Designing safer railway crossings for walking and cycling

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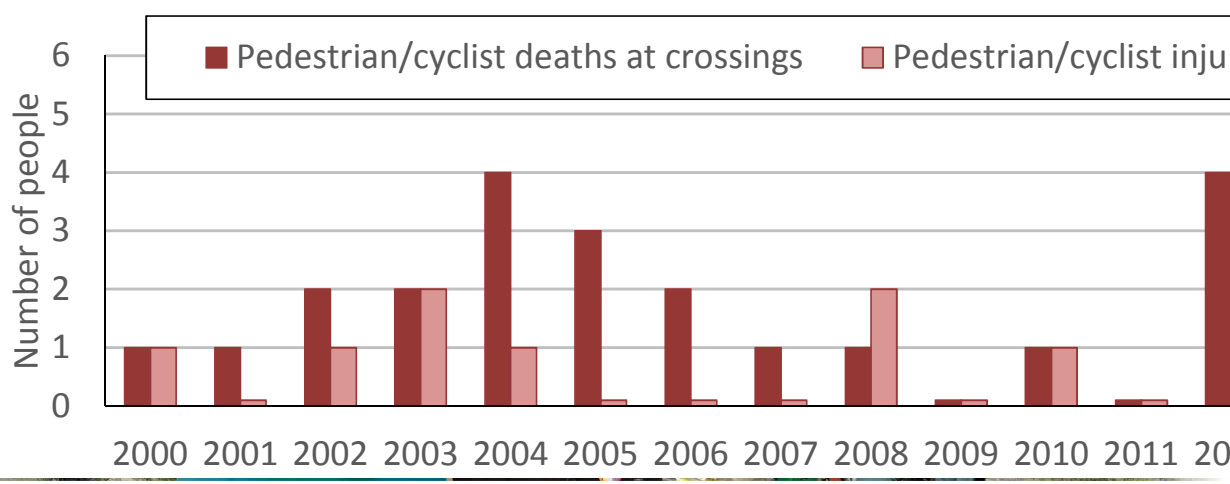
Cycleways at KiwiRail

- KiwiRail has 31 active cycleway applications in progress
  - Incl. 19 Urban Cycleway Programme projects
- Over the past year KiwiRail has developed and improved policy to manage cycleways and level crossings including:
  - Guide for Applicants (and associated flow chart)
  - Approach to cost recovery (project agreement or funding agreement)
  - Approach to calculating the Annual Fee
  - Level Crossing Safety Risk Assessment (for all crossings)
  - **Design Guidance for Pedestrian & Cycle Rail Crossings**

Why is this design guidance needed?

- Address current issues e.g.
  - Use of headphones and mobile devices = **distractions**
  - Gap between rails and crossing surface (**flange gap**) causes problems for people on wheels
  - Provides other options to **mazes** (an accepted treatment but not clear they do as intended)
- Pedestrian/cyclist stats at crossings not improving



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What will the design guide do?

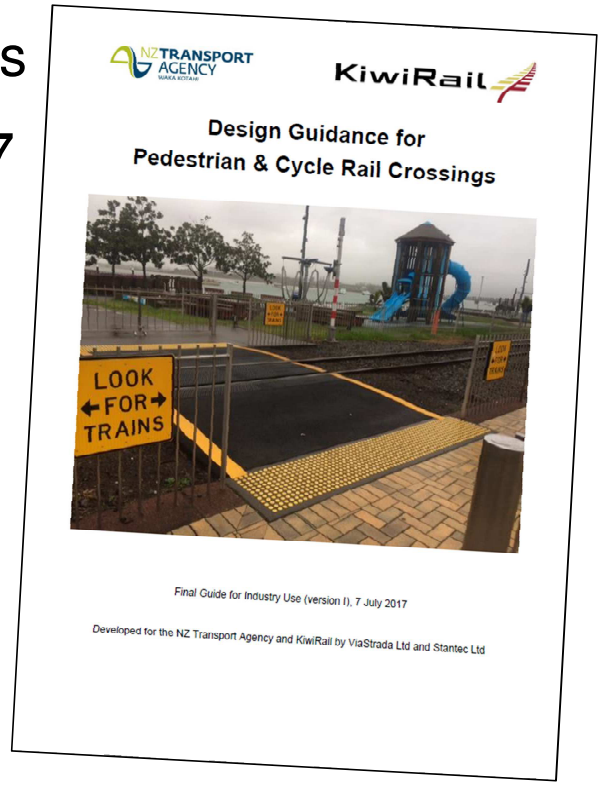
- Help road/rail practitioners better understand risks at level crossings
- Provide design principles, design considerations and standard designs for pedestrians and cyclists
  - Incorporate human factor considerations too
- Provide consistent crossing treatments around the country
  - Treatments at level crossings will be matched to level of risk and site usage
- (Hopefully) Improve safety stats for pedestrians/cyclists at crossings!

