[redacted]

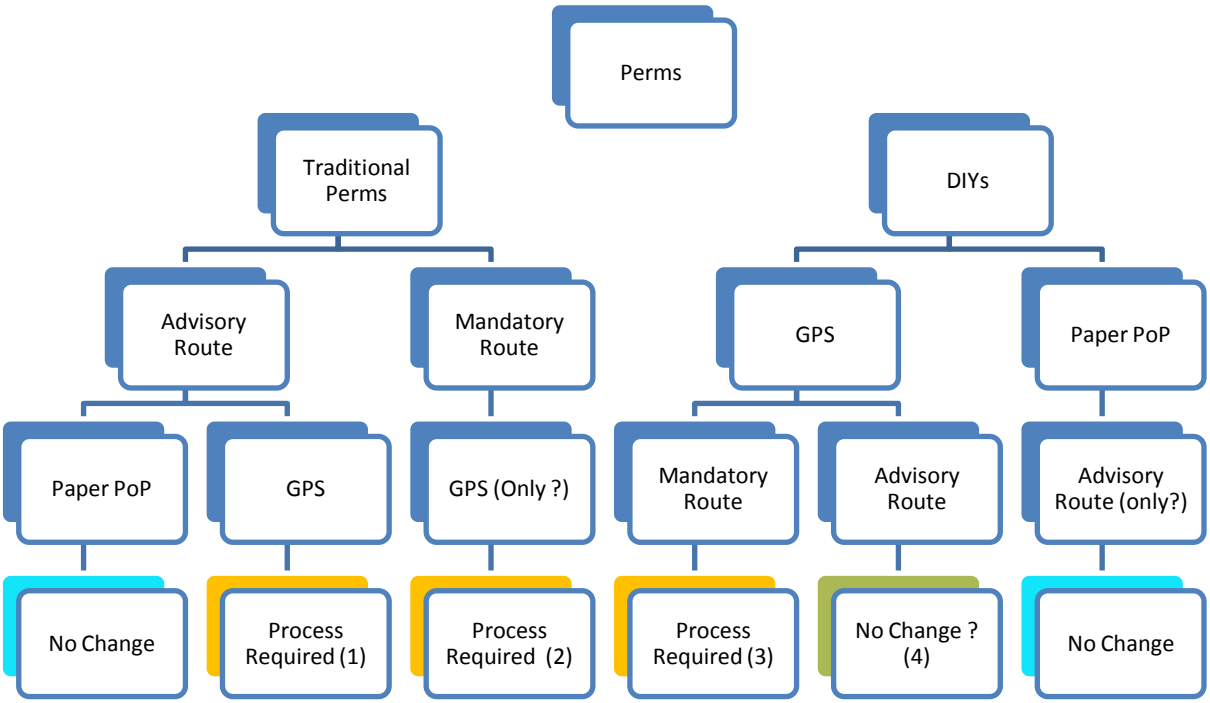
Introduction

This document sets out DRAFT processes for using the routevalidator.com track comparison tool.

The descriptions & processes relate to the prototype version of the tool offered by Ben Taylor, and do not take any account of any enhancements to the tool after 06 November 2015.

Whilst creation of the tool was motivated by the regulatory change to permit the selection of mandatory routing in the context of DIYs (and the changes in Google Maps), it has potentially wider application across more types of Permanent Rides.

As can be seen from the 'map' of the different perm types, the existing arrangements for both DIYs and traditional Perms can stay in place and remain entirely unchanged. The routevalidator tool provides for additional options for rider and organiser whilst ensuring that the integrity of the validation process is maintained.



The workflows on the following pages are effectively independent of where files are stored and how they are transmitted between rider, organiser, and Permanents secretary.

With further developments it can be anticipated that routes are planned on a customised tool available only to AUK members, that the resulting 'intention' files are stored on secure AUK servers, that riders will upload their tracklogs to the AUK site and have them compared 'online' by organisers and validators. As an interim step however files will likely be transmitted as email attachments (as at present with the DIYxGPS system.)

There is also no imperative in any of this to abandon the parallel paper processes and Brevet cards may still be used in in conjunction at least until the system is matured.

[redacted]

Workflow (1)

Scope

Traditional Perm (not DIY)

Perm Organiser has not required mandatory route (remains with default advisory route)

Perm Organiser wishes to offer option of GPS Validation

Workflow only applies if Rider selects GPS option.

