~ # The Crunch Database

A tool of Organisational Support

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Introduction

Recently in Britain we have had a bad time on the railways; several very public and tragic accidents have happened in the last couple of years. The media has raised awareness (or fear) to a point where the whole rail system has undergone massive introspection; we Traffic Officers" have clearly seen the fall-out with increased traffic on the roads to a point, of almost grid-lock on occasions as;people desert rail in large numbers.

But,
if people thought the railways were dangerous,
they ought to see the roads!
(320,310 people killed or injured last year).

It could be said that all of us have an unhealthy tolerance of such tragic events. Why? The road accident rate is several hundred times that of rail. We all know of someone who has been seriously injured in a traffic accident, yet a bad day on the roads doesn't have the same "sex" appeal, and certainly doesn't get the corridors of power talking.

It is a 19th century Italian Economist, Vilfrado Pareto, who is most closely associated with the 80-20 rule. The original theory was to do with social doctrines, but the idea that we should look at 20% of the causes to find 80% of the answer is now accepted as a basic tenant when focusing effort in problem solving.
So where is all this going? And, what has the Pareto principal to' do with our acceptance of such large numbers of road casualties?

In the Police we have now some very sophisticated tasking and co-ordinating systems to identify those who are committing crime (sometimes before they do) and effort is targeted in order to gain intelligence about the problem. Nothing like this contemporariness until recently existed for us in the Met with respect to roads. Maybe we haven't had an intelligence system in place because it has been so difficult for us to see the 20% that is causing the 80% and so focus our effort. Road collisions are the result of a myriad of causes and to tease out some method from the background noise was not in the past easy.

For exactly this problem solving purpose the project which saw the introduction of **The *Crunch Database as*** a tool of organisational support was commenced.

Position at Start

A great deal of data is gathered during the Police investigation of road accidents. This is collected in a strutured way through the reporting process from the moment the first telephone call is made to Scotland Yard. Most data is recorded in the Accident Report Book that the Police officer completes with details of his investigation and other statistical information.

The results are passed through to the Metropolitan Police Performance Information Bureau (PIB) and from there to several of our partners. This data gathering by the Met and other Police Forces around the Country provides much of the information base used in research by the government and other organisations with a vested interest in driving down road accidents.

The two chief public research organisations (as far as London is concerned) is The Department of the Environment, Transport and Regions (DETR) and The London Research Centre (Now a part of Transport For London). Each of these centres publishes an annual document of accident statistics.

Surprising then, that until recently the Police themselves were not able to use the information they had collected in their own work to focus resources on areas of day to day tasking.

The only means of discovering or confirming trends arising at particular locations was to commission measurement or manually trawl through the Accident Reports filed at Police Stations and read individually the story for each incident. This was extremely time-consuming and far from immediate. Tasked deployment towards problem solving was therefore sporadic and there was no standard procedure to make comparisons across Borough divisions.

At the same time as frustration around this shortfall was growing, it was clear that intelligence gathering on the more traditional crime side of policing was having some excellent results as Divisional (or Borough) Intelligence Units made use of large databases such as *"CRIMINT"* and *"CRIS"*.

The Crunch Database project was therefore commissioned to start to address these issues by providing a scanning environment in order to analyse and respond to the problem locations it was predicted we would find.

The Process — Scanning and Analysis

Wish-list

At the start of the project there was a wish-list for the data gathering portion of the exercise. This wish-list enabled the project to proceed in a structured way and ensured that the working model developed within our real world constraints.

- The Database Should if Possible be Accessible By All

The Service wide area network is called OTIS. The Main applications available to all users on the system are Microsoft *Word* and *Excel* (with administrator access to *Powerpoint).* There is also a Newsgroup feature in *Team Forum* and an E-Mail feature in *Team Mail.* Recently a Service Intranet was added using the *Internet Explorer* Browser. It should be noted that although Microsoft Office was available, the main database component (Microsoft *Access)* was not provided. This is because Access could not be supported by our Department of Technology as file transmission caused difficulty.

- The Data Gathering Process should use as much Automation as Possible

Staff reductions (of about one hundred personnel) meant that there was little spare capacity in Traffic to create extra posts to deal directly with the intelligence gathering process.

- The Data should be Current

If the data were current, as well as dealing with real time accident trends, we would be able to make 'a much more cogent case when discussing solutions with our partners (e.g. Local Authorities, Schools, The Vehicle Inspectorate etc.).

- There should be a Clear Line of Process

There should be a clear and repeatable line between scanning, analysis, response and assessment. Unless this could be put in place for each location using the same method in each case, it would not be possible to publish details of our response and how well we were doing with any integrity.

- Oversight and Control should be retained across the database (Human Touch).

This was so that, although we dealt with those locations that were suffering numerous accidents, we should also apply as much human intervention as possible. This was to ensure that these were also the most serious accidents and indeed where we had a real possibility of making improvements together with our partner agencies.

With this wish list in place work continued to find a system that would be the most viable.

CAD and the Back-Door Link to the Database

Perhaps the most essential of all the computer systems that operate today within the Metropolitan Police is the CAD system. CAD stands for Computer Aided Dispatch. This is the computer system that tracks and details our response to a person's call for help.

It has several advantages when considering tracking of live incidents. Accurate geo-coding and timing mean that we can return to an incident at any time after it has happened and recreate events at the time and in the place that it occurred.

