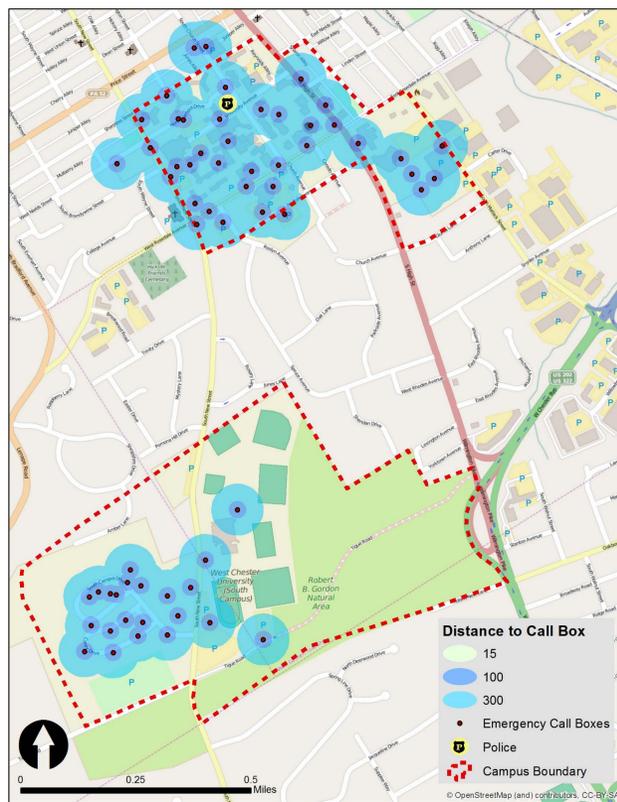


ABSTRACT

The network of emergency call boxes on West Chester University's campus has been mapped and studied to examine its effective area of coverage. While GPS data gave insights into system effectiveness, further research was necessary to enhance the understanding of call box visibility. Using data that was collected in previous research, GIS analysis was conducted to determine the visibility of emergency call boxes when structure height was considered. A digital elevation model of the West Chester University campus was combined with structure height data, and spatial analyst tools like Viewshed were applied to a digital elevation model of West Chester's Campus. The results showed that structure height values are essential for meaningful analysis. In addition, the results suggested further research and improvements to data.



Previous Research



The following data was collected:

- Longitude and latitude of each call box
- Identification Number
- Attributes including model, color, etc.

This was used for the following analysis:

- Multiple-ring buffer distances to each call box
- Distance join between call boxes and university police station

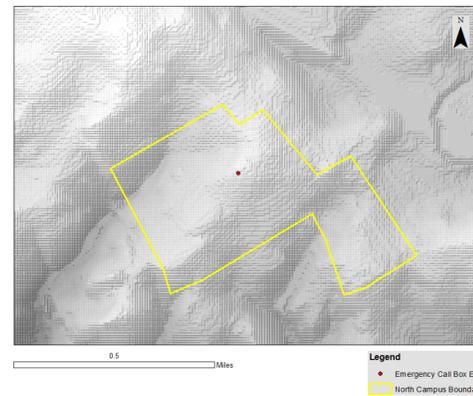
Viewshed Analysis of Call Boxes



Methods

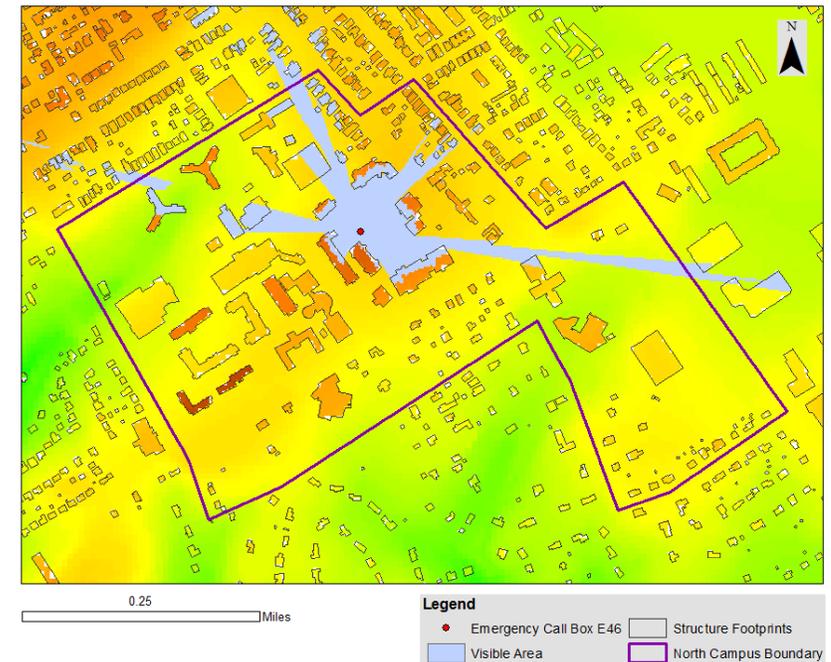
- Spatial analysis using ESRI ArcGIS
 - Creating structure height DEM
 - Emergency call boxes as observer points
 - Viewshed analysis of updated study area

Results



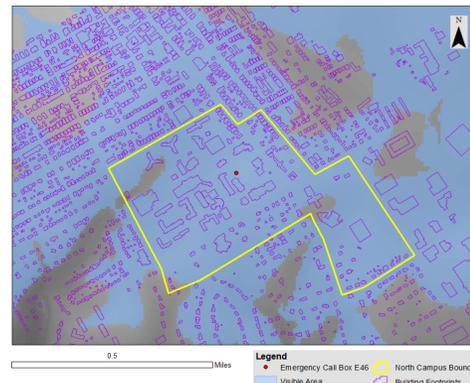
Elevation

Rather than taking a two-dimensional approach to analysis, this project used a 10-meter DEM to introduce elevation values as a factor.



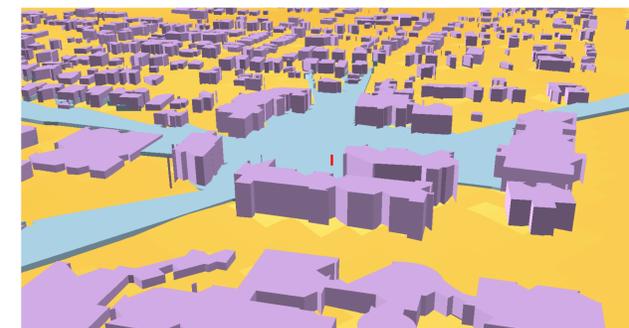
Visibility

However, observer point analysis of DEM data yields exaggerated results when structure heights are not accounted for.



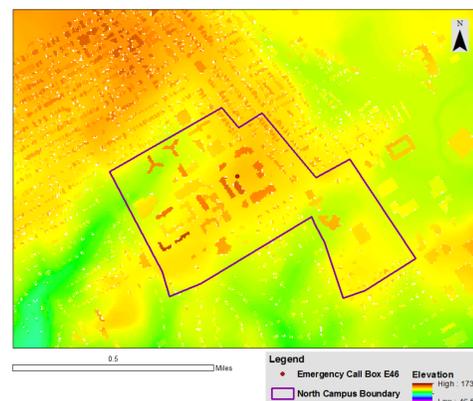
3D Visualization

The data was used in conjunction with ArcScene to render a 3D visualization of the call box's area of visibility. (Visibility is symbolized in blue.)



Structures

Structure footprint data with height values in vector format must be converted to raster format and joined with elevation data before use for callbox analysis.



Conclusions

- Two dimensional analysis is limited in its ability to render an accurate area of callbox effectiveness.
- Useful analysis of call box effectiveness requires structure height data.
- While visibility is better addressed through spatial analyst tools, increased accuracy can be attained through better data, including the use of LIDAR and further analysis of visual obstacles.

Further Research

- Utilize Network Analyst extension to calculate driving response times
- Continue data collection efforts to improve accuracy