8 Assessment of Environmental Effects

8.1 Introduction

The following is a summary of the actual or potential environmental effects that are likely to arise from the establishment of the Bypass and includes an assessment of the following:

1. Urban Design
2. Traffic effects
3. Landscape/visual effects
4. Social and community effects
5. Cultural effects
6. Archaeology and Heritage
7. Property effects
8. Air Quality
9. Stormwater
10. Operational Noise
11. Amenity
12. Ecology
13. Construction effects
14. Vibration
15. Lighting
16. Services

8.2 Urban Design

An Urban Design Review has been undertaken by Brewer Davidson and is attached as Appendix G of this NOR. The report has been developed in conjunction with Hamilton City Officers and has considered 'CityScope' and 'Access Hamilton'. This review document considers the assessment of the Bypass in relation to the essential design qualities of the New Zealand Urban Design Protocol. In addition, due to the close association with the Rotokauri Structure Plan and the proposed Waikato Regional Passenger Transport Plan, the report reviews important urban design context issues with respect to integrating these proposals with the Bypass.

Page 16 of the Urban Design Report lists key design issues north of Ruffell Road. Landscape screening of industrial properties and review of a roundabout solution on Te Rapa Road (existing SH1) are mentioned as the Urban Designer believes these are the key issues in a preliminary design stage. Gateway treatment should be considered for the Te Rapa Road interchange but in a lower key manner as the future gateway will be the Te Rapa Bypass/Waikato Expressway junction which is outside the scope of this assessment. These issues will be dealt with at the detailed design stage of the project, and will be addressed in consultation with HCC, WDC, and Tangata Whenua.

In summary, the key outcomes of this Urban Design Review include:

- The Bypass alignment is in the optimum location from an urban design perspective;
The Bypass should be grade-separated over Te Kowhai Road and Gilchrist Street to promote good connectivity between residential, employment and greenfield locations;

The “Green Corridor” (from the Rotokauri Structure Plan) and the embankment between Te Kowhai Road and Gilchrist Street should be integrated so that the embankment contributes to the amenity of the linear open space; and

Embankments north of Ruffell Road should be planted to screen future views down to proposed industrial areas.

8.3 Traffic

8.3.1 Traffic Environment

The benefits of the Bypass include:

- A safer road network resulting from reduced driver frustrations, reduced vehicular exposure, improved cross-section standards on the Bypass, and reduction in vehicle conflicts,
- Reduced travel times for all road users and hence less vehicle emissions,
- Improvement in trip reliability,
- A transport network that is integrated with the Greater Hamilton Area,
- Improved access for pedestrians and cyclists,
- Provision for easy integration with possible future Travel Demand Management measures, and
- A transport network solution that supports continued viability of the western corridor and regionally significant facilities, thereby enabling long term economic growth to occur within the Horotiu, Rotokauri and greater Waikato areas – as envisaged by the Council’s.

The Bypass will relieve a heavily congested length of SH1, thereby improving access onto the existing road network and improving safety and accessibility to all road users. The Bypass will also provide a corridor for State highway transport users that is efficient and effective for the long term and will minimise the conflict between “through” traffic and local activities, thereby ensuring an effective National Strategic State highway.

In addition, the Bypass will allow the development of the Rotokauri Structure Plan and the Horotiu Structure Plan through the provision of additional network capacity.

8.3.2 Traffic Flows

Identification of future traffic flows in the study area has been based on the Hamilton City Council Transportation Model. Print-outs from the transportation model and
associated intersection capacity analysis (SIDRA modelling) are included within Appendix P.

Assumptions of the traffic model include:

- The existing State highway corridor remains as two lanes between Horotiu and Te Kowhai Road then four lanes through to Wairere Drive junction. This includes the signalisation of Wairere Drive/Te Rapa Road junction.

- Full connections available at Horotiu, and Central Junctions. Only south facing ramps are provided at the Gilchrist Street Junction.

- The Waikato Expressway (Ngaruawahia and Hamilton Bypass sections) are built by year 2021.

- Adoption of 40% land use development of the Rotokauri and Horotiu Structure Plans by 2016, with 100% development by 2036.

**Figure 8.1** shows the predicted traffic flows on the road network in year 2016 and 2036 if the Bypass is developed. This demonstrates:

- The Bypass diverts a significant amount of traffic off the existing SH1 corridor. That is 13,000 vpd (2016) to 20,000 (2036) north of the Central Junction and 13,000 vpd (2016) to 18,000 vpd (2036) south of the Central Junction.