This latter modelling feature was prime in making it ideal for our purposes in traffic.

In addition to this, in recent years it has been possible to interrogate the CAD system through an interface to obtain statistical information held in the background. Most recently this has been possible though scripts on the Intranet. The interface is called CADMIS. This is usually used for management information. In this case it was going to be used as an interface to gain control of tasking.

If we could take the information into OTIS, that meant that we could take the information into Microsoft *Excel. Excel* lends itself very well in support of databases. Also because we could import information from a totally different system into the wide area network we also had the ability to send it around the organisation.

So, with a system of obtaining real time information on where, when and what type of accidents were happening and with the benefit of being able to manipulate this information to obtain a further insight, we had the basis for what became known as the "Crunch Database".

Working-Day Description of the System

Information is transferred as shown above from CAD to OTIS on a weekly basis. Details of every accident reported to police in the South West Area is included. For Instance: the date and time, the type of accident, the location and grid reference, remarks and the result after the officer has made his investigation. All of this information is taken over into excel. Once in excel it can be further manipulated with formulas to find out other information such as the weekday on which the accident occurred. (The look of the database can be examined in appendix 1, 2 and 3 which give a view of the various front screens to areas on the database).

Analysis of the information takes place by use of pivot tables and other graphs that give a more graphical overview of accident trends.

There are about twenty thousand incidents in one year so there is a large amount of data to use.

The data is arranged on a borough basis as this was thought the most logical boundary bearing in mind that most of our contact with outside agencies would be through Borough road safety committees. (A view of the basic tabular data can be seen in appendix **4)**

Filters are used to quickly sort the data and tease out areas where accident rates are high. The standard unit in this measure is the grid square. This provides a numerical reference down to 250 metres square. From here it is then possible to make a more accurate assessment and establish where the accident hot spots are located.

We know the type of accidents occurring and what time. Therefore it is also possible to draw graphs that reflect the most likely times for these accidents to take place and so by this means it is possible to make a prediction. (An example time chart for South West London can be seen at appendix 5. Appendix 6 and 7 show the same data focusing on one division).

Resources can then be deployed as shown below to deal with the problem, and at the most appropriate time to have an affect on the collision rate.

The data analysis is carried out by the Road Crime Intelligence Unit (RCIU) which is staffed by one sergeant and three PCs who use the crunch database as their main source for tasking and assessment.

Incidentally, one spin off that was not foreseen during the design stage was the identification of trends in police accidents and pursuits. Clearly it is necessary for Police drivers to maintain the highest standards in driving. The database identifies trends with respect to police accidents at an early stage so that the problem can be dealt with. The same goes for pursuits.

Back to the main strand. As people who deal with accidents on a daily basis, it was often possible for officers to make a fairly good "guesstimate" as to where and what type of incidents were occurring. However some surprises were found. For instance, one road in Kew was thought to be quite dangerous, but during six months of scanning it was found to have 15 accidents along its length. Another Road in Lambeth, on the other hand, that was regarded as similar in accident rate was found to have suffered 196 accidents.

Therefore, early on, some obvious areas that needed work were starting to show up.

The next stage was to deal with the problems we were identifying, making best use of our resources and making the business case to our partner agencies for action by them.

Casualty Reduction Teams - Response to the Problem

With finite and indeed decreasing staff there were only two options to deal with the tasking coming through from the scanning and analysis.

The first was to bolt on tasking to an officer's daily duties. At each daily briefing, officers were given binders giving details about specific locations where special effort was to be made including the nature of the problem. The officers would attend these locations and carry out casualty reduction initiatives in between dealing with everyday responsibilities like responding to accidents as they happen. The difficulty with this approach was that officer's tasked locations changed on a daily basis and there was little ownership of the problem by individuals. Secondly a policy decision was made that dealing with the symptoms of road accidents should take a much higher priority in our thinking and the crunch database was establishing that there were some clear areas where this approach was likely to have an effect.

It was decided therefore to make a substantial change in the way that we carried out our work. A top slice unit would be created. This was made up of existing staff from the Traffic OCU on secondment from reliefs for a period which initially was two months and which has now changed to one month postings. One sergeant and eight constables therefore make up what is called the Casualty Reduction Team with the specific mission of taking a pro-active role in casualty reduction.

The team is tasked directly by the Road Crime Intelligence Unit (RCIU) using information from the database. While working on the Casualty Reduction Team each officer is freed up from his daily duties to concentrate solely on responding to those areas that have been identified through the scanning process.

The Sergeant in charge of the CRT in agreement with the RCIU Sergeant decides on a method of response bespoke to the location.

This method of dealing with the problem so far has been almost as diverse as the problem highlighted. This often involves us working with partners. One example is where we involve Head Teachers where a problem is identified in the vicinity of a school. This approach has been particularly successful though it is difficult to measure the collateral benefit of Traffic Officers being seen more often in and around Schools.

Another example of closer ties that have come about as a result of such tasking has been working out on the street with the Driver and Vehicle Licensing Authority (DVLA). An accident hot spot is targeted and "hit" with police officers and DVLA officers. The DVLA officers stop large numbers of vehicles that are not displaying road tax and for other licensing offences while the police deal with enforcement issues and get the casualty reduction message across. Sometimes there can be as many as fifteen members of different agencies at one accident hot spot. The large numbers of high visibility yellow jackets on view raises the obvious question in the minds of drivers who are not stopped. "Why are so many here?", The question is answered with boards on the exit side of the junction explaining police action, the casualty reduction message. This method has also been drawn to the attention of the media, further spreading the message.

