

A STAKEHOLDER AND TRAFFIC MANAGEMENT FRAMEWORK FOR ROAD REHABILITATION

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ABSTRACT: Auckland City Council undertakes approximately \$18 million of road rehabilitation and reconstruction projects annually. Up to 30 sites are programmed for treatment each year; these sites are mainly located in urban areas and on roads with high traffic flows.

Increasing traffic flows across Auckland make options for managing displaced traffic less easy to find. Auckland City Council has sought new ways of managing the works and providing sufficient information to affected stakeholders and the travelling public through the implementation of a stakeholder and traffic management framework.

The key purpose of the framework is to define mechanisms for planning, assessing and communicating. It also outlines the roles and responsibilities of each party to the contract, set to generic timescales to be followed during the planning and construction of each site.

The key components that make up the framework include: Programme development, Scoping study, Traffic management, Stakeholder management, Key stakeholder liaison, Integration of work streams and Issues management.

Two projects of particular significance in the 2006/07 financial year were Hillsborough Road and Kepa Road. They were carried out under the Framework, and a case study for each demonstrates how the Framework evolved, lessons learnt and the overall benefits to the client and community.

The implementation of the stakeholder and traffic management framework has revolutionised the way in which road rehabilitation and reconstruction works are implemented in Auckland City.

With this significantly more structured approach to construction planning, traffic management and stakeholder communications, Auckland City Council has the assurance that the key stakeholders, stakeholders and traveling public are aware of and prepared for the works.

It has created opportunities for technically innovate design and construction methods to be explored, which have lead to shorter construction times and a reduction in the impacts to the traveling public. Kepa Road post construction analysis showed that up to \$1million was saved in travel time and construction costs.

INTRODUCTION

Auckland City Council spends approximately \$18 million per year on their Road Reconstruction and Rehabilitation programme. The works under the programme range from, simple re-sealing to complete reconstruction requiring road closures and traffic diversion for periods of up to several weeks.

Road reconstruction involves improving the pavement strength, geometric improvements and drainage to achieve a design life of up to 25 years. Road rehabilitation is similar to reconstruction but doesn't include any geometric improvements. Each year, up to 30 sites are programmed for treatment, these sites are mainly located in urban areas and on roads with high traffic flows.

The current Road Reconstruction and Rehabilitation contract started in 2005. The project is managed by Auckland City Council, with Beca as the Engineer's Representative and also providing the pavement design resources. The project is split into three separate areas. Areas 1 and 2 form the main focus of the works around Auckland's central area and isthmus, while Area 3 covers the islands of the Hauraki Gulf, such as Waiheke and Great Barrier Islands.

As traffic flows across Auckland increase, the options for managing displaced traffic become fewer and Auckland City has sought new ways of managing the works and providing sufficient information to affected stakeholders and the travelling public.

During the 2005/06 financial year a 1.1km length of Hillsborough Road was programmed for extensive rehabilitation work. This required partial closure of the road and diversion of up to 1500 vehicles per hour. The location of the site and the nature of the surrounding road network meant that there was only one suitable diversion route and a combination of factors led to extended periods of major traffic congestion and significant problems for residents, businesses, bus operators and other key stakeholders. This resulted in negative publicity for Auckland City Council and a determination to improve processes for future works.

Following the 2005/06 Hillsborough Road works, Auckland City Council commissioned Beca to develop and implement a framework for managing the impacts and minimising problems on future sites. This initiative arose from the success of Beca's involvement in the Freeflow Alliance's Stakeholder and Traffic Management for the Grafton Gully motorway project in Central Auckland. We took what was current best practice on a large roading project and adapted it to a programme of works, developing an easily understood framework.

The inclusion of the Framework into the Road Reconstruction and Rehabilitation contract led to the development of the Beca stakeholder and traffic management team as a variation to the original contract. Framework development started in around May 2006, with works starting in the spring benefiting from the first draft of the new procedures. The Framework evolved further as each site was progressed, and has been further revised prior to the current 2007/08 work programme.

The Framework was developed in close consultation with Auckland City Council's Project Managers, Communication and Marketing Managers and the two contractors for the project. The key purpose of the framework is to define mechanisms for planning, assessing and communicating. It also outlines the roles and responsibilities of each party to the contract, set to generic timescales to be followed during the planning and construction of each site.