- The existing State highway route would still carry around 42,000 (2016) to 48,000 vpd (2036) immediately north of the Wairere/Te Rapa Road intersection.

- Traffic flows on SH1 north of Te Kowhai Road are between 16,000 vpd (2016) to 21,000 vpd (2036). These flows can be accommodated by the existing two lane roadway with similar operating conditions to that currently being experienced.

By 2016 the section of State highway one between Gilchrist Street and Rotokauri Road is likely to be one of the most heavily trafficked roads within the Waikato Region (flows of approximately 39,000 vpd – this is more than the current traffic travelling on the Motorway over the Bombay Hills). By 2036 (even with the inclusion of the Hamilton Bypass) it is expected that this section will be the busiest section of road within the Waikato Region (almost 57,000 vpd – this is approximately the current volume of traffic travelling on the motorway through the SH1 – Manukau Interchange).
Figure 8.1: Potential Future Traffic Flows on Network with Bypass
(Note: includes Hamilton Bypass in Network at 2036, 40% Development in 2016, and 100% Development in 2036)
8.3.3 Likely Level of Service Offered by the Bypass

All land use adjacent to the Bypass will be prevented from directly accessing the route. This will separate the local traffic, which wants to access the adjacent properties, from the through traffic, which has an origin and destination beyond the length of the Bypass. By doing so, the traffic capacity of the Bypass is maximised and the life of the project is extended without compromising safety or travel times.

Travel on the Bypass will therefore be predominantly uninterrupted with the exception of major junctions which are to be “grade separated”.

LOS describes the quality of service provided by a section of road or junction. Six grades of LOS are used ranging from Free Flow conditions (LOS A) down to Forced Flow conditions (LOS F). In general terms, as the amount of traffic increases, the level of service will decrease if no improvements are made to the network. Appendix P includes the adopted bands for LOS classification (as calculated from Austroads Roadway Capacity Manual).

- The Transit State Highway Geometric Design Manual (SHGDM) indicates that a LOS C after 25 years is an appropriate design standard. Given that the Bypass needs to be sustainable until at least the year 2036, it is expected that LOS C should apply to this planning horizon.

The designation requirement is for an ultimate four-lane bypass, hence the LOS offered during peak periods will be LOS at the planning horizon.

On the multi-lane section, between Gilchrist Street and Rotokauri Road, the predicted traffic volumes during peak periods at year 2036 are likely to be 80% of the maximum available capacity. This will result in low travel speeds and low LOS. Given the land constraints through this section and the potential for driver’s to select alternative modes of transport, or travel outside the peak periods, the operational conditions are considered acceptable for the planning horizon.

8.4 Landscape/visual

A Landscape/Visual Report has been undertaken and is attached as Appendix F to this NOR.

8.4.1 Viewing Catchment and Audience

The proposal’s visual catchment and viewing audience will comprise:

- Local residents who can see parts of the proposed bypass from their dwellings and properties;
- Road users on surrounding roads including Avalon Drive, Te Rapa Road, Foreman Road, Gilchrist Street, Ormsby Lane, Tasman Road, Te Kowhai Road, Ridge Park Road, Onion Road, Ruffell Road and Bern Road;
Users of the surrounding industrial and commercial areas may also have views of the proposed bypass, as well as users of the New Zealand Sikh Society temple on SH 1 and the WINTEC Avalon Drive campus;

- Passengers using the NIMTR; and

- Users of the Bypass and link roads.

Two photomontage impressions of the proposal have been prepared (refer to Appendix F attached and forming part of this NOR). These montages are artistic impressions that show the likely extent of the project within each view but exclude any likely noise or landscape mitigation requirements.

8.4.2 Landscape Effects

The area within which the Bypass is situated is not identified as having any outstanding features or being an important landscape. The Waikato District Landscape Evaluation describes the landscape of the northern extent of the bypass as having low to average visual quality with average to good ability to integrate change.

Overall, the landscape and visual effects of the Bypass on the existing urban edge and rural landscape ranges from moderate to significant, where the Bypass comes into close proximity to dwellings and at interchange areas. The elevated nature of the Bypass is a significant change in the landscape and there is limited ability to mitigate the degree of effect on the existing surroundings.

However, the Bypass presents an opportunity through sensitive integration with the landscape to provide a green corridor between future areas of development, and enhance the northern ‘gateway’ and sense of arrival and departure from Hamilton.

