C5 – Contraflow Cycling on One-way Streets

Amendments:

Contraflow Cycling on One-way Streets

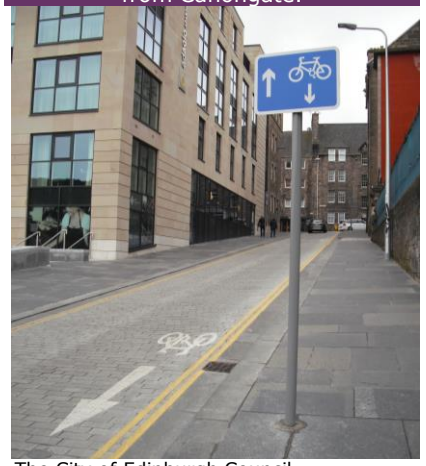
There will be a presumption that all streets will be two-way for cyclists.

Where one-way streets are implemented to manage motor traffic, cyclists should always be exempted from the one-way restriction*.

Benefits

- Improves the permeability, accessibility and directness of the road network for cycling.
- Provides a journey time advantage for cycling.
- Avoids displacing cycle users onto busy alternative routes.
- It aids route-finding because every street is available for two way cycling.
- Contraflow cycling is generally a low cost measure.
- Formalising contraflow cycling is likely to reduce cycling on the footway.
- Universal formalisation of contraflow is likely to reduce motorist/cyclist conflict on one-way streets due to the removal of the driver's sense that cyclists should not be there.

Unsegregated cycle contraflow using contemporary road setts on New St, Edinburgh, island entry from Canongate.



The City of Edinburgh Council

Safety

Contraflow cycling has a potential positive overall impact taking the wider network into account (i.e. by using a contraflow, cyclists often avoid using other, busier, streets).

Research** and UK experience suggests that permitting contraflow cycling has a number of safety-related benefits, including:

- Encouraging cyclists to shift from arterial routes to quieter streets.
- Reducing footway cycling

Other findings include that:

- Very narrow streets down to 3m or less need not be excluded if they have very low traffic volumes.
- Safety issues were most common at intersections or where visibility was poor.

Safety risks can be mitigated by:

- Making the contraflow cycling operation clear at intersections and parking lot / garage entries.
- Using contraflow entry and exit treatments – with appropriate signing, markings and physical segregation where traffic movements merit protection.
- Addressing visibility and traffic encroachment issues, using physical segregation where necessary.

Road safety audits should compare the proposed contraflow route to any alternative route that has to be used in its absence.

One Way Plugs/False One Ways

This type of measure, with a very short section of the street made one way for motor vehicles (either in or out) should always be considered alongside a full one way solution. It will generally be less inconvenient for drivers but can suffer from non-compliance and there may be issues for turning vehicles. See page 3.

In low traffic 20mph streets there is a presumption in favour of unsegregated contraflow cycling. See pages 4-6 for more detail.

Further Guidance:

- Sustrans Design Manual: Chapter 4 – Streets and roads (2015) draft

*The only exceptions are likely to be very busy one-way streets with no scope for a safe contraflow facility.

**"Traffic Safety on One-way Streets with Contraflow Bicycle Traffic" – Federal Highway Research Institute – Germany, 2002

Relevant Factsheets:

Designing for Cycling (C1)
Cycle Lanes (C2)
Segregated Cycle Tracks: Soft Segregation (C3)
Segregated Cycle Tracks: Hard Segregation (C4)

Types of Contraflow Cycling, Street Widths and Parking

Contra-flow cycling can take place in:

- 'non-segregated' carriageway (by using only signs) or one way plugs
- Advisory or mandatory contraflow cycle lanes
- contraflow bus lanes
- Segregated cycle tracks (one-way or two-way) alongside the one-way carriageway

When considering installing a cycle contraflow, each situation should be assessed on its merits. However, contraflow cycling should not generally be considered for streets with a free road width of less than 3.5m. This will ensure that, in the majority of cases, cyclists will be able to pass an oncoming motor vehicle without having to dismount.

One-way contraflow cycle track on carriageway with kerb separation, Hill Street, Birmingham (Sustrans Design Manual: Chapter 4 (2015) draft)

Parking

Parking on streets with a contraflow lane – can be either parallel or echelon, in both cases these should have a buffer zone.

- Echelon parking should be arranged so cars are reversed in and pull out forwards facing oncoming cyclists to give a clear view. Perpendicular parking is not preferred as it is often hard for drivers to see cyclists.

Gradient

A contraflow cycle lane can be less appropriate on a street with a steep gradient as this can increase the speed differential between cyclists and motor vehicles.

