

where you look
is where you go



A fresh approach to the treatment of bends

To compliment Education, Publicity, Training and enforcement/advice projects, WYLIWYG was conceived to address the growing number of crashes on rural high-speed bends, particularly left-handers.

We took the concept of the System of Motorcycle Control from the Police Foundation's book, *Motorcycle Roadcraft - The Police Rider's Handbook to Better Motorcycling* (The Stationery Office London, 2001), and applied it to a bend.

As a Highway Authority, there is little, in engineering terms, that we can influence in the five phases of the System of Motorcycle Control; Information, Position, Speed, Gear, Acceleration.

The biker's position will be based on what information he has available and his level of experience. The speed he chooses to negotiate the bend along with what gear he chooses to select for that speed will also be based on that. His acceleration will be guided by all the foregoing, and, any further information we might be able to provide during the negotiation of the hazard, as well as before the hazard during the information phase.

Therefore, we have the potential to influence the biker's decisions during the information and acceleration phases, and indirectly, the other three. Because of a biker's increased vulnerability, his safety and at times his survival depends on his ability to take and use information. It follows, therefore, that the information given by the Highway Authority must be the right information in the right place.

The biker on the approach to a bend should be seeking as much information as possible about the state of the road surface and the severity of the bend.

A valuable aid to the observation a biker employs is the limit, or vanishing, point. The vanishing point is the furthest point along a road to which a biker has an uninterrupted view of the road surface. On a level stretch of road this is where the right hand side of the road appears to intersect with the left hand side of the road.

Where the road bends, the limit point will appear closer to the biker and the greater the severity of a bend, the closer still it will appear. If the bend has a variable radius, then the limit point will appear to move back and forth before it finally moves further away as the road straightens out.

Another problem bikers face is fixating or focussing on roadside features. This target fixation occurs generally when bikers are faced with a bend in front of them and instead of looking round the bend and into the vanishing point, they can tend to fixate on what is in front of them, whether it is a tree, telegraph pole, field gate or whatever.

In some locations, telegraph poles in the middle distance and pylons in the far distance appear to move across the biker's eye line in the opposite direction to the bend. That may also be just enough to distract or even cause the biker to fixate.

Biking instructors often tell their students that 'where you look is where you go' and this applies especially to this situation. If they look into the vanishing point, generally that's where they'll go. If they look into that field gate in front of them, even though the road bends to the right, that's where they're likely to end up.

Of course, not all bikers, only a minority in fact, have had the benefit of further training and therefore have not experienced this method of using the vanishing point.

So, how can we as the Highway Authority, provide the biker with the right information in the right place and try and keep his eyes focussed into the vanishing point of the bend, and away from the other distractions he could fixate on?