Project governance

- Four project stages:
  - Policy development - DONE
  - Synthesis (risk ratings & design approaches) - DONE
  - Gap analysis and trials - PARTLY DONE
  - Updates to other formal guidance - TO DO
- Involving a number of different parties:
  - Sponsors: KiwiRail, NZ Transport Agency Waka Kotahi, Road Controlling Authorities Forum (NZ) Inc
  - Reference group reps: CCS disability action Including all people, RCAF Active Modes Infrastructure Group, CAN Cycling Action Network, Blind Foundation, Living Streets Aotearoa, transdev
  - Consultants: ViaStrada Traffic Engineering and Planning, MWH now part of Stantec, Pelotion

Development of design guide (v1 Jul 2017)

- Provides updated guidance for pedestrian / cycle level crossings
  - Both standalone and road-side crossings
  - NOT concerned with issues re access ***along*** rail corridors
- Final version for industry use launched in July 2017
  - Interim draft guide released in Mar 2017
  - Informed by feedback from Client and reference group
  - Industry Workshops to introduce and seek feedback
- Future work to refine this guide
  - Based on feedback from RCAs/consultants using it
  - Incorporate findings from innovation trials in 2017-
  - Update other relevant walk/cycle/rail guidelines later



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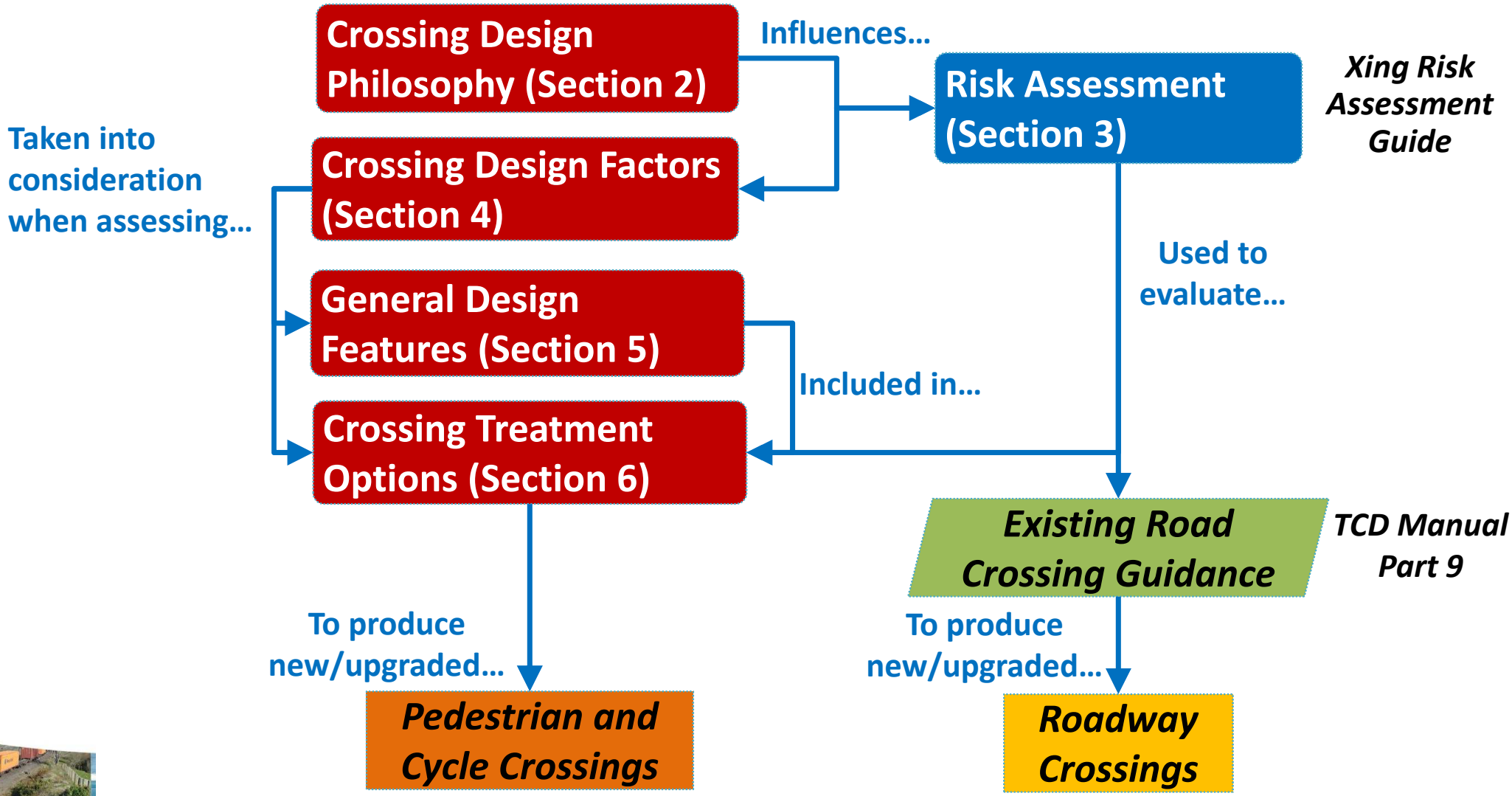
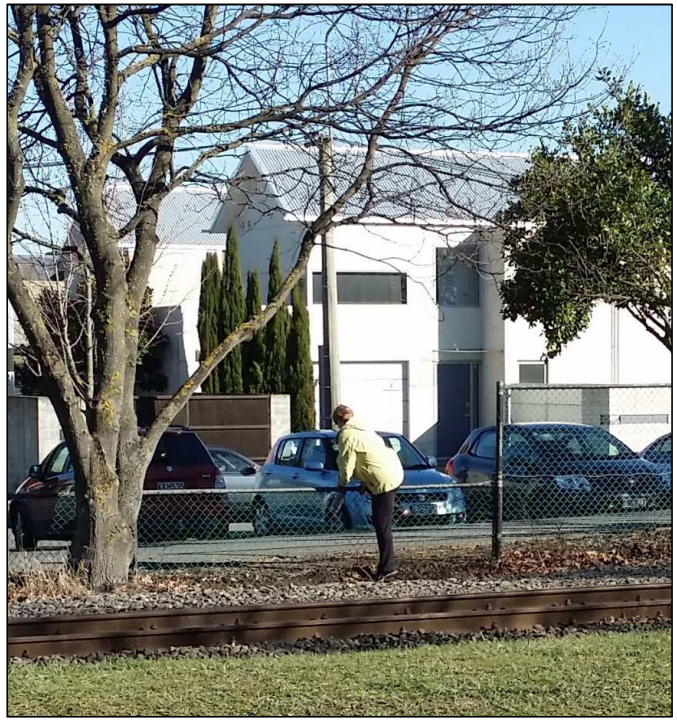
Guide structure and links



