A629 CORRIDOR IMPROVEMENTS

CONTROLLER TO CONTROLLER LINKING, OR LET MOVA DO WHAT IT DOES BEST?

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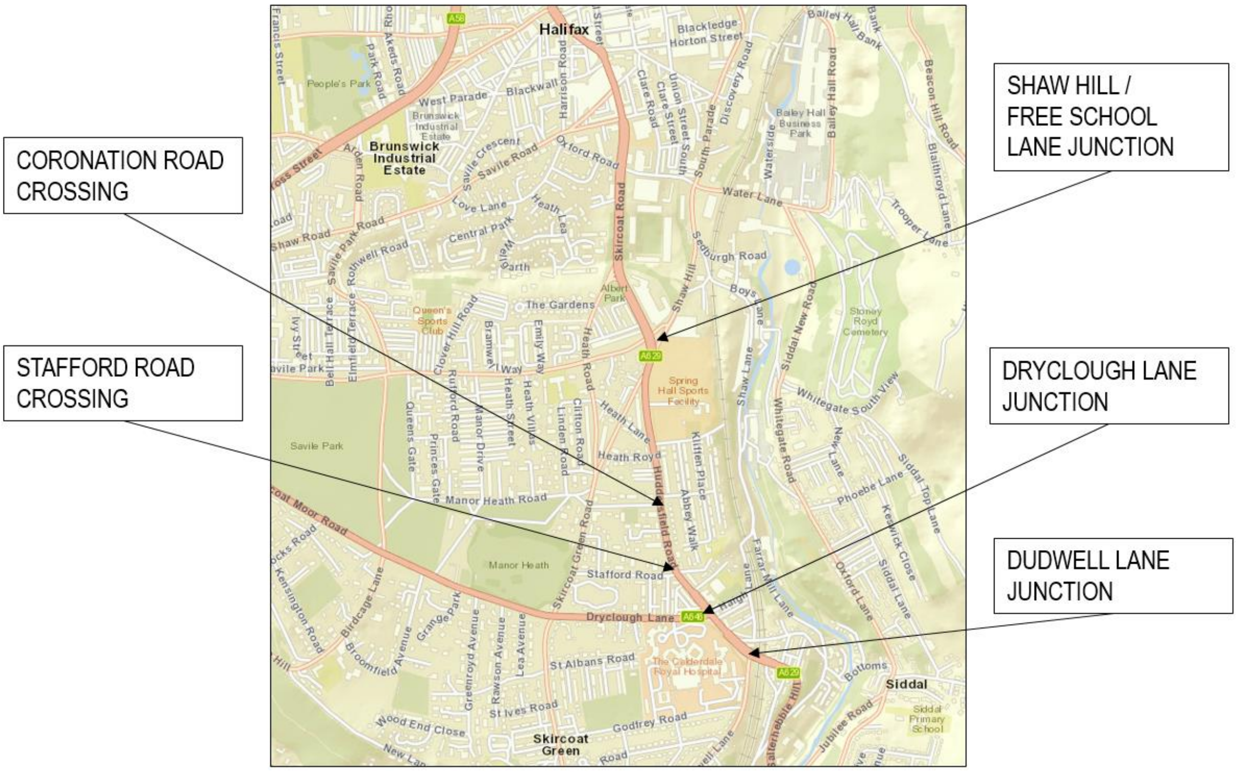
This paper presents the support WSP has provided Calderdale Council to deliver successful MOVA operational designs along the A629 corridor in Halifax.

In fact, the designs have been so successful that the corridor has been observed to flow quicker travelling southbound from Halifax to the two junctions, reducing journey times by approximately 40%.

