Colourful Crossings Research Phase 1 Report

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Associates

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1 Background

Colourful crossings are a street design feature where a large graphic is applied to the area between the 'studs' (that mark the boundaries between the crossing area and the rest of the carriageway). The content of this area is not directly controlled by either LTN 2/95 'The design of pedestrian crossings' [1] or Traffic Signs Manual Chapter 5 'Road Markings' [2] and is typically either the same colour as the rest of the carriageway or has a top layer of asphalt in a contrasting colour, often dark red or buff.

The first 'Colourful Crossing' to appear in London was commissioned by TfL and Better Bankside as part of TfL's 'Future Streets Incubator Fund' and was deployed on Southwark Street in 2015. The graphic was designed by Paris-based architecture collective Exyxt. Subsequent Colourful Crossings were deployed on Sothwark Street with graphics designed by artists Camille Walala in 2016 and Thierry Noir in 2017 [3].

These crossings may themselves have been inspired by a rainbow zebra crossing deployed by TfL at the junction of Pall Mall East and Suffolk Street deployed for the Pride festival in 2014, which was itself inspired by similar designs in Tel Aviv and Sydney [4].

The initial Colourful Crossing on Southwark Street was followed by similar designs in other parts of London. In 2016 a design by print studio Eley Kishimoto was deployed at two adjacent crossings in Brixton [5] and in 2018 two were deployed outside Barbican Station, across Aldesrgate and Beech streets, by The City of London Corporation [6].

Colourful Crossings have also been installed in Newham, Waltham Forest, Enfield, Sutton, Kensigton & Chelsea. As they became more common across London disabled people and groups representing them began to raise concerns about their impact on street accessibility.

Concerns were raised to TfL by their Independent Disability Advisory Group (IDAG) and to The City of London Corporation by their Access Group (CoLAG). In Enfield a Colourful Crossing designed by a local art teacher was removed following safety concerns and replaced with an amended version [7]

2 Scope of this project

TfL commissioned the author to undertake a small research project to begin building an evidence based on both the impact of colourful crossings on disabled individuals, and the objectives commissioners sought to achieve in deploying, based on a series of interviews.

Nine interviews were conducted in 2020 and 2021 and form the basis of the evidence presented here. Based on these interviews illustrated proposals for other street interventions that could meet the objectives of colourful crossings without the negative impact on Disabled people are also presented.

3 List of interviewees

The names of the individuals interviewed have been changed to preserve anonymity.

3.1 People involved in commissioning colourful crossings

Steve
Steve works for Greater London Assembly on transport and infrastructure.

George
George works for a London local authority on highways schemes.

3.2 Disabled people and other people with relevant expertise

Bruno
Bruno is registered 'severely sight impaired', has only central vision, and carries a symbol cane when he is navigating streets.

Linda
Linda is registered 'severely sight impaired', her vision is 'blurry' and she carries a symbol cane, which she uses in crowds situations. She also has a mental health condition that makes her feel *"very anxious about getting about"*.

Andrea
Andrea experiences an anxiety disorder and through her work helping to support young people and adults who are on the autistic spectrum has become familiar with the issues many of them face navigating the build environment.

Beryl
Beryl is registered 'blind'. Her eye condition causes her usable vision to vary day to day. She describes it:

> *"I have very severe myopia which is partially corrected by the glasses. I have nystagmus which means my eyes wobble constantly which means that things go in and out of focus, which I can't always compensate for. I've got no depth perception.*
>
> *"My best vision is in the centre. On a good day I can read large print.*
>
> *"Beyond two meters I struggle to pick out any detail and beyond six meters it's just blobs and colours."*

She usually travels with her guide dog but sometimes uses a long cane instead.

Dawn
Dawn is a neurodivergent woman in her 20s and is a neurodiversity advocate.

Brittany
Brittany is an expert in the area of design for neuro-divergence and particularly autism, working as a researcher a a UK university. Her PhD explored ways to co-design environments with autistic adults that have additional learning disabilities and limited speech.

Rebecca
Rebecca is registered 'blind' and works as a mobility trainer teaching other people with vision impairments how to navigate streets independently. She usually travels with a guide dog but is between one dog retiring and a new one being provided so is travelling with a long cane. She has some usable vision and uses contrast in her environment to aid her mobility.

4 Objectives of colourful crossings

4.1 Re-contextualising the street

According to the installers of the first colourful crossing in London, Better Bankside Business Improvement District,

> *"The aim of the Colourful Crossings commission is to explore how everyday infrastructures in the city, such as pedestrian crossings, are perceived and can be transformed,"* [8]

This suggests that creating something unexpected, and re-contextualising the crossing are both objectives, though it leaves the practical benefits of these effects undefined.

Steve elaborated on what these benefits might be:

> *"It would be about looking at the Healthy Streets indicators, and there's argument that they deliver against quite a few of those. It's making a street more interesting - things to see and do, you would hope it makes a street easier to cross, it's trying to switch the balance from carriageway design being all about cars to being more about people."*

4.2 Place making and way finding

George emphasised the role that colourful crossings could have in place making:

> *"I think it's just a piece of public art, trying to emphasise something. Something that's iconic to that area."*

He explained that the scheme in his local authority, where they installed four colourful crossings they were *"multifunctional to us, with the branding and changes to directions."*

> *"When we were developing the project, it [the colourful crossings] was a means of reinforcing a branding theme we were developing for [the area] and emphasising the access points for the town centre shopping centre."*

In this context the colourful crossings were used in conjunction with other coordinated interventions; the painting of some buildings and the application of vinyl stickers to the footways in order to both provide a cohesive sense of place to the area and way finding.

