Difficult to validate reported locations**

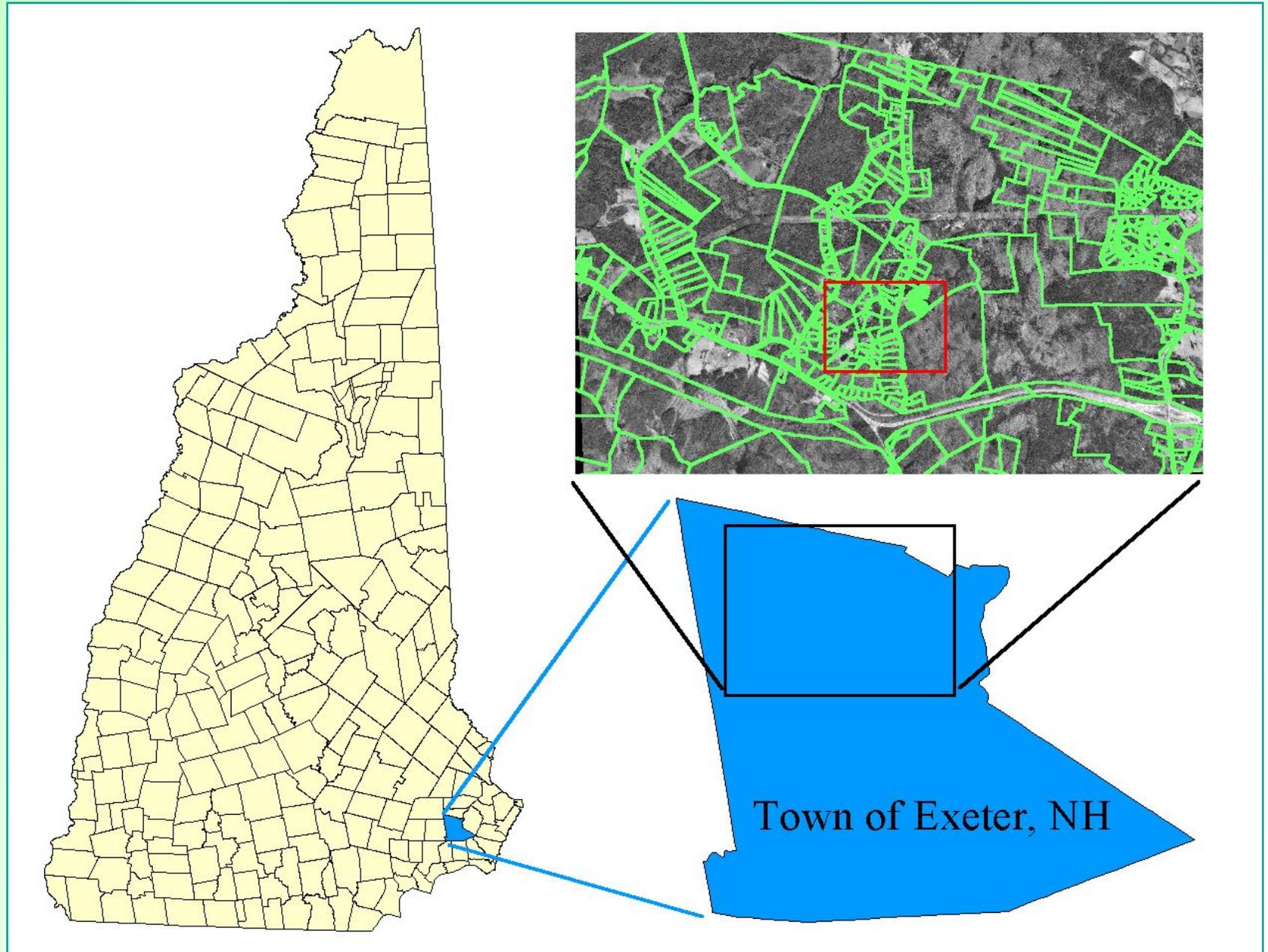
DESKTOP GIS METHOD FOR REMOTE INVENTORY OF WELL LOCATIONS

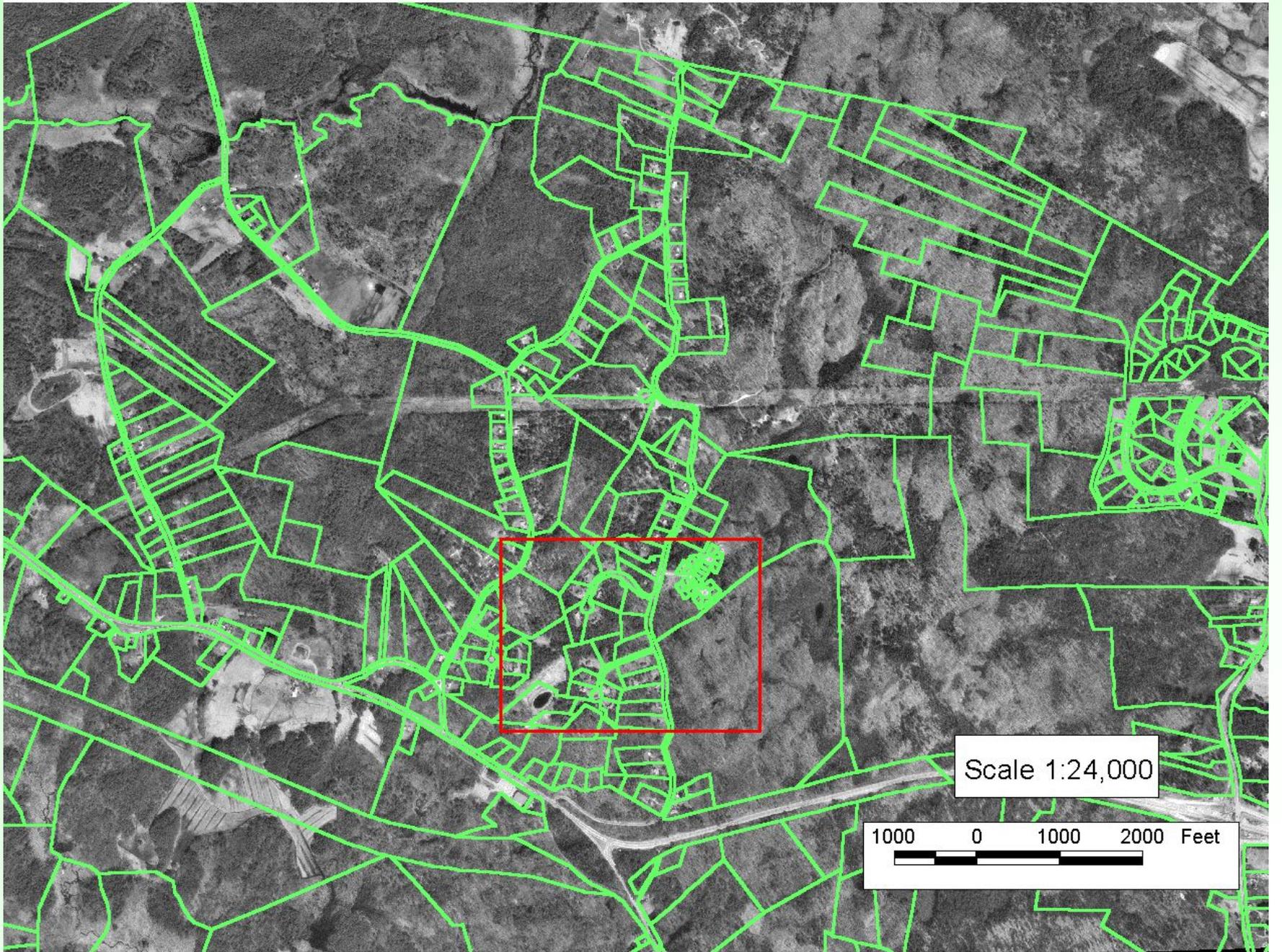


Desktop Inventory for the towns of Northwood and Exeter