Contraflow cycling with advisory cycle lane, adjacent echelon parking with frequent cycle symbols, Penarth (Sustrans Design Manual: Chapter 4 (2015) draft)

Contraflow cycle lane, London (City of Edinburgh Council)

Contraflow cycle lane, Northcote Road, London (City of Edinburgh Council)

Contraflow cycle lane, Rankeillor Street, Edinburgh (City of Edinburgh Council)

Contraflow cycling with advisory cycle lane on a one way street , Ebury Street, London (Google Maps)

Relevant Factsheets:

Designing for Cycling (C1)
Cycle Lanes (C2)
Segregated Cycle Tracks: Soft Segregation (C3)
Segregated Cycle Tracks: Hard Segregation (C4)

One Way Plugs

There are two types of one way plugs that can be considered for use in Edinburgh, these are shown on this page in the drawings opposite.

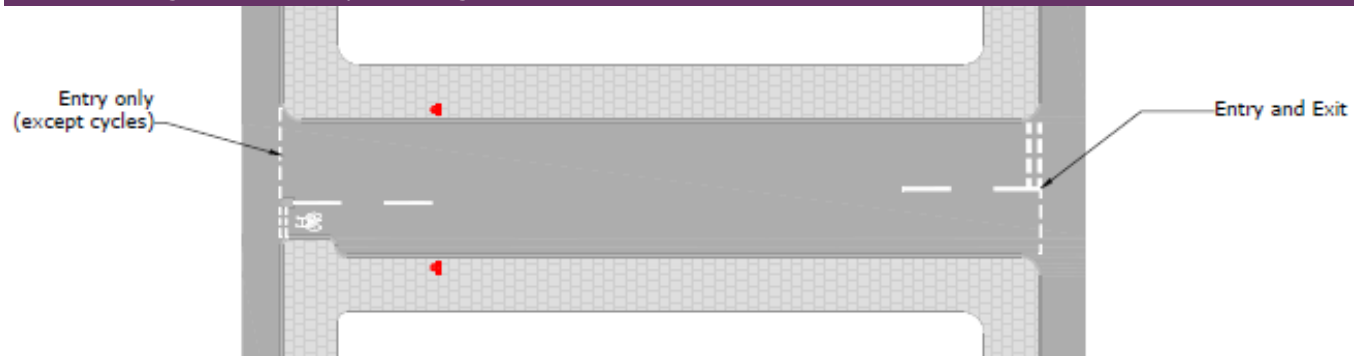
Both allow normal access and egress at one end of the street. The other end of the street is restricted to either access only or egress only for motor vehicles. The decision over which to use should be taken based on the unique location requirements.

Using the "one way in, two ways out" option may be preferred where the street is likely to be used by larger vehicles that may find it difficult to turn.

The "two ways in, one way out" option may be suited to a side street where traffic has/causes difficulty when joining the main road at the proposes "in-only" end.

Cyclists should always be exempted from one-way plug restrictions.

One way plug - two ways in, one way out. Note that appropriate signage should be provided using Diag. 616 and Diag. 954.4, where possible signs should be mounted on illuminated bollards to reduce street clutter.



Drawing 5145925-CC-C-0002

One way plug – one way in, two ways out. Note that appropriate signage should be provided using Diag. 616 and Diag. 954.4, where possible signs should be mounted on illuminated bollards to reduce street clutter.

