Geography Coursework

Delimiting Stamford CBD

By John Cassels

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Abstract

The aim of this project is to delimit the CBD of Stamford. The CBD is the central business district of a town in which are found most of the offices and shops. The group that aimed to find the borders of the town was a group of Rugby School pupils. This group collected the Data and in this booklet is discussed the relevancies of the information, why trends in the data have been found and how these trends could be used to find and Delimit the CBD of Stamford. This delimitation is done in the conclusions section. Finally in the Evaluation problems with the project are discussed and how it could be improved if the investigation were to be repeated.

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*Used a map obtained from www.multimap.com

Acknowledgments

Thanks should be given to the group and all the effort they have put into this project. I also thank Lincolnshire police for the Crime Data and Experian for the goad map, www.voa.gov.uk for the rateable index data, www.multimap.com for all the maps of Stamford and finally to the Rugby School Department of Geography for all the help they have given in this coursework.

Introduction

General Aim

The Aim of the project was to delimit the Central Business District (CBD) of Stamford, Lincolnshire.

Geographical Hypothesis

The CBD is the centre of the town, the point in the settlement where the majority of business takes place and is often were the original settlement was situated we could therefore expect to observe certain trend:

-Pedestrian numbers would decrease with increasing distance from the town centre. This is because there is more reason for people to be at the centre where there are shops and jobs to go to.
-Numbers of CCTV cameras, rubbish bins, public toilets and benches increase with decreasing distance from the town centre. Because the more people that a town has to cater for, the more public facilities are needed
-Shops improve in appearance with decreasing distance from the town centre. Those shops that can afford the rent in the centre of a town are high quality stores, for them appearance is important.
-Number of shops and numbers of stories in each building increases with decreasing distance from the town centre. The more people there are around, the more shops there will be to exploit the market and due to the high cost of land the shop owners will maximise the floor space on small plots of land by building more stories.
-Number of residential homes would decrease with increasing distance from the town centre. The cost of land would be greater in the CBD so less people can afford to live there
-More well known and chain stores increase in number with decreasing distance from the town centre. Only the richer companies can afford the high rent.
-Parking restrictions increase with decreasing distance from the town centre. More people mean more cars and cars cause congestion, cars are therefore discouraged by parking restrictions
-Pedestrians distance from home would increase with decreasing distance from the town centre. Because the homes are mainly in the outskirts of the city.

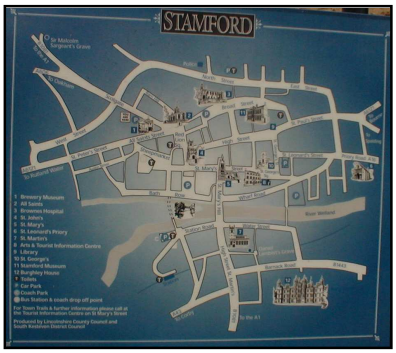


Fig 1.1: A tourist information map board of the centre of Stamford.

Relevant Geographical Information

Location of Study Area

-Stamford, Lincolnshire

Stamford was picked as the study area because it is quite close to Rugby School and is of roughly the right size for the group of students which came from Rugby to conduct the investigation. Stamford is not too small as to not contain a definable CBD, but is small enough for the project group's capabilities within a single day. The town also has plenty of pedestrians on the streets which could be counted, but there are not too many, which would have made it impossible for the groups to count the pedestrians Stamford's good road access also made it easy for workers and shoppers to get into the town providing the market and labour for the thriving CBD the group hoped to define. This road access also made it easier for the group of students to get to Stamford. Another advantage of the town being small was increased safety and a lower likelihood of pupils getting lost.

Fig. 1.2: Stamford from the air.

Background and Theory

Stamford is a small town in Lincolnshire it is situated near the A43, A16 and A1 giving it good road access. It also has a population of about 16,000 people (source: www.stamford.co.uk). The main built up area of the town covers about a square km.

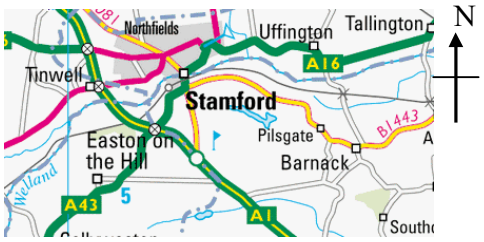


Fig 1.3: Stamford's location, shown with a close up on a road map

In a town we expect to see certain typical 'layers', including the frame, inner core and outer core, these 'layers and their properties are explained succinctly in *fig 1.4.*

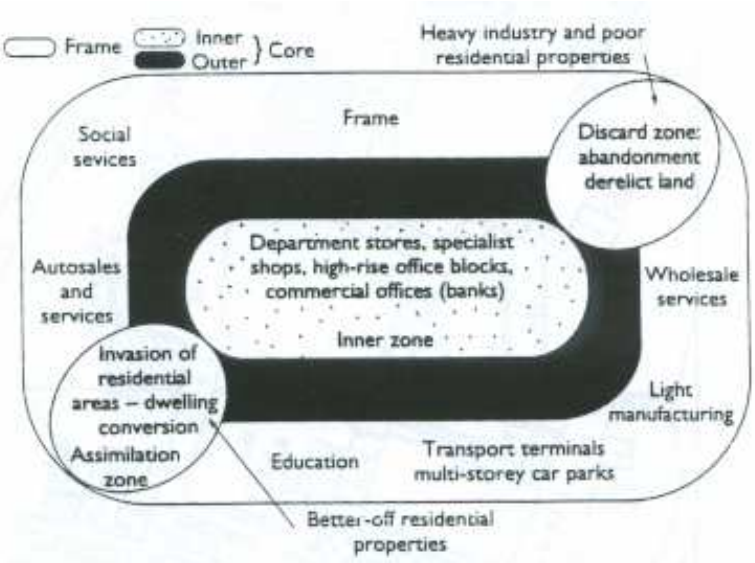


Fig. 1.4: This core frame model shows a simplified version of the types of shops we hoped to find in each area of Stamford, this would help us to define the CBD core and CBD fringe or frame. (Source: Geography Intranet)

Justification of the Project Theme

Delimiting the CBD of Stamford has relevance to the specification (spec A OCR) because it covers Unit 2: *People and places to live-Settlement* from page 22 of the specification. The investigation should help to reinforce the knowledge already gained over the GCSE course.

A final reason for conducting the investigation was the usefulness of knowing how to delimit a CBD. When placing a business it is important to have it situated in or as close as possible to the Central Business District, as it is in the CBD people expect to find work, shops and businesses offering services. For example it would be stupid to place a bank 1 mile out from the nearest shop, no-one would want to work there or use the bank. It is also important for the county council authorities to be able to delimit a CBD as the county council is responsible for controlling the growth and structuring of a town. It is the council's responsibility to place the CCTV cameras, rubbish bins, public toilets and benches; they must know where to place them.

Methodology

Primary Data

When the Rugby School group arrived in Stamford on the 5th November 2002 each group first made its way in to the town centre for 11:30am, to the point assigned to them. There were 10 points (shown in *Fig 2.1*) which were intelligently chosen, at roughly equal distances apart and covering as much of the central area of Stamford as possible, once the data had been pooled the groups would have a very detailed picture of the centre of Stamford. Once there, the group counted the pedestrians passing that point on both sides off the street, for five minutes then recorded the data, this was repeated twice more. Doing each set of data collection three times allowed the group to collect data of greater reliability, because if an unusual rush of people had passed all at once then the data would not be distorted; we would be able to discard the data collected at the time of the rush and use the two other readings.

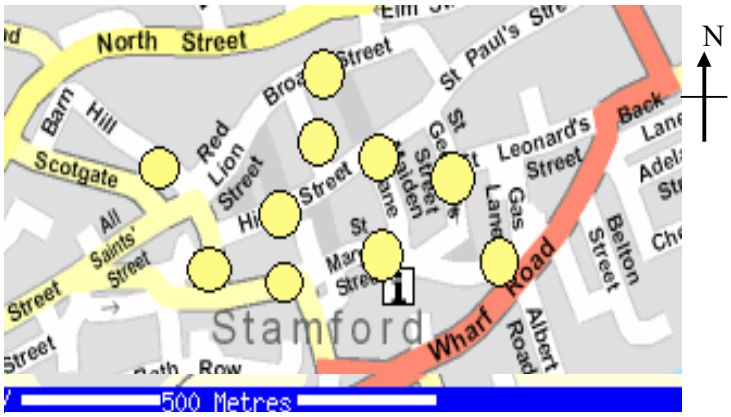


Fig. 2.1:
The ten town centre points assigned by the Department of Geography.