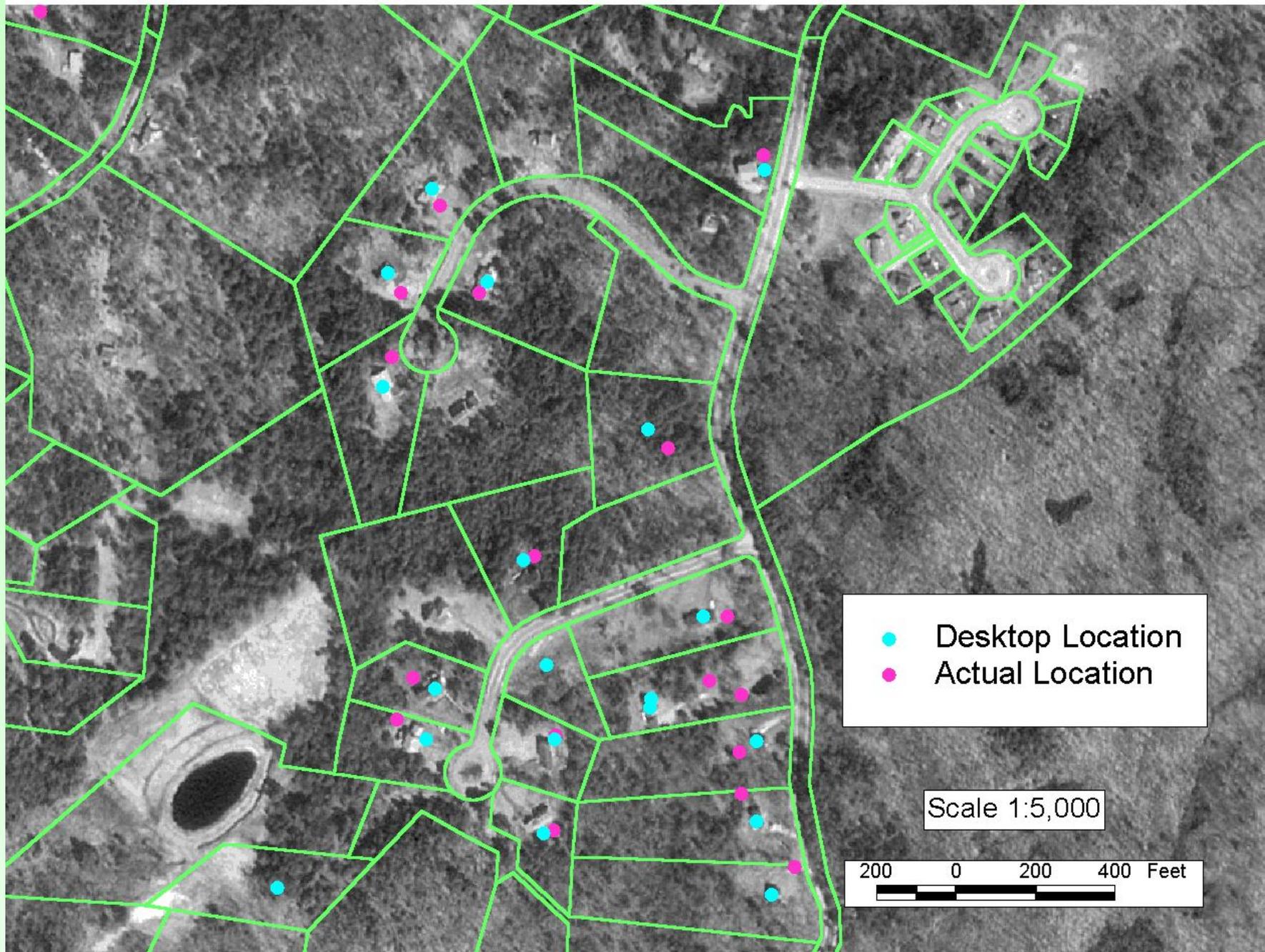
Desktop Method Example in the Town of Exeter





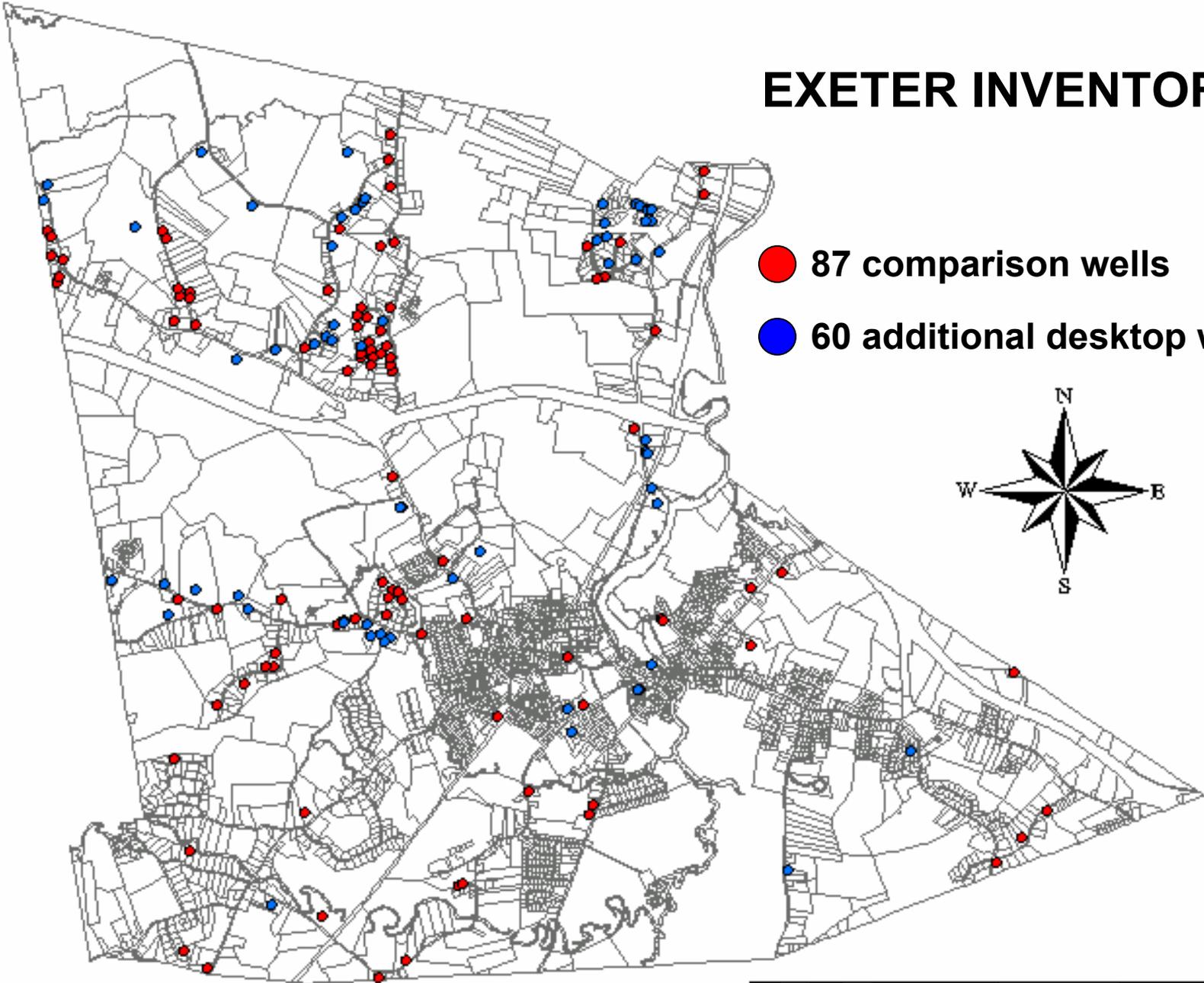
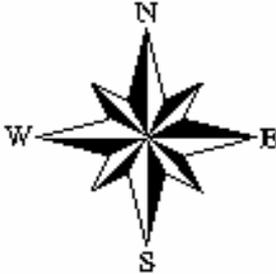
Scale 1:24,000





