

→ Grace Ryan Senior Transport Engineer, Ōtautahi



SH1 Tinwald Corridor Improvements (NZ Upgrade Programme)

Overview

- Project context
- SIDRA modelling
- KiwiRail
- Rail signalling
- Phasing
- Signal features
- Outcomes
- Lessons learnt



Context - Tinwald signals

Client: Waka Kotahi, delivering the Government's NZ Upgrade Programme (NZUP) with KiwiRail as Partner

KiwiRail 🚄

Location: Tinwald, south of Ashburton, South Canterbury **When**: Designed 2021-23 | Construction from July 2022 by Fulton Hogan

Context: Residential and commerical land use. Severance due to SH1, MSL tracks and a large drain. Constrained intersection footprint.

SH1 Tinwald Corridor

Improvements

Ungrade

Programm

Design input: Grace Ryan *(GHD, SSBC, Design manager)*, Andrew Metge *(GHD)*, Bill Sissons *(Client review, CIS author)*, Andy Scott *(Client review, equipment)*, KiwiRail signalling subcontractor *(JMDR in Aus)*, Albert Chan *(Waka Kotahi PM)*, Mike Blyleven *(Waka Kotahi SSBC PM)*, Fraser Scales *(KiwiRail PM)*.





Objectives

- Improve safety
- Improve transport choices including walking, cycling, scooters
- Make it easier for people to get to shops, local businesses, school and community facilities (more gaps in traffic with signals)
- Strengthen community connections between West Tinwald and East Tinwald across SH1 and the rail line





Scope

- Signalise SH1 / Lagmhor Road / Agnes Street
- Upgrade level crossing
- New pedestrian and cycling facilities





SH1 right turn arrows Combined pedestrian & cycle crossings Turning bays for peak queues and vehicle tracking More reliable access for side roads Monitoring with cameras & remote connection Linked to rail signals and train detection Queues to clear each signal cycle New durable road surfacing

Lagmhor Road

Pedestrian & cycle refuge Shared path connections Queue storage before rail tracks



SIDRA modelling

- Layout confirmed
- Filtering right turns on side roads permitted
- **Phasing** as single diamond overlap with combined side road phase, rail phases
- Assumed rerouting from side roads ~50%
- Growth including land development
- **Concerns** existing SH1 congestion would be made worse *(or be seen to)*
- Design horizon 10 year
- Stakeholder messaging



KiwiRail interface

- LCSIA to confirm equipment
- **Safety** (permits, grants, approvals)
- Offset limit line and how to 'flush' any queues out
- **Rail signalling** inputs (TRAIN, TRAIN-CANCEL), and minimum warning time from main line and a siding
- New rail assets signalling ducts & pits, new LOC box, new half arm barriers
- Deed of Grant process for the road signal ducts and access pits in rail land



Rail signaling



KiwiRail liaison

Rail design was well developed before tender

Regular communications and collaboration during design - KiwiRail part of the team



Developed KiwiRail methodology, scope split, pre-ordered rail equipment, confirmed requirements

New double-gate path crossing detail developed

'Block of line' for the level crossing upgrade booked early:

33 hours: 1000 Saturday 7 October to 1900 Sunday 8 October 2023



Phasing

Single diamond overlap with combined side roads Ducting TO NEW RAIL SIGNAL

to flush out on rail approach SIGNAL GROUPS PHASING AND APPROACH NUMBER Е F (PRE-RAIL) A1 (RAIL) (13)(11) Α D (3)(1) ____ (7)(5)(1)**P1** ~ (2)(4)0 11 8 13 HELD ON RE В (Z-) E1 G (12)(6)(8)(3)--[^] ALL RED PHASE (2)-(1)(1)-(Z+) E2 С (1) = APPROACH NUMBER * = RED ARROW PEDESTRIAN PROTECTION -(2 PHASE SEQUENCE 1: ABCDEFG • V/ 2 : ABCDEFG ∠___<u>P1_</u> <u>P1</u>



Signal features

• 2 x JUMA

- UPS (batteries, used the P43 checklist)
- ELV for 1 x JUSP (transformers)
- **2 x cabinets** to fit all the gear (new electrical and fibre connection)
- 2 x new CCTV cameras
- Combined ped cycle aspects as a trial site (thanks Chris Bealing/Steve De Jong)
- Rail LOC box connection (50mm comms)
- 3x 100mm ducts between chambers, 1 x 200mm under tracks
- **Pole retention sockets** (as per CTOC regional conditions)



Outcomes

- Reviews
- Stakeholder questions
- Monitor operation / behaviour, and adjust
- Major events and weekend congestion
- **Pavement** with SMA surfacing
- Wayfinding across rail and signals



- Benefits realisation measuring safety & mode shift
- Lessons learnt KiwiRail in the team, allow time for rail signaling (!), specialist inputs / reviews, design conventions to help the CIS set up, inclusion as a trial site, JUMA foundation service clashes, UPS checklist useful, ELV and CCTV easy to add

Opening





Questions



Thanks for support to present this project from GHD, Waka Kotahi, KiwiRail and Bill Sissons