



ASSET MANAGEMENT PLAN

ROADS

ROAD BASE, ROAD SURFACE AND KERB & CHANNEL



ASSET MANAGEMENT DEPARTMENT

June 2007

ASSET MANAGEMENT PLAN ROADS
ROAD BASE, ROAD SURFACE AND KERB & CHANNEL

TABLE OF CONTENTS

1. EXECUTIVE SUMMARY.....	3
2. LIST OF FIGURES	11
3. INTRODUCTION.....	12
4. LEVELS OF SERVICE.....	17
5. FUTURE DEMAND	25
6. LIFE CYCLE MANAGEMENT PLAN.....	28
7. FINANCIAL SUMMARY	43
8. ASSET MANAGEMENT PRACTICES	46
9. PLAN IMPROVEMENT AND MONITORING.....	49
10. REFERENCES.....	52
11. APPENDICES & ATTACHMENTS	54

1. EXECUTIVE SUMMARY

The Asset Management Plan Roads - Road Base, Road Surface and Kerb & Channel together with the Road Management Plan sets out the blueprint for how these vital community assets will be managed in Boroondara until the year 2026. It is the first of its kind, being a “first generation” document, written according to acknowledged best practice standards, peer reviewed and capitalising on several significant investments by Council. It forms part of the final phase of Council’s initial Asset Management Strategy. It will be refined over time, with the second version due by the end of June 2010, incorporating a number of improvements highlighted in this plan to result in an even more robust document.

This long term strategic plan is the broad ‘what, where, when, how and why’ document for Road Base, Road Surfacing and Kerb & Channel in Boroondara, and should be adopted by Council in order to convert its effort and intent into actions.

Asset Stock Summary

The Road Base, Road Surface and Kerb & Channel asset stock includes a variety of road base materials, road surfaces and kerb & channel on Local Roads for which Council has full responsible.

As at June 2006, Boroondara Road Base, Road Surface and Kerb & Channel asset portfolio on Local Roads consisted of the following:

- 37 Kms of Roads with - Greater than 5000 Vehicles per day (Vpd) (Roads coloured Blue);
- 51.5 Kms between 2000 and 5000 Vpd (Roads coloured Red); and
- 478 Kms less than 2000 Vpd (Roads coloured Buff).

Note 1: Refer to the attached Boroondara Road Classification Plan No. 12770.

Note 2: For detailed roads listing refer to Councils Road Register.

Other road infrastructure in the City of Boroondara includes:

- 1.5 Km (approximately) of Made Private Streets on Body Corporate or private property - No responsibilities for Council, however some of these are named & shown in Street Directories;
- 1 Km (approximately) of Unmade Private Streets on land reserved for road purposes where Council has the planning and development controls but no financial controls unless it is also an adjoining property owner. (Named & Shown in Street Directories);
- 8 Kms of Made Laneways named & shown in Street Directories, and
- 78 Kms of Made Laneways unnamed & not shown in Street Directories.

Under the Road Management Act 2004 there are clear lines of responsibility for VicRoads on the following classifications of roads that exist within or on the boundaries of the City of Boroondara for their road related assets of: Road Base, Road Surface and Kerb & Channel.

- All Freeways – Eastern and Monash
- State Highways – Burwood (Toorak Rd), Chandler, Maroondah, and Warrigal; and
- All Declared Main Roads.

Note: All of the above are now referred to as Arterial Roads within the meaning of the RMA 2004. Under the Road Management Act 2004 there are some roads where Council is the responsible authority, however because of the nature and function of these VicRoads are continuing to maintain them whilst an agreement of understanding is being considered.

The following roads areas are listed for this agreement:

- Yarra Boulevard – Walmer St to Chandler Highway, and
- At the following cuttings:
 - Barkers Rd at Harrison;
 - Burwood Rd at Church St, and
 - Glenferrie Rd at Scotch College.

Note: Council does not undertake maintenance on Arterial Roads on behalf of VicRoads for the assets of Road Base, Road Surface and Kerb & Channel. However, there are other assets in these road reserves that Council is fully responsible for example; footpaths and most signs but not through traffic related signs.

Valuation Summary

The Council portfolio has a current replacement value estimated at \$255 M for Road Base, \$48 M for Road Surface and \$90 M for Kerb & Channel as reported in the Annual Report for 2005-2006, as at 30 June 2006. These figures are projected to remain approximately at this same value based on 2006 Dollars to the end of 2033/34, if the strategy to maintain surface replacements at 8% annually is maintained. This strategy maintains a good quality road surface whilst providing the required water protection to the underlying road base asset.

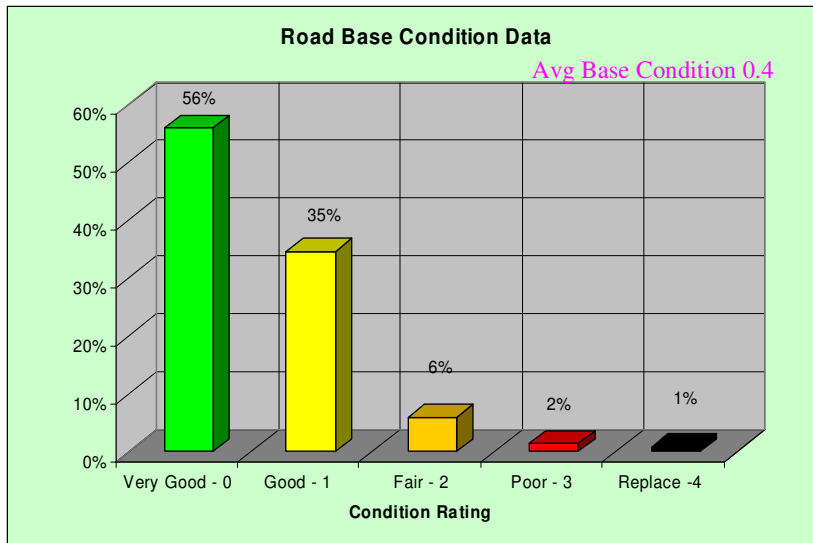
Condition Summary

Condition assessment for Road Base, Road Surface and Kerb & Channel is undertaken on a five-year cycle where council has undertaken two complete assessments of its roads, the first was in 1996 and the last rating dated 2003.

As of June 2005, the portfolio had the following attributes:

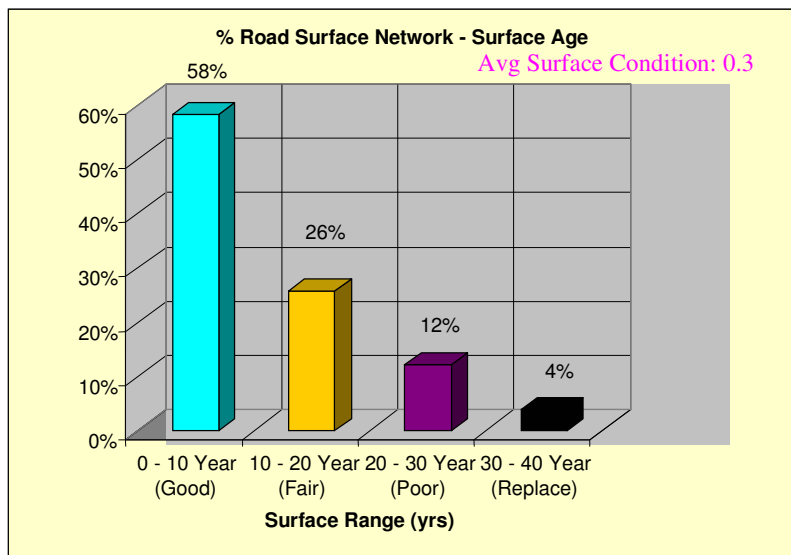
Road Base

- An estimated average condition of 0.4 on a 0 to 4 scale (0 being new, 4 being requiring total reconstruction).
- 3% of the portfolio was in substandard condition.
- The full details are contained in the table below.



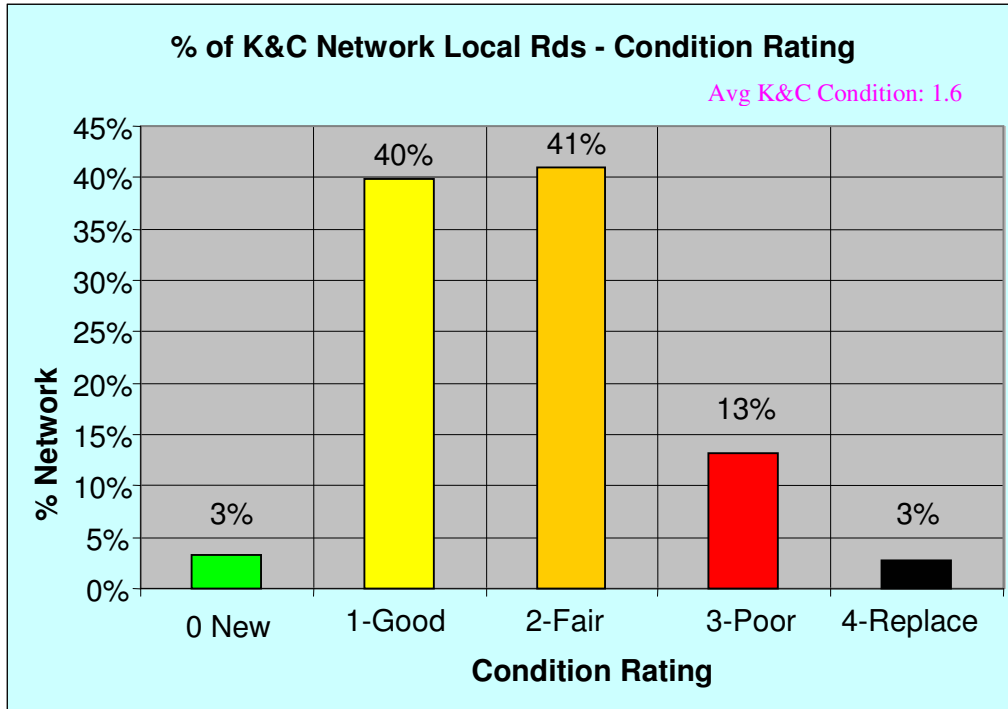
Road Surface

- An estimated average condition of 0.3 on a 0 to 4 scale (0 being new/less than 5 Years old, 4 being greater than 25 years requiring resurfacing usually with asphalt).
- 4% of the portfolio was in substandard condition.
- The full details are contained in the table below.



Kerb & Channel

- An estimated average condition of 1.6 on a 0 to 4 scale (0 being new, 4 being requiring total reconstruction).
- 3% of the portfolio was in substandard condition.
- The full details are contained in the table below.



To establish and formally adopt the service levels and response times contained in this plan, it is proposed that following consideration of this draft plan Council will undertake a consultation process. The consultation process will take the form of seeking feedback from the major stakeholders and involve a survey of 100 community members to confirm the current levels of service or provide feedback for Council to consider what changes may be required within Council resource levels.

See **Appendix D** for Service Standards.

Budget Impacts

The current budget provisions for 2006/07 and the proposed five-year plan show an investment of around \$1.5 M in maintenance and \$5.2 M of Capital improvements.

There is a need for increased funding for:

- **Road Base:** To minimise the amount of road base where a substandard condition is evident i.e. having a Pavement Condition Index (PCI) of less than 4, funds in the order of \$8.4 M would be required. However a more practical approach would be to reduce the backlog over a ten year period at a cost of \$840K each year for road sections that have a PCI of less than 4 by programming the required works on a needs basis.
- **Road Surface:** To minimise the amount of road surfaces where the age of the last treatment has exceeded its rated life expectancy by more than 2 years except asphalt where 5 years is the maximum. Funds in the order of \$3 M would be required to achieve this objective. However, when considering asphalt surfaces a more practical approach would be to reduce the backlog over a ten year period at a cost of \$300K per year.
- **Kerb & Channel:** To minimise the amount of Kerb & Channel where a substandard condition is evident having a Condition Index less than 3, funds in the order of \$16 M would be required. However a more practical approach would be to reduce the backlog defined as above 60% condition 3 & 4, requiring funding of \$2.1M over a 10 year period at a cost of \$210K per year as Kerb & Channel does not critically impact on the risk of the other two road components.

Inspection and Works Maintenance programs

Since the introduction of the Road Management Act, Council has undertaken a higher level of Inspection and Maintenance of the road assets. In November 2004 a new Risk Management approach was introduced by Council's Asset Management Department to meet the requirement of the Road Management Act. Risk assessments are now undertaken of all road related infrastructure in accordance with usage, size, value and importance of its asset stock. All major resurfacing works are arranged through the Projects & Strategy Department who also undertake the Capital Works reconstruction programs for the road network. Infrastructure Services Department undertake the day-to day reactive requirements for all road related infrastructure. All departments record their activities within the corporate asset management system Conquest.

After the identified catch-up program between 2006/07 and 2025/26 discussed above is completed, the annual allocation of roads funds should be around \$8.1 M (plus CPI) compared to current expenditure of \$6.7 M for the annual program requirements for roads. The decision 'triggers' which determine when works are required have been reset to enable intervention to be made proactively and based upon planned cyclical maintenance as distinct from traditional approaches of reactive response. Through time this approach will reduce the need for relatively inefficient reactive works and will improve the overall quality of the road network.

Performance Summary

A number of performance issues regarding Road Base, Road Surface and Kerb & Channel will be enhanced with the current processes in place to identify all works performed on all assets via the Conquest Asset Management system.

Commensurate with this approach Councils asset management system is being progressively populated with detailed road asset information so that capacity to better plan programmed works is progressively refined and improved. The future performance of these assets will also be linked to best practice management for Council.

Future performance will be guided by reporting on the following:

- Improvements to asset monitoring processes;
- Funding needs versus long-term asset sustainability; and
- Customer satisfaction and service response standards.

Community Research Summary

Previous community research on Road Base, Road Surface & Kerb & Channel has identified priorities as:

1. Safe roads;
2. Maintenance requests promptly attended to;
3. Reduction in risk incidents;
4. Disruptions to road users are minimised; and
5. Smooth road ride quality for higher volume roads.

These outcomes can be summarised as a safe and smooth road network providing an efficient and effective transport system for the community.

These performance issues and research outcomes will require further work in order to quantify how they will affect the adopted service levels. Council is currently developing reporting tools within DataWorks and Conquest to enable analysis of response and service standards to be reported on.

Since the introduction of the Road Management Act, Council has introduced a Risk Assessment and Analysis Program. This program aims to minimise risk incidents and to be proactive in identifying the risks and resolving them without the need for the community to be the first to report these risks. Further work in the area of Intervention Levels and response times to mitigate these risks will be undertaken by Council. Council's reporting tools will then provide the means to show that all road related infrastructure is providing a safe and appropriate level of service, that maintenance requests are promptly attended to and that risks are minimised.

Other key outcomes and issues that this plan addresses are:

- Regulatory and Statutory requirements – including the Road Management Act, the Disability Discrimination Act and the Disability Standards for Accessible Public Transport; Transport Safety Regulations.
- Standards – such as the Australian Standard series AS/NZS 1158;

- The Road Safety Strategy adopted by Council in 2001 and Community Safety Plan 2003.
- The Fixed Asset Accounting Policy and Asset Valuations.

As mentioned, the historical valuation amounts for Roads – (Road Base & Surface) and Kerb & Channel, excludes ‘Laneways’ as there has not been sufficient research and data collection at this point in time. However, the basic data collection and condition information are now underway. It is anticipated that Laneways will be brought into the next revision of the Asset Management Plan for Roads anticipated to be within three years for the 2008/09 financial year.

The 2005/06 financial summary for roads included an assessment for lanes valued at \$36 M.

- Through rolling condition assessment programs, Council will measure changes in the Road Base, Road Surface & Kerb & Channel asset stock, and whether the adopted strategies are targeted correctly and are prudently managing the risks associated with these assets.
- Programmed and targeted public risk assessments are in place to enable proactive works programme and to minimise the need for the public to inform Council of the development of isolated risk incidents, improve public accountability and minimise insurance costs.

Asset Custodian Comments:

This plan has documented the current position of these road assets and shows that Council has in the past used best practise methods to maintain roads at a good standard in keeping with the community expectations. The maintenance planning methods utilised and the level of funding applied need to be increased to ensure that at a network level Road Surface Assets will protect the Road Base Assets for future generations.

With the information progressively being captured, Council will be able to undertake further detailed analysis on the future needs and deterioration rates of these assets. Armed with this information Council will be able to position itself to optimise its investment decisions into the future whilst ensuring the requisite standard of asset condition are rigorously maintained across the City.

Keith Reiter
Principal Advisor Asset Management

2. LIST OF FIGURES

Figure 1. Organisational Structure	13
Figure 2. City Works Directorate Objectives	15
Figure 3. Reactive Request Levels	22
Figure 4. Operating and Maintenance Expenditure on Road Base, Road Surface and K&C	26
Figure 5. Road Base, Road Surface and K&C Operating Cash flow 2000-01 to 2025-26.....	27
Figure 6. (2) Trends in Road Base, Road Surface and Kerb & Channel Related Service Requests.....	29
Figure 7. Condition of Boroondara Road Network 2003.	31
Figure 8. Change in Road Network Condition 1996 – 2009	32
Figure 9. SMEC PMS Modelling Funding Scenarios	33
Figure 10. Projected Network Condition of Boroondara Road Network	33
Figure 11. Straight line Valuation for all Council Controlled Roads	35
Figure 12. Capital and Maintenance Thresholds	36
Figure 13. Road Base, Road Surface, Kerb & Channel Maintenance Cash flow 2004-05 to 2025-26	37
Figure 14. Refer to figure 4 plus additional capital works proposed in the Executive Summary – (Budget Impacts)	38
Figure 15. Capital Renewal Funds 2004/05 – 2024	39
Figure 16. Renewal and Recurrent Cashflow 2004 - 2024.....	39
Figure 17. Road Base, Road Surface and K&C Capital Upgrade Cash flow 2004-05 to 2024.....	42
Figure 18. Road Base, Surface and Kerb & Channel Capital Cashflow 2004/05 to 2024/25	43
Figure 19. Projected Replacement Value of Road Base, Seals and K & C	44
Figure 20. Projected Written Down Value	44
Figure 21. Projected Depreciation for Road Base, Road Surface and Kerb & Channel.....	45
Figure 22. Improvement Program for Road Base, Road Surface and K&C Asset Management Plan.	51

3. INTRODUCTION

3.1 BACKGROUND

The purpose of an Asset Management Plan for Road Base, Road Surface & Kerb & Channel is to document the status quo and future directions for these assets. This includes treatment of issues such as levels of service and key performance indicators, long-term financial forecasts and a plan for how these assets and the methods for their management will be improved over time.

This Asset Management Plan links to (or will in the future be linked to) several other documents:

- Council Plan 2006-2010 and its successors. In the current Council Plan, the relevant Council Plan strategic objective is No.3 Maintaining Our City;
- The Asset Management Strategy and Corporate Objectives, adopted by Council on 10 December 2001;
- Service Levels for Asset-Related Services, adopted by Council on 25 November 2002;
- Business Plans for the Infrastructure Services, Projects & Strategy and Asset Management Departments;
- Council's Draft Asset Management Policy Manual;
- Council's Road Management Plan May 2007;

The infrastructure assets included in this plan are the Road Base, Road Surface and Kerb & Channel assets throughout the city that are owned and maintained by Council. A sample listing of these assets is contained in **Appendix E** in summary form. Because of the number and detailed description required to identify these assets it is not practical to list each assets in this plan. The details are fully contained within Council's Conquest Asset Management System. The Conquest system enables reporting on the assets at an individual asset level or collectively attributed for each group e.g. For K&C: Bluestone, Concrete or Other. Road Bases: Flexible or Rigid. Surfaces: Asphalt, Seals, or other;

Key stakeholders in the Asset Management Plan for Road Base, Road Surface and Kerb & Channel, and their interests, are:

- Road users – end consumers of the asset;
- The Asset Management Department - strategic custodian of the asset class;
- The Infrastructure Services Department - carries out the routine operational maintenance and responds to customer requests on Road Base, Road Surface and Kerb & Channel assets;
- The Projects & Strategy Department - is responsible for the periodic surface maintenance, capital works road base, road surface and kerb & channel replacements, project management and delivery as provided in the scheduled works plans;

- The Asset Management Department - are responsible for developing future Works Programs and for monitoring the condition and risks of these assets;
- The Principal Advisor Asset Management, who is responsible for developing and updating the Asset Management Plan and ensuring its outcomes are realised;
- Vic Roads and the Public Transport Corporation insofar as there is an interaction between Council and these agencies with regards to Road Base, Road Surface and Kerb & Channel assets located on arterial roads, within tram tracks and over railway lines. These organisations are fully responsible for their respective assets within Boroondara as described in the Road Management Act 2004. Any changes to ownership/maintenance responsibilities for assets in road reserves must be documented in agreements and gazetted in accordance with the requirements of the RMA;
- Utility service authorities including electricity, gas, water and telecommunications who provide the City area with electricity, gas, sewerage, reticulated water and telecommunications services and whose infrastructure is located on road reserves;
- The municipalities which border Boroondara, if any assets are located such that shared responsibility may exist. Responsibilities for these assets are described in the agreement between Whitehorse Council. (See **Appendix F**).

