

Roadway Mapping Project for UNH Facilities Information Technology

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FIGURE 2. Roadway Attribute Table

Attributes of roadways										
OBJECTID	SHAPE	FeatureID	Material	RoadName	Class	Ownership	SeasonalMaintenance	SHAPE_Length	SHAPE_Area	
1	Polygon	4646	Paved	Mean Street	Arterial	Durham		832.74767	1207.24533	
2	Polygon	4646	Paved	College Road	Arterial	UNH		1178.04233	1762.52311	
3	Polygon	4646	Paved	McKersich	Arterial	UNH		492.61267	732.01138	
4	Polygon	4646	Paved	Conover Drive	Connector	UNH		300.22627	364.18079	
5	Polygon	4646	Paved	Wilburton Way	Connector	UNH		712.42668	1234.79188	
6	Polygon	4646	Paved	Wilburton Way	Connector	UNH		528.74201	738.40663	
7	Polygon	4646	Paved	McKersich	Connector	UNH		597.57968	1034.83391	
8	Polygon	4646	Paved	College Road	Arterial	UNH		2127.24862	4024.12663	
9	Polygon	4646	Paved	Quinn Way	Connector	UNH		231.50268	343.91126	
10	Polygon	4646	Paved	Quinn Way	Connector	UNH		562.63268	427.25268	
11	Polygon	4646	Paved	Quinn Way	Connector	UNH		562.92542	907.02024	
12	Polygon	4646	Paved	Yallow Brook Lane	Connector	UNH		628.30128	1234.81449	
13	Polygon	4646	Paved	Library Way	Connector	UNH		1333.70177	1431.01449	
14	Polygon	4646	Paved	Thompson Hill	Connector	UNH		383.15183	624.20466	
15	Polygon	4646	Paved	Edgewood Lane	Connector	UNH		674.12732	1262.28919	
16	Polygon	4646	Paved	Edgewood Lane	Connector	UNH		1124.24268	2012.42414	
17	Polygon	4646	Paved	M.B. Way	Connector	UNH		134.00232	1558.89143	
18	Polygon	4646	Paved	M.B. Way	Connector	UNH		602.07567	724.83232	
19	Polygon	4646	Paved	Prospect Hill	Connector	UNH		52.02641	203.49883	
20	Polygon	4646	Paved	Prospect Hill	Connector	UNH		207.27267	478.01722	
21	Polygon	4646	Paved	Prospect Hill	Connector	UNH		212.42638	322.42412	
22	Polygon	4646	Paved	Prospect Hill	Connector	UNH		79.86211	52.61476	
23	Polygon	4646	Paved	Prospect Hill	Connector	UNH		224.62638	368.04232	
24	Polygon	4646	Paved	Leah Hill	Connector	UNH		70.36268	302.72126	
25	Polygon	4646	Paved	Leah Hill	Connector	UNH		242.89128	382.12024	
26	Polygon	4646	Paved	Leah Hill	Connector	UNH		112.02638	174.24232	
27	Polygon	4646	Paved	Leah Hill	Connector	UNH		587.12421	1012.21232	
28	Polygon	4646	Paved	Mean Street	Arterial	UNH		827.00429	801.42394	
29	Polygon	4646	Paved	Mean Street	Arterial	UNH		142.74267	4.96164	
30	Polygon	4646	Paved	Mean Street	Arterial	UNH		327.22024	368.17263	

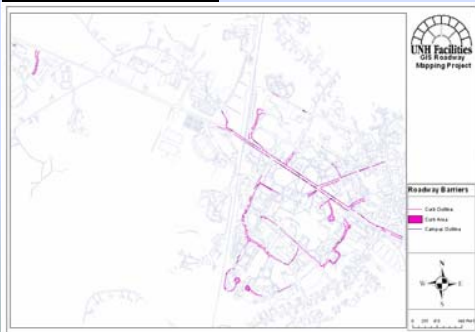
The attribute table for roadway areas shows how we chose to define each area using attributes such as road name, road ownership, seasonal maintenance and classes. Figure 2 also shows total areas and lengths for each road.

FIGURE 3. Geodatabase Construction



ArcCatalog was used to create a feature library. Additionally a data dictionary was created for each roadway feature and entered into the geodatabase.

FIGURE 4. Curb Areas



This map shows the curb areas mapped across campus. Note that many areas do not have curbs and are not mapped.

INTRODUCTION:

In the spring of 2006, the University of New Hampshire Facilities Information Technology (IT) department was presented with the task of creating a geographic information system (GIS) for the university campus. This project would include creating a detailed geodatabase of roadways, parking lots, and pedestrian walkways. To assist in the creation of a campus GIS, six undergraduate students were selected for the positions of initial data acquisition and post-processing. Seth Prouty and Jeremy Onysko requested and were chosen to assist in the planning and development of a roadway geodatabase.

RESULTS:

The roadway geodatabase created this semester is part of a larger campus GIS project. Although not entirely complete, much work was required to initially develop the geodatabase. The results of this project thus far:

- Development of a roadway geodatabase, including feature library and data dictionary.
- Roadway (see Figure 6) and curb (see Figure 4) polygons for much of campus with road class, ownership, materials, and maintenance attributes recorded (see Figure 2).