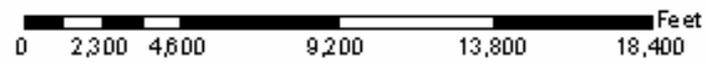
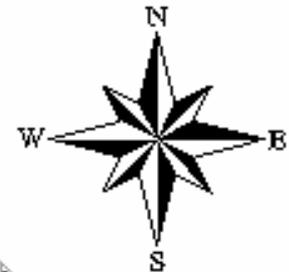
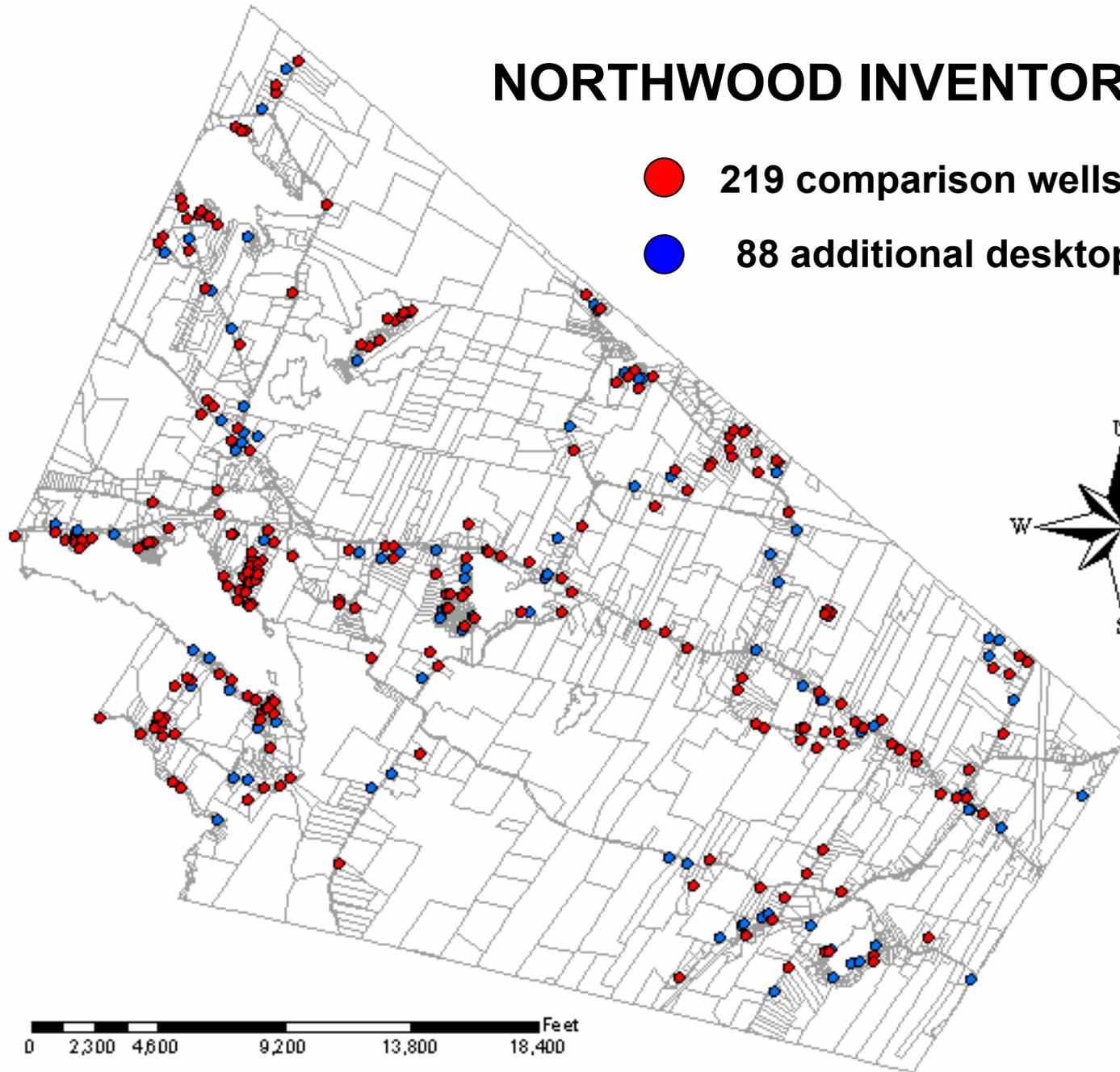
EXETER INVENTORY