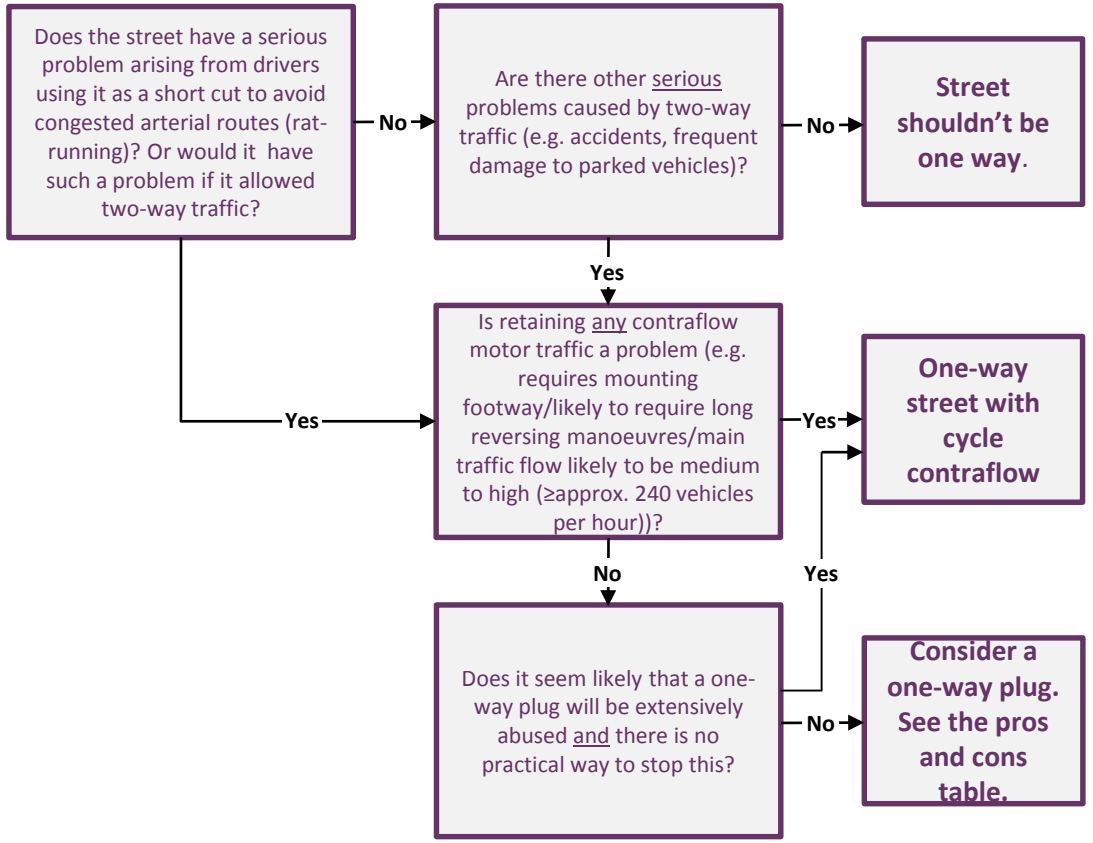
Drawing 5145925-CC-C-0003

1-Way Streets or Plugs Decision Tree

In general, the decision process for considering one-way street/one-way plug options should be as laid out in this decision tree.

A one-way plug, with a very short section of the street made one way for motor vehicles (either in or out) should always be considered alongside a full one way solution.

It will generally be less inconvenient for drivers but can suffer from non-compliance and there may be issues for turning vehicles.



One-Way Plugs – Pros and Cons:

Type of facility	Pros	Cons
2 ways IN, 1-way OUT for motor traffic	• Useful for removing access onto a main road where there are problems created by joining vehicles.	• Potential for motor vehicles to become 'trapped' in street because they can't turn around
	• Depends on local circumstances, e.g. which direction of one-way helps prevent 'rat-running'	
1-way IN, 2 ways OUT for motor traffic	• No issue of motor vehicles becoming 'trapped' in street because they can't turn around	• Egress from the "one-way" end is maintained – generally more problems are caused by traffic joining, than by traffic turning off a main road.
	• Depends on local circumstances, e.g. which direction of one-way helps prevent 'rat-running'	
Both	• Inconvenience to drivers is significantly less than full one-way street - ability to both enter and exit one end of street • Drivers will encounter motor vehicles as well as cyclists in the opposing direction. • Motor vehicle speeds likely to be lower than in full one-way streets	• Relatively low likelihood of drivers who contravene the restriction being caught in the act of doing so means non-compliance is more likely to be a problem than with a full one way. Consider the likely consequences of infringements and measures to minimise (e.g. road narrowing).

Contraflow Types Details

The table opposite classifies the different types of contraflow that can be employed in the City of Edinburgh. It describes each of these and provides some details of what they comprise.

This table should be used in conjunction with the decision tree and tables 2, 3 and 4 on the following pages to identify the appropriate type of contraflow for different locations.

*Careful consideration should be given to use of a mandatory cycle lane. These are not enforceable by CEC, so enforcement relies on the Police. To enable CEC enforcement a TRO to prohibit waiting and/or loading also needs to be promoted. Mandatory cycle lanes also prohibit the use of the area for bus stops.

