

CAMBRIDGESHIRE GUIDED BUSWAY OPERATIONS HANDBOOK

V1.19

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1 Introduction

- 1.1 The Cambridgeshire Guided Busway (“the Busway”) is a flexible transport system that will provide people with a reliable, fast and frequent bus service for getting to work and leisure activities in and around Cambridge and the A14 corridor. It serves Huntingdon, St Ives and Cambridge, suburban areas, villages, major hospitals, railway stations and key employment and educational sites.
- 1.2 The Busway route is split between two transport modes:
 - On road – Between Huntingdon and St Ives and in Cambridge city centre. Buses will operate on-road with bus priority where possible.
 - On Guideway – Between St Ives and north Cambridge, and between Cambridge Railway Station and south Cambridge (including Trumpington and Addenbrooke’s Hospital). Buses will operate on a guideway exclusively for buses.
- 1.3 The County Council has ownership of the guideway infrastructure and its surrounding land, with bus operating companies providing bus services on it, and on connecting public roads. While on the guided sections, the County Council is in overall control of all services to ensure the safe operation of the system.
- 1.4 Safe operation of the Busway is paramount. This requires both the County Council and the bus operators to integrate and apply one standard set of operating procedures to all operating situations on the guideway.
- 1.5 Re-stated, all operating procedures are based upon a first principle of safety for users and staff.
- 1.6 The approach to safety is established by:
 - The scrutiny through the 2004 Cambridgeshire Guided Busway Public Inquiry, the outcome of which was published in December 2005.
 - Design of the Busway having been tested by Risk Assessment procedures applied by the Designer during the construction process.
 - The scrutiny of Road Safety Audits, as established by the Design Manual for Roads and Bridges at interfaces with vehicular accesses to the system and similar audit processes for the mainline and the stops on the system.
 - Adopting all Construction and Use regulations and Department of Transport (DfT) and Traffic Commissioner’s requirements for the safe operation of buses (PCV - Passenger Carrying Vehicles) in the United Kingdom.

2 What is a Guided Busway?

Outline

- 2.1 A guided busway is a rapid transit system exclusively for buses fitted with the appropriate guidance equipment to use the system. The method of guidance varies and can be optical, magnetic or kerb guidance of which the Busway is the latter. These buses can use both the guided busway for which they were adapted and normal roads as well.
- 2.2 The Busway consists of twin guideways with each guideway constructed to form a channel slightly wider than a bus and designed so that the ingress of vehicles other than specially adapted buses is virtually eliminated. This ensures that the buses operate in an exclusive transport corridor much like a train or tram. There is a short single section of track in Trumpington Cutting.
- 2.3 Specially adapted buses, known as guided buses, are fitted with small solid-rubber guidewheels which contact with the kerb upstands of the concrete channel when in the guideway and hold the bus securely. These kerbs thus steer the bus, allowing the driver to concentrate on braking and accelerating to give a smooth ride.
- 2.4 As guided buses using the system are guided very precisely, they can get closer to the platform edge of Busway stops than usual bus stops. This allows step free access onto and off the bus.

Definitions

Guided bus

- 2.5 Guided buses on the Busway may be single-deck or double-deck and may be obtained from several manufacturers (e.g. Scania, Volvo, Mercedes-Benz). The same basic principles apply to each. The section of guideway between St Ives and Cambridge is suitable for both single, and double deck vehicles, but the section between Cambridge railway station, Trumpington, and Addenbrooke's is only suitable for single deck vehicles due to height restrictions.
- 2.6 Each of these guided buses is fitted with a guidance system consisting of small solid-rubber guidewheels mounted in the horizontal plane just ahead of each front wheel. These guidewheels extend slightly beyond the width of a conventional bus at a low level and connects to the steering mechanism via a J-shaped arm.
- 2.7 This mechanism is the only modification required to allow buses to use the Busway. However, tied into the agreement with the bus operators to use the Busway is a commitment to use vehicles of a high standard.

Guideway

- 2.8 A guideway is in effect an exclusive bus lane for guided buses to run in and vehicles not adapted to run in them are likely to be damaged if they try to use them.

- 2.9 Each guideway section is constructed to form a high-quality 2.6m wide concrete channel with kerb upstands on either side. Each of these sections is then placed end to end to form a continuous guideway route with excellent ride quality for guided buses to run in.
- 2.10 Although very narrow, the speed of the bus is unaffected and high running speeds are achievable. The driver can then concentrate on accelerating and braking, with the steering aided by the kerbs. Entering and exiting a guideway is done by a funnel type arrangement with steel rails usually at road junctions.

Maintenance track

- 2.11 Alongside the twin guideways which make up the majority of Busway route, a maintenance track runs parallel to it. This allows access to whole width of the Busway corridor for maintenance to be carried out.
- 2.12 The maintenance track serves a dual purpose, not only as an access for maintenance but also as a permissive route for pedestrians, cyclists and equestrians. This is limited to pedestrians and cyclists only in the more urban southern section.

Busway stops

- 2.13 Along the Busway route there are dedicated high quality Busway stops where passengers can get on and off guided buses.
- 2.14 These Busway stops have more in common with railway stations than normal bus stops and incorporate the following features:
- Step free access from the platforms on to and off buses;
 - High quality shelters on all stop platforms;
 - Real Time Bus Information on all stop platforms;
 - Covered and well lit cycle parking at most stops;
 - CCTV coverage for security at all stops.
- 2.15 In addition to the Busway stops along the route, three Park and Ride sites, at St Ives, Longstanton and Trumpington are available. These sites have all of the features of Busway stops together with other features more commonly seen at Park and Ride sites.

The Busway corridor and land

- 2.16 In most locations the Busway corridor contains twin guideways (one guideway in each direction) with the maintenance track running parallel to it between its two boundaries. Also within the corridor will be stops, fences and landscaping. Other assets of the Busway, such as Park and Ride sites and ecological mitigation areas are usually situated on land adjoining the Busway corridor.
- 2.17 It is necessary to be aware that as the Busway has been constructed under the Cambridgeshire Guided Busway Order 2005 ("the Order") and 'stronger' regulations apply than for conventional buses on the public

highway. The Busway is NOT a public highway although there are road junctions along it, and it is protected under the Order in much the same manner as railway lands or statutory undertakers' equipment has protected status.

3 Introduction to general operating principles

- 3.1 While on the Busway, the bus driver remains responsible for the safe operation of his/her guided bus, in the same way as on the public highway, and will remain in full control of the bus at all times. The bus operating company is responsible for the provision of a suitable and safe vehicle.
- 3.2 All types of passenger safety, bus performance, operation and manoeuvring remain the drivers' responsibility as they would on the public highway in accordance with The Highway Code.
- 3.3 Control of the operation of the Busway is located at the Control Centre within the Longstanton and Ride site. Some operations on the Busway may from time to time be managed from other locations, for example from the St.Ives Park and Ride site or from vehicles attending incidents on or near the Busway.
- 3.4 Phone and mobile communications are linked to the Control Centre, as are CCTV systems covering stop platforms and highway junctions.
- 3.5 At all times the Control Centre is to be kept informed of any event that is disrupting or threatens to disrupt services on or near to the Busway.
- 3.6 Individual bus company operating arrangements do not, on their own, take the place of the County Council who will make all decisions about Busway operations. The Control Centre is always responsible for all Busway operations within guided sections.
- 3.7 A bus must only operate in the one direction that the respective guideway track is designed for. There must never be any attempt to operate in the opposite direction to that designed, even in an emergency.
- 3.8 Directions of travel on the Busway will be referred to as Southbound towards Trumpington and Northbound towards St. Ives. The tracks are designated 'Alpha' for the guideway towards Addenbrooke's, and 'Bravo' in the opposite direction. These titles apply even when the individual bus is not operating to the extreme southern or northern ends of the Busway.
- 3.9 For ease of reference the Busway has been split into two sections:
 - Northern – St Ives to Cambridge; and
 - Southern – Cambridge to Trumpington and Addenbrooke's Hospital.
- 3.10 Drivers will anticipate conditions on the guideway ahead of the bus as they would on the public highway driving according to the conditions, and should be aware of pedestrians, cyclists, and horse riders using the track, particularly at junctions, crossings, and stops.
- 3.11 Line speed will be 56mph and applies everywhere except stops, road junctions, burst throughs or as otherwise advised in this Handbook. Drivers should operate at line speed where possible unless advised otherwise by the control room, or if in their judgement there is a safety-critical risk (for example thick fog, people trespassing on the track, work adjacent to the track

4 Vehicle considerations and on-road procedures

- 4.1 Existing bus operator handbooks will already cover topics required for on road operations and how to correctly set up a guided bus for operation; however there are some additional details to be considered when operating a guided bus.
- 4.2 The guidewheel and guide-arm mechanism of the guided bus is fitted:
 - Protruding slightly beyond the overall width of the body of the bus, making a guided bus slightly WIDER; and
 - The mechanism sits below the body of the bus, making the ground clearance slightly LOWER than for a conventional bus.
- 4.3 The guidewheel settings are critical. Unlike other guideways in the UK, the Busway has met extremely high construction tolerances. Guidewheel settings must be 2605mm +/- 2mm. Setting the wheels too wide runs the risk of over-compression, leading to overheating, and guidewheel failure. Operators should provide a copy of their method statement for ensuring that these tolerances are maintained.
- 4.4 Buses must also be checked more thoroughly than if for on road use to ensure that they are correctly aligned and not 'crabbed'. Because guideways are relatively narrow (only 2600mm -0+3mm between kerbs) there is a risk that on a curve that a rear tyre could come into contact with the inside kerb, causing scuffing and leading, potentially, to a rear-wheel blow-out.
- 4.5 The guideway is designed with sufficiently gentle curvature to avoid this sort of problem, providing that the bus runs reasonably straight and is not 'crabbed'.
- 4.6 It is therefore important that, whenever a guided bus is supplied with guide-arms, or has guide-arms fitted, or has undergone extensive repair or overhaul which may have affected its alignment, it is thoroughly checked and before re-entering service, a trial should be undertaken as below, conducted by the operators engineering and overseen by Council staff, BEFORE the bus is allowed to operate on the Busway again. A section of guideway will need to be booked for this take place.
- 4.7 To test a bus for crabbing, it should be allowed to 'drift', with hands-off the steering wheel, for some 50+ metres and then stopped. The distances between the first and second wheel hubs and the guide kerbs should be measured and recorded.
- 4.8 Assuming that the front wheels are correctly centred (which can itself be checked using the same process), the 'offset' or 'crabbing' dimension of the bus is given by the formula [half the difference between the 2 measurements for each axle].
- 4.9 If this offset dimension is greater than 25mm the bus MUST not be operated in any guideway and its alignment must be adjusted and then rechecked.

Extra width

- 4.10 The extra overall width of a guided bus means that there will be occasions when a guidewheel does touch a solid or substantial vertical object like a kerb.
- 4.11 If a hard impact has occurred the driver must, as soon as possible when and where it is safe to do so, stop his vehicle and carry out a thorough visual examination for damage or disturbance. If in doubt, contact the depot before moving the vehicle. The bus should not be used in a guideway again until it has been checked.

Reduced ground clearance

- 4.12 The guidewheel and guide-arm mechanism of the guided bus sits below the level of the body of the bus which means additional care must be taken when encountering areas where adjacent surfaces are at different levels compared to the road surface. For example at road works, conventional on road bus stops and when mounting the kerb.
- 4.13 In such situations, it is possible that the guidewheel may get wedged on top of the kerb damaging the mechanism. If a hard impact has occurred the driver must, as soon as possible when and where it is safe to do so, stop his vehicle and carry out a thorough visual examination for damage or disturbance. If in doubt, contact the depot before moving the vehicle.

5 On guideway procedures

- 5.1 Operating procedures on the guideway are broadly similar to those of on road operating procedures to be found in existing bus operator handbooks; however, there are some key additional details to be considered when operating a guided bus on the Busway:
- Only vehicles fitted with the guidewheel mechanism specifically designed for guideway use, and checked by the bus operator may operate on the guideway. Operators should put in place a system to clearly show staff which buses are 'guideway ready', and which are not.
 - Whilst on the guideway, control of the vehicle is via acceleration and braking only. There is NO STEERING control whilst in guidance.
 - Whilst in guidance, the vehicle must only travel forwards and CANNOT REVERSE more than a very short distance.
 - The entire Busway including the guided sections, maintenance track, park and ride sites, and associated land, and operations on it are the responsibility of the County Council. Any incident which affects or threatens to affect the system must be reported immediately to the Control Centre.
- 5.2 The following sections detail the procedures necessary for on guideway operations.

6 Entering a guideway section

- 6.1 The entrance to a concrete section of guideway has a metal funnel or 'flare' to make it easy for drivers to enter the guideway.
- 6.2 On approaching the guideway, a vehicle must be steered gradually to the right until the guidewheel lightly contacts the right-hand metal guiderail which leads onto the concrete track.
- 6.3 Slight pressure must then be applied to the steering wheel to ensure that the right-hand guidewheel remains in contact with the metal rail until the vehicle has fully entered the guideway.
- 6.4 As the bus moves forward it may be necessary to turn the steering wheel further to maintain the contact with the pick-up kerb as the bus body straightens to run parallel to the kerb.

Speed of approach

- 6.5 Guideway entry flares are usually part of a highway junction and the overall speed limit which applies on the surrounding road applies.
- 6.6 The maximum mandatory speed of approach and entry to any guideway section is 20 mph (32 kph).

Angle of approach

- 6.7 The design of each entry funnel is intended to allow as direct and straight an approach as the road layout in the vicinity permits.

7 Driving in a guideway

Use of the steering wheel

- 7.1 While a vehicle is travelling on the guideway, under normal operating conditions, pressure should not be applied to the steering wheel.
- 7.2 Once fully in the guideway beyond the entry funnel section the driver may release the steering wheel entirely if he so wishes, as he can make only a minor influence on the lateral positioning of the bus which is now being carried out by the guidewheels.
- 7.3 In practice most drivers remain ready to regain control of the steering by positioning their hands appropriately.
- 7.4 When in a guideway drivers should NEVER wrap their fingers around the wheel but only rest their palms on the spokes or rim. (In this way, should any ride problem occur and the wheel turns rapidly, injury to hands and fingers will be avoided).
- 7.5 Drivers must concentrate on the track ahead and check their mirrors while travelling on the guideway and, must not undertake any task which may cause their attention to be distracted.

Use of the accelerator and brake

- 7.6 Because your lane is clear of all other vehicles (but not necessarily clear of pedestrians or cyclists), you should be able to accelerate and brake more gently than on the ordinary road as unexpected hazards should not arise.
- 7.7 However, it is also the case that you cannot take avoiding action by swerving, in the event of an obstruction arising, and braking is the only means you have of avoiding an obstruction.
- 7.8 Drive wholly within the limits of your straight-line braking ability. You cannot swerve to avoid a problem.

Safety implications of fixed path running

- 7.9 Whilst driving in a guideway you are faced with circumstances quite alien to everything you have previously faced in driving a bus or a car.
- 7.10 Because you do not have to steer and are physically removed from other vehicles there is an understandable temptation to relax concentration compared to that needed when driving in general traffic, as there is an expectation that less is likely to happen which may require urgent action by a driver.
- 7.11 It is certainly true that the frequency of potential incidents will be far lower in a guideway than in ordinary driving on road, but the probability of being able to avoid such incidents developing into problems is also significantly reduced.
- 7.12 "Tail-gating" or following too close to the bus in front, is particularly dangerous as neither bus can swerve to avoid a collision in the event of

the lead bus stopping or braking hard. A distance of not less than 500 metres must be maintained between guided buses in normal operations.

- 7.13 You must be vigilant of potential problems and develop a driving 'culture' whereby your speed is regulated so that you always have enough time and space to brake safely prior to reaching any potential problem.

Obstructions and other users

- 7.14 The lack of ability to swerve around an obstruction means that you must be extra vigilant in watching not only for actual obstructions but also for potential ones. To assist in this, the forward visibility on the Busway is generally excellent.
- 7.15 For example if you see one or more people standing or moving close to a guideway section, you must be prepared:
- Anticipate them stepping into the path of your bus;
 - Be prepared and slow down if you are approaching such a situation;
 - A light toot on the horn may be appropriate to highlight your presence;
 - Do not assume that pedestrians, cyclists and horses etc. realise that you cannot steer around them,
 - You cannot assume that other users will have heard you approaching – despite the high line speed buses are much quieter than on road due to the smooth concrete track.
- 7.16 You should be prepared for pedestrians, cyclists, and horse riders to be using the maintenance track, and should anticipate people crossing the guideway at the burst-throughs and other Rights of Way crossing points.
- 7.17 There is no need to use your horn when approaching the burst-throughs, or when there is a horse and rider on the maintenance track.
- 7.18 A very small obstruction in the guideway can, in practice, be run over at speed in safety. However it is always better to try to stop safely before any such obstruction and remove it.
- 7.19 Should the obstruction be too large or heavy to remove by hand it must be reported immediately to the Control Centre. See the Incident Playbook for the correct procedure.
- 7.20 During the hours of darkness or poor weather conditions drivers must keep headlights on full beam unless a bus is approaching the other way.

Stopping on the guideway

- 7.21 During normal operations on the guideway track, no vehicle shall stop at any place other than at designated stops apart from in an emergency. If it becomes necessary to stop on the guideway track, the driver must engage the hazard warning lights and contact the Control Centre immediately – see the Incident Playbook for the correct procedure.

Busway stops

- 7.22 Busway stops have raised platforms to enable level boarding. Ramps must not be used at stops on the guideway – in any event they should

not be required. Drivers should also be aware that their wing mirror will stick out over the platform area and therefore should be wary of the risk of hitting a pedestrian standing close to the edge of the stop when driving into, or out of, a Busway stop.

Traffic signals and road signs

- 7.23 All normal highway signs apply. When running in a guideway you must obey all highway signs applying to the 'lane' in which you are travelling, including speed limit signs. You must obey a police officer as you would on highway.
- 7.24 Automatic 'tripping' of traffic signals has been designed as part of the scheme. As a key objective of the Busway is to provide a fast and reliable service, it will be normal practice to provide priority for buses approaching junctions with the highway. Drivers **MUST** beware, however, of assuming that they will receive automatic priority out of the end of a guideway or across a signalised pedestrian crossing. Even if they receive such a priority 99.9% of the time, a 'clear' phase for them cannot be assumed and a driver must be prepared to stop smoothly and safely at any traffic lights. Drivers should be extra vigilant for cyclists, pedestrians, and other road users at junctions.
- 7.25 If the traffic signals have failed, the control centre should be informed immediately so that remedial action can be taken and other buses warned. In these circumstances, drivers should treat the junction as any normal signalised highway junction where the lights are not working, and use extra caution when crossing.