Performance for each visit to one of the hot spots is measured and fed back to the RCIU who are responsible for directing progress at each location. (At present this is through the Casualty Reduction Tern Daily Return Form; appendix 8).

At the same time, for each location, officers must complete a form in relation to risk assessment and engineering options. This form is particularly important (A copy is shown at appendix 9). All of these are passed to the Area Traffic Management Officer (ATM) who is our main link in lobbying outside agencies. With the scene risk assessment reports, he is armed with real information observed by police officers about the risks at a particular junction and together with the database results is able to encourage action to be taken by our partners to deal with those locations that are most vulnerable.

The complete system has now been operating for six months.

RCIU Watch - Assessment

The RCIU maintain a watch, through the database, on those locations that have received attention from the Casualty Reduction Team (Some example chart are shown t appendix 0 and 11). Clearly if an affect is being made we would expect to see the worst offending locations not score so highly in the pivot tables on the crunch database. If they stay on top we can return to the location and perhaps adopt a different approach. Returning again and again to the same top scoring location gets very boring so the encouragement is there to find permanent solutions.

On occasions it is clear that we will not be making an effect. This is where the human oversight and control is so important. There may be other outside factors that are having an effect on the road accidents at a particular location; we cannot be responsible for everything. But if we are able to show that we have done everything possible on our part to reduce casualties at a location, we have an ace card in persuading others to support us. That card is the repeatable line in the scanning process. Because the database uses exactly the same scanning process on each location, the data has a great deal of integrity and is a very powerful weapon in our argument to encourage casualty reduction.

This then is the circle of continual assessment and action to improve matters.

The Casualty reduction Team and the Crunch Database have been working together now for six months. At some locations the rate of offending saw an improvement within one month.

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Recent Developments

Within the last.month, a recent development has been to make further use of IT and to bring the system closer to that mentioned earlier and operating with respect to mainstream crime. (A standard Pro-active assessment an tasking pro-forma is shown at appendix 12)

The risk assessment form mentioned above has been moved from paper to the computer Crimint system. The Crimint System is the standard database that the Service uses with respect to crime. It is used on all divisions to collate information about Criminals. There are major benefits in using this system for Traffic. The first is that as the database grows it will be searchable. Secondly its organisation mirrors that of one already operating outside Traffic. This means that new recruits will readily understand the system and need little training to support it. Finally it is free; the Traffic OCU can avail itself of a system in place for the service as a whole.

Further Work

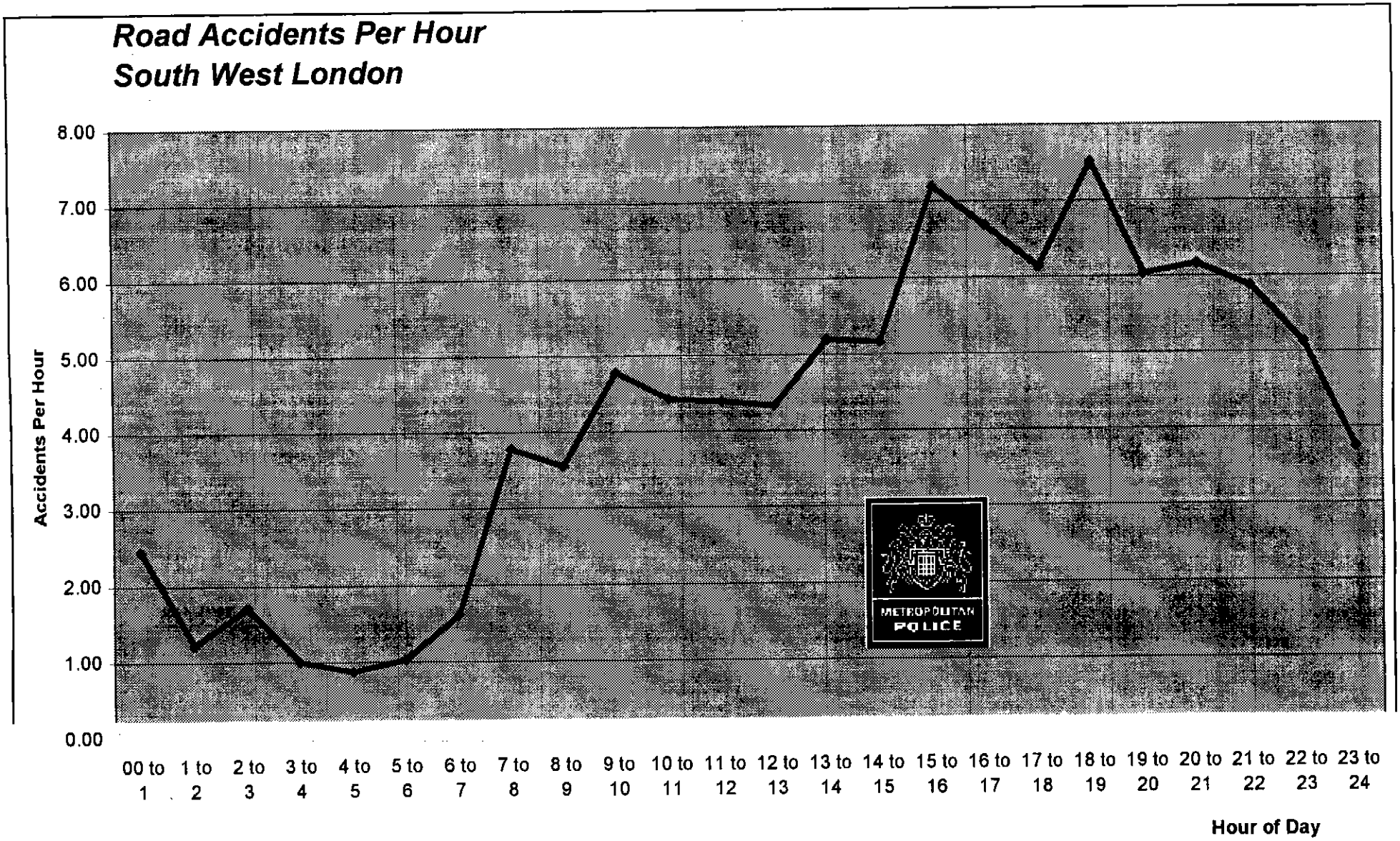
This report sets out the benefits of the system. Unfortunately this is not the whole story and there is along way. to go.