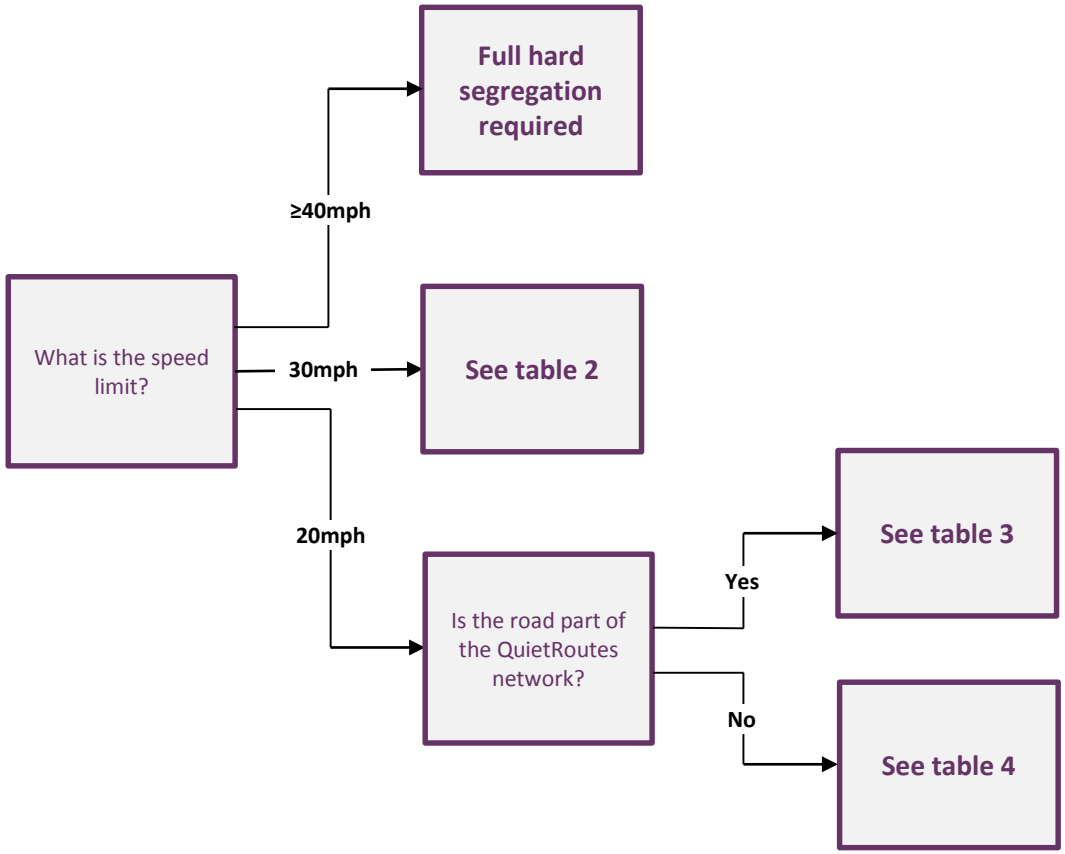
Table 1. Types of contraflow

Ref.	Contraflow Type	Description	Features
P	One way plug	Unsegregated except at plug	• Some form of lane or segregation at plug • Signs and markings • Otherwise as 'U'
U	Unsegregated	No lane or segregation	• Signs • Consider markings (e.g. cycle symbols with arrows) • Consider lane/ segregation at entry and/or exit and/or at difficult locations • Consider providing gaps in parking to allow space for cyclists to pass oncoming motor vehicles
A	Advisory	Advisory cycle lane, allows motor vehicles to encroach	• Signs • Consider segregation at exit (especially) and/or entry • Consider mandatory lane, and/or parking/loading restrictions or segregation at difficult locations
M	Mandatory*	Solid white line. Vehicles should only encroach on lane if they are crossing the lane to a driveway, access or parking/loading bay	• Signs • consider segregation at exit (especially) and/or entry • Implement complementary parking/loading restrictions • Consider segregation at difficult locations
S	Segregated	Hard or soft segregation to keep motor vehicles out of cycle lane (though crossing it to accesses etc can be permitted).	• Signs • Physical segregation. This may be soft or hard. Hard segregation preferred at higher traffic volumes and on QuietRoutes

Contraflow Type Selection

The decision tree opposite provides guidance as to the appropriate level of segregation required for cycling contraflows on roads of different speed limits.

It links with tables 2,3 and 4 on the following pages which provide further information about the options available in different situations.



Contraflow Type Selection Continued

The tables opposite and on the following page provide guidance as to the type of segregation to be employed for different street situations.

The type of contraflow decision tree on page 5 provides guidance as to which table is most appropriate. These tables should also be used in conjunction with table 1 which provides more detail on the segregation type.

Table 2. Suggested Segregation methods for contraflow cycle facilities in a 30mph speed limit

Peak Hourly Flow (vehicles/hour)	Suggested Segregation Type[1,4]
< 30	U+, generally A
30 – 60	A+, generally M
60 – 120	M+
≥ 120	S

Table 3. Suggested Segregation methods for 20mph QuietRoutes[2,3]

Peak Hourly Flow (vehicles/hour)	Expected Average Speed ≤20mph?	Suggested Segregation Type[4,5]
< 30	Yes	U
	No	U+
30 – 60	Yes	U+
	No	A+
60 – 120	Yes	A+
	No	A+, if possible M or S
120 – 240	Yes	A+, if possible M or S
	No	S
≥ 240	Yes	S
	No	

Notes to tables:

1. Any contraflow cycle lanes on a 30mph road on the QuietRoutes Network should be hard segregated.
2. Always consider using a one-way plug first. See page 3.
3. Enhanced segregation should be considered in locations with additional problems for cyclists, in particular poor forward visibility or likely higher speeds.
4. U+, A+, M+ means that you should consider means of segregation from U, A, M respectively upwards, starting with the least segregated option (unless the table says otherwise). You should generally consider speed reduction measures to bring average speeds below 20mph before considering a higher level of segregation. Hybrid solutions, as per note 3, should be considered.
5. Other factors such as street width and car parking often constrain or influence marking/segregation options. The level of marking/segregation should not be increased just because there is space to do so. However, marking/segregation should be increased if it seems likely that there will be appreciable benefits in relation to the cost and any negative impacts.