Trumpington Cutting

- 7.26 Trumpington cutting has a single section of guideway controlled by traffic lights at either end. In the unlikely event that these signals fail, then drivers should contact the control center for instruction. Further information is included here to assist.

How it works

- 7.27 Trumpington Cutting has two approaches (known as Phases):
Phase A at the Park and Ride
Phase B at the Clay Farm end
- 7.28 Normally the signals rest with Phase B at green. When a bus enters from this end going towards the Park and Ride, the bus is counted in over the stop line and out when it reaches the other end. Buses arriving from the Park and Ride will normally arrive on a red. They will have to wait for the lights to check if there are any buses coming towards them, and allow them to clear before the bus can start.
- 7.29 It is normal to have to wait 30 seconds or longer when leaving the Park and Ride.
- 7.30 The traffic lights will change to red behind the bus and wait for it to leave the other end. If the bus does not go into the guided part of the cutting, the lights will assume a van has left on the maintenance track and will change to green at the far end.

- 7.31 Do NOT stop in the cutting, once you have passed the stop line unless it is an emergency!
- 7.32 If you are forced to stop in an emergency, engage hazard warning lights and contact the Busway Control Room before continuing – do not enter the guided section unless told to do so by the operator.
- 7.33 What could go wrong
- A bus can break down, or be forced to stop.
 - Maintenance vehicles (or others) may misuse the busway
 - The traffic lights are damaged or faulty
 - The traffic lights go off.

Bus breakdowns and maintenance vehicles

- 7.34 If a bus is forced to stop in the guided part of the cutting, the traffic lights will 'lock' after 3 minutes and go back to green at the end that the bus came in from. A small blue light on the traffic light near the stop line will light up to let other drivers know that there is a problem. Busway Control will have to check that the cutting is clear of traffic before they can reset it and get the lights working again.
- 7.35 If any maintenance or construction traffic uses the guided part of the Cutting, they can cause similar problems to a bus stopping. Unless authorised by the Control Room, maintenance vehicles should NOT use Trumpington Cutting.

Damage and Faults

- 7.36 The traffic lights are checked by a monitoring system between Monday and Friday and faults are repaired as quickly as possible after they have been noticed. If any damage is seen, please report it to the Busway Operator as soon as possible.

Traffic Lights are Off

- 7.37 Drivers should not go into the Cutting if the lights are off unless told to go in by somebody who has control of both ends of the Cutting. After any power cuts, the lights will stay off long enough for any buses already in the shuttle to get out, before restarting.
- 7.38 Please contact the Control Room if the lights are off.

Speed Limit

- 7.38 **A mandatory 30mph (48kmph) speed limit operates within the entire southern section of guideway between the central railway station, Addenbrooke's and Trumpington.** A Mandatory speed limit of 20 mph (32kmph) also operates through the unguided Orchard Park section of the Busway. These and any other speed limits in place using Highway standard speed limit road signage must be obeyed at all times.

8 Guideway burst throughs and additional speed limits

- 8.1 A guideway burst through is a place where the guide kerbs on a guideway section are 'broken' for a short distance to allow users to cross the guideway on the level without having to step over kerbs.
- 8.2 A burst through is easy to spot as it has visible gaps in the guidance kerbs. Some are marked with the highway standard red triangular warning sign featuring a horse. Drivers need to take care and expect people in the vicinity of these designated crossing points to cross over the guideway.
- 8.3 All burst throughs are 'uncontrolled' i.e. not protected by traffic signals. They are NOT zebra crossings and pedestrians using such crossings are simply crossing the guideway and should give way to the buses.
- 8.4 A mandatory 40mph (65kmph) speed limit operates through all burst throughs.
- 8.5 A mandatory speed limit of 20 mph operates through the Holywell Ferry (Lakes) crossing.
- 8.6 A mandatory 30 mph speed limit operates either side of the Rampton road/Reynolds drove horse crossing.

Crossing a burst through

- 8.7 Because the guideway ends before, and then restarts shortly after, such a crossing, the bus is guided back into position by short guiderails funnelling back into the standard guideway width. This can produce a slight jolt as the bus picks up the guiderails. So to reduce the effects of such a jolt to an acceptable level a mandatory speed limit of 40 mph (65 kph) is imposed.
- 8.8 To cross the burst through it is recommended:
 - That drivers position their hands appropriately ready to regain control by steering wheel for the last 10 metres before the gap, across the gap and until full guidance has been re-engaged.
 - That across the gap the bus should travel at a constant speed. Drivers should NOT accelerate or brake.
 - That across the gap the bus should travel in a straight line. Drivers must NOT steer the bus when crossing such a crossing gap. Resting the hands on the steering wheel may be appropriate.
- 8.9 As there are no guidekerbs across such a crossing it is possible for a bus there to veer to left or right in certain circumstances. The above recommendations ensure that the bus crosses the gap in the straightest possible line thereby minimising any 'bumping' on re-entry.
- 8.10 Except in case of emergency it is preferable NOT to brake across a pedestrian crossing gap. If required, brake a little more heavily prior to the gap, 'freewheel' across the gap, and then resume braking after it.

Other crossings

- 8.11 There are a small number of other footpath or bridleway crossings of the Busway which do not have breaks in the guideway. They can be

identified by a chicane on either side of the guideway, anti-skid surfacing, and usually the highway standard red triangular horse or pedestrian sign.

9 Exiting a guideway section

- 9.1 A guideway section usually ends at a road junction at the ends of the route or to allow a road to cross the Busway on the level, although in some cases a section will end at a junction at a guideway to guideway intersection or Park & Ride site.
- 9.2 The ends of guideway sections at road junctions are controlled by traffic lights to stop normal traffic and allow bus priority for buses using the guideway. The excellent forward visibility on the guideway ensures that these traffic signals can usually be seen well before the end of the guideway section.

Driving technique

- 9.3 When leaving a guideway you are returning to a normal highway environment in which vehicles and pedestrians will be encountered and are likely to do unpredictable things.
- 9.4 Make sure you are back fully in a frame of mind for on-road driving before you reach the end of the guideway.
- 9.5 When a vehicle approaches the end of the guideway track, the driver must be prepared to take control of the steering wheel immediately before a vehicle leaves the concrete track.
- 9.6 On the approach to the end of a guideway section rest your hands on the steering wheel. When you get to about half a bus length from the end of the guide kerbs hold the steering wheel exactly as you would for normal road running, but do not attempt to steer until you are out of the guideway section.
- 9.7 If you do try to steer too early you will feel resistance from the guideway kerbs and you should release pressure immediately. If you have pressure applied as you leave a guideway section, the bus may veer violently in the direction of steer when the end of the guide kerb is reached.
- 9.8 Once out of the guideway normal operating procedures for on road operations as given in the existing bus operating company handbooks come into effect.

10 Headway

- 10.1 Headway, the distance between two buses travelling on the Busway, is required for the safe operation of the system to ensure that vehicles do not travel too close to each other.

Minimum safe headway

- 10.2 The minimum safe headway for buses on the guideway will be the 500m. Following bus drivers are advised to leave this gap between themselves and the vehicle in front. .
- 10.3 While travelling on the Busway, vehicles are to travel as close as practicable to the speed limits applying. Extended periods of stopping to adjust running times to fit with published timetables must not be done while travelling on the Busway. However, actions to adjust running times must be done, where necessary, by speed adjustment, layover zones at Park and Ride sites and on road.
- 10.4 At the park and ride site at St Ives, there are dedicated stop and layover areas. Services should only go to the stop just before departure, and all efforts must be made to maintain the departure slots shown on the timetable.

11 Works within the Busway corridor

- 11.1 As noted earlier, the Busway as constructed under the Order has the status of a Statutory Undertaker which means that the Busway corridor is protected in the same manner as railway lands or the equipment of other statutory undertakers such as the electricity, gas or water boards. In practice this means that ALL works within the Busway corridor are to be authorised by the County Council via the Control Centre.
- 11.2 ANY UNAUTHORISED WORKS WITHIN THE BUSWAY CORRIDOR MUST BE REPORTED IMMEDIATELY. ANY PARTY WORKING WITHIN THE BUSWAY CORRIDOR WITHOUT CONSENT ARE LIABLE TO BE PROSECUTED.
- 11.3 However from time to time it will be necessary for authorised works to be done and under normal circumstances this should not adversely affect buses using the guideway.
- 11.4 Where possible authorised works immediately affecting the guideway will be done outside of operational hours (that is 00:00hrs to 05:00hrs) so that bus services are not disrupted. As a last resort services can be diverted onto the public highway while that particular section of guideway is being worked on. This is only to be done in extreme circumstances when there are no other options available.
- 11.5 More commonly, there will be authorised works such as routine maintenance being carried out within the Busway corridor that does not affect buses using the guideway. For such activities, such as grass cutting, appropriate safety zones will be set up and operatives will wear suitable clothing to warn bus drivers of works being carried out adjacent to the guideway. Drivers will be informed of any planned maintenance, and should exercise the same caution as they would for road works on the public highway.
- 11.6 All works within the Busway corridor are subject to approval prior to commencement, following the submission of appropriate Risk Assessments and Method Statements to the Control Centre. The Control Centre is responsible for the co-ordination of all works within the Busway corridor and needs to be informed of proposals in advance of the work happening.
- 11.7 Apart from maintenance work there will be situations where parties bordering the Busway corridor may want to develop adjacent lands. In such circumstances, such parties need to be referred to the Guidance for Developers document for the Busway in the first instance. This is to be found on the County Council's website.

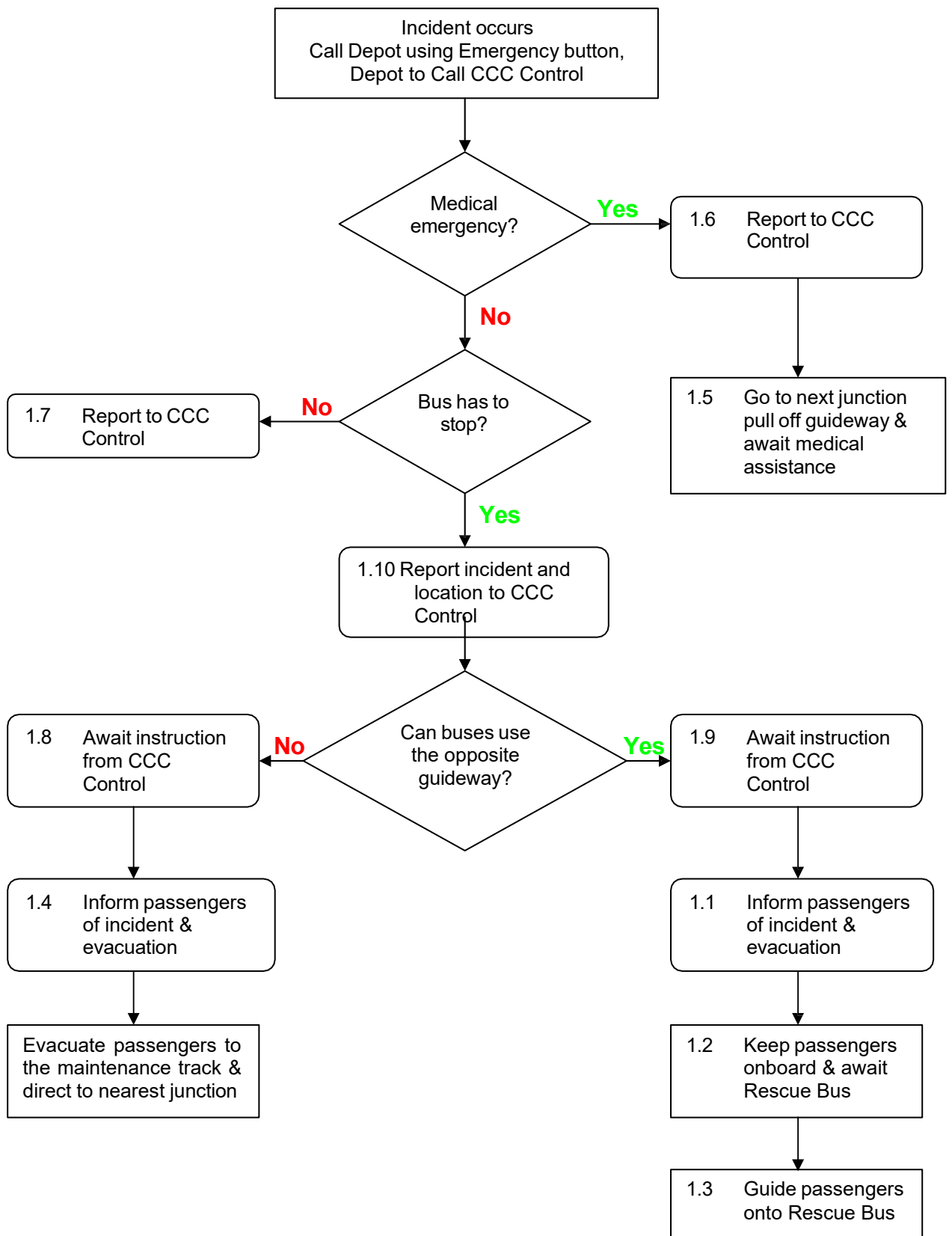
12 Flooding

- 12.1 Between St Ives and Swavesey the Busway route is situated within a floodplain and is at risk from flooding from the River Great Ouse. Other locations at risk from flooding are at Rampton Road and at Oakington from the nearby Beck Brook.
- 12.2 At risk sections of the Busway will be closed when imminent flooding is expected, but it is common to get a warning period of several days prior to a flood event as the principal watercourse feeding this area, the River Great Ouse, will flood first upstream of those areas at risk of flooding. Operations south of these areas may continue after the northern section has closed. This decision will be taken by the County Council.
- 12.3 Within those areas at risk, the maintenance track of the Busway will flood before the guideway. In this instance, services will still run on the guideway (possibly at reduced speed) while the maintenance track is closed due to flooding.
- 12.4 In general, actions will arise from the following flood warning trigger levels :
- 12 hours prior to a flood event – Warning issued by Environment Agency;
 - Maintenance track floods – Control centre staff close maintenance track in affected area and continue guideway operations with caution;
 - Water levels reach within 300mm of guideway running surface – Close guideway in affected area.
- 12.5 Following the receding of the water level after a flood event, the Busway will need to be inspected by the Council and any flood damage repaired prior to guideway operations resuming.
- 12.6 Drivers should follow the advice of the control centre in a flood event.

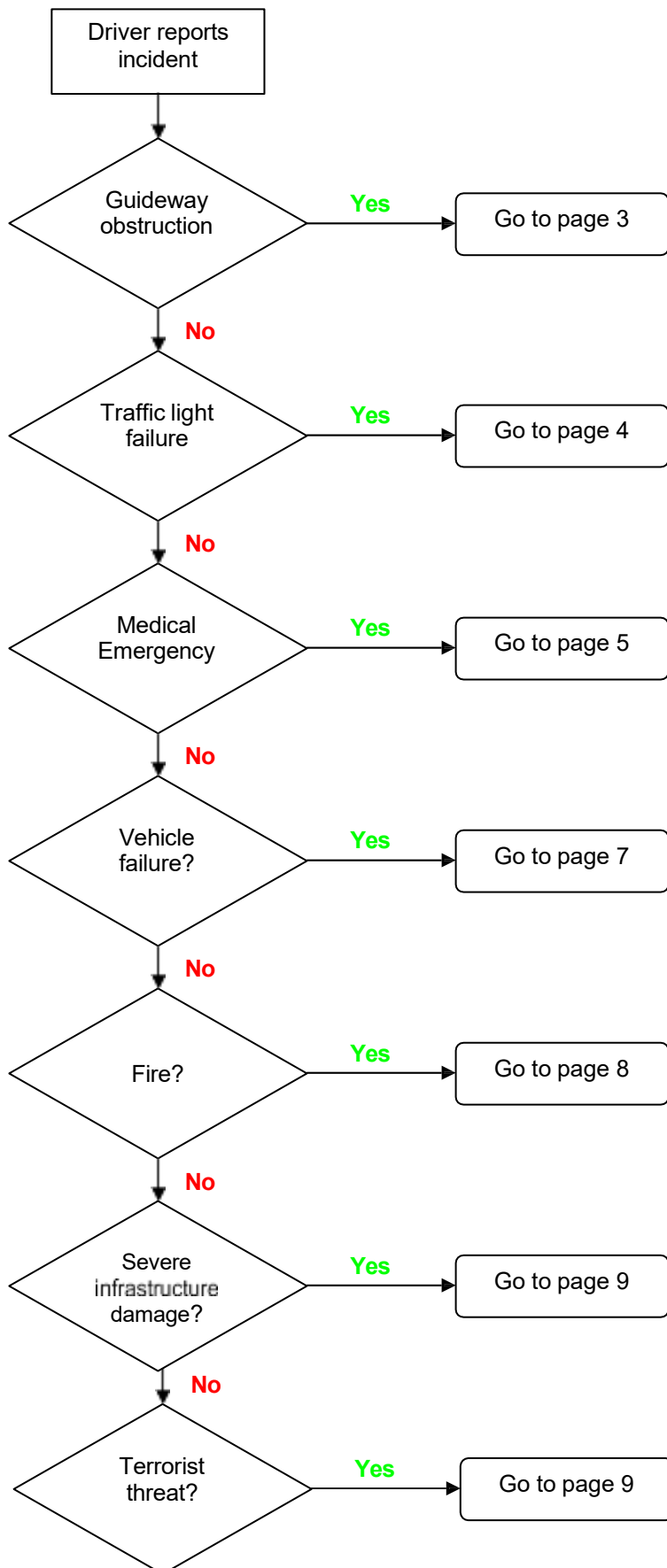
13 Southern Busway Safety Fence

- 13.1 A new safety fence is installed between the start of the Busway at Hill's Road bridge and Long Road bridge separating the Busway from the maintenance track. The fence has a series of gates installed every 100 metres to allow emergency evacuation onto the maintenance track and for emergency services to gain access if required. Stagecoach and Whippet have a detailed Risk Assessment for breakdowns and emergencies in this area and all drivers must make themselves aware of this Risk Assessment.
- 13.2 In the event that a gate unit requires to be opened by a driver the padlock code of every gate is XXXX. Gates must be folded flat against the infill panel of the fencing to prevent obstruction of the maintenance track.

14. Drivers Handbook: Incident flowchart



15. Emergency Incidents: Controllers Playbook



Definition of Terms

“1-way Closure”

- Closure of the section of guideway in one direction, which the Driver's bus is in.
- The guideway in the opposite direction remains open.

“2-way Closure”

- Closure of the section of guideway in both directions, which the Driver's bus is in.