After counting pedestrians the group observed the buildings 50 metres either side of their point and noted down the shopping quality and street appearance, using the system of assessing *(fig. 2.2)* provided by the geography department of Rugby. The positions of any nearby rubbish bins were also noted down

	Shopping quality	Score (on a scale of 1 to 5)
A	Type of shop	1 = dominated by department/variety stores, or shops selling 'comparison' goods 5 = wide variety of shop types, convenience goods dominant 6 = no shops
B	Other land-use groups	1 = mainly shops 2 = shops and banks/building societies 4 = mainly offices 5 = very few shops – dominated by houses/industry
C	Retail organisations	1 = national chain stores dominant 3 = mixed – some national and independent 5 = small, independent shop units 6 = no shops
D	Quality of goods	1 = good quality and/or high price goods 5 = low quality and/or low price goods 6 = no goods sold.

TOTAL : 23

	Street appearance	Score (on a scale of 1 to 5)
E	Safety for pedestrians crossing street	1 = very safe 3 = busy street with pelican crossing 5 = high risk – busy street with no crossing
F	Shopping crowds	1 = very busy – large numbers of shoppers 5 = very quiet – few shoppers
G	Street cleanliness	1 = very clean – no litter 5 = very dirty – serious litter problem
H	Exterior appearance of shops	1 = well-maintained property/attractive window display 5 = poorly-maintained/very drab
I	Traffic/pedestrian segregation	1 = pedestrianised street/precinct 2 = buses only route 3 = open to all traffic – no parking 4 = open to all traffic – limited parking 5 = main traffic route – no parking restrictions
J	Vacant premises	1 = all premises occupied 5 = many vacant premises/cleared sites

TOTAL : 30

Fig. 2.2: This is the system used to measure street appearance and shopping quality at each point. The shopping quality was marked out of 23 and the street appearance out of 30. (Source: Geography Intranet)

Finally my group (stationed on centre point 4) also decided to conduct a questionnaire; the questions that they chose to ask were:

"Do you ever shop within 100m of where we are now" and "How far away from here do you live"

The group interviewed as many of the people who passed their point as possible in the time available, but not everyone agreed to answer the questions.

The groups were also each given a transect leading off from the centre of the town. The transects divided the town into seven sections. The transects were chosen intelligently by the Geography staff at Rugby, they were chosen to show the greatest change possible along their length and sample as much of the town as possible. Each transect branched out from the centre of Stamford, along a main road, providing safety and ease to walk along its length. The transects went away from Stamford until we could be sure it was not going to be the CBD anymore; ie. There were no longer any shops along the road, only houses. Each transect had three points along its length chosen intelligibly at roughly equal distances from each other to show the change with distance from the centre of Stamford. These points allowed us to use the transects as interrupted transects. We needed to assess these aspects of the town at each point because we hoped to see trends with increasing distance from the town centre; this would help us to delimit the CBD of Stamford, the aim of the project. The Data which was collected at each point was the number of pedestrians passing in five minutes, shopping quality and street appearance along its length. This information was collected in the same way as on the centre points. Again when groups pooled all the data they would each have a wide perspective of the town centre.

The groups were also assigned times to go to each of the points along the transects, each group did their 1st transect point at 12:30pm, point 2 at 13:00pm and then point 3 at 13:30. These times applied for all the other groups as well, to uniform the data collected between groups. At each of the points the number of cars and

pedestrians going into and out of the town were counted and the shopping area 50 metres either way was assessed. Our group also did the questionnaire along at each of its transect points. Finally the group observed the buildings 50 metres either side the transect point and noted down the shopping quality and street appearance. The group repeated all these steps at all the other transect points.

The group then worked its way back to the centre of Stamford noting down where any litter bins were.

Group Primary Data

There were seven groups of three people doing the seven transects and there were ten groups of two people assigned with a point in the centre of Stamford. Each of these groups followed the same method of timings and assessing the area for their assigned transects and points at the centre of Stamford. Once all the data had been pooled we had a very detailed picture of the main roads into Stamford, which took cross-sections of the layers of urban development in Stamford as transects. Shopping quality, pedestrian counts, street appearance and positions of rubbish bins were all available for our analysis.

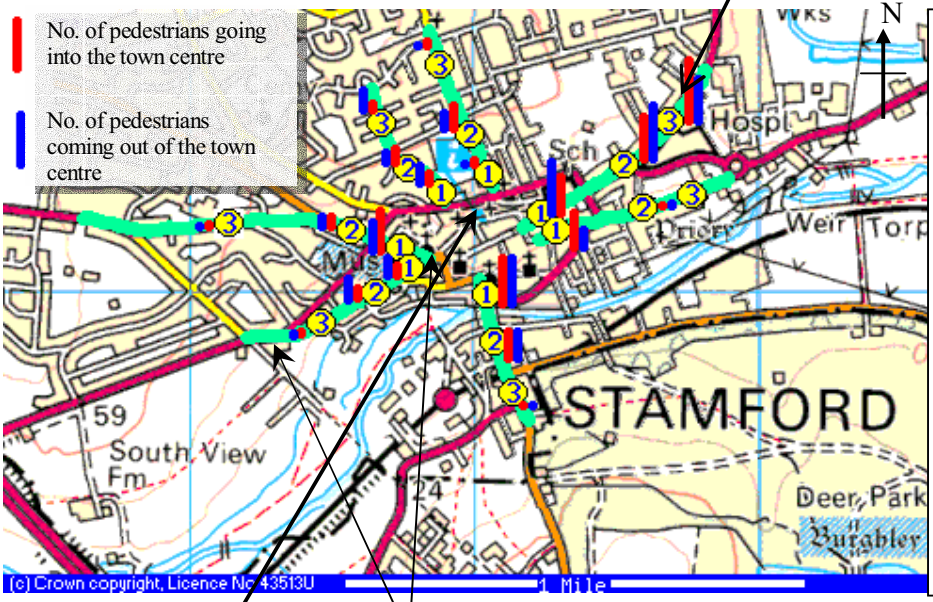
Secondary Data

It was also possible to find out the bid rent or rateable value of a building in the CBD using the VOA website (www.voa.gov.uk). The rateable values for stratified buildings along Broad Street, High Street, Iron Monger Street, All Saints Street, Maiden Lane, St Marys Street and Mary Hill were taken. The buildings chosen were on average three buildings apart (to see the actual buildings chosen see the rateable values section of the analysis and interpretation.). Once the buildings had been identified and their rateable values taken, the buildings area was measured by multiplying the width by the length. These dimensions were found by using the goad map provided by Experian which was to scale. The rateable value of the building could then be divided by the area to give a rateable index.

Lincolnshire Police kindly provided information on where crimes had recently taken place. The positions of the crimes were in address format so all that was necessary to present the results in was to mark the points on a map of Stamford centre. The Assaults and Criminal Damage data can also been used to give an indication of the centre of Stamford CBD. This was done by placing a numbered grid over the map and noting down the position on the grid, i.e. coordinates of each site of crime.

Results

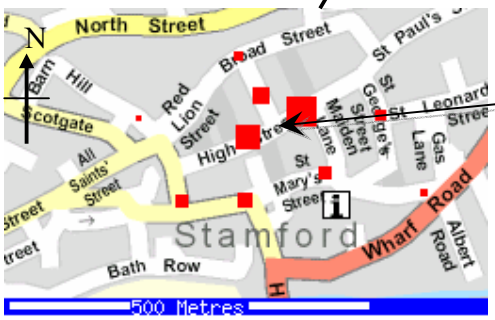
Pedestrian counts:



This area has an unusually high pedestrian count for so far out.