Referring to the first junction improved as part of the Phase 1a scheme, Cllr Barry Collins, Calderdale Council's Cabinet Member for Regeneration and Economic Development said:

> *I'm delighted that local people are already seeing real benefits from the improvements at Shaw Hill. This is exactly what we're aiming to achieve through our A629 project – quicker and easier journeys, better access to jobs and business opportunities, improved connectivity to and from the M62 and boosted economic growth.*



The corridor improvements are a real testimony to the WSP team's hard work. One of WSP's selling points for this design, and others, is to include special conditioning for all possible variations in demand and coordination in order to react to any situation.

The paper shows a few examples of conditioning, and goes on to question the operational design process.

A629 / FREE SCHOOL LANE / SHAW HILL

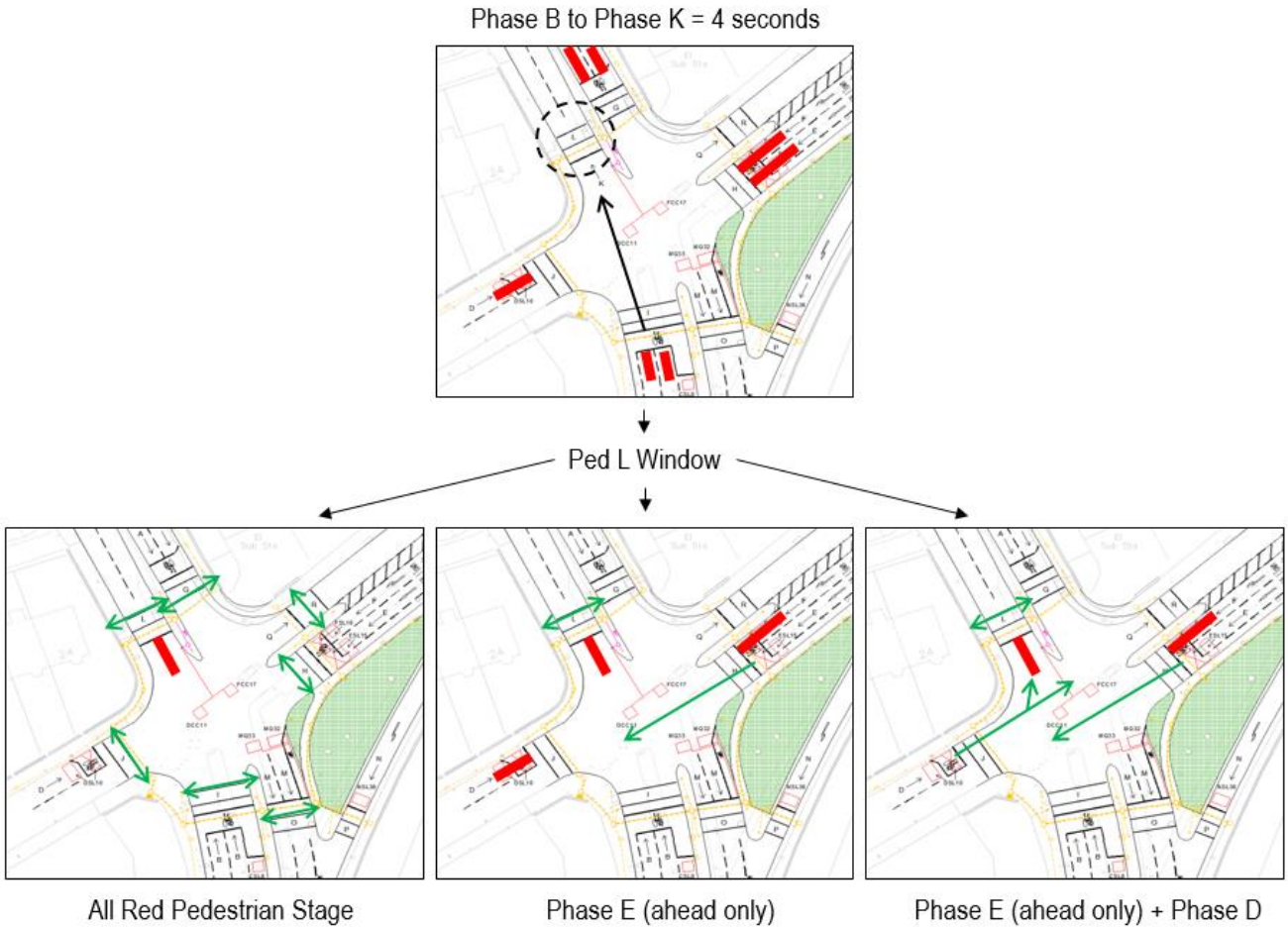
WSP were commissioned to design the MOVA operation for this junction. The junction design was to incorporate pedestrian crossing facilities across all arms of the junction as well as increase lane capacity for general traffic.