Contraflow Type Selection Continued/Use of Red Chips

Table 4. Suggested segregation methods for 20mph streets that are not on QuietRoutes[1,2]

Peak Hourly Flow (vehicles/hour)	Expected Average Speed ≤20mph?	Suggested Segregation Type[3,4]
< 30	Yes	U
	No	U+
30 – 60	Yes	U
	No	U+
60 – 120	Yes	U+
	No	A+
120 – 240	Yes	A+, if possible M or S, especially at higher speeds
	No	
240 – 480	Yes	M or S, preferably S, especially at higher speeds
	No	
≥ 480	Yes	Always S (Hard)
	No	

Notes to table:

1. Always consider using a one-way plug first. See page 3.
2. Enhanced segregation should be considered in locations with additional problems for cyclists, in particular poor forward visibility or likely higher speeds.
3. U+, A+, M+ means that you should consider means of segregation from U, A, M respectively upwards, starting with the least segregated option (unless the table says otherwise). You should generally consider speed reduction measures to bring average speeds below 20mph before considering a higher level of segregation. Hybrid solutions, as per note 2 should be considered.
4. Other factors such as street width and car parking often constrain or influence marking/segregation options. The level of marking/segregation should not be increased just because there is space to do so. However, marking/segregation should be increased if it seems likely that there will be appreciable benefits in relation to the cost and any negative impacts.

Use of a Red Chipped Surface

The use of a red chipped surface helps draw attention to a cycle lane. However installation over small areas is relatively expensive. Guidance is provided below as to when to consider using red chips for cycle lanes:

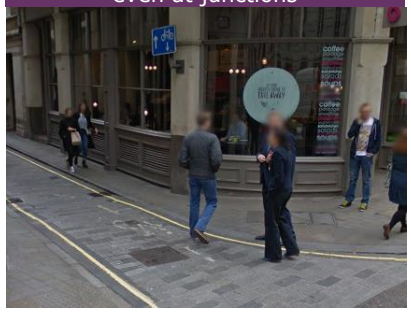
- Use red chips in contraflow lanes, including short lengths at plugs and entry/exit points, when resurfacing the whole street.
- The safety value of red chips versus cost should be considered when installing contraflow but <u>not</u> resurfacing the whole street.

Contraflow with minimal segregation

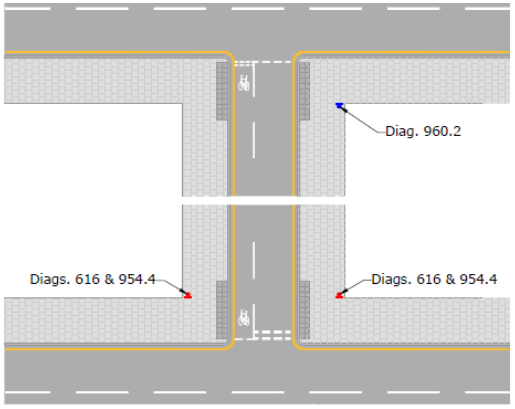
Use on quiet streets, where risk of encroachment onto cycle side is low.

DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- NO RED CHIPPING REQUIRED
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE

Contraflow on very narrow streets – no lane delineation even at junctions



One-way contraflow on the narrow Ironmonger Lane, London. Note the Diag. 960.2 signage (Google Maps).



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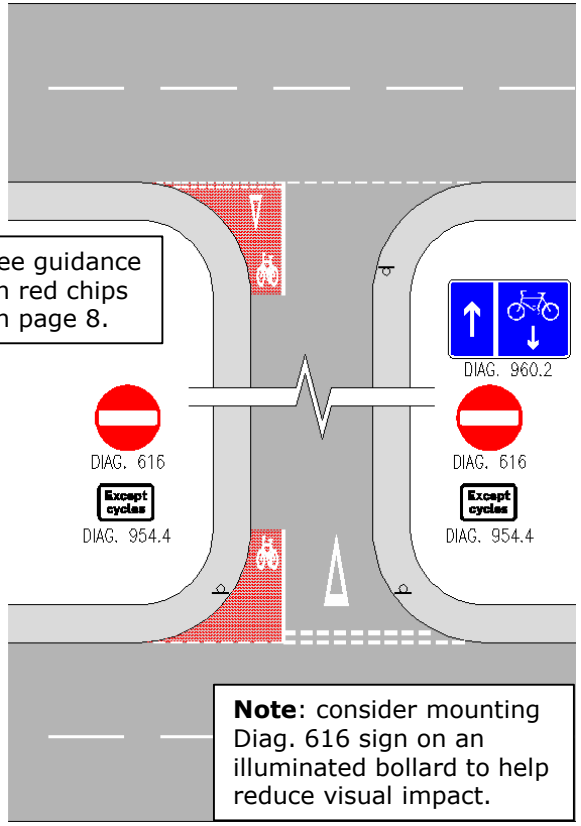
Contraflow with enhanced markings and minimal physical segregation

Use on quiet streets, with straightforward entry/exits with some risk of encroachment by motor vehicles.