- 87 comparison wells
- 60 additional desktop wells

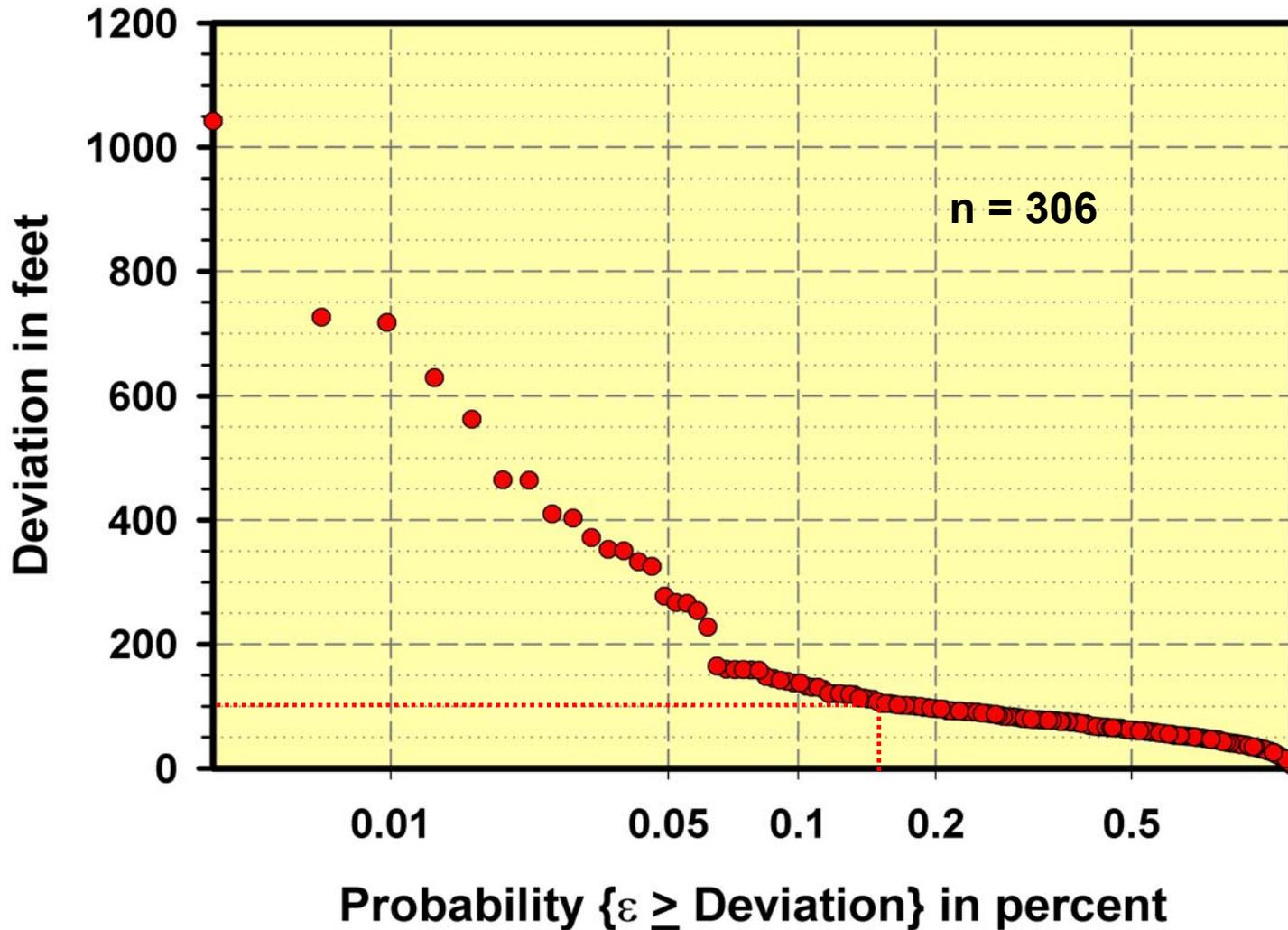


NORTHWOOD INVENTORY

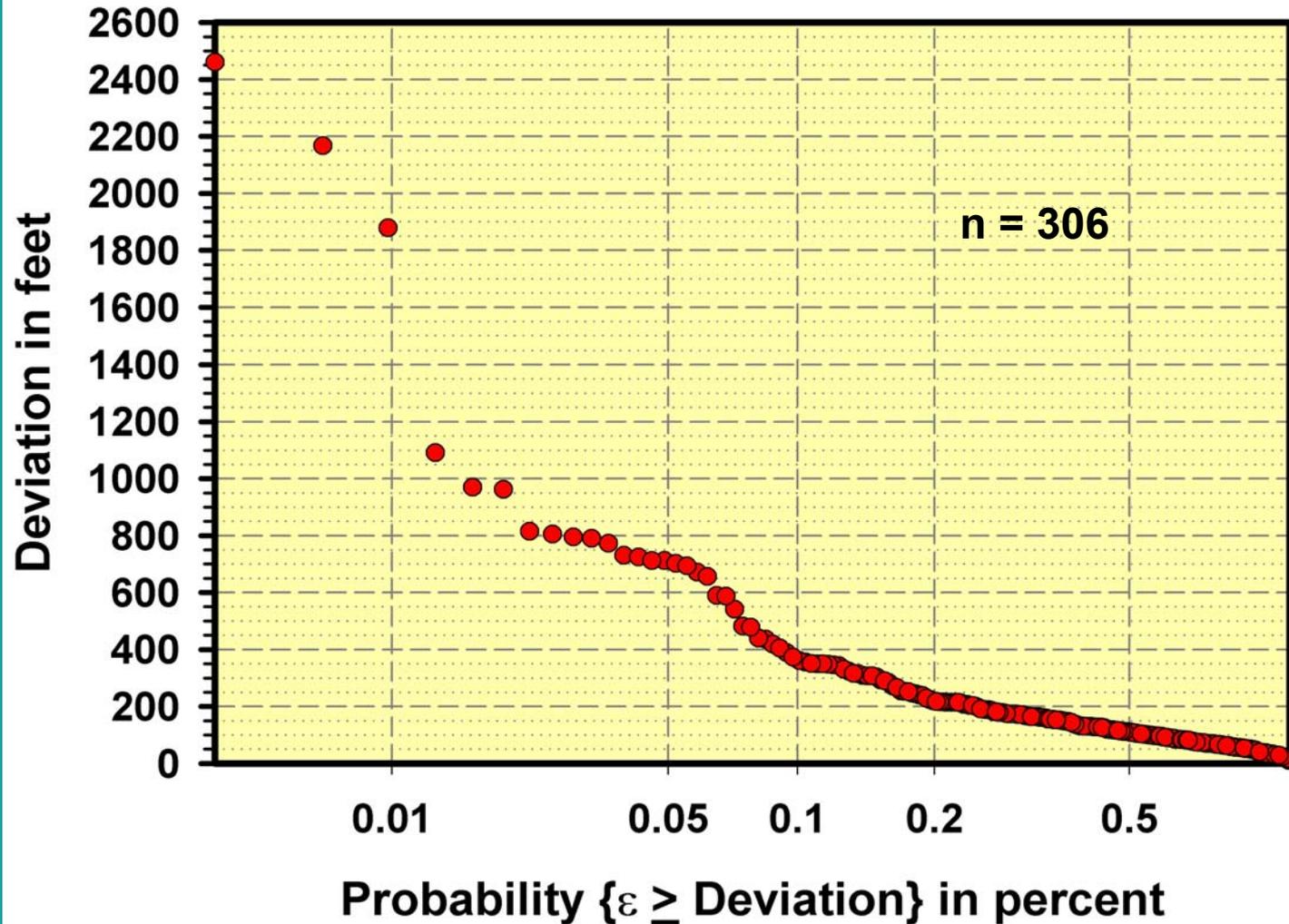
- 219 comparison wells
- 88 additional desktop wells



