- report

Investigation of Growth in the Coulson Road Area, Greymouth - Draft

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Prepared for

Grey District Council

By

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June 2005

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1 Introduction

There has been significant development in the Coulson Road area of Greymouth in recent times and this development is anticipated to continue in the near future. In response to this the Grey District Council has commissioned this report, to investigate the implications of this growth, particularly as it affects services.

This report is not intended as an intensive study but rather it identifies the issues for the area and also any need for further investigation.

2 Study Area

2.1 Scope

The study area is approximately 96 hectares in size. It is a long rectangular shape that is approximately 3.2 km long and 0.3 km wide. It is bounded generally by Coulson Road to the east, Main South Road (State Highway 6) to the west, Jamieson Road to the north, and Saltwater Creek road to the south (see Appendix A).

To the east of the Coulson Road is a large area of rural residential land that is approximately 0.8km wide and travels the length of the study area. While this does not form a core part of the study area, it has been considered as part of this plan given its potential for further development.

From the southern end of the study site the South Island Main Trunk Line (SIMTL) travels in a northerly direction adjacent and to the east of State Highway 6 until it crosses over to the west north of Jacks Road.

2.2 Description

The Coulson Road area is a mix of rural/residential developments on an approximately 1 km wide coastal margin lying between the Tasman Sea and a range of lows hills to the east, 2 km south of Greymouth. The area is bounded to the west by a railway line and State highway 6 (SH6). Vegetation is predominantly pasture, or domestic landscaping, with some areas of second generation native growth and wetlands. A large proportion of the hill area to the east of the study area is currently planted with exotic forests.

The hill slopes to the east appear to be a fine silt stone, from recent road cuts, while the coastal margin is likely to be predominantly silty sand. Mining operations in the past may have significantly altered the composition of the terrace area.

The study area is predominantly residential and rural residential in nature, with a small amount of industrial use. The residential use is concentrated in three pockets within the site. There are two large residential areas in the centre and the south of the site and a small area at the north of the site. The remainder of the site, apart from a small industrial area to the north adjacent to the rail line, is rural residential and is not used intensively.

The land in the vicinity of Tasman View Road is on a terrace, elevated above the study area, and has recently been developed into a rural residential subdivision.

A recent application by Paroa Estates sought to subdivide land in the centre of the subject site for residential use. The proposal includes 53 residential lots on residentially zoned land, adjacent to the existing residential area.

3 Zoning

The subject site is shown on the Grey District Planning Maps 36-38. The land is predominantly zoned for Residential and Rural Residential purposes.

The Residential zoning is at the north, centre and south of the site. The Rural Residential zoning occurs in two areas, in between the Residential zoning. In addition, there is a small pocket of Industrial zoned land at the north of the site, between the SIMTL and State Highway 6.

The majority of land to the east of Coulson Road is zoned for Rural Residential purposes, with the exception being two small pockets of Residential zoned land at the southern end of the study area (see Appendix B).

Any future rezoning (which will be necessary given that a large proportion of the area is currently zoned rural-residential) needs to address servicing issues.

4 Growth

For the purposes of this study the following assumptions have been made regarding projected development densities in the area. It is anticipated that the development density for residential allotments will be ten allotments per hectare and rural residential allotments will be two allotments per hectare.

4.1 Servicing of Development

The central servicing aspects associated with Coulson Road are:

- Roading
- Stormwater
- Sewerage
- Water
- Reserves
- Schools

These aspects will be considered in detail below. The existing sewerage, stormwater and water reticulation is shown in Appendix A.

5 Roading

5.1 Existing Road Network

The existing road network is shown in Figure 1. The key routes in the development area are:

- Coulson Road which is currently formed between Clough Road and Dowling Road in the south and between Tasman View Drive and Hewlett Road in the north;
- Dowling Road which connects with Gilbert Road which links to Rutherglen Road;
- Rutherglen Road which runs between the State Highway and Shantytown;
- Clough Road which connects Coulson Road to the State Highway; and
- Jamieson Road which connects the northern section of Coulson Road to the State Highway.

There are currently two unformed sections of Coulson Road between:

- Tasman View Drive and Clough Road, and
- Dowling Road and Rutherglen Road.

It is expected that these two sections of Coulson Road will be formed as further subdivision occurs. It is expected that the link between Tasman View Drive and Clough Road will be formed as further subdivision occurs to the north of Clough Road and that the link between Dowling and Rutherglen Road will be formed as the traffic volumes along the narrow Gilbert Road become greater. Figure 1 shows these two new links.

