

DREM TO GULLANE CYCLE PATH Options Appraisal

15 August 2022

Prepared for: East Lothian Council

Prepared by: Danny Greiner

Project Number: 332010714

#### Drem to Gullane Cycle Path

Revision	Description	Author	Date	Quality Check	Date	Independent Review	Date
R01	Draft	DG	17.06.22	BR	17.06.22	DMcL	17.06.22
R02	Final	DG	11.07.22	BR	11.07.22	DMcL	15.07.22
R03	Minor Update	DG	12.08.22	BR	12.08.22	DMcL	12.08.22

The conclusions in the Report titled Drem to Gullane Cycle Path are Stantec's professional opinion, as of the time of the Report, and concerning the scope described in the Report. The opinions in the document are based on conditions and information existing at the time the scope of work was conducted and do not take into account any subsequent changes. The Report relates solely to the specific project for which Stantec was retained and the stated purpose for which the Report was prepared. The Report is not to be used or relied on for any variation or extension of the project, or for any other project or purpose, and any unauthorized use or reliance is at the recipient's own risk.

Stantec has assumed all information received from East Lothian Council (the "Client") and third parties in the preparation of the Report to be correct. While Stantec has exercised a customary level of judgment or due diligence in the use of such information, Stantec assumes no responsibility for the consequences of any error or omission contained therein.

This Report is intended solely for use by the Client in accordance with Stantec's contract with the Client. While the Report may be provided to applicable authorities having jurisdiction and others for whom the Client is responsible, Stantec does not warrant the services to any third party. The report may not be relied upon by any other party without the express written consent of Stantec, which may be withheld at Stantec's discretion.

Prepared by:	
	Signature
	DANNY GREINER
_	Printed Name
Reviewed by:	
	Signature
	BOB REID
—	Printed Name
Approved by:	
	Signature
	DERICK MACLEOD
	Printed Name

# **Table of Contents**

1	STUDY OBJECTIVE	1
2	BACKGROUND	2
3	SITE EVALUATION	5
3.1	Mapping and Topographical Survey Data	5
3.2	Accident History	5
3.3	Site Visit and Key Constraints	5
3.4	Land Ownership	
3.5	Traffic Volumes and Speeds	
4	DESIGN GUIDELINES AND STANDARDS	
4.1	Sustrans Consultation	
5	ASSESSMENT CRITERIA AND PROCESS	14
6	DESIGN OPTIONS	
6.1	Sustrans Design Option 1	
6.2	Sustrans Design Option 2	
6.3	Sustrans Design Option 3	
6.4	Sustrans Design Option 4	
6.5	Stantec Design Option 1	
6.6	Summary of Option Appraisal	
7	CONCLUSIONS	

# 1 Study Objective

East Lothian Council (ELC) has commissioned Stantec to assess the feasibility of four design options prepared by Sustrans, the national walking/cycling charity, to address a key constraint on the proposed Drem to Gullane cyclepath. The constraint is located in a key access/egress area to the north of Drem Village on the B1345 road where the proposed options are constrained by the road and the space between two third party land boundaries.

The purpose of this study is to determine whether any of the concept designs are viable and will meet the design criteria agreed by ELC and Sustrans. This study will also highlight key constraints to delivering a route through this section and recommend possible further measures to be taken. It is intended that this information will be used to inform potential funding applications and relevant ELC strategies, plans and guidelines should a viable solution be identified and proposed for further design development.



The study area is illustrated in Figure 1.1 below.

Figure 1.1: Study Area of the Drem Village section of the route

## 2 Background

The desire for a safe walking and cycling route between Drem and Gullane was first identified during early consultations for ELC's Core Paths Plan in 2005. A route, roughly following the old 'Drem Ride', was identified and included in the first draft Core Paths Plan in 2007. Since then, ELC has had ongoing discussions with affected landowners, local residents, the Drem to Gullane Path Campaign Group and East Lothian Access Forum, with the aim of developing a preferred route.

In May 2016, having been unable to reach a consensus with key stakeholders on a preferred route to the north west of Drem, ELC appointed an independent Mediator to help take the project forward. Following consultations with all key stakeholders, the Mediator prepared a report which set out a number of findings and recommendations.

Following the issue of the Mediator's report in March 2017, ELC continued to engage with stakeholders to develop a walking and cycling route from Drem to Gullane, recognising that it would form an important sustainable transport connection between the two communities.

In 2017, Peter Brett Associates (PBA) (now Stantec) were commissioned by ELC to undertake a feasibility study to focus on the most constrained section between Drem and Peffer Burn. The report, which was published in April 2018, detailed a preferred route alignment, design specification, and outline cost estimate. The report also recommended that:

- A detailed topographical survey be undertaken along the extents of the proposed route to confirm physical constraints and establish the extents of land ownership boundaries. Affected landowners should be consulted/ involved in this process so that they can be satisfied that the boundary of their property has been established accurately.
- A 3D preliminary design should be produced to confirm the horizontal and vertical alignment of the route. This should confirm the limits of construction works, including any necessary land acquisition and accommodation works. This will enable project costs and delivery timeframes to be more accurately defined.
- A speed limit review be undertaken, to consider the potential for a reduction in the posted speed limit through Drem from 40mph to 30mph, in conjunction with complementary measures such as village gateway treatments, speed activated signs and street lighting.
- Consultation is undertaken with affected landowners, local residents, and other stakeholders and statutory bodies during the preparation of the preliminary design.

In 2019, a further feasibility study was undertaken by PBA that investigated the Drem to Peffer burn section to better understand the impact on third party land. A topographical survey was commissioned and designs modelled to gain an appreciation of the physical parameters and constraints of the site and to establish land ownership boundaries. The study concluded that Section 1 of the route through Drem village cannot be delivered without impacting on private land on both sides of the B1345. The study also noted that affected landowners had objected to any provision of land either through temporary access or permanent acquisition to accommodate the path construction and as such the proposals were considered unfeasible.

After reviewing the 2019 feasibility study delivered by PBA, Sustrans produced a report in 2021 that summarised the constraints of the site and outlined four possible design solutions. The report is included in Appendix A. The following accompanying measures were proposed for every circumstance:

- Reduce the speed limit through the village, ideally down to 20mph
- Extend the speed limit further north along the B1345 to beyond the corner, at the end of the straight
- Introduce gateway features to encourage traffic to slow down
- Introduce speed detectors to encourage traffic to observe the correct speed limit
- Introduce warning signs to warn drivers of pedestrians and cyclists
- Strip back hedges and foliage around the bend, to increase visibility.