> *"The temporary vinyls on the footway to mark different things as way markers, working with the local business district. A new crossing was added and we were trying to encourage people to use it, dragging the eye to it. Trying to emphasise some of the new pedestrian routes we wanted people to use."*

4.3 Celebrating

A fourth objective for the installation of colourful crossings is celebration. George explained how a of temporary rainbow crossing was deployed annually in part of his borough for the Pride festival and how

> *"it's seen as a big part of the festival now."*

As well as crossings celebrating the pride festival, which have been deployed in several London local authorities, The Royal Borough of Kensington & Chelsea has deployed crossings celebrating the cultural organisations it hosts. 'Creative Crossings' have been planed on Kensington High Street

> *"to show the diversity of artistic flair and influences in W8."* [9]

The two deployed so far are outside the Design Museum and Japan House and were designed by practitioners with connections to those institutions. Additionally a colourful crossing was deployed on Cromwell Road outside the Victoria & Albert Museum to celebrate their Mary Quant exhibition. [10]

5 Production process and costs

George explained that there were two ways to create a colourful crossing.

If the crossing only needs to last a few days:

> *"There's a new temporary solution, they mask the carriageway, paint it with spray paint and then jet wash afterwards. About £1,000 a crossing but doesn't last that long."*

For something that will last longer (up to two years) a different technique is used:

> *"They cut out the colour pieces that match the design then heat them to bond to the asphalt and then they spray glass beads on to increase grip as it's cooling."*

George estimated that the four crossings they installed by this method cost around £50,000 in total, but that:

> *"You could do it cheaper if you didn't have as complicated a design."*

6 Impact of colourful crossings on disabled people

Colourful crossings impact on disabled people varies significantly depending on the individual's impairment, mobility strategies and sensory preferences. Based on the feedback from disabled people received at the instigation of this project, the groups primarily affected were believed to be people with vision impairments who use their residual vision as part of their mobility strategy and neurodivergent people, particularly those on the autism spectrum. Understanding the impact of colourful crossings on these people was the focus of the interviews. The issues raised are presented thematically.

6.1 Overstimulation

Andrea explained that some people she works with are hypersensitive to colour and pattern. She felt that many of the colourful crossing designs "could lead to a risky situation" for those people for several reasons.

> *"They could feel like they were falling, have nausea, feel like they needed to look away, or get fixated on a pattern."*

She explained that she had often experienced people having similar issues with patterns on floors and carpets and that

> *"When I wear a striped T-shirt it causes my clients distress. Some clients struggle with the moquettes on busses and the tube."*

Brittany had a similar reaction, based on her own extensive engagement with neurodivergent people. She emphasised both the potential of some colourful crossing designs to disorientate someone

> *"That's got so much movement to it I would say that could make someone feel really dizzy and like the ground is moving a little bit."*

but also the converse risk of a person becoming too absorbed in the design and ending up not paying attention to the traffic or dwelling on the crossing area.

> *"It could be a distraction from the road and what is going on with the traffic as you are focusing so much on this pattern. I can imagine people really loving it and getting fixated on it and standing on it for longer than you normally would on a road or crossing. It's a distraction in an important place where you shouldn't be distracted."*

Dawn explained how some of the colourful crossing designs would make her feel unwell.

> *"it makes me a bit queasy looking at it, a bit nauseous. It would really depend on my mood if it put me off using it. If I was having a stressful day and not feeling 100% it would but if I was feeling OK I'd deal with it but I wouldn't be happy about it."*

Brittany pointed out that the colourful crossings would also be likely to affect neurodivergent drivers:

> *"Even for neurodivergent people who are driving all of this would apply. It being confusing, disorientating and distracting as a driver."*

Brittany also explained that the interaction between the colourful crossing design and crowds of other pedestrians could make things even more difficult for neurodivergent people:

> *"Adding people onto these is just going to add another layer of complexity. If you add that on top of one of these it is another layer of overstimulation. People's behaviour on these could be even more unpredictable."*

Rebecca also worried about the impact the change of behaviour of other pedestrians, caused by the colourful crossing, could have on people with vision impairments:

> *"I guess you could get children trying to jump from one [visual element] to the other so you can't get to where you want to go because the children are messing around."*

Beryl also found herself overstimulated by some designs.

> *"This is quite painful for me to look at. My eyes don't know where to settle in the image. I can feel the muscles in my eyes and contracting and relaxing constantly. If this were in my local area I would avoid it. I'd have to find another route. If you put this in my high street it would be a nightmare.*

> *"There's just so much visual information. I can't handle that, I don't like that. I'm having a visceral reaction to that in a way that's shocked me a bit."*

In addition to the effect on her, Beryl also felt that some of the colourful crossings could overstimulate her guild dog:

> *"[she] would de completely distracted by that for sure"*

Whilst not causing direct discomfort for her, Rebecca felt that some designs could confuse her and slow her down.

> *"I might be stood at the crossing trying to make sense of it. It might be irritating because I don't really know what I'm looking at. It might be distracting."*

6.2 Misleading shapes and/or contrast

In addition to a feeling of being generally overwhelmed or overstimulated, participants with vision impairments reported that some designs, in particular those with high contrast elements such as the ones deployed on Southwark Street, outside Barbican Tube and in Brixton, gave them a sense that there could be obstructions on the crossing that they might need to avoid. A lack of depth perception can make it difficult to differentiate between a graphic element and a hole, a sense experienced by Linda:

> *"I'd have a problem because I'd think it was full of holes"*

and also reported by Rebecca in her experience as a mobility trainer:

> *"People might see the dark bits and think oh that's a hole and veer off."*

and by Bruno from his own experience:

> *"You can see a blurry hole in the road."*

Rebecca also noted that the contrasting horizontal bars present in one of the Southwark Street designs could be misread as a different street feature.