5.2 Development Blocks

Figure 2 shows the four development blocks that have been considered. These are:

- **Block 1:** The undeveloped land likely to be developed as residential allotments to the west of Coulson Road between Clough Road and Dowling Road;
- **Block 2:** The undeveloped land currently cleared of bush to the east of Coulson Road either side of Kamahi Place that is likely to be developed as rural-residential allotments;
- **Block 3:** The undeveloped land to the west of unformed section of Coulson Road, north of Clough Road, that is likely to be developed as residential allotments; and
- **Block 4:** The undeveloped land cleared of vegetation to the east of Coulson Road, to the north of Block 2, that is likely to be developed as rural-residential allotments.

The following development densities in Table 1 have been assumed for each block. Development west of Coulson Road is assumed to be residential and to the east, rural-residential.

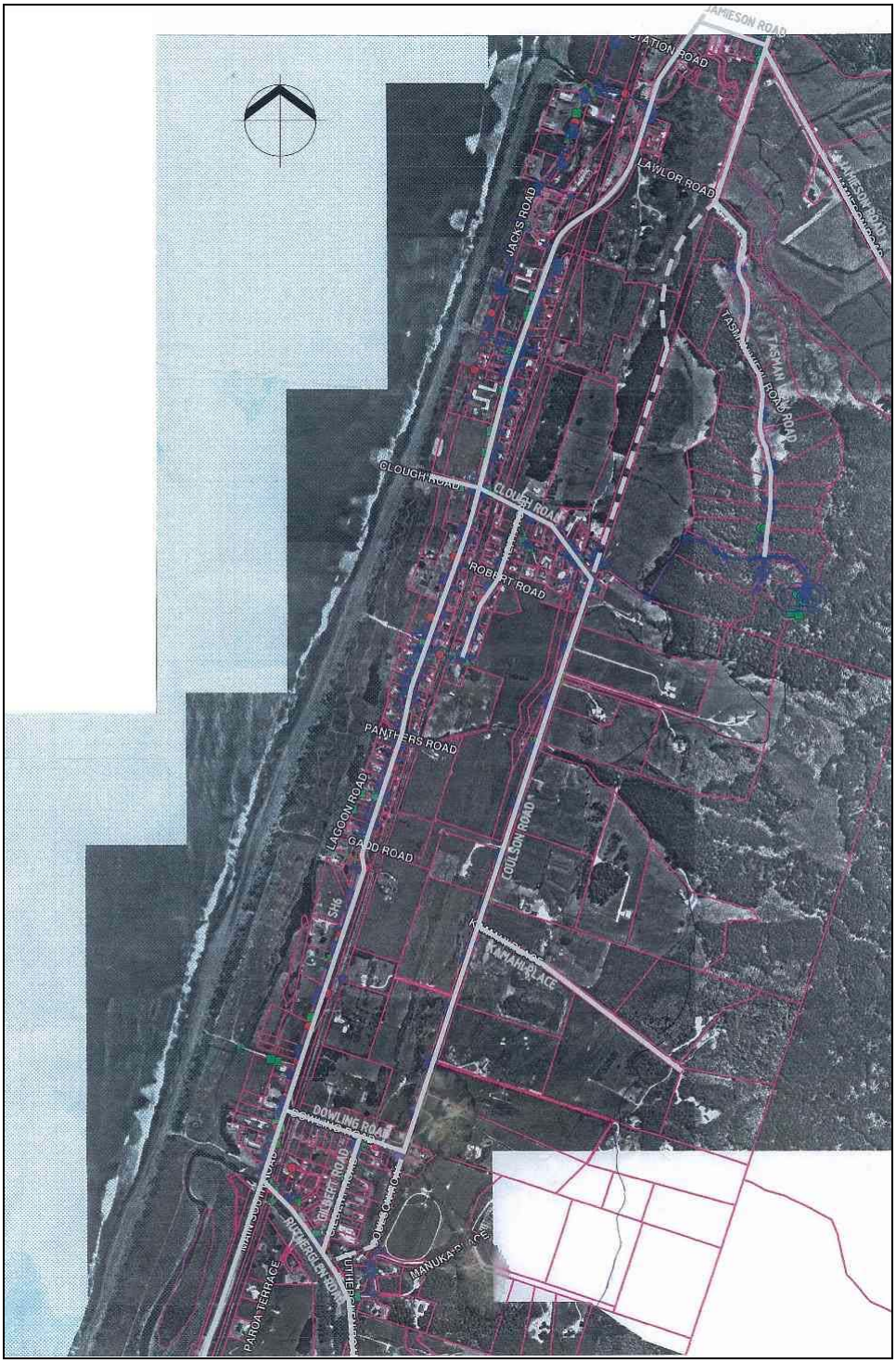

Figure 1 – Existing Road Network with Future Coulson Road Links

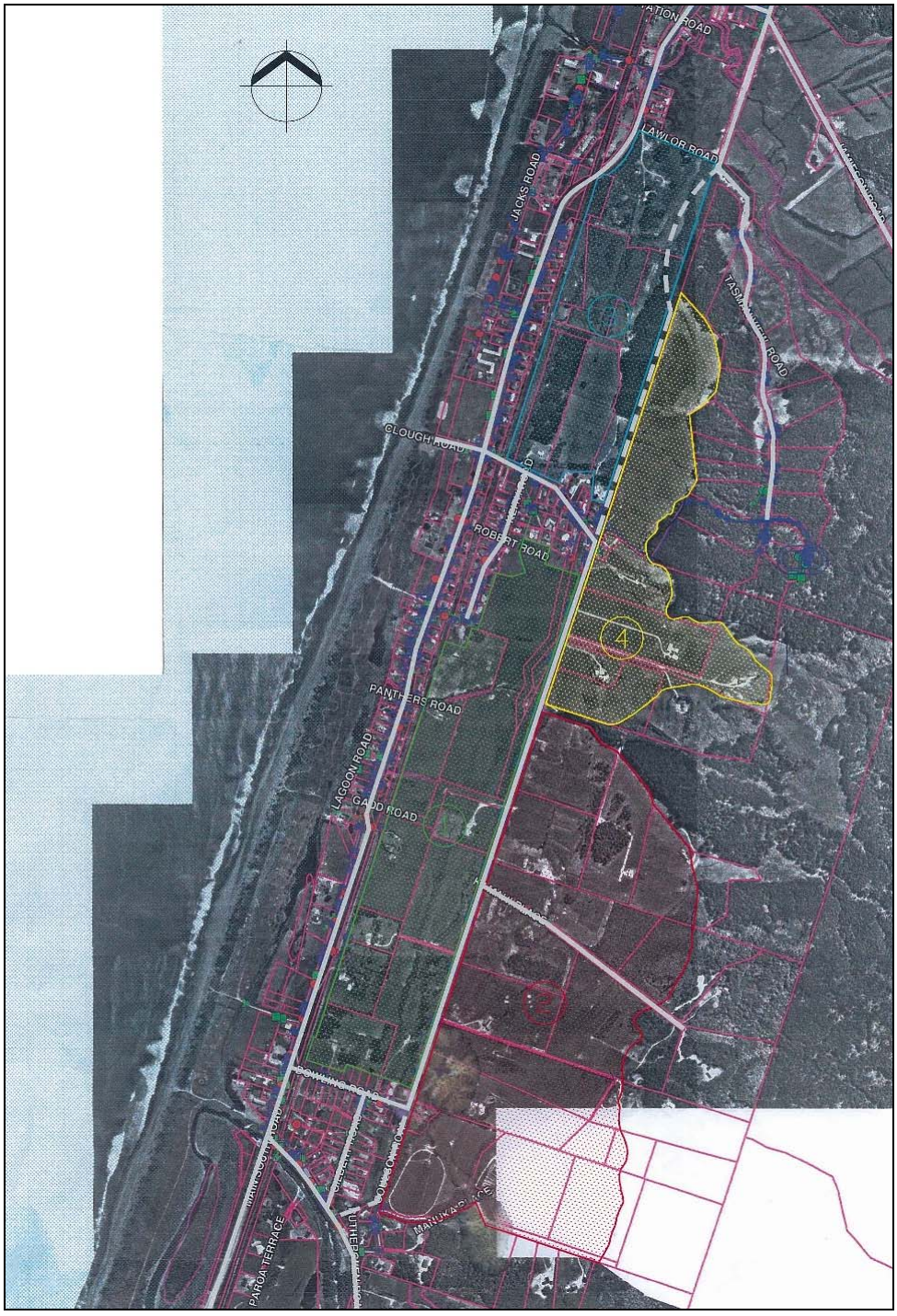

Figure 2 – Development Blocks

Table 1 - Development Densities

	Allotments per hectare
Block 1	10
Block 2	2
Block 3	10
Block 4	2

5.3 Development Staging Scenarios

Three development scenarios have been used. These are:

- **Scenario 1:** Full development of block 1;
- **Scenario 2:** Full development of blocks 1 and 3 and formation of Coulson Road north to Tasman View Drive and south to Rutherglen Road; and
- **Scenario 3:** Full development of all four blocks.