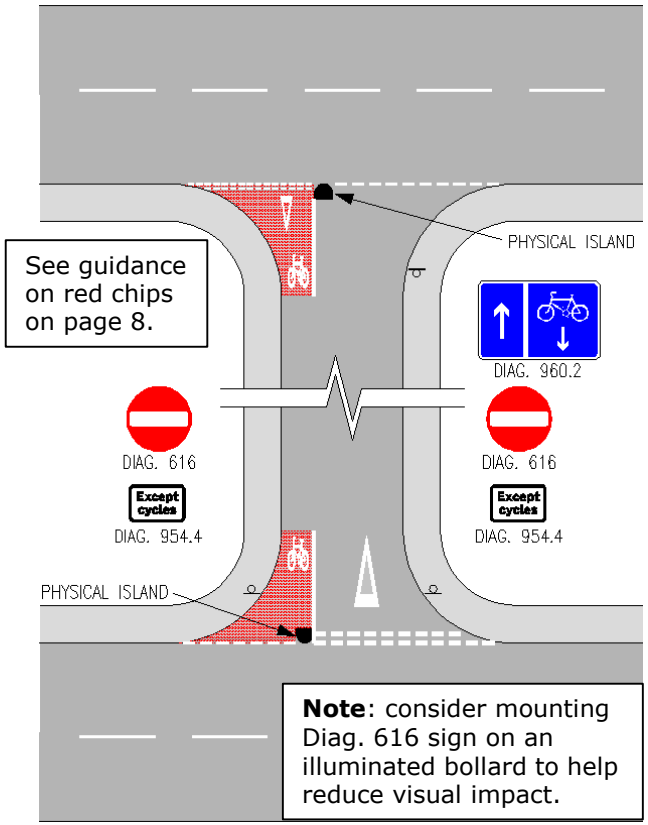
DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE



Contraflow with physical protection at entry and exit, but minimal markings

Use on quiet streets with higher risk of encroachment especially if HGV/Bus use is significant. Protection is generally more important at cycle-only exits.

DESIGN INFORMATION:
- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE



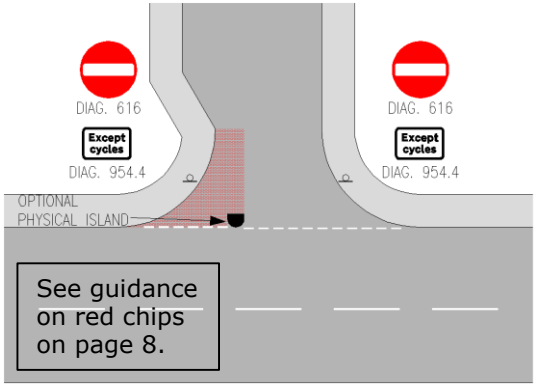
Contra-flow options (drawings from One Way Street Review, WSP PB)

Contraflow cycle lane entry at false one way junction (one way plug)

Physical protection required if vehicles, especially HGVs, are likely to encroach. (Less likely here than at the exit from a contraflow lane)

DESIGN INFORMATION:

- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- RED CHIPPING SURFACE FINISH TO CYCLE LANES



One-way contraflow cycle lane exit at false one-way, Penarth (Sustrans)

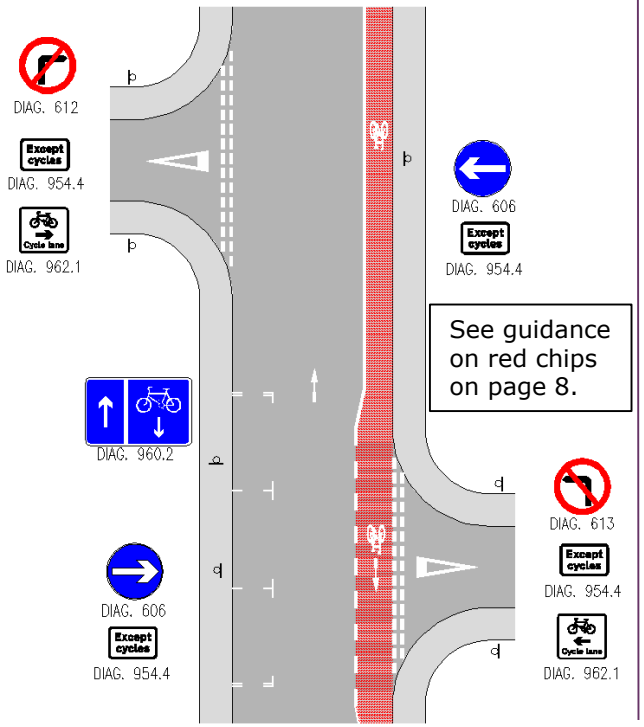
Ensure exit from any protected section of cycleway is not blocked by parked cars.