The crunch database is based around locations and times. These are a large part of the story, but by no means the whole story. Some causes travel. Those causes are people, vulnerable groups. They are also types of vehicle. So far, the Crunch database can do little to spot these major factors and we still rely on hypotheses and more time consuming research to find trends here. There seems little chance that we will be able to alter this fact in the very near future but as more and more of our record keeping is computerised there is little doubt that we will eventually be able to capture data in this area as well.

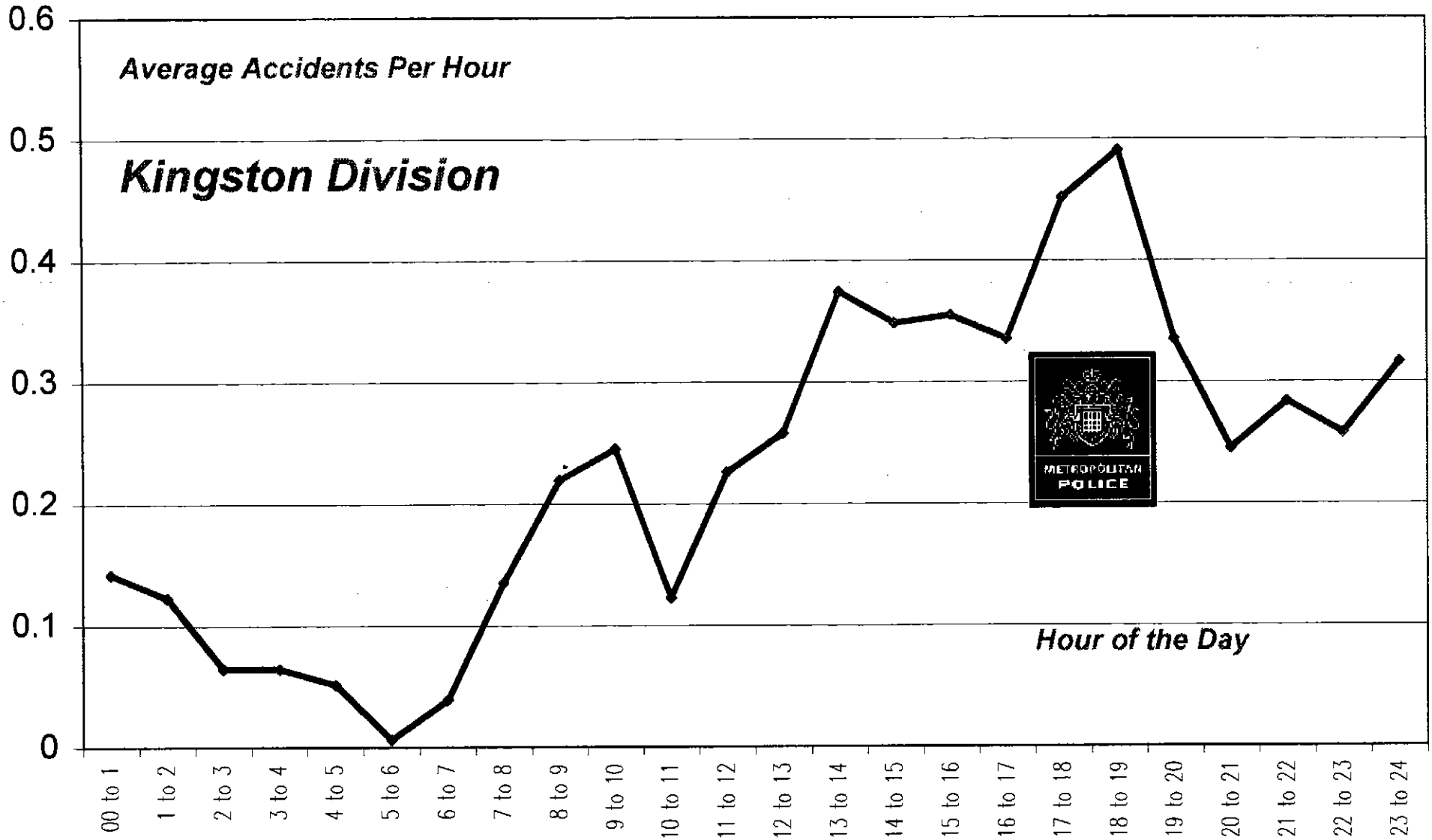
And Finally

If you are a believer in the Pareto Principle you will be interested to know if the data capture so far is tending to confirm the 80-20 rule. The answer is: "It doesn't appear so". But at least we can now measure it fairly closely.
The relationship is in fact: 59% of the accidents happen in only 20% of the grid squares.
So if principle does apply, then the'truth is still out there.

..... but not forever.