Key design principles



Provide high-level thinking to the design problem:

- Minimise the **need** for at-grade crossings
- Seek **user awareness** of crossings and trains
- Seek **user compliance** when crossing
- **Safe, accessible and practical** for all users
- **Appropriate & consistent** treatments for the actual risk
- Crossing treatments should be **maintainable**

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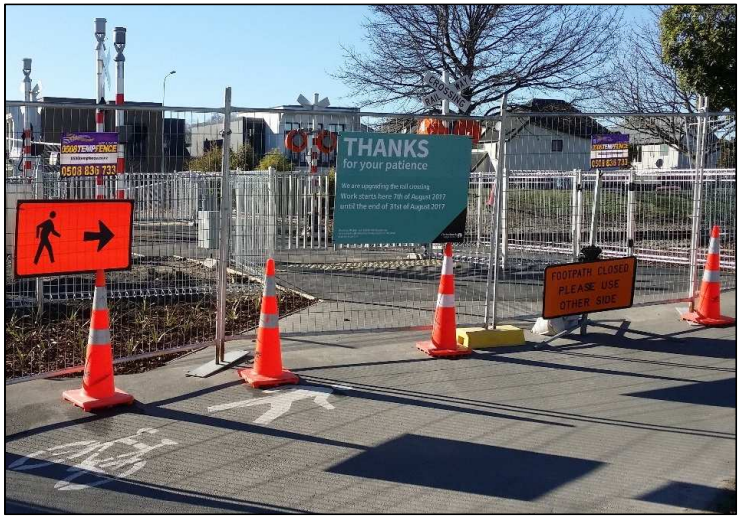
General policy for level crossings



- **New** level crossings:
  - Avoid!
  - Or substitute (close off another site)
  - Consider grade separation?
- Modifying **existing** level crossings:
  - Ideally a “low / low-medium” risk assessment score
  - Focus especially on improving existing high-risk sites
  - Or at least don’t make the risk worse

Key message: always talk to KiwiRail and NZTA!