Fig. 3.1
Each bar on this map shows how many pedestrians past that transect point in Stamford. The greater the bar, the more pedestrians passed, on average, every five minutes. The height, in pixels of each bar of each square was calculated by using the formula: **Height = 2*No of pedestrians**

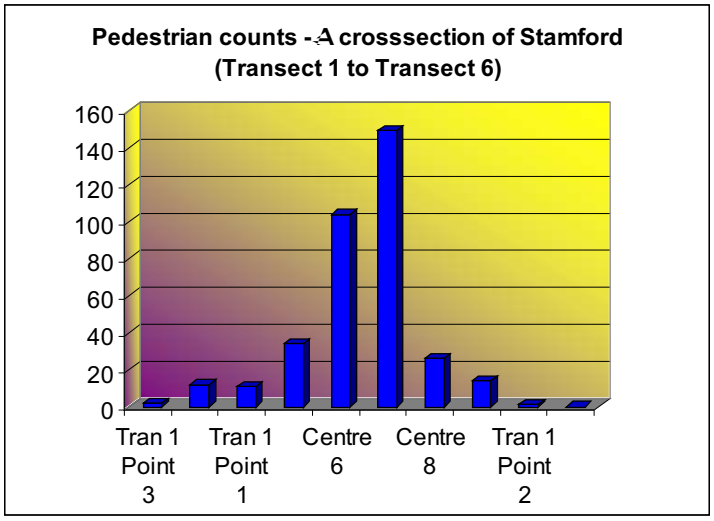
Along most transects one can see, as expected that pedestrian count decreases with increased distance from the town centre.



The high street shows a very high pedestrian count.

Fig. 3.2:
The centre area of Stamford has been enlarged because it would have been too cramped to display the centre results in *Fig. 4.1.* The area of each square was calculated by using the formula:
Area = 2*√(No of pedestrians/2)

Fig 3.3:
A bar graph to graphically show the increasing pedestrian count with decreasing distance from the CBD centre



Shopping Quality:

Fig. 4.1:
This map shows the SQ index at each transect point. The squares are sized proportionally with the SQ index measurements; the greater the square, the greater the SQ Index. The greater the SQ index is the lower the Shopping Quality in this area. The side length, in pixels of each box of each square was calculated by using the formula:
Area = 2*(SQ index recorded/0.23)

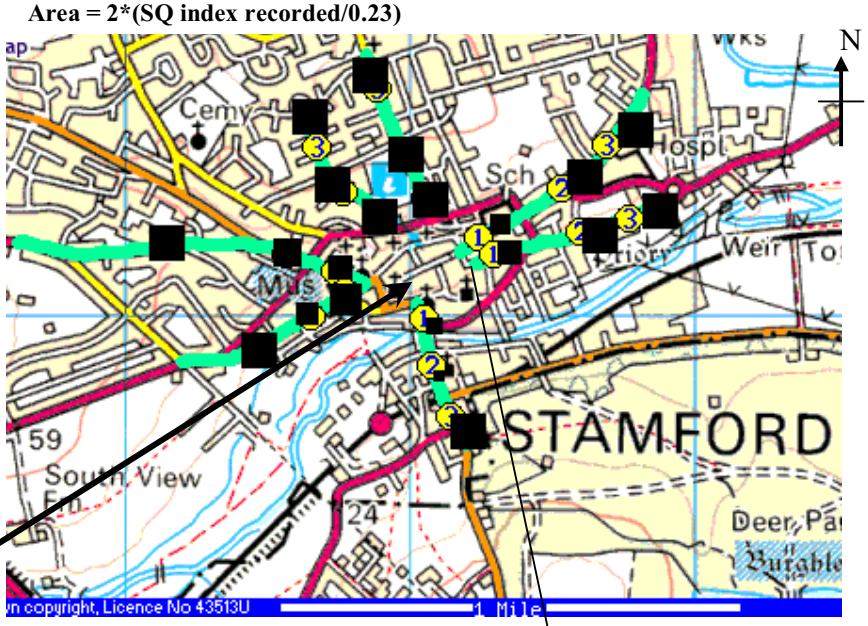
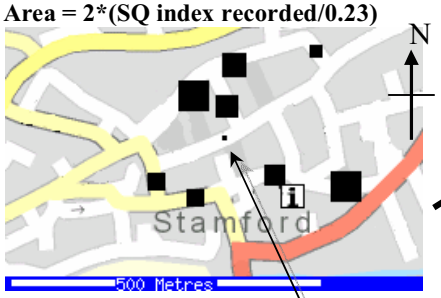


Fig. 4.2:
The centre area of Stamford has been enlarged because it would have been too cramped in *Fig 4.1*. The side length, in pixels of each box of each square was calculated by using the formula:
Area = 2*(SQ index recorded/0.23)

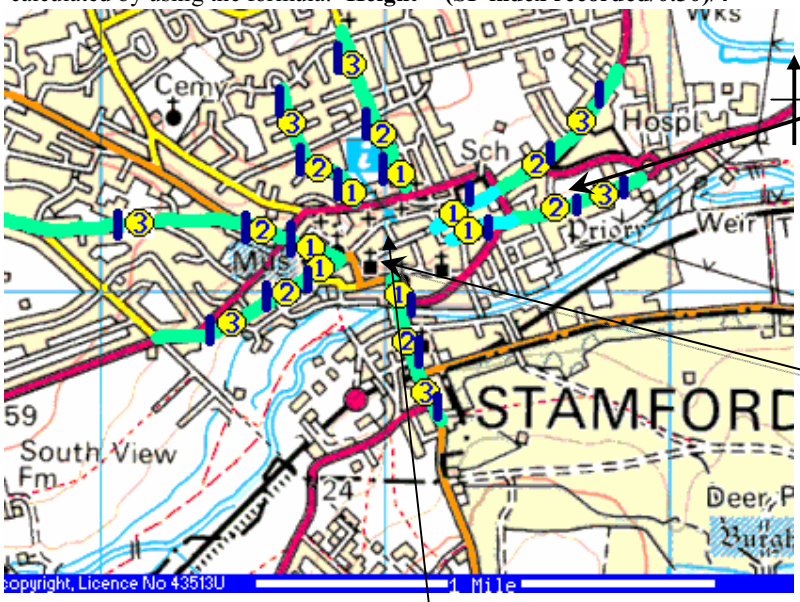


There is a trend of decreasing SQ indexes with decreasing distance from the town centre.

As one gets closer to the centre of Stamford one can still see a decreasing SQ index. The High Street at the very centre of Stamford has the lowest SQ index of all indicating a very good street appearance.

Street Appearance:

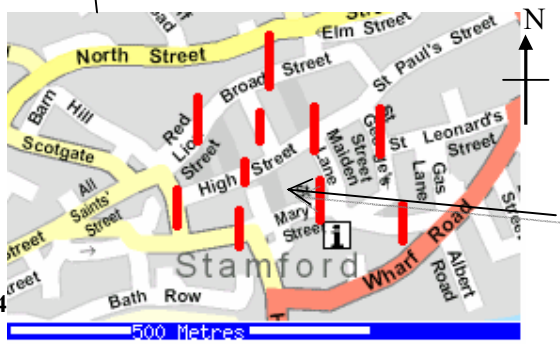
Fig. 5.1: Each bar on this graph represents the SP index recorded at each transect point; the greater the bar, the larger the SP index; the larger the SP index is, the lower the street appearance is at the transect point. The height, in pixels of each bar of each square was calculated by using the formula: **Height = (SP index recorded/0.30)/4**



There is little difference between th e recorded street appearances, but it is possible to notice a trend of a lower street appearance at the western side of the town.

There is a trend of decreasing SP indexes with decreasing distance from the town centre.

Fig. 5.2: Again the centre area has been enlarged to make it easier to distinguish the different SP indexes. The height, in pixels of each bar of each square was calculated by using the formula: **Height = (SP index recorded/0.30)*0.4**



Again one can see a drop of SP index values at the centre of the town.

Analysis and Interpretation

Pedestrian counts:

Centre point pedestrian counts

The average pedestrian count was calculated by summing the three measurements of each point and then dividing by three.

Centre Point	1	2	3	Average ped. Count
1	35	35	43	38
2	49	27	26	34
3	13	8	8	10
4	19	24	19	21
5	50	54	53	52
6	109	101	102	104
7	157	140	150	149
8	31	22	26	26
9	16	13	14	14
10	24	33	32	30

Transect point pedestrian counts – Into the centre of town

The average pedestrian count was calculated by summing the three measurements of each point and then dividing by three.

