Henry Underwood

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Spring 2008 GIS Internship

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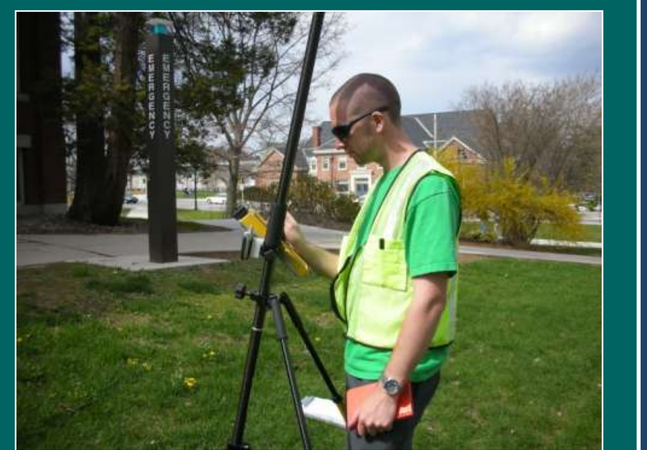
Above Ground Storage Tank Map Book

Photo 1: Electrical transformer

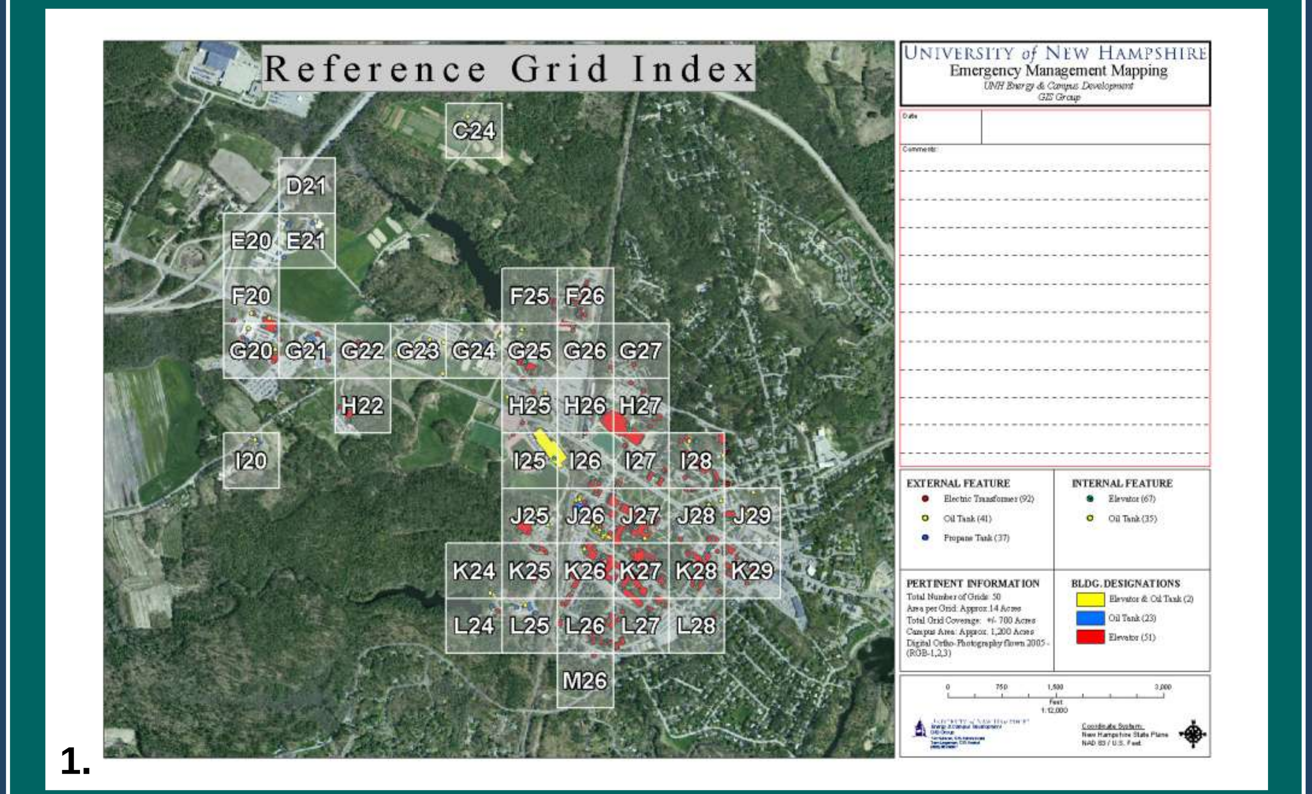
Photo 2: Henry operating RTK GPS



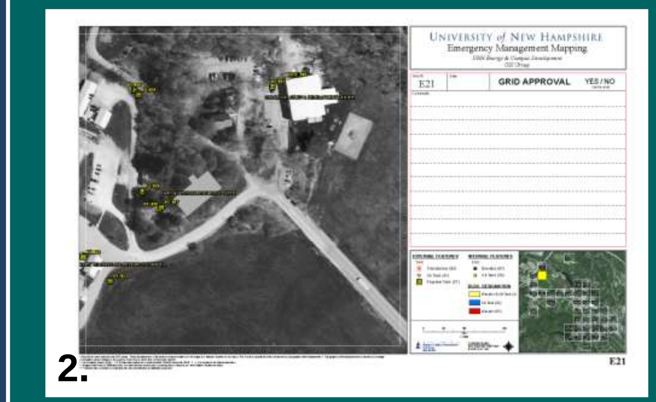
Original photos were taken for the Above Ground Storage Tank Map Book. Only new electric transformers were collected via RTK GPS offset.

- The Above Ground Storage Tank (AGST) Map Book was requested by the UNH Office of Environmental Health and Safety to provide the locations of features containing cooling oil, propane, and heating oil.
- Photos of each electrical transformer were incorporated into the AGST personal geodatabase using mapping software (ArcGIS 9.2).
- A list of specific issues was compiled and addressed in order to update the first version of the map book. This included: creation of new building polygons, naming issues/clarification, and other small corrections.
