ROAD MAINTENANCE MANAGEMENT IN BANKSTOWN CIVIC SERVICES GROUP, A CASE STUDY

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ABSTRACT

Civic Roads is a Business Unit within the Bankstown Civic Services Group. Civic Roads is responsible for maintaining Bankstown City Council’s roads and associated assets. This paper outlines Civic Roads’ experience in changing from a reactive, complaints driven system of road maintenance, to one involving inspection of assets, recording of defects, and programming maintenance works. It includes a brief outline of background changes. The two systems are compared and advantages and disadvantages discussed. The paper concludes that the planned approach to road maintenance is superior and lists some of the benefits gained.

1. BACKGROUND

With the appointment of a new General Manager, Bankstown City Council embarked on a program of major organizational change, commencing in 1995. A purchaser provider split was introduced at the first level below the General Manager and new management positions created and filled.

A Work Re-Design Team was established in every unit of Council to review processes, structures and resource levels. Most changes recommended were implemented.

Council had a policy of no forced redundancy for its staff. However, some staff elected to take voluntary redundancy. Staff who left, generally were not replaced in operational units.

Business Units were permitted to seek external work.

Council introduced its Competition Policy in June 1996 which allowed for increasing amounts of work, up to 60%, to be exposed to competitive tender. Of particular significance to road
maintenance was that half the City’s roads was planned to be put out to tender in 1999/2000, with a three year contract period.

Under the new structure, Council’s Civic Services Group (CSG) is the service provider for Bankstown City Council. Civic Roads is a Business Unit in CSG responsible for maintenance of Council’s roads. There are about 658 kilometres of roads and 458 kilometres of concrete footpaths in the Bankstown Local Government area. Population is about 168,000 people.

Under the purchaser provider split, Service Planning and Commissioning Group (SPC) is the asset manager and Civic Roads’ customer in Council. SPC investigates all external customer requests relating to assets to determine responsibility for repairs, handles all Councilor, policy and budget issues and representatives attend Council Meetings. This arrangement enables the provider, Civic Roads, to focus entirely on road maintenance operations. The ability to isolate service providers from direct political influence is the biggest single advantage of Bankstown City Council’s split structure.

The two parts of the organization prepared for tendering out road maintenance from different sides. The purchaser selected the AUS SPEC # 4 specification for Road Maintenance and prepared its staff for managing the contract. The provider, Civic Roads streamlined and improved its operations, identified likely competitors and prepared its staff for tendering for road maintenance and working under a contract. The staged introduction of competition allowed some time for both Groups to ready themselves.

Council has since put its Competition Policy on hold, and did not put road maintenance out to contract. However, along the way, Civic Roads made significant improvements to the way it operated. One outcome was that budgeted staff numbers in Civic Roads reduced from 158 in 1995/96 to 76 in 2003/04 across all operations, the plant fleet was rationalized and overall savings estimated in excess of $20 million have been achieved in Civic Roads since the changes were introduced in 1995.

Competition policy was found to be in conflict with Council’s policy of no forced redundancies. Now that new staff are not covered by the no forced redundancy provision, Council still has the option of reactivating its Competition Policy in the future with a better chance of it working, should it choose to do so. Civic Roads’ objective is to keep Council satisfied with the way road maintenance is done so it will never feel the need to exercise this option. Council has retained its purchaser provider split structure, which is working well.

Also in the period between 1995 and 2003, CSG gained accreditation to AS/NZS ISO 9001:2000 Quality Management Systems requirements and in July 2003 is undertaking a final accreditation audit for its Occupational Health and Safety (AS 4801) and Environmental Management Systems (ISO 14001). Other impacts on our operations are that Bankstown City Council had a major fire in July 1997 and lost its entire administrative building, and Council’s corporate computer and information systems have been completely changed.

Outside Council, changes to common law and legislation with respect to Public Liability had an impact on how we think about road maintenance, particularly whether it is acceptable to rely on non feasance as a defense in public liability claims or whether we really owe a duty of care to
road users. For example, the High Court of Australia decision in 2001 in the cases of Ghantous and Brodie removed non-feasance as a defense, while in New South Wales, the enactment of the Civil Liability Act 2002, re-established non-feasance as a defense for claims in that State.