Pedestrian accessibility has been strategically designed into the operation such that, where possible, stage combinations have been developed to allow crossings to run with traffic and reduce wait times.

DESIGN EXAMPLE: VA CONTROLLED NORTHBOUND EXIT CROSSING (PED L)

Visibility to this crossing, especially when turning, is limited. To enable some traffic to keep moving, stages have been included which only allows the ahead movement from the east, holding back the right turners until the crossing stage has finished.

Any processed unlatched demand for Ped L to be output on MOVADET.
Upon termination of Phase B, start delay timer 4 seconds (handset adjustable).
Upon termination of the delay timer, start a 5 second (handset adjustable) window timer for Ped L.

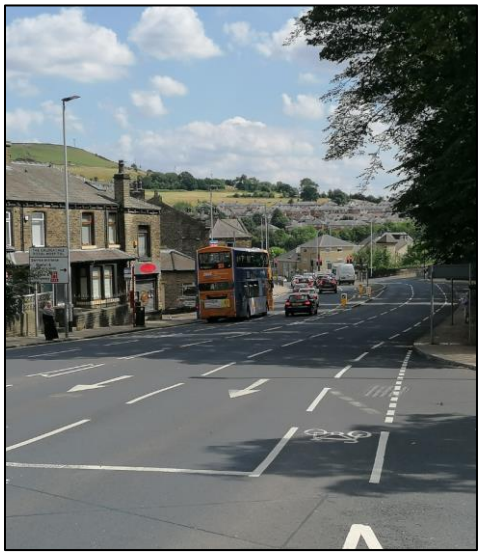


A629 CORRIDOR

WSP were also commissioned to design the MOVA operation for the next stage of the A629 corridor works. This included two pedestrian crossings (Stafford Road and Coronation Road) south of the Shaw Hill junction, and the following two junctions.

DUDWELL LANE (NORTHBOUND AND SOUTHBOUND)

DRYCLOUGH LANE (NORTHBOUND AND SOUTHBOUND)