The organisation structure of Council shown below indicates the current relationships between the stakeholders:

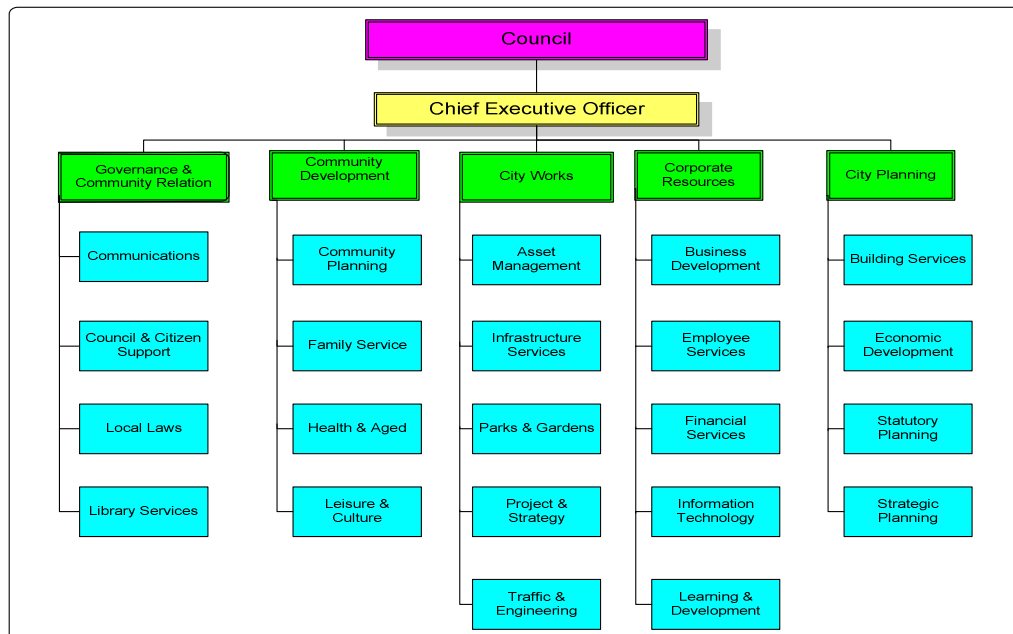


Figure 1. Organisational Structure

3.2 GOALS AND OBJECTIVES OF ASSET OWNERSHIP/ACCOUNTABILITY

Road Base, Road Surface and Kerb & Channel are treated as infrastructure assets in this plan because:

- Together, they make up a “network” which forms part of the broader road transport system (which itself is composed of several asset classes);
- They are managed at Boroondara by the directorate (City Works) given the role of managing civil infrastructure (in the draft Asset Management Policy section on roles and responsibilities); and
- They require a management plan, and the methodology related to infrastructure assets that are suitable for a large network of significant financial value to the community totalling some \$393 M.

Under the legal framework provided by the Local Government Act and the Road Management Act, Council is the controlling authority of the majority of public land and the road reserves throughout the municipality. Council is therefore responsible for managing the infrastructure assets within these areas where these assets have been vested in Council and or provided to Council for their ongoing care and maintenance. Most road base, road surface and kerb & channel assets in the City are located within public road reserves, with a lesser number located within Council Managed Land (CML), and in Carparks. These assets within CML and Carparks are contained within a separate Carparks Asset Management Plan – Carparks and Access Roads.

The goals and objectives for the care and maintenance of Road Base, Road Surface and Kerb & Channel assets are at two levels:

Level 1: Corporate Objectives

The adopted Asset Management Strategy contains the following Asset Management Corporate Objectives:

- Ensure all assets are identified;
- Provide integrated control and improved management of asset-related information.
- Reduce risks and costs associated with asset failures;
- Optimise strategic and operational decision making on assets; and
- Ensure service standards are developed for assets and delivery methods provide best value for the community.

These corporate objectives are now contained in the following Strategic Objectives adopted by Council on 26 June 2006 in maintaining our city.

Strategic Objective 3. – Maintaining our city

‘We will manage, maintain and enhance the public assets under control of Council to maximise their value to the community’.

The City Works Directorate has prime accountability for this Strategic Objective and has adopted in part the following Strategies to achieve these objectives towards the Road Base, Road Surface and Kerb & Channel assets.

Strategy 3.1 - Asset Management.

Develop strategies for the long-term ongoing renewal of Council's physical assets.

Strategy 3.2 - Infrastructure Services.

Manage, maintain and enhance the public assets under the control of Council to maximise their value to the community.

Strategy 3.3 – Parks & Gardens (not applicable).**Strategy 3.4 - Projects & Strategy.**

Plan for the development of Council's physical assets for long-term sustainability, residential amenity and public safety.

Strategy 3.5 - Engineering & Traffic.

Respond effectively and in a timely way to community needs on traffic, parking, drainage and other engineering-related matters.

Strategy 3.6 - Engineering & Traffic.

Protect Council's assets through the application of the Asset Protection Local Law and provide technical engineering advice regarding new developments.

Figure 2. City Works Directorate Objectives – Council Plan 2006-2010

These objectives apply across all infrastructure asset classes, and were adopted in part due to the overlaps and gaps inherent in the Council Plans prior to 2003, with regard to clear aims for asset management for the city.

Level 2: Asset Class Specific Objectives

Road Base, Road Surface and Kerb & Channel are constructed for the purpose of:

- Enabling the safe movement of vehicles, pedestrians and cyclists along road pavements;
- For Kerb & Channel – enabling clear definition of the road and physical support for the road pavement as well as the safe collection of stormwater from the road related infrastructure and conveyance to the made stormwater drainage infrastructure.

There has been no formal decision to adopt specific goals and objectives for Road Base, Road Surface and Kerb & Channel, apart from those inherent in the service levels adopted on 25 November 2002¹. The relevant goals or outcomes are underlined in the extracts from adopted service standards are shown below:

- Safe roads;
- Smooth road ride quality;
- Maintenance requests are promptly attended to;
- Reduction in risk incidents; and
- Disruptions to road users are minimised.

In other words, the local community's stated specific goals for Road Base, Road Surface and Kerb & Channel can be summarised as a safe and smooth road network providing an efficient transport system for the community.

¹ Ref No. 1

The outcomes encapsulated in the service levels align with the following extract from Councils Vision Statement:

‘Our City will foster.... a safe and attractive city that looks after its built and natural assets, now and for future generations’.²

They also align with the mission statement:

‘Our mission is to pursue social, environmental and economic well-being for the City’.³

The provision of adequate Road Base, Road Surface and Kerb & Channel, as part of a cohesive municipal infrastructure, is a clear expectation of the community, and in this regard many Road Base, Road Surface and Kerb & Channel assets are not just ancillary but crucial to the broad Council Plan Strategic Objective 3 ‘Maintaining our City’ (refer also to section 4.2 Customer Research and Expectations).

With regard to internal accountability of Road Base, Road Surface and Kerb & Channel, the Asset Management Department is the nominated ‘Asset Custodian’ and is charged with the ‘Strategic’ responsibility to ensure the long-term goals for these assets are achieved. On certain assets, strategic input would also be gained from a variety of other departments, though this would not alter the status of Asset Management as the overall asset class custodian.

3.3 PLAN FRAMEWORK

The Road Base, Road Surface and Kerb & Channel, Asset Management Plan framework will generally follow the format recommended in the International Infrastructure Management Manual 2006 (IIMM⁴):

- The Service Levels will include a treatment of the issue of Key Performance Indicators, as proposed in the IIMM 2006.
- The Life Cycle Management Plan will apply a simplistic approach to sub sections such as routine maintenance planning, renewal/replacement planning, creation/acquisition/augmentation and disposal planning.
- Only certain of the appendices suggested by the IIMM 2006 will be included.

3.4 BASIC AND ADVANCED ASSET MANAGEMENT

This Asset Management Plan is designed to be easy to follow – as mentioned in the section above; it is also ‘first generation’ in nature. While Boroondara has carried out many asset management activities in the past, these activities have not been combined into an Asset Management Plan.

This Asset Management Plan has been delayed to achieve the required changes in all areas of City Works following the introduction of the Road Management Act. All asset management activities across Council have to achieve substantial cultural, work practice and system change if Boroondara is to achieve ‘Excellence’ as set out in **Appendix A (Step graph)**. This level is also seen as the “best appropriate practice” level for a large urban municipality to aim for, as set out in the MAV Asset Management benchmarking survey of late 2001.

² ref. No. 2 page 10

³ ref. No. 2 page 10

⁴ Ref No. 7

4. LEVELS OF SERVICE

4.1 BACKGROUND

The City of Boroondara (and its predecessors) has been managing Road Base, Road Surface and Kerb & Channel assets since the City was initially developed.

During late 2001 and early 2002, an analysis was undertaken by the Asset Management Department of the various asset-related services delivered by Council. This study demonstrated that the only levels of service established for Road Surfaces was an annual performance target of applying new surfaces to 8% of the road network annually. Road bases were nominated for refurbishment and/or reconstruction via the SMEC – PMS management system.

No service targets for Kerb & Channel have been nominated in the past, however condition assessments of these assets has been undertaken and nominated projects completed on a needs basis for several years. Annually all road related works undertaken are reported internally and to Council as part of the overall Capital Works projects completed.

An important next step is therefore to consolidate on the work completed during previous community consultation (that led to the current adopted service levels⁵), and to develop service level targets that are based on a clear strategy to sustain or improve the asset stock and/or services, with meaningful indicators related to the specific asset type.

Consistent with the asset condition rating system published by Civic Mutual Plus (Council's insurers), clear criteria were developed for the process of allocating condition according to a 0 to 4 scale, where 0 = new and 4 = requires reconstruction. The detailed condition descriptors are shown in **Appendix B**.

Specific Levels for Service are detailed in **Appendix D**.

4.2 CUSTOMER RESEARCH AND EXPECTATIONS

Building on the work undertaken during both the Best Value review process⁶ the management of Road Base, Road Surface and Kerb & Channel was specifically included in the 'Best Value Community Consultation on Asset Related Services', the subject of the report and service levels adopted by Council on 25 November 2002⁷. The consultation process itself was carried out in May-June 2002 via a series of workshops with an 'informed customer reference group' of 30 persons chosen to match Boroondara's demographic profile.

The outcomes from that process demonstrated that the community attaches very high priority (relative to other asset related services or service groups) to the benefits gained from these Road related assets and therefore to the services related to them.

Previous consultations have highlighted a number of issues relating to continuously accessible paths of travel and adequate and safe crossing points. This indicated a general need for better-

⁵ Ref No. 1

⁶ Ref No. 1

⁷ Ref No. 1

designed and constructed walking trails or paths, which incorporate issues, related to adequately design and maintained kerb ramps and crossing points. Considerable research (including stakeholder forums and meetings) was carried out in mid to late 2001 by City Works in relation to the Road Safety Strategy, which was developed as part of the State-wide 'Safe Roads' strategy, and was supported by a number of peak agencies. The Road Safety Strategy also addresses vehicle, pedestrian and bicycle transport modes, both in the road reserve and along park trails. Lastly, the Community Safety Plan by the Community Planning department has included stakeholder consultations with a wide variety of community representatives

In summary, these various forms of community research all point to the same outcomes for Road Base, Road Surface and Kerb & Channel:

- Safe roads;
- Smooth road ride quality;
- Maintenance requests are promptly attended to;
- Reduction in risk incidents; and
- Disruptions to road users are minimised.

As the above community consultation was completed some time ago it is now recommended that this Asset Management Plan be the subject of a further consultation process through a survey involving 300 residents and major stakeholders as mentioned earlier. The outcomes of this process would form the basis of the acceptance or amendment of this Asset Management Plan and the associated service levels and response times in the next review of this document. (The service levels and response times are explored in more detail later in this document).

4.3 STRATEGIC AND CORPORATE GOALS

Strategic Objective 3 - Maintaining our City.

We will manage, maintain and enhance the public assets under the control of Council.

Strategy 3.1 – *Maintain Council's built assets to ensure amenity and effective service delivery.*

Strategy 3.4 – *Develop strategies for the long-term on-going renewal of Council's physical assets.*

This asset management plan addresses all of the above insofar as they apply to Road Base, Road Surface and Kerb & Channel.

4.4 LEGISLATIVE REQUIREMENTS

There are a large number of legislative requirements that apply to the management of Road Base, Road Surface and Kerb & Channel. In summary, they are as follows:

- *Local Government Act* (1989). The purposes of a Council include "to provide equitable and appropriate services and facilities for the community and to ensure that those services and facilities are managed efficiently and effectively" (s. 6 (1) c). Other sections of interest include s. 203-207 "Provisions Relating to Roads and Public Highways and Traffic Regulation" and s. 208 "Best Value Principles", Schedule 1 "Function of Councils", Schedule 10 "Powers of Councils over Roads", and Schedule 11 "Powers of Council over Traffic". This Act includes footpaths and bicycle paths in its definition of "what is a road".

- *The Local Government Act* puts the responsibility for all roads onto Councils except in certain prescribed circumstances where they reside with Vic Roads or other nominated bodies. The road management Act now further clarifies who is responsible for assets in road reserves. Vic Roads owns and controls all Bridges on declared arterial roads.
- *Transport (Highway Immunity) Act (2002)*: This Victorian legislation nominally reinstates the “non feaseance” defence until 1 January 2005, and since that date the Road Management Act has now come into effect. Vic Roads is also currently instituting a new form of Maintenance/Management agreement on arterial roads (consistent with the directions being taken by the *Road Management Act*), which further clarifies roles and responsibilities;
- *Roads Management Act (2004)* establishes a new statutory framework for the management of the road network, which facilitates the coordination of the various users of road reserves for roadways, pathways, infrastructure and similar purposes. It sets out certain rights and duties of road users; establishes the general principles which apply to road management; provides for the role, functions and powers of a road authority; provides for the making of Codes of Practice to provide practical guidance in relation to road management; facilitates the making of road management plans as part of the management system to be implemented by a road authority in the performance of road management functions; provides for the construction, inspection, maintenance and repair of public roads; sets out the road management functions of road authorities, infrastructure managers and works managers in providing infrastructure or conducting works and provides for issues relating to civil liability arising out of road management.
- *Accident Compensation Act 1985 (as amended), Accident Compensation (WorkCover Insurance) Act 1993 and Accident Compensation Regulations 1990*: Provides for the payment of compensation to workers injured after 1 September 1985 and requires WorkCover insurance to be maintained.
- *Disability Discrimination Act (1992)*, including the *Disability Standards for Accessible Public Transport (2002)*. The DDA sets out the general principles and definitions of disability and discrimination, including treatment of issues such as discriminating by denying access to premises or services. The *Disability Standards for Accessible Public Transport* provide specific details about the Infrastructure provided in the vicinity of public transport stops. These issues could affect the design and construction of Road Base, Road Surface and Kerb & Channel in the City, particularly in relation to pedestrian movements.
- Boroondara Planning Scheme – which is empowered by and forms part of the *Planning and Environment Act (1987)*. This sets out areas of the city where, as far as Council assets are concerned, construction is to be “like for like” to preserve the amenity of the designated areas;
- *Road Safety Act (1986), Road Safety (General) Regulations (1999), Road Rules Victoria*: Regulate Road use, including definitions of “what is a vehicle”. When read in conjunction with the *Transport Act (1983)*, clarifies issues concerning where cyclists may ride. The *Transport Act* also addresses issues such as construction and maintenance of roads (including paths), though this has caused some confusion with regard to the rights and obligations of Councils under the *Local Government Act (1989)*. The *Road Management Act* is meant to clarify any inconsistencies between the various Acts.
- *Subdivision Act (1988) and Regulations (1999)*: Governs subdivision of land, and variation of easements or restrictions. Council may require a developer to install Road Base, Road Surface & Kerb & Channel assets under the powers of this Act and vest the ownership in Council.

- There are also various other acts that currently allow for various service supply authorities to locate their assets in or on Council assets, which appear to allow them not to require Council consent or application of standards to Council's satisfaction. It is anticipated that the *Road Management Act* will clarify or address these anomalies, at least within the road reserve and possibly in other locations deemed (by Council)'ancillary' to the road reserve.
- Other minor legislative requirements for Roads are also listed in **Appendix I**

(**Note:** Some of the text above has been extracted from an advice given to Council by Maddock Lonie and Chisholm Solicitors in August 2000).

None of these legislative requirements are prescriptive concerning the standards or principles that must be applied to Road Base, Road Surface and Kerb & Channel in the form of service levels. The legal responsibilities for Council are detailed in the Road Management Act.

These are;

Sec 34 of the Act defines the general functions of a road authority:

- (a) "To provide and maintain, as part of a network of roads, roads for use by the community served by the road authority;
- (b) To manage the use of roads having regard to the principle that the primary purpose of a road is to be used by members of the public and that other users are to be managed in a manner which minimises any adverse effect on the safe and efficient operation of the road and on the environment;
- (c) To manage traffic on roads in a manner that enhances the safe and efficient operation of roads;
- (d) To coordinate the installation of infrastructure on roads and the conduct of other works in such a way as to minimise, as far as reasonable practical, adverse impacts on the provision of utility services;
- (e) To undertake works and activities which promote the functions referred to in paragraphs (a), (b) and (c) and to undertake activities which promote the function in paragraph (d)"

In seeking to achieve its functions, a road authority should:⁸

- (a) "Consult with the community and disseminate information in relation to the exercise of those functions;
- (b) Take steps as are reasonably practicable to ensure the structural integrity and safety of public roads in accordance with this Act."

Sec 39 of the Act empowers a road authority to make a policy decision relating to road management functions. A policy decision includes decisions about the circumstances and the manner in which a road management function is to be performed and the standard to be achieved in performing a road management function.

A road authority is to be taken to have made a policy or decision relating to a road management function if the road authority has made a road management plan that includes provisions relating to the performance of that road management function.

Sec 40(1) of the Act specifies the statutory duty to inspect, maintain and repair public roads to the standard specified in the road management plan for that public road or a specific class of public roads which include that public road. Under subclause (2), this statutory duty does not create a duty to upgrade a road or to maintain a road to a higher standard than the standard to which the road is constructed.

⁸ Road Management Act Sec 41 (3)

The statutory duty to inspect applies to any part of a roadway, pathway, shoulder or road infrastructure but does not apply to a road which is not a public road, any roadside or other area that has not been developed by a road authority for use by the public as a roadway or pathway or non-road infrastructure installed in the road reserve.⁹

Sec 41 of the Act details the powers relating to determining the standard of construction, inspection, maintenance and repair.

- (1) “The relevant road authority may determine the standard to which the relevant road authority will construct, inspect, maintain and repair roadways, pathways, road infrastructure and road related infrastructure.
- (2) Without limiting the generality of this section, the relevant road authority may determine
 - (a) in relation to construction, the nature of the construction of any roadway, pathway, road infrastructure or road related infrastructure;
 - (b) in relation to inspection, the inspection of specified matters and specified intervals;
 - (c) in relation to inspection –
 - (i) the maintenance programs;
 - (ii) the maintenance work to be performed in the course of regular maintenance;
 - (iii) the standard to which the maintenance is to be performed;
 - (d) in relation to the repair of defects reported or found on inspection –
 - (i) the matters which are to be treated as defects which require repair or a warning;
 - (ii) the circumstances in which intervention action is to be taken with respect to repair needs for defects;
 - (iii) the type of intervention action to be taken;
 - (iv) the period of time within which the intervention action is to be taken;
 - (v) the priority to be given to the intervention action.

Intervention action includes any action to conduct repairs, erect warning signs or reduce or remove a risk.¹⁰

The above is an overview summary of sections of the Road Management Act relating to Council’s powers and responsibilities. Readers should refer to the complete Act and/or specific legal advice or interpretation.

4.5 CURRENT LEVEL OF SERVICE

At its meeting of 25 November 2002, Council adopted service standards with regard to Road Base, Road Surface and Kerb & Channel. These are shown in detail in Reference 3 and were listed and discussed briefly in section 3.2 above.

It is difficult to comment conclusively on Council's performance in relation to delivering the current level of service, as expressed in the adopted service standards that relate to Road Base, Road Surface and Kerb & Channel. However, Figure 3 below indicated that there are

⁹ Ref No. 5 Road Management Act Sec 40 (3) (4)

¹⁰ Ref No. 5 Road Management Act Sec 41 (3)

relatively speaking very little call for reactive responses from the community on these assets compared to that from footpaths and other road related assets and public authority requests.

(Note that the 2005-06 is actual data and the 2006-07 includes estimate for June 2007.)

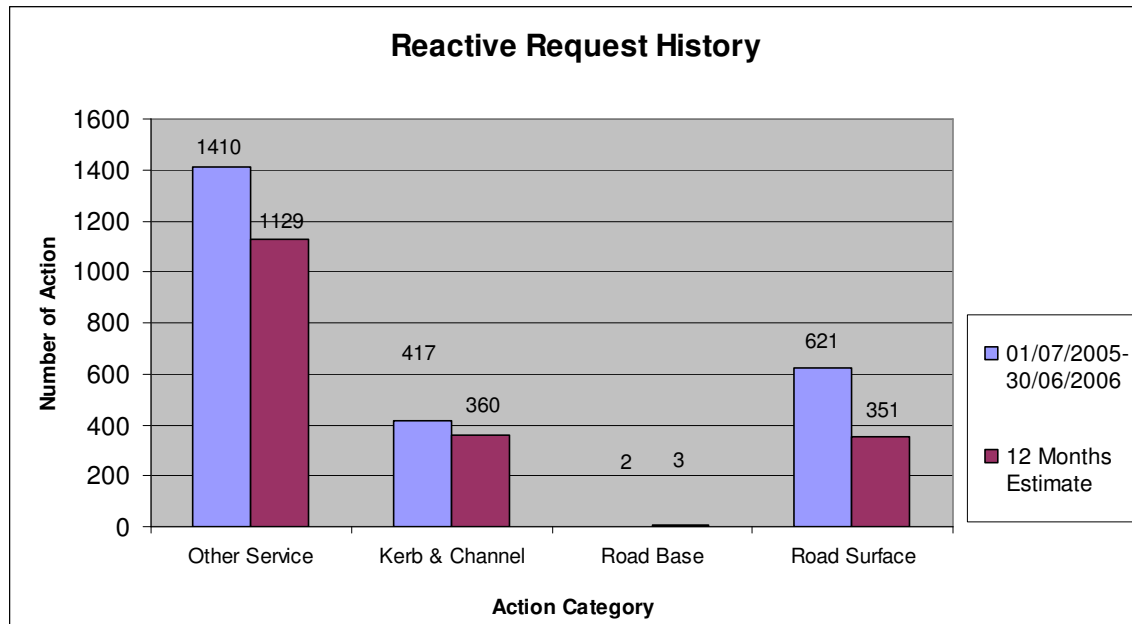


Figure 3. Reactive Request Levels

In terms of these desired outcomes, we have quantified current level of service as;

- Local Road Maintenance
 - Respond to all requests and ensure sites are made safe within 48 hours and all formal repairs of potholes is within the requirements of 'Appendix D' after being reported to Council;
 - Ensure that all completed works have been carried out to the standard required by Council;
 - Be available 24 hours per day for any emergency call outs for any of Councils roads;
 - Ensure that all works on roads are carried out in accordance with the Occupational Health and Safety Act;
 - Ensure that all setting up of signage is in accordance with the VicRoads Roadwork Signing Code of Practice;
 - 90% of all reactive repairs are adequately repaired first time (i.e. no return after completion of the formal repairs').
- Line Marking
 - In general painted road markings need to be replaced on a cyclical program.
 - Long life markings are anticipated to last approximately 7 years.
- Management of Maintenance and Renewal of Council Roads
 - Maintain the existing Pavement Condition Index (PCI) for roads at a similar level;
 - Aim for 8% coverage of road surface per year;

- Keep open to traffic all constructed Local Roads as defined and listed in Council's Road Register;
- Management of VicRoads Renewal and Maintenance Programs
 - Plan and coordinate works programs where practical with VicRoads and Service Authorities to minimise disruptions to road users and property owners in the vicinity of works;
- Coordination of Utility Authority Reinstatements and Risk Items
 - Ensure all reinstatement of service authority work affecting Council assets (including nature strips) is carried out to Council standards by;
 - Inspecting a percentage of all temporary works where Council is notified, whether or not work is actually performed by Council;
 - Carrying out random audits of service authority works, to determine quality of work and whether Council is being advised;
 - Reporting all risk issues and asset failures arising from service authority works to the relevant authority and liaising to ensure issues are resolved;
 - Carrying out final reinstatements within 40 working days of temporary works being completed to Council Standards where authority has agreed for Council to undertake this work at agreed rates or price.