These measures aim to improve the safety of all road users in the area and to supplement the proposed designs. ELC have indicated that reducing the speed limit through Drem to 30mph may be possible, and it should also be noted that a reduction to 30mph would also change the parameters for allowable minimum widths of active travel paths that are recommended through Sustrans guidance documents. However, a reduction to 30mph will require a significant change to the physical environment in the vicinity of the proposed speed limit change as well as a Traffic Regulation Order that will be subject to public scrutiny and potential objection.

Reduction to a 20mph limit on a road which performs such a strategic function on the road network in this area is not considered to be appropriate and speed surveys undertaken within Drem Village have indicated that the mean speed is 28mph. Guidance on setting local speed limits (Speed Limit Guidance - ETLLD Circular 1/2006) notes that mean speeds should be used to determine local speed limits, as this reflects what the majority of drivers perceive as an appropriate speed to be driven on the road. The aim in setting speed limits should be to align speed limits with the original mean speed driven on the road so that actual speeds are at or below the new posted speed limit for that road. Based on this approach a reduction to 20mph would not be appropriate or supported by Police Scotland as it would not be self-enforcing.

The idea of extending the speed limit was given some consideration. However, the traffic surveys have demonstrated that the mean speed of vehicles along the straight section of the B1345 before that bend in the road is between 40 and 50mph so a reduction to 30mph along this section would be difficult to justify in terms of the guidelines for setting local speed limits and would be unlikely to secure the support of Police Scotland as it would not be self-enforcing.

The other measures listed by Sustrans in their note are all aimed at improving road safety and encouraging traffic to slow down, observe the speed limit and take cognisance of the change in environment as they enter Drem Village. Clearance of hedges and other vegetation to improve sightlines and the use of features such as village gateways, digital speed display signs and warning signs could all be considered as part of the detailed design process if a viable solution is found for taking a route through this constrained section.

For each proposed design option, Sustrans provided an initial assessment of the pros and cons and details about considerations to further develop the designs. The preferred option, referred to as Option

# Drem to Gullane Cycle Path 2 Background

4, consisted of a signalised, shuttle working, arrangement on the narrowed road running adjacent to a shared path 3.5m wide on the eastern side.

Since the report, ELC have commissioned Stantec to further develop the four Sustrans design proposals, as well as provide an additional option to be developed by Stantec covering the revised design criteria and evaluate the feasibility of the options. This report summarises the findings.

## 3 Site Evaluation

### 3.1 Mapping and Topographical Survey Data

As identified in the previous studies, a topographical survey would need to be undertaken to identify key pinch points and confirm physical constraints of the site for a basis of design.

A topographical survey was commissioned by PBA and was completed by Malcolm Hughes Land Surveyors Ltd in April 2019. The study established the extents of the land ownership boundaries at the fencelines on either side of the carriageway. The site has not undergone any changes since the survey had been commissioned in 2019, thus making it appropriate for use in this study.

Areas outside the topographical survey extents were assessed using Ordnance Survey (OS) Mastermap data which is considered appropriate for planning purposes at this stage.

### 3.2 Accident History

An assessment of recorded injury accidents on the B1345 was undertaken to determine whether there were any locations in the study area that have an accident history. The assessment utilised data that is available to the public from the crashmap.co.uk website ('Crashmap'). Data published in 'CrashMap' is established from information collected by the police about road traffic accidents occurring on British roads where someone is injured. This data is approved by the National Statistics Authority and reported by the Department for Transport each year.

The assessment was undertaken using data that was extracted for the most recently available five-year period, which is from 2017 to 2021 inclusive. This revealed that there had been 1 serious incident on the B1345 within the Drem to Peffer Burn section in July 2020 involving a vehicle and cyclist. This accident resulted in one casualty.

A previous Crashmap assessment undertaken during the 2019 feasibility study revealed that there had been no prior recorded injury accidents on the B1345 between 2014 – 2018.

### 3.3 Site Visit and Key Constraints

Stantec undertook a site visit in April 2022 with representatives from ELC to identify and confirm the physical constraints within the study area that have been detailed in previous feasibility studies. The details are summarised below along with supporting images taken on the most recent site visit to Drem.

 $\bigcirc$ 

Figure 3.1: Watercourse alongside the B1345	A subterranean culvert is situated within the verge on the eastern side of the B1345. The depth of the pipe is shown indicatively on the drawing cross sections provided in the report within Appendix B. The culvert runs adjacent to the B1345 under the eastern verge for the full length of the constrained section on the northern egress point from Drem and outfalls north of the constrained area. Any excavation works proposed for construction into the eastern verge would pose a risk to the culvert and any additional loading on top of the pipe system may cause it to fail. The culvert may require to be diverted and/or protected to accommodate the proposals.
Figure 3.2: Drainage and service chamber	There are a number of chamber covers present in the eastern verge which are suspected to be BT apparatus. Any modifications to the eastern verge may require utility diversion and/or protection works to accommodate the proposals at additional cost. There are existing gullies along both sides of the carriageway that would need to be realigned relative to the new kerb lines to reconnect the surface water drainage network to suit the new proposals. The repositioned gullies may require permissions from Scottish Water to connect into their network.



Figure 3.3: B1345 route to Gullane exiting Drem

A sharp bend with a radius of approximately 90m is present on the northern approach to Drem on the B1345. This is a historical road where the geometry does not meet current road design standards for the speed and standard of road as dictated by the Design Manual for Roads and Bridges (DMRB). This sub-standard geometry has an impact on the forward site distance at this location. In addition, the profile of the road and the presence of vegetation and road barrier on the inside of the bend further reduces the achievable forward site distance on the road.

Any changes to road alignment or geometry will require visibility splay and forward visibility envelope checks and potential regrading/vegetation clearance to enable sufficient forward visibility. Clearance works could be challenging to implement as the hedges/bushes are located on third party land.



Figure 3.4: Well established hedgerows and trees along both sides of the B1345 Drem to Peffer Burn section Thick vegetation and foliage is present on both sides of the carriageway and will need to be cleared for path construction and to improve visibility. Most notably, there is a large established private hedge on the boundary of 'The Bothy' residence, which overhangs the road boundary.



## 3.4 Land Ownership

The previous feasibility studies have determined that the measured fenceline boundaries within the topographical survey are to be considered as the landowner boundaries. Both landowners on the eastern and western sides have recently been consulted by ELC and have indicated that they are not willing to concede any land at this location to facilitate the construction of the route.

### 3.5 Traffic Volumes and Speeds

Whilst on site, it was observed that there is a high frequency of HGVs and large agricultural vehicles using the B1345 in both directions. This is supported by data obtained from the traffic survey undertaken in the area. This data was collected through Automatic Turning Count (ATC) surveys undertaken on the B1345 for a one-week period from 31/03/2022-06/04/2022. The locations of the counts are shown in Figure 3.7 below.



