

# Analysis of Future Construction Possibilities on the Colby College Campus

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## Abstract:

With the recent construction of Colby Green and the current plans for the construction of several new buildings, the total area for future development on campus has declined. The goal of this study was to illustrate existing campus development and to determine where future growth could occur. GIS was used to determine the different soil systems on campus, the current use of the land, and the boundaries of the Colby property. The project shows what potential obstacles the college will have in attempting to expand the campus and proposes where the best options are for construction are.

## Introduction:

With the ongoing Colby Green Project and the upcoming addition to Cotter Union, it is apparent that the Colby campus will never stop growing. It seems that there is always a need for new buildings, parking lots, and athletic fields as the college grows year after year. Eventually, space will simply run out for Colby to grow further. In order to figure out what options Colby has for future expansion, it is necessary to determine how much of the college's property is actually able to support construction. This report is designed to show the available space that Colby owns and to illustrate its capacity to undergo construction. Taken into account are soil properties and current land use of the college in order to provide an outlook on the future.

## Analysis/Results:

For this project, areas for potential expansion are those that are within the college's property, but not already in use. That is areas inside the yellow lines but not covered by red. Judging by space alone, there seems to be an extensive area the college owns, but has not begun to capitalize on. However, when soil properties are examined, the sense of available land is greatly changed. Certain soil types are extremely difficult to build upon and require intense manipulation that can cost millions of dollars. For example, the Colby Green Project lies on a section of Paxton-Charlton fine sandy loams at the base of Mayflower Hill. This particular soil type does not have proper drainage properties to build upon, so the college had to hire a team of hydrogeologists and engineers to develop a system to make the land suitable for drainage. This cost Colby a large sum of money and in addition created artificial drain pools in the arboretum that intrude upon the natural landscape of the woodland.

Any project proposal in or around the Buxton or Scantic soil in the arboretum would require similar treatment, but drainage areas would soon expire if the college tried to expand there. Expansion onto the Hollis fine sandy loam area known as Runnals Hill would also create potential problems. The bedrock in that area is very close to the surface of the soil, so any expansion would require massive cut and fill processes in addition to blasting of the bedrock. Project proposals in both the arboretum and Runnals will provoke similar protests to the one seen earlier this year concerning the beech trees outside Cotter. These restrictions leave us with a few other options. Outside of the main campus are a number of large tracts of land that most students don't even know about. There is one large one to the North and one to the northwest, and a number to the southwest, west of Runnals. The only quality spaces out of these are the areas to the southwest of campus as they provide a suitable soil profile as well as level land. Both the areas on the opposite side of I-95 and on the near side have high potential for construction possibilities, but they are a great distance from campus, putting limitations to what sort of facility would be practical there.

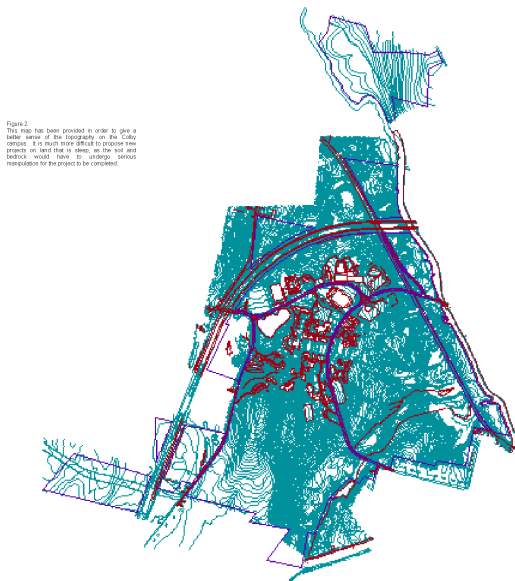


Figure 2  
This map has been provided in order to give a better sense of the topography on the Colby campus. It is hard to see details to colored area from the map, but the red line shows the college's boundary. The red line would have to undergo serious manipulation for the project to be completed.

## Methods

In executing this project, a number of GIS layers were involved. First a 1:24,000 scale layer of the Kennebec County soil properties was cut to fit a polygon which encloses the extent of Colby's property. Specific properties of each soil type were taken from the 1978 Soil Survey of Kennebec County. On top of this, several layers from PFD were combined to illustrate the actual boundaries of the property as well as the land already in use by the college or by other authorities. These layers were converted to GIS by Professor Phillip Nyhus and then modified to obtain the end result. In addition, the inset map shows the campus with short-interval contour lines, probably averaging 1-2 feet in separation. All of the layers have been converted to the coordinate system NAD 1983 UTM Zone 19N in a Transverse Mercator Projection.

