NSW Quarry Services

Church Hill Quarry

Existing Road Safety Audit

August 2014

Table of contents

1. Introduction 1
   1.1 Purpose of this report 1
   1.2 Background 1
   1.3 Study area location 1
2. Objectives process evaluation criteria 2
   2.1 Objectives of the Road Safety Audit 2
   2.2 Process of the Road Safety Audit 2
   2.3 Criteria used to assess the levels of risk 2
   2.4 Road safety categories 3
3. Administration & supporting material 5
   3.1 Road Safety Audit team 5
   3.2 Site inspection and audit 5
   3.3 References & documentation audited 5
   3.4 Limitations of this audit 6
4. Findings 7
   4.1 Intersection Pavement 7
   4.2 Sight distance 7
   4.3 Delineation 8
   4.4 Signage 9
5. Audit Statement 10

Table index

Table 1 Summary of frequency descriptions 2
Table 2 Summary of severity description 2
Table 3 Summary of levels of risk 3
Table 4 Priority to levels of risk 3
Table 5 Road Safety Audit Categories 4

Figure index

Figure 1 Study area 1

1. Introduction

1.1 Purpose of this report

This report has been prepared to document the safety issues identified as part of a Road Safety Audit (Austroads 2009) of the Church Hill Quarry project in Kempsey, NSW.

1.2 Background

GHD was commissioned by NSW Quarry Services to undertake a traffic assessment for a Development Application (DA) for the expansion of the Church Hill Quarry.

1.3 Study area location

The study area is located at the intersection of Crescent Head Road and Church Hill Quarry Access Road in Kempsey, NSW. The intersection is located approximately 300 m east of the bridge over the Pacific Highway (Kempsey Bypass). The sites and features are shown in Figure 1 below.

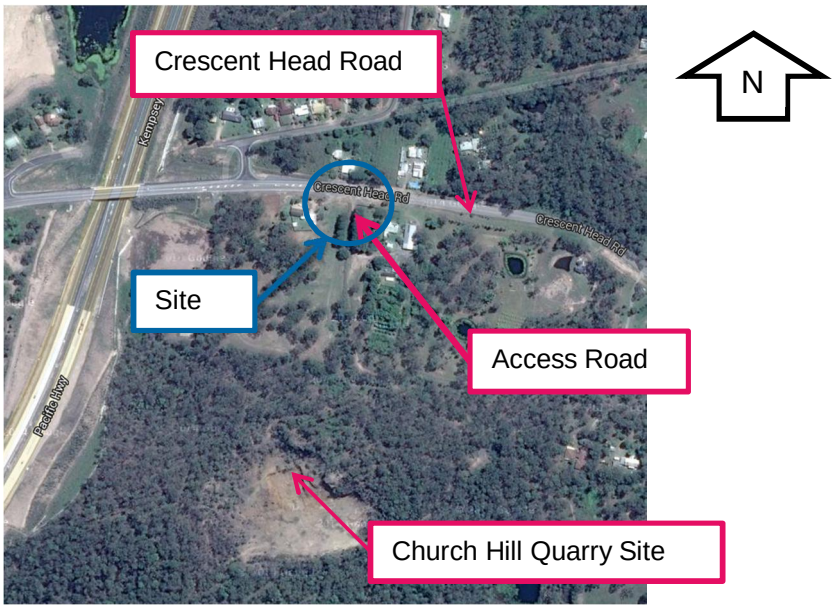

Figure 1 Study area

2. Objectives process evaluation criteria

2.1 Objectives of the Road Safety Audit

A road safety audit (RSA) is "a formal examination of a future road or traffic project or an existing road, in which an independent, qualified team reports on the project's crash potential and safety performance" (Austroads 2009).

2.2 Process of the Road Safety Audit

The road safety audit followed a standard practice in identifying safety related issues. It involved a site visit during both daylight and night conditions in addition to a desktop assessment of available background information. If any previous RSA reports exist they are reviewed for close out of findings which have been considered as part of this audit. Standard issues such as sight distance, speed zones, lighting, safety barriers, approach road alignment, delineation, line marking and signage, intersection layout and conditions (amongst others) were assessed with respect to safety. The audit is structured around a standard checklist provided in the Austroads "Guide to Road Safety: Part 6 – Road Safety Audits" and RMS's Guidelines for Road Safety Audit Practices, July 2011".