Appendix 5


Average Accidents Per Hour
Kingston Division
Hour of the Day
METROPOLITAN POLICE
0.6
0.5
0.4
0.3
0.2
0.1
0
00 to 1
1 to 2
2 to 3
3 to 4
4 to 5
5 to 6
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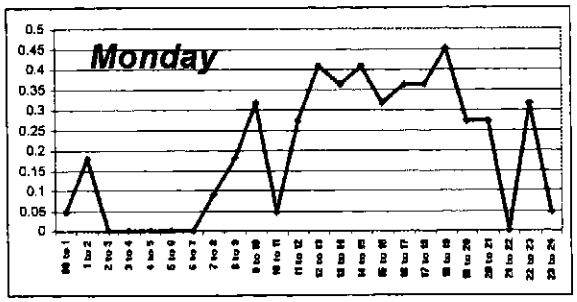
Appendix 6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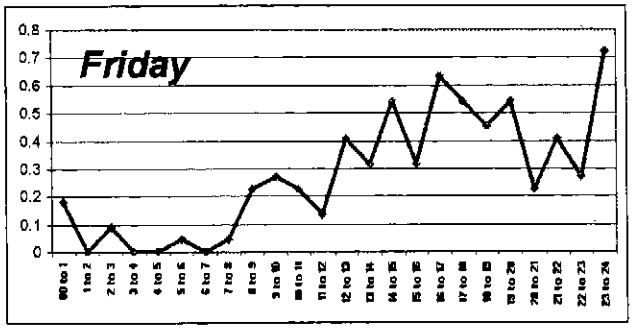
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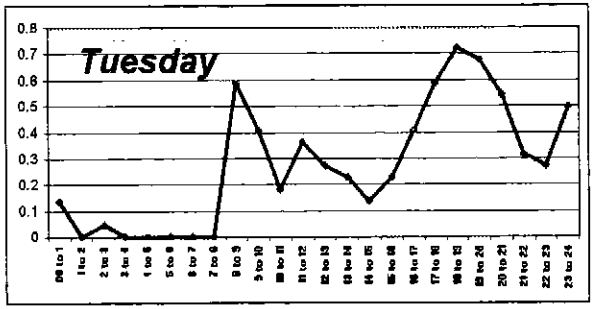
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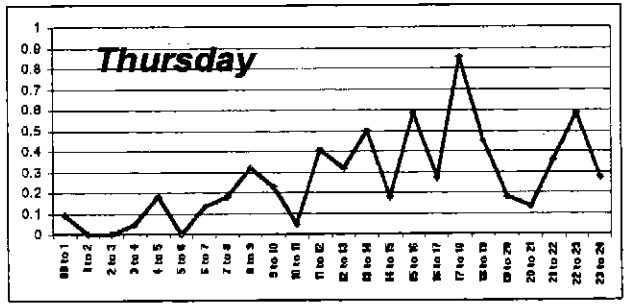