Contraflow cycle lane with side streets

Typical detail for general use. If the side road has a continuous footway, remove give way markings etc.

DESIGN INFORMATION:

- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- CYCLE LANE SHOULD INCREASE BY 0.5m AT JUNCTIONS
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE

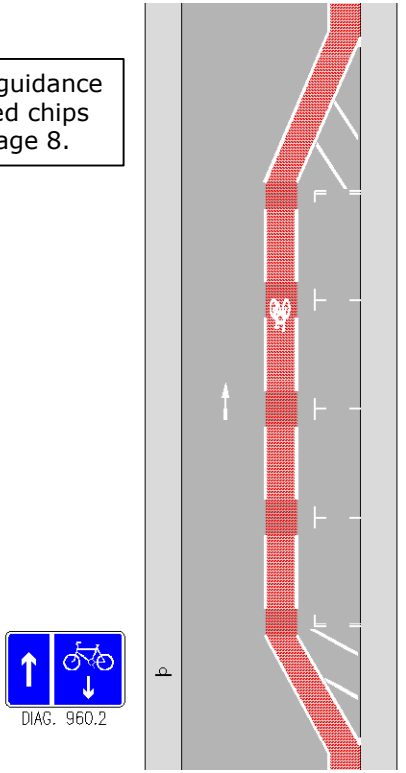


Contraflow cycle lane adjacent to parking bays

May create a pinch point on narrow streets where either cyclists or vehicles may need to give way, acceptable on quiet streets.

DESIGN INFORMATION:

- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- TAPER ON APPROACH 1:10; EXIT 1:5
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE



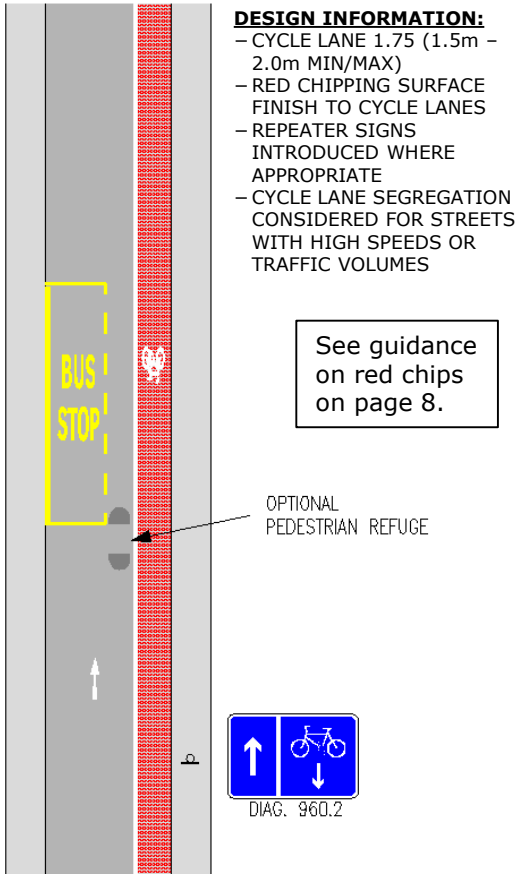
Contra-flow options (drawings from One Way Street Review, WSP PB)

Relevant Factsheets

Continuous Footways (G7)

Contraflow cycle lane passing a bus stop

Optional refuge for pedestrians crossing behind bus acts as extra cyclist protection.



DESIGN INFORMATION:

- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE
- CYCLE LANE SEGREGATION CONSIDERED FOR STREETS WITH HIGH SPEEDS OR TRAFFIC VOLUMES