4.6 DESIRED LEVEL OF SERVICE

In terms of 'desired outcome', the adopted service standards contained in **Appendix D** should be refined over time to further enhance and quantify the following issues:

- Issues related to the inspection, maintenance and renewal of Council's owned Road Base, Road Surface and Kerb & Channel assets; and
- Issues arising from a review of the resources required to maintain the desired level of service and changes in community expectations.

4.7 PERFORMANCE MEASURES

The issue of performance measures has in the past been dealt with on a pure 'output' basis. This has been in two forms – the number of Road Base, Road Surface and Kerb & Channel renewed/replaced vs. estimates for the year and the number of customer requests outstanding (that is, not completed within the timeframe specified by the generic Council service charter) related to maintenance and repairs. These are not overly helpful in terms of managing the assets strategically, as they do not tell you whether things are getting better or worse or whether the other outcomes of importance to the community (i.e. other than "was the job I requested completed") are being realised.

The Business Development Department will be working with all asset custodian departments to carry out benchmarking activities and also assist them in developing helpful performance measures relevant to their services. With Reference 9 in mind, the following are suggestions that could be applied:

With regard to the current service levels – Asset Management to monitor:

- For Road Base, Road Surface and Kerb & Channel Maintenance and Renewal
 - Average Road Base, Road Surface & Kerb & Channel condition rating
 - Ratio of (Renewal plus Maintenance \$ required)/(Renewal plus Maintenance \$ allocated);
 - Ratio of (\$ spent on Road Base, Road Surface and Kerb & Channel expansion or upgrade works)/(\$ spent on the asset class in total);
 - Customer satisfaction with Road Base, Road Surface and Kerb & Channel in the city;
 - Number of Road Base, Road Surface and Kerb & Channel with condition 3 or 4 present; above acceptable maximum tolerance;
 - Proportion of annual proactive works program delivered on time and within budget;
 - Number of risk incidents relating to Road Base, Road Surface and Kerb & Channel that are proved on investigation to be related to utility condition. Asset Management to monitor, in conjunction with Employee Services Risk Management team the number of public liability claims for each Asset Group.

With regard to the future service levels – Asset Management to monitor:

- Once a reactive service aspect is quantified, numbers of requests and numbers of responses met within timeframes set out in the adopted service standard;
- Once a proactive planned maintenance system is firmly in places, the ratio of proactive to reactive maintenance expenditure;
- Once issues concerning safety (i.e. “how safe?”), visibility, accessibility and cleanliness are clarified, they may be able to have appropriate performance measures developed.

Some of the above would be of interest from a monthly or quarterly reporting point of view, while others would only be of interest annually, for assessing the effectiveness of strategies.

5. FUTURE DEMAND

5.1 DEMAND FORECAST

Boroondara has an extensive network of Road Base, Road Surface and Kerb & Channel that are in a mature stage. Demand for additions to the Road Base, Road Surface and Kerb & Channel asset stock is expected to be minimal in the future. However there will be one additional area of new assets for Council to maintain in the future when the Kew Residential Services (KRS) site is completed.

By 2021, Boroondara population will have grown to an estimated 165,628 persons, an increase of 5.35% on the 2001 population (source: City of Boroondara Population Forecast). New residential construction to allow for the population growth will mainly be urban consolidation modes such as dual occupancies, and replacement of current single occupant (aged) dwellers with families or “empty nesters” performing renovations. The demographic profile will by 2021 proportionally and numerically consist of many older persons, so the focus on improving accessibility and reducing risk over the short to medium term is crucial.

In summary, the Road Base, Road Surface and Kerb & Channel asset stock is expected to remain relatively constant for the life of this Asset Management Plan.

5.2 CHANGES IN TECHNOLOGY

Road Base, Road Surface and Kerb & Channel are not predicted to become obsolete or used less due to changes in technology over the life of this plan.

New technology may see:

- improvement in maintenance techniques and practises leading to extending life of road bases;
- new technology developments and products in sealed surfacings giving greatly extended asset useful life;
- improved asset performance knowledge;
- improved asset recording and reporting techniques, and
- improvements in pavement management systems and analysis techniques to reduce whole of life costs.

New technologies are likely to impact on the service via improvements in monitoring condition, capturing or analysing data, planning works and making information available to supervisory staff. As these technologies come to light and are applied, consideration should be given to revising the adopted and published service levels as appropriate.

5.3 DEMAND MANAGEMENT PLAN

The only possible alternatives to asset-based solutions would be as follows:

- Maintain a lower level of service and obtain a higher level of insurance and/or self-insurance pool to cover the increased payouts and litigation for trips and falls within road reserves on footpaths and on Council managed and controlled land.

This is not considered feasible for the following reasons:

- (a) Litigation is increasing in a climate when insurance is becoming harder to obtain;
- (b) To intentionally avoid a duty of care would be in breach of common law principles

and be in conflict with the Disability Discrimination Act, the Local Government Act and the Road Management Act;

- (c) The community's expectations are that we retain roads and kerb & channel and maintain and renew them to maintain service levels.

5.4 FUTURE WORKS PROGRAMME AND COST

Operating and Capital expenditures for Road Base, Road Surface and Kerb & Channel are shown in Figure 4 below.

Financial Year Ending	Road Base and Surface			Total \$,000	Kerb & Channel			Total \$ 000
	Operating	Maintenance	Capital		Operating	Maintenance	Capital	
	\$,000	\$,000	\$,000	\$,000	\$,000	\$,000	\$,000	
2001	149	1321	1444	2914	41	N/A	0	41
2002	165	1190	1076	2431	54	N/A	224	278
2003	201	1109	2454	3764	36	N/A	292	328
2004	177	1119	3139	4435	28	N/A	272	300
2005	239	851	3237	4327	67	N/A	810	877
2006	219	1225	4374	5818	70	0	850	920
2007	220	1000	5840	5920	60	0	1700	960
2008	220	1000	5840	5920	50	0	1750	1000
2009	220	1000	5840	5920	50	0	1800	1050
2010	220	1000	5840	5920	50	0	1900	1150

Figure 4. Operating and Maintenance Expenditure on Road Base, Road Surface and K&C

Operating expenditure does not include the following:

- Road Surface Line marking; and
- Kerb & Channel Street sweeping.

These cash flows include all expenditure on Road Base, Road Surface and Kerb & Channel, but not five-year condition audits nor the regular risk assessment audit inspections and operational costs such as design, supervision and management. These are relatively minor and not easily separable from their parent operational budgets; those are not asset class specific and are covered in three different departmental accounts.

The projected cash flow for operations of Road Base, Road Surface and Kerb & Channel is shown in Figure 5.1 & 5.2 below. Financial figures are in 2005 dollar values.

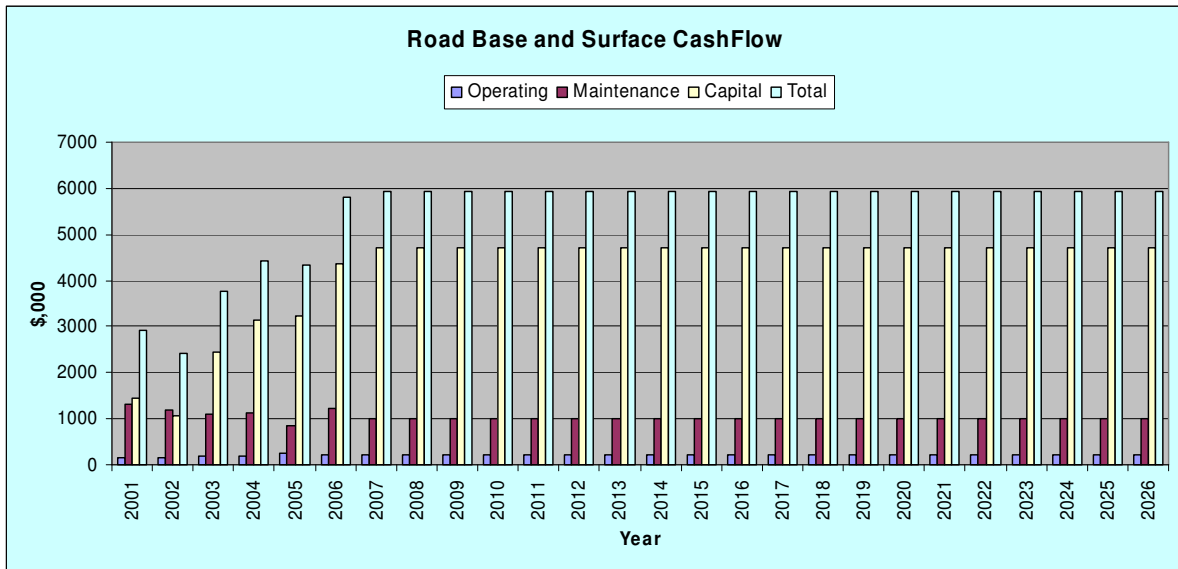


Figure 5.1. Road Base, Road Surface - Cash flow 2000-01 to 2025-26

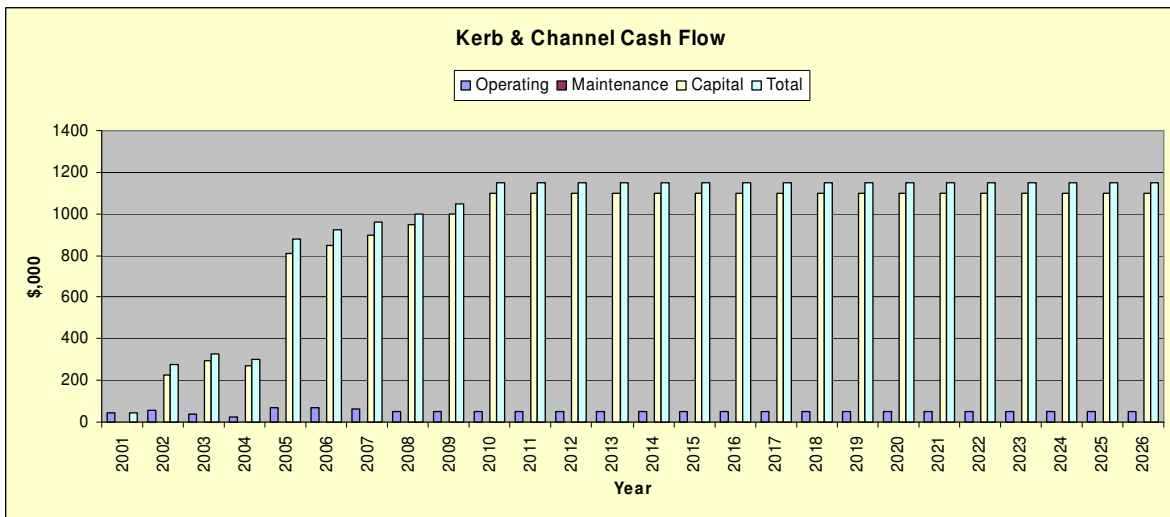


Figure 5.2. K&C - Cash flow 2000-01 to 2025-26

6. LIFE CYCLE MANAGEMENT PLAN

6.1 BACKGROUND DATA

6.1.1 Physical Parameters

The Road Base, Road Surface and Kerb & Channel asset stock includes road bases, sealed surfacings and kerb & channel on Council controlled Local Roads only. Previous information in the PMS contained also the data and programs for Main Roads for which Council was partly responsible. This responsibility for Main Roads ceased on 1 January 2005 following the introduction of the Road Management Act 2004. The basic data for roads is being re-structured to reflect these changes.

As at June 2005 within the boundaries of Boroondara Road Base, Road Surface and Kerb & Channel asset portfolio consisted of the following:

1. VicRoads Arterial Roads

- 10 Kms of Freeways;
- 7 Kms of State Highway;
- 78 Kms of Declared Main Road;
- 8 Kms of Tourist Road; and
- 500 meters of Access Road.

2. Council Controlled Public - Local Roads

- 37 Kms of Local Roads where traffic Volumes exceed 5000 VPD (Roads coloured Blue);
- 51.5 Kms of Local Roads where traffic Volumes are between 2000 and 5000 VPD (Roads coloured Red);
- 478 Kms of Local Roads where traffic Volumes are less than 2000 VPD (Roads coloured Buff);

The Hierarchy of roads is shown in **Appendix H** (Plan No 12770).

3. Council Controlled Private Access Roads.

i.e. Private Rear Access Roads on Land reserved for road purposes.

- 78 Kms of Made Rear Access Laneways;
- 8 Kms of Unmade - Formed Rear Access Laneways, and
- 28 Kms of Unformed grassed Rear Access Laneways.

4. Private Named Roads not controlled by Council

- 1.5 Kms of Private Roads on Private Land, and
- 500 meters of Private Roads on Land Reserved for Road Purposes.

The Road Base, Road Surface and Kerb & Channel asset stock is one for which clear lines of responsibility exist.

VicRoads is responsible for all Arterial Roads:

- Freeways;
- State Highway;

- Declared Main Road, and
- Any other specific roads by agreement.

Boroondara City Council is responsible for all public Local Roads:

Information on individual assets and attributes is obtained via either the Conquest Asset Management System or E-View Corporate GIS viewer.

6.1.2 Asset Capacity and Performance

As discussed in the section above titled ‘Demand Forecast’, and evidenced by the works program¹¹, Councils Road Base, Road Surface and Kerb & Channel asset stock is unlikely to significantly change in the period of this 5 year plan.

Performance of Road Base, Road Surface and Kerb & Channel are contained in the figures below. The trends indicated by the graphs show that Council’s works are changing from a reactive to a proactive service.

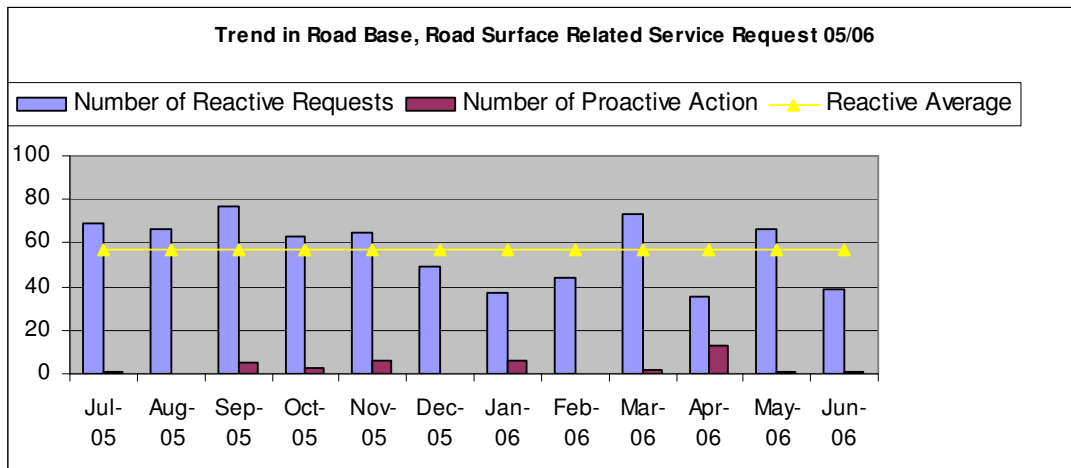


Figure 6.1 Trends in Road Base, Road Surface Related Service Requests

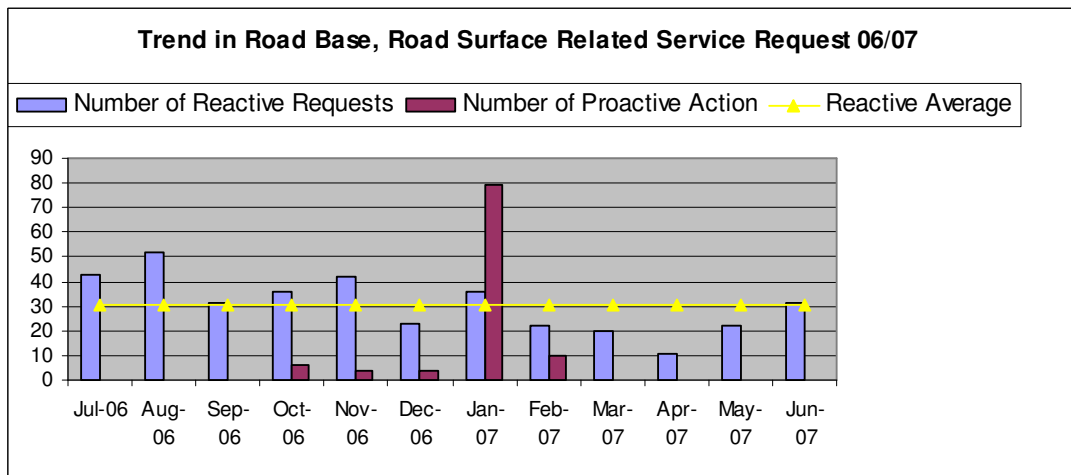


Figure 6.2 Trends in Road Base, Road Surface Related Service Requests

¹¹ Ref No. 3

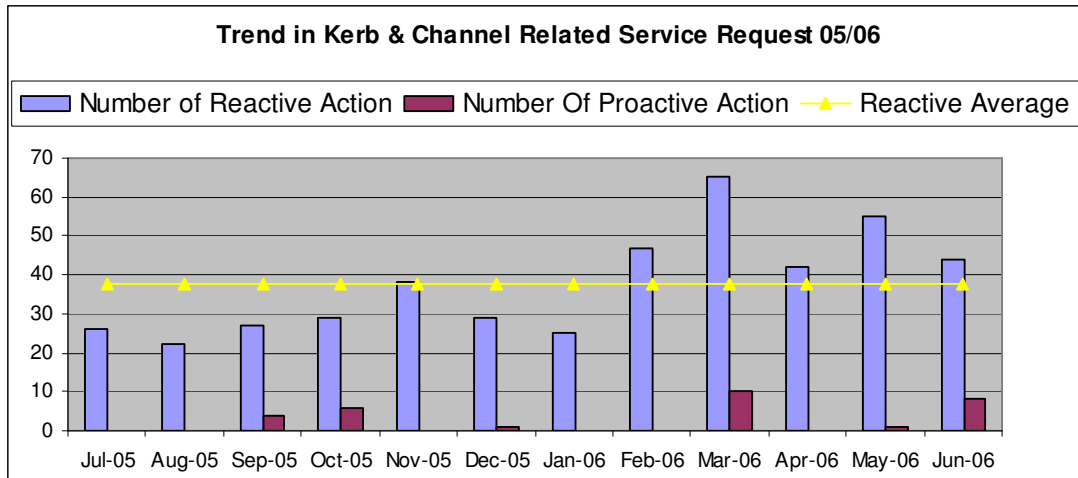


Figure 6.3 Trends in Road Kerb & Channel Related Service Requests

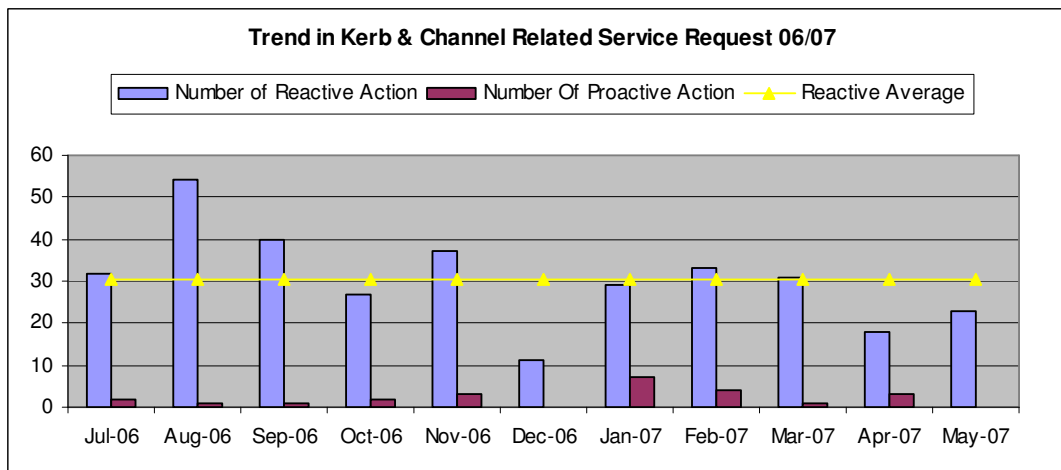


Figure 6.4 Trends in Road Kerb & Channel Related Service Requests

The failure modes related to condition are fully described in **Appendix B**.