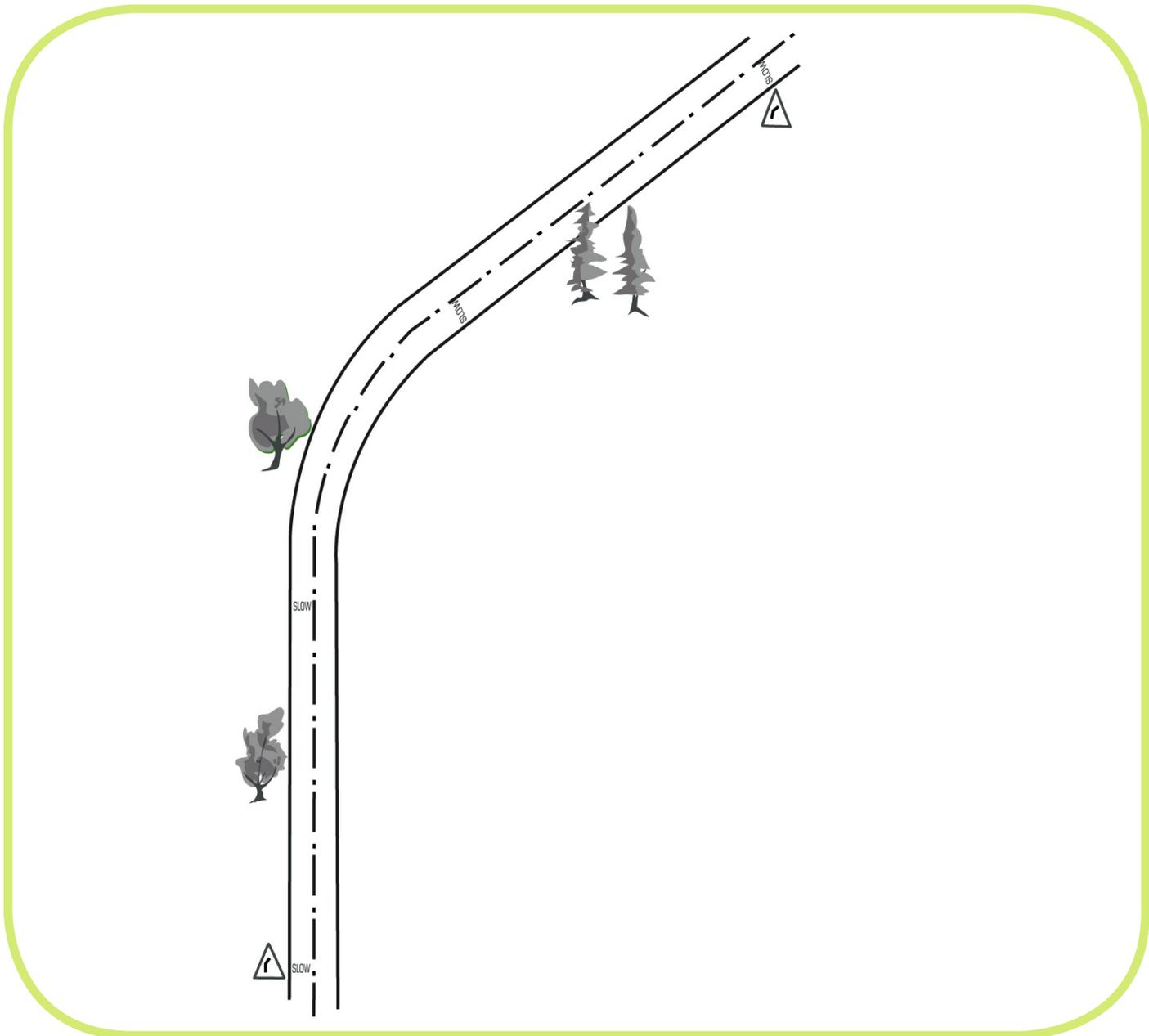
One way is to extend the use of Vergemasters or Hazard Marker Posts (Signs 560 or 561, The Traffic Signs Regulations and General Directions 2002) further round the bend than the traditional length of just on the curve, to the point where the vanishing point starts moving away from the biker's view, which is often into the straight.

It was felt that by placing them closer together, they keep appearing into the biker's view, focusing him into looking into the bend for as long as they kept doing this.

In practice, riding, driving and filming, the vergemasters kept popping out of the vanishing point and into the bikers view, hopefully concentrating his focus on these as they appear instead of being distracted by anything else.

So, where the biker looks, the biker goes!

This then requires us as the designers to understand where the vanishing point starts to move towards and the away from the biker. This can be achieved on a plan, but must be verified and if necessary modified on site.