2.3 Criteria used to assess the levels of risk

Risk levels have been assigned for each deficiency identified along the route by the audit team and are based on the criteria set out in the Austroads guide. These risk levels have been determined based on the deficiency's frequency and severity. Definitions of the different levels of frequency and severity have been reproduced in Table 1 and Table 2 below from Austroads Guide to Road Safety, Part 6: Road Safety Audit, 2009.

Table 1 Summary of frequency descriptions

Frequency	Description
Frequent	Once or more per week
Probable	Once or more per year (but less than once a week)
Occasional	Once every five or ten years
Improbable	Less often than once every ten years

Table 2 Summary of severity description

Severity	Description
Catastrophic	Likely multiple deaths
Serious	Likely death or serious injury
Minor	Likely minor injury
Limited	Likely trivial injury or property damage only

Austroads Guide to Road Safety, Part 6: Road Safety Audit, 2009, provides definitions for four different levels of risk, namely, "intolerable", "high", "medium" or "low". Extracts of the risk assessment matrix from Austroads are provided below in Table 3.

Table 3 Summary of levels of risk

		Frequency			
Severity		Frequent	Probable	Occasional	Improbable
	Catastrophic	Intolerable	Intolerable	Intolerable	High
	Serious	Intolerable	Intolerable	High	Medium
	Minor	Intolerable	High	Medium	Low
	Limited	High	Medium	Low	Low

It is noted that as a consequence of the Austroads guide not adopting a more objective risk ratings process, the risk rating reported in all Road Safety Audits are subjective. As a result, the audit findings can be skewed towards reporting risks as “high” and “intolerable”.

Care should be taken by the appropriate decision maker when using these results to justify an outcome.

Of the four possible risk ratings levels (i.e. Intolerable, high, medium or low) a description of their priority are defined below in Table 4.

Table 4 Priority to levels of risk

Level of Risk	Description of Priority to Risk Rating
Intolerable:	A significant road safety risk requiring immediate urgent attention.
High:	A high road safety risk requiring immediate or urgent attention.
Medium:	A road safety risk that may lead to crashes and that requires attention as soon as reasonably practicable.
Low:	A lower road safety risk that requires attention. Remedial action may be carried out on a non-urgent basis, such as in conjunction with routine road maintenance or other planned work.

2.4 Road safety categories

Road safety audit categories are utilised to assist the management of corrective actions and the monitoring of road safety deficiency trends. A list of the available categories is scheduled in Table 5 below which have been derived from the Roads and Maritime Services (RMS) road safety categories information sheet.

Table 5 Road Safety Audit Categories

Category	Examples
Access Impact	Property developments, traffic generators, rest areas, emergency vehicles, service vehicles, maintenance, vehicles breakdowns, etc.
Auxiliary Lanes	Overtaking lanes, passing lanes, tapers, merges, etc.
Bridge Structures	Road bridge, pedestrian bridge, rail bridges etc.
Bus Infrastructure	Bus lanes, bus facilities, bus stops etc.
Cycle Infrastructure	Cycleways, on-road facilities, off-road facilities, cycle routes etc.
Delineation	Guide posts, pavement markings, reflectors, warning signs etc.
Heavy Vehicle Infrastructure	Inspection bays, facilities, provisions, routes etc.
Intersection	Roundabouts, T-junctions, cross junctions etc.
Landscaping	Shrubs, trees etc.
Lighting	Street lighting, tunnel lighting etc.
Miscellaneous	Matters not covered by categories listed.
Network Effects	Road function, traffic composition, traffic volume, traffic characteristics, route choice, impact of continuity with the existing network etc.
Special Road User Infrastructure	Trains, ferries, trams, equestrian, stock, special events etc.
Pedestrian Infrastructure	Pathways, pedestrian crossings, pedestrian fencing etc.
Road Alignment and Cross Section	Sight distance, visibility, readability by drivers, glare, widths, shoulders, crossfalls, batter slopes, drains etc.
Road Pavement	Pavement defects, skid resistance, ponding, loose stones material etc.
Roadside Activities	Roadside advertising, road side designs, vending etc.
Roadside hazards	Clearzones, utility poles, culverts, bridge structures, trees etc.
Speed Zones	Speed limits, speed zones, design peed, school zones etc
Traffic Management and Operation	Staging of works, temporary traffic control, detours, peak tidal flows, clearways, parking etc.
Traffic Management Devices	Threshold treatments, road humps, kerb extensions, slow points etc.
Traffic Signals	Signal phasing, bus signals, bicycle signals pedestrian signals etc.
Traffic Signs	Regulatory signs, warning signs, guide sighs etc.
Tunnel Structures	Road tunnels, pedestrian tunnels, cycle tunnels etc.