Figure 3.7 April 2022 ATC Locations

The ATC surveys recorded information on vehicle numbers, composition and speeds. The data obtained from the ATC surveys indicates that there are approximately 469, 515 and 447 two-way vehicle flows during the AM, PM and weekend peak hours respectively.

OGV1 (Ordinary Goods Vehicle) vehicles are large rigid vehicles with two or three axles whereas OGV2 are those with four or more axles and include all articulated vehicles. OGV1 vehicles towing a caravan or trailer are classed as OGV2. On average throughout all ATC location points, OGV1/Bus class type vehicles accounted for an average of 16% of the vehicle traffic (approx. 445 movements per day) and OGV2 class vehicle types accounted for 1% (approx. 60-70 movements per day). The remaining 83% were classified as cars/LGV/caravans and other small vehicles.

The ATC surveys also indicated that the mean speeds were compliant with the posted speed limit at each of the surveyed locations. In addition to this, an analysis of the speed data identified that the majority of vehicles on the road travel at speeds below 30mph in Drem Village itself (approx. 69%), with just over 30% that travel over this speed daily. The average speed within Drem was measured at 28.4mph (Location B), which would suggest that a reduction in speed limit through Drem itself could potentially be feasible and achievable in line with the standards for setting local speed limits.

On the approaches to Drem the speed counts identified that the majority of vehicles are driving at speeds in excess of 30mph, with over 90% of vehicles travelling above this speed to the west of Drem (Location A) and 87% of vehicles to the north (Location C). Speeds on the straight section leading into the bend just before entering Drem from the north were measured at an average of 46.55mph (Location E). This would suggest that extending the proposed 30mph speed limit further north or west would not be a feasible option as it would not satisfy one of the main criteria for setting local speed limits, which is that speed limits should be set at levels which align with the original mean speed driven on the road. A 40mph buffer zone between the 30mph and national speed limit sections would potentially be feasible and may encourage a gradual reduction in speed on the approaches into Drem from the west and north. However, the guidance on setting local speed limits recommends that speed limit zones should be a minimum of 600m in length and this would not be achievable in this area. Careful consideration of the approach to setting the speed limits would be required before committing to publication of any Orders to amend limits in this area.

The mean speeds of traffic measured over the course of the seven day survey are detailed in Table 3.1 below for the 6No. sites where counts were undertaken:

Count Location	Average Speed
A	36.7mph
В	28.4mph
С	34.9mph
D	37.85mph
E	46.55mph
F	39.75mph

Table 3.1: Average speeds at ATC locations on B1345

# 4 Design Guidelines and Standards

Transport Scotland's '*Cycling by Design 2021*' has been used as the primary design reference for this study. The '*National Roads Development Guide*', the '*Design Manual for Roads and Bridges*' (DMRB), 'Roads for All Good Practice Guide for Roads' and the '*Traffic Signs and General Directions*' (TSRGD) are also referenced as appropriate.

The objective of the previously conducted studies was to develop a route for cyclists between Drem and Gullane. The intention was for this to be provided on quiet roads where it had been assessed as being safe to do so. *'Cycling by Design'* states that traffic volumes and speeds are key considerations in determining the suitability for on-carriageway infrastructure. Therefore, where the site conditions were deemed suitable, an on-carriageway facility would have been the prime consideration.

If this was not achievable then cycle tracks adjacent to the carriageway (shared with pedestrians) would be considered. These are detailed in *Cycling by Design 2021*.

Given the site constraints, the intention for the Drem to Peffer Burns section now is to provide a 3.5m wide shared path, but where this is impractical, an absolute minimum width of 2.5m would be adopted, as specified in Table 3.7: Dimensions for cycle tracks in *'Cycling by Design'*. In 40mph sections, a minimum buffer width of 1m would be provided between the shared use path and the carriageway, according to Table 3.8: Buffer widths in *'Cycling by Design'*. This could however be reduced to 0.5m width if a speed restriction of 30mph is put in place in Drem. Vertical features, such as fencing or slopes, would impose an additional spacing of 0.5m of clearance between the track and feature.

To ensure that the path provides a smooth and comfortable ride for cyclists, it is considered that an asphalt surface would be appropriate. This would increase up front capital costs but help reduce future maintenance works and thereby reduce whole life costs. As the route is in a rural location, the specification for the path has been taken from Figure 3.29: Pavement construction options of *'Cycling by Design'* – Type B.

The design criteria required to construct a suitable cycle track according to '*Cycling by Design*' standards and guidelines are summarised in Table 4.1 below and would form the basis of the design intent for the majority of the route. However, it is noted that this standard of facility may not be achievable along the full length due to spatial constraints and reduced standards may be necessary to achieve route continuity.

#### Table 4.1: Criteria for Drem to Gullane Cycle Track

Criteria	B1345 Road (Cycle Track Construction)			
Primary Design Standard	Cycling by Design			
Design Speed	40 mph			
Design Traffic	Two-way cyclist and pedestrian movements			
Cycle Track Type	Cycle Tracks adjacent to Carriageway – shared with pedestrians			
Cycle Track Width – Desirable min	4.00m			
Cycle Track Width – Absolute min	2.50m			
Buffer width	1.00m			
Minimum Clearance – Vertical feature higher than 600mm; Ditch or slope	0.50m			
Gradient – Absolute max	2.5%			
Earthwork Slope (cut)	TBC following geotechnical assessment			
Earthwork Slope (fill)	TBC following geotechnical assessment			
Pavement Design				
Cycle Track Pavement Makeup:	Surface Course: 30mm Hot Rolled Asphalt (Cl 910).			
Type B (rural)	Binder: 40mm Dense Asphalt Concrete (Cl 906).			
	Sub-base: 200mm Type 1 Granular Material (CI 803).			

### 4.1 Sustrans Consultation

A meeting was held between members of ELC, Sustrans and Stantec in April 2022 which discussed the design standards and minimum widths for pavements that would be accepted within this study. It was agreed that the existing roadway width (6.6m) is currently below standard (7.3m) but functions without significant issues. Therefore, it was agreed that any further reductions in the road width would not be acceptable for two-way traffic flow.

ELC stated that the speed limit in the Drem area could potentially be reduced from a 40mph zone to 30mph through the village, with the potential of a 40mph buffer zone either end. If an Order was put in place to reduce the speed limit to 30mph, this would reduce the geometric requirements for the proposed cycle path, with the width of the buffer decreasing from 1.0m to 0.5m.

No definitive minimum width was established for a shared path design. Both ELC and Sustrans concur that the minimum widths within '*Cycling by Design 2021*' are not attainable through this section. It was proposed that the buffer width (0.5m) and offset from a vertical feature including fencelines (0.50m) be maintained but that the effective width be reduced to 1.5m from 2.5m. This would set the shared path to the absolute minimum width, without accounting for the buffer and clearance zones as detailed in the '*Cycling by Design 2021*'.