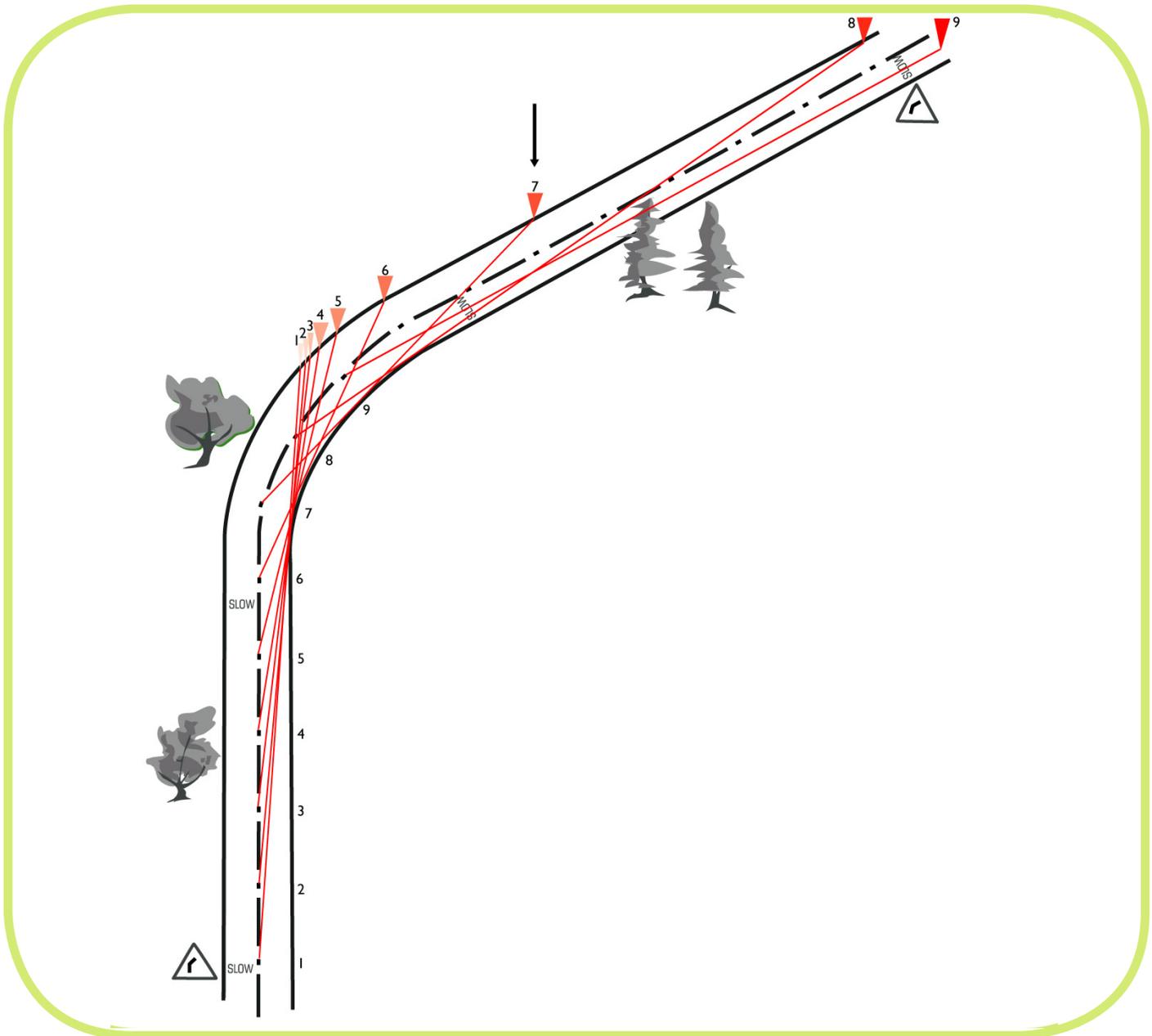


This is the plan view of the bend. It already has a bend sign reinforced by two slow sign in each direction. There are some trees that could be a cause of distraction.



This is how that plan view might appear to the biker.

The vanishing point is where the left hand side of the road appears to intersect with the right hand side.



By drawing a straight line from the centre of the roadway to touch the inside edge of the bend and continuing that line till it touches the outside edge of the bend, as line No 1, you can see in plan view where the theoretical vanishing point is for the position at cats eye No 1 should be.

By repeating the process for cat's eyes 2, 3 et sequa, you can begin to see how the distance to the vanishing point varies.

You can also see that the distance to Vanishing Point No 6 is getting longer than those preceding it.

It is at this point, then, VP No 7 that we finish the system of vergemasters.