FRAMEWORK MISSION STATEMENT

"To satisfy or exceed the reasonable expectations of key stakeholders, immediate neighbours and the wider community, thereby facilitating the achievement of project objectives, enhancing relationships for future projects and establishing a positive perception of the work."

KEY COMPONENTS TO THE FRAMEWORK

The Framework outlines objective, issues and strategies initiatives and provides step-by-step requirements, which enables the Stakeholder and Traffic Management process to be undertaken prior to and during construction. The key components that make up the framework are the Programme Development, Stakeholder Management, Key Stakeholders, Traffic Management and Issue Management.

Programme Development

Each year, the Road Reconstruction and Rehabilitation project starts with the development of a list of sites that is provided by Auckland City Council's Asset Management team. This team initially prioritises the sites based on urgency of repair and manages the funding of the programme.

The annual list goes through a programme development process with the Auckland City Council project manager, design team, contractors and the stakeholder and traffic management team. The process includes site validation, risk assessment and development of potential design solutions. The outcome is a design priority list and a proposed work programme from the contractor which feeds into the start of a scoping study.

The programme development process is very important, as it creates a certainty of construction start dates and methodology so that the stakeholder and traffic management process can be adequately planned and programmed.

Scoping Study

A scoping study forms the first step of the framework implementation and considers each site separately. This is because each location is unique in its size, design, stakeholder requirements, traffic issues and construction duration.

The scoping study is carried out by members of the stakeholder and traffic management team. Its purpose is to determine a site categorisation that identifies each site, both for stakeholder and traffic management issues, as minor, intermediate or major. A simplified risk analysis table is used to score the sites on a number of key issues and impacts and this is included on a site categorisation form that was developed for individual site inspections.

For some sites, categories for stakeholder and traffic issues may differ. For example, a site may be categorised as major for traffic and minor for stakeholder impacts, or vice versa. In these cases, the over-riding categorisation is based on the highest risk and the recommendations of the stakeholder and traffic management team.

Another consideration is the timing of the works, either during the day or at night. Most sites are initially categorised for works being carried out at both times and recommendations are made to the contractor and Auckland City based on the lowest risk and site-specific stakeholder and traffic issues. This information is used by the contractor to develop their final construction programme for the year. As might be expected, daytime works have more impacts on traffic and stakeholders than night time works and this is reflected in the scoring of risks.

At this stage, final checks are also completed to ensure that there are no known conflicts with other major works in the vicinity, such as Transit New Zealand schemes other Auckland City projects or major projects planned by utility companies. This check allows the programme to be altered if necessary. In extreme cases, the planned works may be deferred to the next year.

Once the Scoping Study has been completed, and a final construction programme has been received from the contractor, a stakeholder and traffic management programme is put together identifying the timing of both the stakeholder and traffic activities that must be completed prior to construction.

Traffic Management

Each category of site (major, intermediate and minor) requires different levels of traffic analysis to be undertaken. These reflect the varying scale of impacts that the traffic management associated with site has.

It is the contractors' responsibility under the physical works contract to prepare and manage the Site Specific Traffic Management Plan (SSTMP). The SSTMP is generally prepared according to Code of Practice for Temporary Traffic Management (CoPTTM) (*Transit New Zealand, 2006*) and indicates extent of work areas, construction safety zones, layout of temporary traffic management and the signed detour routes.

Through the Framework there are several steps that need to be completed to develop a SSTMP that minimises traffic and stakeholder impacts. The traffic management team receives a draft SSTMP from the contractor at least 2 months before construction. The team then undertakes traffic capacity analysis to assess the TMP's likely effect on the travelling public and stakeholders. At the same time consultation is undertaken with key stakeholders, such as bus operators, to ensure that their needs are taken into account. The contractor then prepares the final SSTMP, taking into account the changes recommended by the traffic team. A final check of the SSTMP is then made to ensure it conforms to the code of practice before being sent to Auckland City for their approval.

Where consultation with stakeholders indicates that changes are required to the SSTMP to avoid causing unacceptable impacts, alternative solutions are discussed with the contractor, design team and project managers. Changes to the SSTMP are then agreed and implemented to achieve the appropriate balance between the concerns of the stakeholder and traffic management team and the needs and responsibilities of the contractor, design team and client.