There is at present no capacity or even condition deterioration graph available for road bases, surface and kerb & channel due to the lack of a sufficient body of research at Boroondara or elsewhere. Currently life cycle estimates are based on a combination of accountancy theory, engineering assessments and engineering practice. Where information & research is not available, condition assessments are used to derive an estimated remaining useful life.

6.1.3 Asset Condition

A complete condition assessment for Road Base and Road Surface was last completed in 2003.

The 2003 Network Condition by PCI Condition Category is shown in Figure 7. The best condition is indicated by a PCI score of 10.

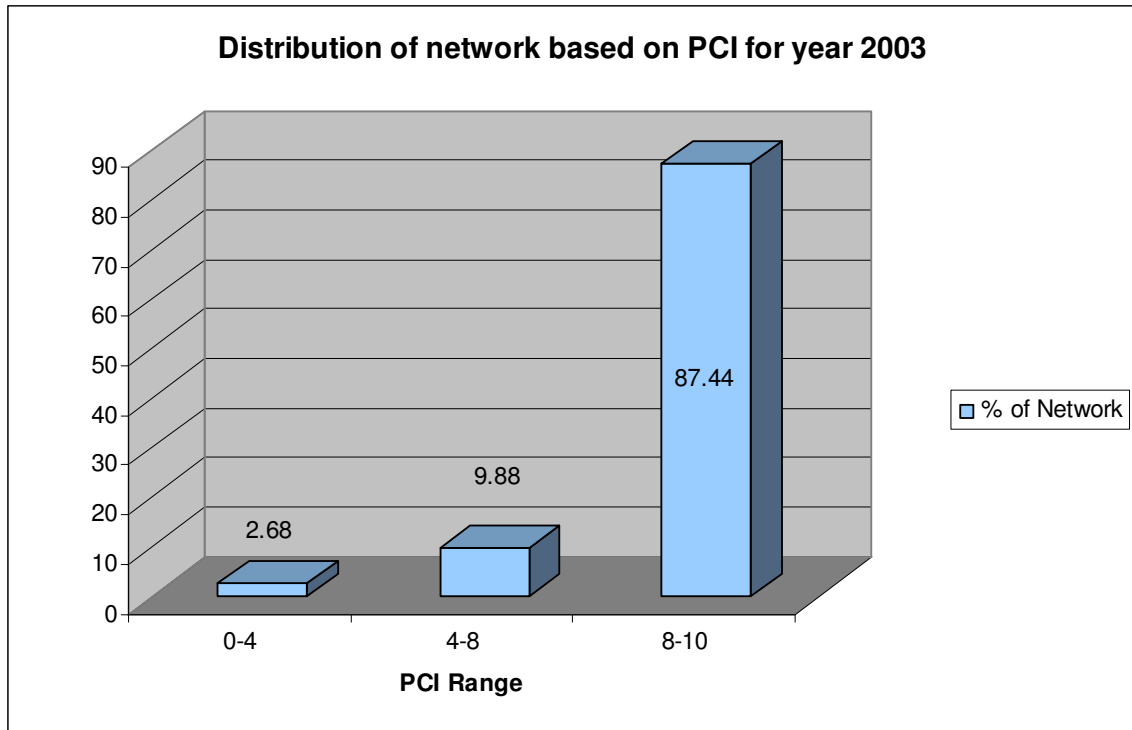


Figure 7. Condition of Boroondara Road Network 2003.
(Source - Fig 4, SMEC PMS Analysis 2004-2018 Works Program p10.)

The PCI of the City's road network has changed little since the last condition survey in 1996 as shown in Figure 8 below.

Year	Percentage of Network in Condition State		
	Poor	Fair	Good
1996	2.86%	8.89%	88.02 %
2003	2.68 %	9.88 %	87.44 %
2006 Estimated	2.5%	30%	67.5%
Target 2008 next Survey	2.5%	10%	87.5%

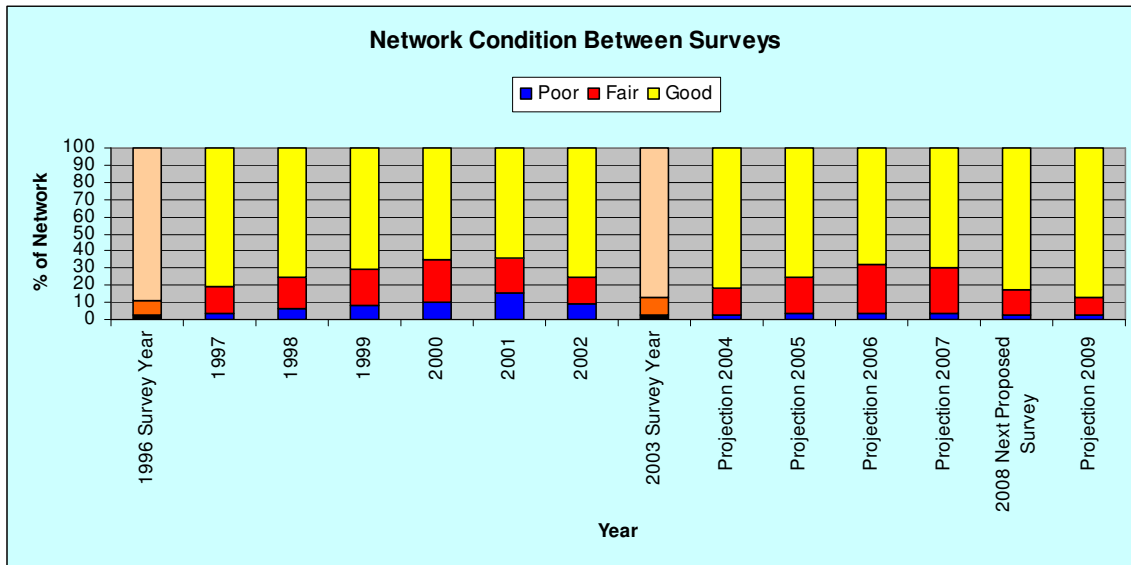
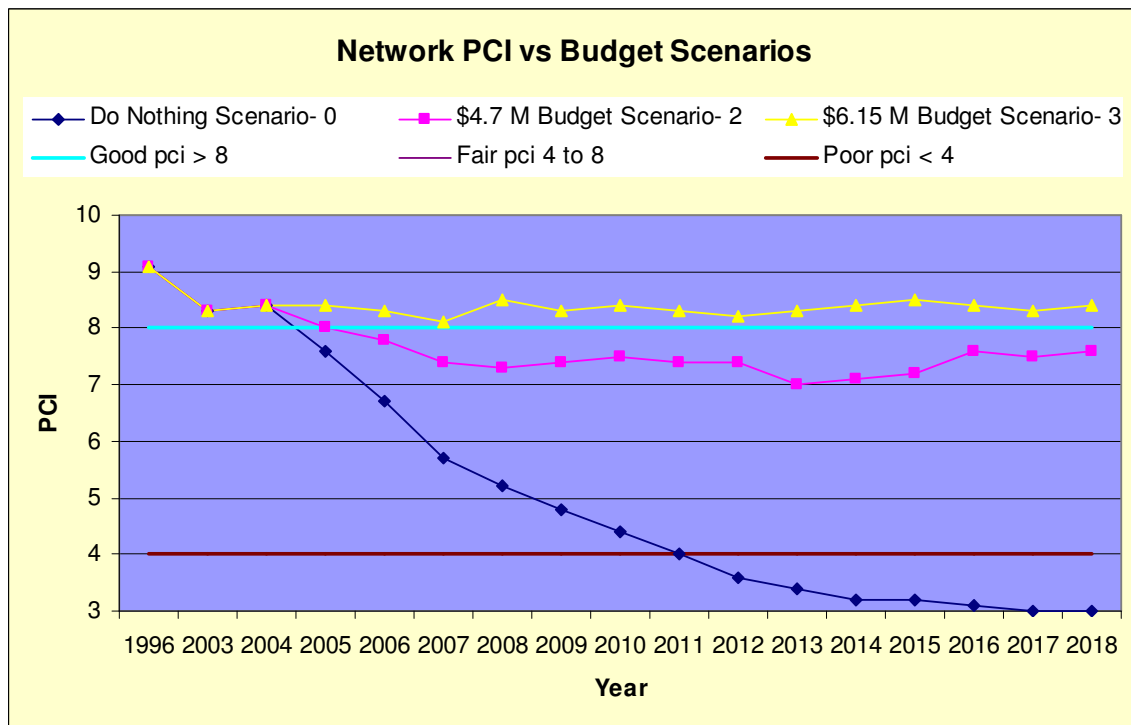


Figure 8. Change in Road Network Condition 1996 – 2009
 (Source - Fig 21, SMEC PMS Analysis 2004-2018 Works Program p25.)

The data was analysed in the City’s SMEC Pavement Management System by Snowy Mountains Engineering Corporation (Reference 1). The analysis modelled the condition of the City’s road network using various budget scenarios. The budget scenarios shown below have been updated to the 30 June 2006, the asset replacement values and the proposal to address the backlog requirements within a 10 year plan.



Budget Scenario	Reseal, Asphalt Re-sheet and Rehabilitation Budgets
Scenario 0	\$0 'Do Nothing'
Scenario 1	\$4,800,000 p.a. = Asset Depreciation p.a.
Scenario 2	\$6,150,000 p.a. = Budget 2006/07

Figure 9. PMS Budget Modelling Funding Scenarios

The Report analysed the Network Condition in three condition categories corresponding to Pavement Condition Index (PCI) scores.

Poor Category – Roads with PCI less than 4.0;

Fair Category – Road with PCI between 4.0 and 8.0, and

Good Category – Roads with PCI greater than 8.0.

The SMEC Report recommended in 2003 that the existing reseal, Asphalt re-sheet and rehabilitation budget of \$2,880,000 as a minimum should be maintained for the next four years ending in 2006/07.¹² However the trend it would have projected was clearly not able to provide the community expectations of maintaining the current service levels. This level has been interpreted as maintaining the existing pci profile or average pci for local roads. Projected network condition is shown in Figure 10.

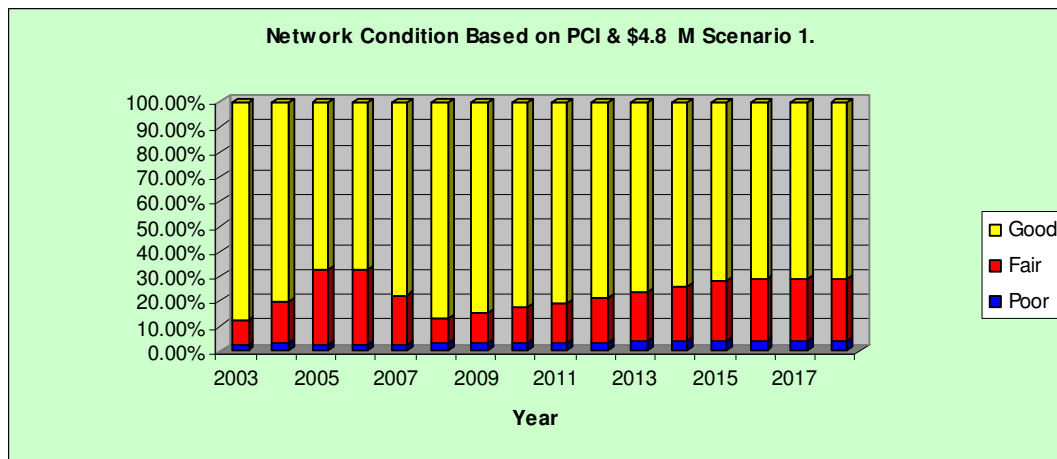


Figure 10.1 Projected Network Condition of Boroondara Road Network
(Based on Budget retained at Depreciation rates until 2018 – No Backlog reduction strategy)

¹² Ref No. 3 page 26.

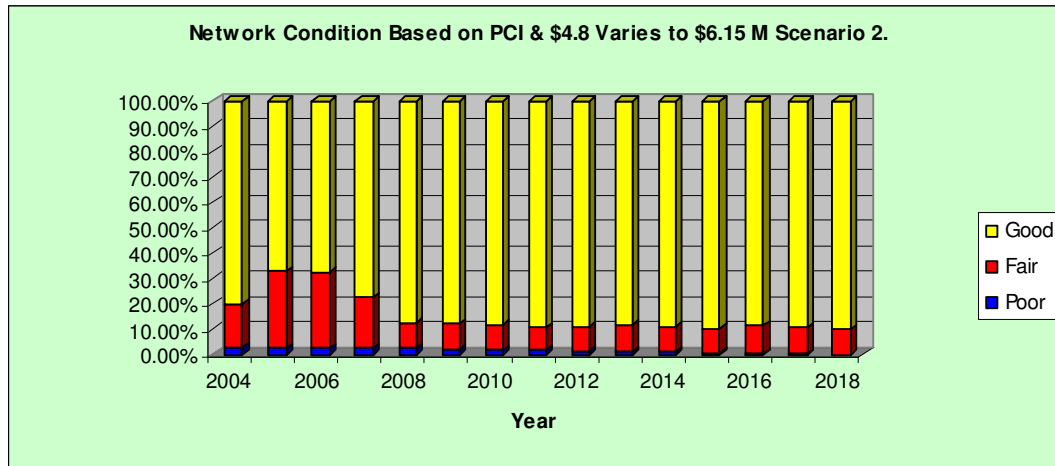


Figure 10.2. Projected Network Condition of Boroondara Road Network
(Based on Budget increased to address the Backlog 10 Year plan)

As it has been decided by Council (and confirmed via the community consultation process of 2002) that condition 3 and 4 for road assets are unacceptable in terms of both required service level and risk, the strategy is to continue to remove the backlog of these in the next several years. Also, by anticipating and replacing the future condition 3 and 4 Road Base, Road Surface and Kerb & Channel assets as they arise in future, this will eventually lead to the condition profile stabilising at around condition 2, with very few condition 3 or 4 Road Base, Road Surface and Kerb & Channel existing except in the year that it arises and until it is renewed in either that year or the following year.

Condition is and will continue to be monitored via several methods:

- Biannual condition inspections of road base and surfacings for performance analysis by Council's SMEC Pavement Management System;
- Regular maintenance and defect inspections of road base, surfacings, kerb & channel and road related infrastructure as detailed in the Road Management Plan;
- Customer requests, which are processed by the Infrastructure Services Department, whose staff assess the sites for urgency and generally carry out reactive repairs, actions to make the assets safe where required;

6.1.4. Asset Valuations and Key Assumptions

Asset Replacement Value summary

At 30 June 2006, Road Base, Road Surface, kerb & channel assets were valued as follows:

Current Replacement Cost = \$394,030,000. Accumulated Depreciation = \$190,569,000

Written Down Value = \$203,461,000. Service potential consumed = 48%

Depreciation Expense = \$4,702,000 per annum. Approximately equal to the adopt Budget 2005/2006 of \$4.8 M as per Figure 9, Scenario 1 and Figure 10.1.

The estimated average useful life of Road Base, Road Surface, Kerb & Channel assets is shown below:

Road Base Flexible	150 years
Road Surface Asphalt	20 years
Concrete Road Base	100 years
Concrete Road Surface	100 Years
Kerb & Channel	75 years

Valuations will be performed in the future using current replacement cost and straight-line depreciation over useful life, as Council now has estimates of installation dates calculated from condition assessments. Useful lives and unit rates (of replacement cost) will be assessed on a five year cycle year to account for unit rate changes or any other significant issues observed to arise.

The SMEC Report included an estimate of “AAS27 Valuations”. The “Straight Line Valuation” for all Council Controlled Roads is shown in Figure 11 below, however this report was based on the June 2003.

	Written Down Value @ 30 June 2003	Fair Value @ 30 June 2003	Depreciation Expense @ 30 June 2003
Surface	\$17,169,201	\$151,789,255	\$1,085,615
Base	\$55,112,737	\$107,144,296	\$1,085,615
Total	\$73,228,938	\$258,933,551	\$2,171,230

Figure 11.1 Straight line Valuation for all Council Controlled Roads
(Source - SMEC PMS Analysis 2004-2018 Works Program p22.)

The above figures vary from the Council’s financial figures of 30 June 2003. However as we progress to fully document and reconcile these assets in Conquest with Finance One the statements will be verified.

	Written Down Value @ 30 June 2006	Fair Value @ 30 June 2006	Depreciation Expense @ 30 June 2006	Reproduction Value @ 30 June 2006
Surface	\$19,172,000	\$48,358,000	\$29,186,000	\$418,867,000
Base	\$123,723,000	\$255,603,000	\$131,880,000	\$55,114,000
Kerb & Channel	\$60,566,000	\$90,069,000	\$29,503,000	\$115,237,000
Total	\$203,461,000	\$394,030,000	\$161,383,000	\$598,218,000

Figure 11.2 Straight line Valuation for all Council Controlled Roads

Historical Data

Historical data on expenditure and valuation can be gained from past Annual Reports, Operational Cost Centres, Finance Department reconciliation/revaluation data (used as the direct source for the annual reports), audit committee reports/minutes, the Fixed Asset Accounting policy).

The capitalisation threshold applied in recent years for Road Base, Road Surface, kerb & channel is shown in Figure 12 below.

Asset Category	Capital Upgrade	Capital Renewal	Maintenance
Road Base	\$5000	\$5000	\$5000
Road Surface	\$5000	\$5000	\$5000
Kerb & Channel	New K&C. Adding new kerb layback, pram/pedestrian crossing, retrofitting TGSi or other access feature to existing layback/crossing. Renewal of K&C with higher cost material. Cost in excess of replacement cost is capital upgrade.	Replaced sections of K&C greater than 30% of total K&C length even if below \$5,000 quantitative threshold. Renewal of K&C with higher cost material. Cost to replacement cost is capital renewal.	Repair of sections of K&C. Replaced sections less than 30% of total K&C segment length.

Figure 12. Capital and Maintenance Thresholds

6.2 ROUTINE MAINTENANCE PLAN

6.2.1 Maintenance Plan

Maintenance is the process of ensuring the Road Base, Road Surface, and Kerb & Channel assets, reach their designated useful life.

Maintenance activities fall into the following categories:

- (a) Scheduled maintenance, following regular risk assessment audits as specified in the Road Management Plan;
- (b) Reactive Maintenance. This derives almost exclusively from requests from the public via the Customer Request System ('DataWorks' from end of August 2004) related to defects. After an initial inspection by Infrastructure Services staff, works are prioritised, authorised for allocated to Council staff or a maintenance contractor. High priority defects are 'made safe' and repairs carried out where budget resources are available. Lower priority works are included in scheduled maintenance programs and undertaken when budget resources permit.

The majority of maintenance work is expected to shift towards proactive maintenance based on annual risks inspections and assessments. Also the condition assessments undertaken on a five year program will in the future provide better analysis data and proactive works programs. Expenditure on Road Base, Road Surface and Kerb & Channel maintenance is expected to initially increase and then remain constant for a time.

It is estimated that maintenance expenditures will remain at 2004/05 values but indexed to cover future cost increases as shown in Figure 13.

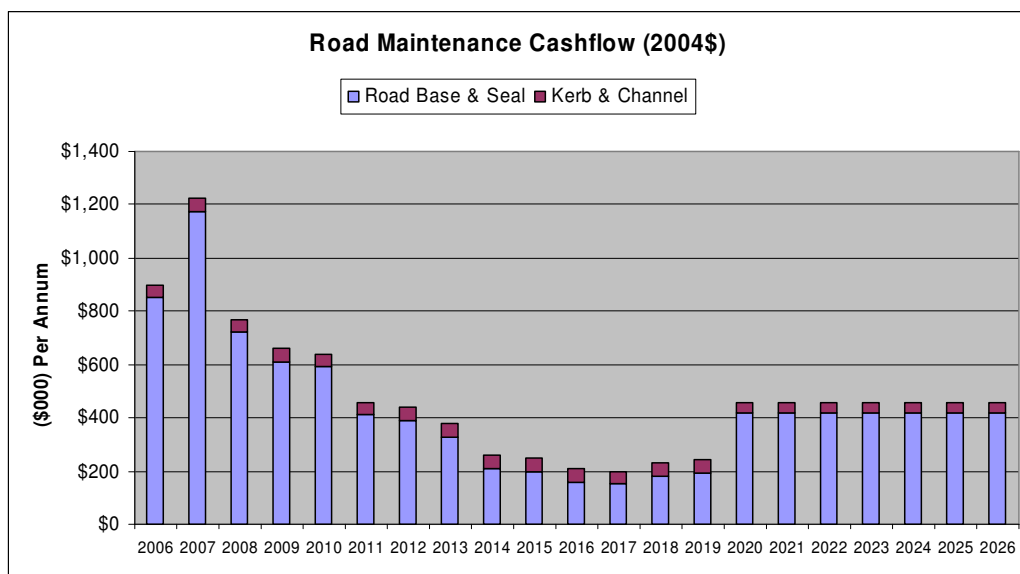


Figure 13. Road Base, Road Surface, Kerb & Channel Maintenance Cash flow 2004-05 to 2025-26

6.2.2. Standards and Specifications

The materials and methods used to achieve the required levels of service are fully described in VicRoads specification for Roadworks.¹³

6.2.3. Summary of Future Costs and Issues

The future costs related to operation and maintenance of Road Base, Road Surface, Kerb & Channel assets are shown in Figure 14. Figures are shown in 2006 values.