In the future, when the Rotokauri and Horotiura Structure Plans have been implemented, and the land on both sides of the bypass becomes commercial or industrial, the visual effect of the bypass will be less obvious. This is due to the likely scale of buildings which will block views of the bypass and to the better fit of the heavily trafficked and lit character of the road in an urbanised setting.

8.4.3 Mitigation Measures

The proposed landscape mitigation measures described below will act to limit the effect of the change to the landscape and help screen and integrate the Bypass in the landscape. Two Indicative Landscape Mitigation plans have been prepared to indicate the mitigation measures adopted.

Key mitigation measures include:

- Revegetation of gully margins adjoining the bypass so as to re-establish indigenous land cover and habitat;
Mass planting of indigenous shrub species for screening purposes where the proposed bypass is in close proximity to residential development and traverses areas of residential landuse;

Planting of groups of trees at specific locations along the length of the bypass to visually ‘soften’ its extent and break up more distant views from the surrounding landscape. This would also act to integrate the proposal with the local vegetation pattern of scattered tree planting;

Gently grading and rounding of the fill and cut batters to match the adjoining landform so as to integrate the bypass with the surrounding rolling terrain;

Tree and shrub planting at the roundabouts and intersections to provide screening to residential properties, define the intersections, and visually reduce the visual extent of road surfacing. This planting will be located and limbed up to ensure traffic visibility sight lines are retained;

Grouped tree and hedgerow planting at strategic locations along the bypass where the outlook from existing dwellings will undergo change. These plantings will screen more immediate views of the bypass;

Retaining as much as possible of the road margins in pasture where the bypass crosses farmland to integrate the bypass with the surrounding rural landuse and landscape;

Development of an overall landscape theme that reflects the history of the area and responds to the Hamilton City Council’s City Entrances Concept Scheme, CityScope, Transit’s Guidelines for Highway Landscaping and Transit’s Urban Design policy;

Framing screening views out over the landscape for the travelling public on the Bypass so as to enhance the outlook from the road, with particular consideration given to screening of potential future industrial development along the eastern extent of the Bypass

Potential for panoramic views from elevated sections of the bypass should be considered where these can be achieved without impact on nearby properties;

The selection of materials and surface finishes of overbridges and any noise barriers during the detailed design phase to minimise the visual effect of these structures;

Noise barriers if required, should be integrated into the landscape through the use of planting. The use of earth bunding is the most visually desirable measure for noise mitigation through areas of existing rural landscape, as it is in keeping with the surrounding topography and existing landscape patterns. However, these may not be able to be achieved to the height required on the elevated sections of road;
- Where practicable, consideration will be given to establishing the landscape and visual mitigation measures prior to construction works commencing or as soon as areas become available for planting due to progress of the works;

- Linking the proposed landscape mitigation planting with areas of vegetation outside of the designation boundary where possible, including the potential future planting proposed at part of the Rotokauri Structure Plan;

- Preparation of landscape plans during the detailed design phase that define the vegetation to be retained, areas of landscape and ecological mitigation planting, the type and density of planting to be undertaken and establishment maintenance requirements. Once established, the type of planting will be such that it does not require specific on-going maintenance. The landscape plans will form part of the physical works contract;

- Recommendations that specific landscape plantings for screening purposes are considered within existing residential properties within close proximity and with direct views of the proposed bypass. Visual mitigation measures need to address impacts on individual properties and affected landowners during the detailed design phase of the Bypass;

- Consideration should be given to the development of reserve areas, integrated stormwater retention ponds, green corridors and open space areas to provide a green buffer between the Bypass and potential future industrial and commercial development. There is potential for cycleway/walkways to be integrated into these areas.

8.5 Social and Community

A Social Impact Assessment was undertaken and is attached as Appendix M to this notice of requirement. This Social Impact Assessment considered the proposed design and engineering works during and post construction, background documentation and the feedback on consultation undertaken. These works have subsequently been evaluated against criteria developed to assess the potential effects on the community.

There is awareness amongst landowners that the area is in a process of land use change and that there is an awareness that area will change in the foreseeable future. In particular, the structure planning exercise has been well publicised and had gone through a number of iterations.

Overall, it is concluded that the social impacts of the Bypass will be minor in the long term. Impacts will be mainly at the individual level, affecting essentially those landowners who are in the position of being reluctant to relocate or businesses affected by the Bypass.