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Risk Assessment of crossings: LCSIA process

- KiwiRail have endorsed a new procedure for assessing the risk for a new pedestrian or cycle facility over or parallel to the railway corridor:

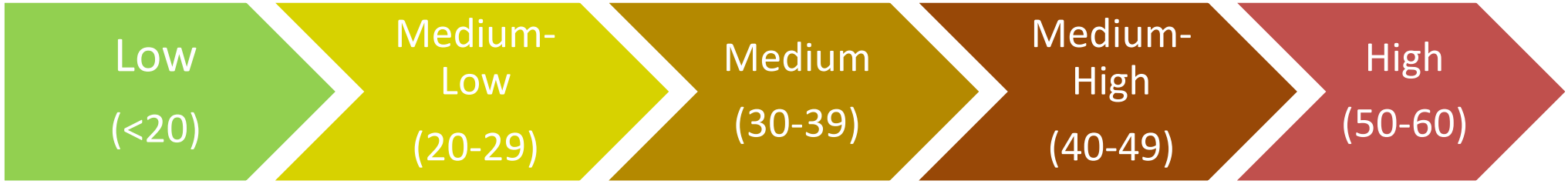
Level Crossing Safety Impact Assessment (LCSIA)

- LCSIA generally occur at scheme design
  - Inform the detailed design of the type of control necessary for the facility
- LCSIA also necessary with a change in an adjacent land activity

  e.g. Would increase the number of users at a nearby level crossing
- Certified assessors required to undertake LCSIA reviews
  - Talk to KiwiRail re LCSIA certification courses

LCSIA assessment method

- New method: Level Crossing Safety Score (LCSS)
  - ALCAM* score (30 points)
  - Historical crash / incident data (10 points)
  - Locomotive & RCA engineers' assessments (10 points)
  - Site-specific safety assessment (more detail than ALCAM) (10 points)



**ALCAM = Australasian Level Crossing Assessment Model*

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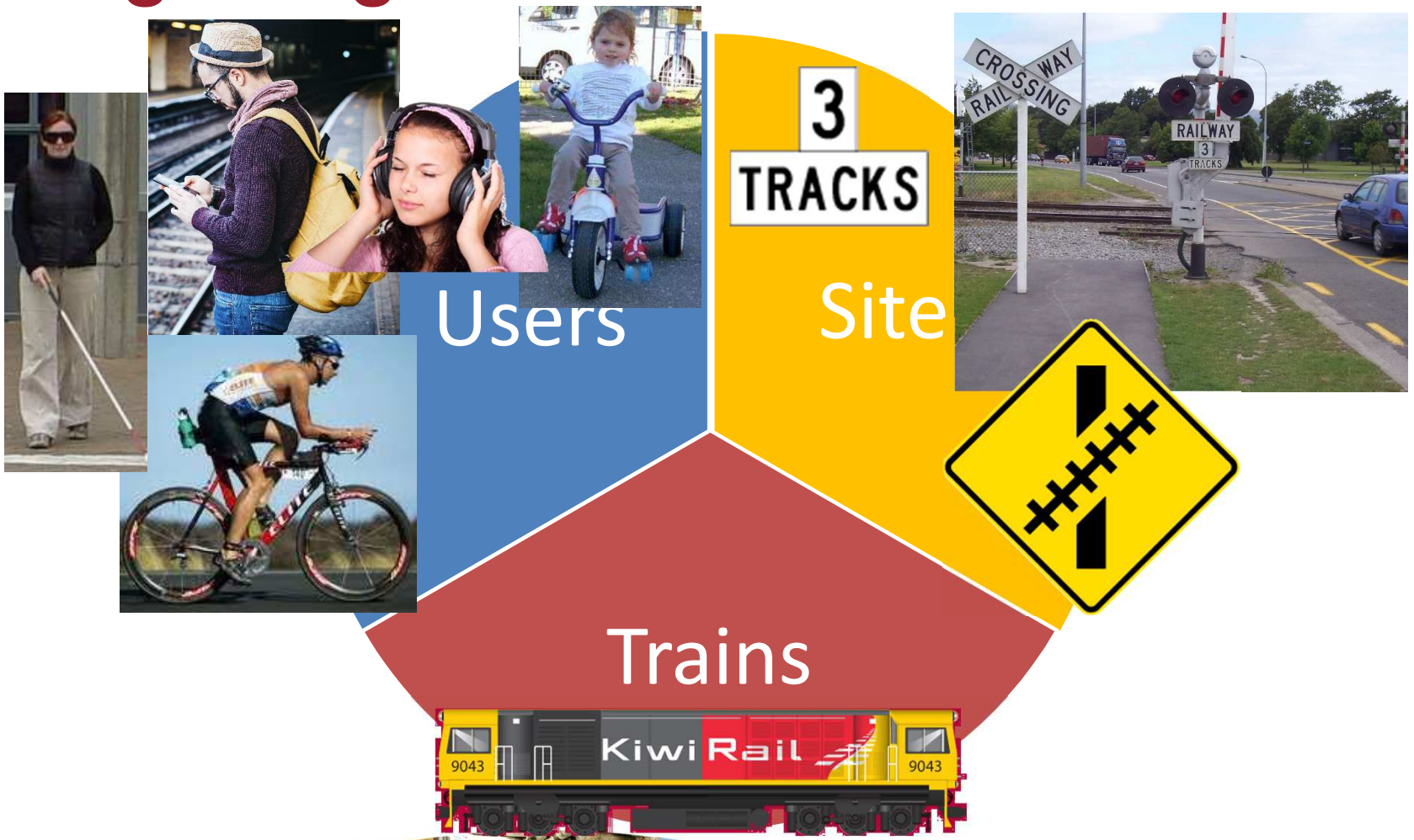
Crossing design factors