Exceedance Probability of Desktop Inventory Errors Orthophoto Interpretation Method

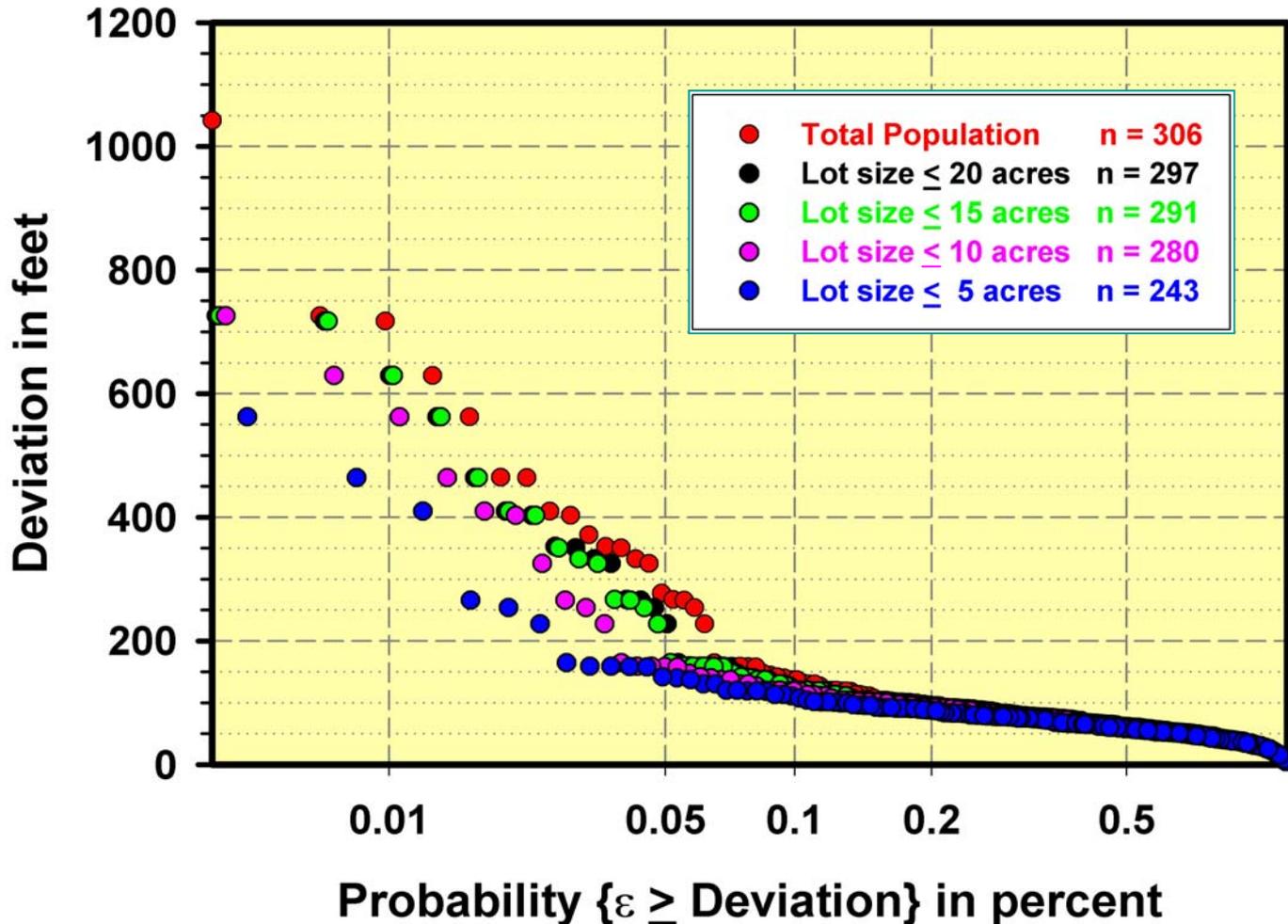


Exceedance Probability of Desktop Inventory Errors Centroid Method

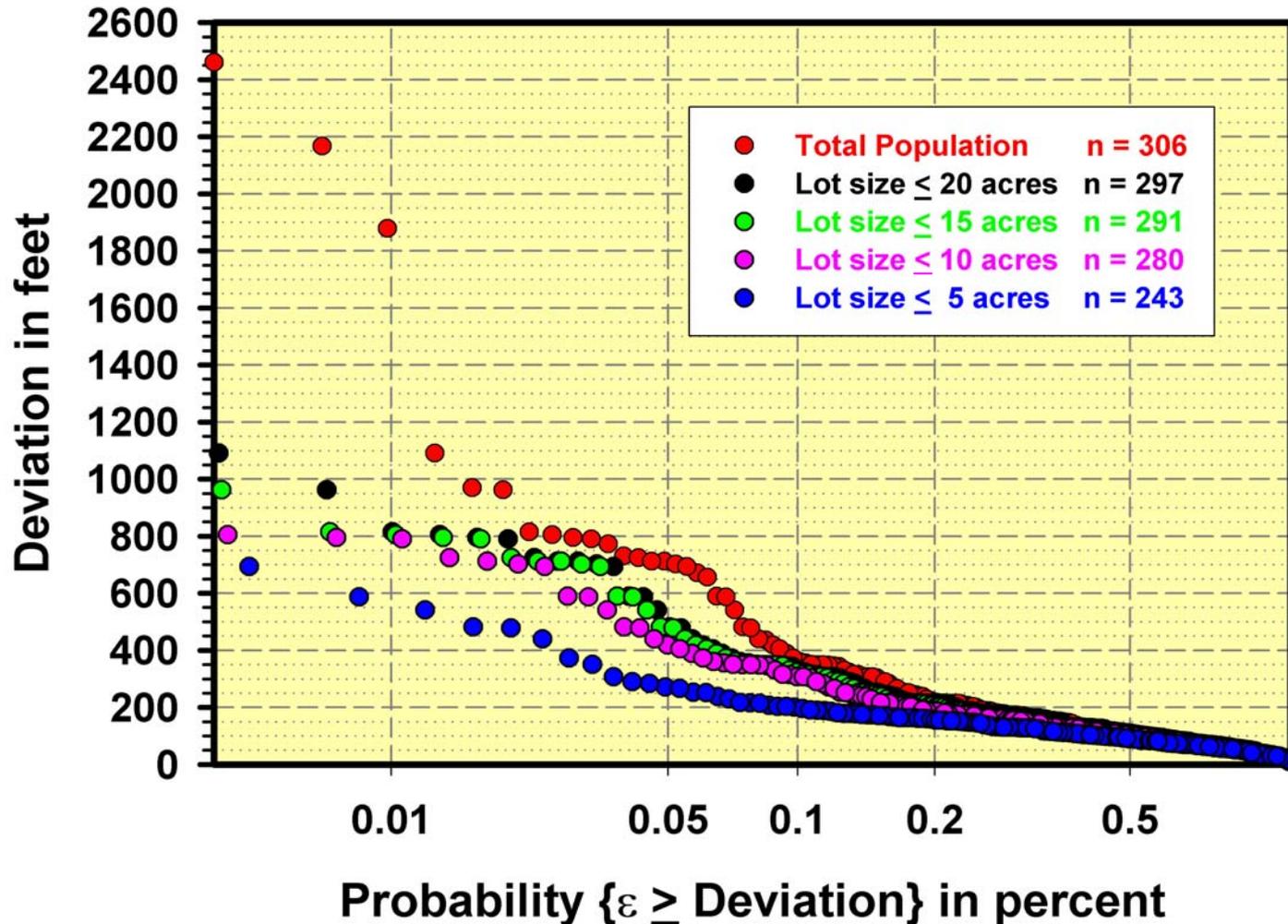


Exceedance Probability of Desktop Inventory Errors

Orthophoto Interpretation Method with Lot Size Limits



Exceedance Probability of Desktop Inventory Errors Centroid Method with Lot Size Limits