Financial Year Ending	Road Base and Surface			Total	Kerb & Channel			Total
	Operating	Maintenance	Capital	\$,000	Operating	Maintenance	Capital	\$,000
	\$,000	\$,000	\$,000		\$,000	\$,000	\$,000	
2006	219	1225	4374	5818	70	0	850	920
2007	220	1000	5840	5920	60	0	1700	960
2008	220	1000	5840	5920	50	0	1750	1000
2009	220	1000	5840	5920	50	0	1800	1050
2010	220	1000	5840	5920	50	0	1900	1150

Figure 14. Refer to figure 4 plus additional capital works proposed in the Executive Summary – (Budget Impacts)

The maintenance program will require funding from general rates revenue, as there is no other dedicated, direct revenue stream possible for maintaining Road Base, Road Surface and Kerb & Channel.

6.3 RENEWAL PLAN

6.3.1 Renewal Plan

The renewal plan has been prepared from two sources:

- (a) Projected for Road Base, Road Surface, kerb & channel are forecast from asset records in the asset register projected over the 30 year planning period using the existing useful life shown in Section 6.1 (iv).
- (b) The SMEC PMS Analysis 2004-2018 Works Program Report, 2004.

The asset register data renewal projections require capital renewal funds of \$54,387,000 over the 30 year forecast period averaging \$1,812,000 per annum. The Renewal projections are shown in Figure 16.1 & 16.2.

¹³ Ref No. 4

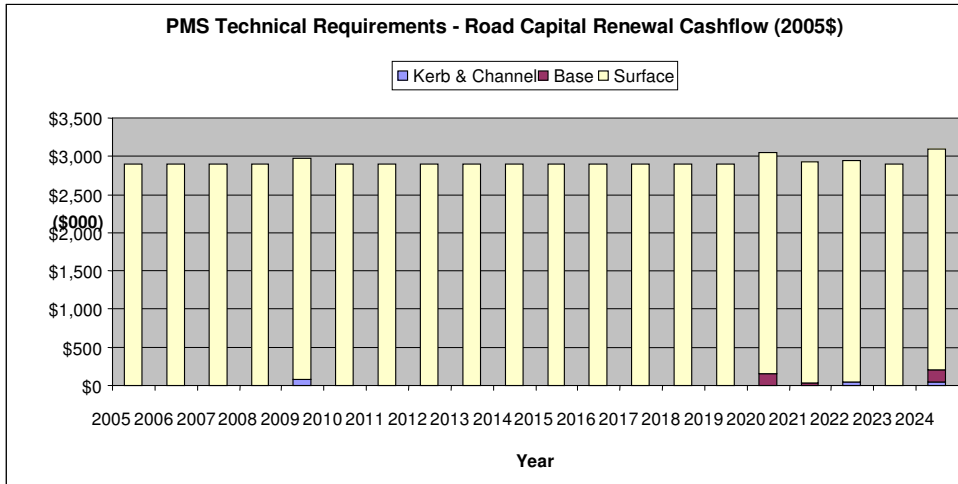


Figure 15. Capital Renewal Funds 2004/05 – 2024

Following the changes to the recent roads budgets there are no large ‘spikes’ in the renewal projections due to a backlog of surface renewals as reported in the SMEC report at 2004. The last date for resurfacings as shown in the data is not of sufficient accuracy for renewal planning and needs to be refined and improved with future condition assessments to determine a more accurate estimate of remaining life. An estimate of the remaining life of each asset should be collected with regular condition audit and maintenance inspections.

The SMEC PMS Analysis Report projected cash flow for Capital and Recurrent expenditure for the period 2004 – 2018. This projection is shown in Figure 16 below.

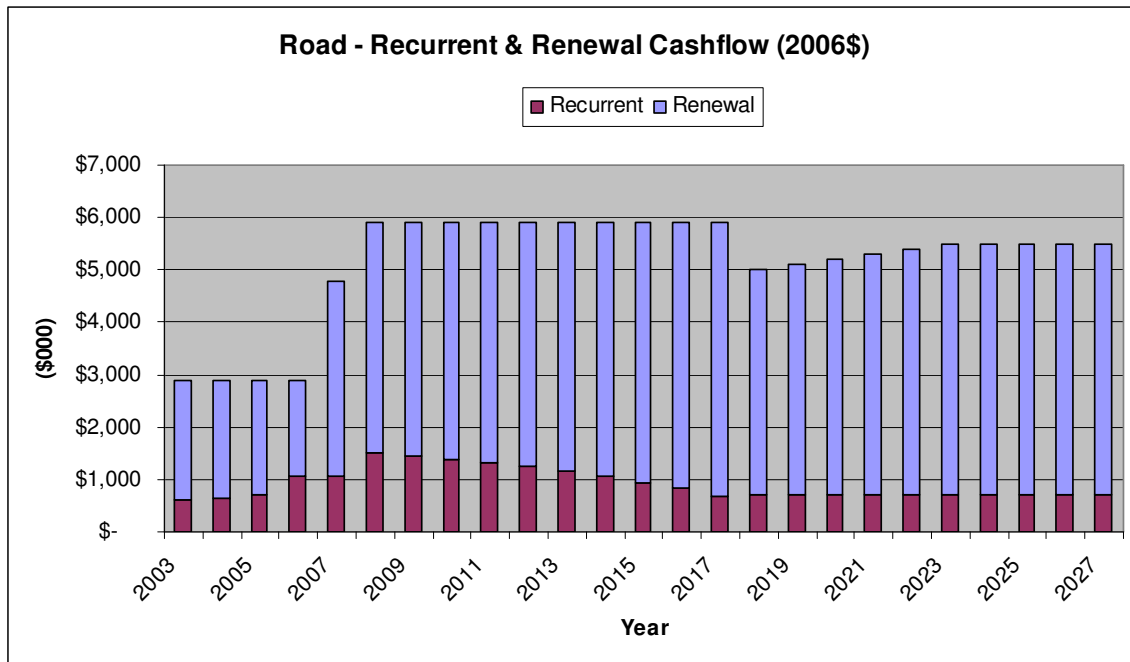


Figure 16.1 Recurrent & Renewal, Cashflow 2004 - 2024

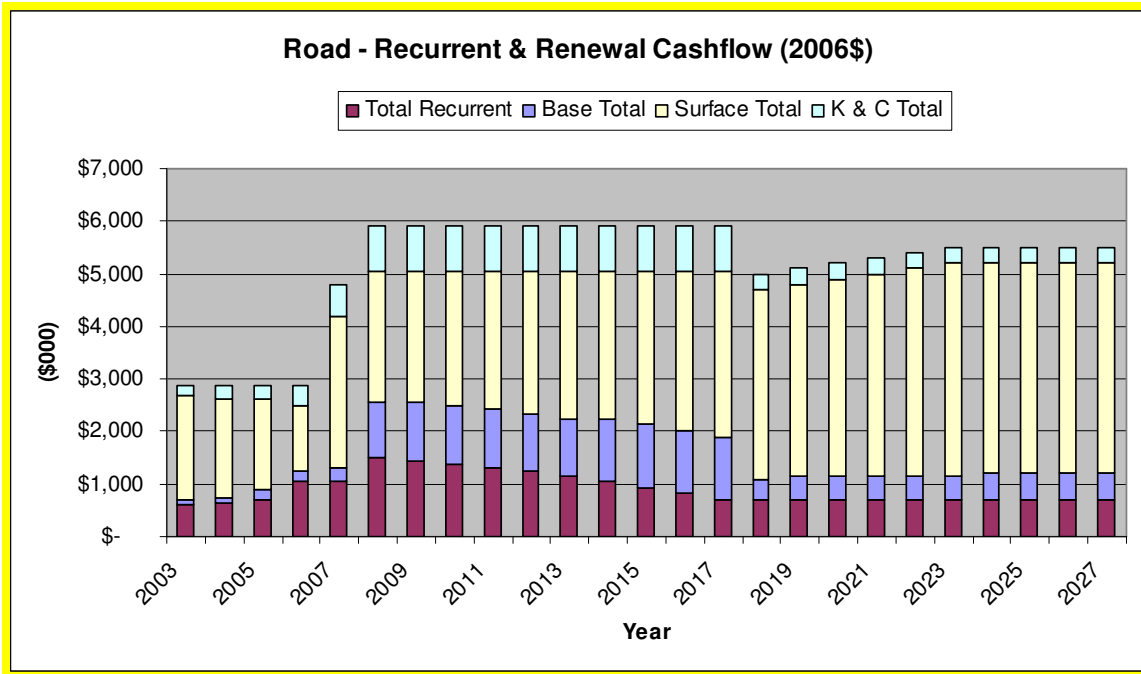


Figure 16.2 Recurrent & Renewal Component Assets, Cashflow 2004 - 2024

6.3.2. Renewal Standards

Road -Asset Type	Asset Group	Capital/Recurrent Renewals	Age
Base Flexible	Base	Capital	150 Years
Base Rigid (Crushed Rock)	Base	Capital	100 Years
Surface Rigid (Concrete)	Surface	Capital	100 Years
Surface Flexible (Asphalt)	Surface	Capital	30 Years
Surface Treatment (Seals)	Periodic Surface Treatment	Recurrent Expense Non Capital	12 Years
Kerb & Channel	Kerb & Channel	Capital	75 Years

6.3.3. Summary of Future Costs

The Future renewal costs are summarised in Figures 16 above.

6.4 CREATION AND UPGRADE PLAN

6.4.1. Selection Criteria

Projects are selected at three levels:

- (a) At the departmental level;
- (b) At the Capital Works Evaluation Panel, via the annual process of refining the definitive list of Capital Works projects across all asset classes, and
- (c) At the Council level.

The first level selection from the Asset Management Department is forwarded to the Capital Works Evaluation Panel and then submitted to Council as part of the overall approval process via a full Council process and public advertising of the draft budget before the third level approval in June each year.

At departmental level, how this occurs is as follows:

The various categories of Capital Works Renewal; Replace, Upgrade, New addition, are driven by different processes and issues, and even by different departments. The Asset Management Department internally prioritises specific locations requiring new or improved Road Base, Road Surface and Kerb & Channel. Prioritised (on the basis of condition and risk rating) lists are provided to Projects & Strategy department. Forward rolling programs are provided, as would be expected from the Asset Custodian to assist with the detailed project level programming to suit other community works of property developments and other Authority programs like water main renewals.

All Capital Works bids across all asset classes are then considered and ranked.

6.4.2. Standards and Specifications

The standard issues, alternatives and risks are generally the same for upgrade/creation works as for renewal. Council's standards are as per the VicRoads Standards for Roadworks.

6.4.3. Summary of Future Works and Costs

The proposed Capital Works Program for renewal and upgrade of Road Bases, Road Surface and Kerb & Channel assets for the period 2004/05 – 2033/34 is shown in Reference 3. The corresponding cash flow related to the upgrades and new works is shown in Figure 17 below:

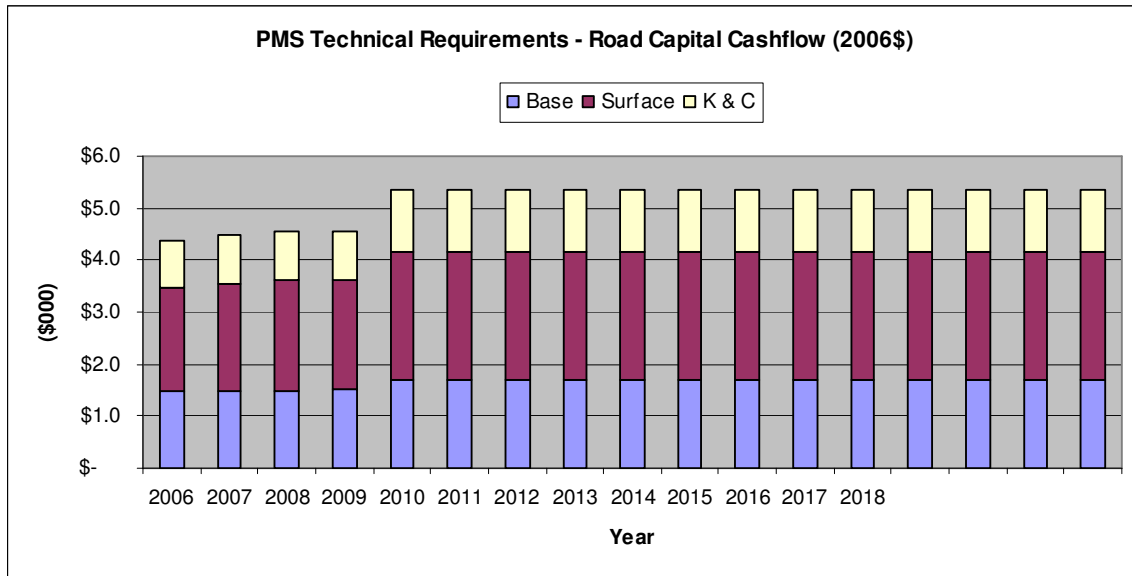


Figure 17. Road Base, Road Surface and K&C Capital Upgrade Cash flow 2004-05 to 2024

6.5 DISPOSAL PLAN

There are at present no Road Base, Road Surface and Kerb & Channel assets earmarked in the city for disposal without replacement. Disposal of roads could occur where they are:-

- Requested by residents and approved by Council;
- Handed over or back to a private interest of other authority; or
- Where utilisation studies specifically shows that no or insufficient use is occurring, and the continuing existence of the asset is not justified.

Generally though, Road Bases, Road Surface and Kerb & Channel are “disposed” of when replaced at the point of upgrading/renewal. Physically, some or all of the material is removed and recycled or disposed of by the contractor. The existing asset record would become the historical (previous asset) record and the new utility asset recognised via the normal asset disposal/creation steps in Conquest. Partial disposals/replacements require special treatment.

The costs of disposal are included in the renewal works cost projections. There is no income stream from disposal, as there is a limited market for used Road Base, Road Surface and Kerb & Channel, which may be recycled into construction material.

7. FINANCIAL SUMMARY

7.1 FINANCIAL PROJECTIONS

Summarising the information presented in other sections, the relevant operating and maintenance cash flow projections for Road Base, Road Surface and Kerb & Channel assets are shown earlier in this document in Figure 14. Capital cash flow projections are summarised in Figure 18 below.

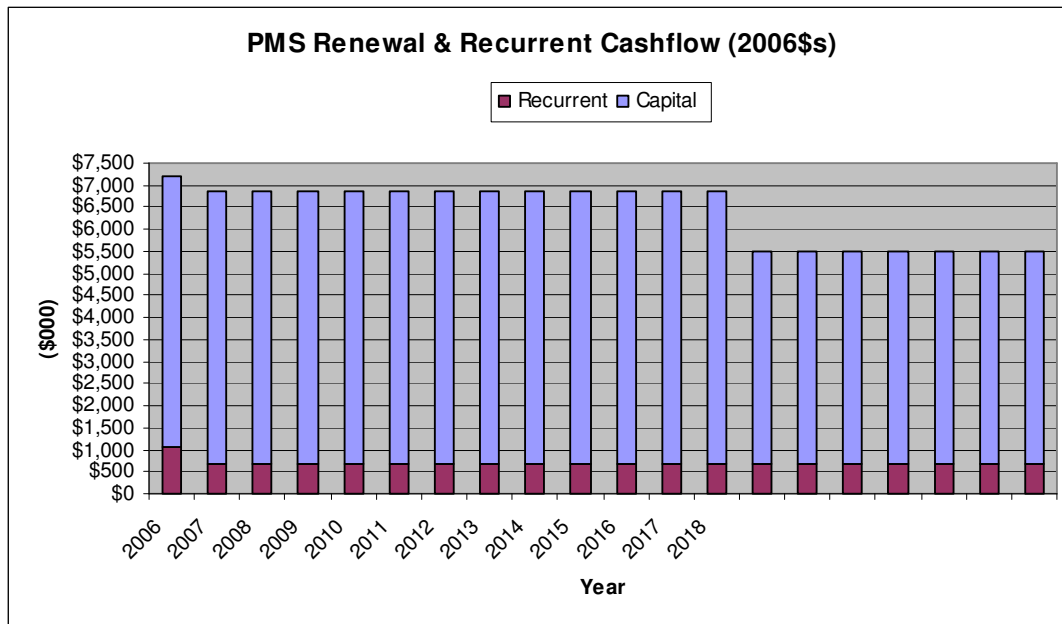


Figure 18. Road Base, Surface and Kerb & Channel Capital Cashflow 2004/05 to 2024/25

7.2 FUNDING STRATEGY

The comprehensive operating, maintenance, renewal and upgrade program contained in this plan will require funding from general rates revenue, as there is no other dedicated, direct revenue stream possible for Road Base, Road Surface and Kerb & Channel. If the cash flow required is too great, the long-term financial strategy could allow for the following:

- Short term borrowings, repaid by maintaining funding levels for the first few years of the predicted technical requirements after 2008/09 and/or
- Establishing a renewal fund during the middle/latter years of the program, in anticipation of the 'technical spikes' projected for 2014/15 and 2029/30 as previously reported. In the SMEC Pavement Report have been avoided by Council's recent budget planning.

These will need to be considered in the context of the overall (all assets) asset management plan and cash flow for Council's entire infrastructure stock.

7.3 VALUATION FORECAST

The future value of the asset stock was calculated by the following method (based on continuing to use fair value and current replacement cost as the valuation basis):

1. Using the current Road Base, Road Surface and Kerb & Channel asset stock and value; and
2. Adding on the value of the renewal/upgrade Capital Works priority program;

The Replacement Value (current replacement cost) and the Written Down Value for the Road Base, Road Surface and Kerb & Channel Asset Classes are shown in Figures 19 and 20 below.

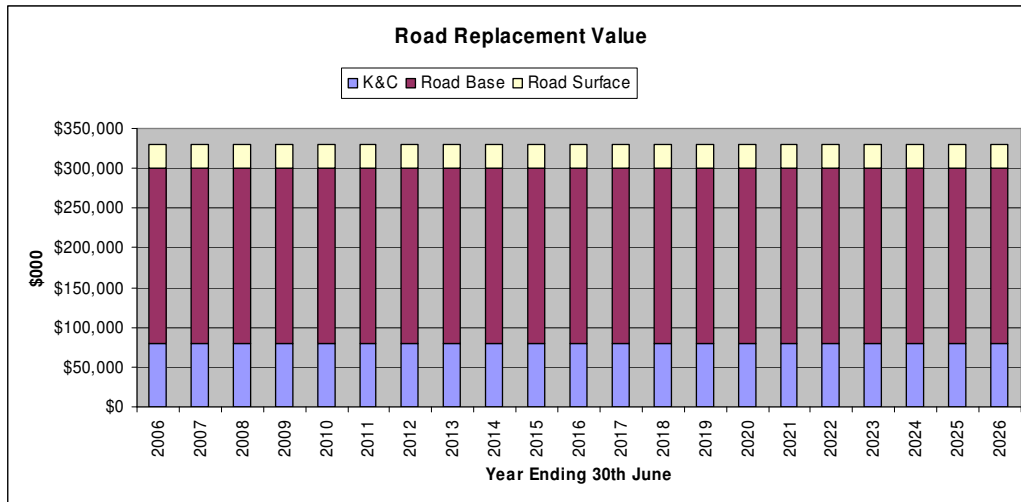


Figure 19. Projected Replacement Value of Road Base, Seals and K & C

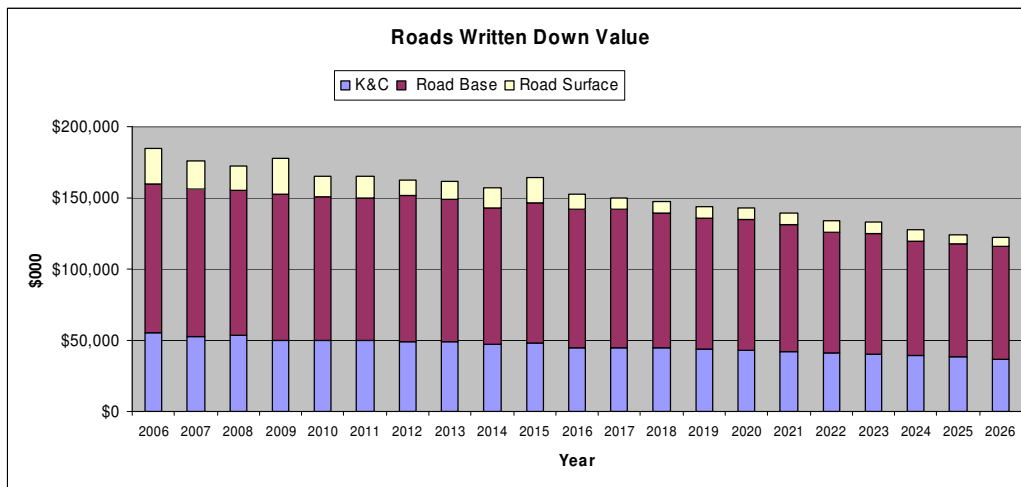


Figure 20. Projected Written Down Value

Note: Forward value projections are shown in current (2005) values. Written Down Values assume that renewals are undertaken as planned over existing useful life for each asset category.

7.4 DEPRECIATION FORECAST

Depreciation is forecast to increase, as existing Road Base, Road Surface and Kerb & Channel assets are renewed/upgraded to maintain and improve service levels standards. Depreciation is forecast to increase at a steady rate over the forecast period to recognise the continual upgrade of service levels and asset stock.