> *"The strips going across people might think that's the up-kerb."*

Bruno emphasised the need to stop and check wherever there was an area of visual contrast:

> *"High contrast can make you think there's an obstacle and you have to stop."*

Beryl mentioned several possible obstructions that some of the designs could imply:

> *"if you don't have proper depth perception, on a bad day I'd think oh there are things in the road I'd better avoid them. I might think there's been an accident here and there's blood on the road. I might think there were spillages or things I needed to direct [her guide dog] around. I've no idea what [her guide dog] would think of this. She might think it was food.*
>
> *"You've got those blocks that could look like holes or something spilled on the road. That giraffe pattern could be glass"*

She also mentioned specifically the risk of mistaking graphical elements in red and yellow for road works equipment.

> *"The red and the yellow they are such danger colours. On a bad day, all this red and yellow are those roadworks? Is it roadworks signs or barriers have blown over? Quite often I find we've found our way into a constriction site by accident."*

6.3 Disorientation

As well as the high contrast elements some colourful crossings include geometric shapes, often with repeating patterns or non-orthogonal lines, or both.

The repeating patterns that could be read as 3D forms, such as the crossings in Stratford town centre, caused issues for sone of the people with vision impairments. Both for Linda:

> *"At certain angles to looks 3D. If it did that [when I was standing on it] I would really distrust where I was walking"*

and Beryl:

> *"It's harder.. because it looks like it's trying to create a 3D image. Vision isn't just what your eyes see it's what your brain processes."*

Brittany also raised concerns about the impact patterns that could read as 3D could have neurodivergent people:

> *"I think the three dimensional aesthetic of this could be really disorientating to walk on, in terms of balance and feeling like you were going to walk into something. Those diamonds almost look like pyramids coming out of the ground. I can really see people walking around it, not wanting to walk on it and walk on the road."*

Rebecca emphasised the challenge that many people with vision impairment experience in walking in a straight line when crossing a road (both so as to cross directly and to end up on the tactile paving on the other side) and raised a concern

about the tendency of designs with strong diagonal elements to lead people to walk at the wrong angle.

> *"Someone that's not brilliant at straight line travel are they going to get drawn with the pattern and walk in that direction?"*

6.4 Lack of consistency

Whilst the different designs of colourful crossing raised the above issues in different combinations and to different degrees, the one attribute they all had in common was they were different to 'standard' controlled crossings.

Steve pointed out that there is not strict uniformity in how the crossing area is treated:

> *"What is a colourful crossing? There are lots of crossings where you have a buff area on black tarmac."*

But all disabled participants identified a significant difference between colourful crossings and what they considered a standard crossing. Some participants felt that this could inherently problematic, even when the design of the crossing did not include any of the specific attributes discussed above.

Beryl mentioned the extent that she relies on her guide dog to locate crossings, and the colourful crossing could stop the dog recognising the crossing, especially where the tactile paving does not have tonal contrast with its surrounding paving.

> *"I'm not sure if I'm asking [her guide dog] to find me a crossing is she going to find that?"*

Bruno emphasised that "consistency is a huge deal" and that inconsistency slows him down and increases his cognitive load.

> *"If things are different I need to spend time working out if this is still a crossing."*

6.5 Beneficial contrast

Rebecca felt that the pride crossings with the vertical coloured bars could be helpful for some of the people with vision impairments she works with:

> *"If you can make use of contrast and one of those colours work for you at least you've got a straight line you can follow. Seeing it on the other side might help people work out that it was a staggered one and which way they needed to go."*

Dawn also felt that those crossings made the crossing place more obvious:

> *"Obviously this one is very clear in terms of where the crossing is as you've got the LGBTQ flag"*

However both Andrea and Brittany raised concerns about the impact of particular colours present in the pride crossings on neurodivergent people they knew with particular sensitivities. Beryl also felt that the design presented problems for the sensitivities caused by her eye condition:

> *"The lines are already playing havoc with my nystagmus and I'm not standing there waiting to cross."*

Despite their reservations with the actual designs all participants with vision impairment mentioned the positive aspects of increasing the contrast between the crossing area and surrounding carriageway if this could be done in a non-visually distracting, and ideally consistent way. Linda said:

> *"I could spot it from further away than a normal crossing. It's actually quite hard to spot a crossing, the only thing I tend to spot is the lights, so having the crossing bright is helpful"*

Bruno said:

> *"Improving on the contrast of the crossing itself would be helpful. Make them brighter and more uniform. Big white or big yellow crossings would be even better."*

Beryl and Rebecca both raised the benefits of providing lines, or high-contrast edges that lead straight across the crossing to aid walking in a straight line. They also mentioned positively the line that is provided along footway to help people get from Old Street Tube Station to Moorfields Eye Hospital.

Beryl also raised the importance of having contrasting coloured tactile paving at controlled crossings, ideally in the red colour specified in the tactile guidance [11].

> *"Having the correct tactile paving is important, it needs to be a bright colour, for a controlled crossing it should be red"*

7 Possible alternative approaches

Most disabled participants recognised the positive elements of introducing artwork into the streetscape, they just questioned the wisdom of doing so at such a high-pressure and safety-critical location. Beryl asked:

> *"Is there something in finding other spaces in the streetscape or roads cape where it can go? Would you change road markings to make it pretty? No because it would be unsafe. If you changed road signs there would be outcry because it was unsafe and confusing. Can we do something instead with pedestrianised areas where there is social space or community space. Maybe a strip of a colour at a kerb edge."*

7.1 Colourful cycle parking

Finding space to relocate designs away from the crossing, particularly onto footways could be challenging, especially whilst maintaining space for sensitive people to avoid walking on the design, but Beryl suggested the area around cycle stands as a potential location:

> *"That bike rack, make that nice! Give that nice bright colours. Turn the bike rack into rainbows. If I walked past a bike rack like that and it had a brightly coloured square of flooring and the bike racks were rainbow, that would be OK as far as I'm concerned"*

Vinyl wraps on traditional steel cycle stands would be possible (as would be installing cast iron ones and painting them) but it is likely that both of these approaches would pose challenges to 'uninstalling' and may degrade quickly in use. However treating the area around cycle stands with the same method used to install colourful crossings would create blocks of colour and pattern in the streetscape of similar visual mass to the colourful crossings themselves, and could aid people with vision impairments in more easily avoiding collisions with cycles and cycle stands.