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General design features

- Passive warning options
- Active warning options
- Security issues
- Path surface treatments
- Non-infrastructure treatments

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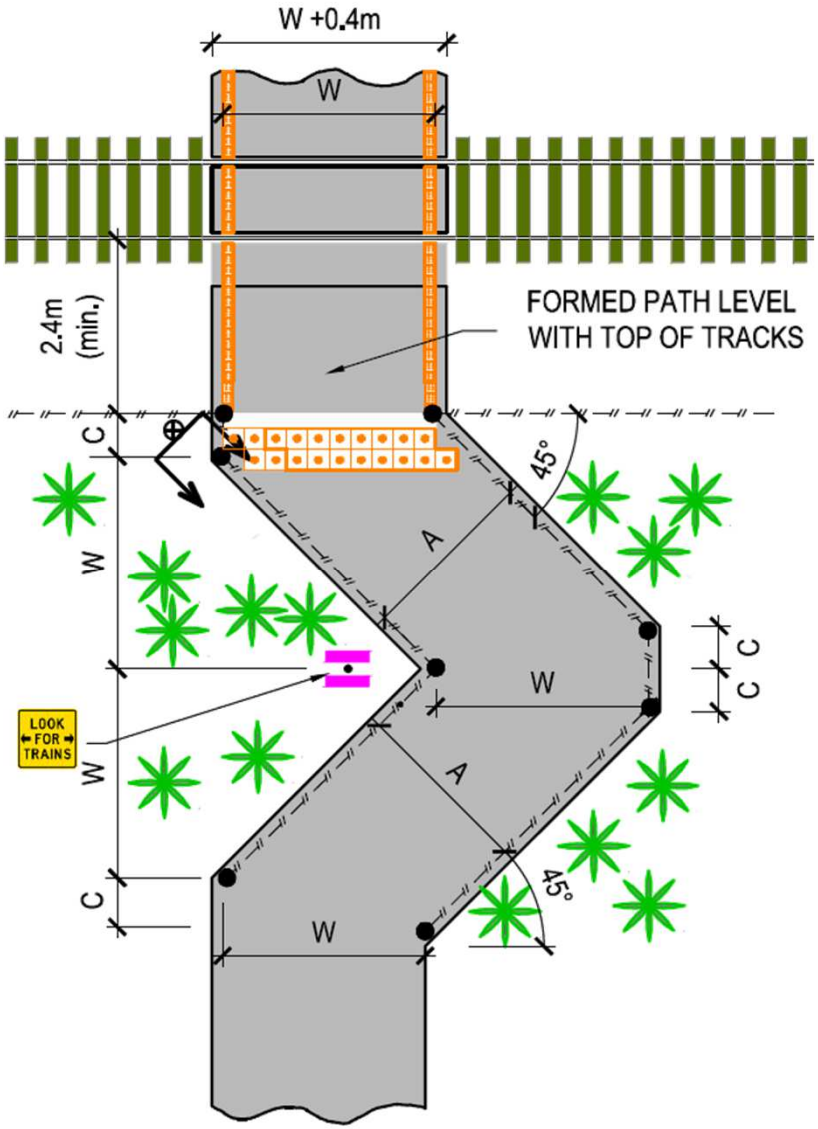
Innovations being considered/used