3. Administration & supporting material

3.1 Road Safety Audit team

The road safety audit team comprised of the following accredited auditors with the NSW Centre for Road Safety's Register of Road Safety Auditors:

Audit team leader

Michael Potts	GHD Pty Ltd, Parramatta.
Auditor ID:	RSA-02-0367
Level of Certification:	3
Certification Expiry Date:	31st October 2014

Audit team member(s)

Shahid Rehman	GHD Pty Ltd, Parramatta.
Auditor ID:	RSA-02- 0676
Level of Certification:	2
Certification Expiry Date:	12th January 2015

3.2 Site inspection and audit

3.2.1 Time and date

The day-time site visit and audit was undertaken on Thursday 26 June 2014 from 15:30 hours to 17:00 hours.

The night-time site visit and audit was undertaken on Thursday 26 June 2014 from 18:00 hours to 18:30 hours.

3.2.2 Weather conditions

The weather condition during the day and night time audit was fine. The road surface during the time of the audit was dry.

3.2.3 Commencement meeting

A project commencement meeting was undertaken between Ben Luffman (GHD) and Michael Potts (GHD) by phone prior to the site visit. The purpose of this was to be inducted into the project, discuss the project scope, status, limitations, safety and any other relevant project information.

The background information for the project was obtained from Ben Luffman of GHD through email on Wednesday 11 June 2014.

3.3 References & documentation audited

- RTA Guidelines for Road Safety Audit Practices, July 2011
- Austroads "Guide to Road Safety, Part 6: Road Safety Audit", 2009
- NSW Bicycle Guidelines Version 1.2, July 2005
- RTA "Road Design Guide", 2002

- Standards Australia “AS 1742 Series 2003: Manual of uniform traffic control devices”, 2003
- NSW Streets Opening Conference Guide 2009

3.4 Limitations of this audit

The following limitations are associated with this audit and report:

- Limited to the background information and conditions witnessed on site at the time of the audit
- Limited to the areas intersection and approaches only.

4. Findings

4.1 Intersection Pavement

Issue

The intersection of Crescent Head Road and Church Hill Quarry Access Road is a basic T-intersection type. Areas of the intersections pavement appear worn and do not cover the full extent.

The pavement condition of the quarry access road is partially sealed and has visible signs of failure (pavement contains potholes). Vehicle track marks show that turning vehicle utilise the unseal shoulder to perform the turning manoeuvre to the quarry access road and the neighbouring properties driveway. There is a risk that the heavy vehicles movements access the quarry site will further damaged the worn sealed pavement and unsealed pavement. This could lead to vehicles losing control on the unsealed loose portions of pavement or negotiating pavement failures and potholes.

The northern shoulder has been widened at the intersection to allow a vehicle to pass another vehicle waiting to turn right into the quarry. The taper of the widened area back to the standard width appears to short and not far enough passed the intersection. There is a risk that a driver may lose control of their vehicle on the loose unsealed pavement in the shoulder when passing another vehicle at the intersection.

Road safety deficiency category

Intersection

Risk rating

Severity: Minor

Frequency: Occasional

Risk: Medium

Recommendations

The intersection could be improved by rehabilitating and sealing of the intersections pavement. This would include the creation of additional parallel pavement and shoulder tapers (1 in 50) on the north east and south east of the intersection. This will allow a vehicle to safely negotiate another vehicle at the intersection and access the quarry.

4.2 Sight distance

The intersection is located on a crest curve in the vertical alignment which limits sight distance along Crescent Head Road. Safe intersection sight distance is also limited to the quarry access by the previously mentioned vertical alignment and also vegetation in the south eastern verge. There is a risk that vehicles are not able to fully appreciate each other approaching the intersection causing side impact collisions.