No matter what changes were thrown at it, Civic Roads’ new road maintenance management system has coped, and our assessment is that we do not need to rethink our basic approach.

2. MAINTENANCE ORGANISATION AND METHODS, BEFORE THE CHANGES

2.1 Complaints Driven And Reactive

Road maintenance in Bankstown in 1995 was totally complaints driven. Complaints came from people who lived or worked in the area or who were just passing through. Some complaints came direct to Council, while others came through Councillors. Complaints would be received by telephone, or at Council’s Customer Service counter and relayed by telephone to Civic Roads at the Depot and confirmed by facsimile. Because people did not have confidence in the system, the temptation was there for Councillors to talk directly with operational staff to expedite repairs. Considerable staff time was involved in talking to complainants and investigating their complaints.

2.2 Inspections

Teams Coordinators would note defects found in their travels and add these to the Teams’ work tasks. These inspections were informal, unplanned and uncoordinated. The roads less traveled were ignored. Frequently used roads received more maintenance attention.

2.3 Communication Methods

Complaints about road defects received from residents and Councillors, would be collected by the Teams Coordinators at the Depot, and issued to the Teams.

Each morning the Teams would assemble at the Depot to receive their work assignments for the day. The Teams would gather around their Teams Coordinators, in a circle known locally as the “Bull Ring”.

2.4 Maintenance Organisation

The structure and strengths of the Teams in 1995 were similar to those listed in Table 1:

<table>
<thead>
<tr>
<th>Teams</th>
<th>Number of People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance Engineer</td>
<td>1</td>
</tr>
<tr>
<td>Teams Coordinators</td>
<td>2</td>
</tr>
<tr>
<td>Asphalt Teams, one per Ward with 6 people each</td>
<td>24</td>
</tr>
<tr>
<td>Concrete Teams, one per Ward with 3 people each</td>
<td>12</td>
</tr>
<tr>
<td>Asphalt Paver *</td>
<td>6</td>
</tr>
<tr>
<td>Pot Hole Response</td>
<td>2</td>
</tr>
<tr>
<td>Pavers Shopping Centres</td>
<td>6</td>
</tr>
<tr>
<td>Eductor *</td>
<td>2</td>
</tr>
<tr>
<td>Flying Squad #</td>
<td>6</td>
</tr>
<tr>
<td>Concrete Saws</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>63</strong></td>
</tr>
</tbody>
</table>

*Table 1: Maintenance Organisation Reactive System*

Note: In Table 1, the items marked with * are now performed by contract and the item marked with # went to other Business Units as a result of reviews.

2.5 Disadvantages of the Reactive Complaints Driven System

- Lost time while Teams waited in the Depot and traveled to their jobs and returned to the Depot each afternoon because of the method of allocating work to the Teams.
- There was a peak of activity each morning until the Teams had been dispatched and the Team Coordinators were a bottleneck in the communication process.
- Finding sufficient works, then briefing and dispatching the Teams, and negotiating allocations of plant was a high stress activity each morning.
- There were no guarantees that an equitable distribution of work between Teams resulted from this method of communication.
- By the time maintenance work was organized, backhoes, saw cutting and other plant items had been allocated to capital project works. This created some ill feeling between capital projects and maintenance Teams and exposed Council to higher OH&S manual handling risks.
- The Teams had no control over their daily activities. They came to work not knowing what they would be doing or where they would be working each day.
- Complaints came in at random, and most were urgent so there was little opportunity to group works into areas. Teams were spending much of their time traveling rather than doing repairs.
- Some Teams were under allocated work because of the inefficient method used.
- Daily allocation of work increased the risk of jobs not being properly prepared for the Teams. For example, Teams may arrive on site and find that the work was not marked out, utility services were not located and saw cutting not done. If they went on to their
next job, there was even less chance that it would be ready, resulting in lost time and unsafe practices through Teams taking short cuts.