This could be particularly straightforward and advantageous where car parking spaces are converted to cycle parking as illustrated overleaf.

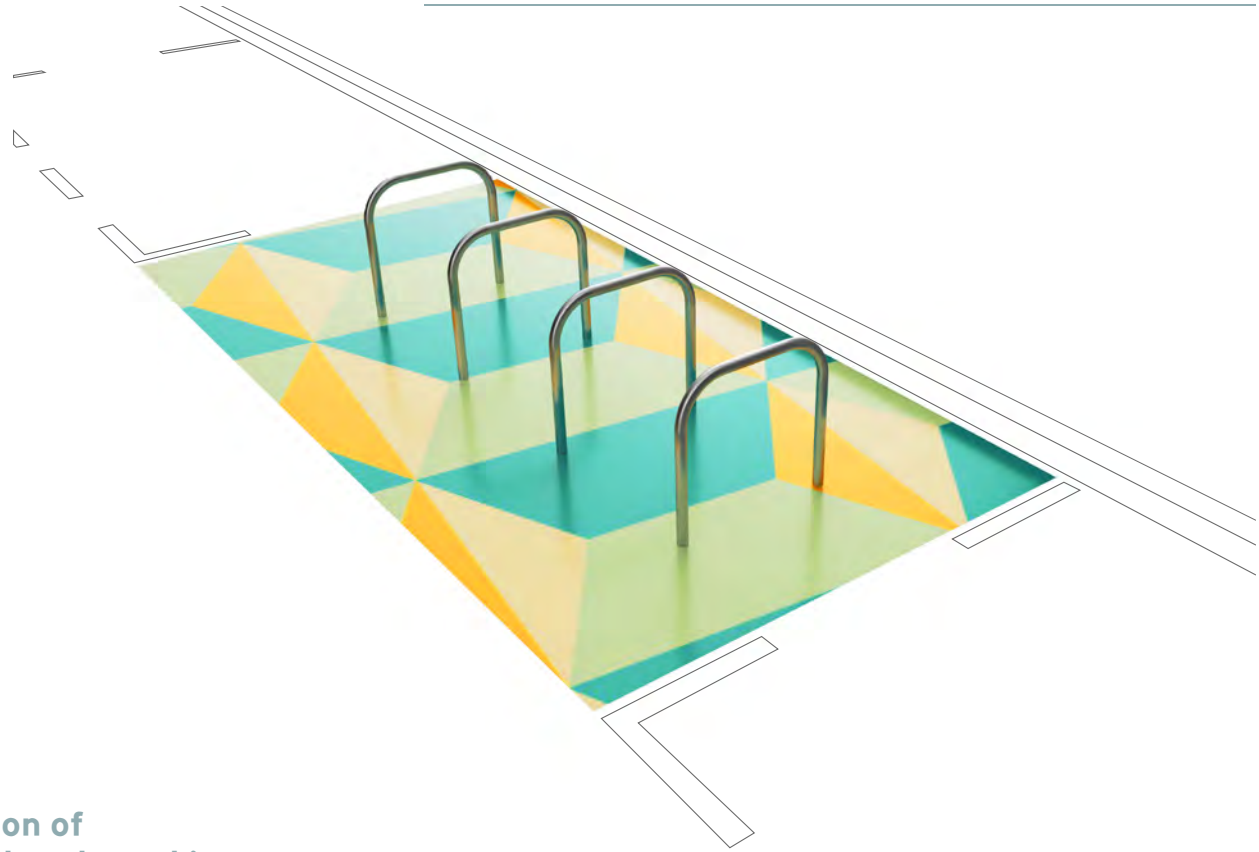


Illustration of
Colourful cycle parking

7.2 Colourful street furniture

The placemaking and celebration functions of colourful crossings could be accomplished by making other street elements colourful. As Beryl pointed out, some street furniture is essential:

> *"All that street furniture that has to exist you can make that nice colours."*

Street furniture like seats and benches, where they can be installed and sufficient footway width maintained, can provide a significant accessibility benefit, allowing people who, due to a large variety of different, high-incidence impairments, are unable to walk long distances without having a rest.

As well as an accessibility benefit Steve identified *"benches and places to rest"* as another way to meet the same placemaking objectives as colourful crossings.

Benches, seats and litter bins, with mild steel structures, could be produced that are able to accept printed panels which would make installing and changing over the 'colourful theme' straightforward and quick. These panels could be printed and cut by sign making companies who have the large format digital printers and CNC cutting machines that are now common in the industry.

These machines can handle several sheet materials, which are typically supplied in 2440 mm x 1220 mm sheets. The two most appropriate to this context are Correx (or similar corrugated polypropylene sheets) and Foamex (or similar PVC foam sheets). Where the colourful installation is expected to remain in place for only a relatively short time before being changed Correx could be used because it has lower cost and can be easily recycled. Foamex could be used on installations that are expected to remain in place for longer because of its higher durability.

A system of street furniture that accommodates printed panels cut from either of these materials is illustrated below and overleaf. The system also includes cast iron collars that could be fitted to lamp posts allowing them to be wrapped in either a full or half sheet, depending on available footway width. The system also includes benches and litter bins that have a depth of just 250 mm and so could be installed, along wit the narrower lamp post wrap, on narrow footways where it would not be possible to install deeper street furniture without creating other accessibility problems.