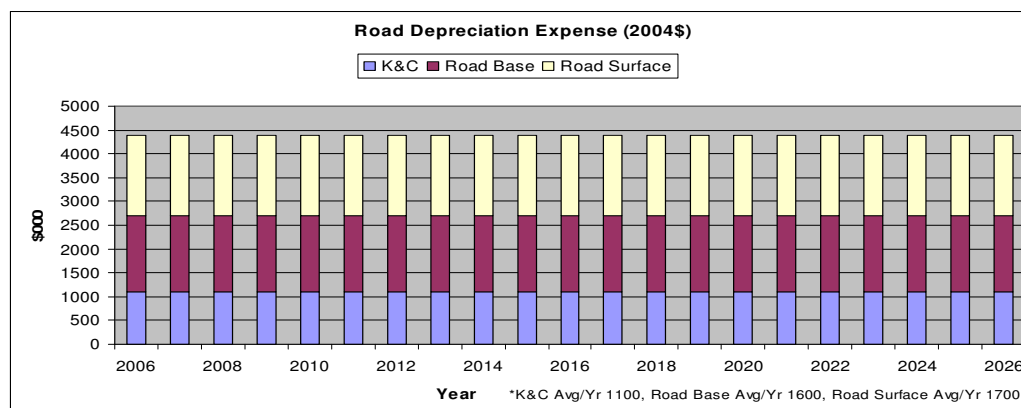


Figure 21. Projected Depreciation for Road Base, Road Surface and Kerb & Channel

Note: Forward value projections are shown in current (2006) values

7.5 ASSUMPTIONS MADE IN FINANCIAL FORECASTS

The following assumptions have been stated in earlier sections also, but are summarised again below:

1. Capital renewal and upgrade is for road surfacings and kerb & channel. There are very few forecast road base renewals within the 30 year forecast horizon of this Asset Management Plan due to the very good condition assessments and 150 year useful life of road base assets in Boroondara. Renewal projections for road surface are based on the calculated last surface renewal dates of the asset stock and estimated useful life of 20 years for road Surface. Renewal projections for kerb & channel are based on the adopted acquisition dates and 75 years useful life for kerb & channel. Renewal estimates are based on current replacement values.
2. Road Surfaces are replaced in full at the end of their 20 year useful life;
3. Kerb & channel assets are replaced in full at the end of their 75 year useful life;
4. Operational Costs such as supervision and design not allowed for, though these are assumed to be minor;
5. No 'privately developed' road bases, Surfaces and kerb & channel added to the network or requiring repair/renewal during the course of the time projection;
6. Financial figures are shown in current (2006) dollar values.

Sensitivity analyses for useful life has not been carried out for this "first generation" asset management plan. Such advanced methods should be incorporated into the second-generation plan.

8. ASSET MANAGEMENT PRACTICES

8.1 ACCOUNTING AND FINANCIAL SYSTEMS

The accounting system used by Council is “Finance One”, a product supplied by Technology One. This system was one of the first new Corporate Systems rolled out to the organisation under the “BoroonDATA” suite of Information Technology projects. The BoroonDATA project was itself an outcome of the Strategic Information Plan adopted by Council in 1999/2000. Finance One (which replaced the “TCS” system) went live on 1 July 2001.

In the past, the Finance system has been the sole repository of detailed financial/valuation information on land and buildings, a partial repository on some other assets (playgrounds, street lighting, sportsground playing seals, plant and equipment), and has provided summary level information only on most infrastructure assets – the detail living in various other spreadsheets or databases held by the asset custodian departments (generally within the City Works Directorate). There has been for some asset classes a lack of clarity about which system should “hold the detail”, and some assets will have gaps (no financial information recorded, including value) or overlaps.

Any discrepancies should be resolved via the reconciliation processes occurring as the Finance Department, Asset Management Principal Advisor and asset custodian departments work together prior to and after the “go live” dates for asset classes to be managed in Conquest with a reconciliation process – a rolling process that should be complete for all infrastructure assets by June 2008 (Road Bases, Road Surface and Kerb & Channel assets went ‘live’ in Conquest August 2003 with a reconciliation process yet to be undertaken). Other discrepancies will be resolved over time via the rolling (AASB 1041 related) asset condition audits or daily operational processes.

In the past, purchases related to assets have been undertaken in the Finance System, with other management-level information residing in the local systems. This has not enabled costs for maintenance or operations (e.g. repairs, emergency works costs) or even capitalisations to be tracked against specific assets. As an asset class “goes live” in Conquest, this will cease, as purchases will be made from within Conquest, and recorded against specific assets. An inter-working between Conquest and Finance One facilitates this workflow and reduces double entry and knowledge gaps of the asset movements/changes. In short, for all assets managed by City Works, Conquest will be the source of detailed information of both a management and financial nature, with the summary level information per asset class recorded in Finance One to facilitate integrated financial reporting.

The Finance and Asset Management departments have been revising the ‘Fixed Asset Accounting Policy’ to align and clarify the definitions of assets (including recognition/capitalisation thresholds, useful lives, measurement and valuation basis etc.) with a view to having the audit committee adopt the changes in the near future. The changes may have an operative date of the start of the 2008/09 financial year. The Finance department has detailed procedures for Financial Transactions occurring within Finance One. For Conquest, a customised user manual and “business rules” document are being developed, the latter being the “how and why” decisions were made that affect the recording and management of assets.

The financial reconciliation between old and new asset classes is likely to be straight forward with relatively good match between data. This is likely to be completed towards the end of 2007/08 year.

8.2 ASSET MANAGEMENT SYSTEMS

Council has adopted a Corporate Asset Management system, “Conquest” following a public tender process in 2001. The first four asset classes went ‘live’ in Aug 2003 and most of the remainder have been progressively rolled since that date.

Conquest has replaced a vast number of asset registers and works management systems, which includes those internally developed, tailor made developments and off the shelf products. The full range of legacy systems and data sources was documented in late 2000 (Reference 7), along with the data quality and completeness at the time per asset class. A small number of specialty systems, such as the SMEC Pavement Management System will be retained, but where appropriate their use targeted only to those tasks not able to be undertaken within Conquest. No other legacy systems were retained for Road Bases, Road Surface and Kerb & Channel assets.

As well as Conquest, graphical information on assets has been substantially rolled out in Councils Geospatial Information System (GIS). This is the ESRI suite of products, such as ArcMap and E-View. E-view displays asset related overlays, display of limited information from Conquest, filtering/finding and inter-working with a dynamic link to individual asset records to Conquest for those persons licensed to use both systems. Road Bases, Surfaces and Kerb & Channel assets are displayed in E-view. They may also be viewed in E-view by use of the high quality aerial photos taken during 2006.

The data for assets such as Road Bases, Surfaces and Kerb & Channel is being held in dedicated database servers at the Camberwell offices, with separate application servers related to Conquest and GIS. Conquest is accessed by use of Citrix software servers linked to a SQL Server database. The user login is seamless once logged into the network.

The quality of data per asset class varied at the initial import, depending on the level of work spent on data cleansing, and whether or not a recent data capture process had occurred prior to import. Data gaps are being filled via ongoing daily work processes (such as works management gradually creating maintenance history) and/or dedicated condition assessment/data capture projects (such as the AASB 116 program – ref 19). The data quality for Road Bases, Surfaces and Kerb & Channel is good (95%). Acquisition dates and remaining lives are fair and will improve over time with regular inspections, condition re-assessments and estimation of remaining life.

8.3 INFORMATION FLOW REQUIREMENTS AND PROCESSES

The key information flows into this asset management plan are:

- The asset register data on size and condition of the network;
- The unit rates for categories of work/material;
- The adopted service levels;
- Correlations between maintenance and renewal, including decay models;
- The Fixed Asset Accounting Policy.

The key information flows from this asset management plan are:

- The assumed Works Program and trends
- The resulting budget, valuation and depreciation projections
- The useful life analysis

These will impact the Long Term Financial Strategy, Council Plan, Annual Report and departmental business plans and budgets and Fixed Asset Accounting Policy.

Decisions on replacements/renewals, new assets and upgrades and strategic directions/tactics follow the following processes:

- The Asset Management Department prepares the coming year rolling renewal/proactive maintenance programs, and submits the corresponding Capital Works bids for renewal/upgrade works. These are prioritised on the basis of risk and condition;
- Once adopted, the agreed Capital Works Program is delivered via the Projects & Strategy Department, including any necessary pre-design tasks. Major design tasks would normally have been undertaken the previous year.

9. PLAN IMPROVEMENT AND MONITORING

9.1 PERFORMANCE MEASURES

9.1.1 Asset Management System

The success of the Asset Management System implementation can be measured via the following means:

- The number of asset classes which are being fully managed from within or via Conquest, including works management, financial and management reporting and customer service interactions;
- The degree of archival/deletion of legacy systems and data;
- The number of subsequent systems purchased or developed by Conquest users (this should be minimal)
- The popularity of the system with users.

9.1.2 Asset Management Plan

The effectiveness of the Asset Management Plan can be measured in the following ways:

- The degree to which the resulting cash flows are incorporated into the Long Term Financial Strategy and Council Plan;
- The degree to which 1-3 year detailed works programs, budgets, business plans and organisational structures take into account the “global” works program trends provided by the asset management plan;
- The incorporation of the plan’s recommendations into the Fixed Asset Accounting Policy.

It is essential that the plan be adopted by Council and made available to internal and external stakeholders so that awareness of the issues it raises occurs.

9.2 IMPROVEMENT PROGRAM

This Asset Management Plan for Road Bases, Surfaces and Kerb & Channel should be improved as suggested in Figure 22 below:

Task	Timeframe	Responsibility	Resources Required
1. Confirm required condition/intervention levels for Road Bases, Surfaces and Kerb & Channel and other road related infrastructure.	By end of 2007/08	Principal Advisor Asset Management, Manager Infrastructure Services	Asset Management staff &/or consultant.
2. Investigate and quantify desired aspects of level of service identified in section 4.6 and incorporate into revised service standard	By end of 2007/08	Principal Advisor Asset Management.	To be investigated. Results to be part of subsequent community consultation prior to adoption.
3. Develop condition decay curves (e.g. http://irc.nrc-cnrc.gc.ca/fulltext/apwa/apwa2000houbaer.pdf)	By end of 2007/08	Principal Advisor Asset Management	Consultant or SMEC-PMS
4. Develop risk based methodology for prioritising reactive and proactive maintenance works and capital works and set up in Conquest	Completed	Principal Advisor Asset Management	
5. Develop Public Lighting Policy	Completed.	Manager Engineering & Traffic	
6. Quantify the reactive service response timeframes aspects of service and incorporate into revised service standard	Completed. Ref Appendix "D"	Principal Advisor Asset Management	
7. Link next version of Asset Management Plan to Conquest Asset Management System works programs and projected budgets and GIS system (similar to Rangitikei District Council, N.Z.)	By end of 2009/10	Principal Advisor Asset Management	None known at this stage
8. Include asset write-off projections in second version of plan	By end of 2009/10	Principal Advisor Asset Management	None additional
9. Align second version plan to service groups and include operating costs, operation plans (developed by operating departments) and risk management improvement plans.	By end of 2009/10	Principal Advisor Asset Management	None additional

Task	Timeframe	Responsibility	Resources Required
10. Second version plans to address analysis of failure modes/locations, nature and cost of renewal and maintenance actions and alternatives to “like for like” renewal, using life cycle costs to identify optimal solutions.	By end of 2009/10	Principal Advisor Asset Management	None additional

Figure 22. Improvement Program for Road Base, Road Surface and K&C Asset Management Plan.

9.3 MONITORING AND REVIEW PROCEDURES

This Asset Management Plan for Road Base, Road Surface and Kerb & Channel should be revised during the 2009/10 Financial Year, incorporating the improvements listed in the section above. It should also include reports on the performance measures related to Road Base, Road Surface and Kerb & Channel (listed in section 4.7), plus those related to the success of the implementation of the Asset Management System and this plan itself.

10. REFERENCES

1. “*Best Value Service Levels for Infrastructure Part One: Analysis of Existing Services and Service Levels*”, City of Boroondara Asset Management Department, March 2002. *Part Two: Service levels for Asset Related Services*”, City of Boroondara Asset Management Department, November 2002.
2. City of Boroondara Council Plan 2006 - 2010
3. “*City of Boroondara SMEC - PMS Analysis 2004 – 2008 Works Program*”, (Snowy Mountains Engineering Corporation – Pavement Management System), October 2003
4. VicRoads Standard Specifications for Roadworks and Bridges February 1995
5. Road Management Act 2004
6. “*Proposed Guidelines for Asset Management Plans in Victorian Local Government*”, Department of Infrastructure, May 2001.
7. “*International Infrastructure Management Manual*”, Institute of Public Works Engineering Australia/NAMS (N.Z.), 2006 edition.
8. “*Analysis of Council’s Infrastructure Assets*”, City of Boroondara Infrastructure Department, July 1997.
9. “*Asset Management Manual (Draft)*”, City of Boroondara Asset Management Department, November 2002.
10. “*Meaningful Performance Indicators for Asset Management*” (S. Howe), “*Public Works Engineering*” Magazine, Institute of Public Works Engineering Australia, July/August 2001.
11. “*Road and Path Maintenance Manual*”, Civic Mutual Plus, 2001.
12. “*Boroondara Road Safety Strategy*”, City of Boroondara, March 2002.
13. www.sco.state.co.us/fiscalmanual/olddocs/FY01/chpt9.pdf
14. www.gfoa.org/services/nl/GAAFRmay-2002-focusarticle.pdf
15. www.lla.state.la.us/gasb34/sugguse.pdf
16. Community Safety Plan 2003-2006, Report to City of Boroondara Services Special Committee meeting of 28 July 2003.
17. City of Boroondara Community Planning Department Population Forecast
18. Boroondara Bicycle Network February 2006

19. Local Government: Accounting for non-current physical assets under AASB 116
20. MAV Annual Asset Management Improvement “Step” Program.
21. Asset Management Strategy Boroondara 10 Dec 2001
22. City of Boroondara Road Management Plan – June 2007
23. Business Plan Infrastructure Services Department 2006
24. Business Plan Projects & Strategy Department 2006
25. Business Plan Asset Management Department 2006

11. APPENDICES & ATTACHMENTS

List of Appendices

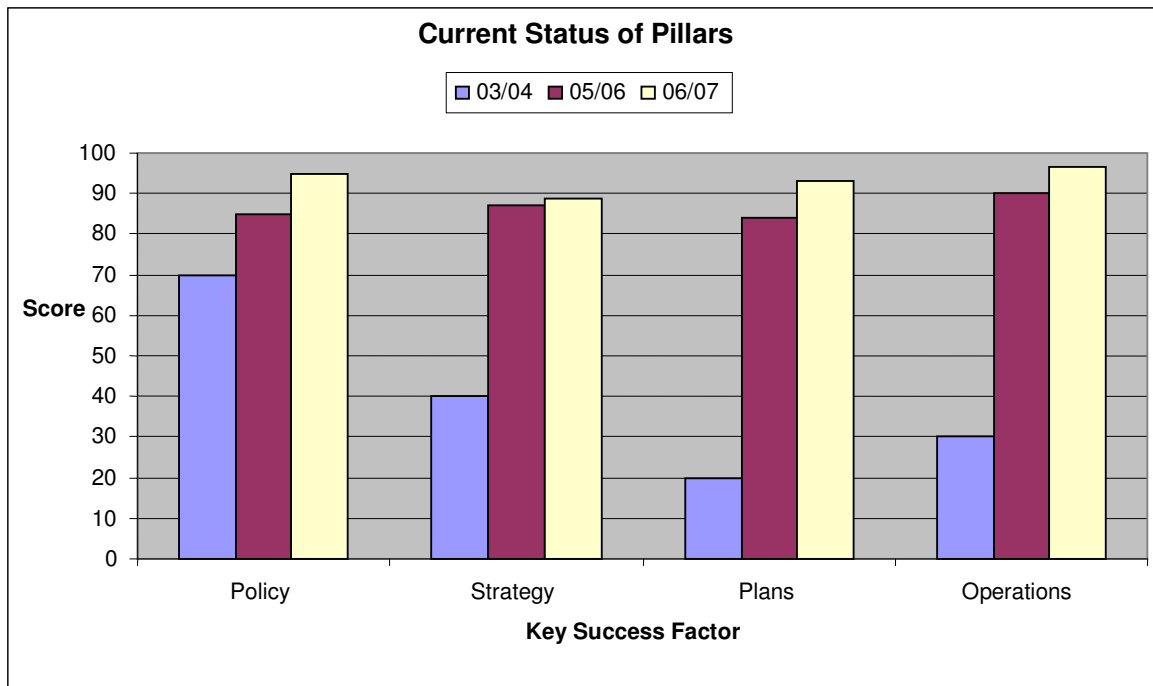
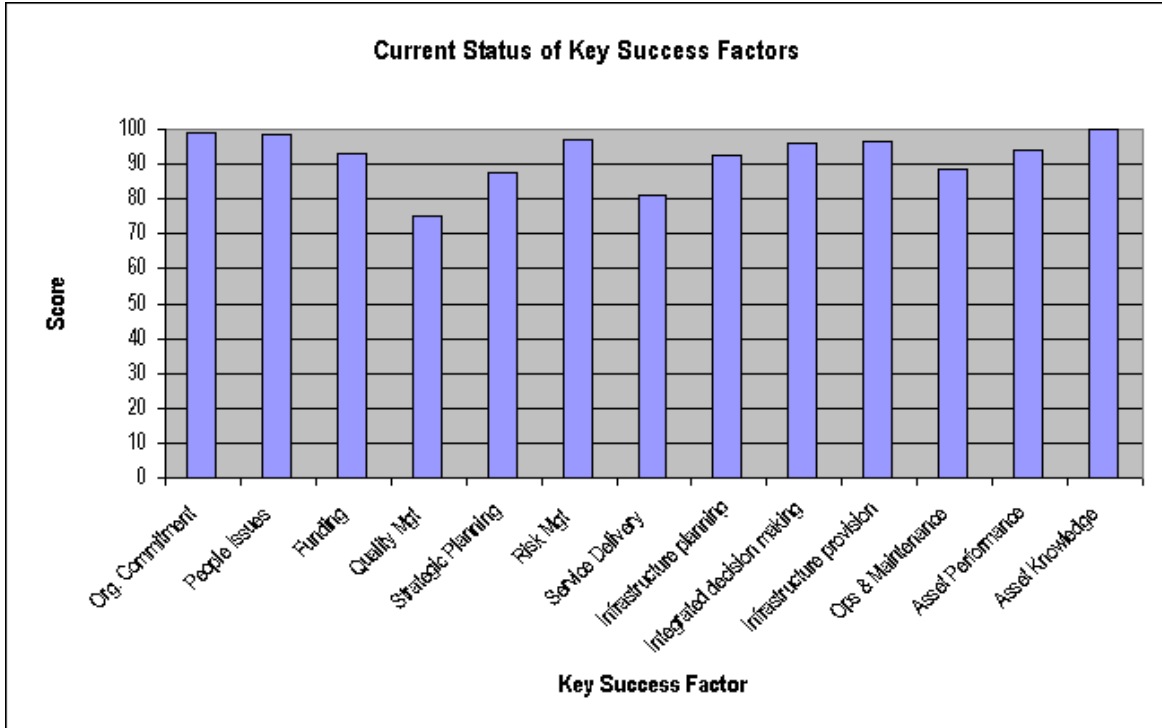
Asset Management Strategy Continuous Improvement Chart	Appendix A
Road Base, Road Surface and Kerb & Channel Condition Rating Criteria	Appendix B
Method of Estimation of K&C remaining useful life - based on Path Valuation	Appendix C
Service Standards Matrix	Appendix D
Register of Road Base, Road Surface and Kerb & Channel Assets (sample)	Appendix E
Boundary Agreement Boroondara & Whitehorse	Appendix F
Bicycle Network Boroondara February 2006	Appendix G
Hierarchy of Roads - Road Classification (Plan No. 12770)	Appendix H
Additional Legislation	Appendix I

List of Attachments

City of Boroondara Road Management Plan June 2007

Appendix A

Asset Management Strategy Continuous Improvement Chart



Appendix B1

Road Base, Road Surface Condition Rating Criteria

Condition Rating	Description (Any one of the descriptions could apply. When more than one description applies the description with the worst rating shall be used to rate the asset).
Rating 0	As new condition showing no sign of distress. Cracking in contraction joints may be evident
Rating 1	Minor distortion or misalignment with no differential displacement. No impediment to drainage function or evidence of ponding. Sporadic localised distress such as widely spaced hairline cracking. Sporadic hairline cracking evident in grouted joints.
Rating 2	Moderate distortion or misalignment. Differential displacements up to 10 mm. Evidence of sporadic ponding of up to a metre long Moderate levels of cracking. Evidence of cracks in kerb or channel starting to have clear widths such that some water infiltration could occur. Evidence of spalling or grout loss starting to occur. House drain outlet surround broken and starting to become dislodged.
Rating 3	Substantial distortion or misalignment but still providing basic drainage functions. Differential displacements between 10 mm and 20 mm. Evidence of ponding exceeding a metre in length. Substantial levels of cracking. Cracking has clear width along length of crack permitting water infiltration. Evidence of adjacent road pavement failure likely due to water infiltration. Spalling up to 20 mm deep. General grout loss in bluestone joints. House drain outlet surround non-existent or substantially removed.
Rating 4	Extensive distortion or misalignment such that it does not perform intended drainage function Differential displacements greater than 20 mm. Extensive and very wide cracking. Spalling of concrete greater than 20 mm deep. Bluestones missing or sufficiently loose to be dislodged.

Appendix B2

Kerb & Channel Condition Rating Description

Cracking, spalling and dislodgement.

- Cracking of joints
- Failure/distortion cracking and spalling

0	As new condition showing no sign of distress. Fine cracking in contraction joints may be evident.
1	Sporadic localised distress such as widely spaced hairline cracking. Sporadic hairline cracking evident in grouted joints.
2	Moderate levels of cracking. Evidence of cracks starting to have clear widths such that some water infiltration could occur. Evidence of spalling or grout loss starting to occur. House drain outlet surround broken and starting to become dislodged.
3	Substantial levels of cracking. Cracking has clear width along length of crack permitting water infiltration. Evidence of adjacent road pavement failure likely due to water infiltration. Spalling of concrete up to 20 mm deep. General grout loss in bluestone joints. House drain outlet surround non-existent or substantially removed.
4	Extensive and very wide cracking. Spalling of concrete greater than 20 mm deep. Bluestones missing or sufficiently loose to be dislodged.