“Be Aware”

- Warning to all drivers via the radio system that an incident is in progress.
- Need to give:
 - Direction of travel affected; and
 - Section of guideway affected.

“Demobilise Closure”

- QR team checks section of guideway is suitable for use and removes closure.
- QR team to report Guideway Clear to Control following inspection and closure removal.

“Depot”

- Bus Operator's Depot

“Driver”

- The driver of the bus reporting the incident.

“Guideway Clear”

- Bus services can resume in both directions on the specified section of guideway.

“Incident Clear”

- To be reported by incident controller when the incident has been resolved.
- Then follow Demobilise Closure procedure.

“Radio All”

- Communication to all drivers via the radio system.

“Rescue Bus”

- In the event of a 1-way Closure, Control designates the next bus to past the Driver's bus in the opposite direction as the Rescue Bus. The Rescue Bus shall pick up evacuated passengers from the Driver's bus.

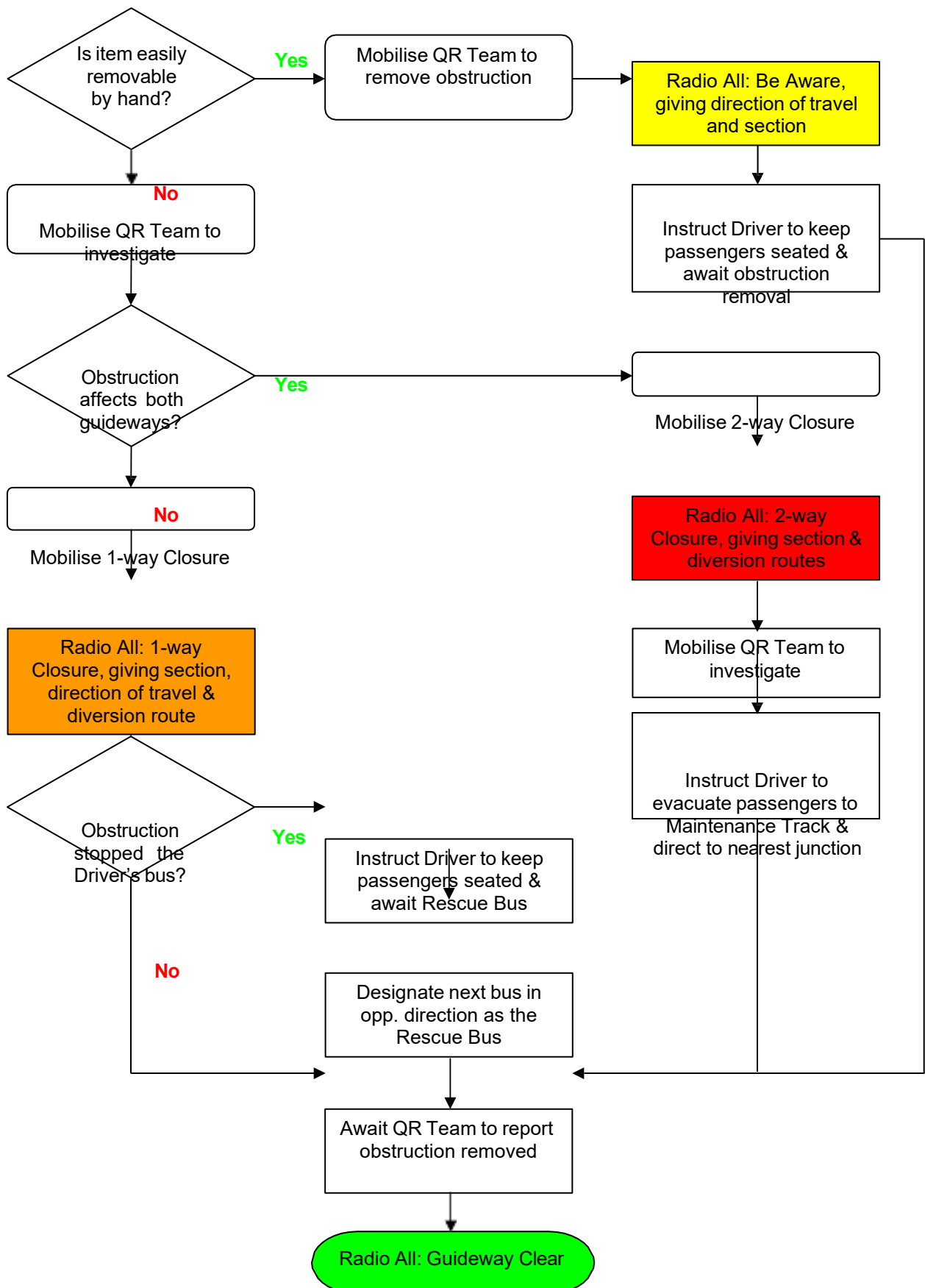
“QR Team”

- This is the CCC Highways quick response team whose role includes:
 - Placing traffic management in the event of a guideway closure;
 - Checking of guideway & removal of traffic management for Demobilise Closure;
 - Inspection of the Busway corridor;
 - Investigation of incidents;
 - Removal of obstructions.

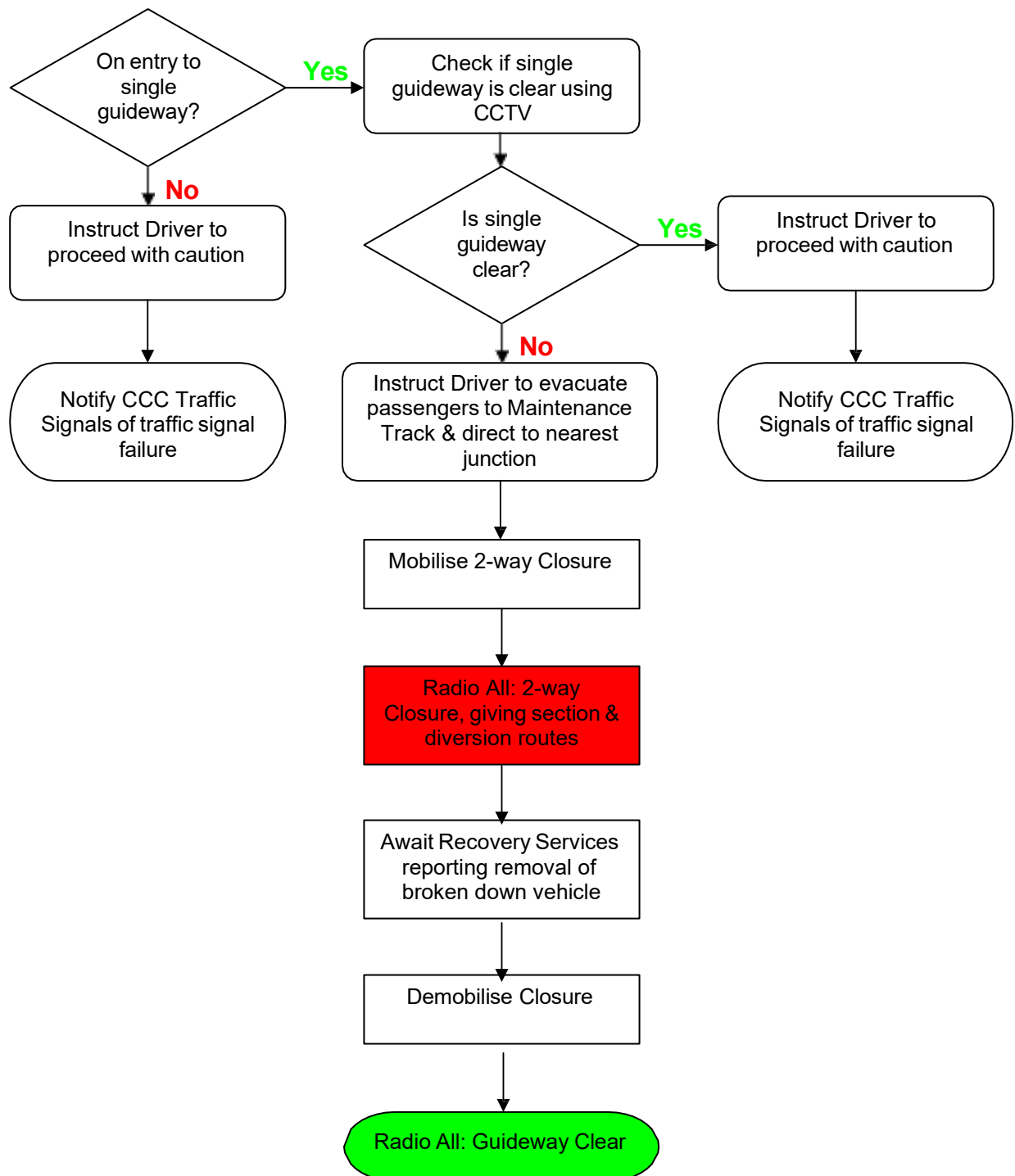
Note:

This playbook has been written on the assumption that CCC Control can only send out communications to all guided buses via radio, but NOT receive them via radio. Incidents will have to be reported to CCC Control from the Bus Operator's Depot radio via or directly telephone.