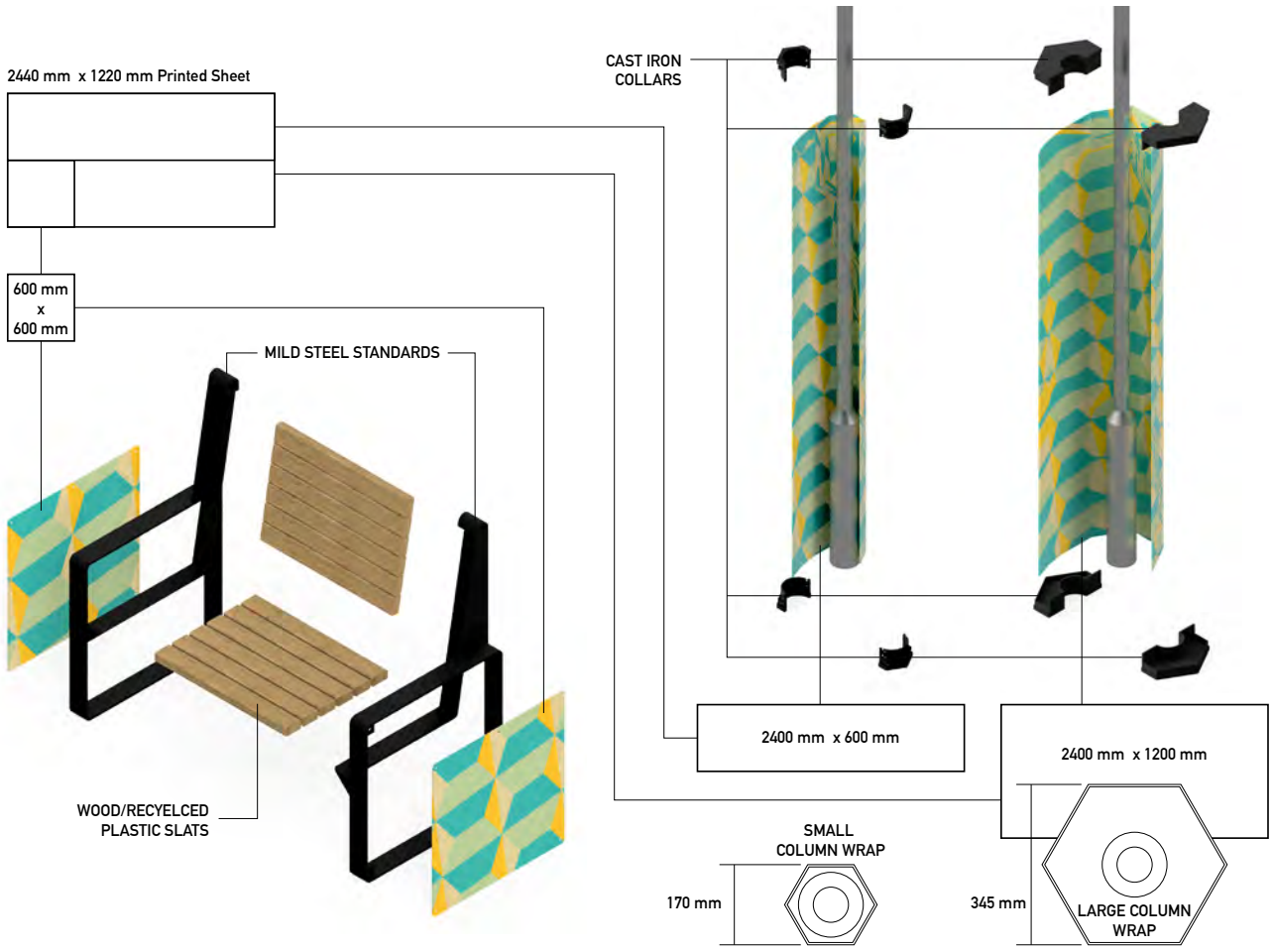
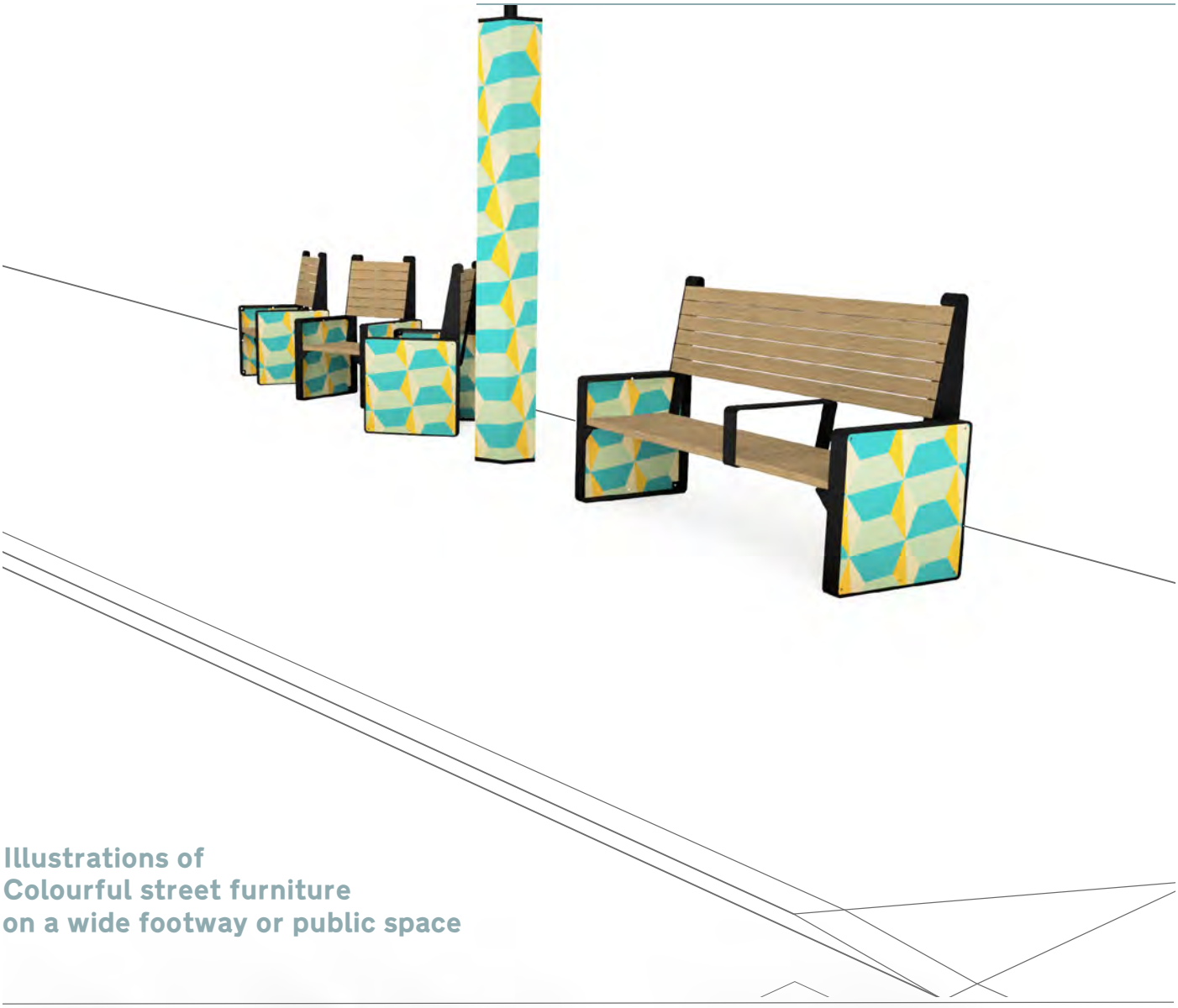