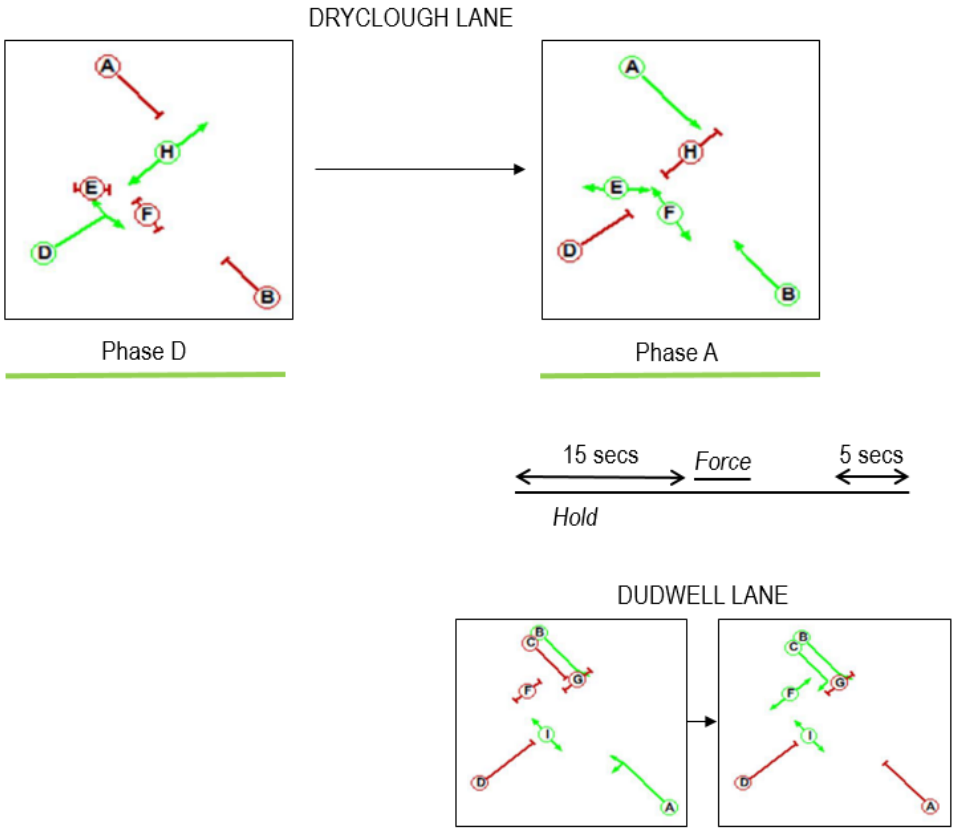
DESIGN EXAMPLE: CONTROLLER TO CONTROLLER LINKING

Controller to controller linking was included to help maintain consistency across the junction at peaks times of day.

DRYCLOUGH LANE -> DUDWELL LANE (SOUTHBOUND MAIN ROAD 'GREEN WAVE')

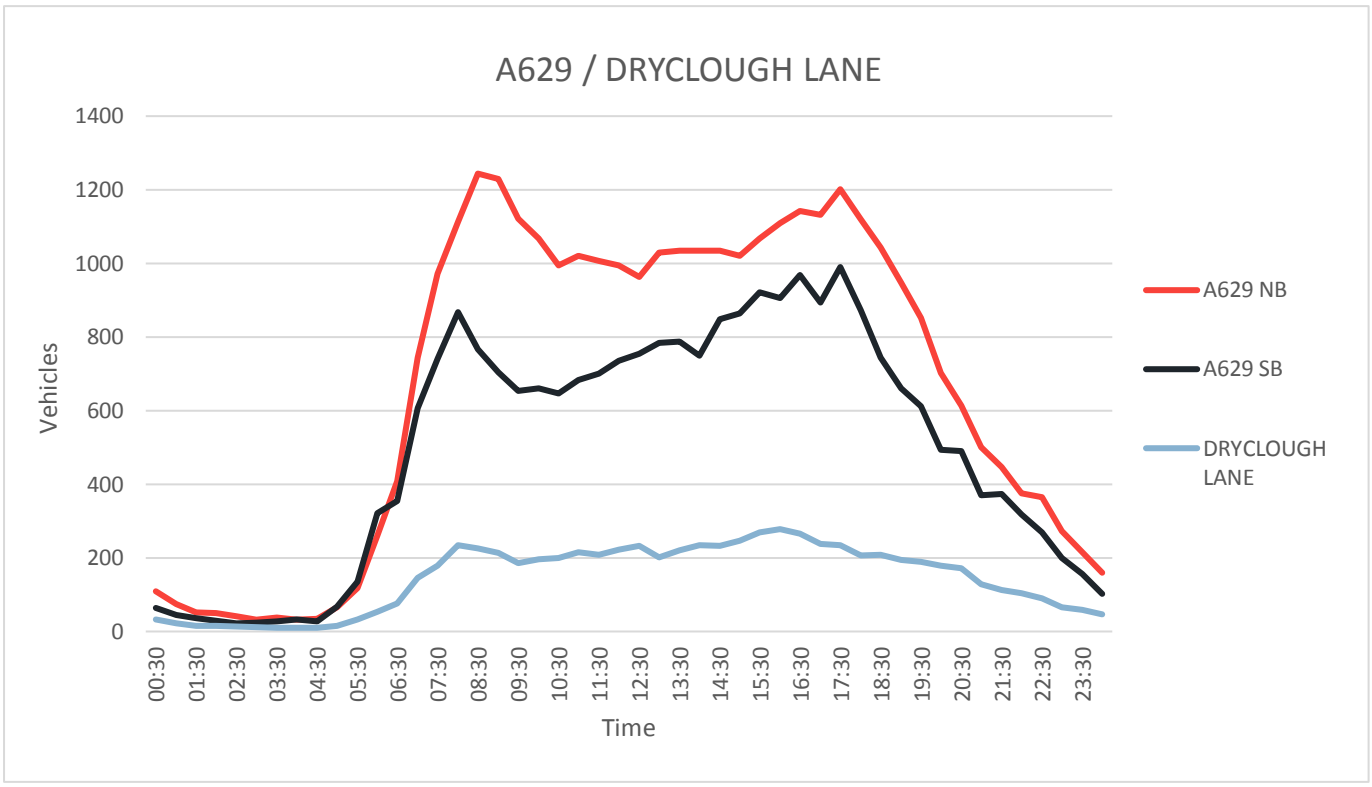
DUD Force *When enabled by timetable*
Output a 3 second pulse on MOVADET.
15 seconds after termination of DRY DCONF