Therefore, the total minimum width of a shared path, inclusive of buffers/clearances, used in this study is 2.50m, as illustrated in the sketch below.



Figure 4.1: Cross section of a shared path (blue) to demonstrate width makeup in metres

## 5 Assessment Criteria and Process

The design options were assessed using Sustrans '*Places for Everyone*' (PfE) design principles. The six PfE design principles listed below serve as a template to assess the design options proposed through a scoring system.

- 1. Develop ideas collaboratively and in partnership with communities.
- 2. Facilitate independent walking, cycling, and wheeling for everyone, including an unaccompanied 12-year old.
- 3. Design places that provide enjoyment, comfort and protection.
- 4. Ensure access for all and equality of opportunity in public space.
- 5. Ensure all proposals are developed in a way that is context-specific and evidence-led.
- 6. Reallocate road space, and restrict motor traffic permeability to prioritise people walking, cycling and wheeling over private motor vehicles.

The design options are evaluated using the following scoring system, consistent with the previous feasibility study scoring system:

- + 3 Significant Positive
- + 2 Moderate Positive
- + 1 Slight Positive
- 0 Neutral
- 1 Slight Negative
- 2 Moderate Negative
- 3 Significant Negative

An additional criterion for deliverability has been included to take cognisance of the constrained nature of the site. This criterion is scored by either a pass or a fail, as any design that would require third party land will not be feasible based on the current information from adjacent landowners on third party land access to facilitate construction.

The design option which achieves a pass for the pass/fail element of deliverability and which achieves the highest score will be recommended as the chosen design to take forward as a detailed design solution for this study.



# 6 Design Options

## 6.1 Sustrans Design Option 1

Sustrans Design Option 1 is shown in drawing 332010714-STN-XXX-000-DR-D-0002 in Appendix B and is detailed below.



#### Figure 6.1: Sustrans Design Option 1

Option 1 consists of a shared path route on the eastern side of the B1345 until the path narrows to < 2.5m. At this point, cyclists activate a call button linked to signals that will stop traffic in both directions in and out of Drem (indicated at the stop line locations). When the cyclist phase is activated, cyclists



would gain full priority of the carriageway space between the stop lines until they are able to rejoin the shared path to the northwestern side and continue enroute to Gullane. The same sequence in reverse would apply for southbound cyclists approaching Drem.

Pedestrians would make use of the shared path and continue onto a footpath constructed in the verge between the existing carriageway and fenceline boundary on the eastern side of the B1345 as indicated in the sketch above. To construct the footway, a retaining wall would be required along the extent of the footway which would require access to third party land to construct. A controlled crossing point in the north allows pedestrians to cross the B1345 in a controlled manner with no conflict with traffic and rejoin the shared path en route to Gullane.

The western access road to the residential area is to be closed off to remove the requirement for signal infrastructure on this access and the potential conflict with residential accesses. This also enables the infrastructure to be constructed within the road boundary. Access to the residential area is maintained via a southern access road at Drem Farmhouse.

The DMRB stipulates a desirable minimum Stopping Sight Distance (SSD) of 215m for vehicles travelling at the national speed limit on the southbound approach road to Drem. The anticipated forward visibility envelope for vehicles approaching the northern stop line in this area is significantly obstructed by vegetation and large trees on the western side of the B1345 and does not meet visibility requirements. An SSD of 160m, which is one step below the desirable minimum distance, also requires a visibility splay that encompasses the third party land that is populated with trees and hedges. Similarly, there is insufficient SSD provided for visibility to the position of the northerly located traffic signals. The height of the trees will obscure the view of the signals for traffic travelling towards Drem. This initial assessment of sight distance indicates that southbound traffic will have sub-standard visibility to the Roads Authority. However, it should be noted that some of the impacts could potentially be mitigated to some degree through the inclusion of standard advance warning signage for signals and queues and potential introduction of vehicle activated signage to warn drivers of queues forming ahead.

As the speed limit through Drem is proposed to be lowered to 30mph, the desirable minimum SSD for the northbound approach road is 90m. There is sufficient visibility provided to the stop line and signals at this location.

Traffic analysis for this option is documented in the traffic report in Appendix C of the report. The report indicates that this option would generate significant queuing but can operate within capacity. The projected queue during the morning peak hour would be approximately 45m on the northbound lane and 32m on the southbound lane on the B1345. The projected queue during the afternoon peak hour would be approximately 34m on the northbound lane and 54m on the southbound lane. Visibility checks for traffic approaching the back of the anticipated queuing vehicles on the southbound approach show that sufficient forward stopping distance can be achieved. Visibility checks on the northbound approach have shown that the lengthy queues on the approach road do not meet minimum SSD requirements for a 30mph zone. Trees and buildings at the junction across from Drem train station would obstruct visibility to the end of the anticipated queue and reduce visibility below the required stopping sight distance. Warning signage and the removal of some vegetation would be necessary to forewarn drivers of potential queues forming after the bend in the road.

#### Pros

- The safety of cyclists is ensured through complete segregation from vehicular traffic.
- Kerblines maintained on western side.
- No carriageway realignment required.

#### <u>Cons</u>

- Footpath width narrows to < 1.35m, this may pose issues for footpath users requiring space to pass pushchairs, prams and wheelchairs. The width does not meet the absolute minimum requirements of Roads for All and would require a Departures from Standards. Such a Departure on a heavily trafficked B Class road is unlikely to be approved by the Roads Authority, given a path of this width would generally not even be acceptable on a quiet residential road.</p>
- Footpath construction on the eastern side requires a retaining wall structure due to level differences, this will require third party land for installation.
- Unknown services in the eastern verge where the proposed footpath is to be constructed may be impacted and incur additional costs for diversions.
- The cyclist phase may cause confusion for drivers unfamiliar with the setup leading to vehicles entering the carriageway during the cyclist phase and putting cyclists on the carriageway at risk for vehicular collisions. Drivers may become frustrated at long wait times at stop lines and risk dangerous driving.
- Accidental activation of the cyclist phase will cause unnecessary traffic delays. Further
  investigation into potential cyclist detection systems through the section would be required to
  ensure that the arrangement works safely and efficiently.
- Vegetation (trees and hedging) will need to be removed on the eastern side to construct the shared path.
- This design option places a heavy reliance on the continuous operation of signals. Without signals, or in the case of signal failure, the functionality of this layout will not be clear and will be hazardous for both cyclists and vehicles.
- A turning head will need to be placed in the village green, large enough to suit refuse vehicles and other vehicles that may require access such as fire trucks.
- There are no known examples of this design implemented in rural environments. Unfamiliarity with the layout may give rise to hazardous situations among cyclists and drivers.