	P1				P2				P3			
	1	2	3	Av	1	2	3	Av	1	2	3	Av
Tran 1	8	3	7	6	5	6	7	6	2	2	0	1
Tran 2	11	11	10	11	3	10	5	6	1	2	1	1
Tran 3	2	3	5	3	7	3	1	4	2	1	4	2
Tran 4	2	1	1	1	9	6	4	6	4	0	1	2
Tran 5	6	15	9	10	15	12	8	12	21	18	10	16
Tran 6	8	8	12	9	1	0	0	0	0	0	0	0
Tran 7	11	15	11	12	5	7	11	8	1	0	0	0

Transect point pedestrian counts – Away from the centre of town

The average pedestrian count was calculated by summing the three measurements at each point and then dividing the sum by three.

	P1				P2				P3			
	1	2	3	Av	1	2	3	Av	1	2	3	Av
Tran 1	6	2	7	5	6	4	8	6	1	0	2	1
Tran 2	9	7	8	8	2	3	4	3	0	2	0	1
Tran 3	4	6	5	5	3	1	4	3	8	5	3	5
Tran 4	1	0	1	1	0	9	5	5	1	0	0	0
Tran 5	16	12	14	14	9	18	16	14	8	13	14	12
Tran 6	5	7	3	5	1	1	1	1	0	0	0	0
Tran 7	11	15	11	12	5	7	11	8	1	0	0	0

From the Pedestrian count results, illustrated in *fig. 3.1* and *3.2* one can see a trend of increasing numbers of pedestrians on the streets with decreasing distance

from the centre of Stamford, this is as predicted. Transect 5 breaks the trend of reducing pedestrian counts from point 1-3, transect five has large pedestrian counts at all three points, this indicates a north westward trend. The largest bars and boxes on the maps indicate that those points are part of the CBD. Because the CBD is likely to have many pedestrians walking on the streets. Many pedestrians will be walking in a CBD because of the high clustering of high order shops with high customer thresholds within the CBD. This high quality of shopping is mentioned in the shopping quality section of the results, interpretation and analysis. If one was to delimit the CBD from this map and results only one would probably end up with a similar map to *Fig. 3.4* and *3.5*. The ring for the CBD fringe (*Fig 3.4*) was marked out as an isoline where the Average pedestrian count was 8. The ring for the CBD core (*Fig 3.5*) was marked out as an isoline where the Average pedestrian count was 50. The area within the rings would then be the CBD core and CBD fringe.

Fig. 3.4: This map shows the rough delimitation of Stamford CBD fringe using the shopping quality data only.

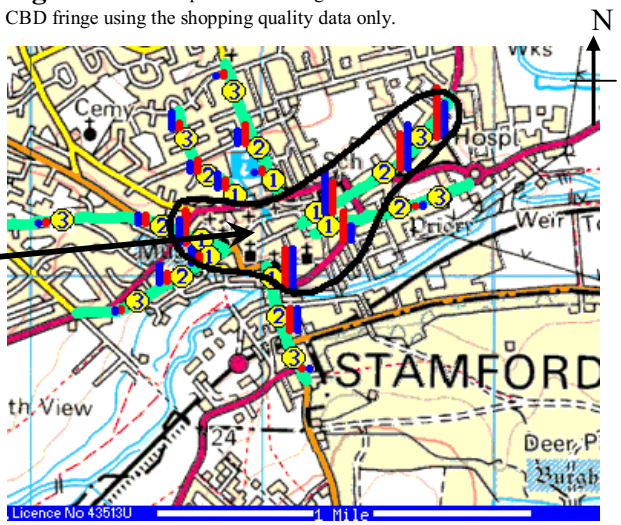
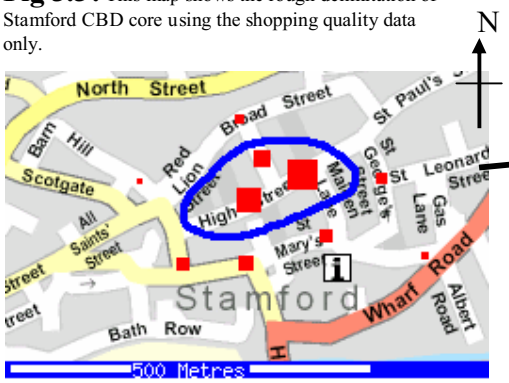


Fig 3.5: This map shows the rough delimitation of Stamford CBD core using the shopping quality data only.



Shopping Quality:

Shopping quality results measured using the SQ index are shown here with the SQ index percentage. The SQ index was marked out of 23. The SQ index was then turned into a percentage by dividing it by 23.

	SQ Index	SQ Index percentage
1	15	65%
2	14	61%
3	23	100%
4	10	43%
5	9	39%
6	4	17%
7		0%
8	10	43%
9	23	100%
10	16	70%

	Shopping Quality			Percentage		
	P1	P2	P3	P1	P2	P3
Tran 1	16	18	23	70%	78%	100%
Tran 2	20	15	23	87%	65%	100%
Tran 3	23	23	23	100%	100%	100%
Tran 4	23	23	23	100%	100%	100%
Tran 5	14	23	23	61%	100%	100%
Tran 6	16	23	23	70%	100%	100%
Tran 7	12	8	23	52%	35%	100%

From the Shopping Quality results, illustrated in *fig. 4.1* and 4.*2* one can see a trend of decreasing SP index and therefore increasing shopping quality with decreasing distance from the centre of Stamford, this is as predicted. The largest boxes on the maps indicate that those points are not part of the CBD because the CBD is likely to have a good shopping quality as it is a centre of commerce and business. Large businesses and chain stores will want to have their shops in the best places, Prices are pushed up (see rateable indexes) and the only companies able to afford the land are the large stores and many large well-known shops creates a good shopping quality and a low SQ index.

If one was to delimit the CBD from the shopping quality results only, one would probably end up with a similar map to *Fig. 4.3* and *4.4*. The ring for the CBD fringe (*Fig 4.3*) was marked out as an isoline where the SQ index was roughly 75%. The ring for the CBD core (*Fig 4.4*) was marked out as an isoline where the SQ index was 50%. The area within the rings would then be the CBD core and CBD fringe.

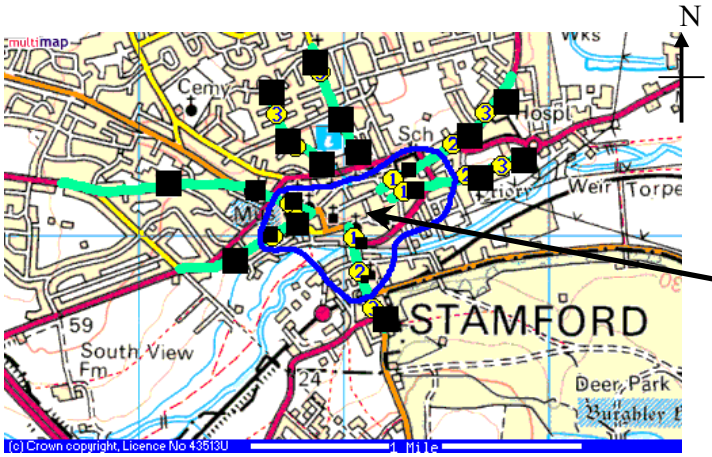
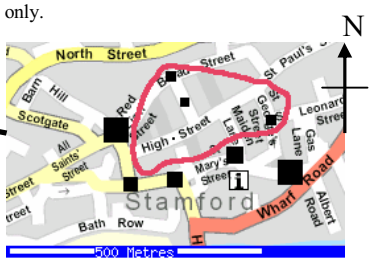


Fig. 4.3: This map shows the rough delimitatio n of Stamford CBD fringe using the shopping quality data only.

Fig. 4.4: This map shows the rough delimitation of Stamford CBD core using the shopping quality data only.