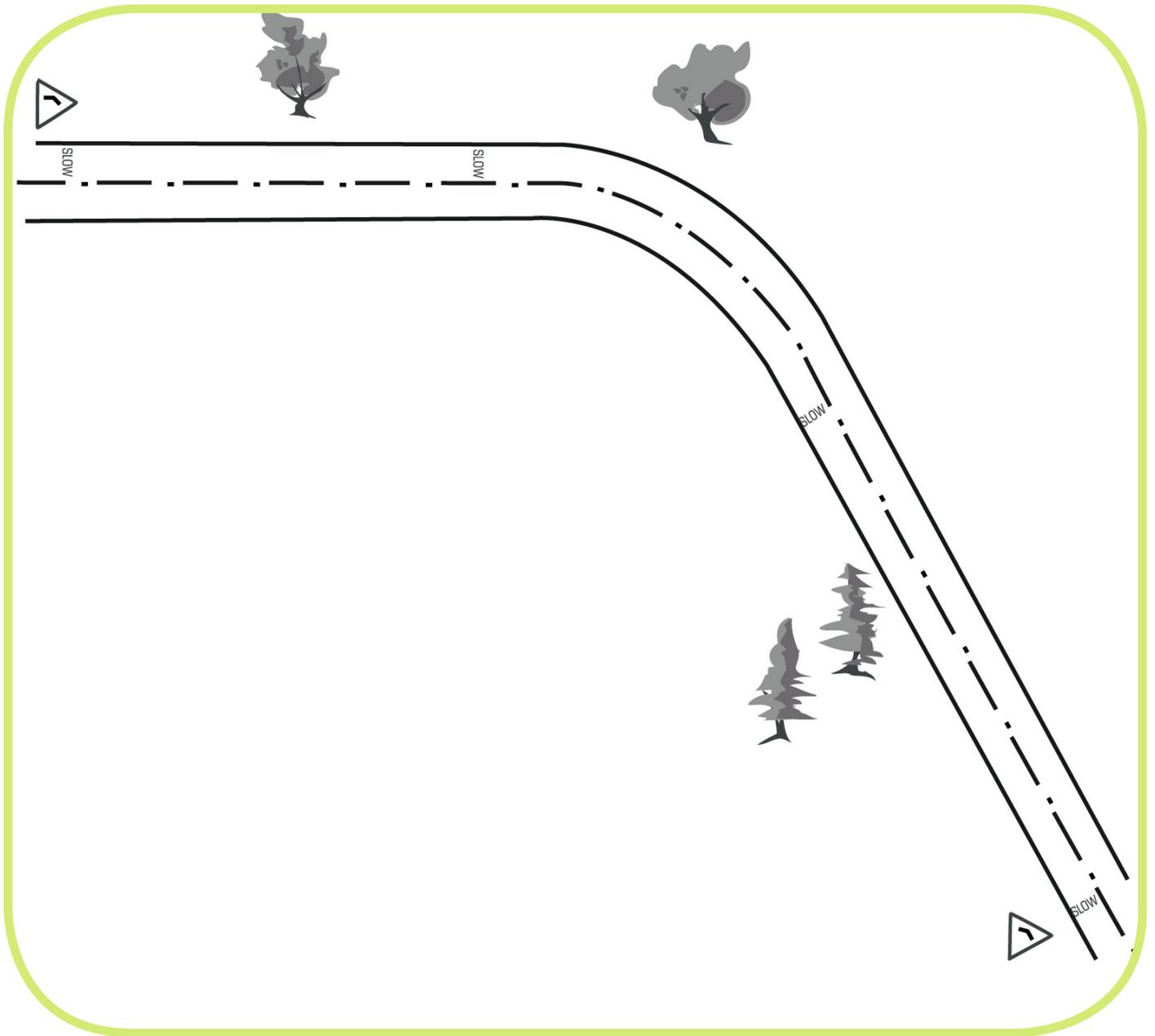
But we now need to find where the other end of the line of vergemasters should be.



This is how it might look to the biker

But this is just from one fixed position. The biker is moving towards that vanishing point.