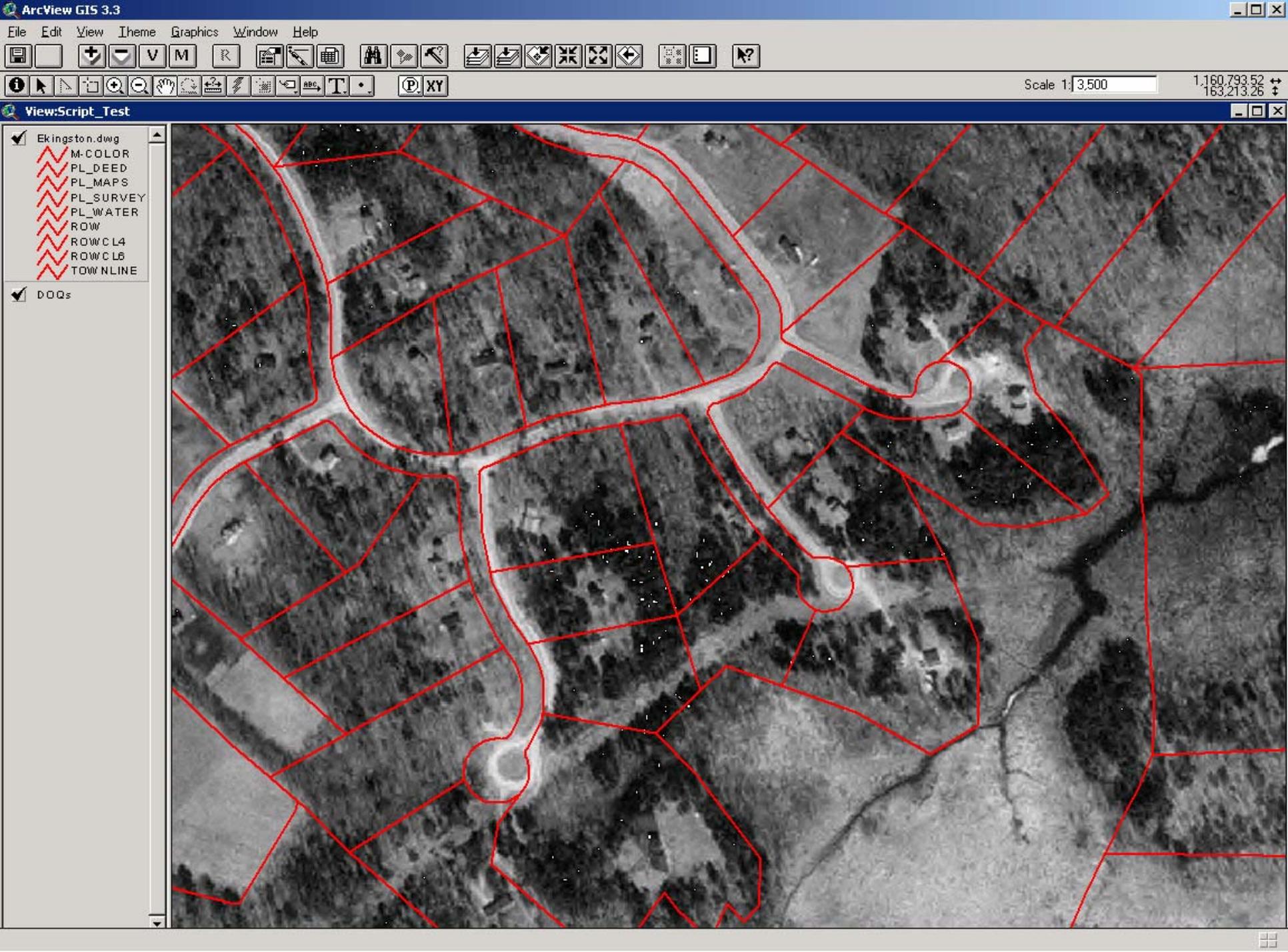


**Wells located on all parcels
(219 wells)**

**Wells located on parcels ≤ 5 acres
(165 wells)**



Check for significant changes in spatial distribution of data





- ✓ Ekington.n.dwg
- ✓ DOQs

Script:ShapeToGraphic

Name: Graphics.ShapetoGraphic

Title: Shape to Graphic Converter

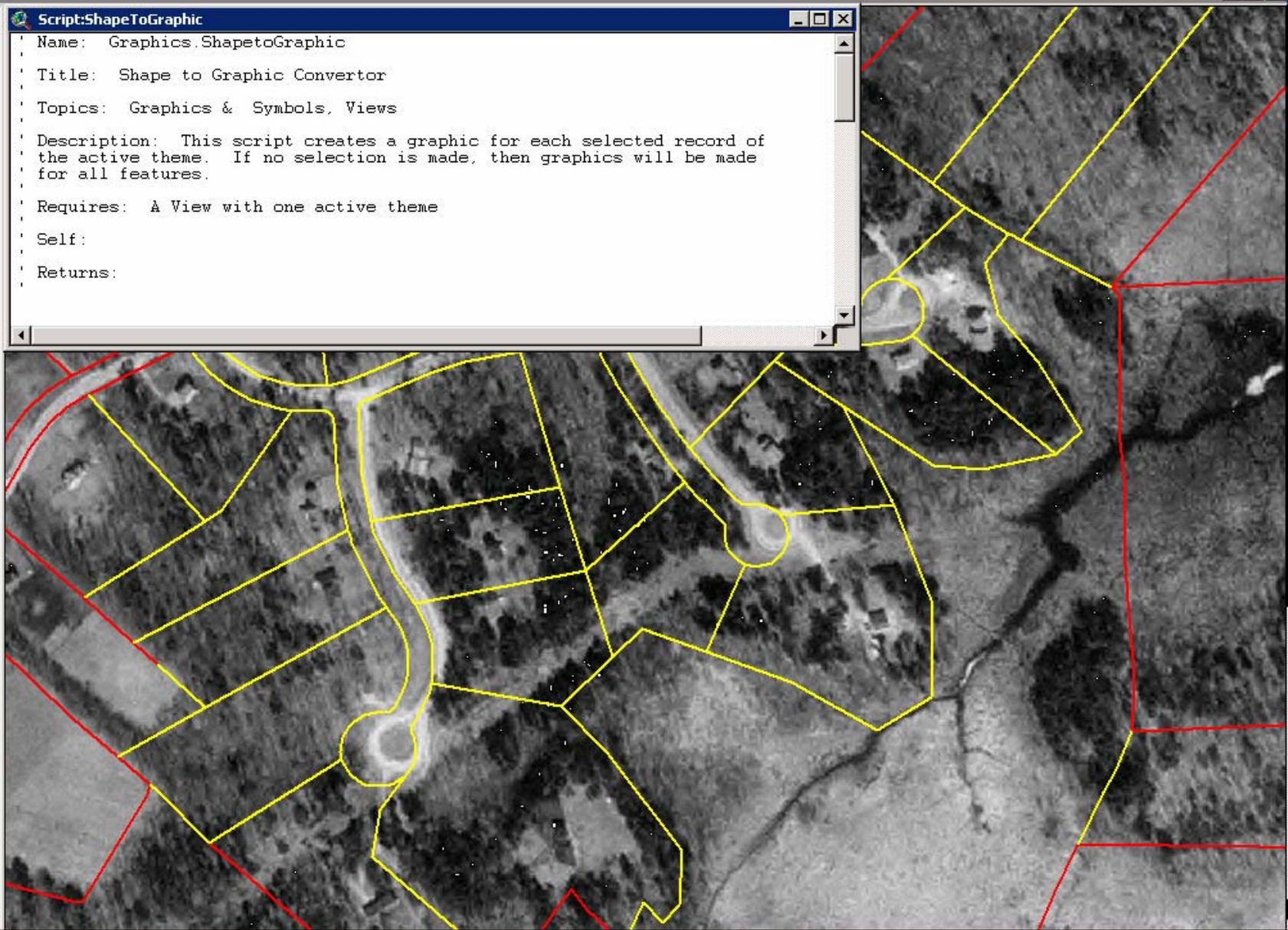