# Drem to Gullane Cycle Path 6 Design Options

#### Table 6.1: Visibility splay summary of Sustrans Option 1



Project Number: 332010714

 $\bigcirc$ 



 $\bigcirc$ 

#### Table 6.2 - Sustrans Option 1 Score

<u>Criteria</u>	<u>Score</u>	Justification
1. Develop ideas collaboratively and in partnership with communities.	+1	Sustrans design option that prioritises cycling which has been campaigned by local community groups for many years. The queuing traffic may not be favourable with the residents in Drem but this will only occur when the cycle phase is initiated. However, it should be noted that no formal public consultation on this option has been undertaken to date.
2. Facilitate independent walking, cycling and wheeling for everyone including an unaccompanied 12-year old.	-3	This option does not provide a sufficient width of footpath for all users. Cyclists using the carriageway benefit from full use of carriageway space. Unique design that most road users, especially children, may not comprehend, thus posing a safety hazard.
3. Provides enjoyment, comfort and protection.	-2	Footpath users are not well considered in this design and may find it challenging to pass other users on the path at its narrowest sections. Vehicles will pass close to pedestrians on narrow path sections which may be uncomfortable for users. Cyclists reduce risk of vehicle collisions by gaining full use of carriageway.
<ol> <li>Ensures access for all and equality of opportunity in public space.</li> </ol>	+1	Footpath users are not well considered in section of this design where path width goes below absolute minimums. Controlled pedestrian crossing provided which prioritises pedestrian movements. Cyclists well catered for due to inclusion of cycle stage in signal configuration.
5. Ensures all proposals are developed in a way that is context-specific and evidence-led.	-2	The proposed option has been modelled and would generate significant queuing but can operate within capacity. However, no evidence of this solution being workable or used elsewhere on roads with such high volumes of traffic and HGV movements.

6. Reallocates road space, restricts motor traffic permeability to prioritise people walking, cycling, and wheeling over private motor vehicles.	0	Allocating full use of the carriageway allows cyclists to gain full priority of the roadspace without vehicle interference. This is only prioritised once the call button is activated. Crossing facility at north end gives priority to pedestrians to cross in controlled conditions with no interface with moving traffic. No evidence of this solution being workable or used elsewhere on roads with such high volumes of traffic and HGV movements. Concern that road users will jump the signals if see little or no activity in the road space in front of them.
7. Scheme deliverability including constructability and third party land requirements.	FAIL	A retaining structure is required to provide a level footpath, this will require third party land for installation on the eastern side of the B1345. Advanced cyclist detection measures would need to be developed to ensure that the arrangement works safely and efficiently.
TOTAL	0	

## 6.2 Sustrans Design Option 2

Sustrans Design Option 2 is shown in drawing 332010714-STN-XXX-000-DR-D-0003 in Appendix B and is detailed below.



Figure 6.2: Sustrans Design Option 2

Option 2 consists of a continuous shared path route on the eastern side of the site by reallocating carriageway space to maintain a minimum shared path width of 3.5m. The B1345 in this option becomes a one-way traffic priority system, where traffic exiting Drem has priority over traffic entering Drem. The carriageway is reduced to a minimum width of 4.0m along this length. An uncontrolled crossing in the north allows shared path users to cross the road and continue towards Gullane.

<u>Pros</u>

- Shared path maintains adequate width greater than minimum requirements.
- Kerblines are maintained on western side.
- No carriageway realignment required.

• The access road serving the village green remains open.

#### <u>Cons</u>

- The traffic flows exceed the workable limits for priority control. Local Transport Note 01/07 Traffic Calming indicates that vehicle flows shouldn't exceed 3,000 vehicles per day for single lane working, whilst the DMRB indicates that rural single-track roads have a link capacity of 280 two-way vehicle flow per hour. It is noted that the daily and peak hour vehicle flows at the site are significantly higher than the limits mentioned above. This means there will be insufficient gaps to allow vehicles to enter Drem, resulting in driver conflict, excessive queuing and potential accidents on the high speed road approach to this traffic calming feature.
- The above issue is exacerbated by the length of the proposed priority system. Vehicles would need to have priority over a distance of 90m which is considerable for this type of arrangement. The overgrowth of vegetation and tall trees on the western side of the B1345 will obscure vehicles travelling northbound within the priority section from southbound drivers approaching the northern give way line, which could give rise to misjudgements from drivers requiring late braking. This could lead to loss of control, rear end shunts and other forms of accident in this location due to drivers having less time to react to the presence of a vehicle within the priority section.
- Vehicle break downs on the carriageway within the priority distance coverage will cause complete closure of the road that would not allow passing for emergency vehicles.
- Users of the access road serving the village green exiting the residential area onto the B1345 will be restricted in visibility for oncoming traffic towards Drem and may cause interrupted use of the priority system and/or collisions. This presents itself as a double give way situation that may lead to the access road being perceived as the priority. This may lead to confusion from the drivers travelling south on the B1345 and may result in abrupt, unsafe stoppages and reversing manoeuvres on the carriageway.
- Shared path construction on the eastern side requires a retaining wall structure due to level difference, this will subsequently require third party land for installation.
- Unknown services in the eastern verge where the proposed shared path is to be constructed may be impacted and incur additional costs.
- The narrowing of the carriageway puts shared path users at risk for wing mirror clippings with larger vehicles. Large vehicles may mount kerbs to allow other vehicles to pass when drivers have committed to manoeuvres, thus putting pedestrians and cyclists on the shared path further at risk.
- Vegetation (trees and hedging) will need to be removed on the eastern side to construct the shared path.

#### Table 6.3 - Sustrans Option 2 Score

<u>Criteria</u>	<u>Score</u>	Justification
1. Develop ideas collaboratively and in partnership with communities.	+1	Sustrans design that prioritises shared path use and cycling which has been campaigned by local community groups for many years. It is considered to be unlikely that the proposed arrangement will be favourable for local residents within Drem due to the queuing and delay it will introduce around the village. However, it should be noted that no formal public consultation on this option has been undertaken to date.
2. Facilitate independent walking, cycling and wheeling for everyone including an unaccompanied 12-year old.	+1	Shared path users benefit from unimpeded travel along the eastern side of the B1345 as well as a 3.5m wide path. The crossing will be uncontrolled at the northern end across a single lane of traffic.
3. Provides enjoyment, comfort and protection.	0	Shared path will be constructed adjacent to a carriageway with no hard separation.
<ol> <li>Ensures access for all and equality of opportunity in public space.</li> </ol>	+2	The shared path width of 3.5m ensures ease of two-way travel for a range of users. Vehicular traffic retains priority at uncontrolled crossing.
<ol> <li>Ensures all proposals are developed in a way that is context-specific and evidence-led.</li> </ol>	-3	The proposed traffic arrangement does not comply with design standards, which is likely to lead to significant conflict between road users.
6. Reallocates road space, restricts motor traffic permeability to prioritise people walking, cycling, and wheeling over private motor vehicles.	-3	Existing carriageway space is used to construct the shared path. Uncontrolled crossing does not prioritise pedestrian and cyclists. Traffic flows exceed workable limits for this arrangement which may lead to road traffic accidents involving vehicles and potentially users of the cycle path due to frustrations associated with queueing and delays in the way the arrangement operates.
7. Scheme deliverability including constructability and third party land requirements.	FAIL	A retaining structure is required to provide a level shared path, this will require third party land for installation on the eastern side of the B1345. The traffic flows exceed workable limits for this

		arrangement which may lead to road traffic accidents involving vehicles and potentially users of the cycle path.
TOTAL	-2	

## 6.3 Sustrans Design Option 3

Sustrans Design Option 3 is shown in drawing 332010714-STN-XXX-000-DR-D-0004 in Appendix B and is detailed below.