In addition to those recommended by the noise, traffic and landscape assessments, the following mitigation measures are suggested to address the potential social impacts:

Construction
• Maintain access to community facilities during construction. If unable to do so, consider relocating the facilities to an alternative site.

• Prepare appropriate noise and traffic management plans to manage the effects of construction on the surrounding residential areas.

• Implement a communications plan for residents, schools and other community activities, to provide ongoing warning the timing and duration of the construction works, temporary street closures, diversions etc.

• Temporary relocation of residents where the noise effects cannot be mitigated.

Post Construction

• Reinstatement of permanent access ways to properties and local roads.

• Safe crossing points for the community and in particular, residents, school pupils etc be provided across the major routes at key points.

• Public areas take into account Crime Prevention through Environmental Design Principles “CPTED”.

• Appropriate compensation under the Public Works Act for residents permanently affected by the works.

8.6 Cultural

A Cultural Investigation report was undertaken by Nga Mana Toopu o Kirikiriroa (NaMTOK) in July 2004. A full copy of the report is attached as Appendix L to this NOR.

The land in the investigation area has an extensive and rich pre-European Maori history. This whole area has always been a centre for Maori people and hence it has been fought over and occupied by a number of different hapu over time. Consequently it is claimed as part of the traditional lands of several hapu of the Waikato Iwi. These hapu include Ngati Wairere, Ngati Koura and Ngati Ngamurikaitaua.

Whilst the whole of the Waikato region is the traditional lands of Waikato Tainui, each of the individual Hapu who make up Waikato Tainui have their own traditional land areas within the region. The investigation area and surrounding districts were developed upon the traditional lands of several of these Waikato Tainui Hapu including Ngati Wairere, Ngati Koura, Ngati Iranui and Ngati Ngamurikaitaua.

Sites of specific significance identified in the report are as follows:

• The Mangaharakeke gully catchment system is the major and most significant feature in the present investigation area. It is a tribal landmark marking the boundary between Ngati Wairere to the South and Ngati Mahanga and Ngati Tamainupo to the north. In addition, the gully was not only a prime location for flax production but the stream in the gully was an important food resource for eels. There are other gullies within the investigation area which would have also supported eel stocks for which Rauwiri (eel
weirs) were established. A famous eel weir was constructed in the gully system which discharges into the Waikato River midway between Mangaharakeke Pa and Pukete Pa. That landmark was known as Te Raratuna O Tutumua which became the name of the gully and urupa also. Whilst springs probably may exist within the investigation area and their specific locations have not been identified.

- Pikihinau. This is the name of a small kahikatea bush stand on the corner of Te Kowhai and Burbush road. It was a noted gathering area for hinu berries and hunting of native birds. Pikihinau was considerably larger in pre-European times but has been considerably reduced as a result of European farming activities.

- Te Maire. Te Maire refers to the name of the swamp which makes up much of the flat dairy farmland north of Te Kowhai Road.

- Te Raratuna O Tutumua. Te Raratuna O Tutumua is the name of the gully system which can be seen from Maui street.

- Te Okepo. This is the name of the hill that overlooks onion road and the entrance to the Fonterra Diary factory off SH1.

The report recommends a series of commemorations and mitigation for the bypass. The recommendations should not be regarded as commitments by Transit to implement every proposed measure. However the Cultural report identifies a number of urban design ‘gateway’ issues which will be considered in the detailed design phase. Tangata Whenua, Waikato District Council and HCC Planning / Urban design representatives will be involved in this process to ensure a collaborative vision is understood in defining the appropriate gateway treatment and the role the Bypass plays in defining territorial and cultural boundaries.

8.7 Archaeology and heritage

Assessment of archaeological and heritage effects involved a site walkover and completion of a detailed report undertaken by a qualified Archaeologist. A copy of the full report is attached as Appendix N.

No tangible evidence of archaeological sites or deposits was found during the Archaeological walkover. A number of areas were highlighted as having potential for subsurface archaeological deposits although this potential was assessed as low.

The implementation of an accidental discovery protocol during the construction phase of the Bypass would mitigate any potential impacts on unrecorded archaeological sites. Under this protocol, in the event of the discovery of archaeological material or prehistoric garden soils, earthworks will stop immediately and the advice of the NZ Historic Places Trust (NZHPT) will be sought. An authority to damage, destroy or modify the archaeological site may then be required.

The NZHPT have received a copy of the archaeological assessment for the Bypass and have endorsed the recommendation that earthworks for the Bypass operate under an accidental discovery protocol.