- Pedestrian-activated “Look for Trains” voice message and flashing pavement studs at passive crossings
  - New Plymouth DC and KiwiRail (2017/18)
- “Another Train Approaching” voice messages
- In-ground LED flashing pavement studs on the opposite side of an active footpath crossing
  - Kimbolton, Feilding
- Use of flange-less rubber mats on ped/cycle crossings that get upgraded

Treatment options

- Grade separation
  - Overbridge / Underpass
- Automatic barriers
  - Swing gates, raised barriers
- Audible and visual warnings
- Physical calming
  - Maze / chicane approaches
  - Manual gates
- Simple passive control
- Relocate or remove crossing



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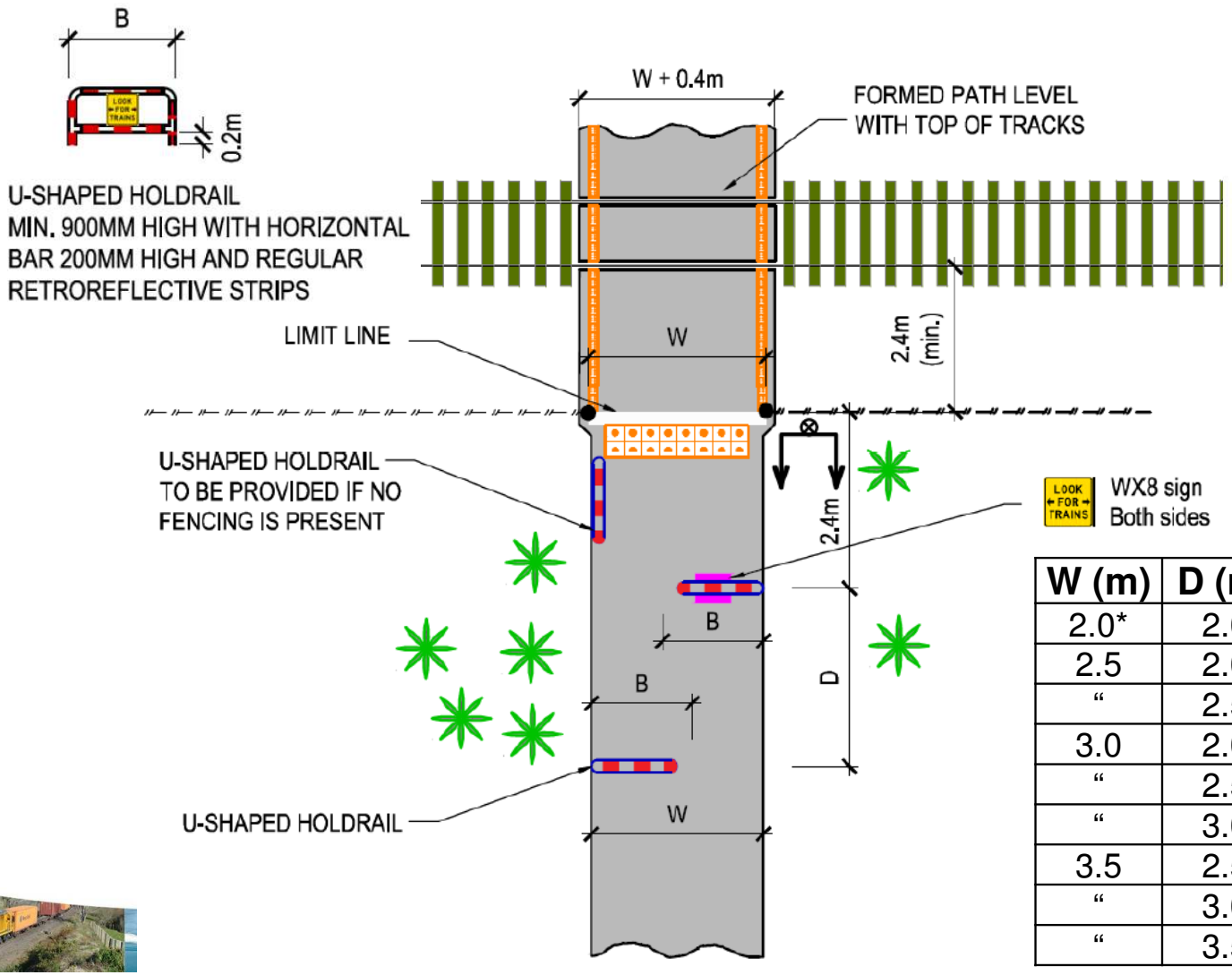
Physical calming – chicane railings