Street Appearance:

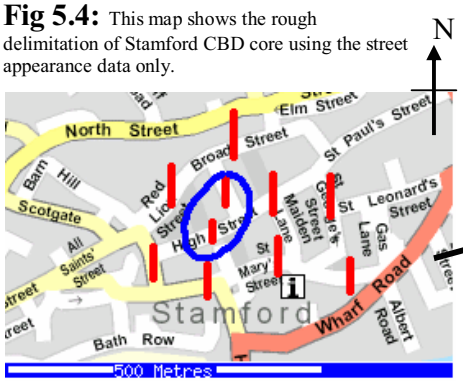
Street appearance results measured using the SP index are shown here with the SP index percentage. The SP index was marked out of 23. The SP index was then turned into a percentage by dividing it by 30

	SP Index	SP Index Percentage
1	14	47%
2	15	50%
3	17	57%
4	20	67%
5	12	40%
6	9	30%
7		0%
8	18	60%
9	14	47%
10	16	53%

	Street Appearance			Percentage		
	P1	P2	P3	P1	P2	P3
Tran 1	16	19	19	53%	63%	63%
Tran 2	24	20	19	80%	67%	63%
Tran 3	21	21	21	70%	70%	70%
Tran 4	21	21	21	70%	70%	70%
Tran 5	14	13	16	47%	43%	53%
Tran 6	15	11	13	50%	37%	43%
Tran 7	14	21	17	47%	70%	57%

From the Street appearance results, illustrated in *fig. 5.1* and 5.*2* one can see a trend of decreasing SP index and therefore increasing street appearance with decreasing distance from the centre of Stamford, this is as predicted. The largest bars on the maps indicate that those points are not part of the CBD because the CBD is likely to have a good street appearance as it is a centre of commerce and business and the council will want this place to be clean of litter and look good. This is because, if a place is really clean it will attract more people and more business meaning more revenue for the council. If one was to delimit the CBD from the street appearance results only one would probably end up with a similar map to *Fig. 5.3* and *5.4*. The ring for the CBD fringe (*Fig 5.3*) was marked out as an isoline where the SQ index was 50%. The ring for the CBD core (*Fig 5.4*) was marked out as an isoline where the SQ index was 40%. The area within the rings would then be the CBD core and CBD fringe. But the street appearance measurements were very close, not giving clear cut trends this data is unlikely to give a reliable delimitation.

Fig 5.4: This map shows the rough delimitation of Stamford CBD core using the street appearance data only.



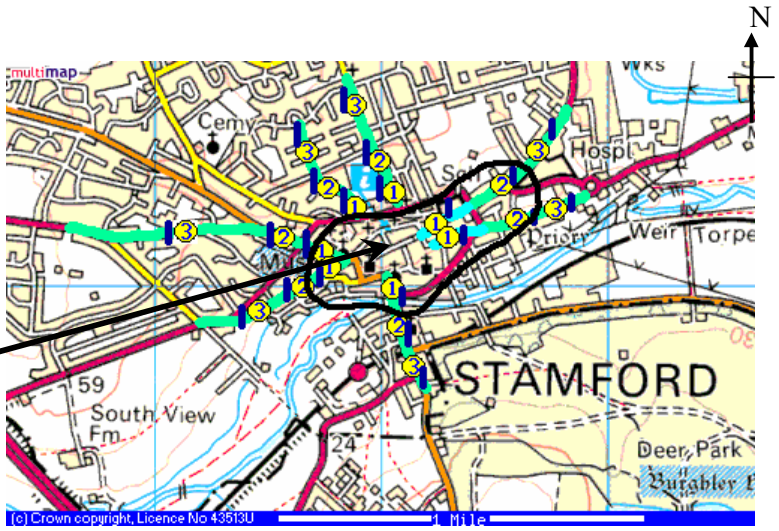


Fig. 5.3: This map shows the rough delimitation of Stamford CBD fringe using the street appearance data only.

The questionnaire

The questionnaire results for transect two and Centre point 4 were successful in giving clear trends (*fig 6.1 and 6.2*). A high percentage of people answered "yes" to the question "Do you ever shop within 50 metres of here" in the centre point 4. Also transect points 1 and 2 have both given a 60% answer of 'yes' to the question indicating that they are part of the CBD fringe but transect point 3 had no answers of 'yes' to the question, indicating that that point is not part of the CBD. If it was part of the CBD one would expect a high percentage of people answering 'yes' to the question because the CBD is the min shopping area of the town.

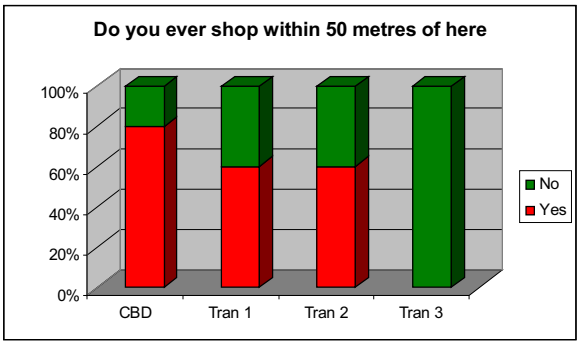


Fig. 6.1: This graph shows results for the question "Do you ever shop within 50 metres of here" which was asked along the second transect and the forth centre point in Stamford.

The second question, "How far away do you live" gave less clear cut results but there was still a trend that as one got further away from the centre people were living closer. One would expect people to have walked or driven longer distances to get to the CBD a) because the CBD contains few houses and b) because people will come a long way to get high order goods which are found in the centre of a town. As one got closer to the centre more of the people asked said they had travelled a greater distance to get to where there, which would suggest that these points were part of the CBD. The CBD point and to some extent transect point two (indicating that even though transect point 1 is closer it isn't as much part of the CBD as Transect point 2) contained people which answered that they had driven for over 30mins to get there. This suggests that these points are part of the CBD. But Transect point 1 and 3 both had 100% people walking to get there and in transect 3 50% of the people only walked 5 minutes to get there indicating those points were not part of the CBD.

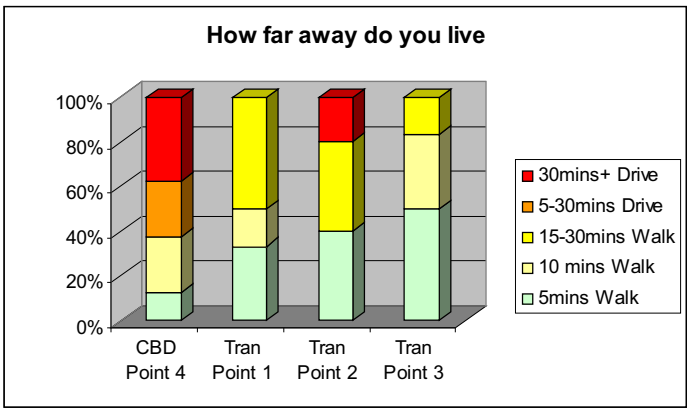


Fig. 6.2: This graph shows results for the question "How far away do you live" which was asked along the second transect and the forth centre point in Stamford

Assaults and Criminal Damage

The fold out A3 map (*Fig*. 7.1) in the results section shows all the places where criminal damage and assaults have taken place in 19/08/02 – 13/10/02. Each square on the map represents a point where a crime took place, red squares represent assaults and yellow squares represent criminal damage

As predicted they show an increase in density with decreasing distance from the centre of Stamford. A lot of criminal damage and assaults have taken place along Broad street and the High street, indicating that they are part of the CBD core. More assaults can be expected to have taken place in the CBD because there will be more people there to assault and they are likely to be carrying recently bought items. In the CBD there are more pubs and shops in which alcoholic beverages can be found and alcohol is known to increase the likelihood of criminal incidents. Therefore increased densities of criminal incidents are likely to be found in the CBD.

Using only this map and the Assaults and Criminal Damage data a rough delimitation of the CBD has been marked out. The blue ring represents the end of the CBD core and the dark green ring represents the end of the CBD fringe

The Assaults and Criminal Damage data can also been used to give an indication of the centre of Stamford CBD. This was done by placing a numbered grid over the map and noting down the position on the grid, i.e. coordinates each site of crime:

	Criminal damage			Assaults			Assaults & Criminal Damage	
	x	y		x	Y		x	Y
	0	26		4	16		178	385
	1	27		6	17		155	277
	2	13		6	15			
	3	23		7	15			
	4	14		7	16			
	6	15		7	16			
	6	15		8	11			
	8	9		8	11			
	8	14		8	15			
	8	15		8	16			
	8	17		8	16			
	8	17		9	16			
	9	13		9	17			
	9	13		9	17			
	9	14		9	17			
	9	15		10	15			
	9	15		14	13			
	9	16		18	18			
	9	21						
	11	12						
	12	16						
	12	26						
	18	19						
Total	178	385		155	277		333	662
Mean Average	7.73913	16.73913		8.6111	15.389		8.175121	16.06400966
Rounded to 0 decimal points	8	17		9	15		8	16

The mean average point was then calculated using the formula:

((Sum of all x's)/No. of points , (Sum of all y's)/No. of points)

The mean average point for all the crimes was calculated to be (8 , 16). This could be taken to be the rough centre of Stamford CBD

Rubbish bins

Fig. 8.1 (Fold out map in the results section) shows the points in Stamford where litter bins were found. There is a trend on the map of increasing density of litterbins with decreasing distance from the town centre. This is supported in the prediction.

