

## **Abstract To The Tilley Award Application 2000**

**By**

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**(395 words)**

## **Title**

**The Development Of A Computerised System To Retrieve And Analyse  
Information From The Merseyside Police's Command And Control  
Mainframe Computer**

## **Nature of the Problem**

The main problem addressed was to find a system to utilise the information held on computer to scan and analyse incidents of crime and disorder, mapping these incidents to ascertain the location and frequency of offences, assisting officers to complete their SARA enquiries.

*"Effective interventions targeted at repeat victims can  
significantly reduce crime"*

Problem Solving Tips, originally produced by U.S.  
Department of Justice. Adapted by Merseyside Police  
Problem Solving Team.

## **Evidence used to define the problem**

Senior police officers asked personnel from the IT Department if it was possible to extract and interrogate Command and Control and to analyse the results. They were told that it was impossible.

## **Response**

The focus of the problem for me shifted to the question of extracting data from the mainframe and analysing it. Nobody told me it was impossible. A Copernican Revolution was about to take place. As each new problem arose I was presented with new challenges, new ways of doing things and new success criteria. I felt compelled to learn advanced database techniques and programming together with advanced spreadsheet functions and development skills.

## **Assessment**

As a result I was able to produce a system which was recognised by Chief Constable Norman Bettison as being a major achievement. It was adopted throughout each and every area within Merseyside Police and is estimated to save the Force £1 million in the first year.

## **Conclusion**

My knowledge and experience of Epistemology and in depth study of Problem Solving Policing have been invaluable in assisting me to develop the Incident Retrieval System which has the following benefits:-

- There is no double-key inputting
- Can search back through many thousand records
- Is extremely fast
- Is easy to use with a minimal of training

- Can identify hotspots of crime or disorder
- Data can be charted by Day, Month and Time
- Is flexible enough to combine different types of incident
- Can combine a number of streets to examine problems within a small neighbourhood
- Key words can be used to filter only specific incidents e.g. "stones" re: Youth Disorder or "glass" re: Public House Disorder.

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# Contents

# Page

<b>BACKGROUND</b> .....	4
<b>THE PROBLEM</b> .....	5
<b>A SHARP LEARNING CURVE</b> .....	7
AN UNQUALIFIED SUCCESS.....	8
A FURTHER CHALLENGE.....	9
<b>PROBLEM SOLVING POLICING</b> .....	10
<b>THE INCIDENT RETRIEVAL SYSTEM</b> .....	13
<b>ASSUMPTIONS BASED ON EXPERIENCE</b> .....	15
<b>SUCCESS CRITERIA</b> .....	16
<b>CONCLUSION</b> .....	17
<b>APPENDIX 1</b> .....	18
EXAMPLE OF A TIME CHART.....	18
EXAMPLE OF A DAY CHART.....	18
BEAT PROFILE CHART.....	19
A "HOT SPOT" ANALYSTS.....	20
<b>APPENDIX 2</b> .....	21
RECOGNITION FOR THE WORK OF THE IRS.....	21

*Astronomers work always with the past; because light takes time to move from one place to another, they see things as they were, not as they are.*

- Neale E. Howard (taken from "Crime and Everyday Life" Chapter 9 by Marcus Felson.

## Background

In order to SCAN ANALYSE and ASSESS any project it is essential to have relevant and timely data from which to work. Evidence is necessary to define a problem. Anecdotal evidence, whilst carrying emotional weight cannot and should not be the starting point for embarking upon a problem. Empirical evidence is necessary.

Having studied Epistemology- that branch of philosophy dealing with the nature and scope of knowledge - at Durham I am fully aware of the need for timely and relevant data as a starting point for further investigation.

With the advent of the introduction of the Crime and Disorder Act by the Government, it was important to find out what, if any relationships existed between Disorder incidents and Crime. There is much anecdotal evidence here. People generally use phrases like "... *it's obvious...* " or "... *it's common sense ...* ", when referring to youths gathering and damage caused, but the evidence in **fact** is missing.

Merseyside Police had recently adopted the Problem Orientated Policing Model "SARA" as a basis from which to act. Their training program was well underway and I familiarised myself with this model.

## The Problem

Apart from specific detailed studies into the relationships between Crime, Disorder, Socio-economic conditions and demographic features carried out by universities there was no easy, fast and repeatable method of obtaining the initial information from which to form a solid grounding for further study.

