OPEN PLAN

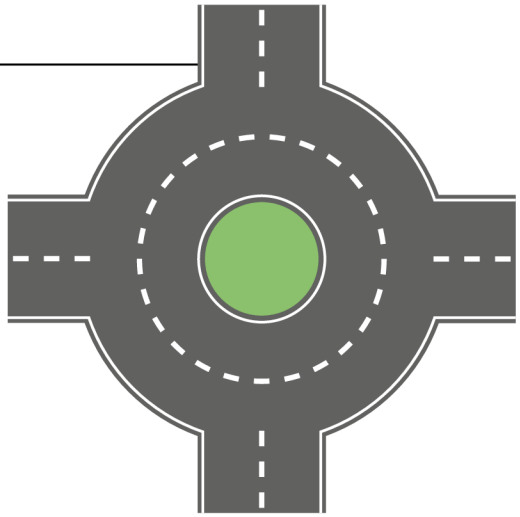
CASE STUDY

Strategic tools for a safer roading system

Supporting the national roading body to deliver a 10-year programme of speed and infrastructure interventions

Prioritising thousands of safety projects based on their efficacy and funding constraints

Developing several innovative tools and processes to help map, analyse and automate project prioritisation



The challenge

In May 2021, NZ Transport Agency Waka Kotahi endorsed the Speed and Infrastructure Programme (SIP) business case, with the aim of providing direction over the next 10 years on investment in a nationwide programme of safety improvements. This included things like median barriers, intersection improvements, raised safety platforms and speed reviews.

The SIP programme was made up of thousands of different safety interventions across the national road network, with each intervention stored in a database to capture the cost, type of safety intervention and its benefit – i.e., annual reduction in Deaths and Serious Injuries (DSIs).

Open Plan were brought in to provide tools and advice across the life of the project, starting in the programme's infancy. This came with the challenge of developing systems, processes and tools from scratch to help the nation-wide programme run smoothly.

Tailor-made tools to streamline project prioritisation and reporting

Open Plan added significant value by developing innovative tools to help with reporting, project prioritisation, budget allocation and scenario testing.

One of the key challenges was how to approach the automation of calculations across vast quantities of data from a variety of sources, to help analyse and report on existing work and future forecasts so that projects could be planned quickly and effectively.

Along with geospatial advice, the team supported the development of geospatial tools, such as the Project Pipeline Development Tool (PDT). This spatially maps the country's road corridors and intersections to help users identify high-risk areas and explore which were the most effective safety treatments for investment. This tool was then used to identify and define new projects - creating a project long-list of the most effective solutions.

But how do you go from a long-list of good ideas to a prioritised list that delivers a robust and value-driven programme of works and projects? More tools!

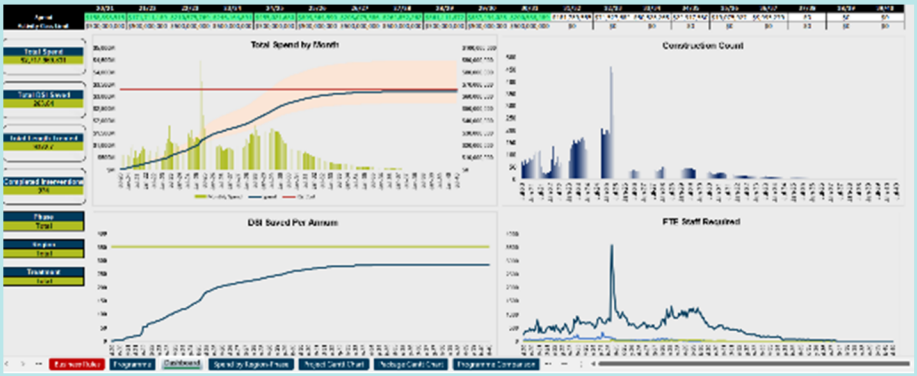
Building on the project long-list created in the Pipeline tool, the team developed the Scenario Planning Tool (SPT), to help prioritise projects into a 10-year programme based on which offered the biggest reduction in DSIs, within funding constraints, and met programme targets around outputs (like the number of roundabouts, length of median barrier etc).