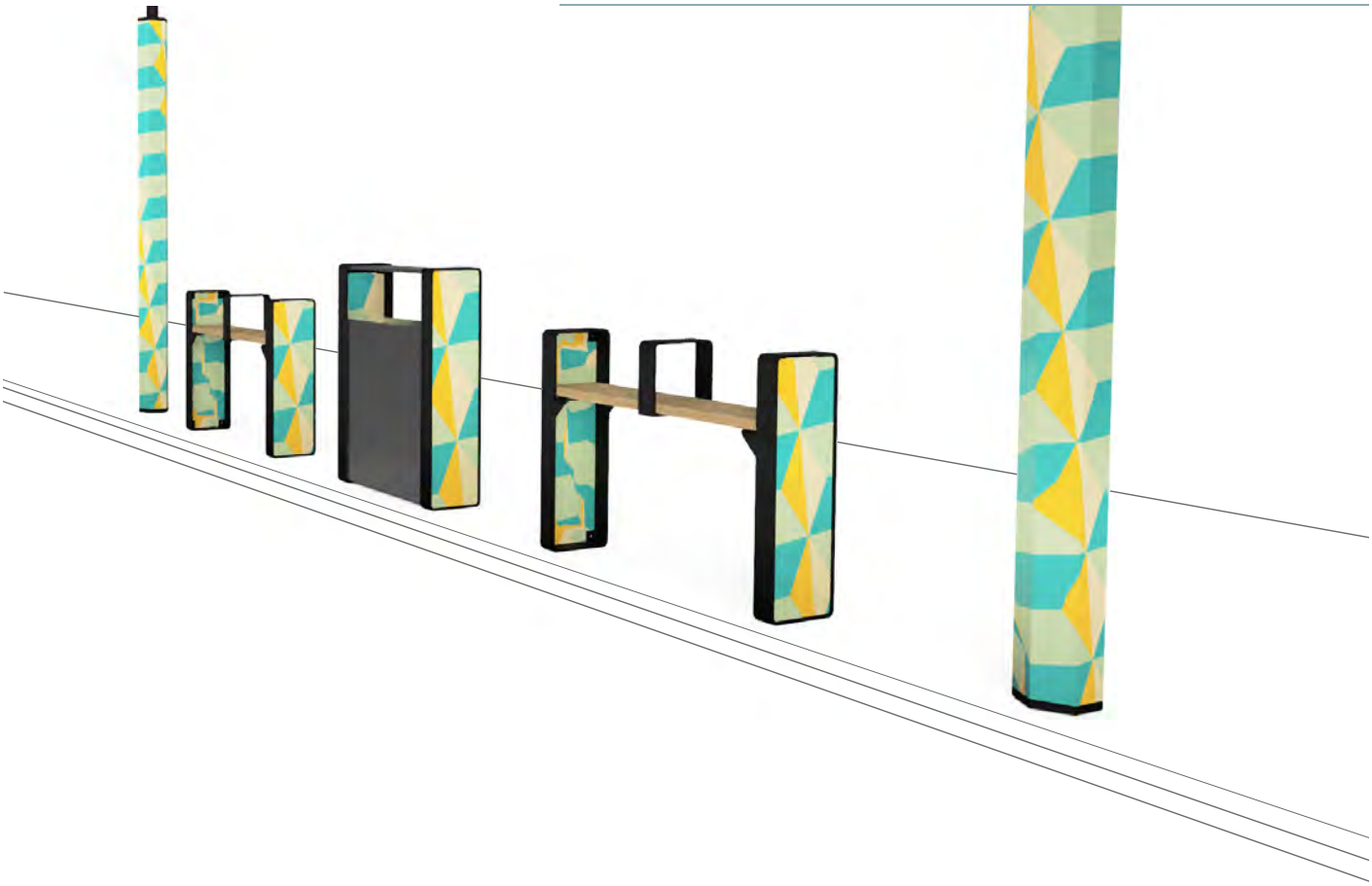