5.4 Trip Generation

It is common for residential development of this type to have a trip generation of 8-10 trips per dwelling per day. A trip generation estimate of 8.5 dwellings per trip was calculated for the existing households in this area for the Paroa Estate development (refer to the Traffic Engineering assessment prepared by Urbis Traffic Planning and Development, Feb 2004) which is situated in development Block 1. This was calculated using traffic counts on Clough Road and the number of existing households. This estimate seems reasonable for this location and has been used in the assessment of development of both residential and rural-residential properties. Table 2 shows the daily trip generation of the proposed development in each block.

Table 2 – Additional Trip Generation

	New Households	Daily Trip Generation (trips/day)
Block 1	316	2700
Block 2	113	970
Block 3	210	1800
Block 4	41	350

Figure 3 shows the two-way flow profile at the Clough Road railway underpass from the Council's July 2004 traffic count. This figure shows a typical urban flow profile where the evening peak (4-6 pm) is the busiest period of the day, and significant morning and midday peaks. In calculating peak period volumes generated by the development, the percentage of the daily flow in the average weekday peak hour was used. This percentage was calculated to be 10.6%.

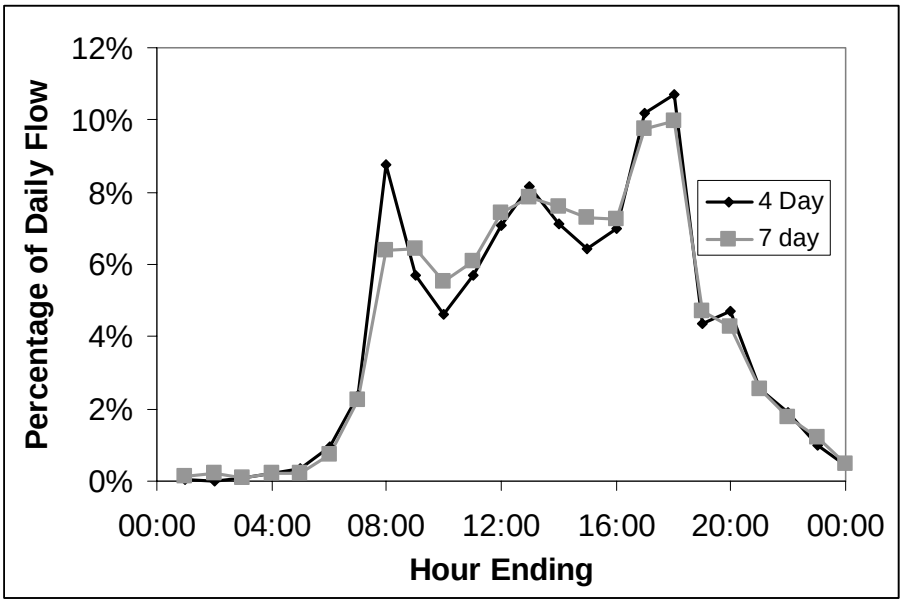

Figure 3 - Clough Road Flow Profile (July 2004)

This assessment does not consider an increase in trip generation per household over time. Given the high car ownership levels in New Zealand and increasing fuel costs, there is uncertainty in whether the trip rate per household will grow. However, a conservative approach would be to assume 2% trip generation growth per year in addition to the volumes calculated in this report. This traffic volume could be used for future modelling of intersections.

5.5 Trip Distribution

It is expected that the majority of trips to and from this development would be to and from Greymouth in the north. Using turning movement counts at the intersections of a.) Clough Road and State Highway 6 and Gilbert and b.) Rutherglen Roads an estimate of the trip distribution was made for the Paroa Estate development (refer to the Traffic Engineering assessment prepared by Urbis Traffic Planning and Development). This traffic count analysis indicates that 76% of trips are to or from Greymouth, with the remainder to or from the south. The split seems reasonable and has been used for this analysis.