*This project was,* therefore trying to find a suitable computerised system which would extract chosen data and then analyse it for use in SARA packages in helping to Scan, to Analyse and later to Assess the impact of the chosen Response.

I searched Police Areas and Departments throughout Merseyside Police for a system, which would allow me to investigate possible links between Crimes and Disorder Incidents as recorded on the force Command and Control Mainframe computer. What I found were officers reading through mountains of computer printouts relating to disorder incidents within their patrol areas. They were creating databases and typing in information, which they considered relevant.

This double-key inputting tied up precious resources at a time when all Police Forces were required to cut costs. Also, and just as importantly, this process was very slow, tedious, subject to inputting errors and did not link disorder incidents with those of crime as only disorder incidents were recorded. By the time the database incidents were typed in the

information was out of date being, in some cases, five months out of date. Officers were always working "in the past" with no relevant and timely data.

Merseyside Police's own IT Department were working towards a "data warehouse" system that could service the whole force. As yet, no workable systems have been developed by the IT department to interrogate their Command and Control system, let alone analyse information coming from the system.

I asked myself the question: Where is the Youth Disorder information held? The answer was clear: On the Command and Control Mainframe Computer. I then had a choice. I could "trawl" through the Command and Control Mainframe, print out the information required from my own terminal or I could ask for a special request form from the IT department at Headquarters, called a CERRI query which would give me more paperwork, mountains of it, in fact.

I categorically refused to do any double-key inputting, saying to myself if the information is in the computer I need to get it out." After numerous enquiries and help from the IT Department at Headquarters I was given a floppy disk holding all the Command and Control data for a month for the Police area where I worked, many hundreds of incidents. I was very pleased. The data could be accessed without being printed out. This, in itself, was a major break-through.

## **A Sharp Learning Curve**

My joy, however, was short-lived. I did not know how to use the data or even how to get it into a database. Having borrowed some "teach yourself" books from a library I quickly built a database and imported the incidents obtained from the floppy disk into this database. I found that some of the formatting was quite unusual for a database of this type. The data, for instance, was in Julian Date format with the year tagged onto the front. The Julian Date format numbers each day of the year consecutively so January 1<sup>st</sup> is One, January second is Two, January 31<sup>st</sup> is 31 and February 1<sup>st</sup> is 32 and so on. The time was in text formatting, making it impossible to complete calculations based upon time.

I decided that the time, date and other calculations needed to be correct prior to importing into the database. If they were converted dynamically at run-time, the database would soon slow down considerably as the incidents populating the database grew.

I was completely stuck and frustrated. I could get the relevant data out of Command and Control. I had learned about database design and programming and knew that I could interrogate the information inside the database. But, I could not get the data in there. I made many and varied enquiries with IT personnel within Merseyside Police, with developers in "GEC", Liverpool City Council and independent consultants. I also contacted "newsgroups" over the Internet.

All responded by acknowledging the problems but offered no viable solution. I was given a glimmer of hope when someone suggested "data parsing" the text file into a spreadsheet program from where it could be manipulated. I immediately responded by searching the help files for the meaning of the term "data parsing" and having had no formal training at all I decided to learn advanced spreadsheet functions, after learning the basics, of course.

### ***An Unqualified Success***

It took me over two hours of patient, painstakingly hard work and concentration to turn one month's worth of Command and Control incidents into something the database could use. For me this was an unqualified success: Only two hour's work for all Command and Control incidents compared to very many days of work for data inputters collecting only Youth Disorder. At last, I had the beginnings of a tool that officers could use for their SARA enquiries.

This system was still not "smart" and users would have needed an advanced level of database programming to use the system correctly. I spoke about this problem widely amongst database designers and I was left with two alternatives:

1. Train everyone up to advanced level in database programming
2. Make the system easy for anyone to use.

Alternative one was not viable so I opted for number two. A seasoned database designer', said to me :

*"You realise that you will have to think of all  
the possible questions your users might ask and  
build all these questions into the user interface,  
the front end"*

Mr.W Leadbetter

### ***A Further Challenge***

Now there is a challenge: To think about every possible question and combination of questions that anybody might possibly ask of the database and then program those questions into the database.