Illustration of
Colourful street furniture assembly



Illustrations of Colourful street furniture on a wide footway or public space

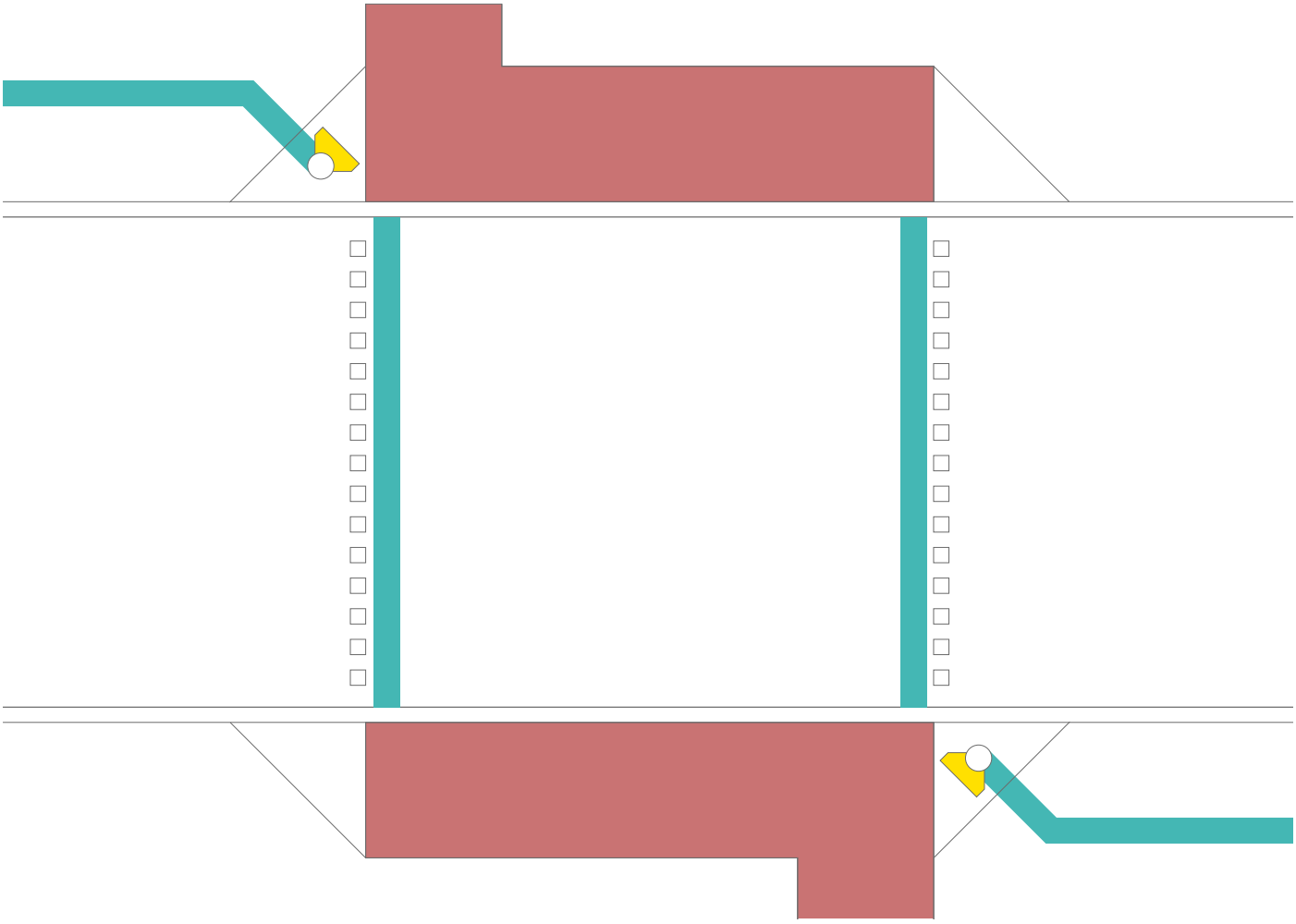


Illustrations of Colourful street furniture on a narrower footway

7.3 Colourful lines

Several participants with vision impairments mentioned the green line that leads from Old Street Tube Station to Moorfields Eye Hospital as a beneficial was to add colour to the surface of streets. It is possible that similar coloured lines could be used to meet the way finding objectives of colourful crossings.