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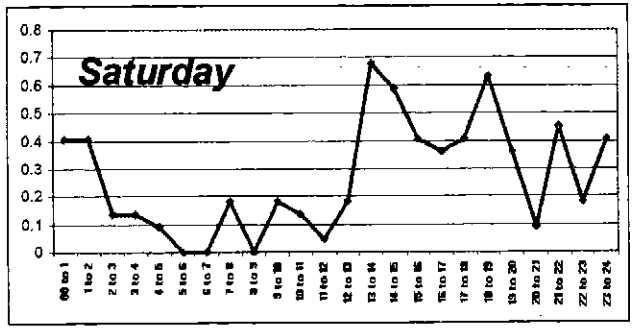
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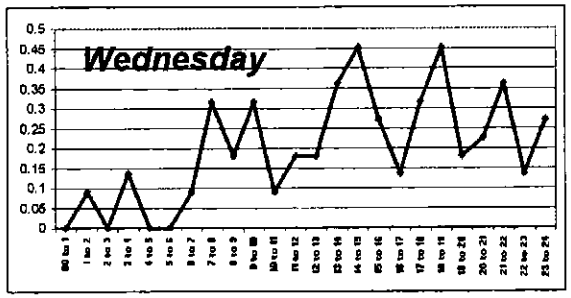
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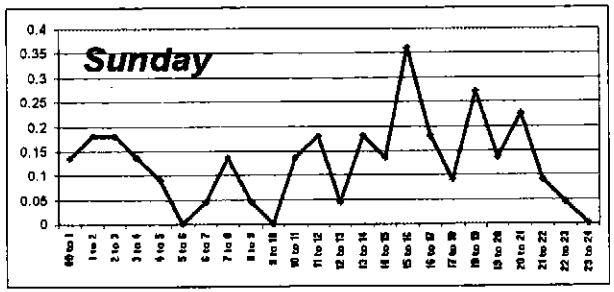
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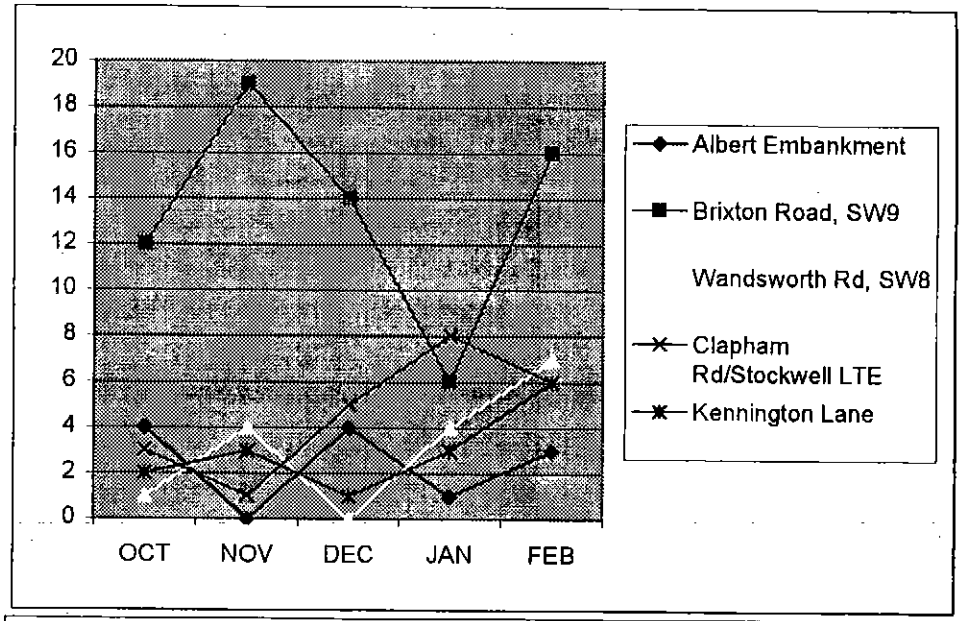
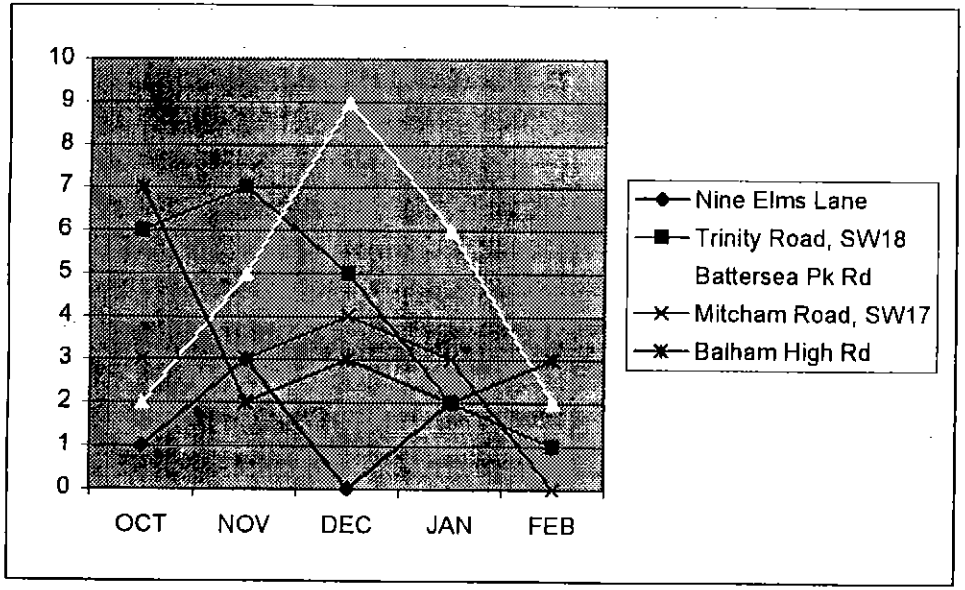
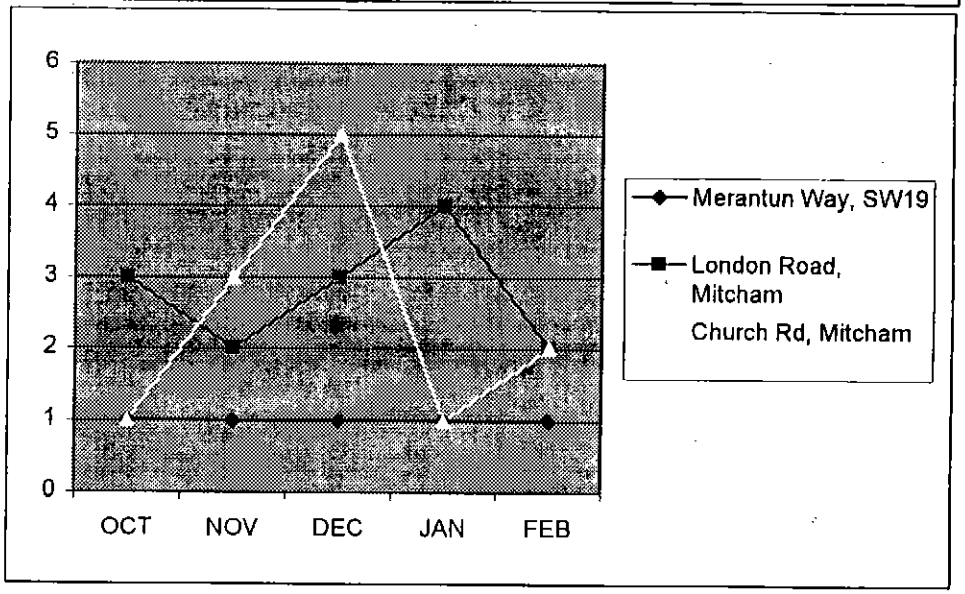
Appendix 7