- New photo pages and attribute table updates were required to complete revisions to the map book (Figures 3 and 4).

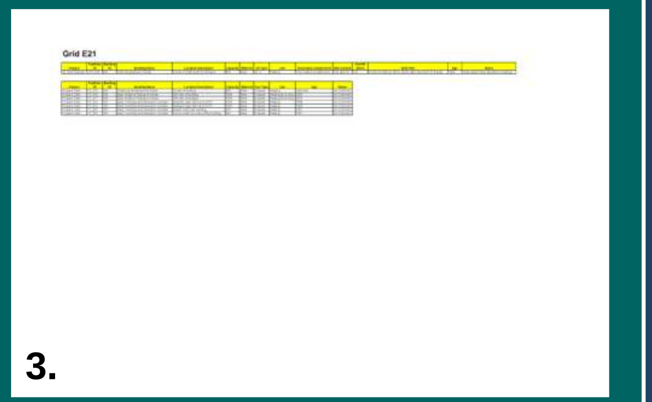
Figures 1-4: Above Ground Storage Tank Map Book



1.



2.



3.

4.

Abstract

Background

The function of the Energy & Campus Development Geographic Information System Group (ECD GIS) is to serve the University of New Hampshire (UNH) with mapping technology. To assist in this function, the ECD GIS Group teamed with the UNH Geography Department to create a GIS Internship. The objective of the internship was to increase the depth and breadth of knowledge about geographic information systems through experience with real-world projects. A second objective of the internship was to enrich UNH databases and holdings while earning academic credit. Over the course of the term, smaller training exercises and two larger projects were completed. The larger projects included: Above Ground Storage Tank Map Book and Telecom & Electric Mapping.

Photo 3: Trimble field computer

The field computer was used to input and store feature location and attribution information.

Tools

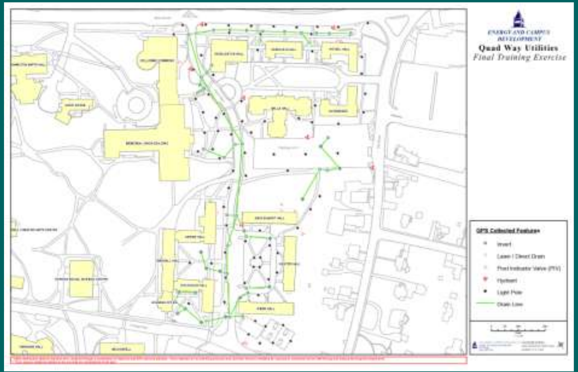
A Trimble 5800 Real Time Kinematic Global Positioning System (RTK GPS) was used for the collection of point features. A Bluetooth device connected the GPS receiver, data logger, and mobile phone (which acts as a modem). When connected via mobile phone to the Trimble 5700 Base Station at West Edge, the GPS unit is capable of ±1 cm horizontal accuracy and ±2 cm vertical accuracy. Additional tools included a laser distance meter and surveyor's compass.

Results

The Above Ground Storage Tank Map Book was completed for a UNH customer on a specific timetable. The Telecom & Electric Mapping Project focused on updating an existing database with RTK-collected points. Both projects will enrich the UNH infrastructure databases by providing the ECD GIS Group with updated positional and attribute information.

Training

Figure 5: Quad Way Utilities Map



Point features were collected with RTK GPS. Drain lines were digitized on-screen.

- ArcGIS 9.2 was used to manipulate data, create detailed attributes for features, and develop maps for display.
- Field training included the use of an RTK GPS unit to collect points, modify attributes, and calculate offsets.
- A utilities map of Quad Way was developed to display newly acquired skills.

Photo 4: Andrew measuring an offset

Field techniques were strengthened with training exercises.

Accomplishments & Skills

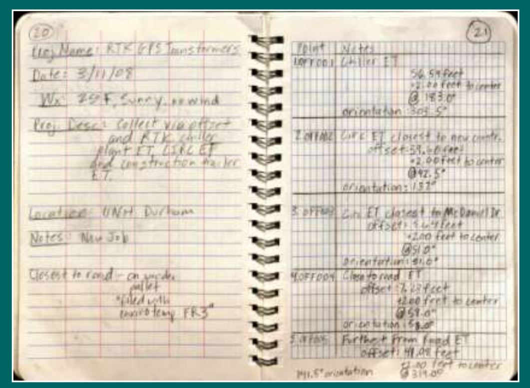
Photo 5: Henry using ArcPad on a Tablet PC

Arc Pad gives an operator the ability to view and edit GIS data while in the field.

The following is a list of accomplishments and skills obtained over the course of the semester:

- Knowledge of Trimble GPS equipment and associated Trimble Geomatics Office software
- Common post-processing techniques were established
- Introduced to personal geodatabase creation and other ESRI spatial data file types
- Workplace etiquette, time management, and communication skills were refined
- Learned how computer-aided design (CAD) and other applications like Google Sketch-Up apply to ECD GIS projects