For some of the major sites the traffic management team will also monitor traffic conditions at the commencement of works and suggest any changes that may be required to further enhance the temporary traffic management and mitigate its impact.

Stakeholder Management

Clear and accurate communication is the key success factor for stakeholder management. Informed stakeholders are likely to be more accepting of any inconvenience caused during construction. Successful communication can open opportunities for the construction methodologies, traffic diversions and working hours that were not previously thought possible.

Each site has different types of immediate neighbour stakeholders, from businesses, schools and hotels through to residential housing. These stakeholders are identified by the stakeholder team through the site categorisation process. Their main concerns are usually about the impacts the works may have on their properties, activities and businesses.

Another group of stakeholders is the wider community; they are mainly the public who drive through the work site. Their main concerns are the impact the works will have on their journeys, whether there are delays to be expected or potential changes to the route, through diversions.

Mechanisms for communication vary with the type of stakeholder involved and impact the works will have on stakeholders. These mechanisms include project information signs, mail drops, meetings with affected stakeholders, media releases, newspaper and radio advertising, variable message boards (VMS) and website and call centre information.

Stakeholders are contacted and where necessary individual meetings are held. This gives all parties an opportunity to discuss processes and timeframes, and to try to mitigate any issues prior to the works commencing.

For each site, general information that must be provided to stakeholders includes the purpose, scope and status of the works; potential impacts and means of mitigation and points of contact for further information.

Advance communications play an important role in keeping all affected stakeholders and road users informed of the works well in advance of the construction period. This will give them enough time to make alternative arrangements. It is however important that once communications have been issued, the construction activities follow as they have been communicated.

Key Stakeholders

From the start of the Framework's development, it was recognised that getting the key stakeholders' involvement and input on the stakeholder and traffic management programme would be key to its success. The stakeholder team established regular programme-wide liaison with the key stakeholders and this was held in the form of bi-monthly workshops, followed by regular phone and email contact and in some cases site-specific workshops. The key stakeholders involved are:

- Auckland Regional Transport Authority (ARTA);
- Public transport operators;
- Transit New Zealand;
- Auckland City Utilities Liaison;
- New Zealand Road Transport Association (NZRTA); and
- St Johns Ambulance, Police and Fire service.

Initially the workshops proved to be a great success but, with the busy schedules of various parties, the level of participation dropped. Subsequently, shorter workshops were held as necessary for particular sites and regular communication on the programme and individual sites was carried out by email.

Involving the key stakeholders at the early stages and seeking their input allows for them to plan and communicate alternative arrangements to the public and internally well in advance, minimising disruption to their operations.

Integration of Work Streams

The success of the stakeholder and traffic management Framework relies on the accuracy of information that is disseminated. It also relies on information being transferred between the core teams at Auckland City Council, the contractors and within Beca. It is important that all teams work closely together to enhance outcomes for the stakeholders and travelling public.

The stakeholder and traffic management team provide specialist advice to the contractor and Auckland City Council regarding the potential impacts on the stakeholders and travelling public. They also facilitate the dissemination of up to date and accurate information to stakeholders that will mitigate potential issues.

Auckland City Council has a number of roles, as well as being the Client. The Communications and Marketing team ensure that all communications meet required standards. The Project Manager has overall responsibility for the works, attends stakeholder and project related meetings, representing the council's best interests.

The Contractors' role is to carry out the physical works, and provide the stakeholder and traffic team with the information on construction methodology, construction programme and communication outputs they require for conveying the correct messages to stakeholders, both prior to and during construction. The Contractors also have ultimate responsibility for traffic management and site safety.

The project design team liaise with the stakeholder and traffic team and consider potential stakeholder and traffic impacts and mitigation measures during the design phase. In some cases this might lead to a more expensive design option being chosen in order to minimise impacts on stakeholders and the travelling public. In addition, the Site Engineer responsible for the construction supervision of each project is required to advise the stakeholder and traffic team of any changes to the work programme or traffic management.

The collaboration of all parties involved through workshops, site specific meetings and regular communication allows for new approaches to construction, traffic management and stakeholder liaison to be explored, creating opportunities for use of alternative methods.