To mathematically show the densities are actually increasing one has to work out the densities. To do this the points had to be divided up into different distances away from the centre point (the centre point determined in the Assaults and criminal damage section was used here). Circles of increasing radius have been drawn from the centre point at distances of 125m, 250m, 375m and 500m. The number of bins marked within each ring was then counted, the area of the ring was then calculated

using the formula: $\prod r^2 - \prod (r-125)^2$ when r = radius of the ring and the density calculated by dividing the number of points in the ring by the area:

Radius of ring	Number of points in ring	Calculation for area	Density calculation	Density
<125	12	$\prod 125^2 - \prod (0)^2$ =49087	12/49087 = $2.44 * 10^{-4}$	$2.44 * 10^{-4}$
<250	22	$\prod 250^2 - \prod (125)^2$ =147262	22/145262 = $1.51 * 10^{-4}$	$1.51 * 10^{-4}$
<375	5	$\prod 375^2 - \prod (250)^2$ =245436	5/245436 = $0.203 * 10^{-4}$	$0.203 * 10^{-4}$
<500	4	$\prod 500^2 - \prod (375)^2$ =34361	4/34361 = $0.116 * 10^{-4}$	$0.116 * 10^{-4}$

An increasing density trend can be observed

As predicted the density of litterbins increases with decreasing distance from the centre. But the densities of the 125m and 250m rings are quite large compared to the other two indicating that the two inner rings are part of the CBD and the other two are not.

Rateable Indexes

Rateable Value and Index for the centre of Stamford:
After sampling 60 buildings in Stamford central and taking their rateable value their area was also measured. To get a rateable value index the rateable value was divided by the total area of the building.

Building Type	Address	Rateable Value	Width	Length	Total area	Rateable Index
LAUNDERETTE AND PREMISES	25, BROAD STREET, STAMFORD, LINCS	3,150	22	5	110	29
SHOP AND PREMISES	31, BROAD STREET, STAMFORD, LINCS	7,500	15	7	105	71
MUSEUM AND PREMISES	33, STAMFORD MUSEUM, BROAD STREET, STAMFORD, LINCS	20,000	8	19	152	132
SHOP AND PREMISES	37, BROAD STREET, STAMFORD, LINCS	4,750	3	7	21	226
SHOP AND PREMISES	40, BROAD STREET, STAMFORD, LINCS	7,200	7	4	28	257
SHOP RESTAURANT AND PREMISES	52, BROAD STREET, STAMFORD, LINCS	15,750	10	5	50	315
CAFE AND PREMISES	1, RED LION STREET, STAMFORD, LINCS	8,400	7	5	35	240
SHOP AND PREMISES	3, RED LION STREET, STAMFORD, LINCS	9,000	7	5	35	257
SHOP AND PREMISES	5, RED LION STREET, STAMFORD, LINCS	9,750	9	2	18	542
SHOP AND PREMISES	10, RED LION STREET, STAMFORD, LINCS	7,700	5	7	35	220
SHOP AND PREMISES	3, HIGH STREET, STAMFORD, LINCS	17,500	5	2	10	1750
SHOP AND PREMISES	5, HIGH STREET, STAMFORD, LINCS	49,000	17	6	102	480
SHOP AND PREMISES	7, HIGH STREET, STAMFORD, LINCS	39,600	15	4	60	660
SHOP & PREMISES	9, HIGH STREET, STAMFORD, LINCS	42,500	20	5	100	425

SHOP AND PREMISES	14, HIGH STREET, STAMFORD, LINCS	34,500	12	3	36	958
SHOP AND PREMISES	17, HIGH STREET, STAMFORD, LINCS	38,500	20	5	100	385
BETTING SHOP & PREMISES	20, HIGH STREET, STAMFORD, LINCS	24,250	9	2	18	1347
SHOP AND PREMISES	24, HIGH STREET, STAMFORD, LINCS	29,000	13	3	39	744
SHOP AND PREMISES	28, HIGH STREET, STAMFORD, LINCS	10,750	8	2	16	672
SHOP AND PREMISES	33, HIGH STREET, STAMFORD, LINCS	18,250	16	3	48	380
SHOP AND PREMISES	36, HIGH STREET, STAMFORD, LINCS	13,000	10	7	70	186
SHOP AND PREMISES	48, HIGH STREET, STAMFORD, LINCS	19,750	11	3	33	598
SHOP AND PREMISES	UNIT 2, HIGH STREET, STAMFORD, LINCS	43,000	10	5	50	860
SHOP AND PREMISES	56, HIGH STREET, STAMFORD, LINCS	50,000	12	6	72	694
SHOP AND PREMISES	62, HIGH STREET, STAMFORD, LINCS	68,500	16	7	112	612
SHOP AND PREMISES	66-67, HIGH STREET, STAMFORD, LINCS	74,000	23	9	207	357
SHOP AND PREMISES	71, HIGH STREET, STAMFORD, LINCS	22,500	10	3	30	750
SHOP AND PREMISES	74, HIGH STREET, STAMFORD, LINCS	20,000	5	7	35	571
SHOP AND PREMISES	1, IRONMONGER STREET, STAMFORD, LINCS	9,700	7	7	49	198
SHOP AND PREMISES	5, IRONMONGER STREET, STAMFORD, LINCS	10,000	4	7	28	357
SHOP AND PREMISES	9, IRONMONGER STREET, STAMFORD, LINCS	9,700	7	3	21	462
SHOP AND PREMISES	14, IRONMONGER STREET, STAMFORD, LINCS	7,500	7	5	35	214
SHOP AND PREMISES	4, ST PAULS STREET, STAMFORD, LINCS	9,900	4	7	28	354
PUBLIC HOUSE AND PREMISES	HALF MOON 6, ST PAULS STREET, STAMFORD, LINCS	8,300	7	12	84	99
SHOP AND PREMISES	10, ST PAULS STREET, STAMFORD, LINCS	4,000	23	2	46	87
SHOP AND PREMISES	43, ST PAULS STREET, STAMFORD, LINCS	9,300	19	3	57	163
SHOP AND PREMISES	4-5, ST GEORGES STREET, STAMFORD, LINCS	4,150	9	6	54	77
OFFICES AND PREMISES	3, MAIDEN LANE, STAMFORD, LINCS	5,600	11	3	33	170
SHOP AND PREMISES	15, MAIDEN LANE, STAMFORD, LINCS	4,650	7	2	14	332
SHOP AND PREMISES	18, MAIDEN LANE, STAMFORD, LINCS	8,100	11	3	33	245
SHOP AND PREMISES	2, RED LION SQUARE, STAMFORD, LINCS	14,500	10	5	50	290
SHOP AND PREMISES	4, RED LION SQUARE, STAMFORD, LINCS	14,250	10	4	40	356
SHOP AND PREMISES	8, RED LION SQUARE, STAMFORD, LINCS	12,000	9	4	36	333
SHOP AND PREMISES	10, RED LION SQUARE, STAMFORD, LINCS	10,750	10	5	50	215
RESTAURANT AND PREMISES	9-10, ST JOHNS STREET, STAMFORD, LINCS	35,500	21	6	126	282
SHOP AND PREMISES	5, CASTLE STREET, STAMFORD, LINCS	6,500	14	7	98	66
CAFE AND PREMISES	1-2, CASTLE STREET, STAMFORD, LINCS	9,700	12	4	48	202
SHOP AND PREMISES	5, ST MARYS STREET, STAMFORD, LINCS	14,750	10	5	50	295
SHOP AND PREMISES	9A, ST MARYS STREET, STAMFORD, LINCS	7,600	14	2	28	271
SHOP AND PREMISES	14, ST MARYS STREET, STAMFORD, LINCS	11,500	12	4	48	240
SHOP AND PREMISES	18, ST MARYS STREET, STAMFORD, LINCS	6,200	17	3	51	122
SHOP AND PREMISES	35-36, ST MARYS STREET, STAMFORD, LINCS	23,750	12	8	96	247
SHOP AND PREMISES	40, ST MARYS STREET, STAMFORD, LINCS	11,500	21	5	105	110
RESTAURANT AND PREMISES	43, ST MARYS STREET, STAMFORD, LINCS	6,300	10	2	20	315
SHOP AND	5, ST MARYS HILL, STAMFORD,	3,900	12	3	36	108