Topics: Graphics & Symbols, Views

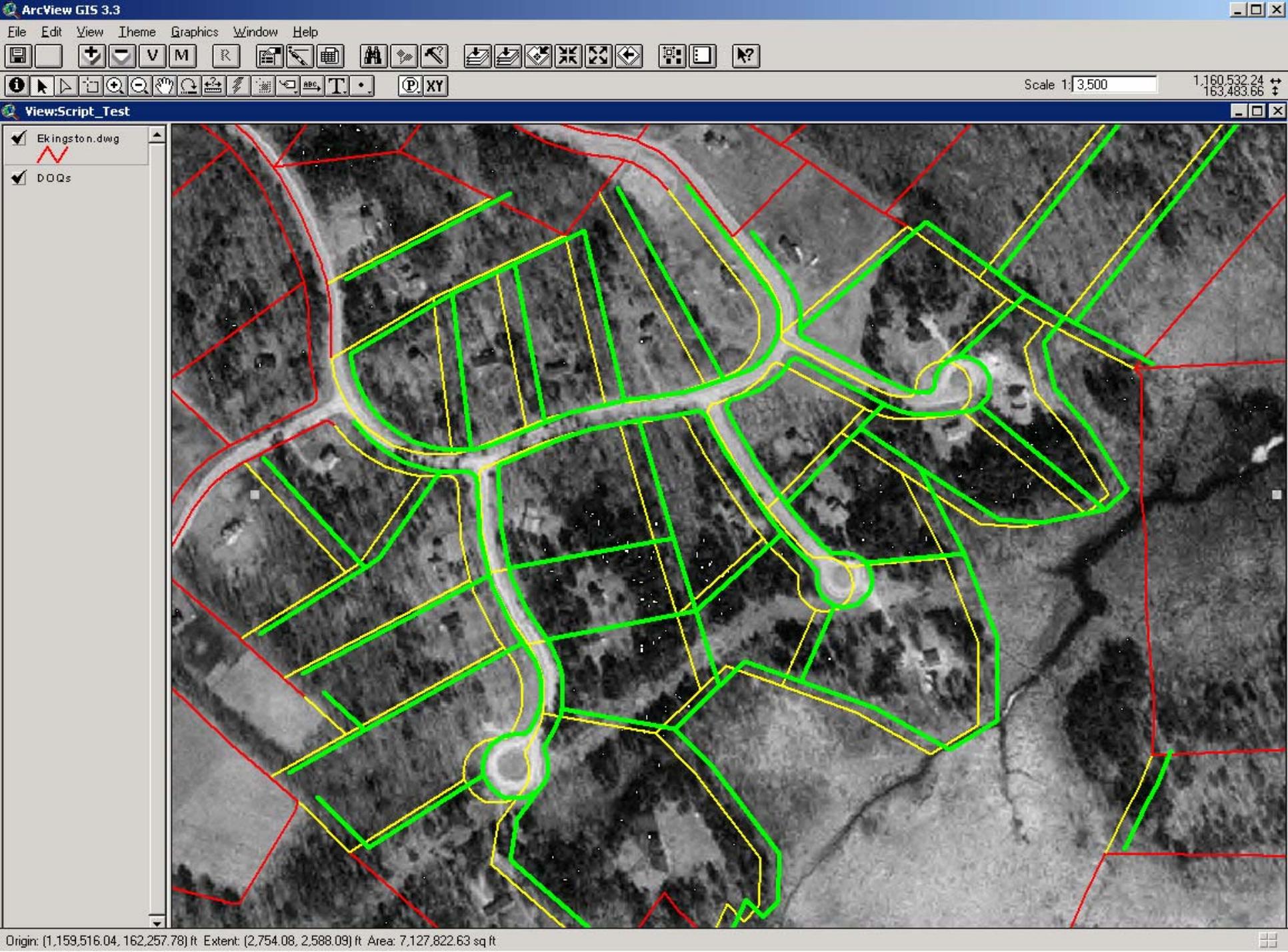
Description: This script creates a graphic for each selected record of the active theme. If no selection is made, then graphics will be made for all features.

Requires: A View with one active theme

Self:

Returns:





ArcCatalog - ArcInfo - H:\WMS\GIS\town_parcel\Northwood\AUTOCAD\PARCEL...