## Problem Solving Policing

Some years before, in July 1996 I applied for the post of Crime Prevention Officer for the St. Helens Area within Merseyside Police. As part of my research, I studied much on the Problem Orientated Policing Philosophy. I read:

- "Broken Windows" - Atlantic Monthly 1982, by James Q. Wilson and George L. Kenning.
- "The Morgan Report" - setting the standards and good practices for Crime Prevention, underpinning its ethos.
- "Crime and Everyday Life" - Marcus Felson (1994)

together with a couple of practical guides for Crime Prevention partnership initiatives.

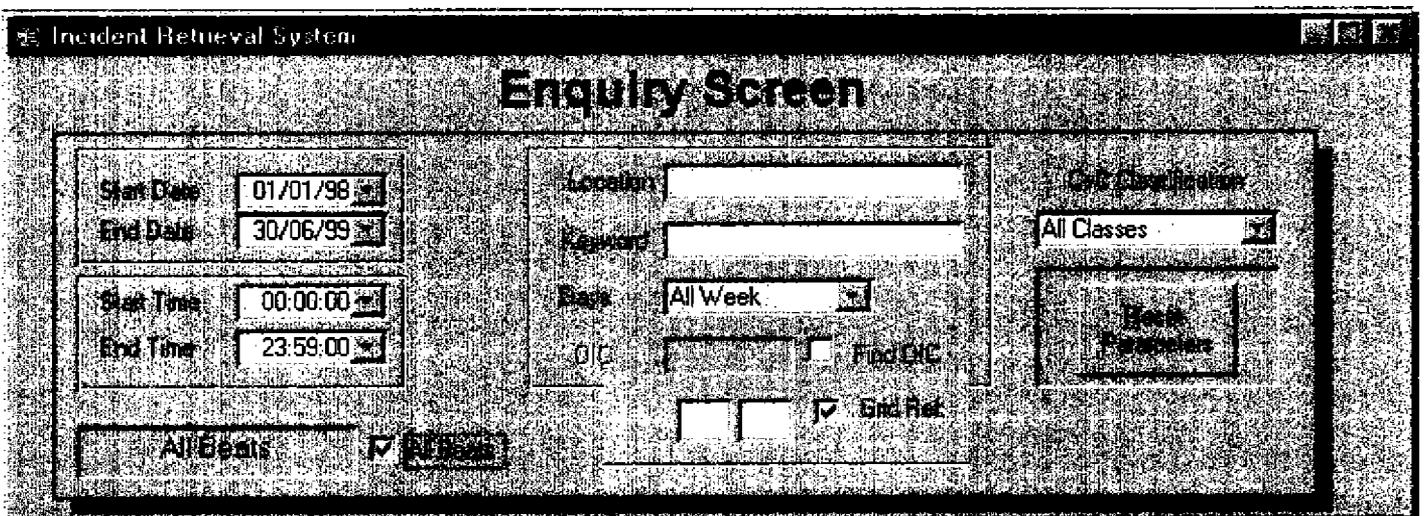
Although unsuccessful in my application, I embraced the Problem Orientated Policing approach. With the introduction of the SARA model and the advent of the Crime and Disorder Act I knew that the most frequent interrogations of my database would be by way of :-

- Repeat victimisation of burglary and violence
- Repeat Disorder incidents especially Youth Disorder.
- The times when these incidents are occurring
- The days when these incidents are occurring
- Combining various incidents to investigate a correlation between them.

- Combining a couple of streets (to form a neighbourhood) where analysis could take place
- Mapping the information selected to identify "hot spot" locations and clusters.

In my own time and with my own resources I set about building all the possible questions I could think of I interviewed those already working on SARA packages and modified my design accordingly.

I tested my design on people who develop and design computer databases and took their advice on board, implementing the changes suggested. I then tested the "User Interface" on people who were not in the slightest bit "computer literate" and again made some modifications. The diagram below is the finished product.



I was pleased with the design and user-friendly front end but it still took me two hours to convert the text file from the IT Department into a useable file for the database. I set about to learn more programming and

with an understanding wife *and* many late nights later I could convert the text file automatically in 20 seconds. From two hours to 20 seconds is a vast improvement. Not only could I convert the raw data but, after interrogation, I could produce charts based on Time, Weekday, Police Beat Area, Month and Year, and very importantly "mapping" to identify "Hot Spots" or "Clusters" of incidents. This Database I called the Incident Retrieval System or IRS for short.