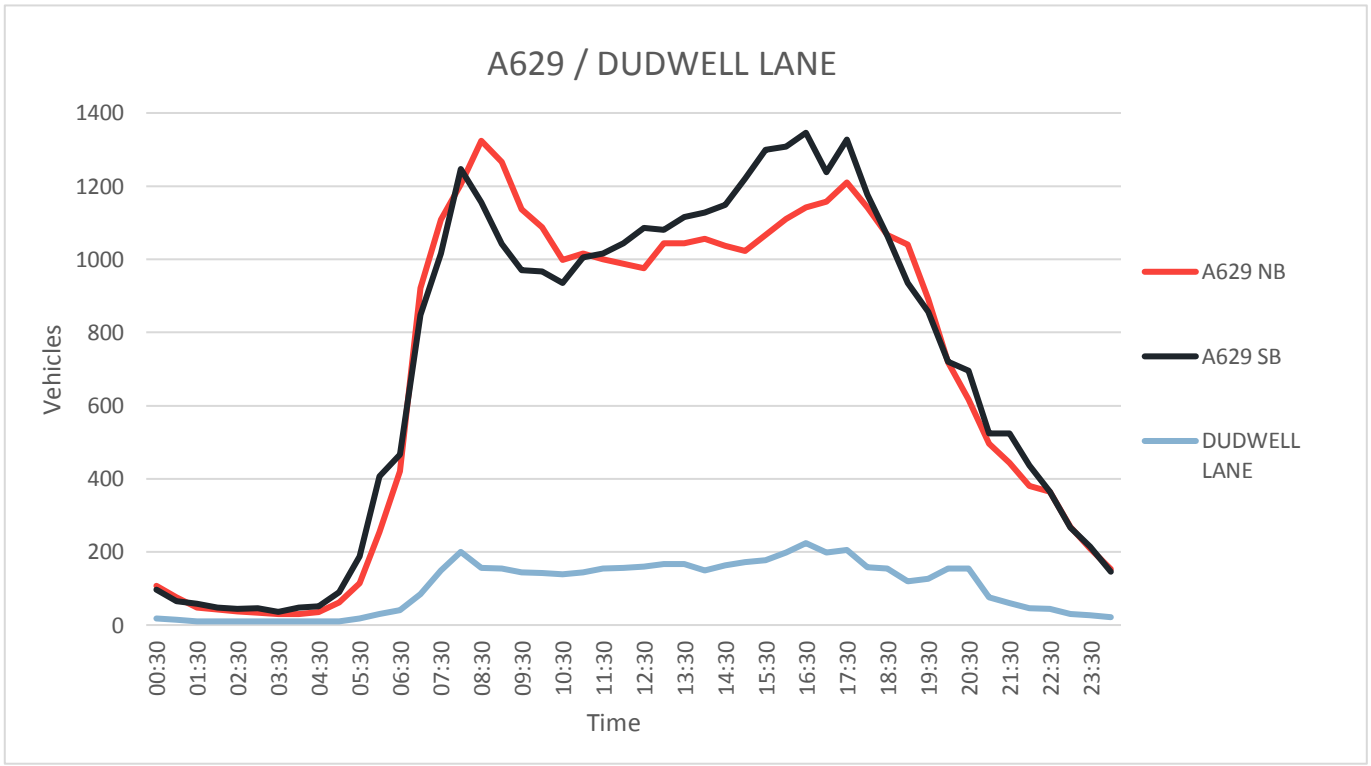
DUD Hold *When enabled by timetable*
From 5 seconds after the termination of DRY DCONF, output on MOVADET
Until 5 seconds after termination of DRY ACONF,
subject to extensions on DUD Phase B, or software switch =1.