5.5.1 Scenario 1 – Block 1

Vehicles travelling to or from this development block currently have two options to access the State Highway, which is the primary route out of the area. They can access from Clough Road or Rutherglen Road. In this scenario it was assumed that all traffic travelling north would access the State Highway using Clough Road and the traffic travelling south would use Rutherglen. By adding the traffic volumes generated by full development of this block to existing traffic volumes it is possible to estimate the future two-way daily traffic volumes on Gilbert and Clough Roads. Peak hourly volumes can also be estimated assuming that the peak hour is 10.6% of the daily volume. Both volumes are shown in Table 3.

Table 3

Scenario 1 Traffic Volumes

	Existing Daily Volume (vpd)	Future Daily Volume (vpd)	Future Peak Volume (vph)
Clough Road (at railway bridge)	680	2,740	290
Gilbert Road (at Coulson Road Intersection)	220 (est.)	870	90

5.5.2 Scenario 2 – Blocks 1 and 3

In this scenario the formation of Coulson Road between Tasman View Drive and Clough Road, and Dowling Road and Rutherglen Road are assumed to be constructed.

It is expected that the new link will change residents travel behaviour so that the majority of residents in Block 1 and 3 will travel to and from Greymouth along the new section of Coulson Road to Jamieson Street and proceed to the Jamison/SH6 intersection. As traffic volumes increase it may be necessary to upgrade this intersection to a roundabout. If a roundabout is not installed then it is likely more traffic from Block 1 will use the current Clough Road/SH6 intersection, which is not desirable given the higher speed environment in which it is located. It will be necessary for the Council to discuss this matter with Transit.

To take the new links into account some further assumptions were made:

- Those heading south from Block 1 would all exit the area via Rutherglen Road;
- 20% of those heading north from Block 1 would exit via Clough Road, the remainder would exit via Jamieson Road;
- Those heading north from Block 3 would all exit via Jamieson Road; and
- 80% of those heading south from Block 3 would exit via Clough, the remainder would exit via Rutherglen Road.

Peak hour and daily volumes are shown in Table 4 for Clough Road and Coulson Road at the intersections with Rutherglen Road and Tasman View Drive.

Table 4

Scenario 2 Traffic Volumes

	Existing Daily Volume (vpd)	Future Daily Volume (vpd)	Future Peak Volume (vph)
Clough Road (at railway bridge)	680	900	90
Coulson Rd (north of Rutherglen Road Intersection)	N/A	960	100
Coulson Road (south of Tasman View Intersection	N/A	3,560	370

5.5.3 Scenario 3 – All Blocks

In this scenario, all blocks are fully developed and all sections of Coulson Road are formed. The assumptions made for Blocks 1 and 3 in Scenario 2 apply for Blocks 2 and 4 respectively. Table 5 shows the peak hour and daily volumes along Clough Road at the railway bridge and Coulson Road at the intersections with Rutherglen Road and Tasman View Drive.

Table 5

Scenario 3 Traffic Volumes

	Existing Daily Volume (vpd)	Future Daily Volume (vpd)	Future Peak Volume (vph)
Clough Road (at railway bridge)	680	1,110	120
Coulson Rd (north of Rutherglen Road Intersection)	N/A	1,210	130
Coulson Road (south of Tasman View Intersection	N/A	4,420	460

5.6 Future Road Network

5.6.1 Road Network

A potential future road network is shown in Figure 4. This network was developed using the following general principles:

- Local streets should typically be linked to a main route, such as Coulson Road in at least two locations, giving emergency vehicles two access options;
- The road network in Blocks 3 and 4 should allow for development densities to increase in the future if necessary; and
- Long cul-de-sacs should be avoided.

Shorter cul-de-sacs and loop roads will be required in addition to the network shown. The pedestrian network should also be designed with a higher level of connectivity than the roading network. An example would be in the proposed Paroa Estate Development between the proposed Ashley Drive and the existing Robert Road, where provision of a road link would encourage 'rat running' of motor vehicles to Clough Road but where a pedestrian link may reduce walking times.

It is recommended that when Coulson Road is linked through to Fern Valley and Rutherglen Road. Traffic calming techniques should be applied to Dowling and Gilbert Roads to prevent these streets being used as a through route to the south, as is the current situation. The narrow width of Gilbert Road makes it unsuitable for carrying significant traffic volumes.

Visibility at the southern end of Fern Valley Road is restricted to the southeast by a curve in the road. It is recommended that a safety assessment be undertaken at this intersection by a suitably qualified safety auditor. Options to improve the visibility might include improving sight lines or reducing the speed environment /limit on Rutherglen Road.