Issue Management

Issue Management involves identifying and responding to issues raised by the stakeholders. Such issues vary in nature or extent and may require special consideration, for example special events or unforeseen incidents.

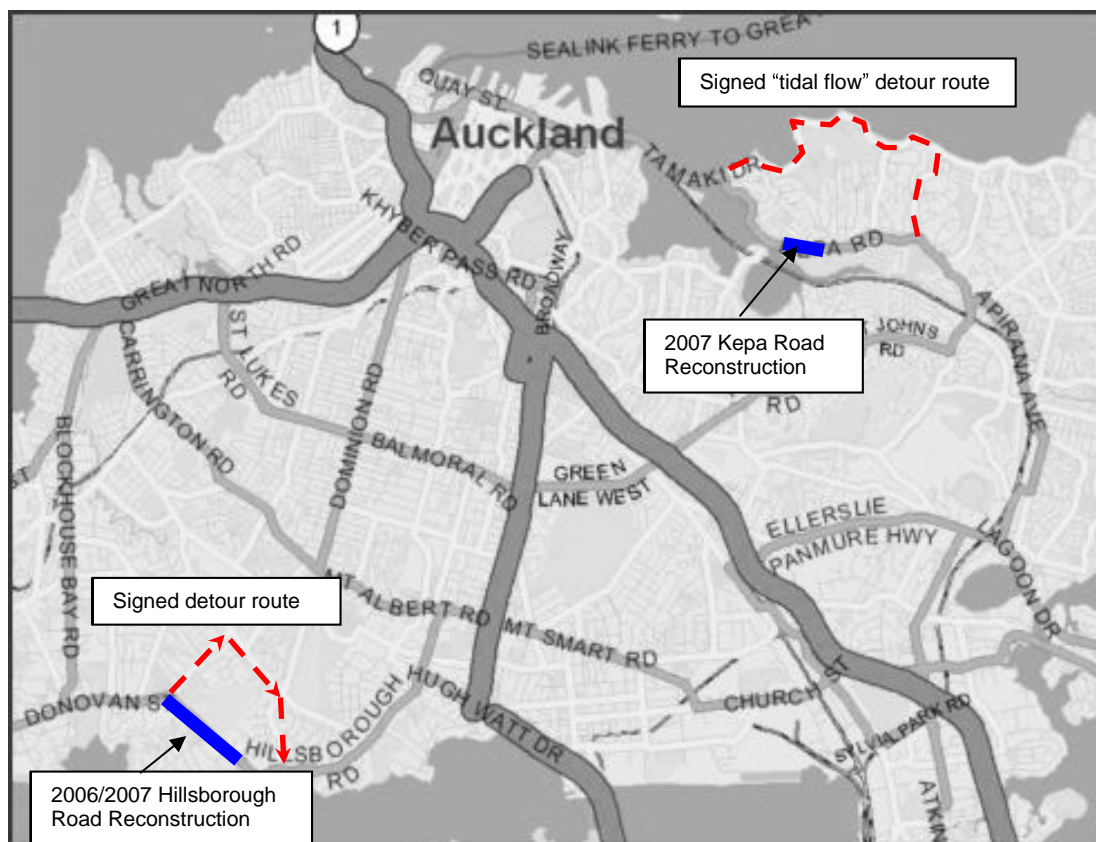
It is important to respond to every issue. If stakeholder issues are not responded to, there is potential for delays to the works, in some cases activities may have to be suspended. It is the responsibility of the whole project team to make sure all stakeholder issues are responded to, the stakeholder provide an overview but the actual resolution is likely through other areas of the project i.e. traffic management or construction methods.

There is a potential for works to impact on special events that occur in the vicinity of the project. In addition some issues raised by stakeholders may be of significant public interest and therefore must be considered as a special event. The success of special events will be important in maintaining a good public profile and particular consideration should be taken for these events.

There is always a potential for unforeseen incidents to occur on the site that can have impacts on stakeholders and the travelling public, as works are undertaken in the vicinity of live traffic lanes in developed areas. There is also the risk that incidents may occur elsewhere on the road network which could also have an impact.