Preparation

a) Organiser creates an "intended" GPX file

This is not intended for navigation, it is a 'sparse' file, consisting of either:

- An "as the crow flies" track connecting the start point to control 1, to control 2, to control 3, etc and on to the Arrivée. *Fig 1*

  or

- *A set of waypoints*[1]

Figure 1. An "as the crow flies" track.
The red dot is the start/finish, white dots are intermediate controls.
This set of control is used on the current perm PL01 and is displayed on a GoogleMaps background

b) Organiser sends GPX file to Perm Sec (or delegate) to check compliance with route sheet or other written details provided.

[1] Prototype of routevalidator does not accept this kind of file. Quite easy to make it do so, but additional work needed to ensure controls visited in correct order. See also Additional Notes

c) Perm Sec authorizes Organiser to offer GPS validation and retains copy of 'Intended' file for each Perm authorized.

Process

1) Rider selects GPS validation
2) After ride, rider submits GPX tracklog to Organiser.
3) Organiser loads 'Intended' GPX and 'Actual' GPX to routevalidator.com (Fig 2.) and hits the blue "Compare" button

Figure 2. Close-up of the routevalidator user interface.

Routevalidator.com checks whether 'Actual' GPX comes within a specified distance of the controls specified in the 'Intended' file

The distance [displayed as Tolerance (metres)] defaults to 200 metres but can be varied between 10m and 1km

If the Actual GPX comes within the tolerance at all the controls the word ACCEPT is displayed in green text above an outline map showing all of both Intended GPX (blue straight lines) and Actual GPX (red line following roads). Fig 3

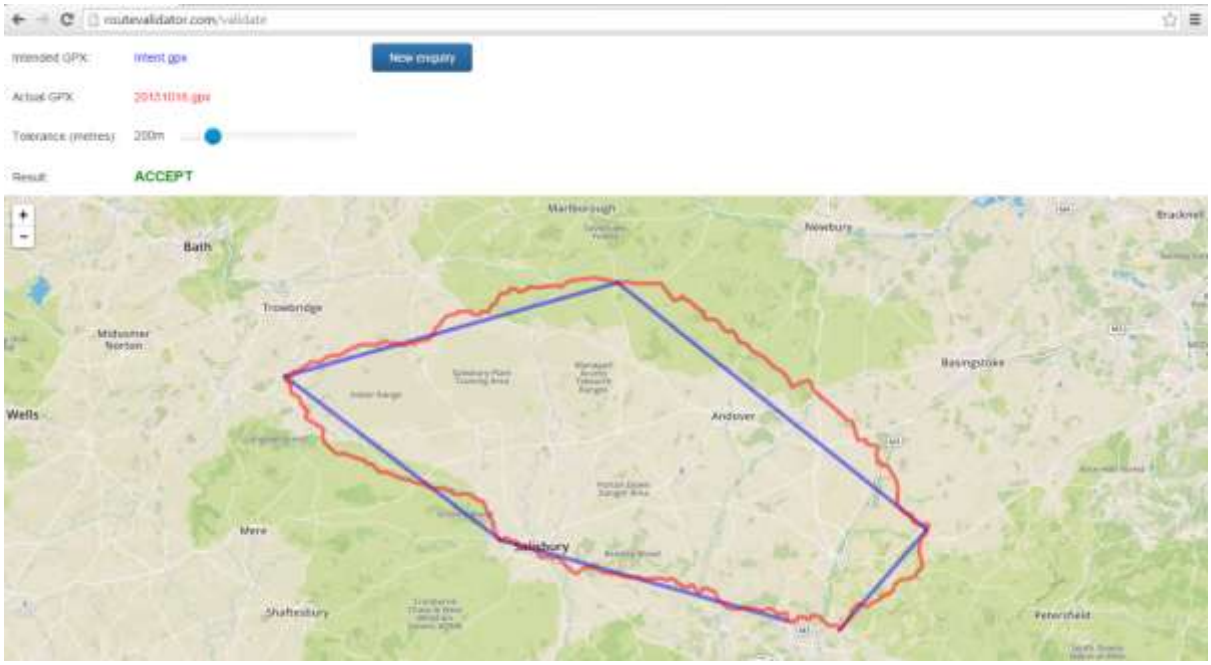


Figure 3. Example of ACCEPTable comparison. Rider has visited all controls. (PL01 again)

This map display enables the organiser to make an additional visual check that the intended journey has been completed.

Organiser must be aware that it is (theoretically) possible to have a set of controls such that if visited in the wrong order the distance is less than the declared distance. Routevalidator.com (in current incarnation) only checks that controls have been visited – without checking the order in which they have been visited.