#### Figure 6.3: Sutrans Design Option 3

Option 3 consists of a shared path with a minimum width of 2.5m that continues on the eastern side of the B1345 between the existing carriageway and fenceline boundary. Existing carriageway space is reallocated to construct the 2.5m wide shared path. The roadway width reduces to 5.13m at its narrowest point. A toucan crossing provided at the north allows users to cross the road and rejoin the shared path en route to Gullane.

Traffic approaching Drem requires a SSD of 215m as a minimum. Due to the geometry of the northern section of the road, the visibility splay encompasses a large area of third party land on the western side where hedgerows and large trees are present. These features disrupt the clear view to the signals and stop line and do not allow sufficient stopping distance for vehicles travelling at the national speed limit on the B1345. This initial assessment of sight distance indicates that southbound traffic will have substandard visibility to the traffic signals. This could have significant road safety implications and may be unacceptable to the Roads Authority. However, it should be noted that some of the impacts could



potentially be mitigated to some degree through the inclusion of standard advance warning signage for signals and queues and potential introduction of vehicle activated signage to warn drivers of queues forming ahead. To provide sufficient visibility of the signals for vehicles exiting Drem, the foliage on the western side will need to be trimmed regularly or removed. It should be noted that clearance works could be challenging to implement as the hedges/bushes are located on third party land.

#### Pros

- Shared path users have an uninterrupted route on the eastern side.
- Kerblines maintained on western side.
- No carriageway realignment required.
- The access road serving the village green remains open.

#### Cons

- The carriageway lane width reduction is unsuitable and unsafe for two-way vehicular traffic. The existing carriageway width is at a minimum of 6.6m wide which does not meet the minimum required road width of 7.3m stipulated in the SCOTS National Roads Development guide and DMRB for two-way traffic flow where there is a significant volume of Busses and HGV traffic. As the existing road operation is compromised, no further reductions in this width would be acceptable to the Roads Authority. Vehicle collisions would be more likely to occur as well as wing mirror strikes between vehicles and potentially with path users also.
- Visibility requirements for SSD to the stop line and traffic signals are not met on the southbound approach to Drem.
- Large vehicles may mount the kerb to pass other vehicles, putting the safety of pedestrians and cyclists at risk on the adjacent path.
- The narrow road may result in an informal give and take arrangement with large vehicles stopping/slowing to allow others to pass. This would not be viable with the controlled crossing in operation as vehicles would be queued through the narrow section.
- Shared path construction requires a retaining wall structure due to level difference as indicated on the critical cross section, this will subsequently require third party land for installation.
- Unknown services in the eastern verge where the proposed shared path is to be constructed may be impacted and incur additional costs and diversions.

# Drem to Gullane Cycle Path 6 Design Options

#### Table 6.4: Visibility splay summary for Sustrans Option 3



#### Table 6.5 - Sustrans Option 3 Score

<u>Criteria</u>	<u>Score</u>	Justification
1. Develop ideas collaboratively and in partnership with communities.	-2	Sustrans design that prioritises shared paths and cycling which has been campaigned by local community groups for many years. It is considered unlikely that the proposed arrangement will be favourable for local residents within Drem due to the increased risk of potential accidents to vehicles and pedestrians. However, it should be noted that no formal public consultation on this option has been undertaken to date.
2. Facilitate independent walking, cycling and wheeling for everyone including an unaccompanied 12-year old.	0	Shared path users benefit from unimpeded travel along the eastern side of the B1345. Shared path meets minimum width requirements agreed upon in the Sustrans consultation. There will be a controlled toucan crossing across the B1345. However, the reduced carriageway and shared path width may lead to potential wing mirror strikes with users of the path.
3. Provides enjoyment, comfort and protection.	-1	Shared path will be constructed adjacent to a carriageway with no hard separation. The path width is below the standard Sustrans guidance minimum width.
<i>4.</i> Ensures access for all and equality of opportunity in public space.	-1	This option does not provide a safe, viable design for two-way traffic flow. Narrow carriageway with min 2.5m path width creates potential for wing mirror strikes on path users. Controlled crossing provided for pedestrian and cyclist movements to remove conflict and isolate crossing users from moving traffic.
5. Ensures all proposals are developed in a way that is context-specific and evidence-led.	-3	The resulting carriageway width will be unsafe for two-way flow which may lead to road traffic accidents involving vehicles and potentially users of the shared path.
6. Reallocates road space, restricts motor traffic permeability to prioritise	-2	Existing carriageway space is used to construct the shared path and the toucan crossing will act as

people walking, cycling, and wheeling over private motor vehicles.		a traffic calming measure for the B1345. Insufficient width for two-way flow which may lead to road traffic accidents involving vehicles and potentially users of the shared path due to side swipe or wing mirror strike type incidents. Controlled crossing point prioritises pedestrian and cyclist movement over vehicles.
7. Scheme deliverability including constructability and third party land requirements.	FAIL	The resulting width of the carriageway is insufficient for two-way flow which may lead to road traffic accidents involving vehicles and potentially users of the shared path. A retaining structure is required to provide a level shared path, this will require third party land for installation on the eastern side of the B1345.
TOTAL	-9	

## 6.4 Sustrans Design Option 4

Sustrans Design Option 4 is shown in drawing 332010714-STN-XXX-000-DR-D-0005 in Appendix B and is detailed below.



#### Figure 6.4: Sutrans Design Option 4

Option 4 consists of a shared path route continuing up the eastern side of the B1345 constructed 1m away from the fenceline boundary with a minimum width of 2.8m, using available carriageway space. The carriageway becomes signalised for vehicles to allow one-way traffic flow along a 4m wide lane. The toucan crossing in the north provides a safe crossing point to rejoin the shared path en route to Gullane.