Differential displacement, lifting and subsidence

0	As new condition showing no sign of distress.
1	Minor distortion or misalignment with no differential displacement. No impediment to drainage function or evidence of ponding.
2	Moderate distortion or misalignment. Differential displacements up to 10 mm. Evidence of sporadic ponding of up to a metre long
3	Substantial distortion or misalignment but still providing basic drainage functions. Differential displacements between 10 mm and 20 mm. Evidence of ponding exceeding a metre in length.
4	Extensive distortion or misalignment such that it does not perform intended drainage function Differential displacements greater than 20 mm.

Kerb & Channel Performance Elements**Kerb & Channel Defects**

- Missing bluestone in channel
- Delamination of channel overlay having depth greater than 30 mm
- Differential displacements greater than 30 mm in channel or on pedestrian areas
- Edge displacements with adjacent road, footpath or vehicle crossing pavement greater than 30 mm Concrete spalling in channel with depths greater than 30 mm
- Longitudinal gaps or cracks between the road pavement and kerb and channel greater than 15 mm wide
- Crossing Channel Infill
- Indented Carparks including Bus Bays, Taxi Ranks and Loading Zones.

Appendix C

Path Valuation

Establishment of Date Created in Conquest

Introduction

Path construction dates used in Council's old asset register up to the year ending June 2002 are generally unsuitable for use in Conquest. The main problem is that the construction date for most of the paths in Local Roads is 1972. In Main Roads, 77% of paths have construction dates of 1946, 1962 or 1979.

These dates are in most cases clearly wrong and, if imported into Conquest, would make nonsense of any strategic analysis of the long-term performance of Council's footpaths.

This document details the process used to estimate 'Date Created' in Conquest based on condition data collected in the second half of 2001. This will provide a base consistent with the development of condition based modelling of footpath performance.

Background

The previous path valuations have been based on footpath condition data collected across the City in 1996 as part of the Pavement Management System condition audit.

Paths were identified using PMS Road ID, Block No and Left or Right. The PMS blocks were generally 200-500 metres long. The length of each path was not specifically measured but calculated as a 0.88 factor of the block length.

The valuation spreadsheets Footpath Local Rds 00-01.xls and Footpath Main Rds 00-01.xls have evolved from this audit and have been used as the path asset register.

There are two dates in each spreadsheet:

"Const Year" - This was originally found from subdivision or road construction plans and is more likely representing when the road pavement was constructed. The path may have been constructed at the same time or later. It may have also been reconstructed since that date. The date was used as a starting point in the earlier asset register. There is great uncertainty as to the reliability and usefulness of the date.

"Revised Const Yr" – A decision was made in the past to calculate the construction date for Local Road footpaths using the overall condition rating for footpaths i.e. 1.44. This meant all Local Road paths acquired the same construction date i.e. 1972. A similar calculation appears to have been made for Main Roads. Some Main Roads (23%) appear to have a variety of dates the origin of which is uncertain. It is possible that the more recent dates are reliable actual construction dates.

Typically, the date is applied to all paths in a street.

In summary, reliable actual or estimated construction dates of most of the paths in the City of Boroondara is generally not known.

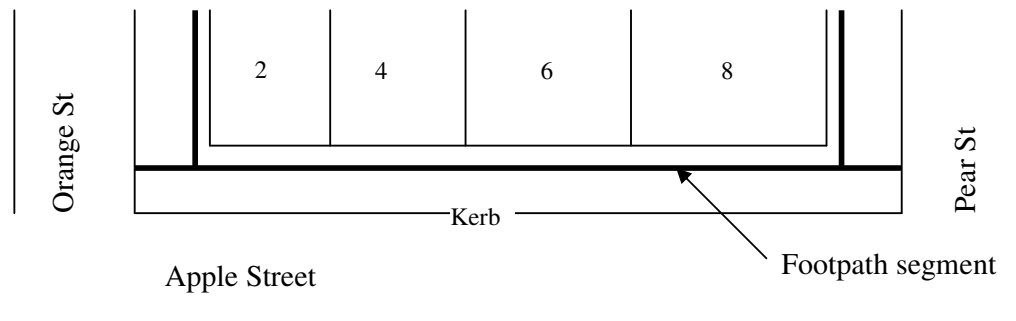
2001/02 Path Condition Audit

Council undertook a condition audit of all its paths during the period August – October 2001. Path condition rating definitions are detailed in Path_Condition_Ratings_Text.doc. There is also has a photographic version.

The project involved the establishment of GIS overlays representing Paths in Streets and Parks. Each path segment on an overlay reasonably represents the length and position of the actual footpath. Refer to Footpath GIS overlay (below) for details on how the path overlay was created for paths in streets. The overlay for paths in parks evolved from the use of old aerial photos (generally of poor quality), site inspections and review using more recent and high quality photos.

These overlays were used in portable hand held computers to identify a path segment on site and populate its attributes including material, width and condition. The length was calculated from the GIS object length and is accurate to within one metre.

Footpath segments in a street are always contained within a road segment (Refer Definition_RoadReferenceSet.doc and sketch below) and there is usually at least one on each side of the road. There may be more than one on a side of a road where there is a substantial difference in general width or material. Localised differences at vehicle crossings, bus stops, corner splays or individual properties are considered minor and are ignored.



The rules for identifying park path segments are contained in the document “Park Paths Naming Convention.doc”.

Condition Data

Condition rating scales range from Condition 0 (as new) to Condition 4 (requires reconstruction). Each path segment has been rated on a percentage applicable to each condition rating. eg a path has 40% Condition 1 and 60% Condition 2. This was on the basis of walking along the segment and estimating (not measuring) the amount of each condition present and was rounded at the time to the nearest 10%. Rounding to the nearest 5% is now used to more accurately record the extent of isolated Condition 3 or 4 paths sections.

The overall condition of the footpath is calculated in simple terms as follows:

$$C=(\%Cond_0*0 + \%Cond_1*1 + \%Cond_2*2 + \%Cond_3*3 + \%Cond_4*4)/100$$

Each %Condition is multiplied by the weighted value of the condition. I.e. the weighted value of Condition 0 is "0", Condition 1 is "1" etc

Conquest has been configured to use a points and weighting system to calculate "Condition Point". Condition 0 is worth 0 points increasing lineally to 400 points for Condition 4. The weighting system is the same as above. Condition Point is the value used to represent the overall Condition of the path segment.

The Condition Point calculation is represent by:

$$C=(Points_0*0 + Points_1*1 + Points_2*2 + Points_3*3 + Points_4*4)/400.$$

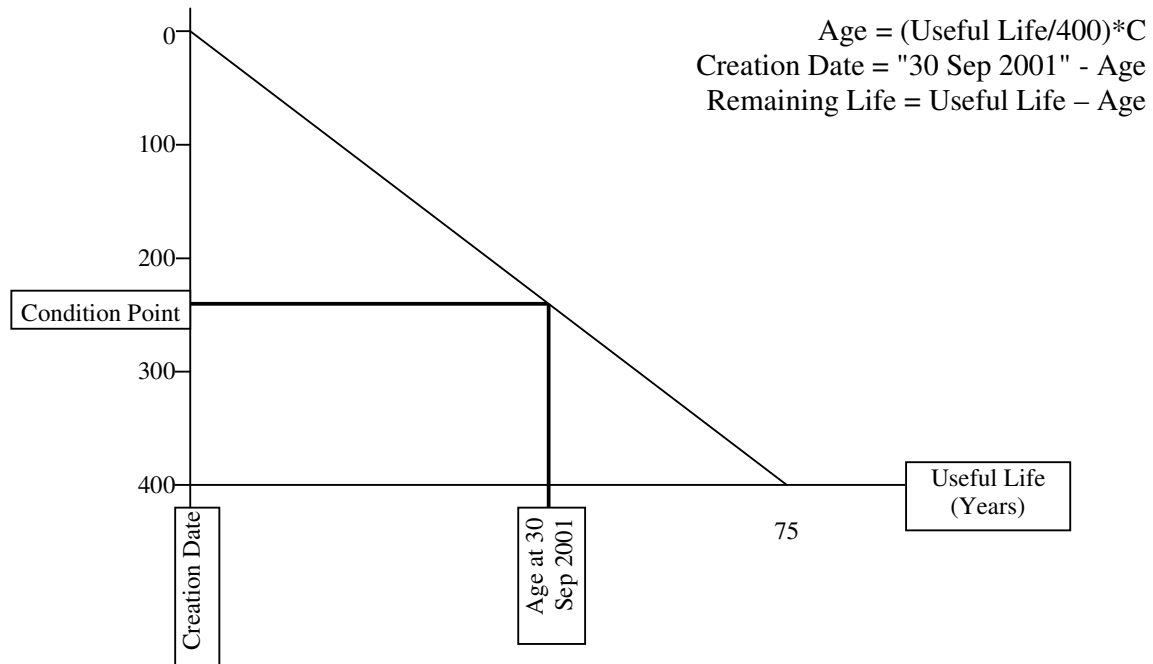
Useful Life

The useful life of paths is generally 75 years except for granitic paths which are 20 years. These have been set up in Conquest and used to calculate the Creation Date.

Paths in Parks have generally not previously been recorded or valued. However, the same useful life will be applied for like materials. Gravel paths, which are predominantly in parks, will have a useful life of 20 years.

Estimated Creation Date

Calculation of the creation date is based on the following relationships:



Note 1: Condition rating is assumed to apply on 30 Sep 2001 so that a common reference point is used for the calculation. Some park paths were resurveyed in 2003 in which case the inspection date was applied

Note 2: The actual calculations were made using months so that the creation date is rounded off to the end of month. Rounding off to years is too coarse and rounding off to days is too precise given the level of accuracy of the methodology used

The estimated Creation Date for each path segment is flagged as an estimate in Conquest unless the actual date is known.

There is a user field in Conquest showing the historical "Const Year". This may be useful information if the historical date is within 10% of the estimated Creation Date and may suggest an actual (unverified) construction date for the path.

Actual Creation Date

There are some sites where the actual construction date of footpaths is known from either recent records or local knowledge of staff. These dates will replace the estimate dates on a case-by-case basis.

Footpath GIS overlay

Every path segment in Conquest is represented graphically in a GIS overlay linked by the Asset ID number. The development of the overlay involved three stages

Stage 1 - Road Reference Set Overlay

The Road Reference Set is a reference set for assets that are in some way related to Road Reserves. The Road Reference set includes roads reserves that have rateable properties using the road name as their address. There are some properties that have named laneways as their rateable address. These lanes are included in the Road Reference Set (they will not be included in the Lane Reference Set when it is created at a later date).

The Road Reference Set is broken down to segments that are sections of road between adjacent intersections. Segments are represented on a GIS overlay by lines that meet at the centre of intersections and *generally* represent the centreline of the road reserve.

Segments are attributed with a Segment ID, PMS Road ID, Road Name, From Road, To Road and Suburb.

Stage 2 – Kerb & Channel Overlay

Kerb and Channel is symbolically represented on a GIS overlay by a line(s) generally on each side of the road in each road segment. The lines were created by globally offsetting from the road reference set lines as follows:

- For Main Roads (e.g. Burke Road Camberwell) – 7m from centreline
- For Declared Roads (e.g. Union Road Balwyn) – 6m from centreline
- For Collector Roads (e.g. Gordon St. Balwyn) – 4m from centreline
- For Local Roads (e.g. Inglesby Road Camberwell) – 3.5m from centreline

The ‘standard’ widths listed above were obtained by querying the SMEC database and determining the typical pavement width applicable to the road hierarchy level. Minor variations will occur in reality for individual roads.

The resulting kerb and channel lines were then trimmed at intersections to connect with intersecting kerb. The intersection of the lines is generally angular and intended to be symbolic rather than inferring a true (normally curved) alignment.

The offset of the kerb alignment relative to property boundaries was adjusted where there were obvious errors resulting from the global creation of the linework. The GIS position would generally be within ± 1 metre of the true position. This level of accuracy is adequate in the short term for Asset Management purposes. Refinement of kerb alignment using aerial photography is an intended future project.

Where there are significant lengths of different types of kerb and channel on a side of a road within a road segment, identified during data capture, corresponding GIS segments were created.

Stage 3 –Path Overlay

Path is symbolically represented on a GIS overlay by a line(s) generally on each side of the road in each road segment. The lines were created by globally offsetting the property line in each road segment by 0.5m. These lines were then adjusted at intersections to either extend to the kerb line of the intersecting road if it was on the major road or extend to the major road footpath if it was on the minor road.

The length of each path segment has been calculated using GIS functionality and rounded to the nearest metre. The accuracy is dependent on: (i) the GIS position of the kerb at intersecting streets and will vary marginally when the kerb alignment is refined at a later date; (ii) the rounding effect; and (iii) the difference between plan length and slope length. This level of accuracy is adequate in the short term for Asset Management purposes.

Where there are significant lengths of different types or widths of path on a side of a road within a road segment, identified during data capture, corresponding GIS segments were created.

Appendix D 1.

1. Road Surface / Road Base

The Initial Response Time (IRT) is 2 Days. The IRT is to inspect the site, make safe, and report on the Risk Category for follow-up action to repair or make good to eliminate the risk.

The following Table shows the defect intervention levels following the IRT inspections for Council to eliminate the risks and/or make good where instances are within Public Road Reserves.

Road Surface/ Road Base (Pothole) Reactive Requests - Intervention Levels.

Defect - Road Pavement Pothole				
	20-50 mm	50-100 mm	100-200mm	>200 mm deep
High Priority	5 Days	1 Day	1 Day	1 Day
Significant Priority	10 Days	10 Days	1 Day	1 Day
Moderate Priority	15 Days	15 Days	5 Days	5 Days
Low Priority	20 Days	20 Days	10 Days	5 Days

Defect - Trench (Max Dimension > 1m)				
	20-50 mm	50-100 mm	100-200mm	>200 mm deep
High Priority	1 Day	1 Day	1 Day	1 Day
Significant Priority	4 Day	4 Day	1 Day	1 Day
Moderate Priority	7 Day	7 Day	2 Day	2 Day
Low Priority	10 Day	10 Day	4 Day	2 Day

Appendix D 2.1.

2. Kerb & Channel

The Initial Response Time (IRT) is 2 Days. The IRT is to inspect the site, make safe, and report on the Risk Category for follow-up action to repair or make good to eliminate the risk.

The following Table shows the defect intervention levels following the IRT inspections for Council to eliminate the risks and/or make good where instances are within Public Road Reserves.

Kerb & Channel –Request for Service Intervention Levels.

1. Kerb & Channel - Cracking by Area				
	<5% by Area	6-10% by Area	11-25%	>26% by Area
High Priority	4 Months	4 Months	4 Months	4 Months
Significant Priority	4 Months	4 Months	4 Months	4 Months
Moderate Priority	4 Months	4 Months	4 Months	4 Months
Low Priority	5 Months	5 Months	5 Months	5 Months

2. Kerb & Channel Defect - Delamination of Channel overlay	
	Depth > 30mm
High Priority	2 Months
Significant Priority	3 Months
Moderate Priority	6 Months
Low Priority	12 Months

3. Kerb & Channel Defect - Differential displacement	
	Depth > 30mm
High Priority	2 Weeks
Significant Priority	3 Weeks
Moderate Priority	6 Weeks
Low Priority	12 Weeks

4. Kerb & Channel Defect - Edge Displacement	
	Depth > 30mm
High Priority	4 Weeks
Significant Priority	4 Weeks
Moderate Priority	4 Weeks
Low Priority	5 Weeks

Appendix D 2.2.

Kerb & Channel - Continued

Kerb & Channel –Request for Service Intervention Levels.

5. Kerb & Channel Defect - Lip gap between Pavement	
	Width > 15mm
High Priority	4 Weeks
Significant Priority	4 Weeks
Moderate Priority	5 Weeks
Low Priority	6 Weeks

6. Kerb & Channel Defect - Missing Lengths			
	< 300mm	>300mm <1000mm	>1000mm
High Priority	2 Weeks	2 Weeks	2 Weeks
Significant Priority	2 Weeks	2 Weeks	2 Weeks
Moderate Priority	3 Weeks	3 Weeks	2 Weeks
Low Priority	4 Weeks	4 Weeks	3 Weeks

7. Kerb & Channel Defect - Spalling of Channel	
	Depth > 30mm
High Priority	6 Months
Significant Priority	7 Months
Moderate Priority	8 Months
Low Priority	9 Months

Appendix D 3.

3. Footpath

The Initial Response Time (IRT) is 2 Days. The IRT is to inspect the site, make safe, and report on the Risk Category for follow-up action to repair or make good to eliminate the risk.

The following Table shows the defect intervention levels following the IRT inspections for Council to eliminate the risks and/or make good where instances are within Public Road Reserves.

Footpath –Request for Service Intervention Levels.

Footpath Open Cracks / Others			
	<5 mm	6 mm to 20 mm	Greater than 20 mm
High Priority	12 Months	6 Months	2 Months
Significant Priority	12 Months	6 Months	2 Months
Moderate Priority	12 Months	6 Months	2 Months
Low Priority	12 Months	6 Months	2 Months

Footpath Crocodile Cracking			
	5-10% by Area	11-30% by Area	Greater 30% by Area
High Priority	12 Months	12 Months	12 Months
Significant Priority	12 Months	12 Months	12 Months
Moderate Priority	18 Months	12 Months	12 Months
Low Priority	24 Months	18 Months	18 Months

Footpath Displacement/Distortion			
	10mm or less	11 to 25mm	Greater than 25 mm
High Priority	3 Months	2 Days	1 Day
Significant Priority	3 Months	2 Days	1 Day
Moderate Priority	4 Months	2 Days	1 Day
Low Priority	5 Months	2 Days	1 Day

Footpath Slippery Surface					
	<=300 mm²	301-1000 mm²	1001mm²- 5m²	5m²- 10m²	Greater than 10 m²
High Priority	2 Days	2 Days	2 Days	2 Days	2 Days
Significant Priority	2 Days	2 Days	2 Days	2 Days	2 Days
Moderate Priority	2 Days	2 Days	2 Days	2 Days	2 Days
Low Priority	2 Days	2 Days	2 Days	2 Days	2 Days

Appendix D 4.

4. Line Marking

The Initial Response Time (IRT) to a request for service is within 2 Days. The IRT is to inspect the site, make safe, and report on the Risk Category for follow-up action to repair or make good to mitigate/eliminate the risk. Council has a 24 hour- 7 days a week emergency service provisions (24/7). The IRT service provisions are set for individual cases, but cannot be guaranteed for city wide emergencies like storm and flood damage events.

The following Table shows the defect intervention levels following the IRT inspections for Council to eliminate the risks and/or make good with formal repairs where instances are within Public Road Reserves.

Road Linemarking –Request for Service Intervention Levels.

LINEMARKING						
	LOCAL ROADS			ARTERIAL ROADS		
	Yellow Roads Less than 2,000 vpd	Red Roads 2,000 to 5,000 vpd	Blue Roads Greater than 5,000 vpd	Black Roads VicRoads Arterial Rds	Car Parks (Off Road)	Paths
Low	42 Days	21 Days	7 Days	Refer to Vic Rds	42 Days	20 Days
Moderate	28 Days	14 Days	5 Days	Refer to Vic Rds	28 Days	15 Days
Significant	14 Days	7 Days	4 Days	Refer to Vic Rds	14 Days	10 Days
High	7 Days	4 Days	2 Days	Refer to Vic Rds	7 Days	5 Days

Appendix D 5.

5. Traffic Management Devices

The Initial Response Time (IRT) to a request for service is within 2 Days. The IRT is to inspect the site, make safe, and report on the Risk Category for follow-up action to repair or make good to mitigate/eliminate the risk. Council has a 24 hour- 7 days a week emergency service provisions (24/7). The IRT service provisions are set for individual cases, but cannot be guaranteed for city wide emergencies like storm and flood damage events.

The following Table shows the defect intervention levels following the IRT inspections for Council to eliminate the risks and/or make good with formal repairs where instances are within Public Road Reserves.
Traffic Management Devices –Request for Service Intervention Levels.

	LOCAL ROADS			ARTERIAL ROADS
	Yellow Roads Less than 2,000 vpd	Red Roads 2,000 to 5,000 vpd	Blue Roads Greater than 5,000 vpd	Black Roads VicRoads Arterial Rds
Low	42 Days	21 Days	7 Days	Refer to Vic Rds
Moderate	28 Days	14 Days	5 Days	Refer to Vic Rds
Significant	14 Days	7 Days	4 Days	Refer to Vic Rds
High	7 Days	4 Days	2 Days	Refer to Vic Rds

Appendix D 6.

6. Carparks Off-Road and On-Road

The Initial Response Time (IRT) to a request for service is within 2 Days. The IRT is to inspect the site, make safe, and report on the Risk Category for follow-up action to repair or make good to mitigate/eliminate the risk. Council has a 24 hour- 7 days a week emergency service provisions (24/7). The IRT service provisions are set for individual cases, but cannot be guaranteed for city wide emergencies like storm and flood damage events.

The following Table shows the defect intervention levels following the IRT inspections for Council to eliminate the risks and/or make good with formal repairs where instances are within Public Road Reserves.

Carparks On Road and Off Road					
Priority	Carparks On Road				Carparks off Road
	LOCAL ROADS			ARTERIAL ROADS	
	Yellow Roads Less than 2,000 vpd	Red Roads 2,000 to 5,000 vpd	Blue Roads Greater than 5,000 vpd	Black Roads VicRoads Arterial Rds	
Low	42 Days	21 Days	7 Days	Refer to Vic Rds	42 Days
Moderate	28 Days	14 Days	5 Days	Refer to Vic Rds	28 Days
Significant	14 Days	7 Days	4 Days	Refer to Vic Rds	14 Days
High	7 Days	4 Days	2 Days	Refer to Vic Rds	7 Days

Appendix D 7.1.**7. Street Sweeping**

The Initial Response Time (IRT) is 2 Days. The IRT is to inspect the site, make safe, and report on the Risk Category for follow-up action to repair or make good to eliminate the risk.