## The Incident Retrieval System

The Incident Retrieval System has been adopted force-wide and used for so many and varied enquiries that it would not be possible to list them all here showing the flexibility of this system. However, a specific example may help to illustrate the strengths of the IRS.

Whilst installing the IRS in Crosby Police Station and teaching an *officer* how to use it I said to him:

*""I will collect Youths Causing Annoyance Incidents over a six-month period and tell you which is the beat with the highest recorded incidents. "*

This I did within a matter of a minute or two. The officer agreed that I had correctly identified the beat in his area that is mostly plagued by Youth Disorder. I then said:

*"I will tell you where on that beat your major problems appear to be."*

I went back to the IRS, selected all the same parameters except I narrowed the search from the whole of the Area to one beat in particular, the one highlighted earlier. I then analysed this information and chose the grid reference where the highest concentration of calls was located. I produced charts indicating the times when the disorder was occurring and the days when it is at its worst. I also noted this grid reference. Again I returned to the IRS and inserted the grid reference, narrowing the field of search even further. However, this time I widened the Command and

Control References to include all incidents recorded and not just disorder incidents. I found that as well as disorder incidents in this very small area there were numerous incidents of:-

- Vehicles on fire
- Abandoned Vehicles
- "Cars Razzing"
- Damage to Property

None of which were coded or linked to the youth problem. See examples of charts produced at Appendix 1.

## Assumptions Based On Experience

Command and Control incidents are logged at the time the call is made. Members of the Public ring the police at the time a disorder is happening so that we can come and do something about it. The assumption, therefore is that the database accurately records **when** a disorder incident is occurring. Similar assumptions are made for those incidents of Violence especially Robbery and Domestic Violence. In my experience, people ring for the police within minutes of being the victim of robbery or assault. For instances of Burglary and Car Crime, people ring the police when they discover the crime, which may be many hours after the offender has left the scene. This information, which is common sense when we think about it, is important to remember when using the IRS, for example,

*The IRS indicated that most vehicle crime on one beat occurred at a week-end between the hours of 0800 hours and 1000 hours. This information ran contrary to my experience until I remembered that the time on the incident log was the time the incident was reported not the time the crime was committed. The crimes occurred during the night when the victims were asleep.*

Therefore, to take initial data as fact without further and rigorous interrogation is a flaw of which we must be aware.

## Success Criteria

Below is a list of successes of the IRS based on the different stages of development. The starting point for this project was to download information directly from the Command and Control Mainframe without the need to double-key input.

Having obtained a text file on a floppy disk ..... **Success**

I needed to input the data contained into a database. I built a Conversion Engine which automatically completed the task in 20 seconds ..... **Success**

I designed and built a database which could interrogate a variety of parameters **quickly** and efficiently ..... **Success**

Further to this I developed and build an analysis program which takes the selected data and produces charts based on Time, Day of the Week, Month and Year, Beat and Hot Spotting by way of Mapping ..... **Success**

The incidents could also be printed out in an easy to read format ..... **Success**

The IRS was adopted Force-Wide by Chief Constable Norman Bettison ..... **Success**

The IRS database is estimated to save Merseyside Police up to £1 Million within the first year, assisting officers to search historical information in a quick and timely way ..... **Success**

## Conclusion

The Incident Retrieval System has been developed against the philosophical groundings of Epistemology and Problem Solving Policing using the SARA model.

It is one tool to be used to highlight and / or analyse "problems" in relation to issues of Crime and Disorder and how the two are linked. It is the only database within Merseyside Police that is able to do this.