CASE STUDIES

Map of case study locations



Case Study 1 – Hillsborough Road Stages 1 and 2

Description of Area

Hillsborough Road is a key arterial route servicing the south and west of Auckland and has an average daily traffic flow of 27,000 vehicles. The work area for the 2006/07 works was approximately 1km long. The adjacent land use consists of mainly residential housing. A local shopping centre with a 24 hour supermarket, as well as car dealerships, a service station and restaurants are also located alongside the work site.

Work undertaken

The rehabilitation work was split into three stages, due to the extent of the works, to minimise impacts on stakeholders over a busy trading period and to take account of Auckland City's moratorium on major works being carried out over the Christmas period. Stage 1 works involved reconstruction of kerb and channel and subsoil drainage and occurred over 6 weeks during September and October 2006, and required a small amount of temporary traffic management. These works were carried out with minimal disruption, however works at the White Swan Road/Hillsborough Road intersection required diversion of traffic for a period of several days.

Stage 2 required the closure of Hillsborough Road in the eastbound direction for a period of 3 weeks to carry out the stabilisation of the road's substructure and laying of structural asphalt. These works commenced in November 2006 and required the diversion of up to 1,000 vehicles per hour onto Richardson Road at peak times. Due to the deep excavation of the

site, detours had to be in place for 24 hours a day over the entire Stage 2 works period as the works area could not carry traffic even when work was suspended for the night.

Stage 3 is discussed separately in case study 2 below.

Challenges

It was quickly established that similar problems experienced on the 05/06 Hillsborough Road works could re-occur if stakeholder and traffic impacts were not addressed at an early stage of design and construction planning. Therefore, a higher level of communication and liaison would be required throughout the works period to manage the expectations of local residents and businesses.

Following the experience of the previous year's works, addressing the following issues was considered key to achieving a successful outcome for all parties:

- Keeping retailers, residents and motorists aware of works;
- Minimising impacts on Public Transport services, including delays to bus services and bus stop closures;
- Minimising impact on traffic;
- Keeping dust and noise disturbance for residents and local businesses to a minimum; and
- Avoiding negative media scrutiny.

Planning

Communications planning and stakeholder liaison was a top priority for this site after the previous year's disruptions. The stakeholder team worked closely with Auckland City Council's Communications and Marketing team and the Project Manager, to develop a communications plan.

Prior to works commencing, the stakeholder team and Project Manager met and liaised with the stakeholders immediately adjacent to the site, and worked with them to mitigate to our best ability the problems they thought they might encounter during the works.

For example, the local supermarket indicated that Stage 2 works would clash with their busiest pre-Christmas trading period. Negotiations were held in the months leading up to the works to try to defer Stage 2 until after Christmas. Unfortunately, deferring the works was not possible as it would have meant Stage 3 would have extended into early March. This would have clashed with the start of the new academic year and the busiest time for traffic and public transport, which would have caused significant problems for a larger number of stakeholders. There was also the risk that the later finish to the works could have led to further delays, since dry summer weather was required for many of the key construction tasks.

The traffic team carried out capacity analysis to assess the likely impact of temporary traffic management on stakeholders and the travelling public. From this it was determined that one of the intersections on the detour route should be modified to provide additional temporary capacity for diverted traffic. These modifications were done before the main works started. The analysis of other options also confirmed that diversion of eastbound traffic had the least impact on traffic flow overall.

Other roadwork's underway in the area were investigated and less critical works on the detour route were suspended on the weekend before the main works started. Works on the Transit, SH20 motorway extension had little or no impact on our works. Although we had to make sure works were completed prior to, when they had extensive closures planned.

Despite the pre-planning and analysis, it was expected that conditions on the first few days would be difficult, as drivers got used to the temporary traffic management.

Construction

The first day of works started after the Monday morning peak hour, with the intention that the travelling public would see the works, and associated traffic management on their return journey on Monday evening and plan an alternative route for the next day.

During the morning peak on the following day, queues of slow moving traffic were experienced for a distance of several kilometres in advance of the work site and along the detour route. Additional Variable Message Signs (VMS) was put in place at a key intersection, in time for the following day's morning peak, to encourage drivers to take alternative routes. By the third day of the works, the expected reduction in congestion began to occur along the detour route, although other nearby routes became much busier as drivers sought alternative routes.