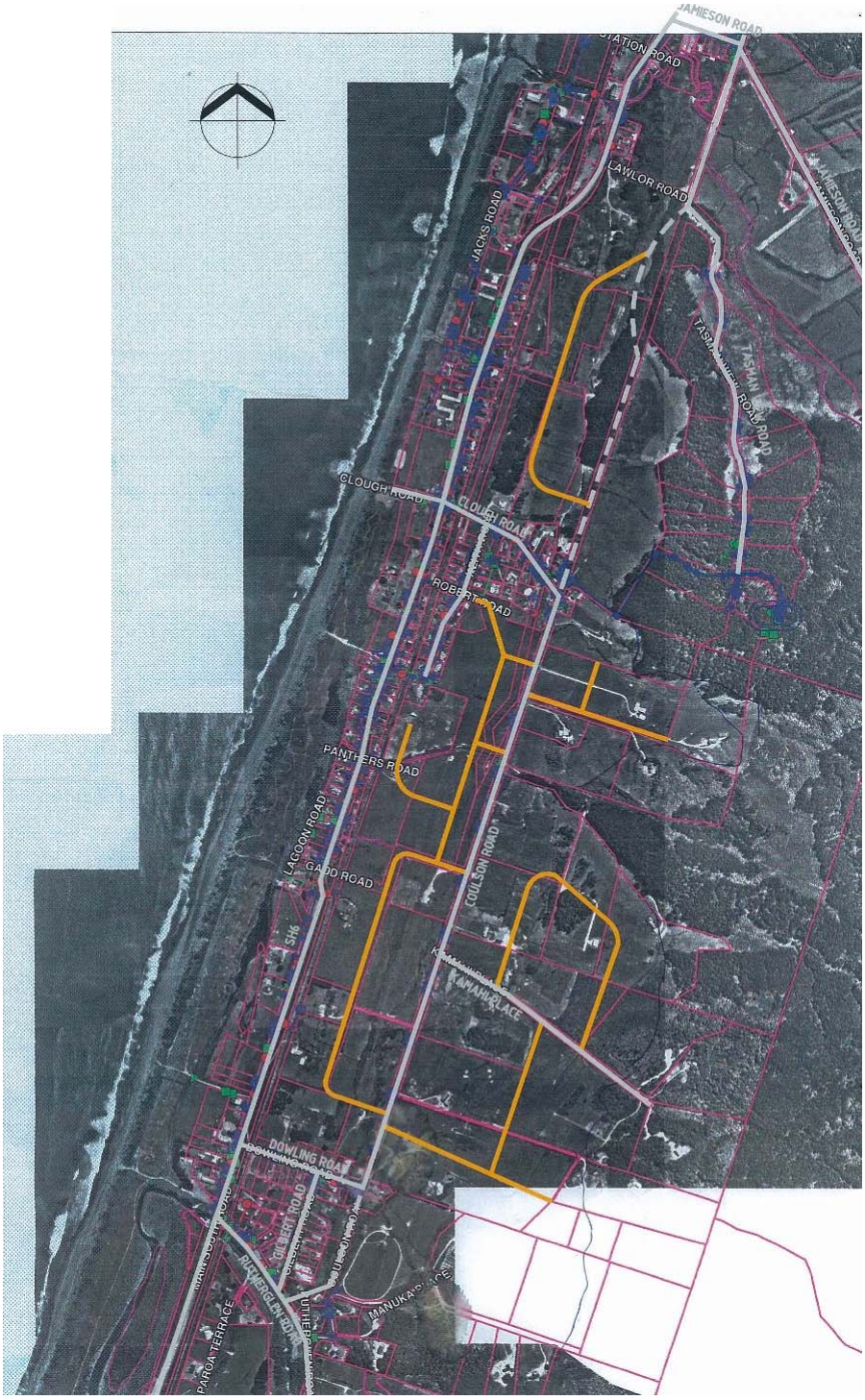

Figure 4 – Potential Road Network

5.6.2 Railway Bridges

Due to the development of these areas the current single lane Clough Road underpass will almost certainly require an additional lane to allow for two-way traffic and installation of a pedestrian footpath (Figure 5). Council is currently discussing this matter with the New Zealand Rail Corporation.