- It is an inequitable system, which serviced people who complained. There was no guarantee that all the network was being maintained to the same level.
- It did not address all issues in road maintenance. Ratepayers tend to complain about what they can see and what affects them and usually these are obvious physical defects such as pot holes, dangerous footpath trips, kerb and gutter heaves, severe road failures and scraping driveways. All other defects go unreported.

3. MAINTENANCE ORGANISATION AND METHODS, UNDER THE NEW STRUCTURE

3.1 Implementation of AUS SPEC # 4 Road Maintenance Specifications

Council purchased AUS SPEC #4 Road Reserve Maintenance as its Specification for Road Maintenance. The purchaser and provider worked together to customize these documents. This process captured current maintenance methods, and was used to align Civic Roads with industry best practice, where needed. Critical elements of AUS SPEC #4 are the Maintenance Defects Register (MDR), Intervention Levels, and Response Times.

3.1.1 Maintenance Defects Register

Civic Roads started inspecting defects because it was good asset maintenance management, proactive maintenance, and as a survival strategy. When Council purchased AUS SPEC #4 we found the two systems came together quite well.

Because of the number of defects found, Civic Roads developed an Excel spreadsheet, which is referred to as the MDR, to store the list of defects on computer. An example of this MDR sheet is included as Table 3 at the end of this paper.

AUS SPEC #4 requires only defects, which meet the Intervention Level criteria, to be recorded in the MDR. Civic Roads inspectors report all defects found and these are recorded in the MDR. Defects recorded on computer can be filtered to show only those which meet the Intervention Level. This approach has several advantages:

- All known defects in the roads and footpaths are listed.
- The condition of these defects can be tracked with time.
- The total cost to repair all defects can be estimated.
- The Intervention Level can be adjusted to match budget.
- Council’s defense against public liability claims is improved for listed defects.

One of the early dysfunctional features of Competition Policy in Council’s split structure, was that initially Civic Roads was cautious about sharing the MDR. The concern was that the MDR represented our knowledge of the network condition and was our competitive advantage. Our overriding concern became that if our customer did not know the extent of defects in the road network, they could not set budget levels and properly evaluate tenders. In hindsight, our
maintenance system would not have worked without sharing the MDR in Council. Since then, the MDR has enjoyed increasing use and become a source of reference in Council, for example:

- SPC can find out current information on defects at a specific location without reference to Civic Roads.
- The Asset Planners can use the data to assist with ranking capital works projects.
- It has enabled Risk Management to deny some public liability claims.
- For non dangerous defects, it has become a sufficient response, to tell complainants that the defect has been included in the program.

Civic Roads is currently migrating the MDR from the Excel spreadsheets into Council’s corporate computer system (MDR will be in SAP R/3). When this is achieved, the MDR will be available to virtually anyone in Council who needs access. Then it will be possible for Customer Service to tell customers, whether a defect is already registered and when it will be repaired, while the customer is making the inquiry.

The MDR is the engine of the whole road maintenance system. The MDR and the inspection regime that supports it, is the biggest single enabling factor that has helped Civic Roads move away from a reactive complaints driven system to programmed maintenance.

### 3.1.2 Intervention Level

The Intervention Level is the preset criteria above which a defect must be recorded in the MDR. The Intervention Levels determine what gets fixed. Obviously the tighter the criteria, the more defects that will meet the criteria, the higher the budget requirements.

After commencing inspections it was soon realized there were a large number of defects in the network. Problem was with allocating priorities; “Where do we start?” Obviously there were more minor defects than serious defects, so we started doing the worst first. For footpath trips, that meant repairing all trips over 40mm, irrespective of where these were found. Then we started a program of repairing all trips over 25mm. However, because of the number of these trips, the program was started on a Partition basis, starting with those Partitions which have higher pedestrian volumes. We adopted a similar approach to setting intervention levels for other defects in the roads reserve.