TDV Tasking Sites

Rolling Five Month Collision Figures

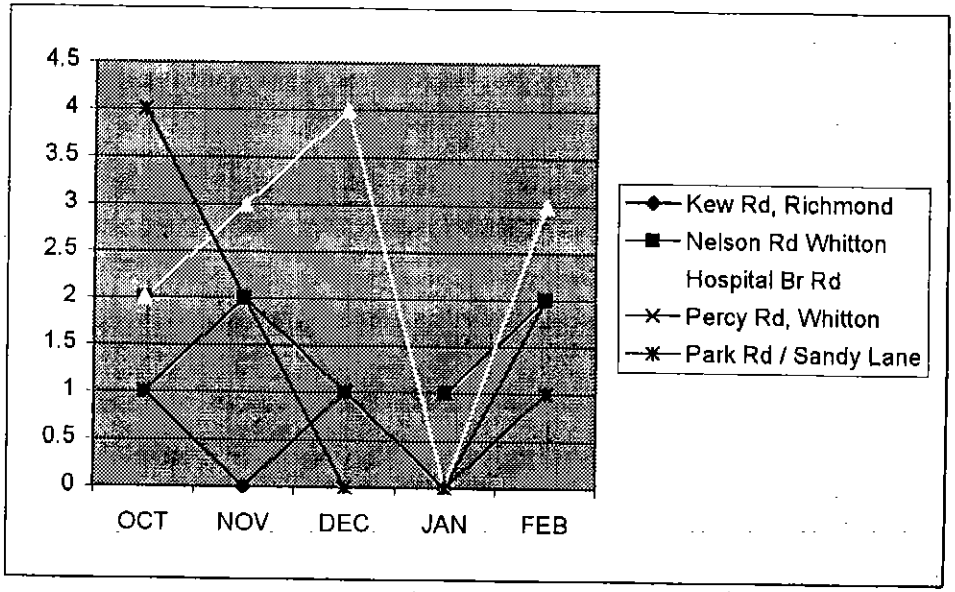


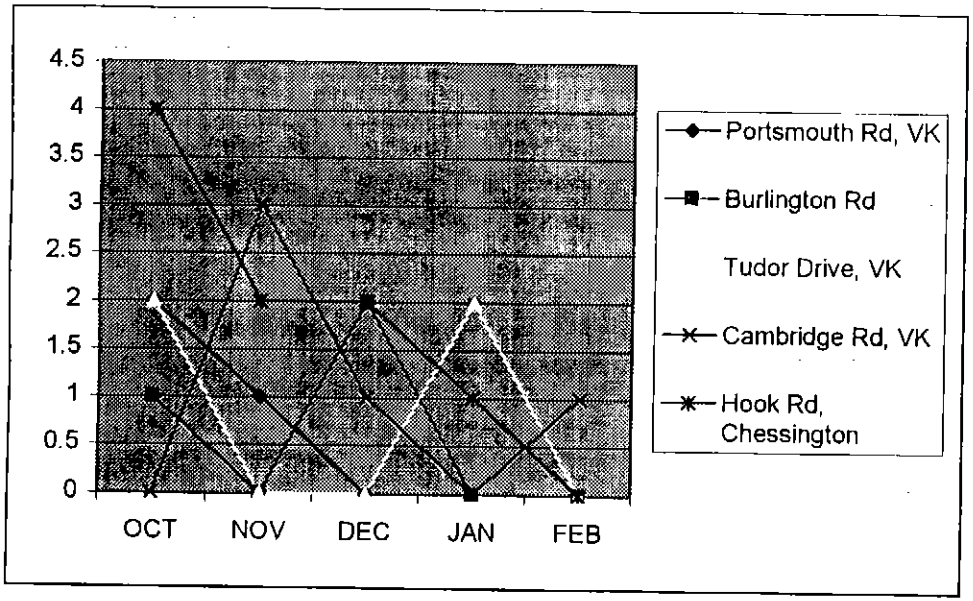


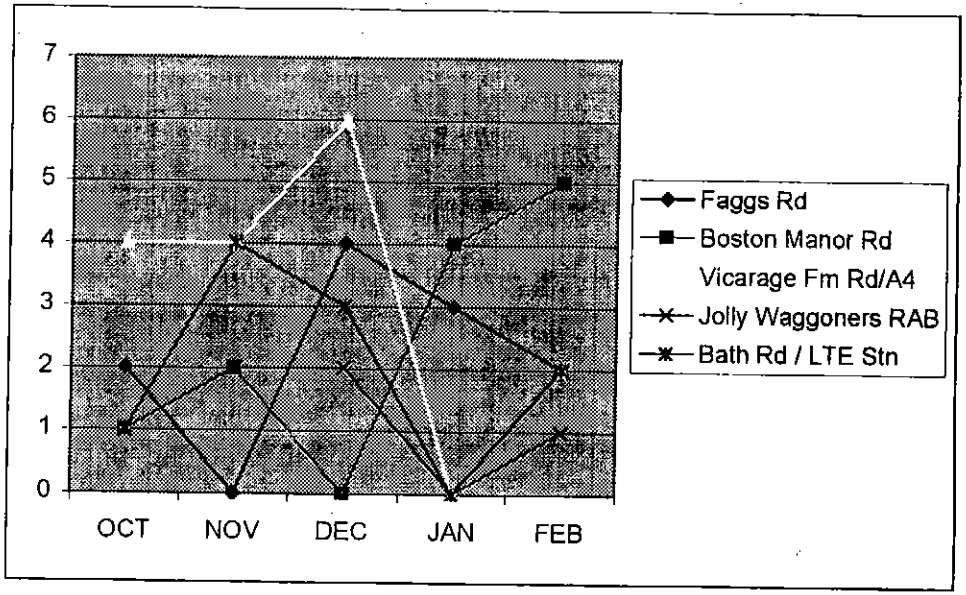


TDT Tasking Sites

Rolling Five Month Collision Figures







METROPOLITAN POLICE

PROACTIVE ASSESMENT AND TASKING PROFORMA (PATP)

FORM 5468 - PATP APPLICATION

1 PATP NUMBER AND OFFICER DETAILS

OCU / Borough (Exact Location)	Traffic OCU / South West RCIU	Metphone	
PATP Reference No.	**SWTU / B / 0001 / 01**		
Directed Surveillance No.	NA		
Operation No. / Name	NA		
OIC		Deputy	
Metphone		Metphone	
24 Hour contact no.		24 Hour contact no.	

2 PROBLEM IDENTIFICATION / SCANNING * (Delete as appropriate)

2.1 Offence / Problem

Offence / problem that PATP will be addressing	High personal injury collision rate.

2.2 Location / Offender / MO

Brief summary sufficient to justify PATP. MO of offence, details of location. Result of initial intelligence searches. Quote existing CRIMINT numbers where intelligence will be found.
Road, (LX) An exceptionally high collision rate resulting in numerous injuries. Searches of both CADMIS and PIB data show that this is one of SouthWest Traffic Unit's worst locations as regards road crashes.

2.3

Particulars of target (s) against whom this application is directed (or description)	
Name : Address : DoB : ID Code : Pool check Folio No. NIB No.	**Name :** Address : DoB : ID Code : Pool check Folio No.
Name : Address : DoB : ID Code : Pool check Folio No. NIB No.	Address : DoB : ID Code : Pool check Folio No. NIB No.

Not Applicable - Target Location Based

2.4 Flagging Request

At SIB	NO
Reasons	
For NCIS flagging - See your Intelligence Unit	

2.5 Analysis