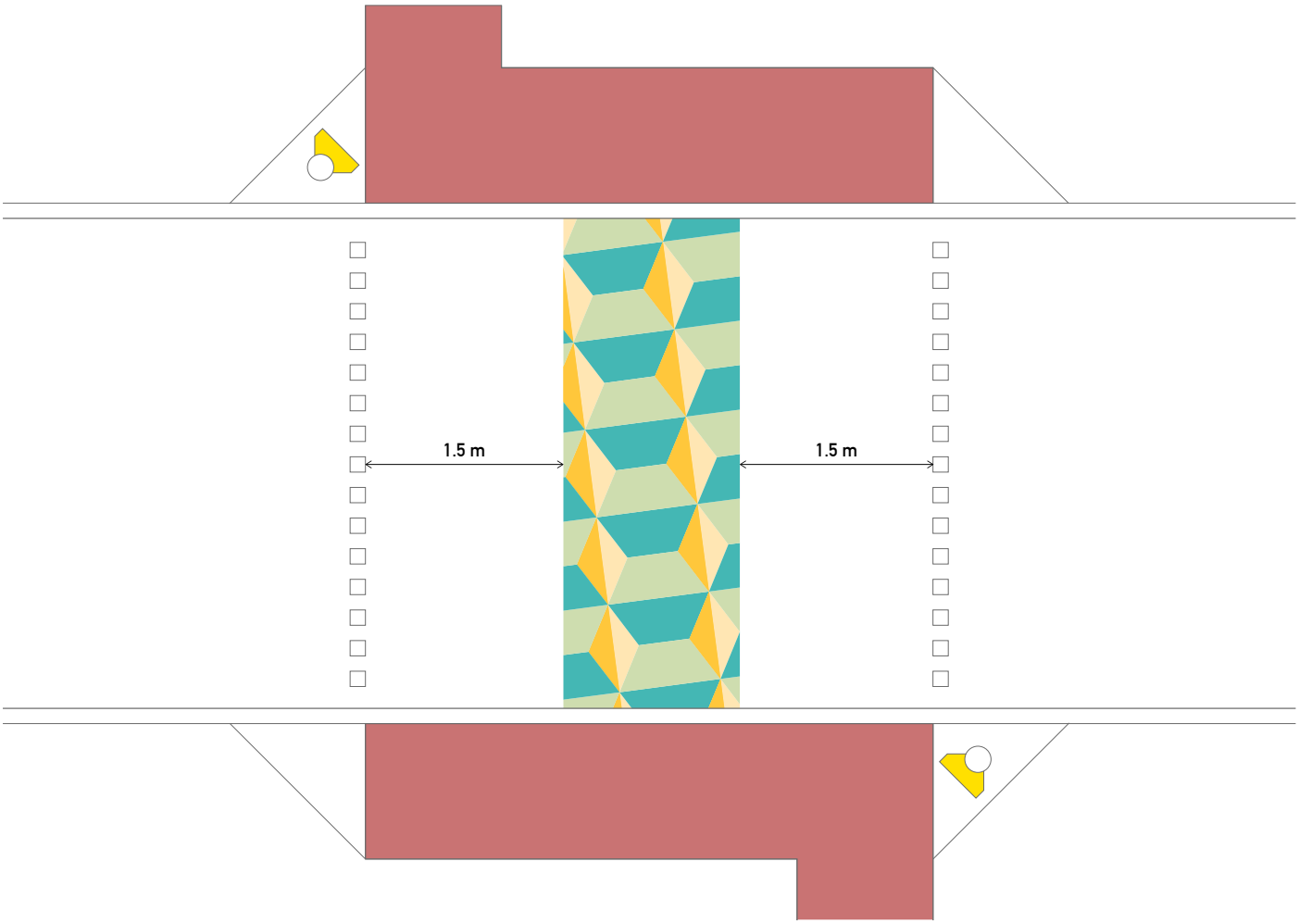
To maximise they utility to people with vision impairments lines would follow unobstructed routes along the footway and lead to the push button boxes at crossing points, and then lead across the crossing from the bush button box to the opposite kerb edge. This would help people with low vision bot to locate the crossing point and push button box and to cross the crossing in a straight line. A line configuration like this is illustrated below.



Illustrations of Colourful lines for wayfinding

7.4 Colourful band

It is possible that some of the negative effects of colourful crossings on disabled people could be mitigated by providing areas of the crossing where it is possible to cross the road without walking on the colourful area. In practice these areas would need to be in front of the two push button boxes, and would need each need to be at least 1.5 m wide to accommodate a guide dog user and their dog, but on crossings over 4 m in width a colourful band of 1 m or more could be installed, as illustrated below.



Illustrations of Colourful lines for wayfinding

8 Discussion

Vision impairments and neurodiversity both affect people in highly variable ways, giving different people different preferences for visual sensory information. There are likely to be individuals in both groups who are not negatively affected colourful crossings.

However the limited engagement that took place as part of this project found evidence of significant accessibility issues for some people in both of these groups. These issues went beyond annoyance or discomfort and were severe enough to either cause individuals to need to expend additional energy to negotiate the colourful crossings or to avoid the crossings all together, in effect being excluded by them.

A piece of quantitive research with a large sample size would be required to determine the proportions, and total numbers of people affected and attempt to establish the severity of the issues for the different populations. However even if this work were done and colourful crossings were found only to affect a relatively small number of people, a clear articulation of the benefits of colourful crossings, robust evidence of their effectiveness at providing those benefits (and superiority to other potential interventions) would be required to justify the trade off against those people's needs.

In the absence of this evidence it is hard to justify deploying features that reduce the accessibility of the streets to any individuals.

9 Recommendations

9.1 Create a clear statement of purpose for colourful crossings

Work with all the organisations seeking to instal colourful crossings to agree a brief statement of purpose that captures the objectives that colourful crossings are believed to meet.

9.2 Measure colourful crossing effectiveness

Compared to other streetscape interventions colourful crossings are relatively quick to deploy and remove. They are also deployed on a piece of infrastructure that, compared to other streetscape elements, is relatively standardised across London. This makes them well suited to study both longitudinally (study of the same crossing before and after an intervention) and using other similar crossings as controls. These factors mean that the 'effect' of the colourful crossing ought to be straightforward to measure with an appropriately designed research methodology.

Once the objectives for colourful crossings are agreed (9.1) their efficacy at meeting these objectives can be measured, depending on the nature of those objectives, either quantitively - for example by measuring pedestrian footfall on the crossing, counts of private vehicles or the takings of local businesses - or qualitatively using 'mystery shopper reports' or shadowing.

Ideally this research would also include alternative interventions that could also meet the objectives at a comparable cost.

9.3 Deploy the proposed mitigations and gather feedback

Design proposal 7.4 'Colourful band' could be deployed as a substitute for traditional colourful crossings, possibly in combination with 7.1 'Colourful cycle parking'. Both could be deployed without a significant change in design or installation approach. Were these deployed feedback could be collected from affected people to see if the major issues that traditional colourful crossings present remain. If the approach makes the issues more manageable then it could become a the standard for future colourful crossings.

The other design proposals here could also be trialled in a similar manner but would require more significant changes to colourful crossing practice.

9.4 Collect on street testimony

The COVID-19 pandemic has limited the scope to collect on-street testimony from disabled people. If case rates remain relatively low it is likely that this research can be conducted safely and could help to build on the evidence base presented here, if it is felt that this is required.

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