The bus operators experienced significant delays over the first few days due to the displaced traffic congesting other arterial routes and due to buses being caught in traffic queues. On the second day of works, measures were taken by Auckland City to increase enforcement of the sections of bus lane that were available, although conditions had already improved by this time.

To establish the impact of the works on traffic flow, members of the traffic team carried out travel time surveys throughout both morning and evening peak periods on both the detour route and other parts of the surrounding network. This confirmed that conditions improved significantly during the first week.

In the early stages contractor needed to close a key access route to the Lynfield area to allow their construction plant to operate safely. This meant that public access to Lynfield, an area with approximately 2,000 houses, two schools and a neighbourhood shopping mall, was only possible from the east. Emergency access was however still allowed from the west via Griffen Park Road for the fire service and St Johns Ambulance. This road was opened up for other local access as soon as it was safe to do so.

The stakeholder team and Project Manager worked closely with the local businesses to help work out ways to keep the people coming to the area. Extra signage was ordered stating that retailers in the area remained open and leaflets were provided to the supermarket for distribution to customers once Griffen Park Road was re-opened.

Regular meetings between Auckland City projects managers, communications and marketing and the stakeholder and traffic management team occurred on a daily basis during the initial weeks of Stage 2. This was to report on the traffic situation and to ensure all stakeholder queries were addressed. Updates were also provided to key stakeholders and senior management within Auckland City.

Benefits

The traffic analysis undertaken in advance of the works allowed temporary traffic capacity improvements measures to be designed and implemented in advance.

The programme development work completed prior to the works meant that the project team were able to respond to unexpected events in a measured way. The local media were briefed in advance of the works. This significantly improved their coverage of the works and helped to inform the public across the whole of the city. Negative publicity was significantly reduced compared to the previous works on the route and traffic conditions settled down to a manageable level within 3 days.

Establishing effective lines of communication with the bus operators meant that additional useful information like which routes were experiencing high traffic volumes, and were parked

vehicles may be obstructing buses was provided by their drivers which assisted the project team in determining the effects of the works. As a result of their feedback, pre-planned contingency measures were implemented by the third day of the works.

Lessons Learnt

The location of advertisements in the newspaper is important. The initial advert ended up in the back section next to the personals column, where it was unlikely to be noticed. For Stage 3 and all other works in the future, it was ensured that adverts were placed in the main section of the newspaper, in the front few pages.

Starting major road works on a Monday morning adds to the congestion caused by the temporary traffic management. Although starting later in the day has significant impacts for the contractor, the benefits of starting later are deemed to be justified.

You will not always be able to inform everyone, no matter how much advanced planning is done. Despite radio bulletins, signage, newspaper adverts and other communications, many drivers were clearly caught unawares by the start of the roadworks. Additional VMS signage was put in place well in advance of the works where possible, but the limited number of units available prevented their widespread use.

Case Study 2 – Hillsborough Road Stage 3

Work undertaken

Problems with stabilisation and equipments encountered during construction of Stage 2, and other traffic management concerns regarding access to businesses along the south side of Hillsborough Road, led to a change in pavement design for Stage 3.

Instead of stabilisation, an innovative lean mix concrete base design was specified. Quick-setting concrete was laid at key driveways and intersections to allow traffic to cross the work site as soon as possible after the concrete was laid. This solution allowed all main accesses to the Lynfield area to be kept open for a high proportion of the works period and also quickened construction to around 4 weeks compared to the previously planned 7 weeks.

As with stage 2, the eastbound traffic continued to be diverted. Works started in early January, taking advantage of the lower traffic flows during the academic holidays.

Challenges

Similar challenges to those experienced in Stage 2 were faced in Stage 3.

Planning

After learning a great deal from the Stage 2 works, through stakeholder feedback and requests, the Stage 3 communications plan was more comprehensive.

An Auckland City Council Transport Ambassador was appointed to the work site, to assist with any queries that the community and local businesses may have had about the works. They would report any back to the stakeholder team and/or Project Manager, resolving issues in a much shorter timeframe.