Photo 6: Field notebook



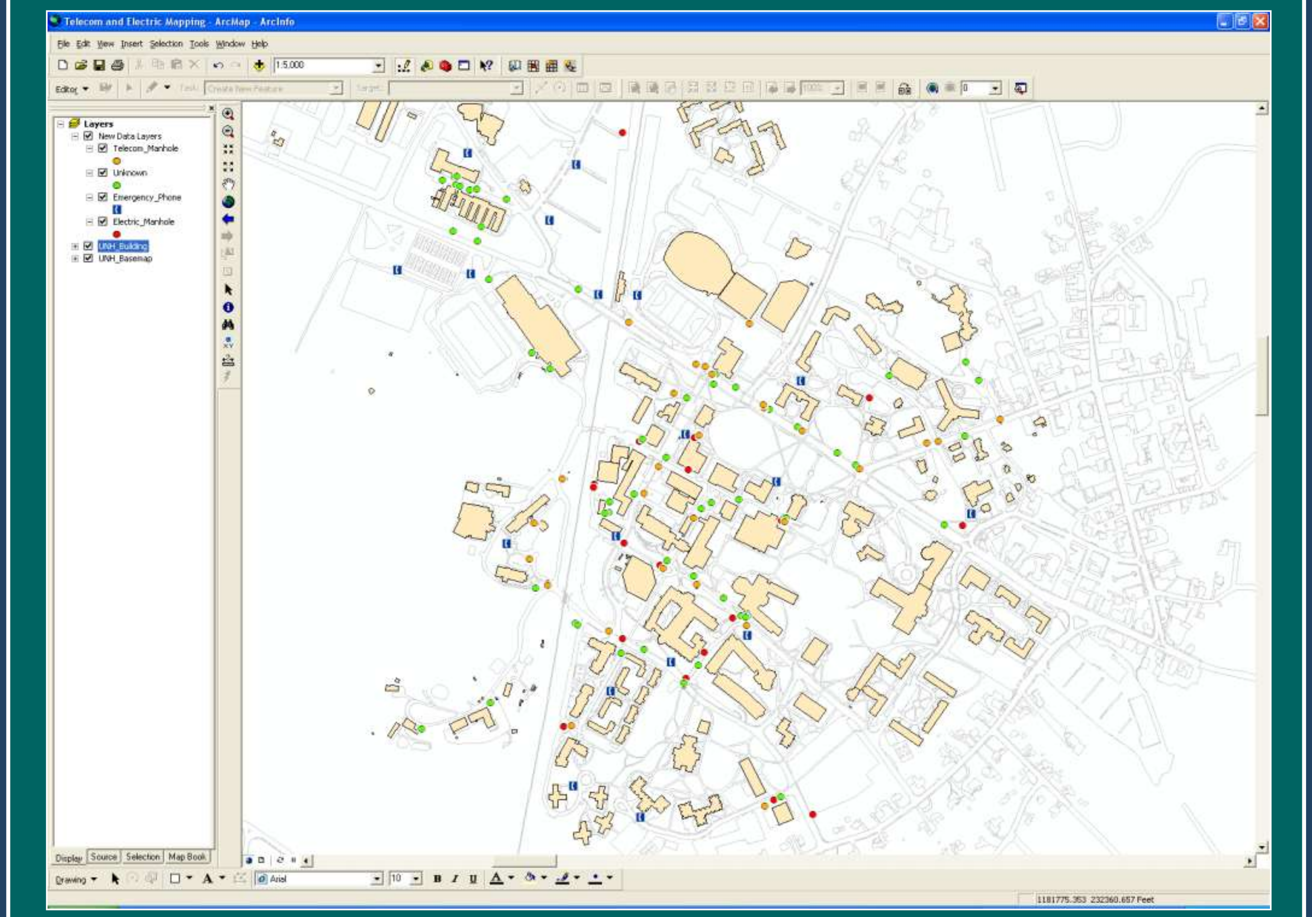
A field book provides hard documentation of essential information that can be easily referenced.

Photo 7: 3D illustration

Andrew created this house using Google Sketch-Up.

Telecom & Electric Mapping

Figure 6: Telecom and electric features collected with RTK GPS



Data view of ArcMap displaying field collected data

- An E-sized map and small-scale maps were used to locate electric manholes, telecom manholes, unlabeled manholes, and emergency phones (blue lights).
- Attributes collected for the manholes included: diameter, location description, obstruction, label, and type. Attributes collected for the emergency phones (blue lights) included: bearing, keypad type, and location description.
- Shapefiles were created for collected data and an excel spreadsheet was created for each feature that was verified but unable to be collected.

Photo 8: Andrew using RTK GPS

Figure 7: Partial list of uncollected features

Telecom & Electric Mapping
Uncollected Features
Spring 2008
Henry Underwood & Andrew Lee
Compiled 5/2

* ID field references older shape files found at L:\6 SPRING 2008\Projects\Telecom and Electric Mapping\Data Layers