Although a simple link, and only active during the peak hours, the coordination didn't behave as expected. It was surprising that although the overall traffic demand in both the northbound and southbound directions were similar, and therefore consistent cycle times where also expected, the arrival rates varied significantly.

The graphs below show the Monday to Friday average for the number of vehicles passing through the junctions, taken from the MOVA flow logs.

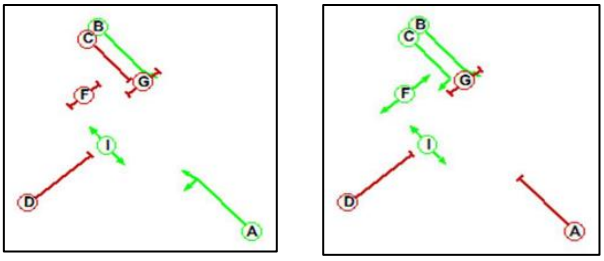




The majority of traffic from Dryclough Lane itself turns right to travel southbound. Therefore, A629 SB and Dryclough Lane summed together in the first graph should approximately equal A629 SB in the second graph.

When there was no traffic remaining to travel northbound, and demand to turn right into Dudwell Lane, the southbound link might have still remained and held Phase B in the right turn stage. Therefore, when all right

turn traffic had cleared through the junction, the stage was being held for southbound traffic whilst northbound traffic demand had arrived but had to wait.