The underpass is a three-span timber bridge with timber pole piers and open abutments with sloping embankments with a small retaining wall on one side. The existing road is located under the centre span of the bridge. There is currently no footpath. In order to provide an additional lane through one of the end spans, one of the embankments would need to be levelled and a retaining wall constructed adjacent to the abutment. Abutment wing walls would also need to be constructed to suit the ground contours. The footpath would be located under the other end span of the bridge. A small retaining wall is likely to be required to retain the soil next to the footpath.

Changing the structural configuration of the bridge requires a detailed structural assessment to be carried out to determine that the existing bridge is not adversely affected by the proposed modifications. A most important factor in this assessment is a geotechnical slope stability analysis. Consequently, a geotechnical soil investigation is required.

Figure 5 – Location of Additional Lane and Pedestrian Footpath

The required timing for an extra lane under the railway overbridge will depend on the level of queuing from the Clough Road/SH6 intersection in peak periods, which is dependent on traffic growth and growth in residential properties.

Given the uncertainty in the times of growth it is recommended that Council proceed with:

- The structural and geotechnical investigations of adding a separate lane (following discussions with OnTrack); and
- Modelling of the Clough Street/SH6 intersection.

5.7 Recommendations

The rate of growth of residential development within the four developments blocks surrounding Coulson Road is uncertain, and needs to be monitored over time. In this report we have assumed a number of development scenarios. It will be necessary over time to review the type and rate of development in each block and generate new traffic volume predictions. However, based on the outcomes of this report it is recommended that Grey District:

1. Undertake a safety audit of the Rutherglen/Fern Valley intersection and develop improvement options as visibility is restricted.
2. Designate the land required for the Coulson Road extensions and/or show the proposed road extensions in the Grey District Plan.
3. Approach Transit NZ and suggest that they or their consultants model the following intersections for all three scenarios and if necessary plan for future intersection upgrades.
   - SH6/Rutherglen
   - SH6/Clough Road
   - SH6/Jamieson Road
4. Depending on the analysis result of recommendation (1), discuss whether a roundabout may be required at the SH6/Jamieson Road intersection in the future, and if necessary, ensure sufficient land is designated for such an upgrade.
5. Undertake a more detailed assessment of modifying the Clough Road railway overbridge so that an additional lane and pedestrian footpath can be added as traffic volumes increase.

5.8 Resources

Urbis Traffic Planning and Development (Feb 2004) Traffic Effects Assessment of the Paroa Estates Limited Development.

6 Stormwater

6.1 Existing Stormwater Regime

The existing stormwater regime is a mix of constructed and natural systems. See Appendix A for existing stormwater sources.

The Coulson Road study area can be divided into five catchments and systems, as described below, and shown in Appendix C.

- To the north of the study area, the land forms part of the Mill Creek Catchment. This catchment has not been investigated as part of this study.
- The Northern Catchment is a mixed residential/rural area that falls to the drain adjacent to Keith Road. This drain passes beneath the railway and SH6 through a 750 mm diameter culvert into a formed drain, which then discharges to sea.

- The Central Catchment is also a rural/residential area. This area is drained by a second system that passes through the Paroa Estates development currently being constructed. The system is comprised of several deep drains that pass beneath the railway and SH6 via two sets of twin 750 mm diameter and 900 mm diameter culverts respectively, with a short, steep section of open channel in between the two sets of culverts. West of SH6 this system discharges to sea via a section of open channel.
- The Southern Catchment has no obvious discharge point. It may connect to the Saltwater Creek Catchment, although it is possible a significant portion of the storm flows collected in this area are detained within the catchment in wetland areas and discharged over time.
- To the south of the study area the land forms part of the Saltwater Creek Catchment. This catchment has not been investigated as part of this study.

The systems described above are all fed by a mix of kerb and channel, pipes, domestic collection systems and open drains of varying ages, sizes and conditions. The number of wetland areas within the study area also indicates a significant portion of the areas stormwater is either detained or discharged to ground during rainfall events.

Preliminary catchment analyses indicate that the existing culverts passing beneath the railway line and SH6 are significantly under capacity. However, as flooding has not been a significant problem in this area to date based on anecdotal evidence provided by GDC, a significant proportion of the flow must be detained within the catchment and either discharge over time through the culverts or to ground.

6.2 Remedial Measures and Management Practices

Should further development in either the Coulson Road area or the hill area to the east be allowed to occur without considerable investment in improving stormwater infrastructure along with changes to zoning, the risk of significant flooding is high.