The SPT tool created the decade-long programme by taking thousands of projects from the Pipeline Development Tool and then using a series of business rules to create project phases and cashflows. **Figure 1** (overleaf), shows a project cost turned into an 8-phase monthly cashflow for the project – this cashflow was unique to the project type, and took into account things like seasonality and a curved construction spend.

This process was undertaken for all projects, and then used to prioritise them to produce a 10-year programme. The tool would select projects based on their priority order (e.g., benefits per dollar spent and alignment with Road to Zero targets), set by the user or an algorithm (or both), and allocated a start date based on available funding.

Figure 1: An example Gantt chart of project phases and spend

Figure 2. An example of a programme dashboard, showing spend, required resources and benefits of a project



This process was repeated until all projects were allocated, or all funding was used. The results were then used to produce a programme baseline, and to forecast total spend, outputs, and benefits across a 10-year period, as shown in **Figure 2**.

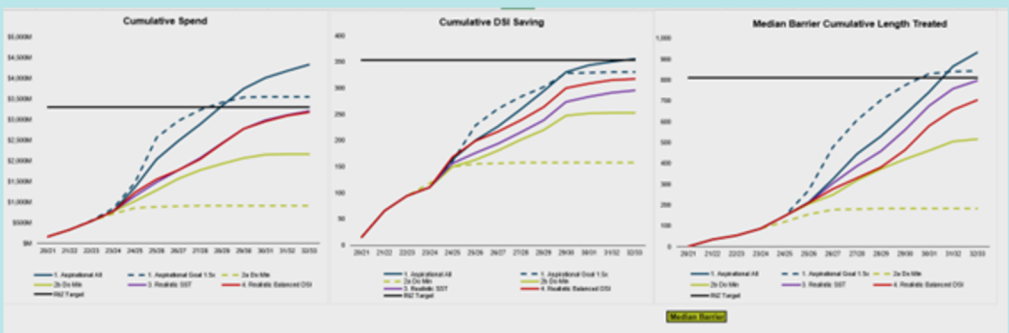
The Scenario Planning Tool was also used for sensitivity testing or 'what if' situations.

It was used to run multiple scenarios such as changes in delivery rates, programme priorities, levels of funding etc. It could also be used to forecast the funding and resource required to meet the programme's targets, with the results of these scenarios then compared to measure the impact of a change in approach, as shown in **Figure 3**.

The SPT was used to model and frame the SIP programme and to inform NZTA's State Highway Investment Proposal to the National Land Transport Fund.

Finally, the team developed a Moderation Tool, which was used to adjust the forecasts of projects already underway and compare the results to the original forecast and assess the impact on the programme in terms of total spend and delivery of benefits and outputs.

Figure 3. An example of scenario comparison



Tools for a full picture

The Moderation and SPT combined to produce a complete picture of the programme for both projects already underway (design and construction) and still in the planning stage and yet to start.

Each tool helped to support a distinct part of the decision-making process for the SIP, from developing a list of projects (Pipeline Development), to budgeting and testing (Scenario Planning), adjusting in real-time (Moderation), and reporting and analysing programme outcomes.

Repeatable

While these tools are uniquely tailored to meet SIP's needs, the underlying concept can be reapplied next time a similar challenge is encountered – making them a valuable addition to the collective toolbelt, to improve our country's long-term planning and decision-making.

Team players

The Open Plan team successfully worked in close collaboration with many parts of the business in order to improve systems and processes, and to deliver the various tools. This included working with teams such as Delivery, Programme Development, PMO, Business Analysts, Road Safety Experts and Project Management.

Planning and reporting

The many tools developed by Open Plan during the SIP Programme also helped to support regular planning and reporting requirements, keeping managers and the Governance Group up to date on programme outcomes.

Open Plan developed a prototype reporting process for State Highways, as well as automated reporting for Local Roads. This involved tracking and bringing together data from 67 different Local Authorities, which were then combined with data from the Transport Investment Online (TIO) and the Pipeline Development Tool (PDT).

AUTOMATING THOUSANDS OF PROJECTS INTO A

10-YEAR PROGRAMME

DEVELOPING SEVERAL

INNOVATIVE TOOLS TO STREAMLINE PLANNING & DECISION-MAKING

USING TOOLS TO HELP GENERATE

PHASES & CASHFLOWS

FOR EACH PROJECT