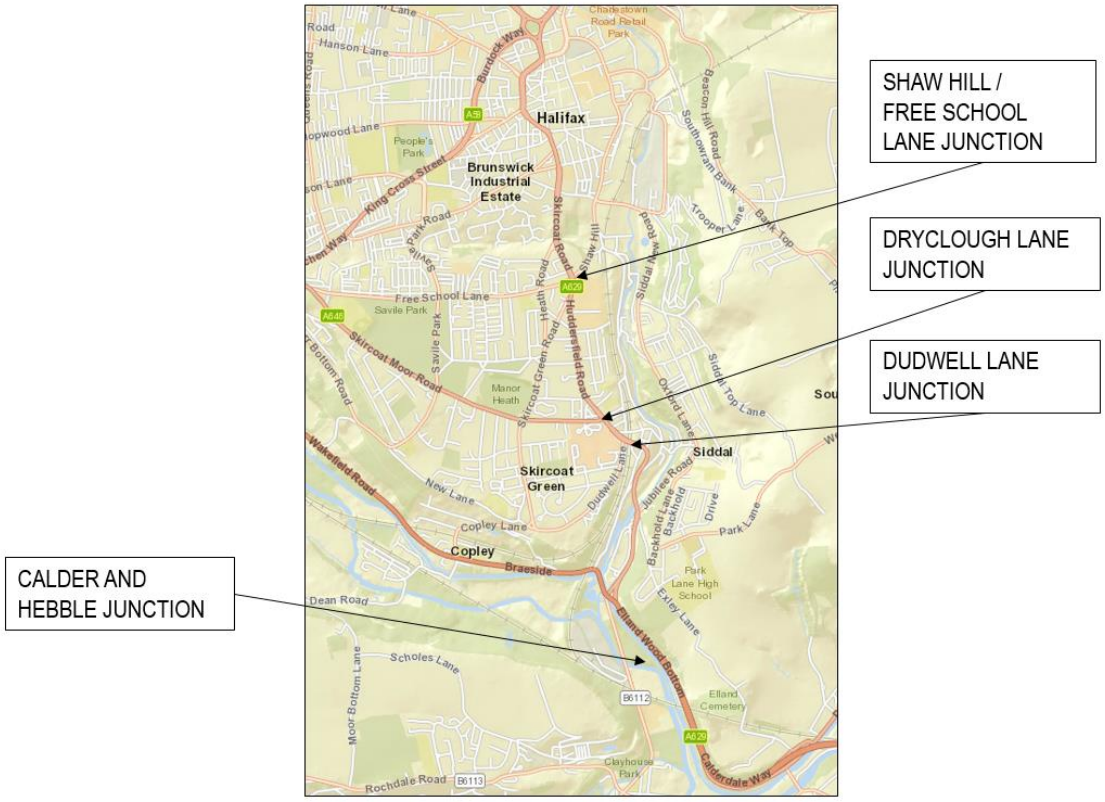
That was the first reason to remove the link between the junctions, in an attempt to see if the right turn stage would only run for as long as there was right turn demand.

Although removing the link enabled greater flexibility to give green time at both junctions, the right turn stage was still extended due to the straight ahead southbound demand.

Therefore, based on site observations, it is recommended that the right turn stage goes first in the cycle before the northbound and southbound ahead stage. This is so the right turn stage will not run for longer than needed, and the two ahead phases would end green together. This configuration change is expected to be modelled and implemented as part of the next stage of A629 corridor works.

A629 CORRIDOR – NEXT STEPS

The design of the A629 Calder and Hebble junction is currently under development, where the dual carriagway will be extended south along the A629 with a new link road to bridge over the Calder and Hebble Navigation and connect to Stainland Road which runs alongside.



This scheme will further enhance the benefits already seen from the Shaw Hill and corridor design work, and visa versa.

EMMA'S THOUGHTS - HOW SHOULD DESIGNERS DESIGN?

So how can we answer this question?

CONTROLLER TO CONTROLLER LINKING, OR LET MOVA DO WHAT IT DOES BEST?

For other networks (including roundabouts) which might require a bit of a nudge on top of normal MOVA operation, maybe this is how the design process should go:

1. Design simple, unlinked, MOVA operation
2. FAT, SAT, initial MOVA validation on site and observe
3. Update design based on site observations, including designing linking where needed
4. Update the configuration and undertake further MOVA validation on site
5. Handover

This would extend the design period past a typical point of handover, yet spread the work to reduce the upfront design for all parties (client, designer and signal contractor), ideally resulting in a better design suited to the site – and resulting in the same overall design cost.

Maybe a really detailed model would help us do everything perfect first time. There does have to be some modelling to get you to the scheme you want and need to build, but does it have to be everything all at once?

Technology changes whilst construction happens, which allows you to do more than you could at the design stage. Why should new schemes be left in the past?

MOVA commissioning has surprised me recently over a number of different schemes, and so I am swaying more towards letting MOVA do what it does best – knowing in some cases, special conditioning intervention is required.

What are your thoughts about the design process?