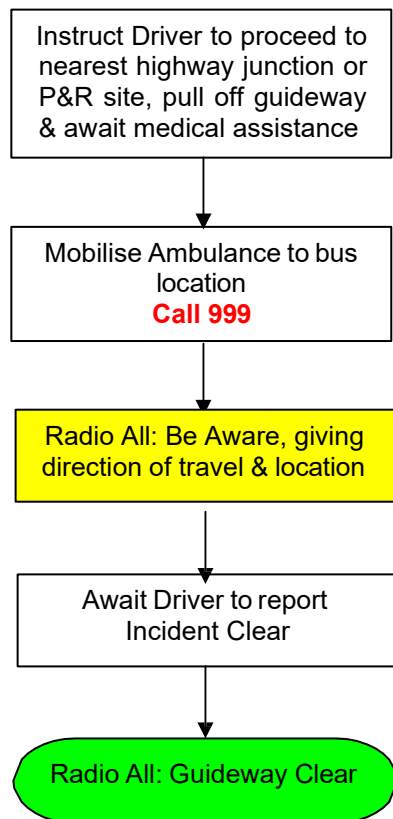
Guideway Obstruction



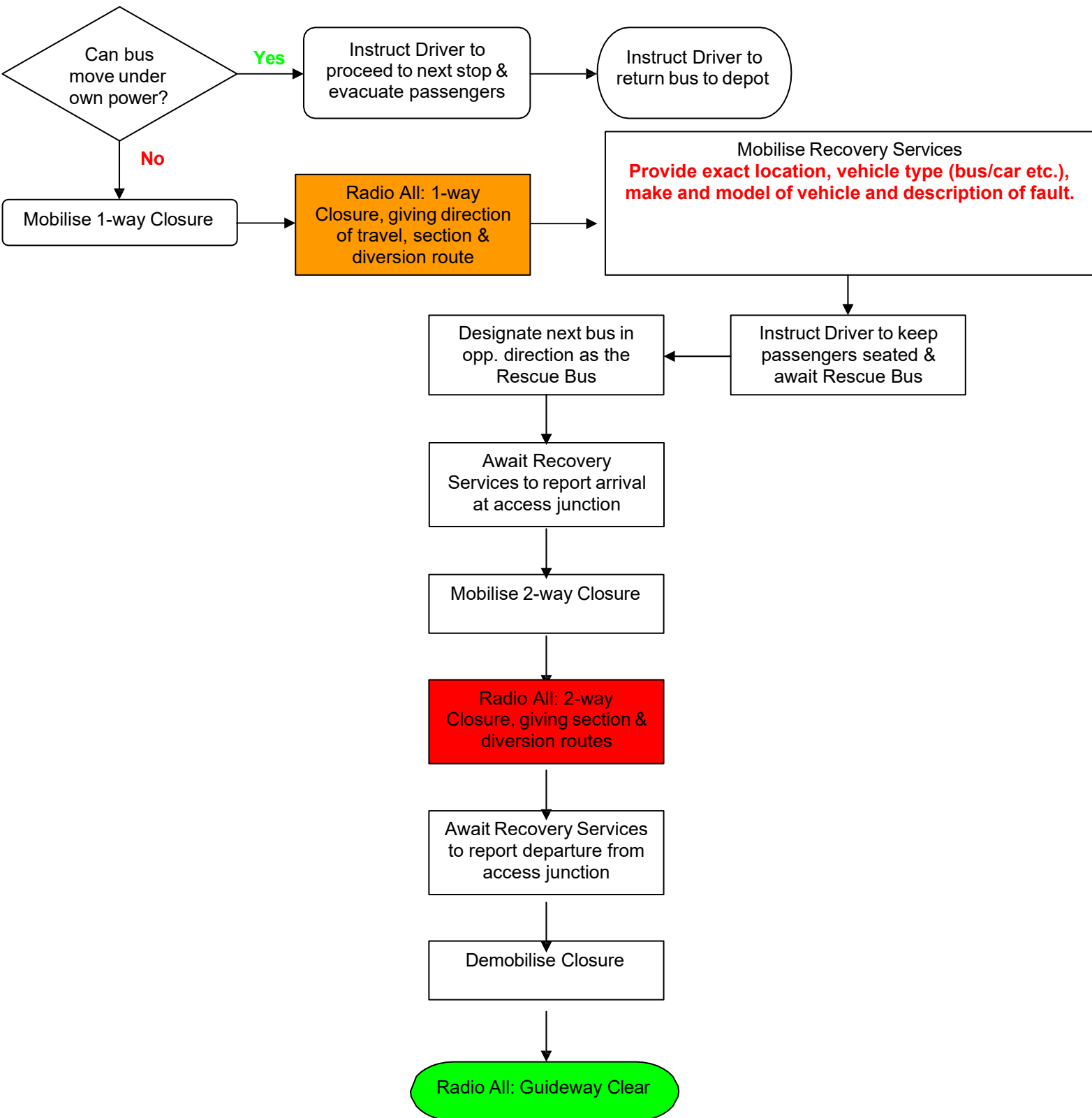
Guideway traffic light failure



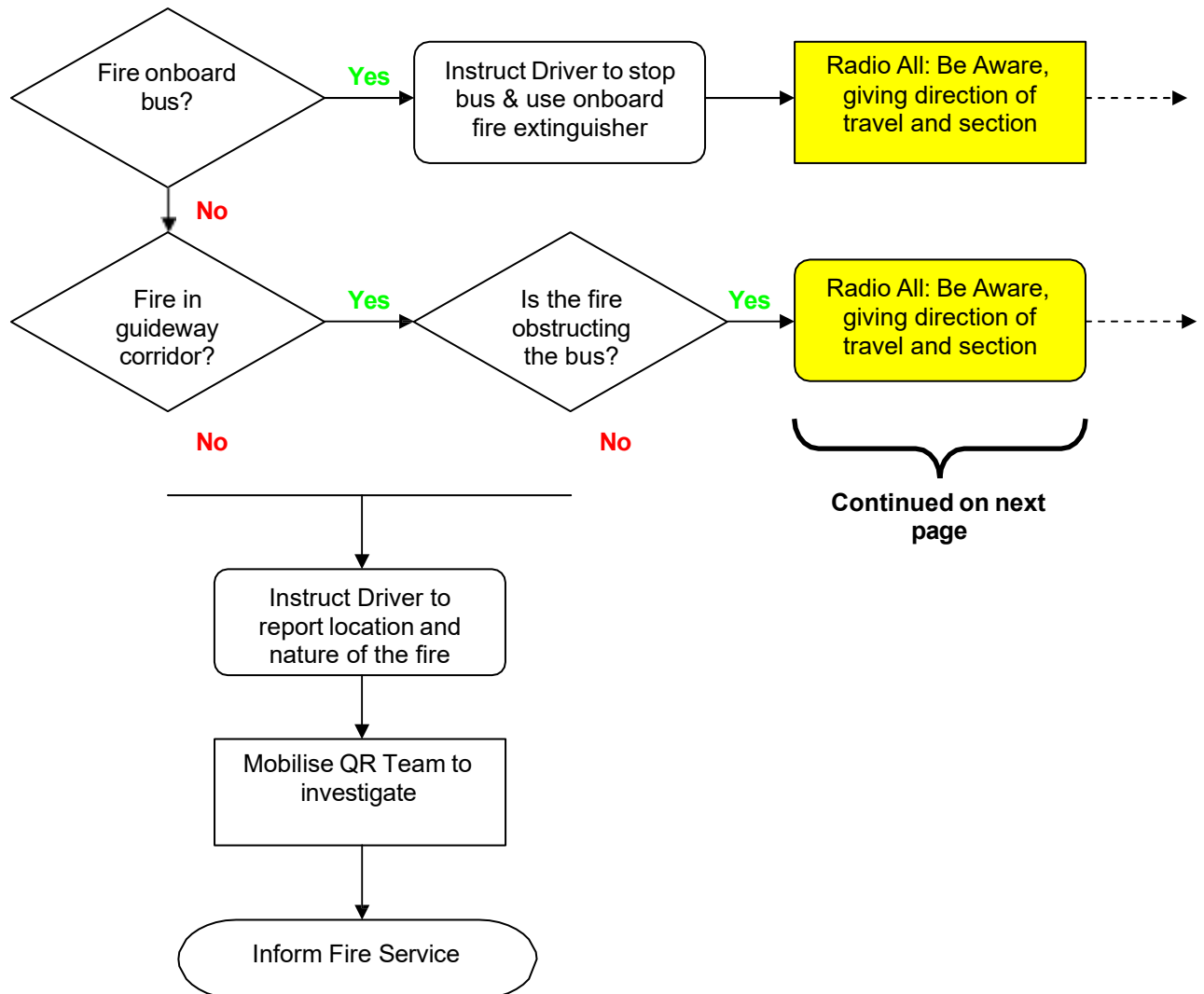
Medical Emergency



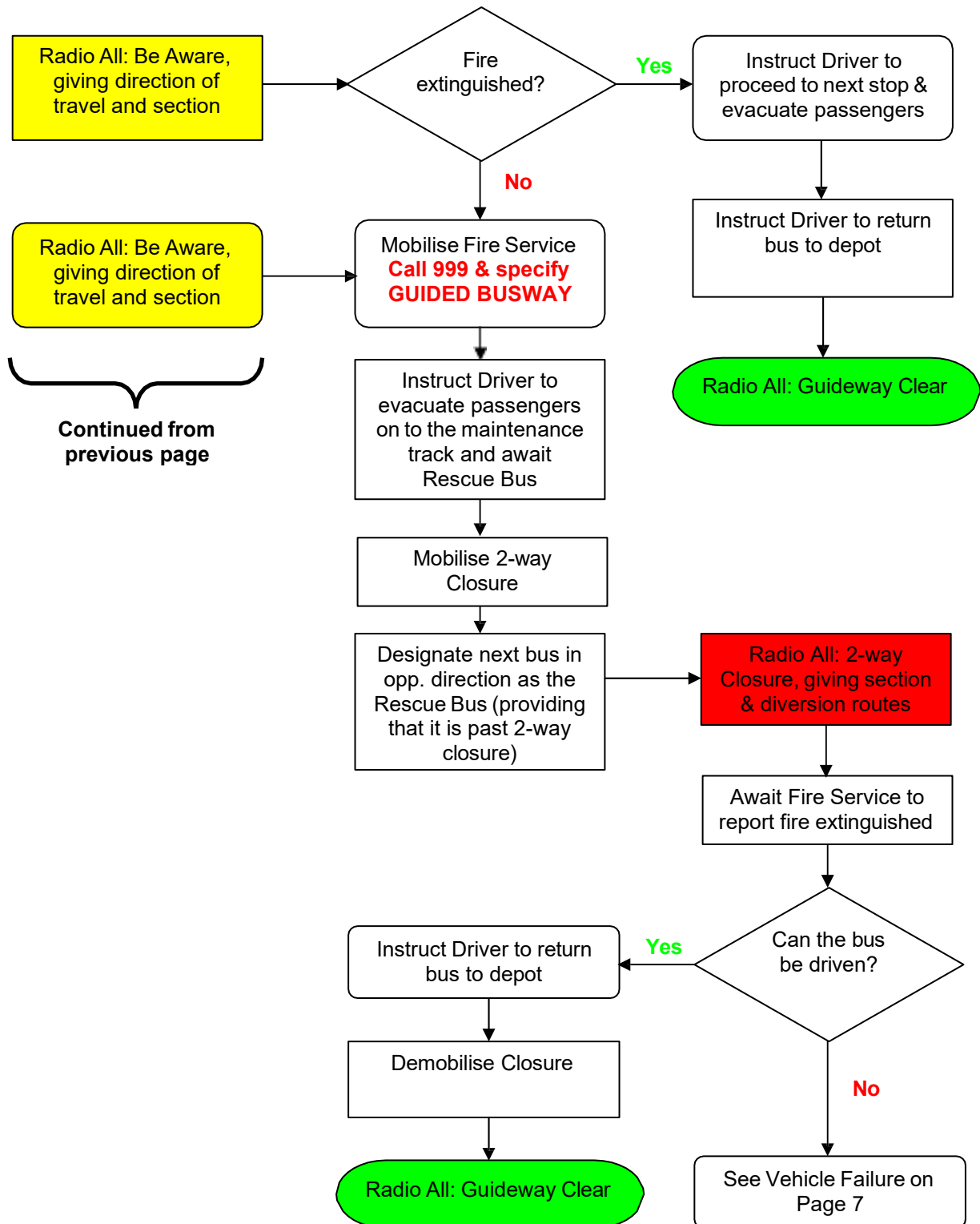
Vehicle Failure (including drive-ons)



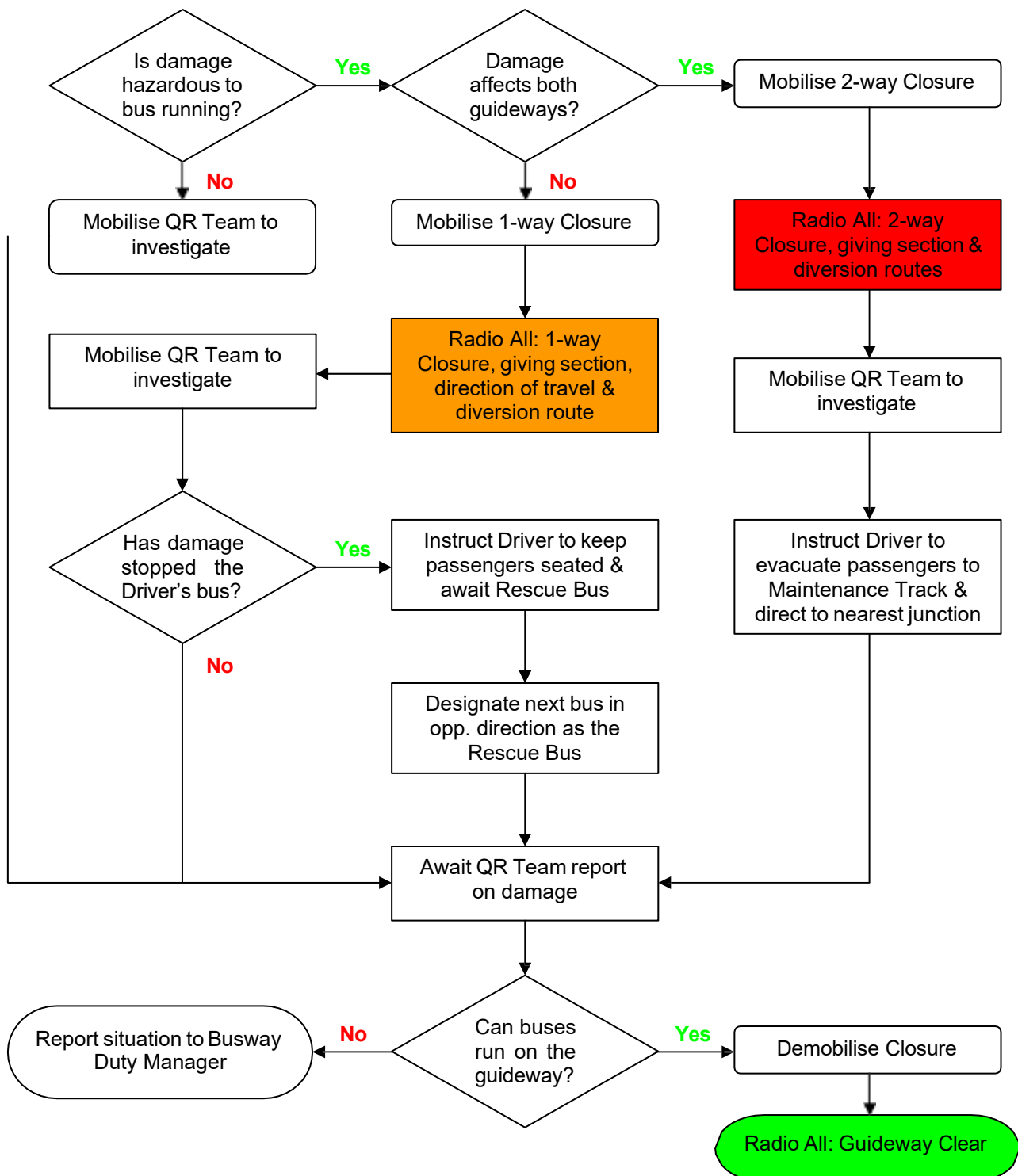
Fire (Page 1 of 2)



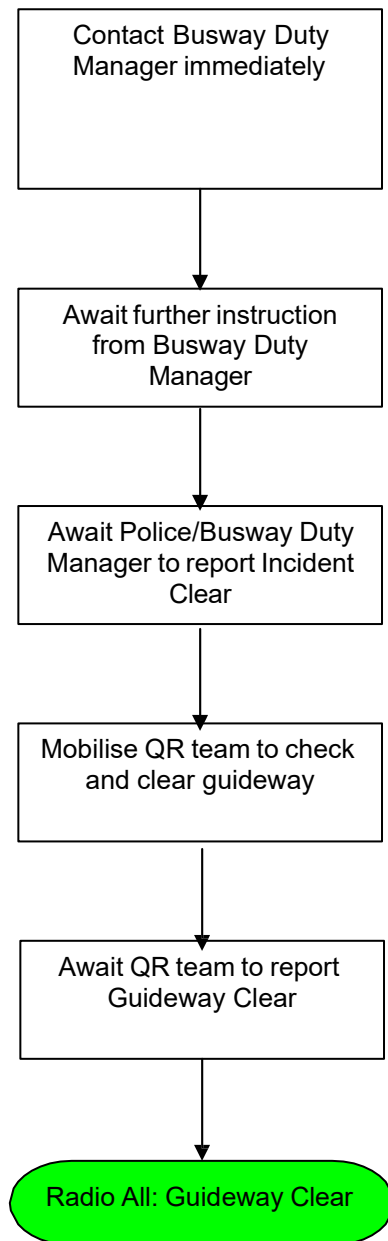
Fire (Page 2 of 2)



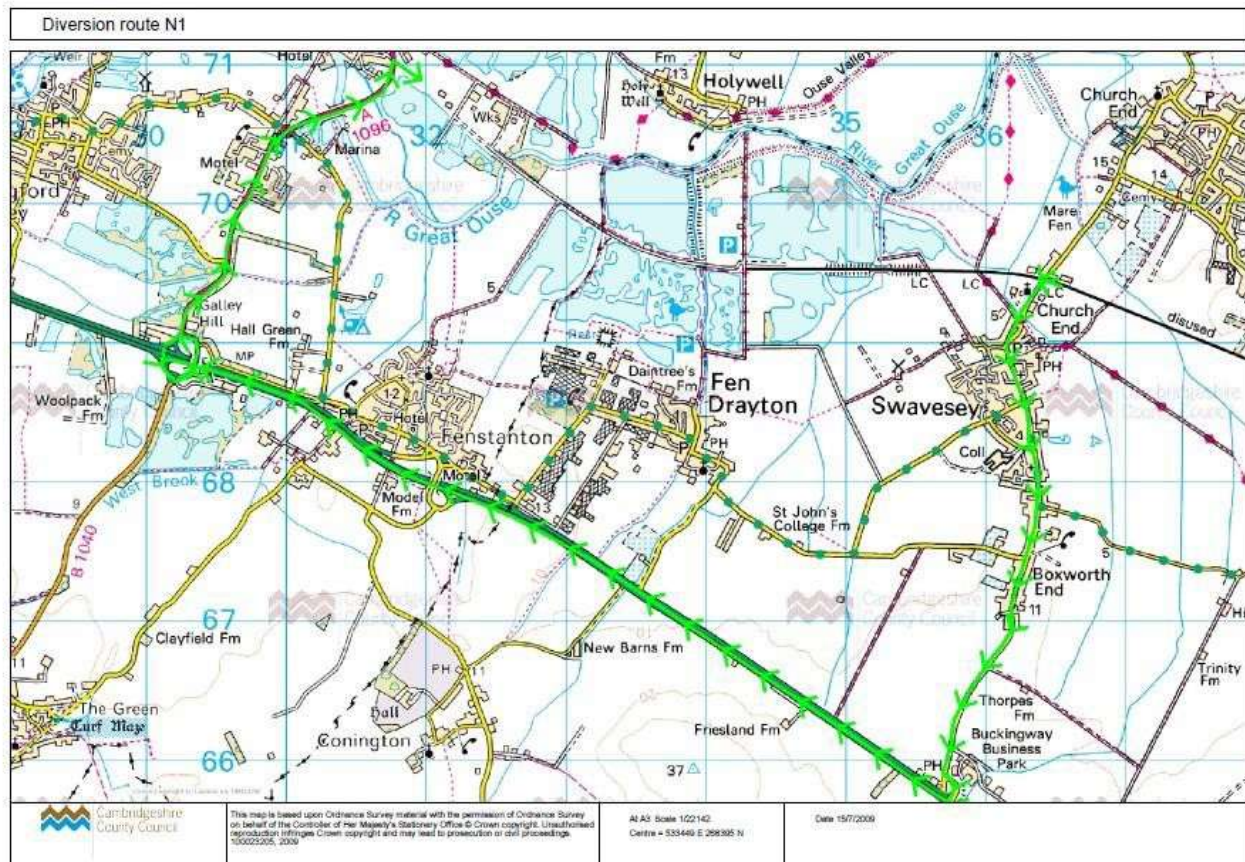
Severe Infrastructure Damage



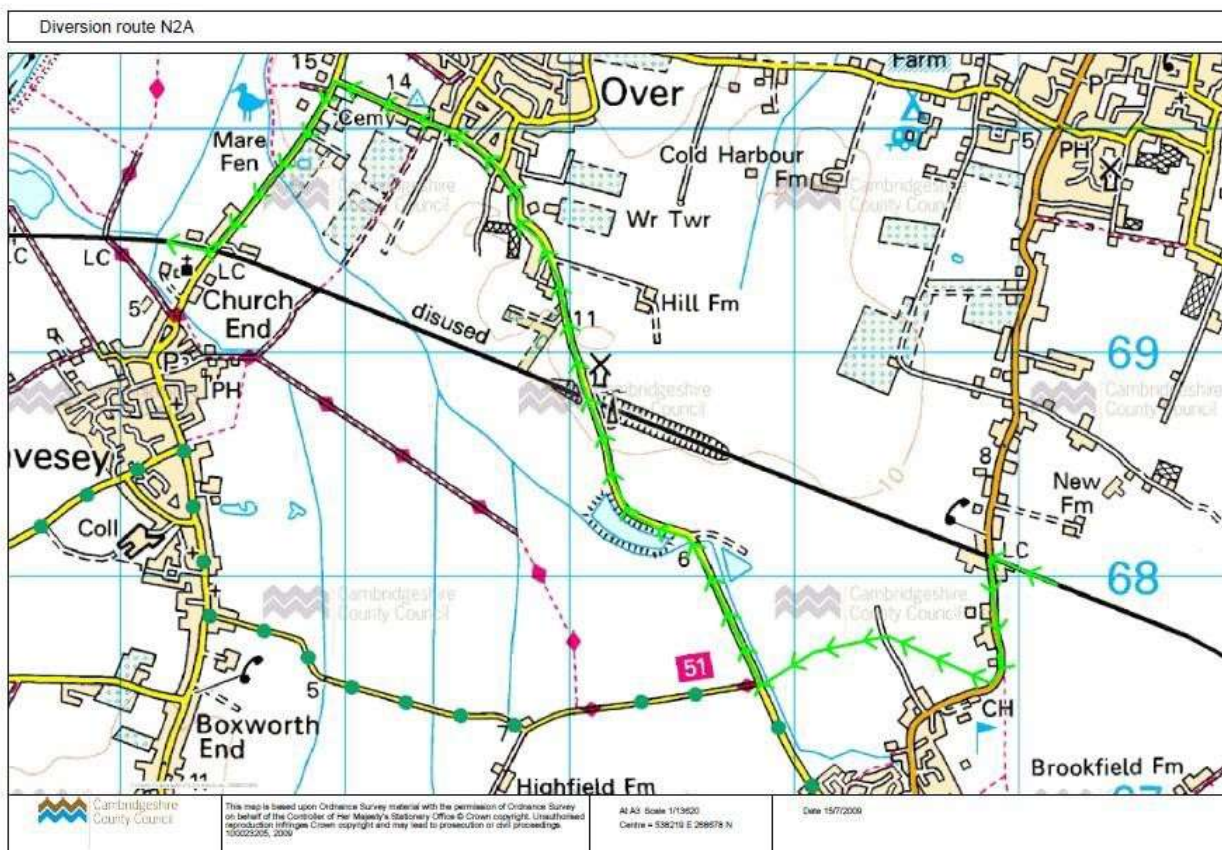
Terrorist Threats



16. Diversion Routes



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
1	Swavesey to St Ives	N1	Leave guideway at Swavesey Crossing turning left towards Swavesey. Proceed through Swavesey to A14; turn left before A14 and left at roundabout to join A14 westbound. Proceed on A14 leaving at junction 26, turn left onto A1096 towards St Ives. At St Ives turn right into local bus access to Park and Ride site.	Holywell Lakes stop not served

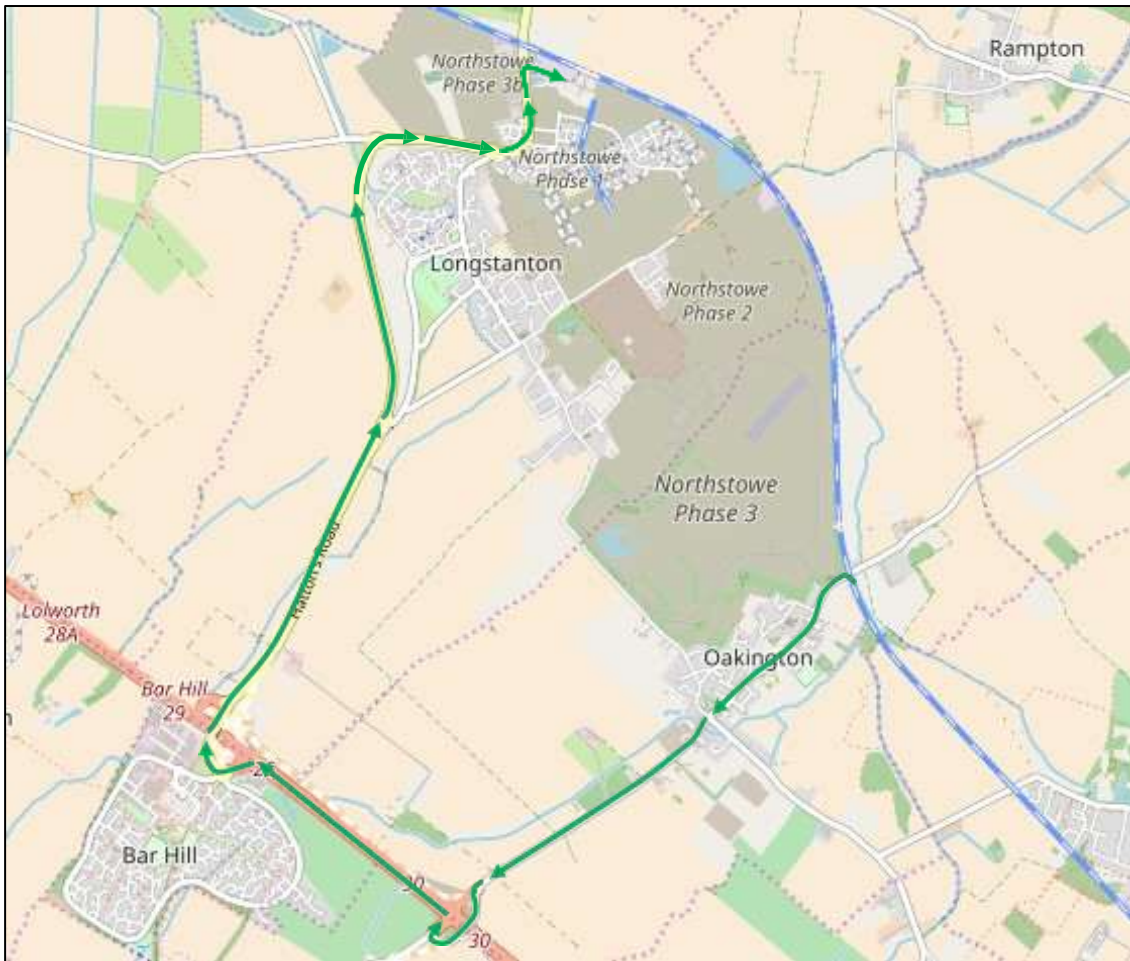


Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
2	Longstanton Crossing to Swavesey	N2A	<i>For closures other than Flooding.</i> Leave guideway at Longstanton Crossing turning left onto B1050 towards Bar Hill. Turn right onto Over Road and proceed to Over. At Over turn left onto Station Road towards Swavesey. Turn right at Swavesey Crossing to rejoin CGB.	Stop required on Station Road, Swavesey.