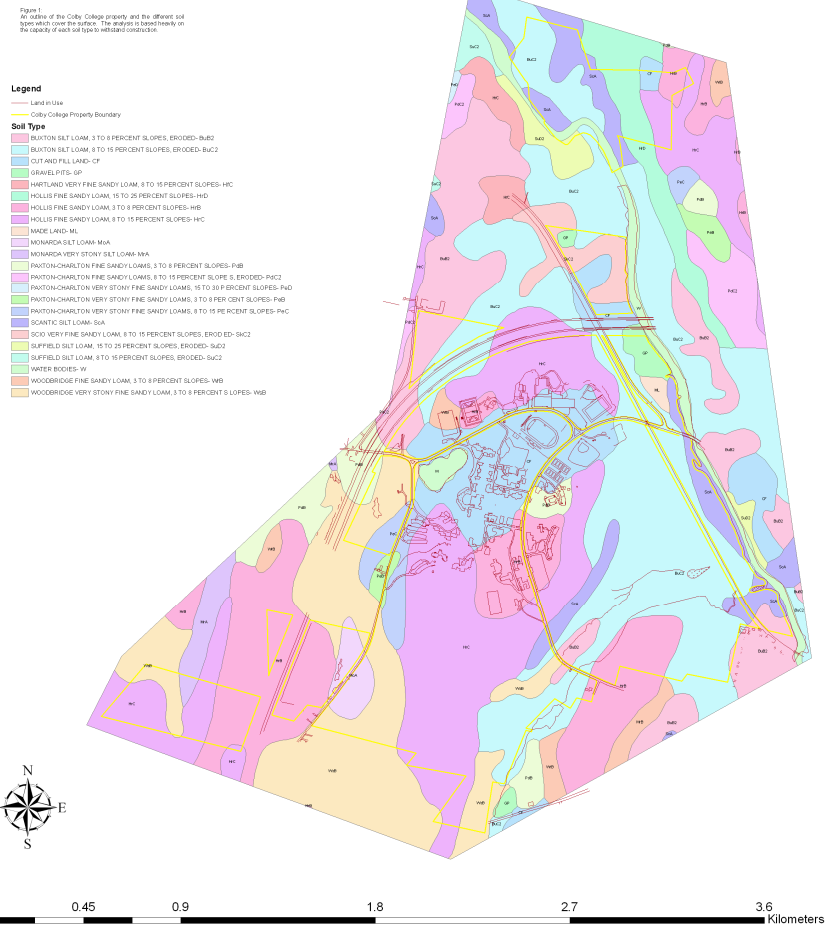


Figure 1  
An outline of the Colby College property and the different soil types which cover the surface. The analysis is based heavily on the nature of each soil type relative to construction.

- Legend**
- Land in Use
  - Colby College Property Boundary
  - Buxton Silt Loam, 3 to 8 Percent Slopes, Eroded-Bu2
  - Buxton Silt Loam, 8 to 15 Percent Slopes, Eroded-Bu2
  - Cot Meadow Land-GP
  - Gravel PFS-GP
  - Hartland Very Fine Sandy Loam, 8 to 15 Percent Slopes-HC
  - Hollis Fine Sandy Loam, 15 to 25 Percent Slopes-HD
  - Hollis Fine Sandy Loam, 8 to 15 Percent Slopes-HD
  - Hollis Fine Sandy Loam, 8 to 15 Percent Slopes-HC
  - Made Land-ML
  - Nonacid Silt Loam-BMA
  - Nonacid Very Stony Silt Loam-BMA
  - Paxton-Charlton Fine Sandy Loams, 3 to 8 Percent Slopes-PuB
  - Paxton-Charlton Fine Sandy Loams, 8 to 15 Percent Slopes-PuB
  - Paxton-Charlton Very Stony Fine Sandy Loams, 8 to 15 Percent Slopes-PuB
  - Paxton-Charlton Very Stony Fine Sandy Loams, 3 to 8 Percent Slopes-PuB
  - Paxton-Charlton Very Stony Fine Sandy Loams, 8 to 15 Percent Slopes-PuB
  - Scantic Silt Loam-BMA
  - Sidco Very Fine Sandy Loam, 8 to 15 Percent Slopes, Eroded-Su2
  - Supfield Silt Loam, 15 to 25 Percent Slopes, Eroded-Su2
  - Supfield Silt Loam, 8 to 15 Percent Slopes, Eroded-Su2
  - Water Bodies-WP
  - Woodbridge Fine Sandy Loam, 3 to 8 Percent Slopes-WB
  - Woodbridge Very Stony Fine Sandy Loam, 3 to 8 Percent Slopes-WB

## Conclusions

In light of recent projects, it is apparent that the college is eternally in need of expansion. With the limited resources that the college has, this GIS analysis provides a potential outlook on future possibilities. From the results, it is concluded that any expansion by the college will have to be either on property a great distance from school, or involve extensive manipulation of the soil and bedrock in the area. While there seems to be a large area of property, the land quality limits the parameters for expansion considerably.

References:  
 Faust A.P. and LaFlamme, K.J., 1978, Soil Survey of Kennebec County, Maine: Department of Agriculture, Soil Conservation Service, Washington, 87p.  
 Maine Department of GIS  
 Professor Phillip Nyhus and the Colby College Physical Plant