It was established that the stakeholder letters needed more detailed information and that they needed to be distributed further a field than just the immediate work area and adjacent residents. A four sided A4 information booklet was produced and delivered to over 4,000 residents within the Lynfield area, with a smaller two-page mail drop reaching another 4,000 houses on and around the detour route.

During Stage 2, the community expressed concern about the lack of pedestrian crossing points through the work site, which was over 1km in length. As a result, the stakeholder team worked with the contractor to identify safe locations and arrangements for extra crossing points.

Extra signage was made, advising the travelling public at various locations outside the work area, that the Lynfield retailers were still open and offered a suggested access route.

Additional parking restrictions were put into place along the detour route to maximise traffic flow on the most congested section. Where required the traffic signal timings were also altered, as in Stage two.

Construction

As a result of the lower traffic flows during the holiday period, as well as driver familiarity with the traffic management, the first days of Stage 3 caused far less traffic congestion than occurred for Stage 2.

The changed construction methodology and good weather meant that good progress was made in Stage 3 and the works were completed ahead of schedule and before the start of the new academic year in early February. The temporary changes to the roundabout on the Richardson Road detour route were removed soon after the completion of Stage 3.

Benefits

The change in construction methodology lead to works being completed ahead of schedule, benefiting the travelling public, local retailers and residents creating a positive perception of Auckland City Council.

Lessons Learnt

With such major works more detailed information and wider distribution area must be considered. Providing answers to "Frequently Asked Questions" appeared to be well received by residents.

Case Study 3 - Keba Road

Description of Area

Keba Road is a key arterial route servicing the eastern bays area of Auckland and has an average daily traffic flow of approximately 24,000 vehicles. The work area was approximately 200m long and the adjacent land use was open space/farm land on one side and local shops and community areas mixed with residential on the other. Located a few kilometres down the road is a large shopping centre, a high school and sports stadium.

Work undertaken

The initial pavement rehabilitation design required closure of a 200m section of the road in one direction at a time for a total duration of up to 3 months. This was to allow subsoil drains to be installed under the road pavement and to allow for the removal of the large scoria boulders underlying the road surface.

Challenges

Following the experience of the previous works, addressing the following issues were considered key to achieving a successful outcome for all parties:

- Keeping retailers, residents and motorists aware of works especially with the innovative 'tidal flow' traffic management being implemented;
- Minimising impacts on Public Transport services, including delays to bus services and bus stop closures;
- Minimising impact on traffic;
- Keeping dust and noise disturbance for residents and local businesses to a minimum; and
- Avoiding negative media scrutiny.

Planning

Originally works had been scheduled for January 2007; however the decision was taken by Auckland City Council to delay the works to allow more communications planning to take place. The works were consequently re-scheduled to April 2007.

Rehabilitation works at this site in previous years had allowed traffic to travel in both directions through the sites under "Stop/Go" manual traffic control. This arrangement had however caused widespread disruption and traffic delays. In a bid to minimise further disruption, it was decided that a one-way traffic closure for 24 hours a day for the full duration of the works, with a detour for traffic in the opposite direction, was the only practical solution.

Traffic analysis data showed the sole available detour route via Tamaki Drive would be unable to accommodate traffic diverted, during the peak hours when the existing flows (up to 1,500 per hour) would clash with the diversion flows, doubling traffic along an already congested route. In close consultation with the contractor, it was decided that the most effective traffic management solution would be a 'tidal flow' operation, to allow traffic through the site in the direction of peak flow during weekdays.

This meant that in the mornings, traffic had to flow through the site in the westbound direction towards Auckland, and then in the afternoons and evenings would need to be switched to the outbound direction from the city. This required a changeover in the direction of traffic flow and significant changes to the associated temporary traffic management twice daily.

At a late stage of the planning, it was decided to change the design of the construction to a lean concrete base with structural asphalt similar to the Stage 3 Hillsborough Road design. This significantly reduced construction time to 4 weeks, but increased construction costs. Auckland City Council made the decision to adopt this revised design to minimise impacts on the public.

Also included in this change was the decision to carry out soil strengthening works on an adjunct site, under the same traffic management plan, to avoid further disruption to motorists at a later date.

In the months leading up to the works, communication and liaison with key stakeholders, immediate neighbours and wider affected parties was carried out. Initial visits to local schools, sports stadium and the shopping centre gave them time to make any special arrangements prior to construction starting, and to give us any feedback on the proposed works.