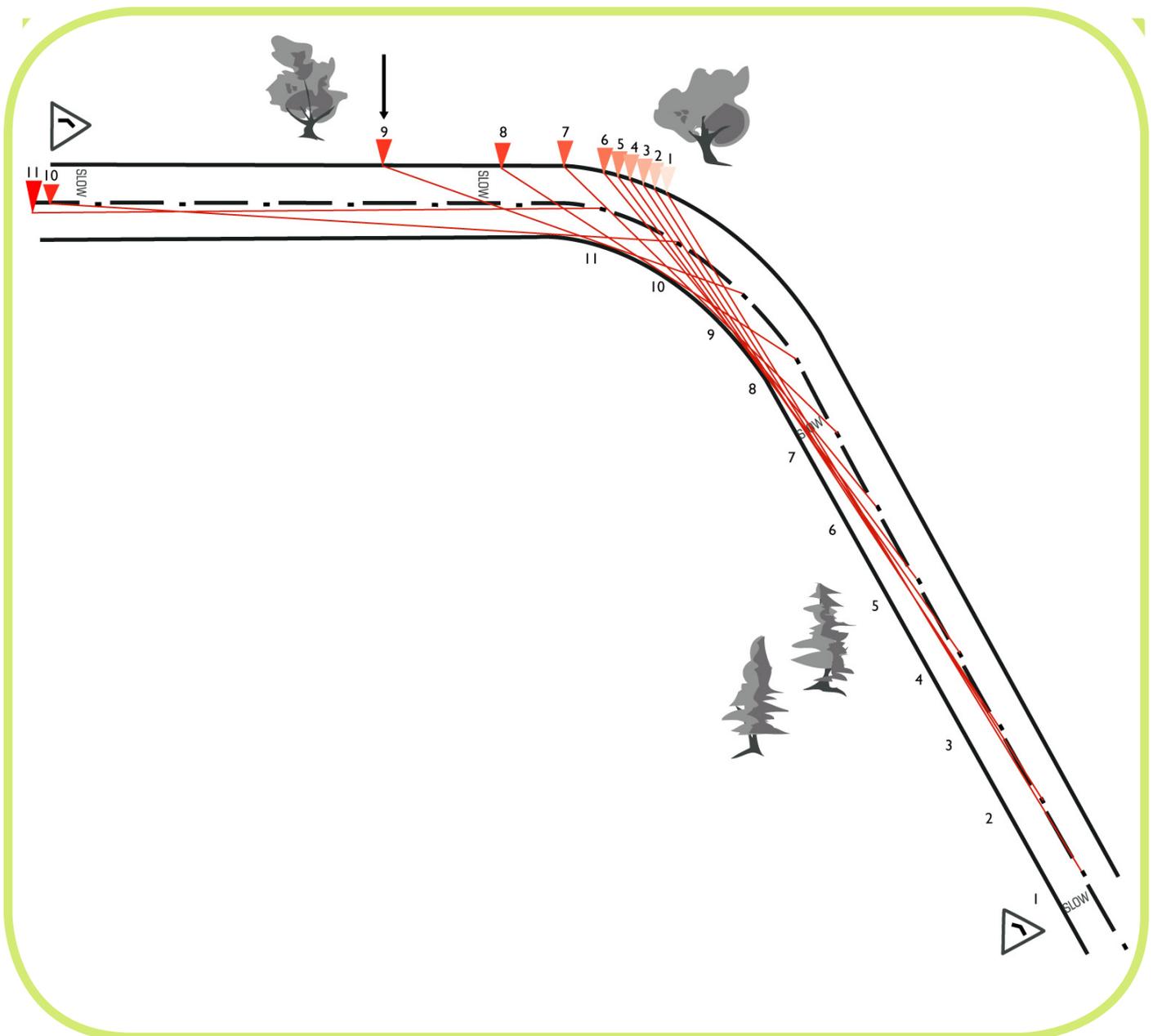
What effect will this have on the vanishing point?



This is the same bend in the opposite direction



This is how the vanishing point might look to the biker.