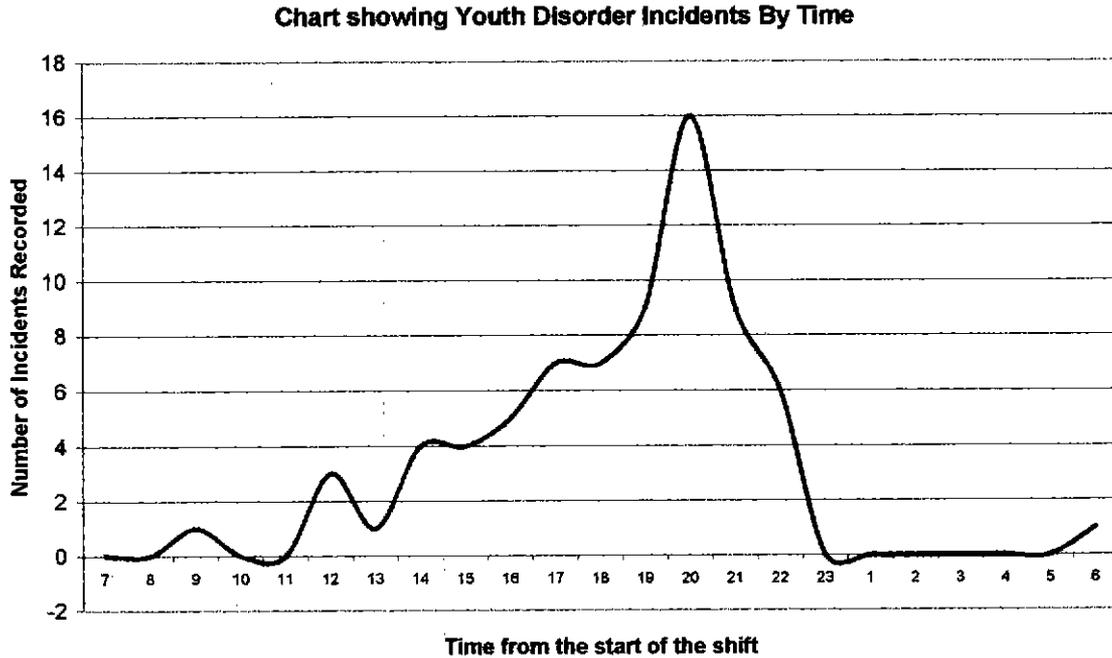
Development is already underway to link the Liverpool City Council Housing Database with this system to further broaden the scope of the database. Development is also underway to "map" the home addresses of offenders to incidents of Burglary and Violence through the ICJS<sup>1</sup>.

The money-saving aspect of the IRS has been highlighted in the local press and the national press (see Appendix 2). However the real benefits are that officers can use their time and experience to Scan, Analyse and Assess problems using the IRS as a starting point. The information they retrieve is timely and accurate and can be quickly analysed to produce charts and Hot Spots assisting them to utilise the "problem analysis triangle"

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<sup>1</sup> Integrated Criminal Justice System

**Example of a Time Chart**

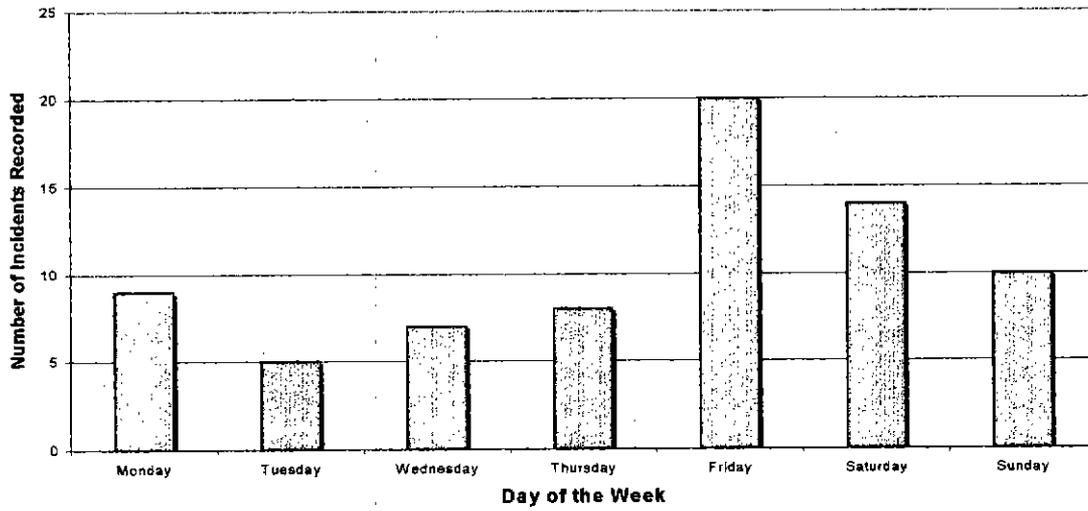


The above chart shows the number of incidents of Youth Disorder against the Time they were recorded. This was for a two-week period from 21<sup>st</sup> January 1998 to 3<sup>rd</sup> February 1998 for the Wavertree and Riverside Area. It is interesting to note the rapid increase in recorded incidents between 1800 hours and 2200 hours.