### 3.1.3 Response Time

The Response Time is the maximum time allowed to fix the defect after entry in the MDR. The Response Times vary to suit the seriousness of the defect and traffic volumes on the road or footpath. Response Times have a significant impact on the maintenance budget. Short Response Times are very resource dependent. The initial version of AUS SPEC #4 had maximum response times of around 90 days.

As inspections continued the lists of defects grew. Inspectors were said to need blinkers to prevent them from finding so many defects. Potential response times to fix defects increased from weeks to months to around three years for some repairs. Initial embarrassment and concern with these protracted response times was eased on hearing that other Councils inspecting their
assets for the first time had similar experiences. Of course, any dangerous defects found were made safe or programmed for immediate repair.

To fix all defects within the contract Response Times would require almost infinite resources for the short term, then only sufficient resources to repair any defects, which triggered the Intervention Level. This was beyond Council’s budget capacity, and not compatible with the need to provide some continuity of work for staff.

There is a point of balance where you accept the risk of lesser defects remaining in the road network for an extended period against your ability to pay for their immediate repair.

3.2 New Maintenance System

In order to bid for the Road Maintenance Contract, Civic Roads needed to know:

- The current condition of the network.
- The amount of work required to bring the network up to standard.
- The rate of deterioration of the network.
- Whether the current organization was keeping up with network maintenance?
- What specific maintenance activities were needed?
- The unit cost of doing specific maintenance tasks.
- The cost drivers for Road Maintenance.

Whether facing competition or not, the answers to these questions are essential to properly manage road maintenance. Civic Roads built its system of road maintenance around these ideas.

3.3 Network Inspections

The most significant difference from the previous complaints driven system is that Civic Roads now conducts its own formal and systematic inspections of the network.

Our belief is that the road network should not deteriorate to the extent where rate payers feel the need to complain to get things fixed. Our objective is to systematically inspect, record and repair defects so that the number of defects will reduce, and those remaining in the network, will be below the threshold of those normally reported by ratepayers.

3.3.1 Maintenance Inspectors

Maintenance Inspectors systematically inspect all of Council’s roads, footpaths and associated assets to find defects. Council’s area is divided into four Wards and further subdivided into a total of 85 Partitions. Maintenance Inspectors work to a program and complete an inspection of all roads in one Partition before starting the next. When we started this, we gave some consideration to which partition we should start in, because we were concerned that could channel all the maintenance funds into that area. Now all Partitions have been inspected more than once, we are just rolling along with inspections, prioritizing works, and this is no longer an issue.
The Maintenance Inspectors go on their inspections, armed with a list of current defects in the Partition. They check these and record any further deterioration and add new defects to the list. They hand these in to the office for data entry into the MDR and are issued with their next Partition, and continue the Inspection Program.

The Maintenance Inspectors did not come from a road maintenance or an assets inspection background. They have been trained in their role and their skills have grown as the system evolved. Their work is audited monthly by the Maintenance Engineer. Sometimes the Maintenance Inspectors are assisted by employees on an Injury Management Plan.

Our Maintenance Inspectors do not mark out defects during their inspections, unless dangerous and in need of urgent repair. The purpose of these inspections is to find the defects. When the defect has been programmed for repair, the Maintenance Inspectors then go back and mark out the defects and organize other preparatory works such as, obtaining Dial Before You Dig plans where needed, locating utility services, and saw cutting. The concern is that if defects are marked out when found, there may be an extended length of time before the work is programmed for repair, and this may encourage public liability claims or invite unwanted criticism.

When a defect is being prepared for issue to a Team, its status is updated in the MDR to register the stage it has reached. These changes show whether the defect has been marked out, located and saw cut, or is ready for issue. This enables us to program pre repair activities and then issue works programs to the Teams.

### 3.3.2 Inspection Program

Inspections are carried out at varying frequencies depending upon our assessment of the risk. We aim to inspect all roads at least once annually. Other processes complement the inspection program.

#### 3.3.2.1 Annual inspections

Annual inspections cover all road related assets in Council’s streets. Civic Roads does not do street signs or line marking, so these are not included. The lists issued to the Inspectors are arranged in numerical order with odds and evens separated to suit the way the inspector works in the field. Any dangerous defects found will be reported and made safe.