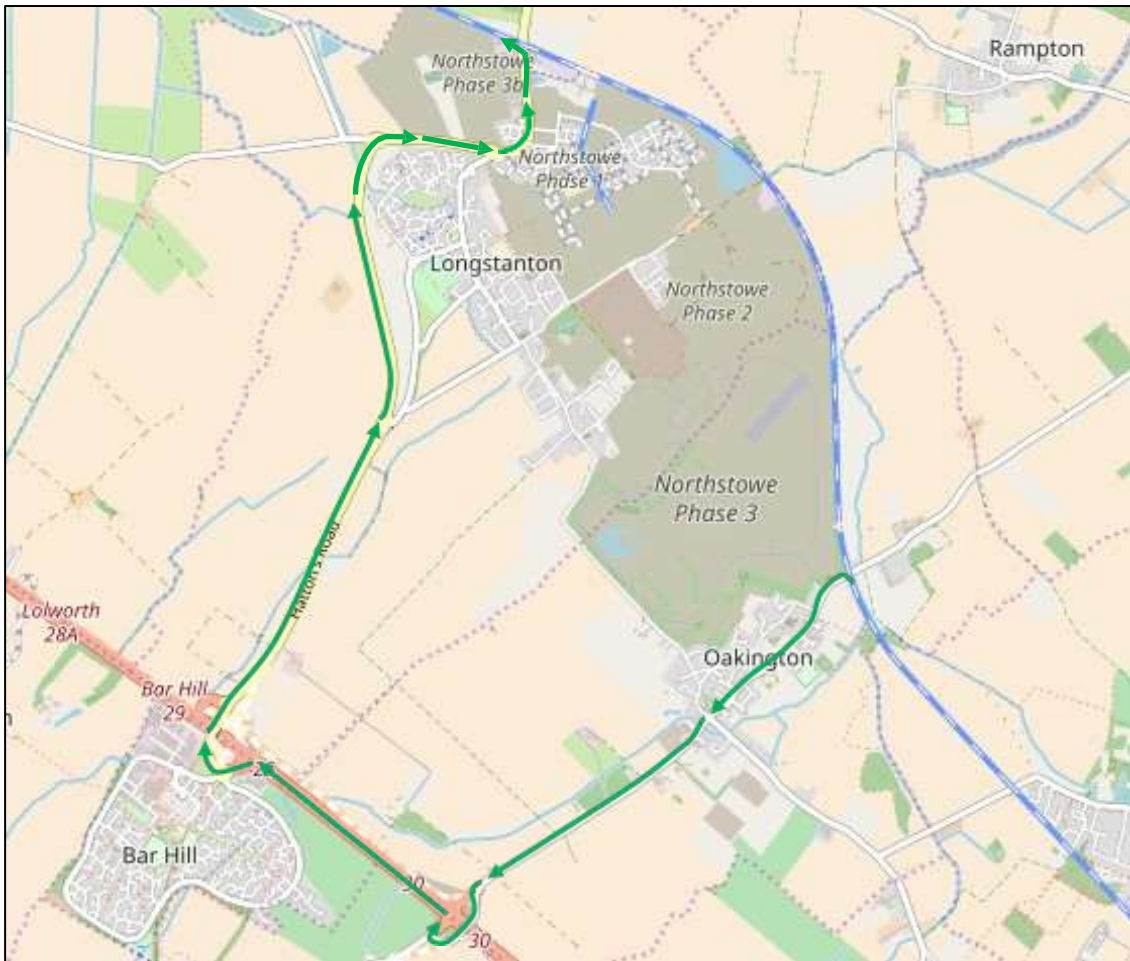
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
2	Longstanton Crossing to Swavesey	N2B	<i>In the event of flooding Section 1 will also be flooded and buses should proceed to St Ives as follows. In extreme flood events services will terminate at Longstanton.</i> Leave guideway at Longstanton Crossing turning left onto B1050 towards Bar Hill. Proceed to Bar Hill; turn right at first roundabout and left at second roundabout to join A14 westbound. Proceed on A14 leaving at junction 26; turn left onto A1096 towards St Ives. At St Ives turn right into local bus access to Park and Ride site.	Swavesey stop not served

Diversion N4A



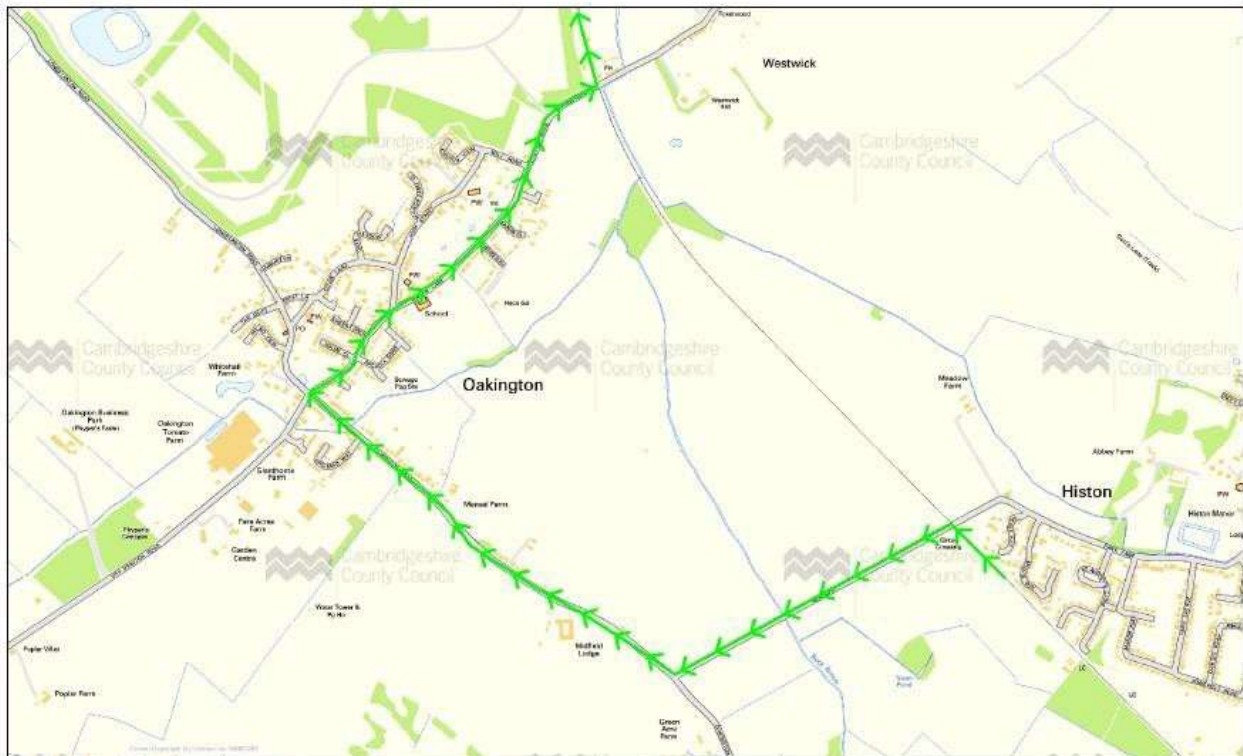
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
4	Oakington to Longstanton	N4A	<i>Oakington to Longstanton P & R</i> Leave guideway at Oakington, turning left towards Oakington. Proceed through village towards A14. At A14 junction follow signs for A14 towards Huntingdon. Take exit for Bar Hill and follow signs for B1050 towards Willingham. At Longstanton P & R entrance, turn right and use bus access road to re-join the guideway	Not required

Diversion N4B



one No.	Closed	Diversion No.	Route	Emergency bus stops
4	Oakington to Longstanton	N4B	<i>Oakington to Longstanton B1050 junction</i> Leave guideway at Oakington, turning left towards Oakington. Proceed through village towards A14. At A14 junction follow signs for A14 towards Huntingdon. Take exit for Bar Hill and follow signs for B1050 towards Willingham. At Longstanton junction, turn left onto guideway.	Stop required in Longstanton

Diversion route N5



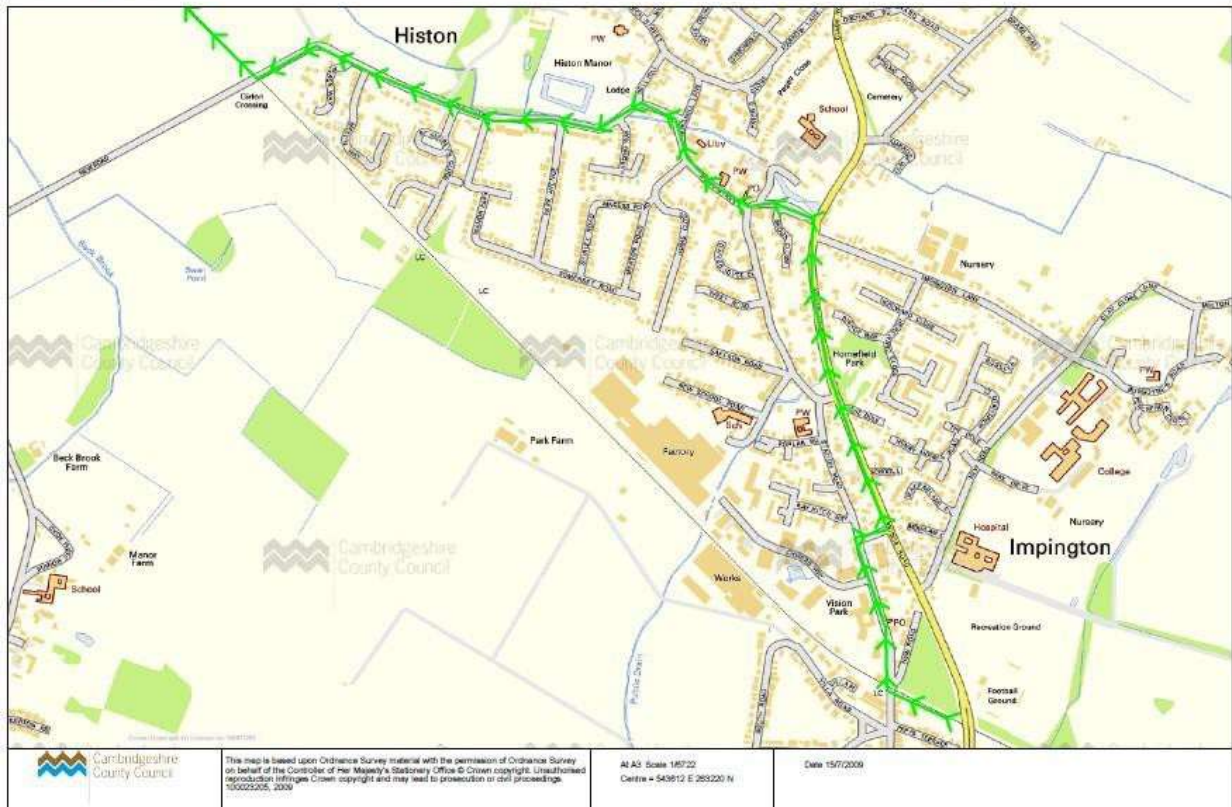
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15/02/2005, 2009

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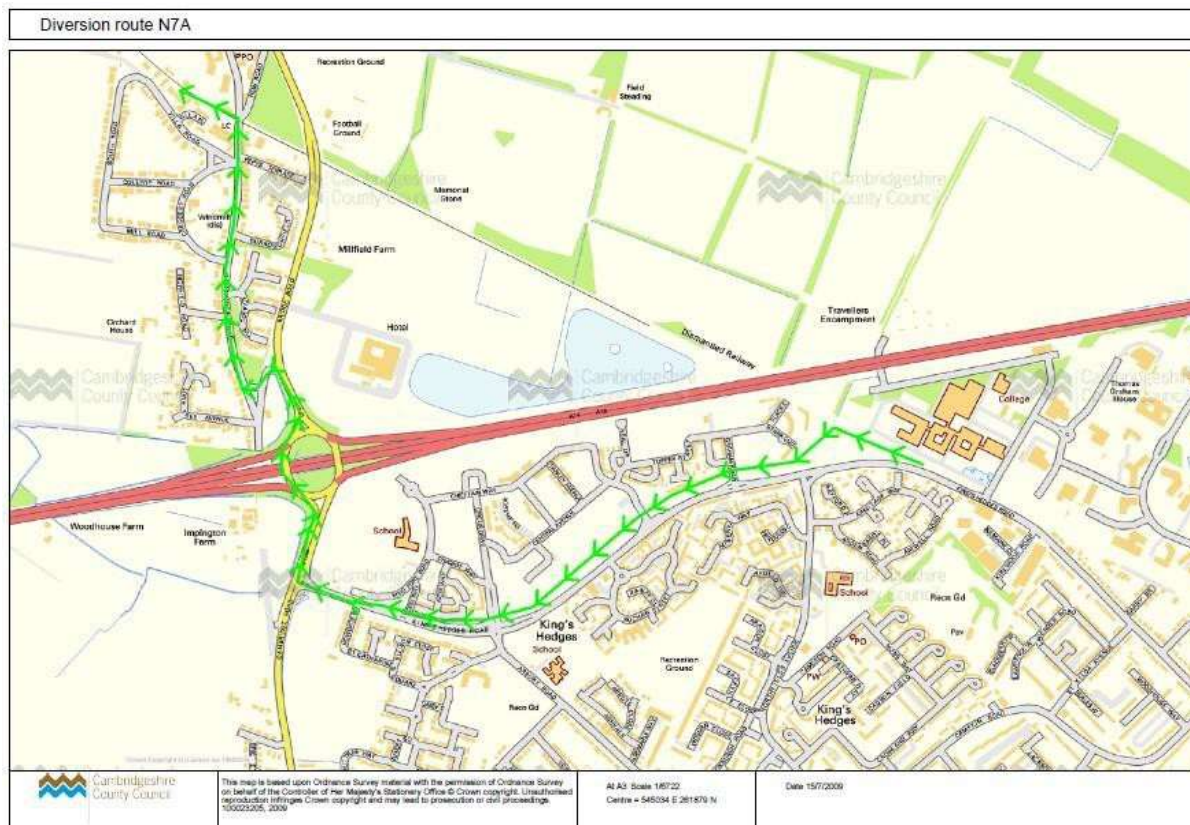
Date 15/7/2009

Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
5	Park Lane, Histon to Oakington.	N5	Leave guideway at Park Lane, turning left towards Girton. At Cambridge Road turn right towards Oakington. Proceed to Oakington and turn right at traffic signals towards Westwick. Turn left onto CGB at Oakington Crossing.	Stop required on Station Road, Oakington

Diversion route N6

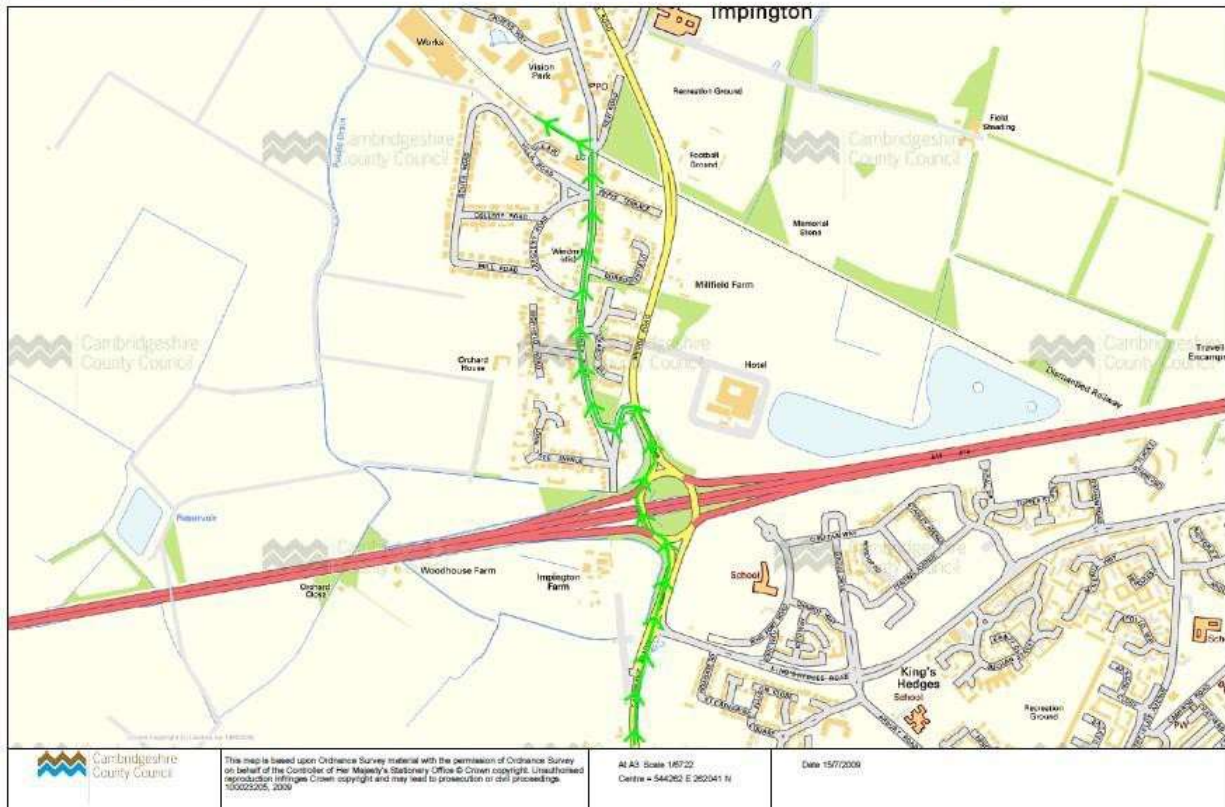


Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
6	Station Road to Park Lane, Histon	N6	Leave guideway at Station Road, Histon, turning right towards Histon. Turn right onto Chequers Lane then left onto Bridge Road. Turn left onto The Green and then left into Park Lane. Turn right to rejoin guideway at Park Lane crossing.	Stop required on Station Road, Histon.