PREMISES	LINCS					
SHOP AND PREMISES	9, ST MARYS HILL, STAMFORD, LINCS	5,200	12	4	48	108
RESTAURANT AND PREMISES	13, ST MARYS HILL, STAMFORD, LINCS	13,500	23	3	69	196
SHOP AND PREMISES	16, ST MARYS HILL, STAMFORD, LINCS	6,600	7	3	21	314
RESTAURANT AND PREMISES	2, ALL SAINTS STREET, STAMFORD, LINCS	8,000	18	5	90	89
SHOP AND PREMISES	4, ALL SAINTS STREET, STAMFORD, LINCS	3,400	4	3	12	283
SHOP AND PREMISES	5-6, ALL SAINTS STREET, STAMFORD, LINCS	19,000	8	7	56	339

The three leaf map, labelled *Fig 9.1* is a graphical representation of the results collected on Rateable Index. On the back sheet, a goad map, the individual sampled buildings have been coloured in categories depending on their calculated rateable index. The OHT top sheet has the calculated rateable indexes of each building written out in their respective positions on the Stamford map. On the middle sheet of tracing paper, isolines have been drawn. These have been done with a different colour coding and categorising system to the back sheet in order to emphasize the trends shown. The trends are that with decreasing distance from the centre of Stamford the Rateable index increased, with the most expensive buildings being in the very centre, on the High street. The buildings in the CBD are more expensive because there are more pedestrians (discussed in the pedestrian count section of the analysis and interpretation) in the CBD which will be willing to spend money in shops. There is an environment in the CBD which attracts shoppers and clients because the CBD has good street appearance (discussed in the street appearance section of analysis and interpretation), high quality shopping (also discussed in analysis and interpretation) chains will also be willing to pay more for desirable premises. The rateable index is an index with is proportional to how desirable premises are. The trends in the results indicate therefore that, the CBD fringe is at a rateable index of around 250 and the CBD core has a rateable index of over 400.

Conclusions

All the results have given a very similar set of trends and estimates of the CBD core and fringe limits. Shopping quality, Street appearance, number of pedestrians on streets, Assaults, Criminal damage and rateable index all increased with decreasing distance from the centre of Stamford, similarly the high point was usually the high street. Shown below on a map of Stamford are the estimations already made using each set of data of the Stamford CBD fringe:

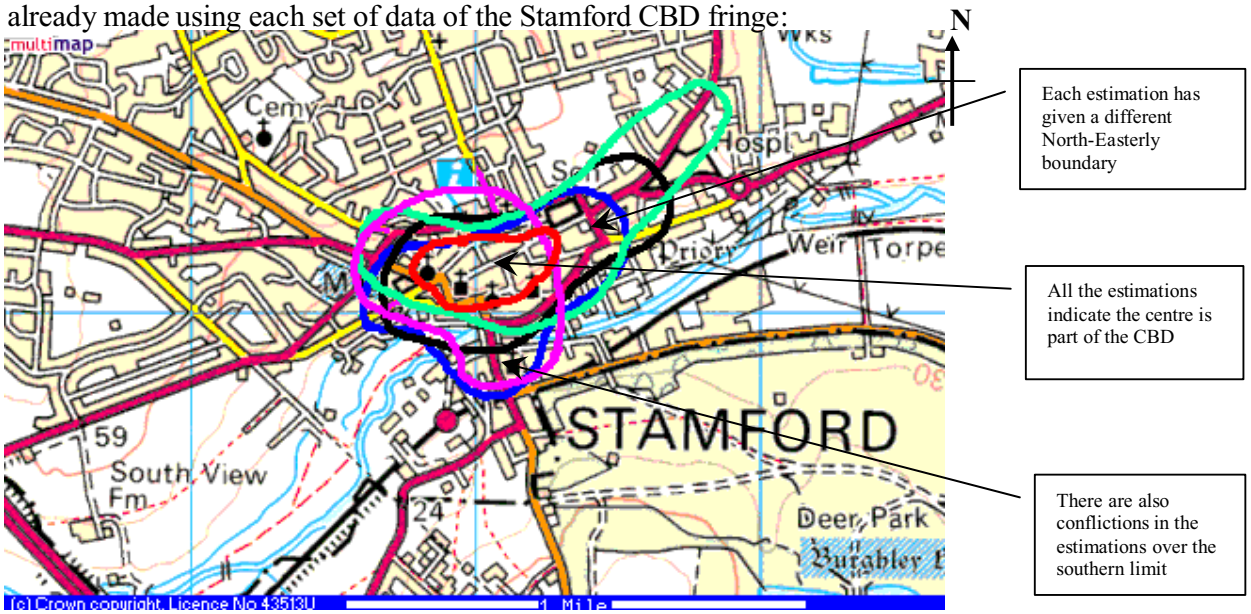


Fig. 10.1: A map of Stamford with the delimitations made using the data from Shopping quality (Blue), Street appearance (Black), Pedestrian counts (Green), Crime (Pink) and Rateable index results (Red).

All of the estimations for the delimits of Stamford cover the high street and Broad street and at least half of St Marys Street. There is conflicting evidence though, in the Data over the position of the North-East and Southern limit of the CBD fringe.

To combine all the data and make a singe delimitation of the CBD fringe can be done by averaging out the estimations made by each of the results, this average can then be taken to be the delimits of Stamford CBD Fringe:

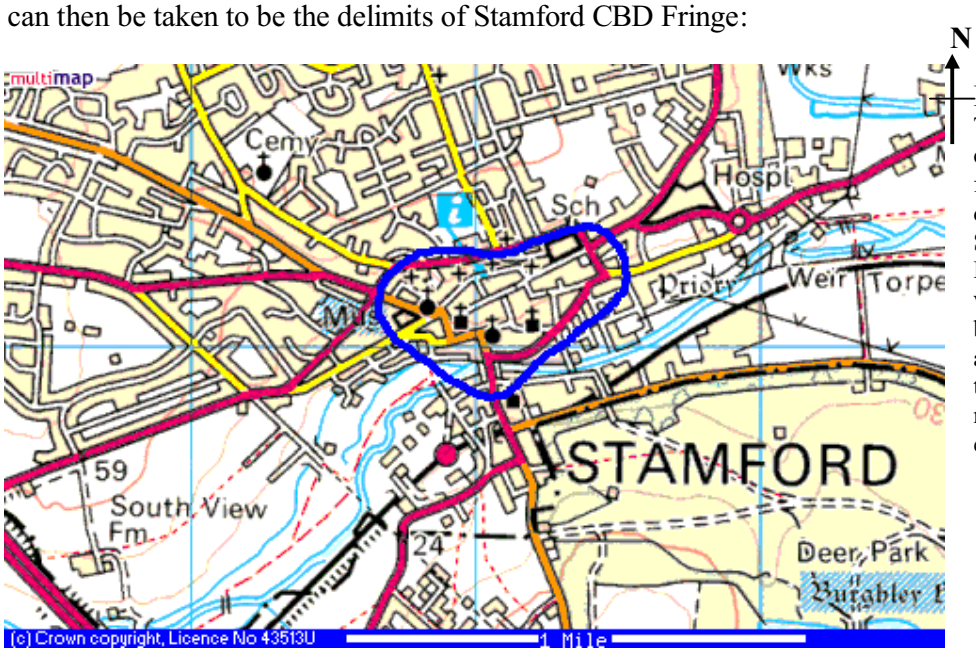


Fig. 10.2: This is the concluded CBD fringe delimitation of Stamford, Lincolnshire. It was calculated by taking the average of all the estimations made using each set of data.

The result for litterbins also suggested that the CBD ended at about 250m from the centre point. This reinforces the conclusion drawn because the delimitation is about 200m away from the centre point on average.