The following Table shows the defect intervention levels following the IRT inspections for Council to eliminate the risks and/or make good where instances are within Public Road Reserves.

Street Sweeping –Request for Service Intervention Levels.

ALL ROADS			
	LOCAL ROADS		ARTERIAL ROAD RESERVES
	Residential Roads	Designated Shopping Centre Roads	Black Roads VicRoads Arterial Rds
Low	72 Hrs	48 Hrs	36 Hrs
Moderate	48 Hrs	30 Hrs	24 Hrs
Significant	36 Hrs	18 Hrs	12 Hrs
High	24 Hrs	9 Hrs	6 Hrs

Appendix D 7.2.

7. Street Sweeping: continued

Street Sweeping –Intervention Criteria & Assessment Matrix.

STREET SWEEPING INTERVENTION RATING					
Type of Request for Sweeping Service	Consequences				
	Minor 0	Serious 1	Severe 2	Major 3	Catastrophic 4
Oil or Paint on Road	A few Drops	100 mm patch	2 to 5 100 mm patches	6 or more 100 mm patches	All patched above 100 mm
Debris from Vehicular Accident	Debris not causing delay to traffic	Minor concern to traffic	Causing delay or traffic to deviate though Path	Queuing and delays experienced	Traffic Stopped and deviation required Police attendance
Kitty Litter Oil Absorbent Material	1 to 4 Bag	5 to 10 Bags	11 to 20 Bags	21 to 50 Bags	More than 50 Bags
Litter spills	50 to 100 loose sheets	100 to 500 loose sheets	20 litre bin volume of material	240 litre bin volume of material	Truck volume of material
Garbage Spills	Less than a 20 litre bin volume of material	20 litre bin volume of material	240 litre bin volume of material	More than one 240 litre bin volume of material	Truck volume of material
Chemical Spills	<5 Litres	5 to 10 Litres	11 to 30 Litres	31 to 100 Litres	More than 100 Litres

Appendix D 8.

8. Risk Matrix

Risk Categories Matrix for field assessments in accordance with the Asset Management Plan; Roads and Road related Infrastructure within the City of Boroondara.

RISK CATEGORIES					
Likelihood	Consequences				
	Minor 0	Serious 1	Severe 2	Major 3	Catastrophic 4
Almost Certain	Moderate	Moderate	Significant	High	High
Likely	Low	Moderate	Significant	Significant	High
Possible	Low	Low	Moderate	Significant	Significant
Unlikely	Low	Low	Low	Moderate	Significant
Rare	Low	Low	Low	Low	Moderate

Kerb and Channel Assets – Sample listing

Appendix E.1

<i>Asset ID</i>	<i>Asset Description</i>	<i>Type Description</i>	<i>Length</i>	<i>Overall</i>
<i>Adeney Av Kew</i>				
513585	Kerb & Channel - Adeney Av (Left Side Argyle Rd to Campbell St)	Bluestone Kerb and 1 Channel	216	1.3
513586	Kerb & Channel - Adeney Av (Left Side Campbell St to Segtoun St)	Bluestone Kerb and 1 Channel	89	1.3
514432	Kerb & Channel - Adeney Av (Left Side Cotham Rd to Parkhill Rd)	Bluestone Kerb and 3 Channel	423	1.35
513632	Kerb & Channel - Adeney Av (Left Side Lalla St to Argyle Rd)	Bluestone Kerb and 1 Channel	61	1.3
514435	Kerb & Channel - Adeney Av (Left Side Parkhill Rd to Lalla St)	Bluestone Kerb and 1 Channel	148	1.3
513587	Kerb & Channel - Adeney Av (Left Side Segtoun St to High St)	Bluestone Kerb and 1 Channel	42	1.2
513622	Kerb & Channel - Adeney Av (Right Side Argyle Rd to Campbell St)	Bluestone Kerb and 2 Channel	209	1.2
513621	Kerb & Channel - Adeney Av (Right Side Campbell St to Segtoun St)	Bluestone Kerb and 2 Channel	82	1.1
513310	Kerb & Channel - Adeney Av (Right Side Cotham Rd to Parkhill Rd)	Bluestone Kerb and 2 Channel	421	1.6
514436	Kerb & Channel - Adeney Av (Right Side Parkhill Rd to Lalla St)	Bluestone Kerb and 2 Channel	148	1.15
513578	Kerb & Channel - Adeney Av (Right Side Segtoun St to High St)	Bluestone Kerb and 2 Channel	45	1.1
<i>Adeney St Balwyn North</i>				
515411	Kerb & Channel - Adeney St (Left Side Luena Rd to Kalonga Rd)	Concrete B2/B3 Kerb and	153	2.35
515450	Kerb & Channel - Adeney St (Right Side Luena Rd to Kalonga Rd)	Concrete B2/B3 Kerb and	148	2.45
<i>Adrian St Glen Iris</i>				
516617	Kerb & Channel - Adrian St (Left Side Bardolph St to Florizel St)	Bluestone Kerb and 2 Channel	26	2.2
516573	Kerb & Channel - Adrian St (Left Side Brandon St to Celia St)	Bluestone Kerb and 2 Channel	100	2.9
516616	Kerb & Channel - Adrian St (Left Side Celia St to Bardolph St)	Bluestone Kerb and 2 Channel	66	2.45
516618	Kerb & Channel - Adrian St (Left Side Florizel St to Hortense St)	Bluestone Kerb and 2 Channel	101	2.55
516572	Kerb & Channel - Adrian St (Left Side Summerhill Rd to Brandon St)	Bluestone Kerb and 2 Channel	100	2.2
516770	Kerb & Channel - Adrian St (Right Side Bardolph St to Florizel St)	Bluestone Kerb and 2 Channel	26	1.3
517032	Kerb & Channel - Adrian St (Right Side Brandon St to Celia St)	Bluestone Kerb and 2 Channel	93	1.8
516771	Kerb & Channel - Adrian St (Right Side Celia St to Bardolph St)	Bluestone Kerb and 2 Channel	68	1.8
516769	Kerb & Channel - Adrian St (Right Side Florizel St to Hortense St)	Bluestone Kerb and 2 Channel	94	1.8
517033	Kerb & Channel - Adrian St (Right Side Summerhill Rd to Brandon St)	Bluestone Kerb and 2 Channel	96	1.5

Friday, 28 July 2006

Page 1 of 2

Road Base Road Surface – Sample listing

Appendix E.2

<i>AssetID</i>	<i>Asset Description</i>	<i>Area</i>	<i>Length</i>	<i>Width</i>	<i>PCI</i>
Arama St Balwyn North					
	Road Pavement (Flexible) - Arama St Balwyn North (Keon Ct to Wandeen St)	637	91	7	8.88
744367	Road Base - Arama St Balwyn North (Keon Ct to Wandeen St)	Depth: 305	Type: Water Bound Macadam		
739623	Road Surface - Arama St Balwyn North (Keon Ct to Wandeen St)	Depth: 80	Type: Asphalt		
	Road Pavement (Flexible) - Arama St Balwyn North (Oravel St to Keon Ct)	946	110	8.6	9.96
744366	Road Base - Arama St Balwyn North (Oravel St to Keon Ct)	Depth: 340	Type: Water Bound Macadam		
739622	Road Surface - Arama St Balwyn North (Oravel St to Keon Ct)	Depth: 80	Type: Asphalt		
	Road Pavement (Flexible) - Arama St Balwyn North (Wandeen St to Helston St)	1064	152	7	8.59
744368	Road Base - Arama St Balwyn North (Wandeen St to Helston St)	Depth: 330	Type: Water Bound Macadam		
739624	Road Surface - Arama St Balwyn North (Wandeen St to Helston St)	Depth: 75	Type: Asphalt		
Arden Ct Kew East					
	Road Pavement (Flexible) - Arden Ct Kew East (Kilby Rd to Arden Ct)	1003	152	6.6	9.02
744369	Road Base - Arden Ct Kew East (Kilby Rd to Arden Ct)	Depth: 200	Type: Water Bound Macadam		
739625	Road Surface - Arden Ct Kew East (Kilby Rd to Arden Ct)	Depth: 10	Type: Spray Seal		
Ardene Ct Hawthorn					
	Road Pavement (Flexible) - Ardene Ct Hawthorn (Wattle Rd to Ardene Ct)	953	127	7.5	7.92
744370	Road Base - Ardene Ct Hawthorn (Wattle Rd to Ardene Ct)	Depth: 200	Type: Water Bound Macadam		
739626	Road Surface - Ardene Ct Hawthorn (Wattle Rd to Ardene Ct)	Depth: 10	Type: Spray Seal		
Ardgour St Balwyn North					
	Road Pavement (Flexible) - Ardgour St Balwyn North (Walnut Rd to Woodville St)	1254	196	6.4	9.09
744371	Road Base - Ardgour St Balwyn North (Walnut Rd to Woodville St)	Depth: 200	Type: Water Bound Macadam		
739560	Road Surface - Ardgour St Balwyn North (Walnut Rd to Woodville St)	Depth: 10	Type: Spray Seal		
	Road Pavement (Flexible) - Ardgour St Balwyn North (Woodville St to Sylvander St)	819	117	7	8.79
744428	Road Base - Ardgour St Balwyn North (Woodville St to Sylvander St)	Depth: 200	Type: Water Bound Macadam		
739561	Road Surface - Ardgour St Balwyn North (Woodville St to Sylvander St)	Depth: 30	Type: Asphalt		

Friday, 28 July 2006

Page 2 of 2

Appendix F.

Enquiries: Alan Marks
 Telephone: 9262 6322
 File reference: 52/01/047

14 December 2004

Mr John Nevins
 Director – City Works
 City of Boroondara
 Locked Bag 2
 CAMBERWELL VIC 3124

Dear John,

RE: BOUNDARY AGREEMENT BOROONDARA & WHITEHORSE

This matter was discussed between Boroondara representatives Mario Galante and Keith Reiter and Whitehorse representatives Kai Yap and Alan Marks at a meeting at the Whitehorse City Council depot on Wednesday 8 December 2004.

As a result of these discussions we have arrived at the following consensus.

Each municipality will be responsible for the drainage and pits, kerb and channel, signage, nature strip and footpath, litter and rubbish on its side of the boundary roads.

Risk and condition assessments from channel to property line to be the responsibility of each municipality on its side of the boundary roads.

For the streets listed in the attached Schedule A, the relevant municipality is responsible for all works on the full width of the road pavement, including:

Minor road maintenance	comprising <ul style="list-style-type: none"> • pothole repair • crack sealing • line marking • litter/debris collection • removal of hazards
Emergency call outs	where problem involves blocked side entry pits, emergency crew to unblock pit. Relevant municipality to be advised of problem.
Road sweeping	full width of pavement
Drainage under the road pavement	
Road opening permits	where opening the road pavement is required
Road closures	(note: advice to be provide to the other municipality prior to issue of any approvals)
Splitter islands	including any signage located in the island
Periodic condition inspections	As required by the relevant municipality's Road Management Plan

For any street requiring resheeting or reconstruction, costs to be shared 50:50 once agreement on scope and timing of works is reached.

For any drainage upgrades involving drainage across the boundary streets, costs to be shared 50:50 once agreement on scope and timing of works is reached.

There will be consultation and agreement on any proposed traffic treatment items including speed humps.

Road opening permits for works in the section of the road reserve from channel to property line will be issued by each municipality on its side of the boundary roads. Where these works also involve opening the road pavement in a road listed in Schedule A, the responsible municipality shall also be informed. For the City of Whitehorse please advise Phil Batson by email to phil.batson@whitehorse.vic.gov.au.

Your confirmation of this agreement would be appreciated. If you have any queries please contact Alan Marks, Engineering Asset Coordinator on 9262 6322.

Yours sincerely

**PAUL KEARSLEY
GENERAL MANAGER CITY DEVELOPMENT**

Cc: Mario Galante
Manager Infrastructure Maintenance City of Boroondara

Schedule A – Boundary Agreement

City of Whitehorse responsibility.

All maintenance to commence from the channel on the City of Boroondara side of each road.

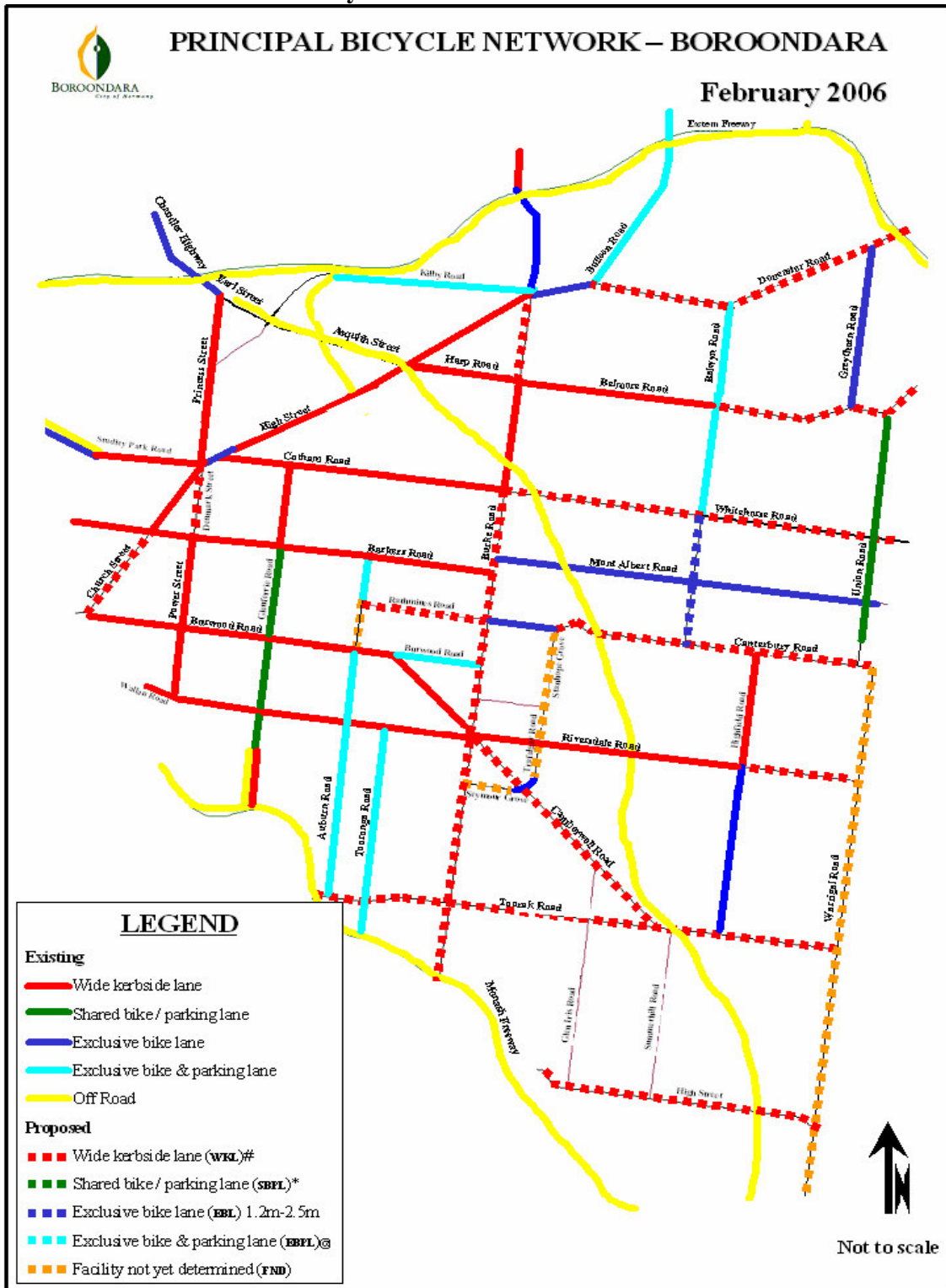
Alexandra Avenue	Full length
Windsor Crescent	Alexandra Avenue to Lorne Parade Reserve
Wilson Street	Full length
Mont Albert Road	Wilson Street to York Street
York Street	Full length
Barloa Road	Full length
Carlyle Crescent	Barloa Road to Carrick Street
Carrick Street	Carlyle Crescent to Kinsale Crescent
Kinsale Crescent	Carrick Street to Kerry Parade

City of Boroondara responsibility.

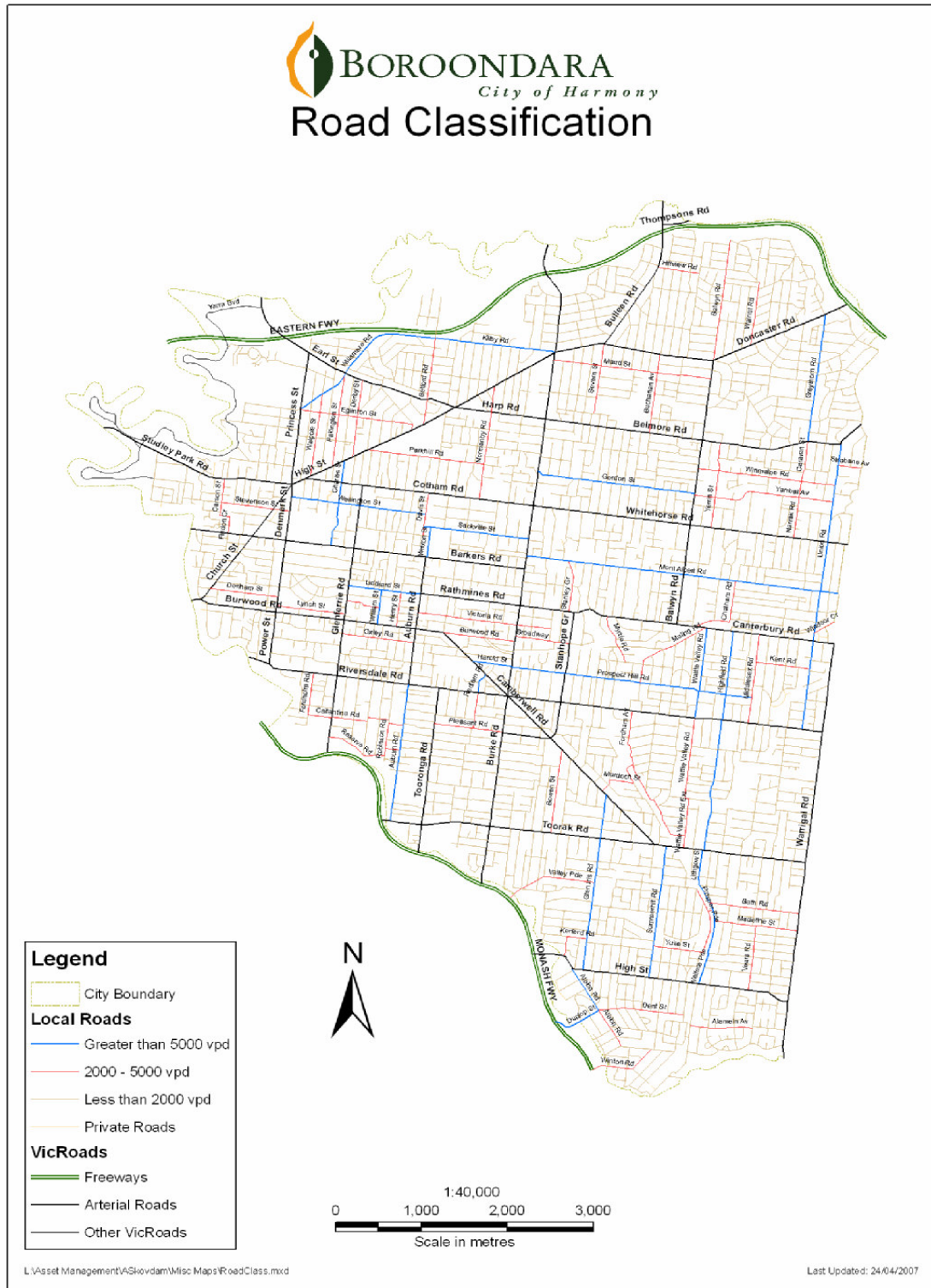
All maintenance to commence from the channel on the City of Whitehorse side of each road.

Kerry Parade	Full length
Evelina Street	Full length
Winfield Road	Belmore Road to Sweyn Street
Sweyn Street	Full length

Bicycle Network Boroondara February 2006



Hierarchy of Roads - Road Classification (Plan No 12770)



APPENDIX I

Additional Legislation applying to the management of Road Base, Road Surface and Kerb & Channel: -

- *Environment Protection Act 1970*, Regulates the emission of pollution, such as waste and noise.
- *Equal Opportunity Act 1994*: Promotes rights to equality and provides redress for those who have been discriminated against.
- *Equipment (Public Safety) Act 1994* and *Equipment (Public Safety) (General) Regulations 1995*: Requires a Council to ensure that any equipment it owns is safe and without risk to health when properly used.
- *Fair Trading Act 1999*: Regulates conduct of Councils, such as misleading and deceptive conduct in the course of trade or commerce.
- *Freedom of Information Act 1999*: Provides the community with access to information in the possession of Councils.
- *Heritage Act 1995* and *Heritage Regulations 1996*: Regulates works to places of cultural heritage significance.
- *Human Rights and Equal Opportunity Commission Act 1986 (Cwth)*: Governs unlawful discrimination.
- *Labour and Industry Act 1958*: Regulates labour and industry (eg obligation to provide toilets to employees).
- *Land Act (1958)*: deals with all leasing and licensing of Crown land, including empowering Council to agree to closure of a road on land vested in the Council (similar issues to the Act above).
- *Occupational Health and Safety Act 2004*: Occupational Health and Safety Codes of Practice and various Regulations: Governs standards for occupational health and safety of employees.
- *Planning and Environment Act (1987)* and *Planning and Environment Regulations (1988)*: Governs use and development of land.
- *Water Industry Act (1994)*: Section 81 governs the obligations of utility companies with regards to maintenance of assets such as fire hydrants.
- *Electricity Industry Act (1993)*: enabled the privatisation of the electricity industry in Victoria.