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
7	Orchard Park junction to Histon	N7A	<i>Buses from Milton Road</i> Turn left at Orchard Park guideway junction and travel via Orchard Park link to Histon Road. At Histon Road turn right towards Histon. At traffic signals after crossing A14 turn left into Bridge Road and then right into Cambridge Road. Turn left to rejoin CGB at Histon Stop.	Not required

Diversion route N7B

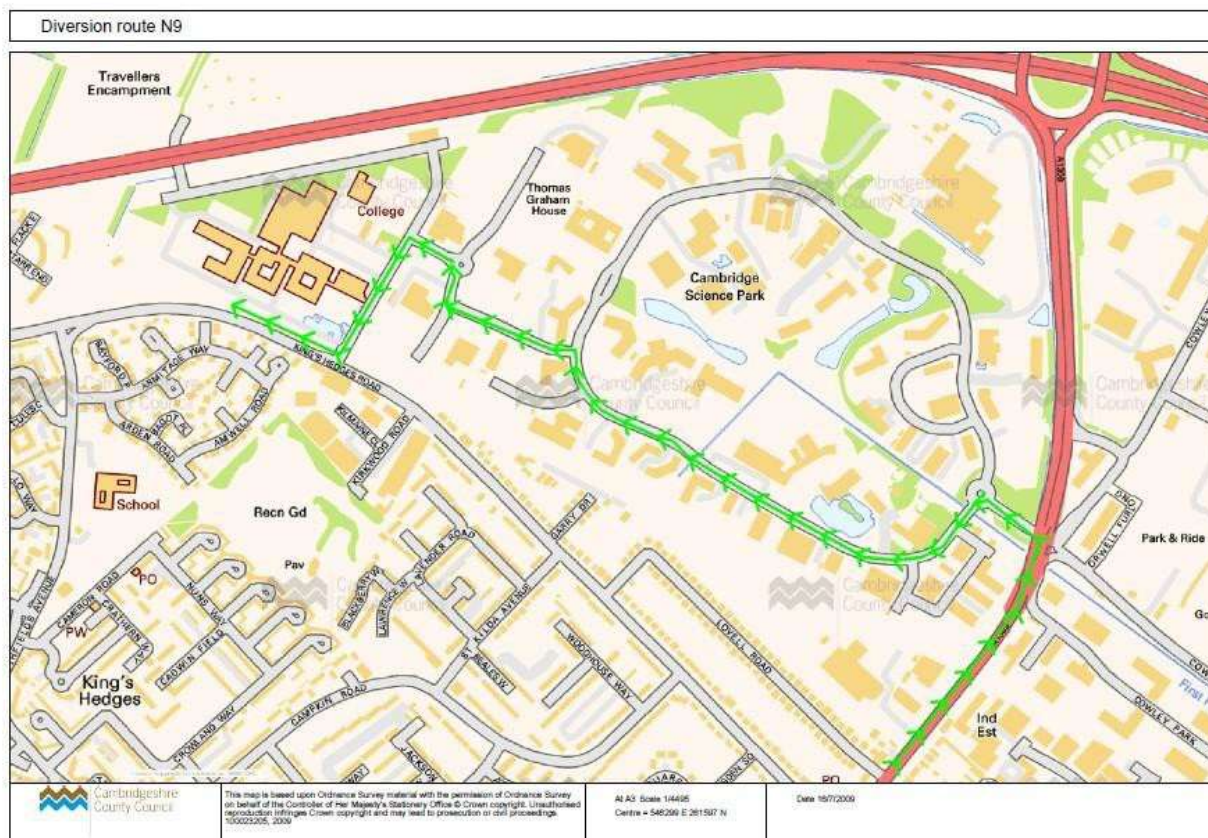


Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
7	Orchard Park junction to Histon	N7B	<i>Buses from Histon Road</i> At King's Hedges Road junction proceed ahead towards Histon, do not join guideway. At traffic signals after crossing A14 turn left into Bridge Road and then right into Cambridge Road. Turn left to rejoin CGB at Histon Stop.	Stop Required on Histon Road to serve Orchard Park. CRC not served.

Diversion route N8

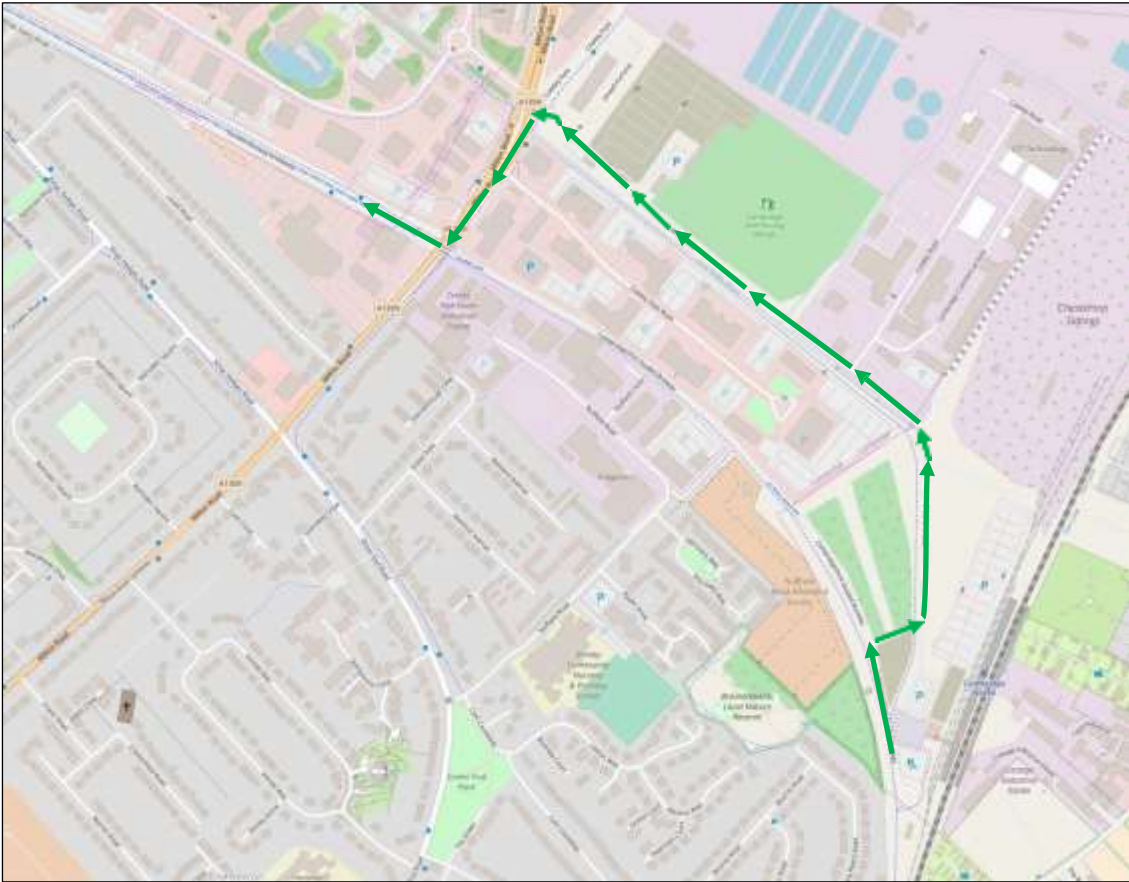


Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
8	Cambridge Regional College to Orchard Park junction	N8	Leave guideway at CRC crossing turning left then right onto King's Hedges Road towards Orchard Park. Proceed to Histon Road and turn right towards Histon. At traffic signals after crossing A14 turn left into Bridge Road and then right into Cambridge Road. Turn left to rejoin CGB at Histon Stop.	

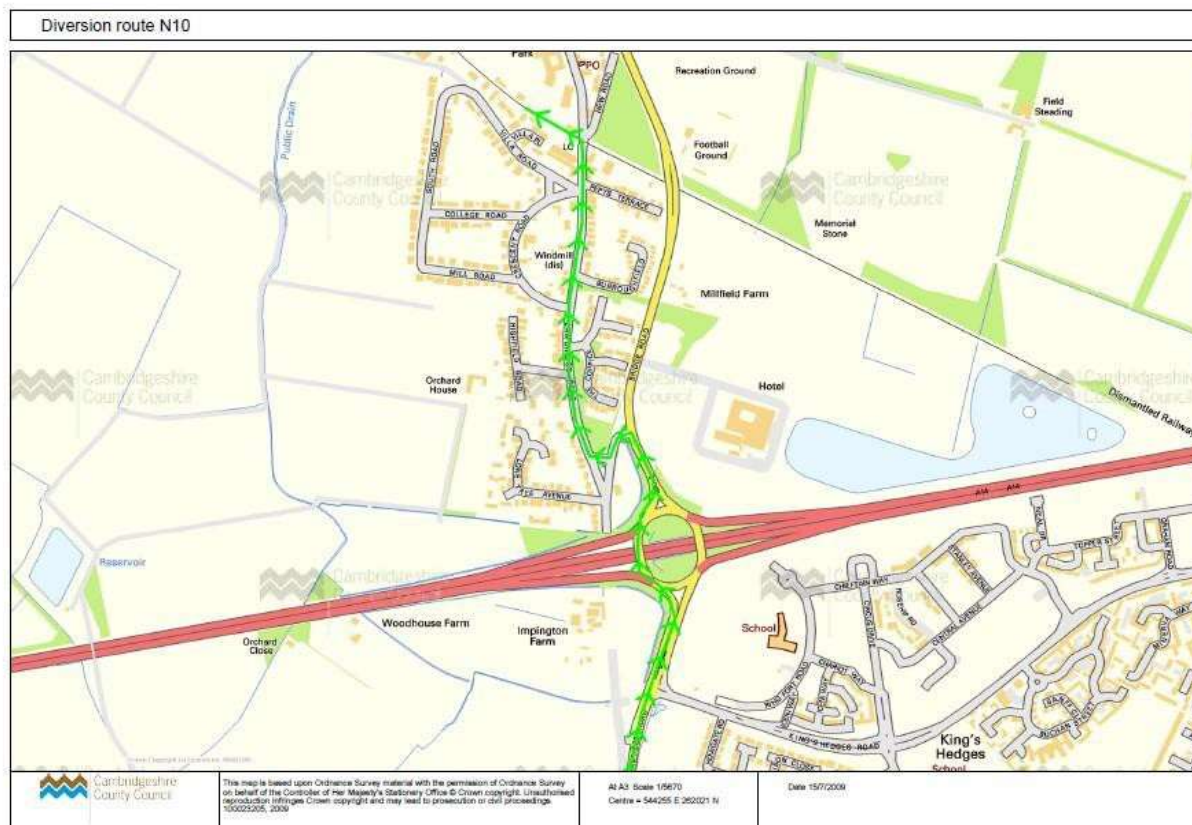


Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
9	Milton Road to Cambridge Regional College	N9	Do not join guideway. Proceed ahead on Milton Road turn left into Kings Hedges Road and right. towards Cambridge Regional College, turn left to rejoin CGB at CRC crossing.	Stops required at Kings Hedges Road

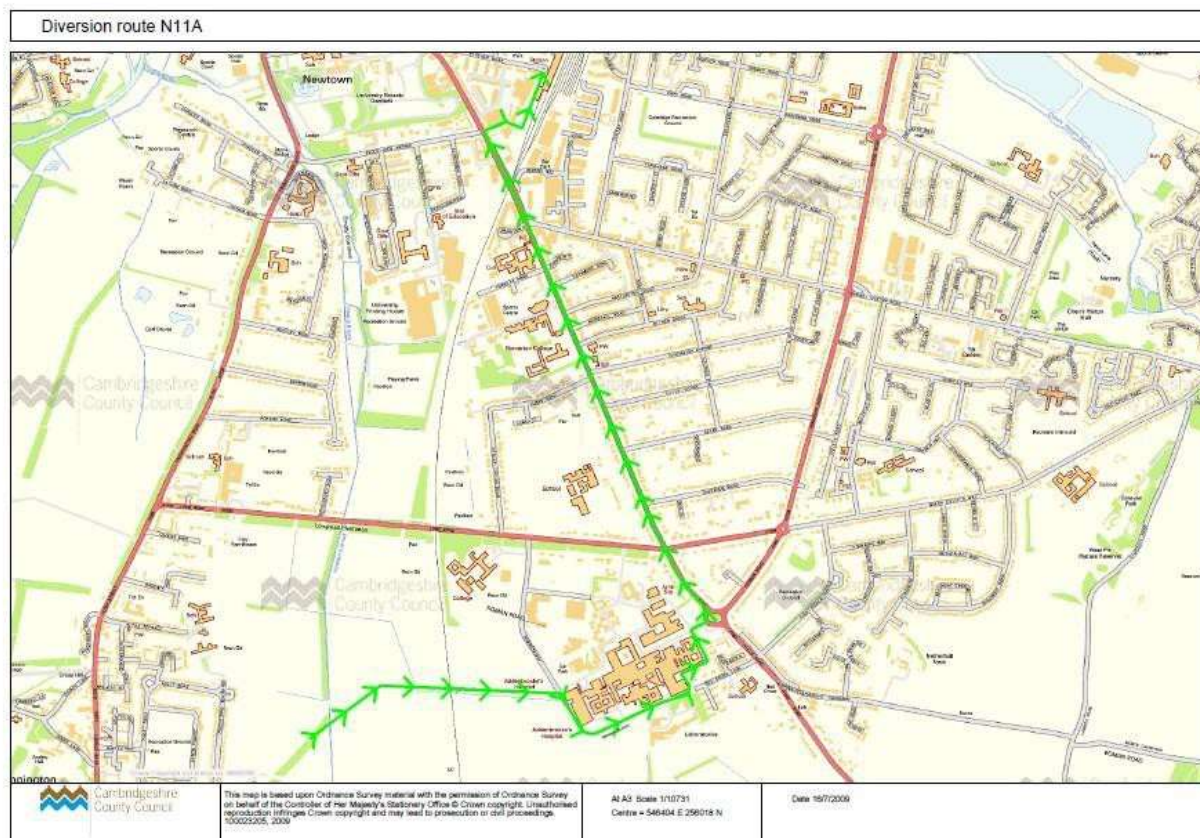
Diversion route N9A



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
9	Cambridge North Station to Milton Road	N9A	On leaving the bus interchange, do not proceed towards the guideway. Take the turning on the right towards Milton Avenue. At the T junction ahead, turn left onto Milton Avenue and proceed to the station exit at the junction of Cowley Road. Proceed ahead on Cowley Road to the signal controlled junction at Milton Road. Turn left onto Milton Road, and proceed ahead to the guideway junction. Turn right to rejoin CGB.	Not required

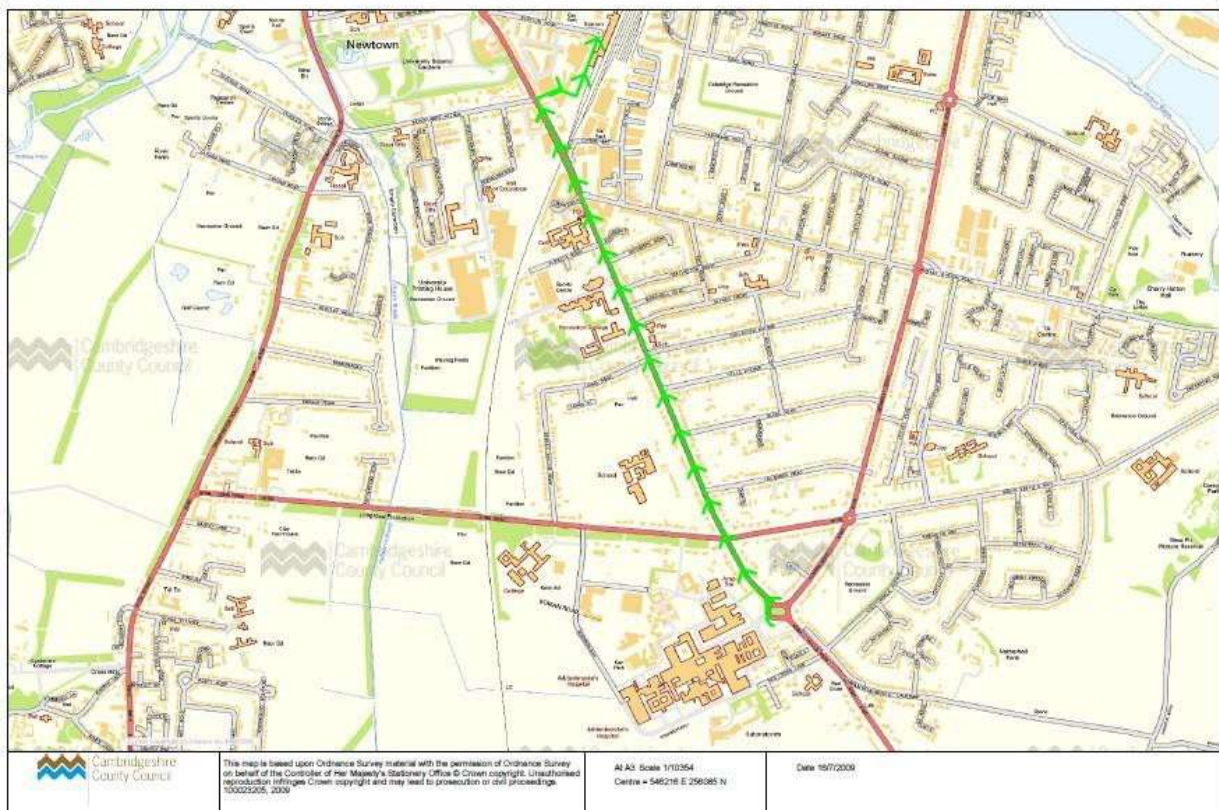


Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
10	Histon Road to Orchard Park Guideway Junction	N10	At King's Hedges Road junction proceed ahead towards Histon, do not join guideway. At traffic signals after crossing the A14 turn left into Bridge Road and then right into Cambridge Road. Turn left to rejoin CGB at Histon Stop.	Stop Required on Histon Road to serve Orchard Park. CRC not served.