The western access road to the residential area is to be closed off to remove the requirement for signal infrastructure on this access and the potential conflict with residential accesses. This also enables the

infrastructure to be constructed within the highway boundary. Access to the residential area is maintained via a southern access road at Drem Farmhouse.

The minimum SSD for traffic approaching Drem is 215m. Visibility to the stop line and traffic signals is obstructed by large trees and hedgrerows present on the western side of the B1345. This initial assessment of sight distance indicates that southbound traffic will have sub-standard visibility to the traffic signals. This could have significant road safety implications and may be unacceptable to the Roads Authority. However, it should be noted that some of the impacts could potentially be mitigated to some degree through the inclusion of standard advance warning signage for signals and queues and potential introduction of vehicle activated signage to warn drivers of queues forming ahead. The trees and hedgerows are within third party land and will require landowner permission to be removed to provide sufficient visibility to the stop line and signals, though a 'Residents Only Parking' sign may need to be relocated. This will need to be carried out when closing off the western access road to the residential area.

Traffic analysis for this option is documented in the traffic report in Appendix C of the report. The report indicates that this option would generate significant queuing but can operate within capacity. The projected queue during the morning peak hour would be approximately 46m on the northbound lane and 38m on the southbound lane on the B1345. The projected queue during the afternoon peak hour would be approximately 54m on the northbound lane and 46m on the southbound lane. Visibility checks have shown that, the lengthy queues on the northbound approach road do not meet minimum SSD requirements for a 30mph zone. Trees and buildings at the junction across from Drem train station would obstruct visibility to the end of the anticipated queue and reduce visibility below the required stopping sight distance. Warning signage and the removal of some vegetation would be necessary to forewarn drivers of potential queues forming after the bend in the road. Visibility splays along the southbound approach road indicate adequate SSD can be achieved to the back of queues forming in the morning and afternoon.

#### Pros

- Shared path users have uninterrupted space on eastern side.
- The design reduces the requirement for third party land acquisition as the path is constructed 1m away from fenceline boundary (although temporary access would still be required to facilitate construction).
- Signals indicate the correct phase for drivers, avoiding ambiguity over road priority and improving safety.
- A toucan crossing ensures the safe crossing of pedestrians and cyclists between the shared paths.
- Kerblines maintained on western side.
- No carriageway realignment required.

#### <u>Cons</u>

- The design reduces the requirement for third party land as the path is constructed 1m away from fenceline boundary, however, temporary access is still required to facilitate construction.
- Arrangement will cause significant queuing during peak periods, although capacity is not exceeded.
- Signalling always required to control priority through the narrow section resulting in driver delays. Any disruption in the functioning of the signals may result in hazardous situations for vehicles as a give way system may arise based on driver judgement.
- The length between the stop lines will result in a greater intergreen period, reducing the efficiency of the junction.
- Shared path construction requires a retaining wall structure due to level difference, this will subsequently require temporary access to third party land to provide working space for construction.
- Vehicle break downs on the carriageway within the priority distance coverage will cause complete closure of the road that would not allow passing for emergency vehicles.
- Unknown services in the eastern verge where the proposed footpath is to be constructed may be impacted and incur additional costs.
- Installation of traffic signals may impact hidden services in eastern verge and incur additional costs.
- A turning head will need to be placed in the village green, large enough to suit refuse vehicles and other vehicles that may require access such as fire trucks.

# Drem to Gullane Cycle Path 6 Design Options

#### Table 6.6: Visibility splay summary for Sustrans Option 4





#### Table 6.7: Sustrans Option 4 Score

<u>Criteria</u>	<u>Score</u>	Justification	
1. Develop ideas collaboratively and in partnership with communities.	+1	Sustrans design option that prioritises cycling which has been campaigned by local community groups for many years. It is considered that the queuing and delay associated with traffic may not be favourable with the residents in Drem. However, it should be noted that no formal public consultation on this option has been undertaken to date.	
2. Facilitate independent walking, cycling and wheeling for everyone including an unaccompanied 12-year old.	+2	Shared path users benefit from unimpeded travel along the eastern side of the B1345 as well as a wide path. Narrowest section is 2.8m which is greater than the minimum width requirements. Controlled crossing ensures safe passage for all users.	
<b>3.</b> Provides enjoyment, comfort and protection.	0	Shared path will be constructed adjacent to a carriageway with no hard separation.	
<ol> <li>Ensures access for all and equality of opportunity in public space.</li> </ol>	+3	The shared path will accommodate all users. The signalised priority system reduces the risk of vehicle collisions and ambiguity with priority. Controlled crossing provided for pedestrian and cyclists, isolating crossing users from moving traffic.	
<ol> <li>Ensures all proposals are developed in a way that is context-specific and evidence-led.</li> </ol>	-2	The proposed option has been modelled and would generate significant queuing but can operate within capacity. The SSD is substandard and compromised by vegetation on third party land.	
6. Reallocates road space, restricts motor traffic permeability to prioritise people walking, cycling, and wheeling over private motor vehicles.	+2	Existing carriageway space is used to construct the shared path and the signalisation will act as a traffic calming measure for the B1345. Controlled crossing point prioritises pedestrian and cyclist movement over vehicles.	

7. Scheme deliverability including constructability and third party land requirements.	FAIL	A retaining structure is required to provide a level shared path, this will require temporary access to third party land for installation on the eastern side of the B1345. The signals will result in significant queuing during peak periods and will be required at all times to control traffic through the narrow section.
TOTAL	+6	

## 6.5 Stantec Design Option 1

Stantec Design Option 1 is shown in drawings 332010714-STN-XXX-000-DR-D-0006 and 332010714-STN-XXX-000-DR-D-0007 in Appendix B and is detailed below.



#### Figure 6.5: Stantec Design Option 1

The Stantec option proposes that shared path users from Drem station cross at a newly constructed traffic island over the B1345 onto the western side and continue en route to Gullane by way of an uncontrolled crossing point over the access road. Through the constrained section, the shared path

widens on the western side and the carriageway becomes signalised to control vehicle movements through a 4m wide narrow section.

The construction of the path on the western side, allows the users to cross within the proposed 30mph zone within Drem. The construction of the footway on the western side will require minor realignment of the B1345 and encroachment into the village green.

The path through the constrained section would require the vegetation on this side to be cleared back to the fenceline including large established private hedge on the boundary of 'The Bothy' residence which overhangs the highway boundary.

The minimum SSD for the traffic approaching Drem is 215m. Visibility to the stop line and traffic signals is obstructed by large trees and hedgrerows present on the western side of the B1345. This initial assessment of sight distance indicates that southbound traffic will have sub-standard visibility to the traffic signals. This could have significant road safety implications and may be unacceptable to the Roads Authority. However, it should be noted that some of the impacts could potentially be mitigated to some degree through the inclusion of standard advance warning signage for signals and queues and potential introduction of vehicle activated signage to warn drivers of queues forming ahead. The trees and hedgerows are within third party land and will require landowner permission to be removed to provide sufficient visibility for drivers on the southbound lane approaching Drem. The northbound lane for traffic exiting Drem demonstrate adequate SSD for vehicles travelling within a 30mph zone and there is clear visibility to the stop line and traffic signals.