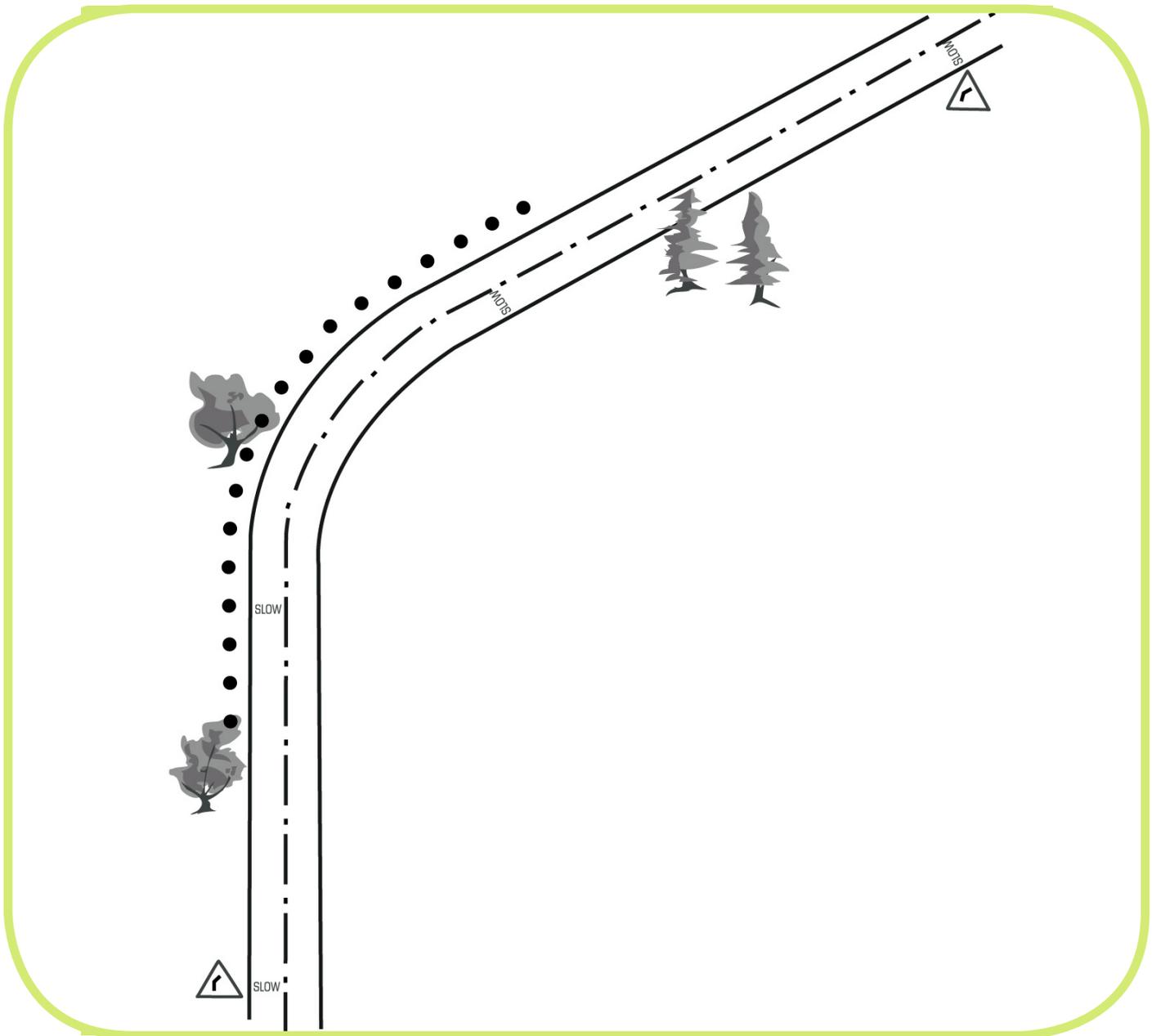
We go through the same process for the bend but in the other direction.

By drawing a straight line from the centre of the roadway to touch the inside edge of the bend and continuing that line till it touches the outside edge of the bend, as line No 1, you can see in plan view where the theoretical vanishing point is for the position at cats eye No 1 should be.