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
11	Addenbrooke's gateway junction to Cambridge Station	N11A	<i>Buses from Trumpington to Cambridge.</i> Turn right at Addenbrooke's gateway junction towards Addenbrooke's. At Addenbrooke's turn right onto perimeter road and proceed to bus station. From bus station turn left onto Hills Road towards Cambridge. Proceed on Hills Road to Cambridge Station turning right onto Hills Road bus only link; turn left onto CGB at Cambridge Station.	Not required

Diversion route N11B



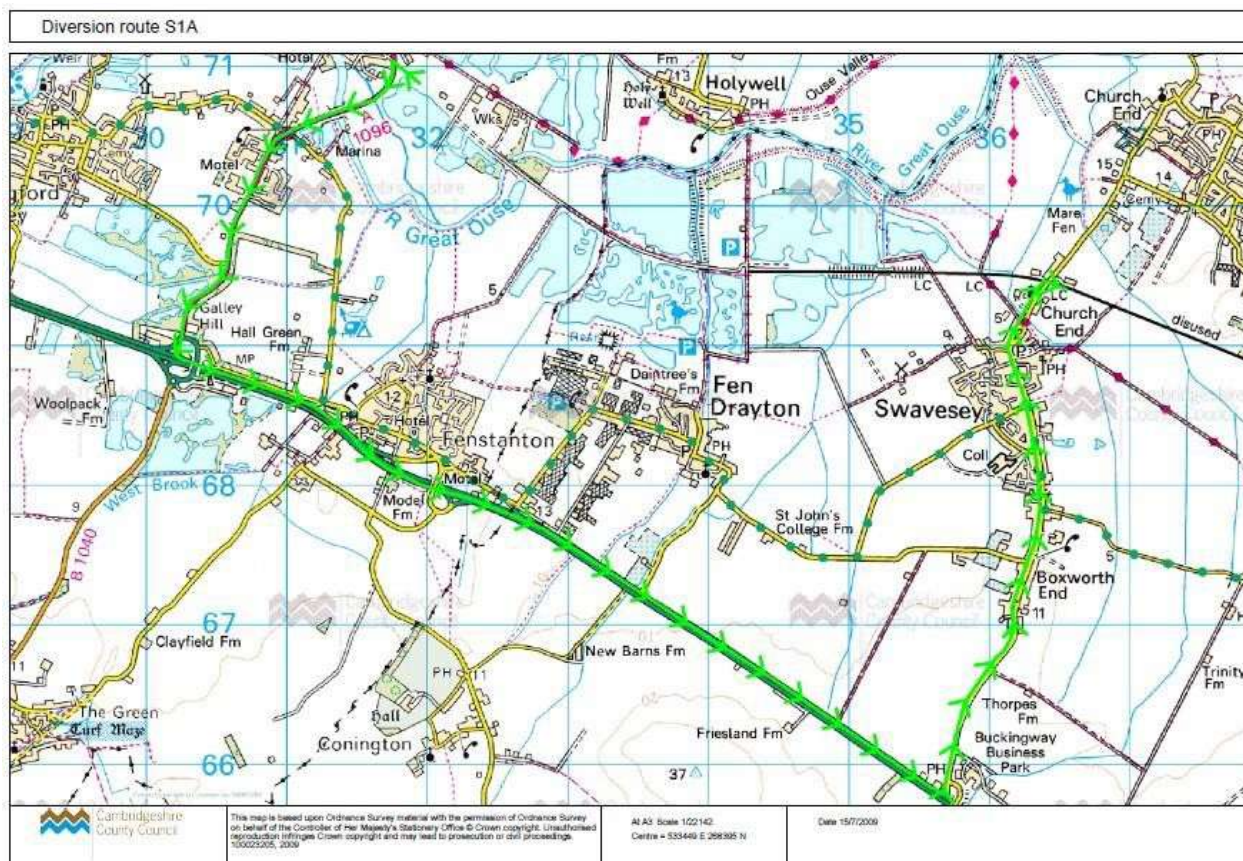
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
11	Addenbrooke's guideway junction to Cambridge Station	N11B	<i>Buses from Addenbrooke's to Cambridge.</i> Do not join guideway. From Puddicombe Way turn right onto Robinson Way, then right onto Long Road and left onto Hill's road towards Cambridge. Proceed on Hills Road to Cambridge Station turning right into Hills Road bus only link; turn left onto CGB at Cambridge Station.	Not required

Trumpington P&R to Addenbrooke's guideway	N12A	<i>Buses from Trumpington to Addenbrooke's</i> Exit Trumpington P&R onto Hauxton Road, turning right. Turn left onto Addenbrooke's Access Road and proceed to Addenbrooke's without rejoining guideway.	
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Buses from Trumpington to Cambridge	N12B	<i>Buses from Trumpington to Cambridge</i>	
		Exit Trumpington P&R onto Hauxton Road, turning right. Turn left onto Addenbrooke's Access Road and turn left onto CGB at Addenbrooke's link; turn right towards Cambridge at Addenbrooke's guideway junction.	





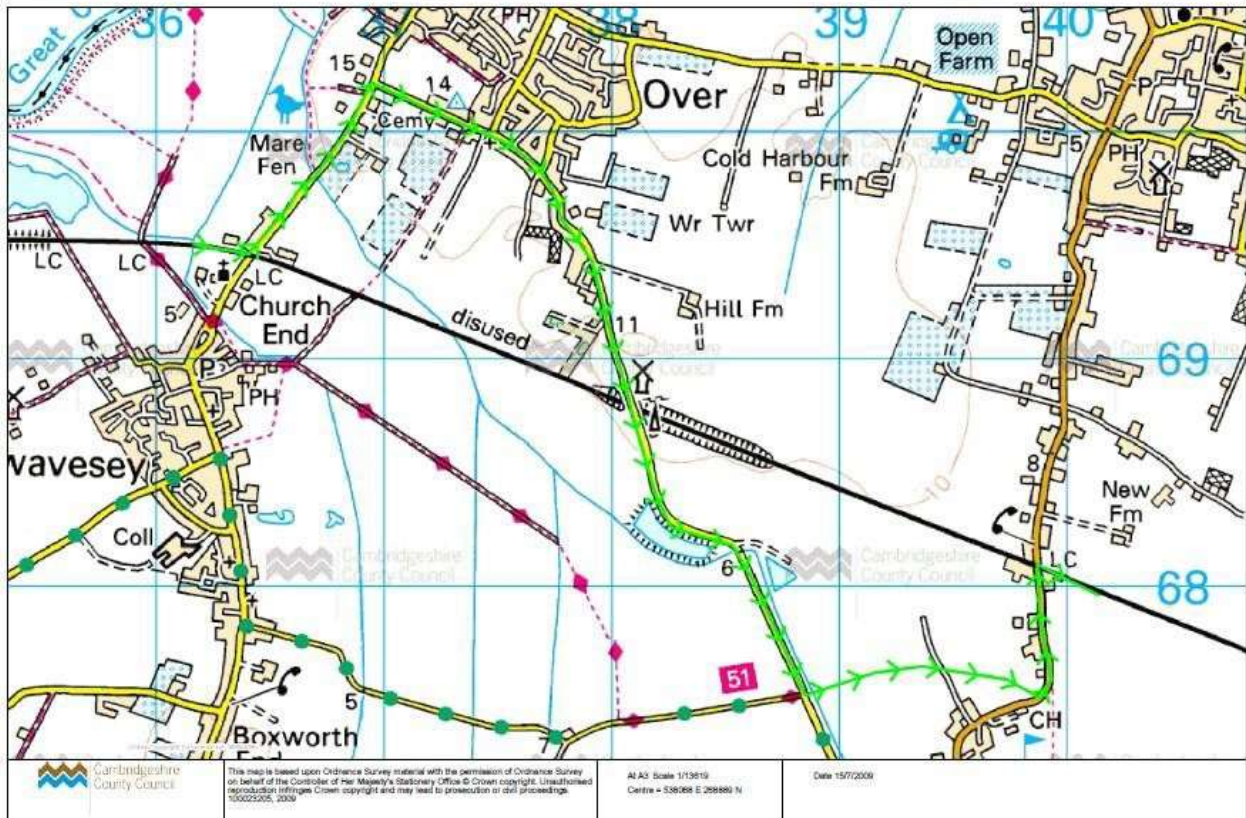
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
1	St Ives to Swavesey	S1A	Leave St Ives P&R site and travel towards St Ives, turn left on to A1096; then left on to A14. Proceed to A14 junction 28 and turn left towards Swavesey. Proceed through Swavesey and turn right onto CGB at Swavesey stop.	Not required Holywell Lakes stop not served

Diversion route S1B



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
1	St Ives to Swavesey	S1B	<i>In the event of flooding Section 2 may also be closed and buses should proceed to Longstanton as follows.</i> Leave St Ives P&R site and travel towards St Ives, turn left on to A1096; then left on to A14. Proceed on A14 leaving at junction 29, turn right at roundabout onto B1050 to Longstanton. Proceed on B1050 past Longstanton towards Willingham. Turn right onto CGB at Longstanton crossing	Not required Holywell Lakes and Swavesey not served.

Diversion route S2



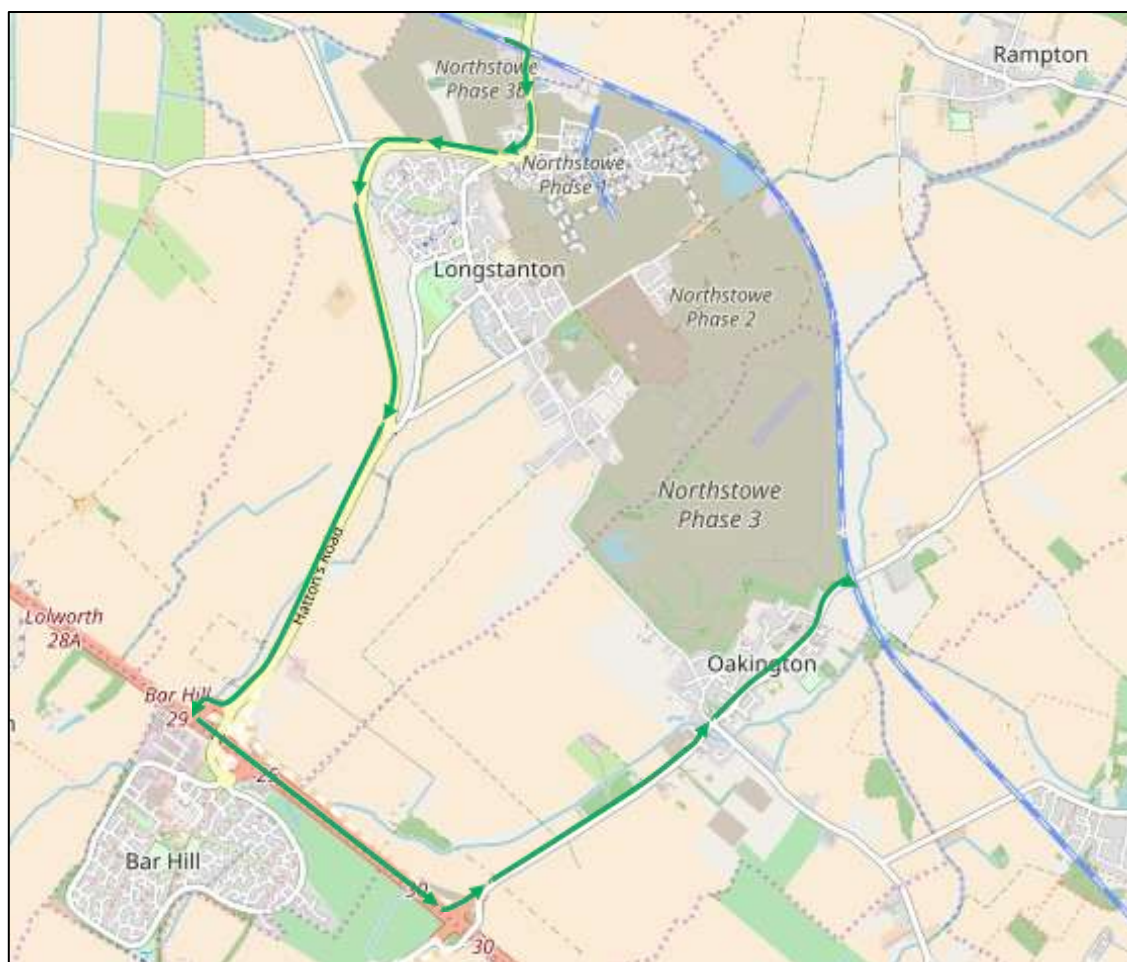
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
2	Swavesey to Longstanton Crossing	S2	Leave guideway at Swavesey turning left towards Over. In Over turn right into New Road towards Longstanton. At Longstanton turn left on B1050 towards Willingham. Turn right onto CGB at Longstanton crossing.	Stop required on Over Road Swavesey

Diversion route S3



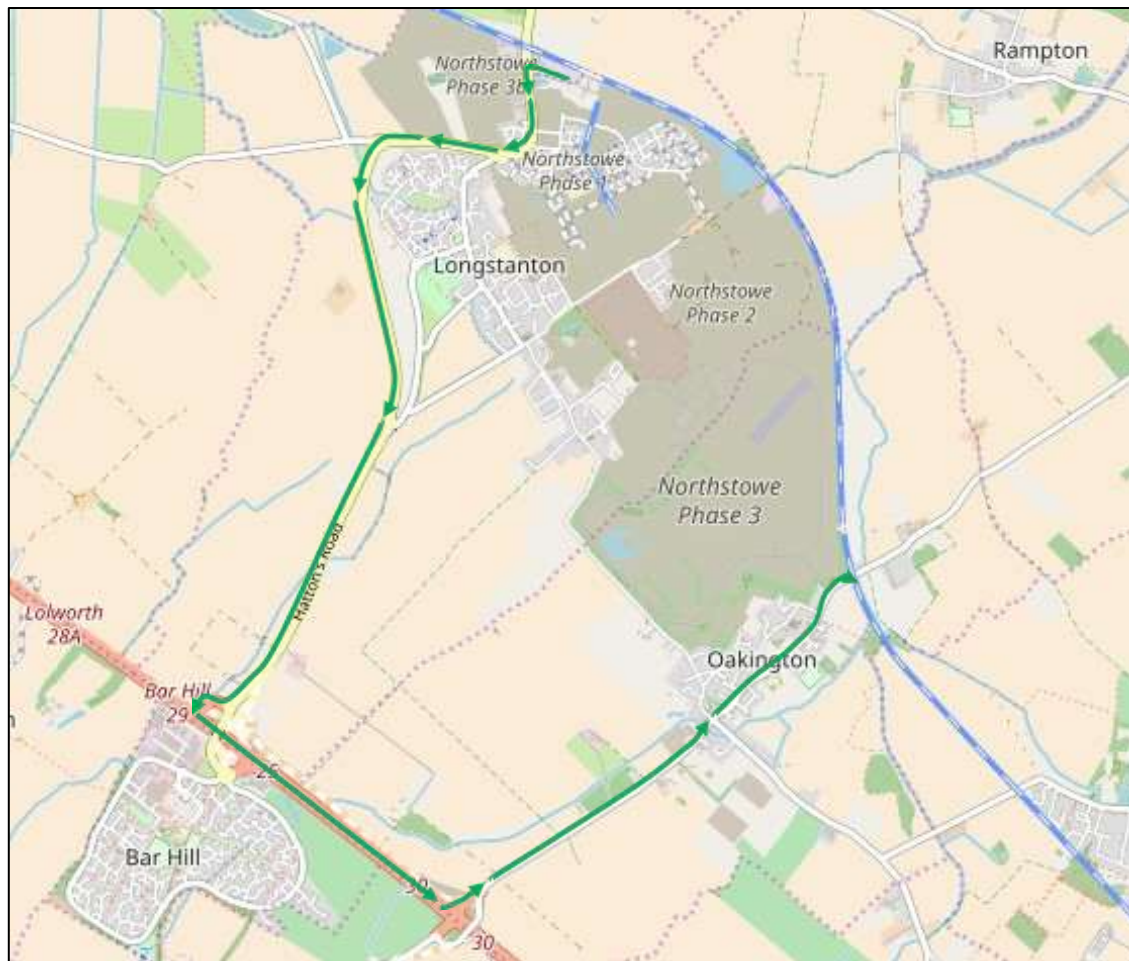
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
3	Longstanton Crossing to Longstanton P&R	S3	Leave guideway at Longstanton Crossing turning right towards Longstanton; turn left into Park and Ride to rejoin CGB.	Not required

Diversion S4A



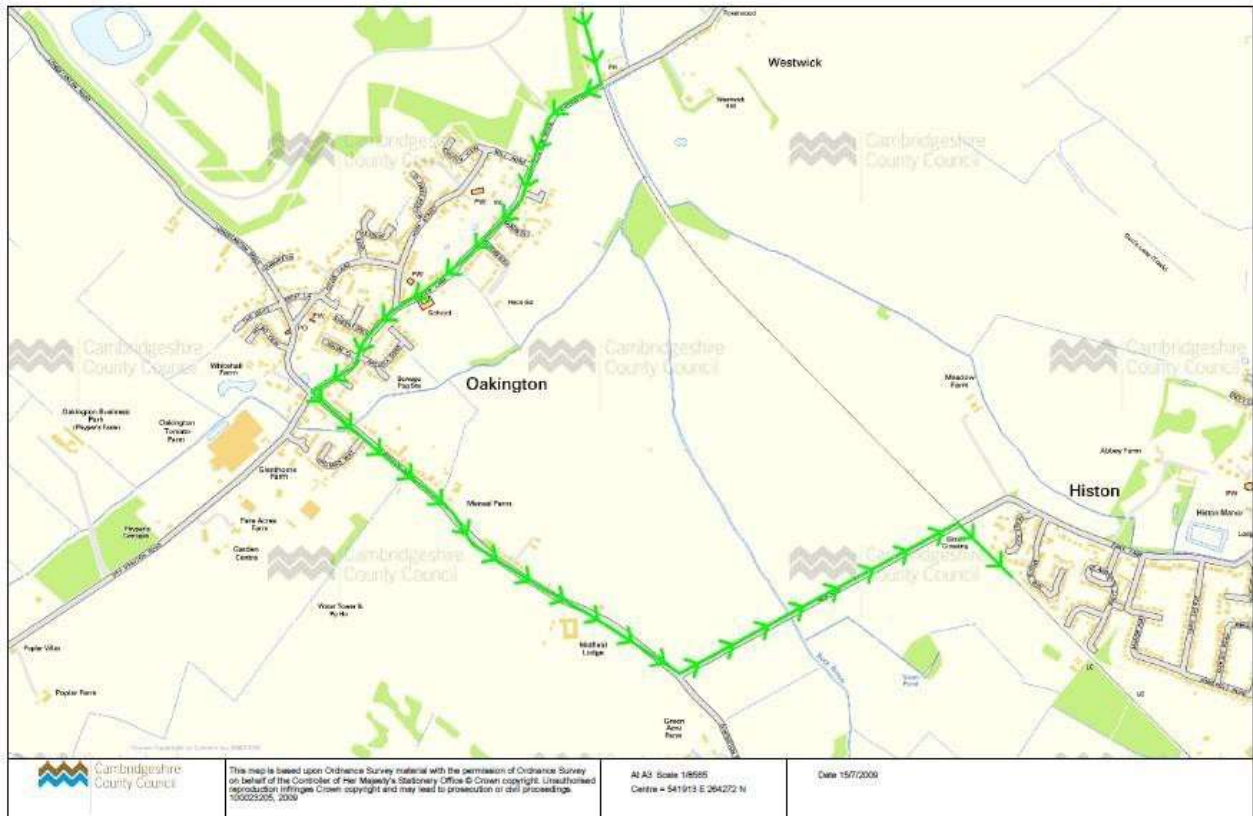
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
4	Longstanton to Oakington Note: Will be revised when local loop through Northstowe is complete	S4A	<i>Longstanton B1050 junction to Oakington</i> Leave guideway at B1050 junction and turn right onto B1050. Follow signs for Bar Hill B1050. At Bar Hill, follow signs for Cambridge A14. On A14, follow signs for Oakington. At Oakington, proceed through village towards Westwick, and re-join the guideway at the Oakington stop	Stop required in Longstanton