Traffic analysis for this option is documented in the traffic report in Appendix C of the report. The report indicates that this option would generate some queuing but can operate within capacity. The projected queue during the morning peak hour would be approximately 45m on the northbound lane and 32m on the southbound lane on the B1345. The projected queue during the afternoon peak hour would be approximately 34m on the northbound lane and 54m on the southbound lane. The visibility splays for both northbound and southbound queues show that adequate SSD is met in both directions during morning and afternoon peak hours.

#### Pros

- Signals indicate the correct phase for drivers, avoiding ambiguity over road priority and improving safety.
- A safe crossing point is created for shared path users through the addition of a traffic island within the proposed 30mph zone further south on the B1345.
- Shared path has a minimum width of 2.5m, widening to provide more space along the constrained region.
- The existing residential access road can remain open.

<u>Cons</u>

 Vegetation will need to be removed along the western fenceline boundary to provide improved visibility and to construct the shared path.

- Arrangement will cause significant queuing during peak periods, although capacity is not exceeded.
- Signalling always required to control priority through the narrow section resulting in driver delays. Signal failure may result in driver judgement on a priority basis, which can be hazardous over the length of priority of one way traffic.
- Vehicle break downs on the carriageway within the priority distance coverage will cause complete closure of the road that would not allow passing for emergency vehicles.
- Shared path users have two uncontrolled road crossings. One crossing is over a minor road serving a limited number of properties.
- The B1345 may need to be realigned to accommodate the path infrastructure within the available width. The realignment of carriageway may impact the existing subterranean culvert and services within the verge, which may require diversion or protection measures to be developed.
- The proposed path on the western side of the B1345 will encroach into the village green.
- The B1345 realignment would require a retaining wall structure due to level difference, this will subsequently require third party land for installation.

# Drem to Gullane Cycle Path 6 Design Options

#### Table 6.8: Visibility splay summary for Stantec Option 1



# Drem to Gullane Cycle Path 6 Design Options



#### Table 6.9: Stantec Option 1 Score

<u>Criteri</u>	<u>a</u>	<u>Score</u>	Justification
1. Dev part	velop ideas collaboratively and in tnership with communities.	+1	Stantec design that prioritises cycling and shared paths which has been campaigned by local community groups for many years. It is considered unlikely that the queuing traffic and encroachment into green space will be favourable with the residents in Drem. However, it should be noted that no formal public consultation on this option has been undertaken to date.
2. Fac and una	ilitate independent walking, cycling wheeling for everyone including an ccompanied 12-year old.	+1	This option provides sufficient widths of shared paths and designated footpaths with appropriate uncontrolled crossing facilities to ensure a safe and continual shared path route out of Drem.
3. Prot	vides enjoyment, comfort and tection.	0	The shared paths and footpaths are constructed adjacent to the carriageway with no hard separation. Users are required to cross the road using uncontrolled crossing points to continue using the shared path route.
4. Ens opp	ures access for all and equality of ortunity in public space.	+1	The shared path has a minimum width of 2.5m at all sections of the route. Uncontrolled crossing points for pedestrians.
5. Ens a v evid	ures all proposals are developed in way that is context-specific and lence-led.	-1	The proposed option has been modelled and would generate significant queuing but can operate within capacity. The removal of the pedestrian/cyclist phase would reduce delay.
6. Rea mot peo ove	allocates road space, restricts for traffic permeability to prioritise ple walking, cycling, and wheeling r private motor vehicles.	+2	Existing carriageway space is used to construct the shared path and the signalised system will act as a traffic calming measure within Drem. This will provide a safer environment for pedestrians and cyclists in and around the area.
7. Sch con requ	eme deliverability including structability and third party land uirements.	FAIL	A retaining structure is required to provide a level shared path, this will require temporary access to third party land for installation on the eastern side of the B1345. The signals will result in significant

		queuing during peak periods and will be required at all times to control traffic through the narrow section. This would require the removal of a large section of established hedge.
TOTAL	+4	

## 6.6 Summary of Option Appraisal

The summary of the scoring is shown in the table below.

Table 6.10 - Summary of Scorin
--------------------------------

Design Option Reference	<u>Score</u>	Pass/Fail
Sustrans Design Option 1	-5	FAIL
Sustrans Design Option 2	-2	FAIL
Sustrans Design Option 3	-9	FAIL
Sustrans Design Option 4	+6	FAIL
Stantec Design Option 1	+4	FAIL

## 7 Conclusions

This section presents significant challenges in terms of deliverability. All options would require access to third-party land on a temporary basis as a minimum and most would require permanent acquisition to allow required retention measures to be implemented. Through consultation with the relevant landowners, it is understood that they are currently not willing to accommodate any encroachment on their land within this section. As a result, all options have failed on the deliverability criteria and are therefore considered unfeasible.

Options which introduce traffic signals and priority working arrangements have been evaluated to assess the traffic impacts. The analysis has demonstrated that signalised options will generally operate within capacity but that queueing and delay will be experienced in locations where none is currently experienced. This change to traffic flows and potential queueing may not be considered as an acceptable consequence by the local community within Drem. The assessment of the priority working arrangement without signal control concluded that the traffic volumes were too high for such an arrangement and did not conform to design standards. On this basis it is recommended that such a solution be removed from consideration on such a strategic route with high levels of traffic.

The analysis of the options identified that visibility to the back of queues from the signals/give way markings in some of the options will be significantly sub-standard and may be unacceptable to the Roads Authority on the grounds of road safety. However, as noted previously in the report, some of the impacts could potentially be mitigated to some degree through the inclusion of standard advance

warning signage for signals and queues and potential introduction of vehicle activated signage to warn drivers of queues forming ahead

The analysis of the options identified that visibility to the traffic signals on signalised options and give way lines on priority working options is restricted by trees and hedgerows located on third party land. This lack of visibility would be a road safety issue and require Departures from Standards to allow implementation of these solutions. The restriction to visibility would be challenging to address as the obstructions are located on third party land adjacent to the road. A reduction in sight distance to traffic signals/priority working sections may be unacceptable to the Roads Authority on the grounds of road safety.

In addition, all the options have generally scored quite low against the criteria set out in the PfE design principles. This coupled with the deliverability, road safety and projected traffic impacts as a consequence of the proposals would make any of the interventions undesirable for implementation on the public road network.



# Appendix A Sustrans Report

# Appendix B Design Drawings

# Appendix C Traffic Modelling Technical Note