File Edit View Go Tools Window Help

Location: H:\WMS\GIS\town_parcel\Northwood\AUTOCAD\PARCELMAPS\tax_maps\NCOM

Stylesheet: FGDC ESRI

Contents Preview Metadata

Tax_Maps

- NCOMP.DWG
 - Annotation
 - MultiPatch
 - Point
 - Polygon
 - Polyline
- Nw101.dwg
- Nw102.dwg
- Nw103.dwg
- Nw104.dwg
- Nw105.dwg
- Nw106.dwg
- Nw107.dwg
- Nw108.dwg
- Nw109.dwg
- Nw110.dwg
- Nw111.dwg
- Nw112.dwg
- Nw113.dwg
- Nw114.dwg
- Nw115.dwg
- Nw116.dwg
- Nw117.dwg
- Nw118.dwg
- Nw119.dwg
- Nw120.dwg
- Nw121.dwg
- Nw122.dwg
- Nw123.dwg
- Nw124.dwg
- Nw125.dwg
- Nw201.dwg
- Nw202.dwg
- Nw203.dwg
- Nw204.dwg
- NW205.dwg
- NW206.dwg
- NW207.dwg

CAD POLYLINE

Preview: Geography

ArcCatalog - ArcInfo - C:\CAD_DATA.mdb\Northwood_Comp_CAD\northwood_parcel...

File Edit View Go Tools Window Help

Location: C:\CAD_DATA.mdb\Northwood_Comp_CAD\northwood_parcel...

Stylesheet: FGDC ESRI

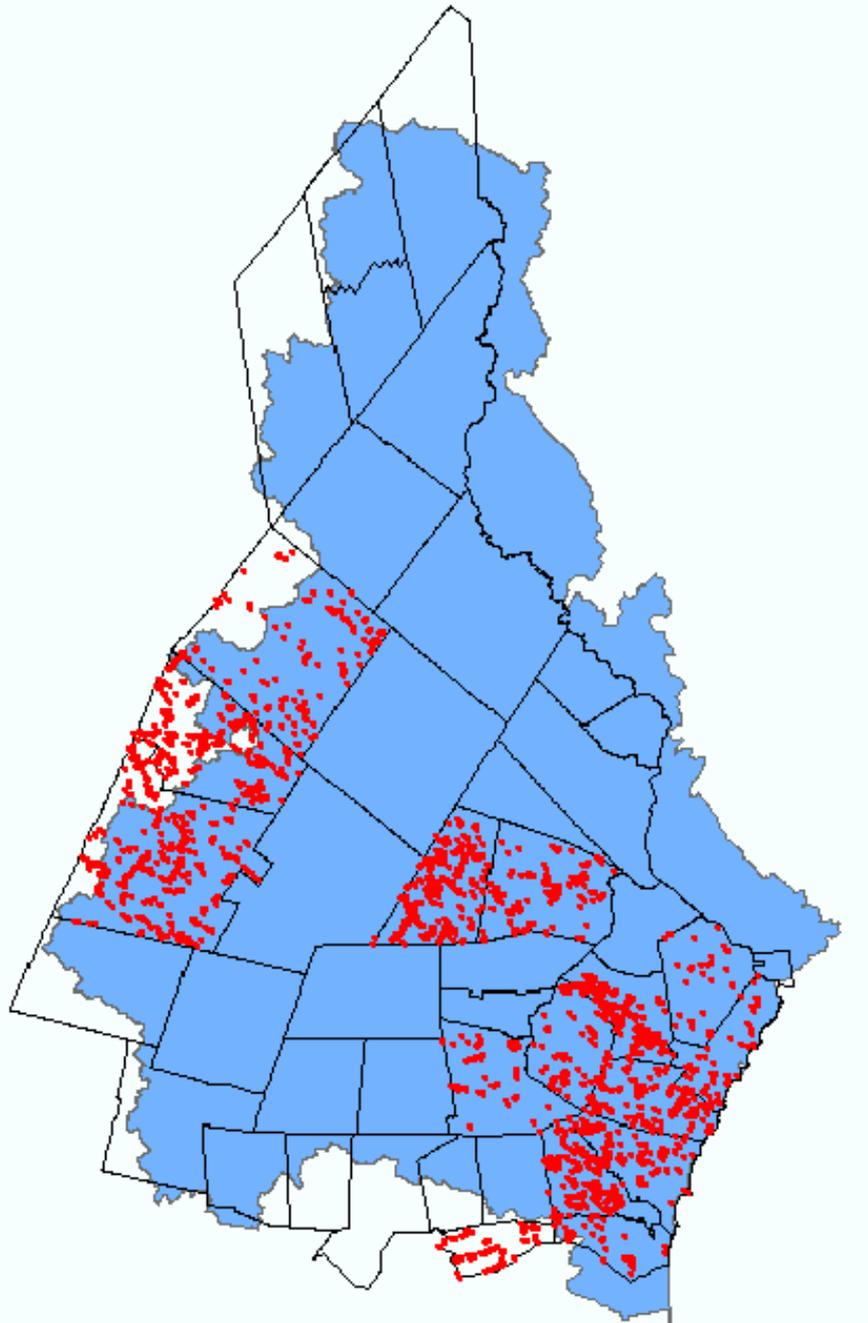
Contents Preview Metadata

- CAD_DATA.mdb
 - EastKingston_Comp_CAD
 - Northwood_Comp_CAD
 - northwood_parcel_p
 - northwood_townwide_anno
 - northwood_townwide_Topology
 - nw_parcel_line
 - Northwood_Map_CAD
 - CAD_Staging.mdb
 - Log.txt
- D:\
- F:\
- H:\
- M:\
- aexeter
- AirResources
- AvExt
- axl
- bedrock
- ccb
- centerline
- Climate
- CoastalImages
- CoastOil
- consland
- developed_lands
- DistillerWatch
- Doq
- drg
- Emergency Oil Spill Forms
- EQus
- ESI
- Fgwa
- flood
- GISDoc
- gismaps
- gwp30
- hillshade
- hydro

POLYGON FEATURE CLASS WITH ATTRIBUTES

Preview: Geography

WELLS LOCATED USING DESKTOP METHOD



Deerfield:	323
Durham:	166
Exeter:	147
Greenland:	261
Hampton:	133
Hampton Falls:	184
Hollis:	295
Lee:	310
North Hampton:	165
Northwood:	307
Portsmouth:	45
Rye:	70
Seabrook:	51
South Hampton:	62
Strafford:	126
Stratham:	111
<hr/>	
Total Wells:	2756

DESKTOP WELL INVENTORY METHOD

ADVANTAGES

- **Fast and cost-effective**
- **Reasonably accurate**
- **Tax map and parcel data usually reported by drillers**
- **Statewide digital orthophotography available**
- **Future acquisition of higher resolution imagery and/or higher quality digital tax maps will only enhance desktop method**

DESKTOP WELL INVENTORY METHOD

DISADVANTAGES

- **Digital tax map data limited, both in geographic extent and quality**
- **Tax map parcel identifiers are NOT “carved in stone”**
- **A significant percentage of well location errors will exceed 100-foot accuracy criterion**

WRAP-UP

- **Use of GPS units by drillers well worth promoting**
- **Desktop GIS method has excellent potential to enable rapid georeferencing of well locations**
- **Tax map and parcel data are critical**
- **Centroid method has potential to greatly streamline the process, but at the cost of decreased accuracy, even if selectively applied**

THE END