**Example of a Day Chart**

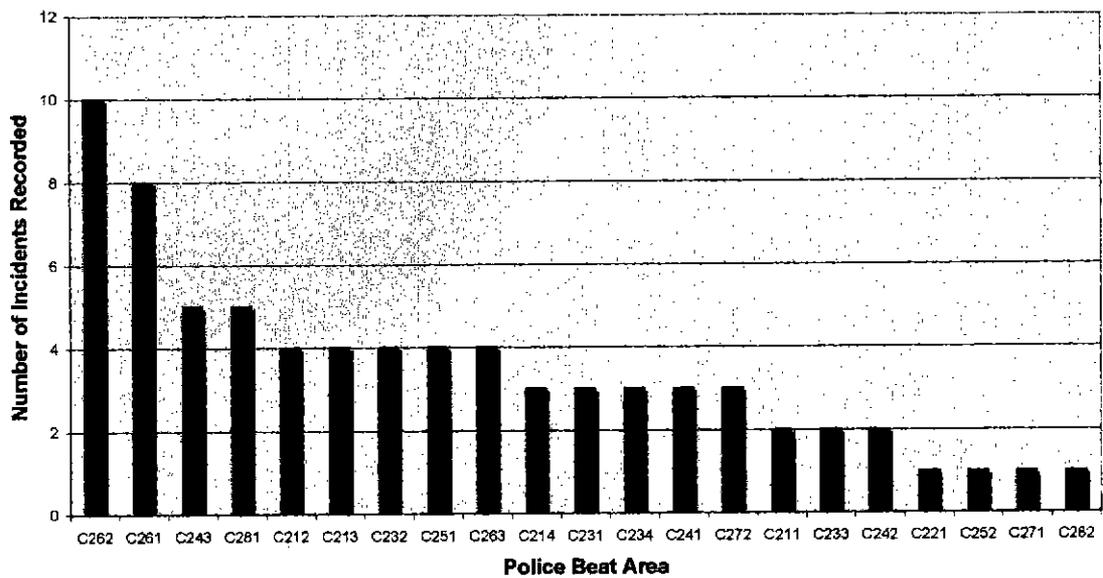
The chart below compares the days of the week against the number of incidents recorded. As can be seen, the greatest number of calls occurs at the week-end, with Friday being the highest. If necessary, it is possible to analyse Friday only and again create a time chart.

**Youth Disorder Incidents by Day of the Week**



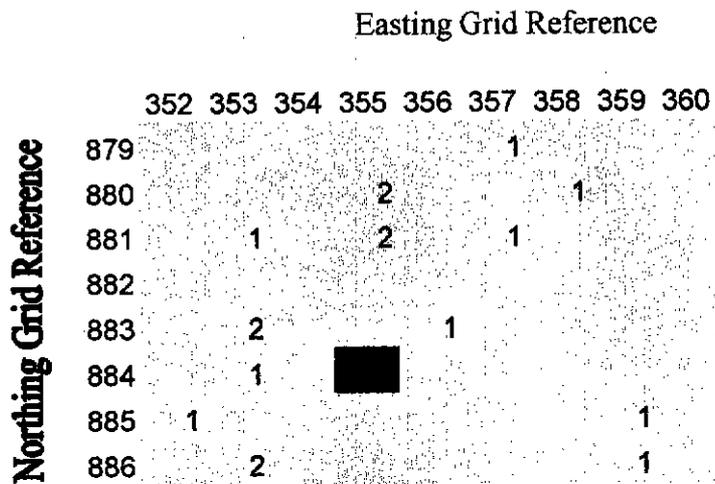
**Beat Profile Chart**

**Profile of Youth Disorder by Beat**



This chart indicates the police beat area with the highest recorded incidents of youth disorder over a two week period from 21<sup>st</sup> January to 3<sup>rd</sup> February 1998. If necessary, each individual beat or combination of beats can be examined by Day, Time, Month and Hot Spot

## A "Hot Spot" Analysis



This grid reference is based upon the information above relating to Youth Disorder. As can be seen from the above diagram, the highest area for youth disorder is indicated by the Red Square, however above this there are two areas of two recorded incidents of youth disorder, a cluster. Each section can be isolated and analysed further if necessary.