Diversion S4B



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
4	Longstanton to Oakington Note: Will be revised when local loop through Northstowe is complete	S4B	<i>Longstanton P & R to Oakington</i> Leave guideway at P & R and use local bus access road to reach B1050 at the site exit. At the junction, turn left onto B1050. Follow signs for Bar Hill B1050. At Bar Hill, follow signs for Cambridge A14. On A14, follow signs for Oakington. At Oakington, proceed through village towards Westwick, and re-join the guideway at the Oakington stop	Not required

Diversion route S5



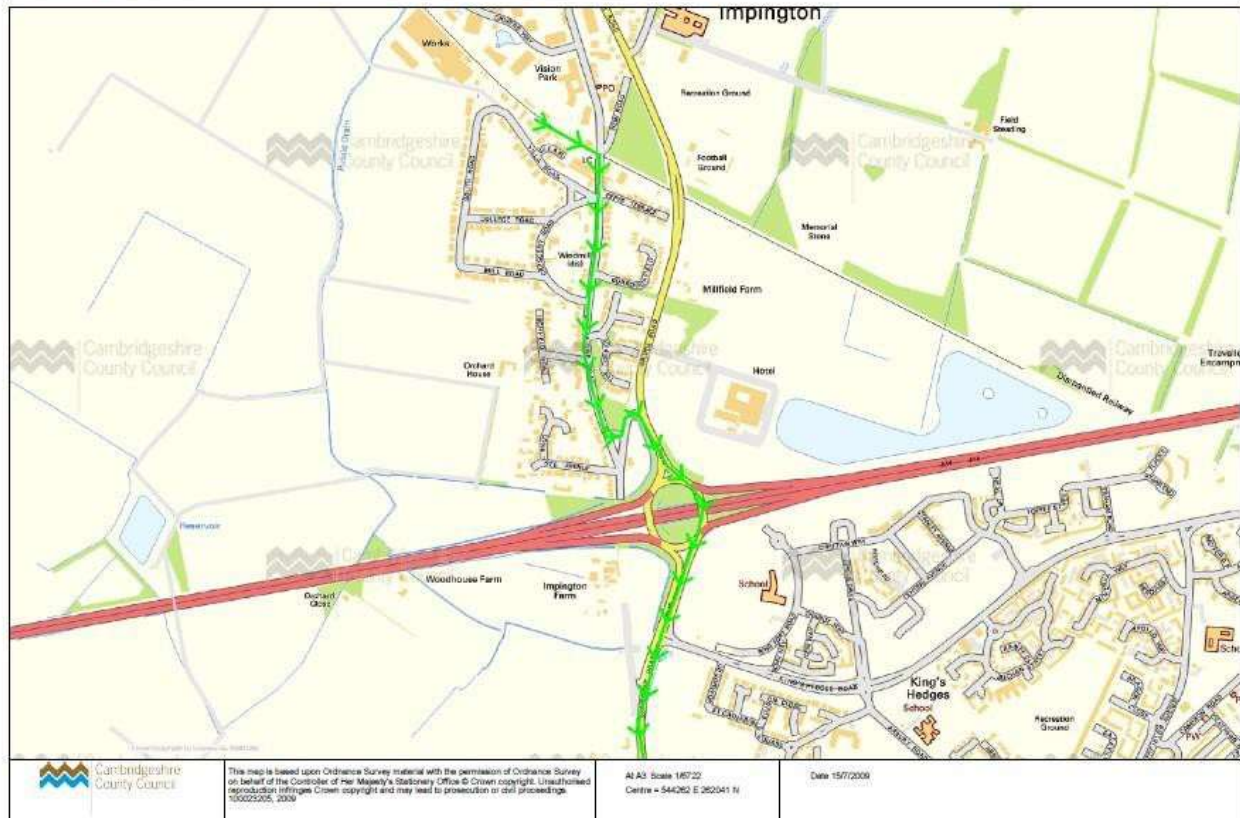
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
5	Oakington to Park Lane (AKA New Road), Histon	S5	Leave guideway at Oakington, turning right towards Oakington. At traffic signals turn left into Cambridge Road; then turn left on to Park Lane/New Road towards Histon. Turn right onto CGB at Park Lane crossing.	Stop required on Station Road, Oakington

Diversion route S6



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
6	Park Lane, Histon to Station Road, Histon.	S6	Leave guideway at Park Lane turning left towards Histon village centre; turn right onto High Street and right onto Water Lane (B1049); turn right onto Chequers Lane and left onto Station Road. Turn left onto CGB at Histon Stop.	Not required

Diversion route S7A



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
7	Histon to Orchard Park Guideway junction.	S7A	<i>Buses proceeding via Histon Road.</i> Leave guideway at Histon turning right onto Cambridge Road proceed to B1049 junction, turn right onto B1049 proceed towards Cambridge without rejoining guideway.	Stop required on Cambridge Road, Histon. Orchard Park will be served by Milton Road services.

Diversion route S7B



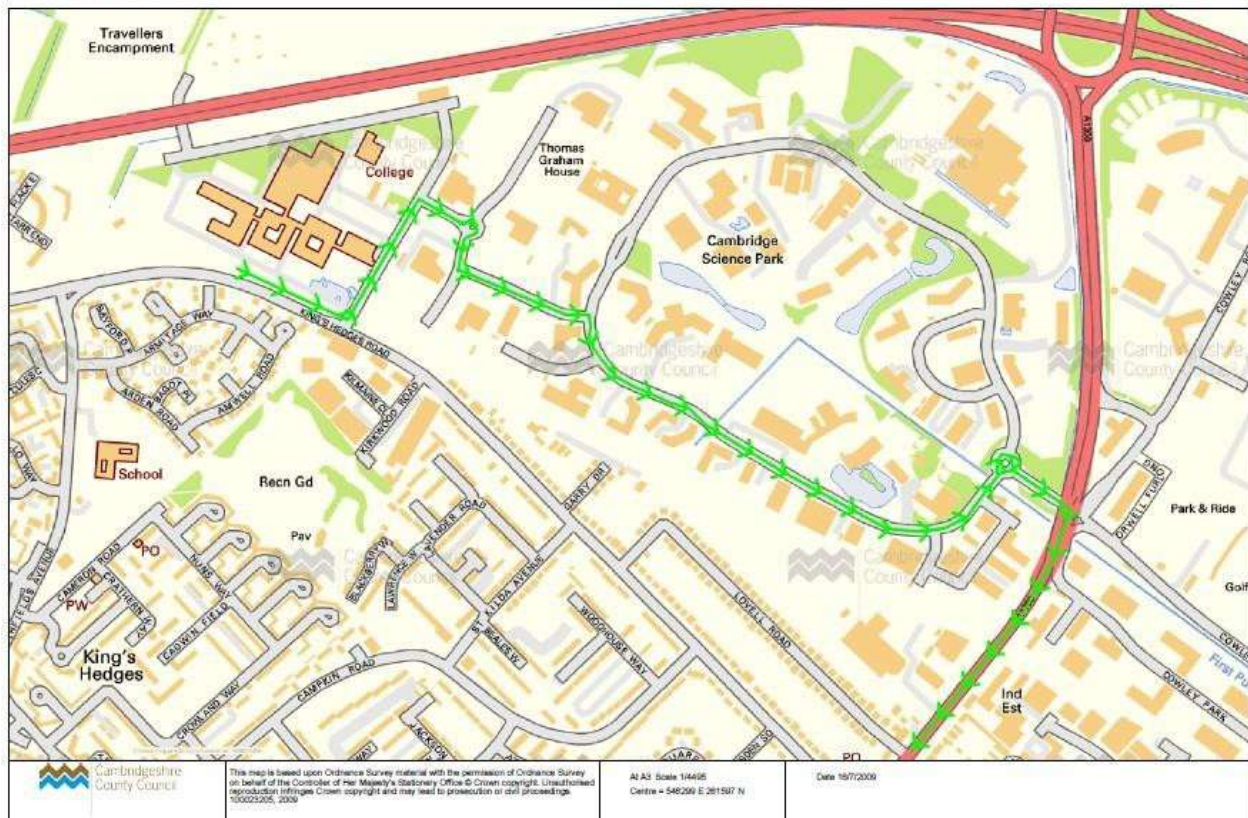
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
7	Histon to Orchard Park Guideway junction.	S7B	<i>Buses proceeding via Milton Road</i> Leave guideway at Histon turning right onto Cambridge Road proceed to B1049 junction, turn right onto B1049 cross A14. Turn left into King's Hedges Road and join Orchard Park branch of CGB. At Orchard Park guideway junction turn right onto Milton Road branch of CGB.	Stop required on Cambridge Road, Histon. Orchard Park will be served by Milton Road services.

Diversion route S8



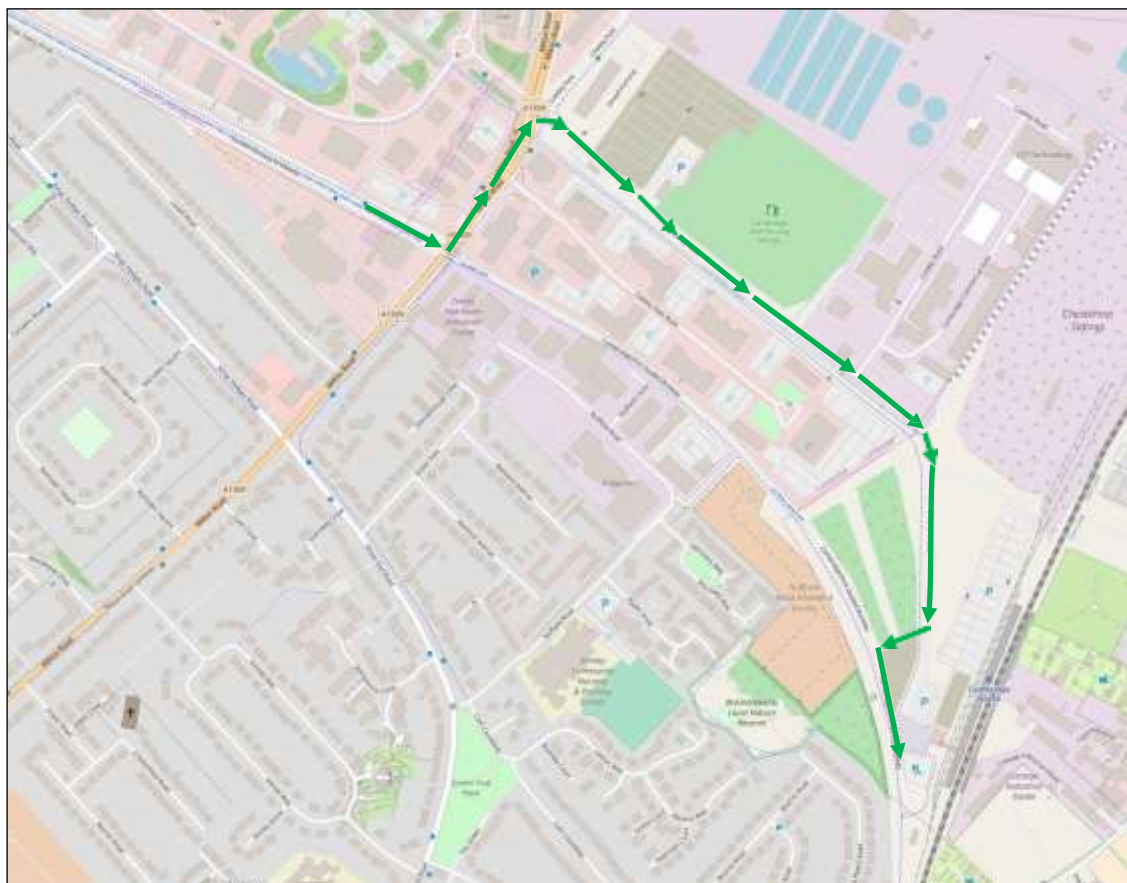
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
8	Orchard Park guideway junction to Cambridge Regional College	S8	Leave guideway at Histon turning right onto Cambridge Road proceed to B1049 junction; turn right onto B1049 to cross A14. Turn left into King's Hedges Road. Proceed on King's Hedges Road to Cambridge Regional College. Turn right at crossing to rejoin guideway.	

Diversion route S9



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
9	Cambridge Regional College to Milton Road	S9	Leave guideway turning right at CRC crossing onto Kings Hedges Road towards Milton Road.. Turn right onto Milton Road and proceed towards Cambridge without rejoining guideway.	Stops required on Kings Hedges Road

Diversion route S9A



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
9	Milton Road to Cambridge North Station	S9A	Do not cross CGB junction at Milton Road. Turn left onto Milton Road, and proceed ahead to the signal-controlled turning into Cowley Road. Turn right into Cowley Road and proceed ahead to end of Cowley Road and into Cambridge North access road. Bear right onto Milton Avenue towards the station, and take the next turning on the right, signposted for buses only. At the T junction ahead, turn left into station bus interchange area	Not required

Diversion route S10



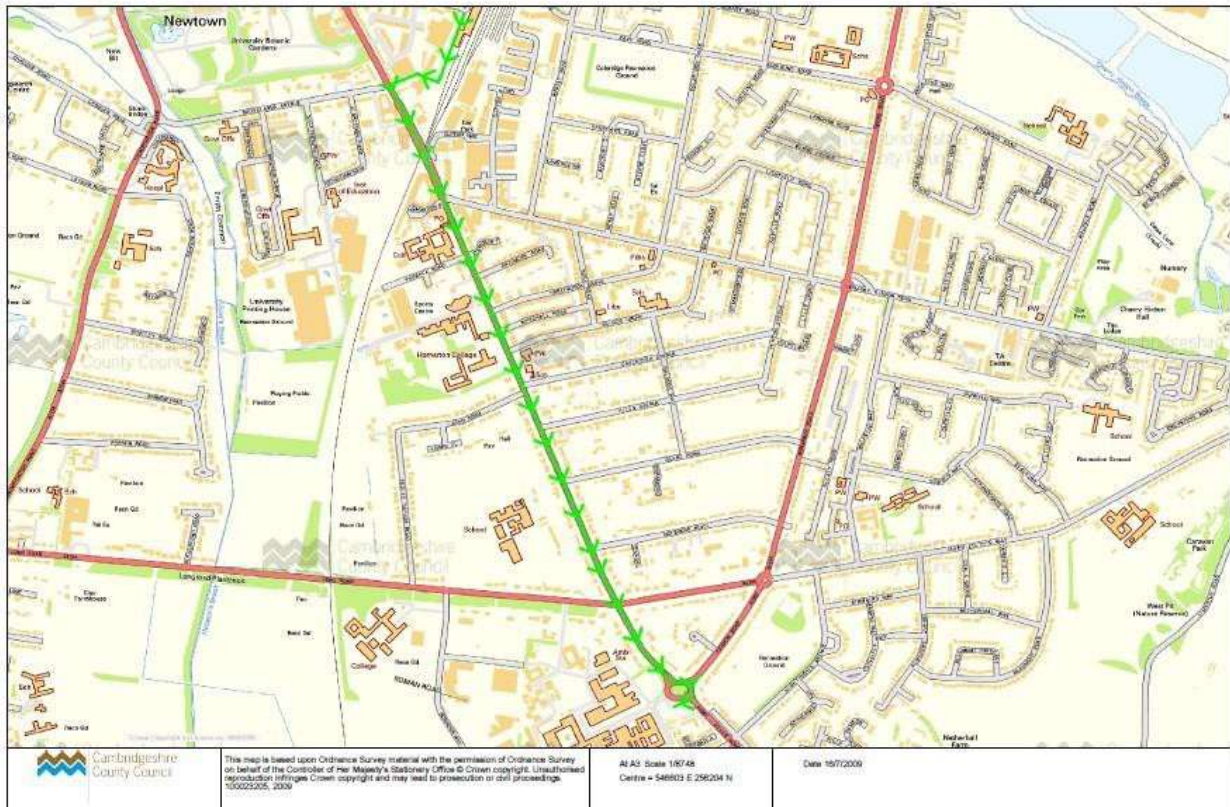
Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
10	Orchard Park Guideway Junction to Histon Road (Orchard Park)	S10	At Orchard Park guideway junction proceed ahead towards Milton Road. Leave guideway at main CRC crossing turn right onto King's Hedges Road towards Histon Road; turn left onto Histon Road and proceed to Cambridge without rejoining guideway.	Stops required on King's Hedges Road

Diversion route S11A



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
11	Cambridge Station to Addenbrooke's gateway junction	S11A	<i>Buses from Cambridge to Trumpington</i> At Cambridge Station turn right onto bus only link towards Hills Road. At Hills Road turn left. Proceed on Hills Road and turn right at roundabout into Addenbrooke's Hospital. Proceed around Addenbrooke's perimeter road and turn left onto gateway at Addenbrooke's Link. Turn left at Addenbrooke's gateway junction and proceed to Trumpington P&R.	Not required

Diversion route S11B



Zone No.	Section Closed	Diversion No.	Route	Emergency bus stops
11	Cambridge Station to Addenbrooke's gateway junction	S11B	<i>Buses from Cambridge to Addenbrooke's</i> At Cambridge Station turn right onto bus only link towards Hills Road. At Hills Road turn left. Proceed on Hills Road and turn right at roundabout into Addenbrooke's Bus Station.	Not required

Addenbrooke's guideway to Trumpington P&R	S12A	<i>Buses from Cambridge to Trumpington</i> At guideway junction turn left towards Addenbrooke's, proceed to Addenbrooke's turning right from guideway onto Addenbrooke's Access Road. Continue along Addenbrooke's Access Road and cross Hauxton Road to Trumpington P&R.	
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	S12B	<i>Buses from Addenbrooke's to Trumpington.</i> Do not join guideway at Addenbrooke's; proceed via Addenbrooke's Access Road to Trumpington P&R.	
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