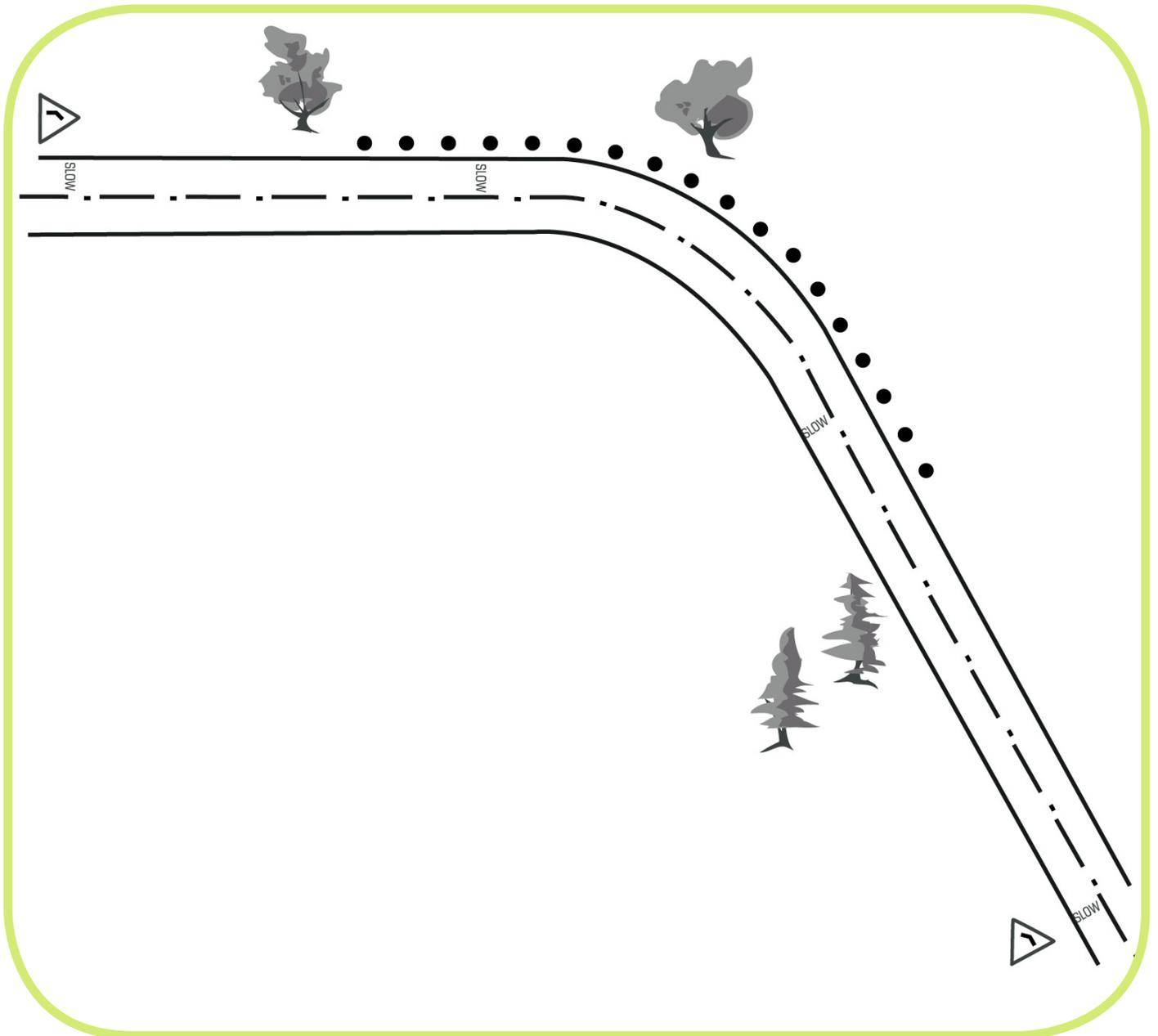
By repeating the process for cat's eyes 2, 3 et sequa, you can begin to see how the distance to the vanishing point varies.

You can also see that the distance to Vanishing Point No 9 is getting longer than those preceding it.