Road safety deficiency category

Intersection

Risk rating

Severity: Serious

Frequency: Occasional

Risk: High

Recommendations

Treating the crest curve in the vertical alignment is not a practical solution and not economically feasible. However sight distance for the intersection can be improved by the removal of the tree in the south eastern verge which limits sight.

4.3 Delineation

The intersection of the Quarry Access Road and Crescent Head Road linemarking is very worn. Many of the raised reflective pavement markers (RRPM) are dislodged. Guide posts, particularly on the eastern side of the intersection, are not present and don't adequately define the roadway, intersection and driveways.

Without appropriate delineation there is a risk that the roadway isn't appreciated by the driver correctly. This is further exacerbated during night time conditions.

Road safety deficiency category

Delineation

Risk rating

Severity: Serious

Frequency: Occasional

Risk: High

Recommendations

It is recommended that linemarking be addressed including associated RRPMs. Linemarking to be address includes the BB centre line, eastern side of the intersection E1 edge lines, TB giveway line for the Quarry Access Road. Guidepost post should be installed to define the roadway, intersections and driveways.

4.4 Signage

The following signage deficiencies were witnessed for the intersection and its approaches:

- There was no signage for the T-intersection signage including giveway sign and unidirectional hazard marker (UHM);
- Church Hill Quarry access sign; and
- Warning signage which warns approaching drivers of the intersection ahead due to the limited sight distance.

Road safety deficiency category

Traffic Signs

Risk rating

Severity:	Serious
Frequency:	Occasional
Risk:	High

Recommendations

It is recommended that additional signage be installed including:

- Intersection warning signs on both approaches (W2-4);
- Trucks (crossing or entering) warning signs on both approaches (W5-22);
- Giveway sign in the south verge (R1-2);
- UHM sign in the northern verge opposite the intersection (D4-2-1); and
- Church Hill Quarry sign (custom).

5. Audit Statement

We certify that in carrying out this audit we have reviewed the available information and have endeavoured to identify features in order to improve safety, although it must be recognised that safety cannot be guaranteed since no road can be regarded as absolutely safe.

The problems identified have been noted in this report and readers are urged to seek further specific technical advice on matters raised and not rely solely on the report.

Signed Date August 2014

Audit Team Leader

Michael Potts, GHD Pty Ltd, Parramatta. Auditor ID: RSA-02-0367

Signed Date August 2014

Shahid Rehman, GHD Pty Ltd, Parramatta. Auditor ID: RSA-02- 0676

This road safety audit report ("Report"):

- *has been prepared by GHD Pty Ltd ("GHD") for NSW Quarry Services;*
- *may only be used and relied on by NSW Quarry Services;*
- *must not be copied to, used by, or relied on by any person other than NSW Quarry Services without the prior written consent of GHD;*
- *may only be used for the purpose of documenting the identified safety deficiencies for the project (and must not be used for any other purpose).*

GHD and its servants, employees and officers otherwise expressly disclaim responsibility to any person other than NSW Quarry Services arising from or in connection with this Report.

To the maximum extent permitted by law, all implied warranties and conditions in relation to the services provided by GHD and the Report are excluded unless they are expressly stated to apply in this Report.

The services undertaken by GHD in connection with preparing this Report: were limited to those specifically detailed in section 1 2 and 3.4 of this Report;

The opinions, conclusions and any recommendations in this Report are based on assumptions made by GHD when undertaking services and preparing the Report ("Assumptions").

GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with any of the Assumptions being incorrect.

Subject to the paragraphs in this section of the Report, the opinions, conclusions and any recommendations in this Report are based on conditions encountered and information reviewed at the time of preparation and may be relied on until 6 months, after which time, GHD expressly disclaims responsibility for any error in, or omission from, this Report arising from or in connection with those opinions, conclusions and any recommendations.

GHD

133 Castlereagh St Sydney NSW 2000
-
T: +61 2 9239 7100 F: +61 2 9239 7199 E: sydmail@ghd.com.au

© GHD 2014

This document is and shall remain the property of GHD. The document may only be used for the purpose for which it was commissioned and in accordance with the Terms of Engagement for the commission. Unauthorised use of this document in any form whatsoever is prohibited.

\\ghdnet\ghd\AU\Sydney\Projects\22\17040\WP\202755.docx

Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
A	M J Potts	S Rehman		B Luffman		15-08-14

www.ghd.com