If an Inspector records a new defect in the same location as one previously entered in the MDR, this will show up during data entry. This triggers a check to see if it is a new defect, which may indicate a deeper problem at this location. It also helps quality checking because it may highlight that the previous repair methods were unsuccessful, or the Team may have incorrectly ticked the work complete box.

#### 3.3.2.2 High Pedestrian Areas

High Pedestrian Areas are usually associated with shopping centres, schools and retirement villages. These areas are inspected three times each year because of the high volumes or special class of pedestrians and the higher risks associated.
3.3.2.3 Bankstown City Plaza

Bankstown City Plaza receives special treatment and is inspected weekly.

3.3.2.4 The Pot Hole Repair Team

The Pot Hole Repair Team inspects all roads for pot holes about four times each year. They repair all pot holes, and refer any pavement failures beyond their capacity, back to the MDR for issue to the Minor Patching or Heavy Patching Teams, or assessment by the Maintenance Engineer.

3.3.2.5 Quality Inspections

Now that Civic Roads has operated this maintenance system for more than five years, the Business Manager, Civic Roads is inspecting all Council’s roads to make sure the system is working. This is a drive through inspection, which gives an overall impression of the condition of the roads and standard of maintenance being applied. Any pot holes or dangerous defects are reported and checked against the MDR. This inspection process provides a quality check and either builds confidence in the system or identifies opportunities for improvement. To date, about half the roads have been inspected and the results indicate that the system is working well.

3.3.2.6 Customer Action Request System (CARS)

Bankstown City Council’s Customer Action Request System (CARS) is used to register customer requests. Requests are reviewed by SPC to determine whether it is the responsibility of Council, some other agency or the ratepayer. Only those requests needing work done on the roads and associated assets are forwarded to Civic Roads. Requests for items, such as pot holes, are forwarded direct to Civic Roads without review. All these requests are entered in the MDR.

3.4 Works Program

The MDR enabled a fortnight’s program of works to be issued to a Team. As a result, the Teams did not have to attend the Depot each morning for a briefing. The Bull Rings ceased to exist. Most Teams could start on the job, knowing what they have to do and where they will be working, days in advance. Teams have approval to take their trucks home each day so they can start on the job.

The Team has control over the order of completing the works on the list. The only requirement is that the jobs on the list have to be completed within the two weeks.

Towards the end of the first week, the Team returns the list to the office with completed works ticked off, for data entry into the MDR. The Team continues working with a photocopy of the Works Program. At the end of the first week, the Team is issued with an updated sheet showing two weeks of work. So the Teams are working on a rolling weekly program, with two weeks work in front of them, and the completed works are being updated in the MDR every week.
The works issued to the Teams are grouped by area, which reduces significantly the amount of travel between jobs.

3.5 Allocation of Plant

Because maintenance works are programmed, Teams can assess their need for backhoes and trucks and other plant and equipment to complete these jobs, in advance. Requesting plant allocations early means that Maintenance Teams get these items when requested, or can adjust their programs to match plant availability. This has Occupational Health and Safety benefits by reducing exposure to the risk of manual handling injuries.

Because we can quantify the extent of work to fix defects we can put a case for purchasing or hiring equipment to suit specific maintenance activities.

3.6 Team Targets

Each item in the MDR is covered by a Notification in SAP. All works issued to Teams are covered by a Works Order in SAP and there may be many Notifications in one Works Order. Works Orders are included in a Work Breakdown Structure (WBS) in SAP and there may be many Works Orders in one WBS. Currently we are costing maintenance works to a WBS level in SAP. In the future we will cost maintenance works against individual Works Orders. This system allows close tracking of costs for maintenance works.

Also, Teams complete a Daily Running Sheet, which reports on the output for each day. Daily or weekly outputs can be compared with planned performance rates. Where Teams are completing similar works, we can compare Teams' outputs. We can also compare their performance against standard costs, what we call snapshots (a costing exercise to determine unit rates at a point in time). This approach has given us a better knowledge on activity costs and Team performance.

3.7 Maintenance Budget

The number and extent of defects are known from the MDR and the unit cost of repairs is known. Therefore, it is a simple calculation to estimate at any time, how much budget is required to fix known defects. It is also easy to filter the known defects so we can determine the cost of repairs for any Intervention Level we care to set.

So it is possible from the MDR to fine tune the intervention levels within the constraints of budget. Alternatively, the MDR can be used as a case to seek higher levels of funding for road maintenance activities.

3.8 Staffing Levels

The current structure for road and footpath maintenance under the Programmed Maintenance System is shown in Table 2.
<table>
<thead>
<tr>
<th>Teams</th>
<th>Number of People</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maintenance Engineer</td>
<td>1</td>
</tr>
<tr>
<td>Teams Coordinator</td>
<td>1</td>
</tr>
<tr>
<td>Maintenance Inspectors</td>
<td>2</td>
</tr>
<tr>
<td>Data Entry</td>
<td>1</td>
</tr>
<tr>
<td>Heavy Patching</td>
<td>7</td>
</tr>
<tr>
<td>Minor patching and Restorations</td>
<td>4</td>
</tr>
<tr>
<td>Footpath Maintenance one Team per Ward</td>
<td>12</td>
</tr>
<tr>
<td>Drainage Works and Reactive Response</td>
<td>4</td>
</tr>
<tr>
<td>Pothole Patching</td>
<td>2</td>
</tr>
<tr>
<td>Saw Cutting and Trip Grinding</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>36</strong></td>
</tr>
</tbody>
</table>

**Table 2: Maintenance Organization, Programmed Maintenance System**

Direct comparison of maintenance organizations between the old and new systems is complicated by the organizational changes made, but a reduction of more than 20% in staff numbers has been achieved after adjusting for these changes and the related employment cost savings achieved exceed $0.5 million per year. In addition, there have been savings in associated costs, such as plant and equipment and other costs, which would have been spent by these extra Teams. The primary objective was not to make savings but to ensure Council’s roads were being maintained. Both objectives have been achieved and this was made possible by knowing the size of our maintenance task, matching our resources to the task, and using our resources more efficiently.

### 3.9 Monitoring Performance

The data available in the MDR enables us to analyse trends and assess any decrease in the number of defects in the network. It also helps to assess whether the resource levels are adequate and if the methods used are getting the desired results. If the number of defects found in each round of inspections is reducing, this would indicate that the changes implemented are managing. It also provides information to enable us to steer maintenance effort, by directing resources to areas of need. For example, the graph in Figure 1 below, shows the area of footpath with trip defects of 20mm or greater, listed in the MDR over the last five years in each Ward.
The MDR data indicates that there has been a 60% reduction in the area of footpath with trips 20mm or greater, over the last five years, and no trip greater than 40mm remains in the network. The graph shows that the area of footpath with trip defects have decreased in each Ward, which indicates that we are achieving an equitable approach to road maintenance. The flattening off in the last year in South Ward is an example of steering the maintenance effort, and is due to diverting resources away from repairing trips to constructing pedestrian ramps, which are needed in that Ward. This is only possible when the total defects are known. Also Figure 1 shows that by comparison with the other Wards, the footpaths in South Ward were in generally better condition, so it was possible to divert resources away from trip repairs to other maintenance activities, in this Ward, without adverse consequences.

3.10  Not All Reactive Maintenance can be Avoided

In spite of our aims to be pro-active with road maintenance and always work to a program, the need to provide good customer service means that some reactive maintenance will be necessary. Because we can only carry out programmed inspections at intervals, the sheer size of our network, its age and condition, means that defects will occur between inspection rounds. So, it helps to have extra sets of eyes out there, checking the network.

Council launched City Fix in 1996, with much publicity. City Fix aims to give customers a single point of contact with Council, for complaints, and there have been several promotions to encourage rate payers to call in and report defects. Initially we believed that City Fix would
work against our efforts to achieve programmed maintenance, but by systematically working on removing defects, this is now of little concern.

Civic Roads established one Team to do reactive maintenance. Other Teams are called in for urgent works if needed. Following storm events, there will be requests to fix pot holes, fallen trees, minor flooding and additional Teams are assigned to respond to these. Our approach to all complaints is to make safe until the works can be programmed.

Another approach is to issue Teams with reactive work requests mixed in with other programmed work items. Where there are a number of defects in the MDR, in the same area as a customer work request, we can still be responsive and do the reactive maintenance work while completing programmed works from the MDR. We just have to alter our works program to accommodate these requests. In this way we minimise the high travel time component of reactive works. Where a customer service request item is isolated from other defects, we have no alternative but to assign this to the Team doing reactive maintenance.

3.11 Other Indicators of Improvement

Council has various systems for monitoring performance in its activities. Two examples follow:

- Council’s CARS system logs all calls from customers on the City Fix number. The CARS system was not set up specifically to monitor condition of roads and the statistics reported by the system may be distorted by City Fix promotions, and storm events. However, trends indicate little change in the number of complaints about potholes and kerbs over the last five years. The trends for footpath complaints indicate some decline in the last year. At least there has been no increase in the number of complaints, despite reduced maintenance resources.

- The number of trip and fall claims against Council have trended down over the last five years with the current year expected to be about half the number of claims in 1998/99. There are some fluctuations against this trend, which are believed to be people making claims before legislative changes. With Australian society becoming increasingly litigious, a downward trend in claims is a good result.

3.12 New Methods of Maintenance, Working Smarter

The MDR indicated there was a large number of footpath trips, which would take years to repair using traditional methods of concrete slab replacement. This method was not very environmentally friendly and was slow and expensive. Recently, Civic Roads started a program of trip grinding for any trips in concrete footpaths on condition that:

- The trips are not caused by tree roots.
- The footpath slabs are otherwise in good condition.
- The footpath slabs are not associated with driveway crossings.
- The trips are 25 mm or less.
Civic Roads did extensive trials of wet grinding and dry grinding and completed friction tests of the treated footpaths. We became concerned that the wet grinding process would leave a highly polished surface, which may result in a slippery footpath in wet conditions. We did not want to replace a trip with a slip. Also we considered that the wet grinding process was not as environmentally friendly as the dry process as it would have been more difficult to manage wet slurry than dry dust.

Civic Roads purchased a dry scabbler type of concrete grinder. This was coupled to a vacuum cleaner to remove dust particles directly from the machine head and clean up after grinding. This machine combination is highly portable and suited to doing lengths of footpaths or isolated footpath trips. Using this method, a trip takes less than 10 minutes to repair, depending on its size.

We have also trialed a combination of treatments where we repaired all footpath trips in a street. Those which could be repaired by trip grinding were repaired using this machine, and those which could not be ground, were repaired by slab replacement. On completion, the whole street was clear of footpath trips at less cost and in less time than if traditional methods had been used to repair every trip. The trial was successful and the method will be repeated in other streets.

Also we have trialed an hydraulically powered horizontal milling machine to repair transverse and longitudinal footpath trip hazards. This machine is self propelled, but because of its size, it is more suited to treating areas having high concentrations of trips. Because the machine is more powerful and the pressure applied to the grinding surface is mechanically assisted, it usually takes only five minutes to repair a trip. We concluded that we would use this machine with long lengths of longitudinal trips or where we needed to supplement the output of our own Team.

Knowing the number of specific defects and the estimated time to fix them has highlighted the need to rethink how we do road maintenance in some activities. This has encouraged Civic Roads to try new approaches and opened up opportunities for innovation. Trip grinding is one example.

3.13 Duty Of Care

After the High Court’s decision in 2001, the new road maintenance system outlined in this paper was formally adopted by Council as its Policy. This step was taken because it was considered, that if it came to defending a public liability claim in Court, Council would present a stronger case in defense if it had formally endorsed the way road maintenance is managed in Bankstown. This road maintenance system enables Council to demonstrate that it is exercising its duty of care because it is being proactive with its approach to road maintenance by identifying, recording, prioritizing and repairing defects within the limits of its budget. The road maintenance system is transparent and lends itself to being presented in court if necessary.
3.14 Benefits of New Road Maintenance System

- Significant savings in maintenance expenditure.
- Confidence in the level of maintenance being provided.
- Ratepayers are being treated more equitably, receiving their fair share of the maintenance dollar.
- Improved staff morale; everyone understands the system and knows what to do.
- Improved OH&S records; work can be planned so safety can be planned.
- Reduced environmental impact from operations, because of better planning.
- Better defense for public liability claims against Council.
- Improved knowledge of the condition of our road network.
- Opportunities for innovation identified through knowledge of the maintenance needs of the road network.

4. Future Directions

Civic Roads has aimed to keep its road maintenance system simple and has deliberately kept it low technology. We investigated the field use of hand held data loggers for maintenance inspections, but for a variety of reasons decided not to proceed with purchase. In any case, there was so much going on with changes to Council’s corporate computer system, that we considered we needed time for these systems to bed down and for staff work loads to normalize. For the same reasons, we decided against any trials of global positioning systems for recording locations of defects and issuing data loggers to Maintenance Teams for allocating jobs and recording completion. In respect to the data loggers, the Maintenance Inspectors expressed some concerns that data entry in the field would slow down their inspections, even though it may speed up the data entry process back in the office. Next financial year, Civic Roads will be in a position to evaluate these systems and adopt any that work because, by then, most of the system changes in Council, such as migration of MDR onto SAP, will have been completed. Also by then, it is expected that these commercially available systems will be at a higher level of development. Obviously any new systems for road maintenance will need to exchange information with Council’s corporate computer systems.

When the MDR has been fully migrated onto Council’s corporate computer system, access to the MDR will be available throughout Council. Because SAP is the system which Council uses for all its financial management and costing, having the MDR in SAP, will enable much tighter control of maintenance costing and allow a number of processes to be automated.

Council’s Pavement Management System (PMS) is being migrated to SAP as well. As SAP requires a functional location for every section of Council’s roads, data in the MDR and the PMS will be linked by location in the one data base. This will allow MDR to feed directly into PMS and for its data to help in determining future priorities for capital project works.

Once the majority of trips have been removed from the footpaths, and the footpaths are safe, work will start on a program of footpath replacement, which will see longer lengths of footpath being reconstructed and built to Council’s new footpath standards.
5. Conclusion

Civic Roads did not start changing to its new road maintenance system to save money, but it has achieved significant savings. We started the new road maintenance system to ensure the road network was being maintained adequately and equitably and feedback indicates we are achieving this. We have found increasing benefits from sharing the information in the MDR with other Units within Council. People gained increasing confidence in the level of maintenance being provided when they understood that all roads are inspected, all defects are recorded and being monitored or programmed for repair. The system becomes self-managing after the initial hurdles of implementation are overcome. The engine room of the system is the MDR because this drives everything else and is a central point of reference. It does not have to be a high technology system to return the benefits of programmed maintenance, but use of computers to store and sort data is a major advantage. If you are still doing road maintenance on a complaints driven reactive basis, we recommend you give programmed maintenance a trial.
### Table 3: Maintenance Defects Register (MDR)

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<thead>
<tr>
<th>ID</th>
<th>South BLOCK</th>
<th>Ward Block Part- tion</th>
<th>No</th>
<th>House</th>
<th>No</th>
<th>House</th>
<th>LOCATION</th>
<th>AUS SPEC Activity Code</th>
<th>Activity</th>
<th>Description</th>
<th>Qty</th>
<th>Trip</th>
<th>UNIT</th>
<th>Rate</th>
<th>Amount</th>
<th>Total</th>
<th>Traffic Score</th>
<th>Response</th>
<th>Quantity</th>
<th>Trip</th>
<th>Subsequent Inspection</th>
<th>Quantity</th>
<th>Program</th>
<th>Month of</th>
<th>Remarks</th>
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