Arrangements were made with the contractor's traffic management staff to allow key bus services through a short section of opposing traffic flow during the morning peak to minimise extended journey times.

Communication of the traffic management was of great importance prior to and during the works. Various methods were used to ensure that the local community and travelling public were well aware of the works and proposed traffic management, including: a 4-page information booklet, distributed to over 6,000 households, A3 posters distributed around community areas, Variable Message Signs (VMS) were located at the site and key locations

in the wider area, project information boards, located at and adjacent to the site followed by promotion staff being employed to stand at 3 locations with placards the week prior to works starting.

Extensive advertising in the newspapers and radio bulletins started two weeks prior to works commencing.

Construction

During construction, Tamaki Drive experienced higher traffic volumes, as was to be expected but there were no major problems. The decision to place a pointsman at a key intersection on the detour route during the peak hours helped to alleviate any traffic queues that built up proved a success.

The travelling public adapted well to the innovate traffic management, and no major delays were reported. The supermarket at the shopping centre requested some additional signage, but on the whole all parties we well prepared and experience no problems during construction.

Overall, construction went smoothly and the project as a whole was deemed a huge success. The management of construction, stakeholders and traffic at the Kepa Road site received good feedback from key stakeholders, the general public and senior Auckland City Council managers, including a personal commendation from the Council's Chief Executive Officer.

Benefits

Co-ordinating other works in close proximity to the main Kepa Road site avoided causing overlapping traffic effects and minimised the cumulative impacts on the local community.

Prior to the communications plan being finalised, consultation with the local shopping mall led to a changes to the planned direction of traffic flow through the site at weekends, allowing the public easier access to the shops.

Economic analysis undertaken after the works indicated that the changes to the construction design, shorter construction period and resulting reduction in traffic disruption could have saved up to \$1 million in travel time and operating costs, since a conservative estimate of the weekly costs were calculated to be in the region of \$200,000.

Lessons Learnt

It is not an easy task to change the travelling public's travel behaviour, a lesson learnt from Hillsborough Road. To combat this Auckland City Council hired promotional staff for the week prior to works commencing, to stand on what would be the work site waving placards reminding the public works were commencing the next week.

The key lesson learnt from this site was that complex traffic management, such as a tidal flow arrangement, can be an effective and appropriate solution if adequately communicated to the travelling public. Although likely to be confusing on the first day, the high proportion of regular commuters using the route meant that they quickly became used to the arrangement and positive comments were received from motorists.

Although starting works after the Monday morning peak period reduced traffic problems, starting works after the Tuesday morning peak was shown to have even greater benefits and this starting time was adopted for future major work sites.

CONCLUSION

The implementation of the stakeholder and traffic management framework has revolutionised the way in which road rehabilitation and reconstruction works are implemented in Auckland City.

The approach to engineering on this project has been more than simply adherence to codes and standards. Considerations of stakeholder and traffic management outcomes are now inherent in all programmed activities - from site investigation to design and construction. This has resulted in clear benefits including:

- Demonstrable reduction in traffic and stakeholder impacts
- Stakeholders contributing to mitigation
- Identification of temporary works in advance
- Media informing public, rather than providing the publicity
- Responding to issues in a measured way
- Collaborative approach leads to design and construction solutions to stakeholder and traffic problems
- Innovative approach to traffic management

With this significantly more structured approach to construction planning, traffic management and stakeholder communications, Auckland City Council has the assurance that the key stakeholders, stakeholders and traveling public are aware of and prepared for the works.

Through this new approach to planning and communications, it has created a positive perception of roadwork's overall, not just for Auckland City Council projects.

It has created opportunities for technically innovative design and construction methods to be explored, which have led to shorter construction times and a reduction in the impacts to the traveling public. Kapa Road post construction analysis showed that up to \$1 million was saved in travel time and construction costs.

The Framework can be applied to smaller projects, and this can already be seen happening within Auckland City, on two stand alone roading projects: Central Connector, a bus corridor between the central city and Newmarket and Tiverton/Wolverton, a road widening project in the western suburbs. Both have used the Framework and adapted it for their own stakeholder and traffic management plans.

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