Shown below on a map of Stamford are the estimations already made using each set of data of the Stamford CBD core:

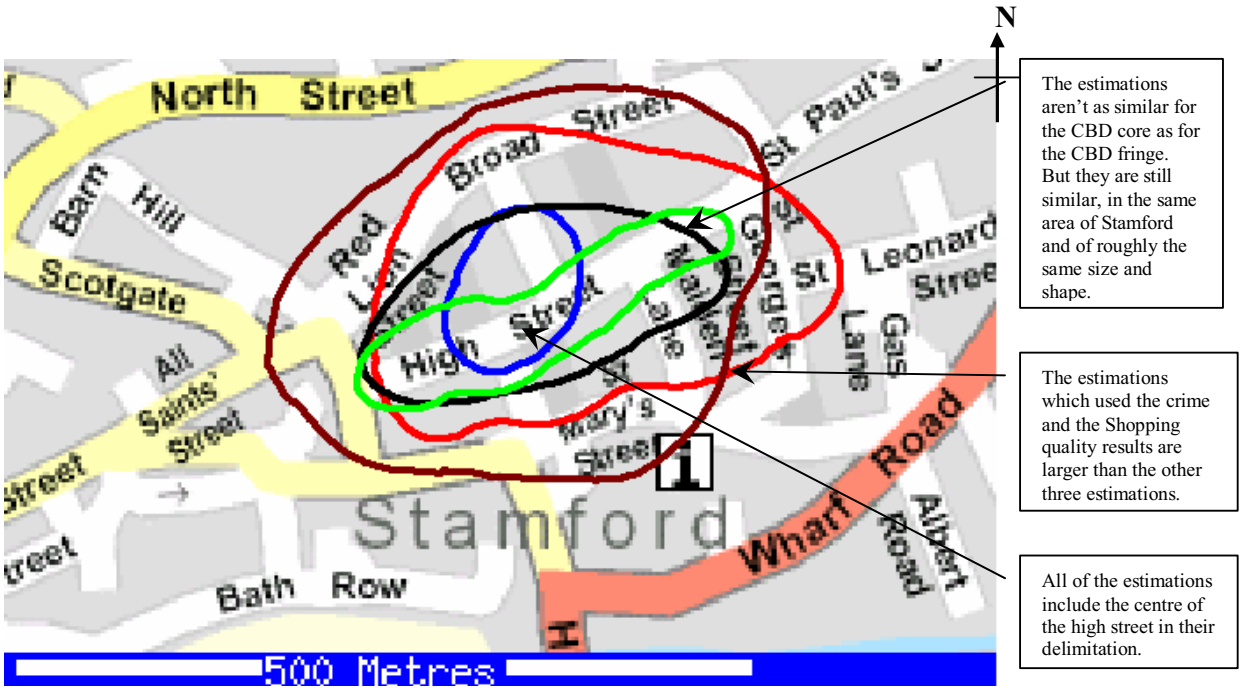


Fig. 10.3: A map of the centre of Stamford with the delimitations made using the data from Shopping quality (Red), Street appearance (blue), Pedestrian counts (Black), Crime (Brown) and Rateable index results (Green).

All of the estimations for the delimits of Stamford CBD core cover the high street and Broad street and at least half of St Marys street. There is conflicting evidence though, in the Data over the size of the CBD core with the estimations differing on their southern and Northern borders.

To combine all the data and make a singe delimitation of the CBD core can be done by averaging out the estimations made by each of the result, this average can then be taken to be the delimits of Stamford CBD Fringe:

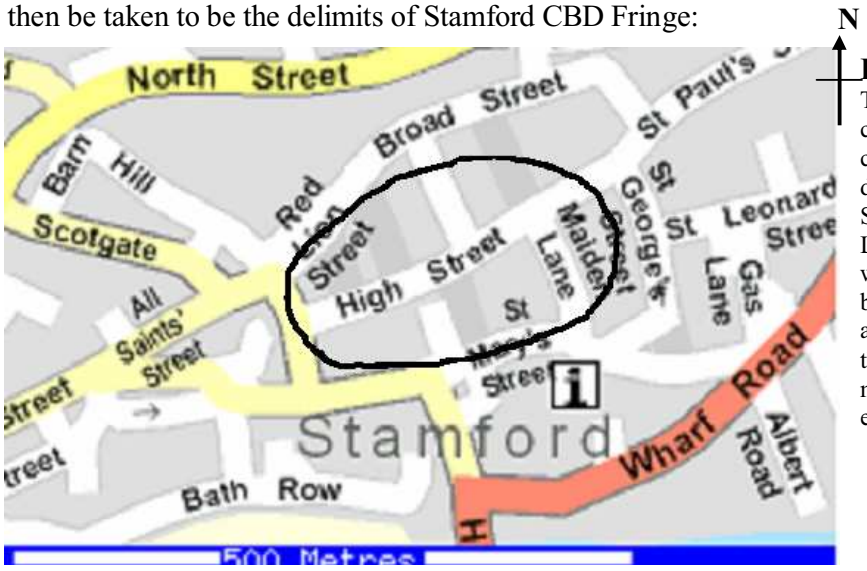


Fig. 10.4: This is the concluded CBD core delimitation of Stamford, Lincolnshire. It was calculated by taking the average of all the estimations made using each set of data.

Evaluation

The investigation and delimitation of Stamford CBD has been successful. Each piece of data collected provided roughly the same trends indicating that they are reliable and that none of our data collection techniques were wildly awry. There were some problems and limitations though, which we encountered whilst conducting the investigation.

Pilot error

There was also a problem in the use of so many small groups of pupils, because each group had a slightly different idea of the aim of the project and the things which needed to be counted or measured in Stamford, each group might also rate streets of the same quality differently to other groups. All this accounted for an increased unreliability and inaccuracy. This inaccuracy is likely to have been reflected in the conclusions drawn in the conclusions section. One method which could have been used to increase reliability of results would be to have done the data collection three times on different days and have different groups collecting the data. Not only would this reduce the pilot error and unreliability it would show up freak occurrences which just happened on one day, e.g. a school trip increasing a pedestrian count or the street having been recently cleaned increasing the recorded street appearance on one of the days.

Survey error

There were some problems with the sampling strategy as well, the Department of Geography at Rugby chose to use a set of stratified points in Stamford chosen to be at sites of interest where change was likely to be seen. This may have warped the results slightly. Possibly a better strategy would have been to have placed the points randomly and/or at equal distances from each other. But this is also open to luck and chance of position choice so the best strategy would have been to have many points.

It would have been better if we could have collected data from more indicators of whether a point is in the CBD or not, for example we could have recorded the price some everyday items were selling in shops. If we did this we would expect increasing price with decreasing distance from the CBD.

It would also have been good if we could have collected data on number of cars passing the points every five minutes. The results expected for this would be similar to the pedestrian count, increasing with decreasing distance from the centre. Although pedestrianised zones would limit the results they would still give one a fuller picture of the nature of Stamford at each point which in turn would make it easier to delimit the CBD.

It would have been preferred if we could have expanded on our data, having more points of collection, but as this was only a GCSE project it wouldn't have been possible to spend more time. It would also have been better if the questionnaire had been conducted at every centre point and transect point, not just transect 2 and CBD 4. If there had been more people or more time this would all have been possible.

Summary

Overall the investigation produced an informed delimitation estimate of Stamford CBD Fringe and Core but the accuracy and reliability would not be sufficient for it to be called a definite and accurate delimitation or to make it commercially viable.

Bibliography

Maps from www.multimap.com
Crime data provided by Lincolnshire police
Rateable values taken from www.voa.gov.org
Goad map from Experian
Class notes
The department of Geography intranet

Appendices

Pedestrian count

See page 14

Street appearance

See page 17

Shopping Quality

See page 16

Rateable index

See page 17

Questionnaire

"Do you ever shop within 50 metres of here?"

	Yes	No	TOTAL
CBD	8	2	10
Tran Point 1	6	4	10
Tran Point 2	3	2	5
Tran Point 3	0	5	5

"How far away do you live?"

	5mins Walk	10mins Walk	15-30mins Walk	5-30mins Drive	30mins+ Drive	TOTAL
CBD Point 4	1	2		2	3	9
Tran Point 1	4	2	6			12
Tran Point 2	2	0	2		1	5
Tran Point 3	3	2	1			6