Add any supporting analysis

ROAD

	Year 2000				Year 1999			
Month Of Accident	Fatal	Serious	Slight	Total	Fatal	Serious	Slight	Total
January	-	-	9	9	-	1	7	8
February	-	3	5	8	-	-	8	8
March	-	3	14	17	-	3	16	19
April	-	4	7	11	-	3	12	15
May	-	4	9	13	-	-	4	4
June	-	2	5	7	-	3	16	19
July	-	1	9	10	-	3	11	14
August	2	-	6	8	-	2	14	16
September	-	3	6	9	-	6	11	17
October	-	3	14	17	-	1	7	8
November	-	3	12	15	-	1	16	17
December	-	1	8	9	-	4	4	8
Total	***2***	***27***	***104***	***133***	***-***	***27***	***126***	***153***

As can be seen from the above PIB figures there is an average of 143 PI collisions per year (plus 2 fatal collisions in 2000).

3 TYPE AND SCALE OF PROPOSED SOLUTION

3.1 Outlined plan ,objectives and scope

Outlined plan – Detail why the methods are necessary

Through the combined enforcement efforts of the PS and 6 PCs on the Casualty Reduction Team it is anticipated that a reduction in the high collision rate will ensue. It is not the intention to limit the scope of the CRT, through site assessment it is envisaged that the Team will find the most effective method of reducing collisions. Any suggestions from the CRT as regards road design will be passed to the ATM for action.

3.2

Costings	
Cost of resources required (whole days only) e.g: • Surveillance • Technical • Car hire • U/C Officer • O/T cost for PC • O/T cost for Sgt	
Is there to be an anticipated claim on the contingency fund?	
Match funding	
Total anticipated cost	

Approved by (Name)	At	DIU:

Applicant	
Name (print) Michael King Rank: PC 300TD	Date: 2nd April 2001 Signature:
Inspector	
Comments:	
Name (print) Date:	Signature:
Flagging Officer Authority	
Comments:	
Name (print) Date:	Signature: