

Emergency Call Boxes: A GIS Analysis to Aid Public Safety Response Phil Johnson and Josh Marcinik, Department of Geography & Planning, West Chester University

ABSTRACT

West Chester University's Department of Public Safety is responsible for campus law enforcement and emergency response. One component of this system is the University's network of emergency call boxes that can connect callers directly to Public Safety dispatch. To better understand the spatial extent of this network, GPS units were used to collect the point locations of all emergency call boxes on West Chester's main campus. With this data, GIS analysis was conducted to determine the areas effectively covered by the emergency call box system. Additionally, further analysis was carried out to calculate distances between public safety assets and call box locations, potentially giving insight into response times and efforts. The results suggested several key improvements that could increase the effectiveness of the emergency call box network.



About Emergency Call Boxes

- Connect callers directly to public safety dispatch; all sounds within 15-foot radius are audible.
- Crime statistics show the importance of effective response to campus and outlying residencies.

Sex Offenses	On Campus	Residential Facilities		
2011	6	6		
2012	7	7		
2013	7	6		
Robbery				
2011	2	0		
2012	1	1		
2013	1	0		
Aggravated Assault				
2011	2	0		
2012	2	1		
2013	2	1		

• Data was collected for a total of 80 on-campus emergency call boxes.



The following data was collected:

- Longitude and latitude of each call box
- Identification Number
- Whether or not a beacon light was present
- The color of the call box
- Specific call box model (often indicating age)
- Additional features including mount type, presence of cameras, and information buttons







Methods

- Pilot study was conducted using remotely sensed imagery
- GPS data collection of point features
- Spatial analysis using ESRI ArcGIS
 - Multiple ring buffer based on critical distances
 - Distance join from public safety headquarters to emergency call boxes

Emergency Call Box Distribution



Call Box Attributes

		Light		Camera		Structure Mounted		Parking Garage	
Campus	Total	Count	%	Count	%	Count	%	Count	%
North	58	52	89.66	23	39.66	34	58.62	25	43.10
South	22	22	100.00	1	4.55	7	31.82	0	0.00
Total	80	74	92.50	24	30.00	41	51.25	25	31.25

Spatial Distribution of Call Boxes



OpenStreetMap (and) contributors, CC-BY

Results







Conclusions

- Current university maps do not accurately reflect call box count.
- While coverage appears adequate, visibility and awareness should be addressed.
- Effectiveness could be increased by enhancing the multirole capability of emergency call boxes.
- Based on the findings of this project, the university decided it needed to conduct maintenance to ensure system functionality.







Further Research

- Identify any additional call boxes, especially inside residence halls
- Utilize Network Analyst extension to calculate driving response times
- Conduct line-ofsight analysis based on building footprint height and DEMs using 3D Analyst