LEGEND:

- RAIL TRACKS (NUMBER OF TRACKS MAY VARY)
- TACTILE PAVING (TO RTS14)
- SAFETY FENCE
- REFLECTORISED YELLOW EDGE STRIP
- 'LOOK FOR TRAINS' SIGN 600MM SQUARE (WX8)
- WX8 sign Both sides
- MAST FITTED WITH FLASHING LIGHTS AND BELLS - OPTIONAL LOCATIONS

W (m)	D (m)	B (m)
2.0*	2.0	0.90
2.5	2.0	1.15
"	2.5	1.40
3.0	2.0	1.40
"	2.5	1.65
"	3.0	1.90
3.5	2.5	1.90
"	3.0	2.15
"	3.5	2.40

* Pedestrian-only crossings

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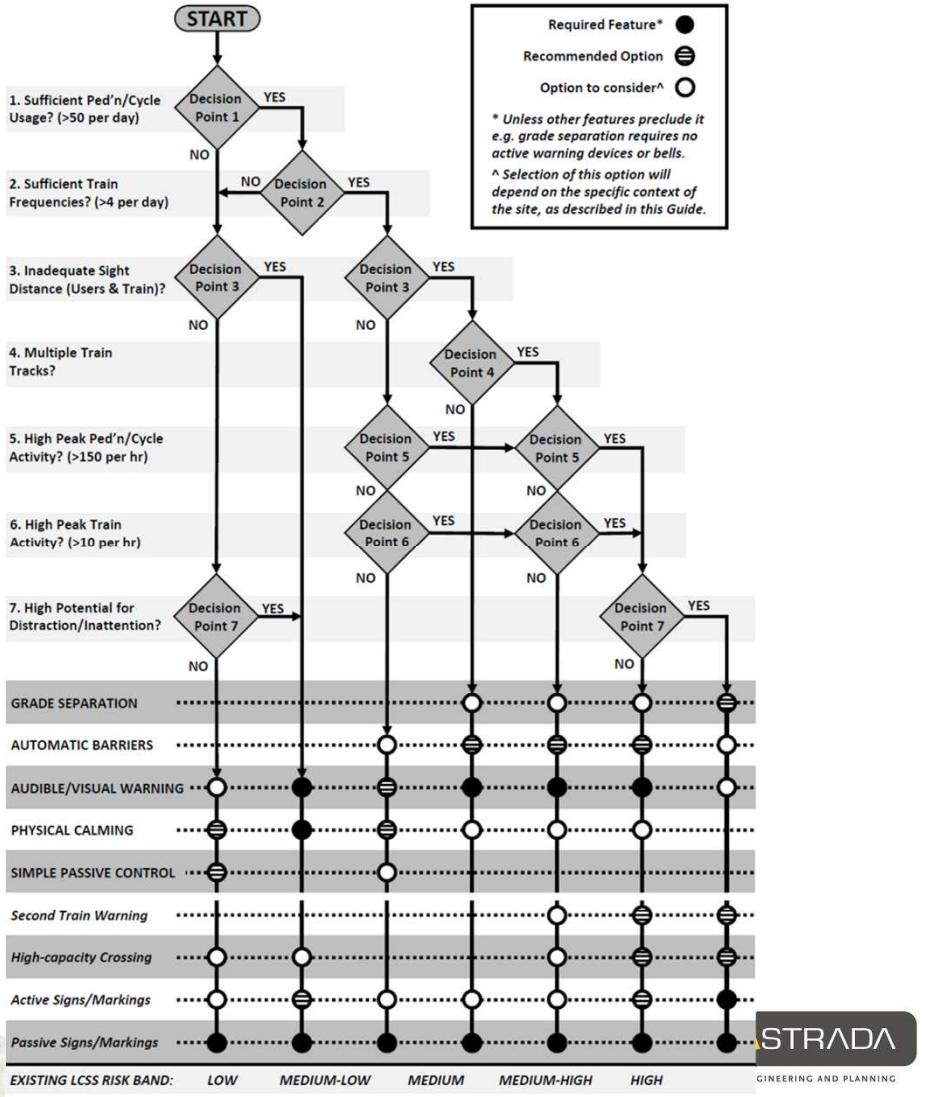
Crossing treatment selection

- Seven steps proposed
  1. > 50 active users / day?
  2. > 4 trains / day?
  3. Sight distance
  4. Multiple train tracks?
  5. > 150 active users / day?
  6. > 10 trains / hour?
  7. High potential for distraction / inattention?