It is noted that in the consent submission made by Cowan & Holmes Ltd on behalf of Paroa Estates' developer, they acknowledged that the existing drainage system was inadequate. However, their argument that the Paroa Estates development would contribute only an additional 1.5% of the 100 year return period flow, and as there were no existing problems the development should be allowed to connect to the existing system, appears a little weak and allows no provision for the long-term situation. While it would be unfair to force the developer who 'breaks the camel's back' to bear the significant cost of having to upgrade any of the existing stormwater systems, or the existing residents as ratepayers to pay the full cost, this is the likely situation if development is allowed to continue in the current fashion, with no improvements to the stormwater network.

To achieve acceptable environmental outcomes from stormwater management as development occurs, there are a range of options that could be considered by GDC, such as increasing the number or size of the existing culverts, constructing stormwater detention areas, creating new drainage corridors, formalising and protecting the wetlands in the area, protecting existing watercourses and gullies from development and restricting development to ridge areas.

6.3 Recommendation

Given the issues associated with stormwater in the area it is considered that, prior to any further significant development occurring in the area, a full stormwater structure plan be prepared for the Coulson Road area.

7 Water Supply

7.1 Water Reticulation

The water reticulation system has been designed to accommodate the additional residential areas.

7.2 Water Reservoirs

The capacity of the water supply reservoirs will need to be further assessed. It is likely that additional reservoirs will be necessary as the infill development occurs, in the Coulson Road block and that it is likely these will be located in the hills to the east to provide the necessary pressure.

8 Sewerage

8.1 Sewerage Reticulation and Treatment

It is considered that the reticulation in this area has sufficient capacity to accommodate the additional residential area. The capacity of the sewerage treatment plant will need to be further assessed. It is anticipated that upgrades will need to be staged as development proceeds. There is sufficient designated land at South Beach for further upgrades.

It is not anticipated that significant sewerage reticulation will be required as the area is gravity fed. In most instances, new internal subdivisions between Coulson Road and the highway should be able to connect into the new systems.

9 Reserves

Public reserves are a necessary component of any developed area, and serve a number of general functions.

The area has a small local reserve on the corner of Clough Road and Keith Road. The reserve contains some play equipment. Generally Grey District Council takes money in leau of reserves given accessibility to outdoors.

Given the development of a relatively linear area of land and the requirements of local needs, it is recommended consideration be given to implementing one or more local reserves that are within walking distance (say 400-600m) of all residents.

9.1 Recommendation

Consideration be given to establishing one or more local reserves within the study area. Given the existing reserve at the corner of Clough/Keith Streets this indicates the need for two reserves 400-600 to the north and south of the existing reserve, in the vicinity of Gadd and Lawlor Roads respectively.

10 Schools

Paroa School, which is situated on Main South Road (SH6), is the primary school that serves this catchment. It has students travelling from as far south as Awatuna.

This school has a large site relative to the number of children in attendance. In response to recent development in the area, the school has added a number of classrooms. The school is of the view that it has sufficient on-site capacity to double the number of children that attend the school, from 250 to 500 students.

10.1 Recommendation

Development is monitored to ensure that the Paroa School has adequate capacity as appears to be the case at present.

11 Telecommunication and Power

Telecom New Zealand (Telecom) have no specific plans for the Coulson Road area other than the normal 'business as usual' issues of meeting growth and providing any maintenance and network repair that is required.

The Coulson Road area is presently serviced by the Paroa exchange. This exchange is fibre fed and already has DSL. A fibre cable also traverses the area, on route from Greymouth to Hokitika.

It is considered that there is adequate capacity to meet the anticipated future demand. The existing nodes can all be easily upgraded and Telecom would cable and meet demand though their normal processes as subdivisions are undertaken. Telecom have indicated that development a significant distance from the route of the fibre cable can potentially be a problem, however given the narrow form of the Coulson Road area, this is not anticipated to be an issue.

12 Summary

The Coulson Road area is undergoing significant development at present. Council envisages that this area will continue to be developed. The area is a mix of residential and rural-residential zoned land.

It is considered that prior to further significant development occurring in the area that:

- Modelling for key intersections, including widening at the Clough Road rail overbridge, be undertaken.
- Proposed extensions to roads should be designated/shown.
- Further investigation of stormwater disposal be undertaken.
- That sewerage and water reticulation upgrades are staged in accordance with development, including identification of reservoir sites.
- Servicing issues need to be resolved at the time of Plan Changes.
- That consideration be given to the provision of one or two local reserves.

▪ Appendix A

Study Area and Service Location

▪ Appendix B

District Planning Maps

Appendix C

Stormwater Catchment Areas