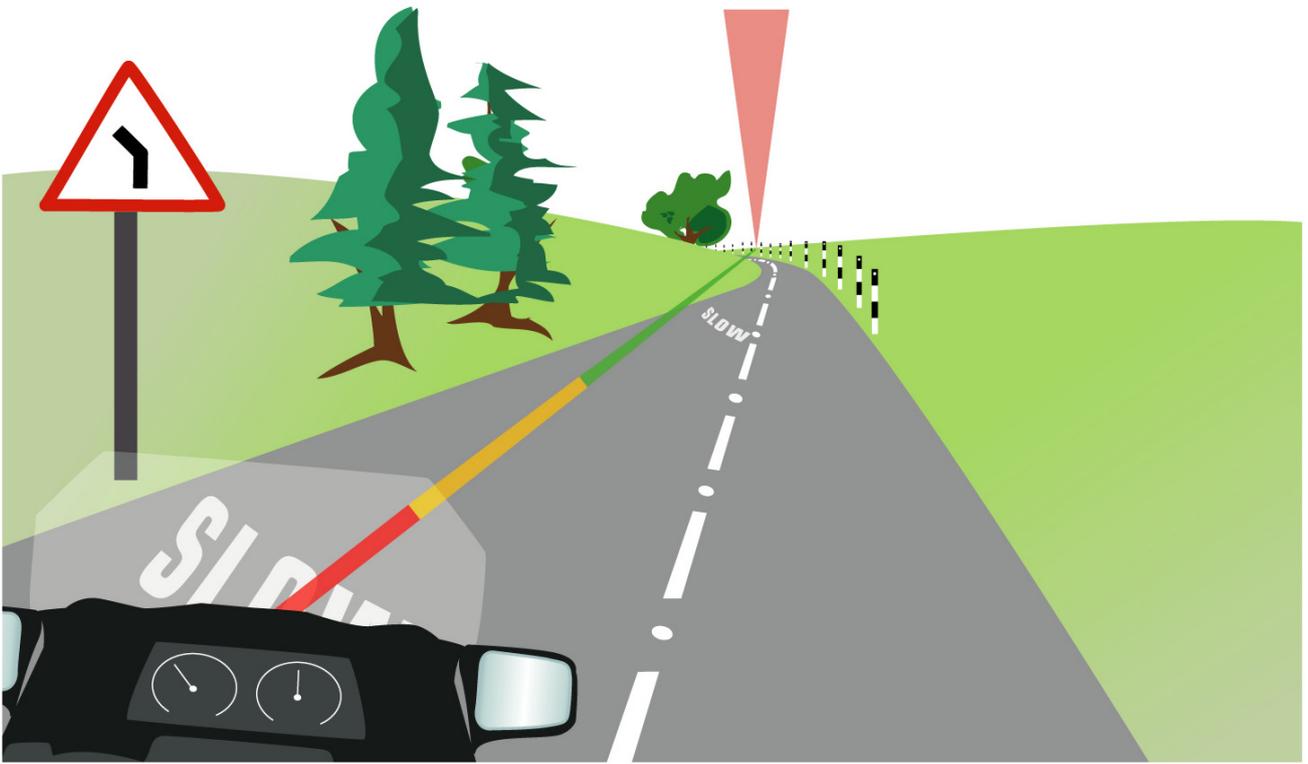
It is at this point, then, VP No 9, that the last of the vergemasters should go.



By joining the two finishing points together with a system of vergemasters, the plan will look like this.



It was found that a distance of 7 to 10 meters was sufficient to achieve the effect.



This is how it might look to the biker as a left hand bend.....



..... and as a right hand bend.



This is how a treated left hand bend looks.



This is how the same bend looks like in the opposite direction.

Not all bends are on a level section of road. The 2D plan of a bend, doesn't take into account that some bends go uphill, and therefore downhill in the opposite direction and that some bends have a crest at some point in the bend.

The use of this approach has the added advantage with bend going downhill, in that the vergemasters being some 900mm above the level of the verge are in view earlier than the road surface at the vanishing point comes into the biker's view.

So the biker can see a earlier where the change of direction and gradient is.

This approach has the potential to influence the biker's decisions during the information phase (advanced warning signs and slow signs), which gives him the information to modify his approach speed and therefore the gear to select for that approach as well as which position in the lane to adopt.

Through the bend, while the vergemasters keep popping into his view from the vanishing point, the biker has the information to know what level of acceleration, if any, is appropriate. Then as the last vergemaster pops into his view, the view ahead will open up and he will be able to see the road straightening and decide again on what level of acceleration to exit the bend hazard.

In 2002, Buckinghamshire County Council treated one such bend following 3 deaths, 5 serious injuries and 2 slight injuries to bikers during an eight-year period. To date, June 2005, there have been no further biker collisions on this bend.

Of course this approach is not just limited to rural bends for the benefit of bikers. There are other sites that might benefit from variations of this approach.

For instance, if the collision analysis identifies the majority of the loss of control collisions are occurring during the hours of darkness, then it might be considered to use intelligent road studs on the road edge to not only delineate the bend, but also to continue into the straight so that they keep appearing into the biker's/driver's sight from the vanishing point.

There are even some motorway sites that involve tight continual bends, particularly on junction slip roads connecting one motorway with another. The single, repeated SDS could be employed, using the process to establish where the vanishing point starts extending away from the driver.

The WYLIWYG approach is intended as a starting point from which designers, having understood the benefit of utilising the vanishing point concept, can then construct a design based on the crash analysis of their bend. It is relatively inexpensive and when well executed can have dramatic results.

Malcolm H James AMIHIH
Collision Analysis and Safety Officer
Buckinghamshire County Council
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Produced by

Buckinghamshire County Council, Collision Investigation & Analysis Team

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