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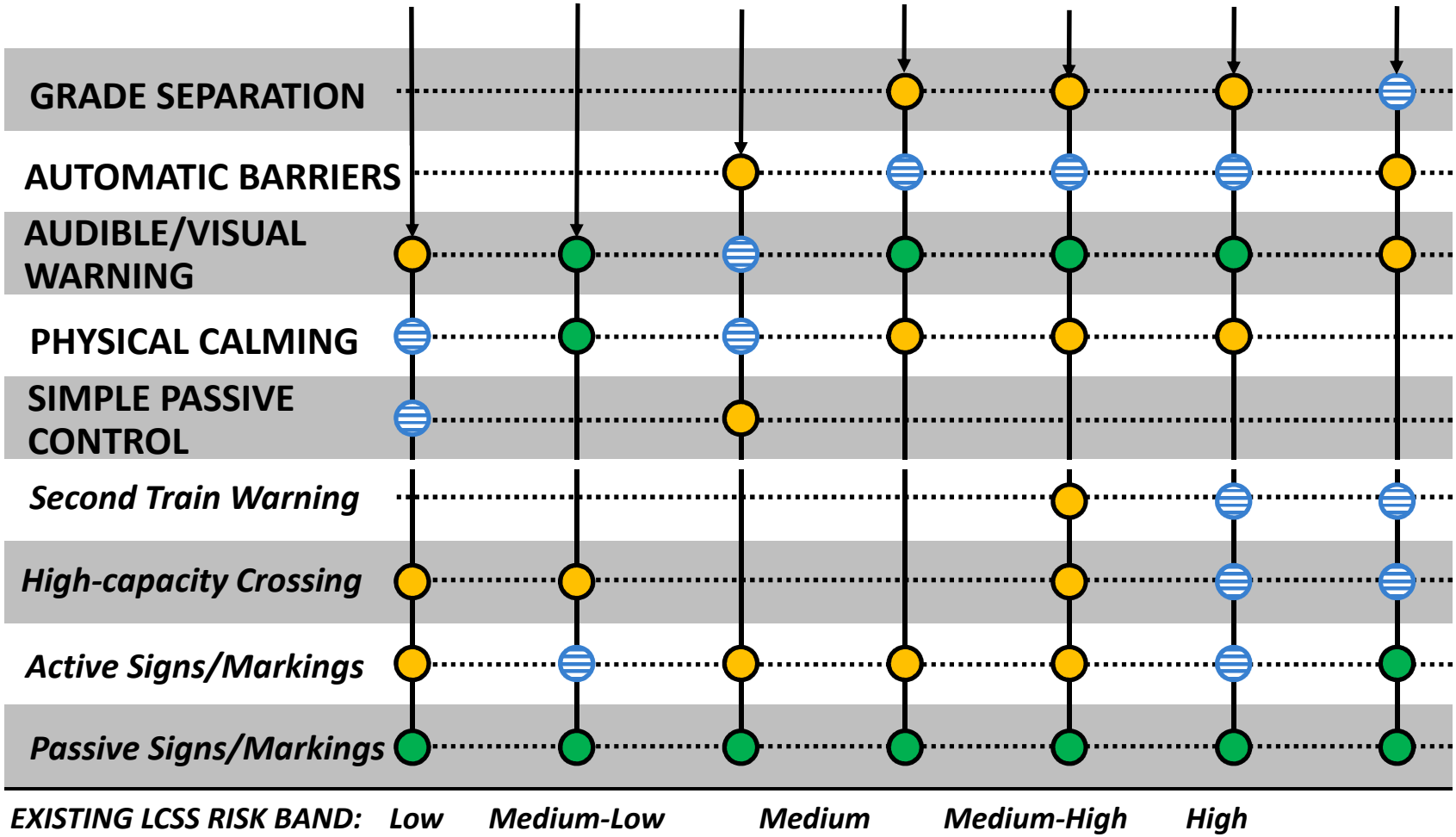
Crossing treatment selection



Required Feature* Recommended Option Option to consider^

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Questions?
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CROSSING
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