METHODS:

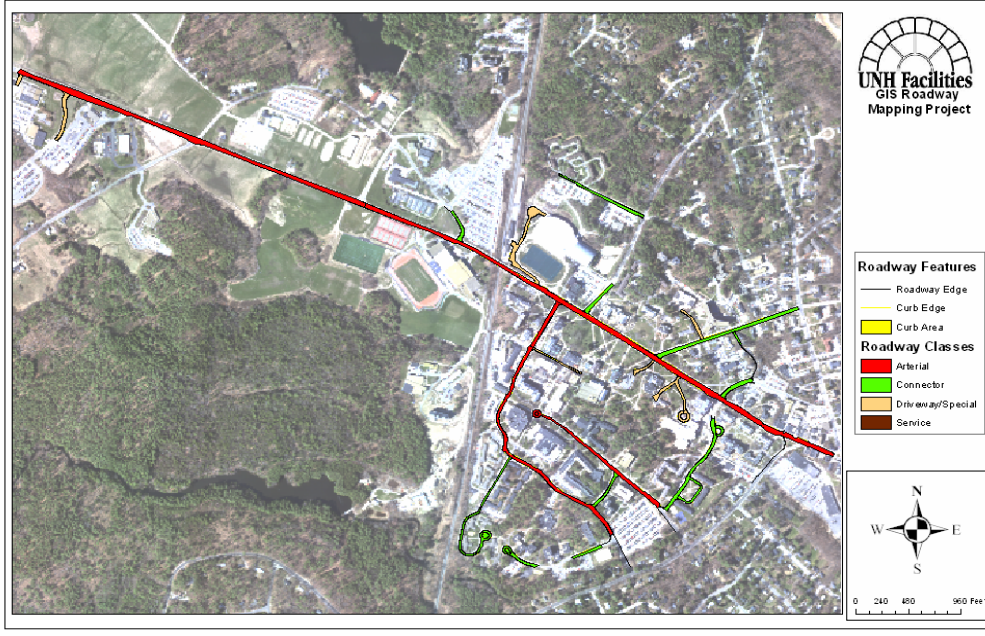
The roadway geodatabase was constructed within ArcCatalog. An exhaustive feature library and data dictionary were created for each roadway feature. Features such as roadway paint markings, speed reduction devices, roadway centerlines, etc were used (see Figure 3). The data dictionary and feature library were incorporated into a Trimble RTK unit (see Photos 1 and 2). This unit was used for the collection of roadway area and curb area points. Utilizing Bluetooth technology, the RTK unit was continuously georeferenced from a base station located near Leavitt Lane; sub-centimeter position accuracies were thus possible. Much field work was involved in creating the geodatabase. Data points were recorded with the RTK unit and then uploaded to the computer using Trimble Geomatics Office for roadway edges and curb edges first. Shapefiles were created from the acquired points and from these; polygons were generated using the trace tool and snap-to feature. These polygons were representative of total roadway area and curb area.

CONCLUSIONS / DISCUSSION:

The roadway geodatabase was created to fulfill the need for more precise and accurate methods of managing roadway infrastructure. Although still incomplete, our work this semester will act as the building block for future development of the overall campus GIS.

While the project overall went fairly smoothly, some issues needed to be addressed. Certain areas on campus had particular issues with higher than acceptable PDOP ranges and thus accuracies had to be noted when taking points. Other areas encountered had unique materials that needed to be noted and consequently entered into the data dictionary (see Figure 5). Fortunately, much planning had gone into the initial setup of the data dictionary as well as the geodatabase itself and therefore these issues were accounted for.

FIGURE 1- Roadway Mapping Geodatabase



During the Spring of 2006 UNH Facilities GIS Division was tasked with creating a Roadway Geodatabase to aid in roadway infrastructure management and to complement the RSMS programs for roadway management on the UNH campus.

PHOTO 1

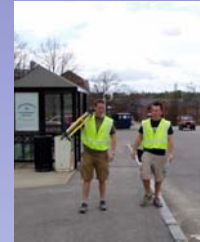
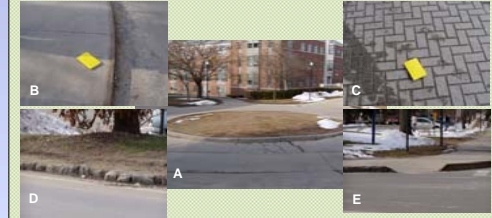


PHOTO 2



Jeremy and Seth using the RTK unit to collect GPS points. These points were later uploaded to Trimble Geomatics Office where it was converted for use in ArcMap.

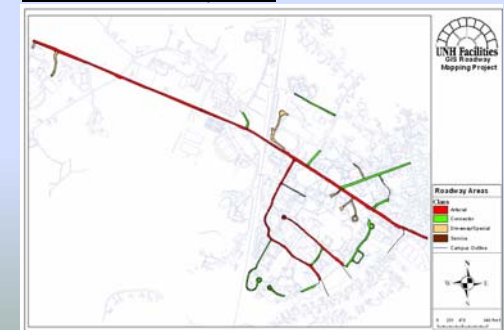
Figure 5. Potential Post-Processing Issues



(A) Traffic circles were a common situation on campus which required some careful consideration during post processing. Additional roadway and curb lines were developed to complete polygon features.

Unique materials that needed to be accounted for in the data: (B) Metal flashing on curb edge, (C) Paving blocks on Library Way, (D) Fieldstone curbing, and (E) Accessibility ramps.

FIGURE 6. Roadway Areas



All roadways are classified and selecting a polygon will open the attribute table (see Figure 2).