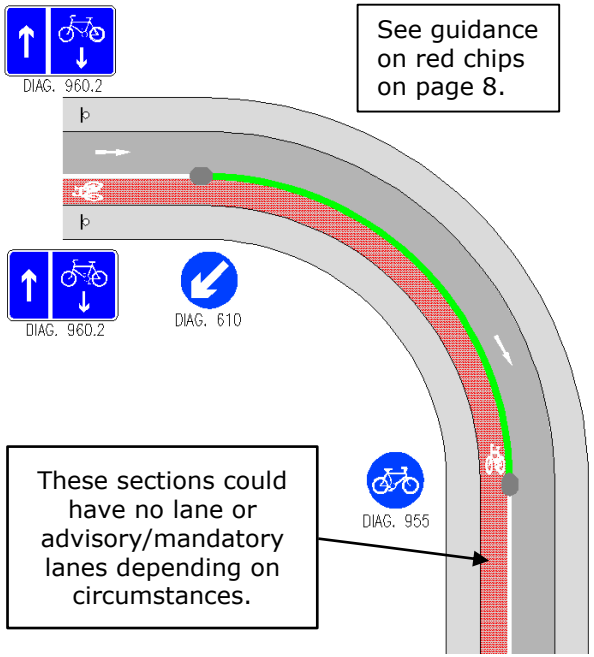
See guidance on red chips on page 8.

Contraflow cycle lane with reduced forward visibility

Physical segregation prevents vehicle encroachment particularly where contraflow on inside of bend, and where reduced visibility.

DESIGN INFORMATION:

- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- GREEN LINE INDICATES PHYSICAL SEGREGATION
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE



See guidance on red chips on page 8.

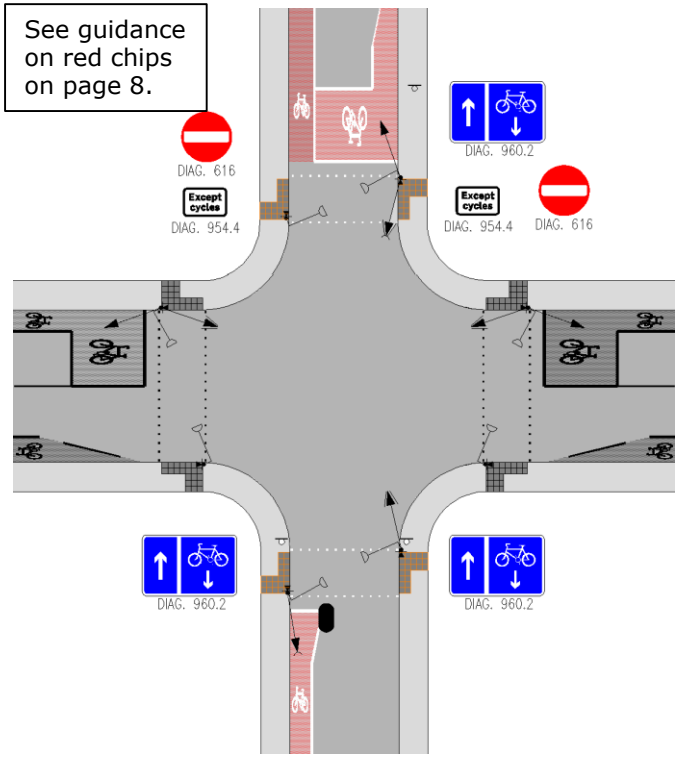
Contraflow cycle lanes at signalised junctions

With protection at contraflow exit.

DESIGN INFORMATION:

- CYCLE LANE 1.75 (1.5m – 2.0m MIN/MAX)
- CYCLE FEEDER LANE 1.5m MIN
- ADVANCED STOP LINE WIDTH 4m MIN
- RED CHIPPING SURFACE FINISH TO CYCLE LANES
- REPEATER SIGNS INTRODUCED WHERE APPROPRIATE

See guidance on red chips on page 8.



Contra-flow options (drawings from One Way Street Review, WSP PB)

Relevant Factsheets

Continuous Footways (G7)

Image References

Contraflow Cycling on One Way Streets

Images: City of Edinburgh Council

Contraflow Cycling

Birmingham: Sustrans Design Manual: Chapter 4 (2015) draft [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/images/files/Route-Design-Resources/4_Streets_and_roads_05_03_15.pdf [Accessed 04 April 2018]

Penarth: Sustrans Design Manual: Chapter 4 (2015) draft [ONLINE]. Available at: http://www.sustrans.org.uk/sites/default/files/images/files/Route-Design-Resources/4_Streets_and_roads_05_03_15.pdf [Accessed 04 April 2018]

London: City of Edinburgh Council

Northcote Road: City of Edinburgh Council

Rankeillor Street: City of Edinburgh Council

Ebury Street: Google Maps (2012) [ONLINE]. Available at: https://bit.ly/2JjJjLU [Accessed 04 April 2018]

Contraflow on very narrow streets

Ironmonger Lane: Google Maps (2016) [ONLINE]. Available at: https://bit.ly/2KtbCqR [Accessed 16 May 2018]

Contraflow cycle lane entry at false one way junction (one way plug)

One-way contraflow cycle lane exit at false one-way: Sustrans: Inspiring Infrastructure Case Study [ONLINE]. Available at: https://www.sustrans.org.uk/article/inspiring-infrastructure-arcot-street-penarth [Accessed 04 April 2018]

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