South of Main Street, East of railroad tracks

Featur	ID	Location Description	Notes
TMH	0018	East side of Southeast Residence B up against the building	No Comment
EMH	0080	Corner of parking lot across from Williamson Hall	This feature may be buried or removed
EMH	0029	North-facing side west wing of Christensen Hall	No Comment
TMH	0024	North-facing side west wing of Christensen Hall	No Comment
TMH	0030	East-facing side East wing Christensen Hall	No Comment
EP	018	Williamson Road between Hubbard & Christensen	No Comment
TMH	0027	Intersection Mill Road and McDaniel Drive	No Comment
EMH	0035	In B-Lot across from NYNEX Building	No Comment
EP	011	South side of Philbrook Hall	No Comment
TMH	0029	Inside construction fence near original entrance	No Comment
EMH	0063	West side of Chiller Plant in parking lot	No Comment
UNK	XXXX	Directly south of Philbrook, in the grass	Labeled Telecom or Electric
EMH	0037	NE Hubbard Hall in walkway	No Comment
EMH	0032	South corner Babcock next to sidewalk and road	This feature is partially or totally buried
EMH	0033	South corner Babcock next to sidewalk and road	This feature is partially or totally buried
TMH	0026	Corner Mitchell Way and McDaniel Drive	No Comment
EMH	0031	Next to walkway between McConnell and Babcock under a tree	This feature is partially or totally buried
UNK	XXXX	Unlabeled off SW corner of Horton along sidewalk	No Comment
UNK	XXXX	Unlabeled off SW corner of Horton in road	No Comment
EMH	0030	North wall of Babcock near dumpster and recycling	No Comment
EMH	0081	NW corner of McConnell	We could not locat this manhole. This feature is totally buried or missing
EMH	0038	S corner of tennis court, the one furthest to the south	No Comment
EMH	XXXX	S corner of tennis court, the one to the north	No Comment
UNK	XXXX	N of south-facing entrance to Gibbs	No Comment
UNK	XXXX	NW facing entrance to Hunter Hall	No Comment
UNK	XXXX	NW facing entrance to Hunter Hall	No Comment
UNK	XXXX	W Englehardt near sidewalk	No Comment
UNK	XXXX	W Englehardt near sidewalk	No Comment
UNK	XXXX	S Englehardt near building	No Comment
UNK	XXXX	S Englehardt in park area	No Comment
TMH	0050	Near crosswalk from Hitchcock to B-Lot	No Comment
TMH	0032	Sidewalk between Hitchcock loading zone and Gibbs	No Comment
UNK	XXXX	Unlabeled in road near TMH 0032	Watch for cars
UNK	XXXX	Unlabeled in road near TMH 0033	No Comment
EP	014	Housing office bus stop	No Comment
EP	015	East corner Hitchcock	No Comment
EP	017	NW entrance Randall Hall	No Comment
EP	016	NW corner Randall Hall	No Comment
EMH	0039	N end Randall Hall near pedestrian bridge	No Comment
EMH	0005	Under S eave of MUB	No Comment
EP	003	Under S eave of MUB affixed to concrete post	No Comment
TMH	0036	West side of C-lot in southbound lane	No Comment
EP	022	C-lot parking attendant booth	No Comment
TMH	0037	Northbound lane of Mill Road across from Alexander	No Comment
EMH	0043	Near east entrance to Alexander	This feature is partially or totally buried
UNK	XXXX	Near east entrance to Alexander	This feature is partially or totally buried
EP	023	Hetzel bus stop on Main Street	No Comment
EP	XXXX	Between Main Street and Fairchild just outside construction fence	This unit appeared to be brand new but was under heavy tree cover
TMH	0034	Between Mills and Fairchild	Behind construction fence
EMH	0040	Between Mills and Fairchild	Behind construction fence
TMH	0033	Between Mills and Fairchild	Behind construction fence
TMH	0035	NE MUB	No Comment
EMH	XXXX	SW corner Huddleston	No Comment
EP	001	NE MUB	No Comment
EMH	0041	NE MUB	No Comment
TMH	0047	NE MUB	No Comment
TMH	0053	Across street from Huddleston	No Comment
EP	029	Janetos	No Comment
TMH	0054	President's House near Main St. sidewalk	Could not find in the field
UNK	XXXX	SW side Health Services	No Comment
UNK	XXXX	SW side Health Services	No Comment
UNK	XXXX	SW side Health Services	No Comment
EMH	0047	Main entrance Stoke	No Comment
UNK	XXXX	Main entrance Stoke	No Comment
UNK	XXXX	Main entrance Stoke	No Comment
UNK	XXXX	Main entrance Stoke	No Comment
EMH	0050	SE wing Stoke	No Comment
EMH	0048	Stoke basketball court	No Comment
EMH	0049	Stoke basketball court	No Comment

Excel spreadsheets and lists were used to record progress and outline future tasks.

Photo 9: Unlabeled manhole and emergency phone (blue light)

Collection issues ranged from tree cover to building and utility wire interference.