The display of the complete map will show if this is the case. Fig 4 shows an example where the controls have been visited (and the word ACCEPT is displayed) but the map display makes it clear that the rider has not completed the ride correctly.[2]

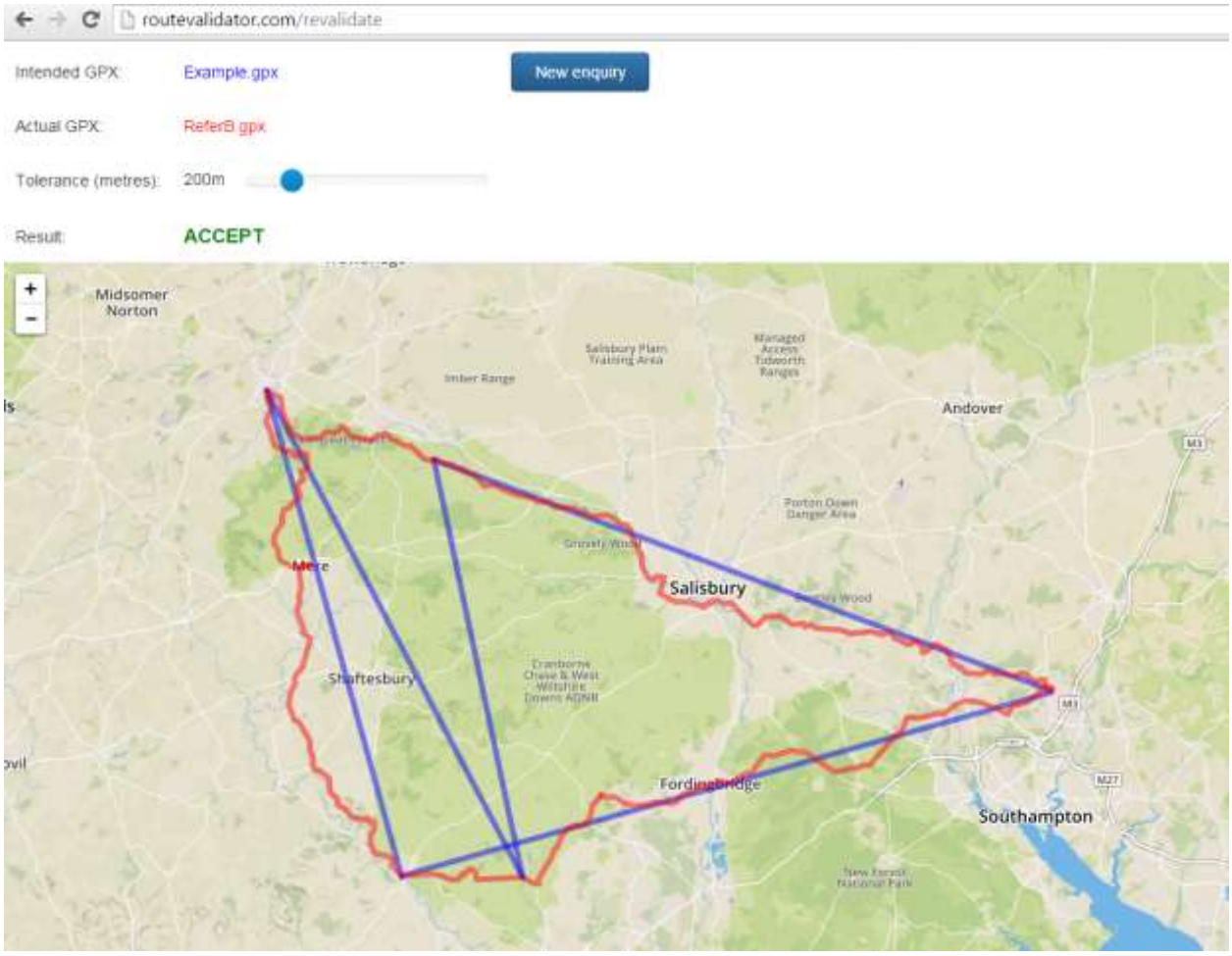


Figure 4. Example where rider has visited all controls but in an incorrect sequence.

If the rider has not come within the Tolerance (metres) distance of each control the word REFER (in Orange text) is displayed in place of the word ACCEPT, as shown in Fig 5

There is also a box showing how many discrepancies (Referral areas) the software has discovered. See enlarged area and also Fig. 6.

[2] Perm Sec may wish to refuse authorisation for GPS validation for routes where material short cuts are possible by visiting controls in the incorrect order.

[redacted]

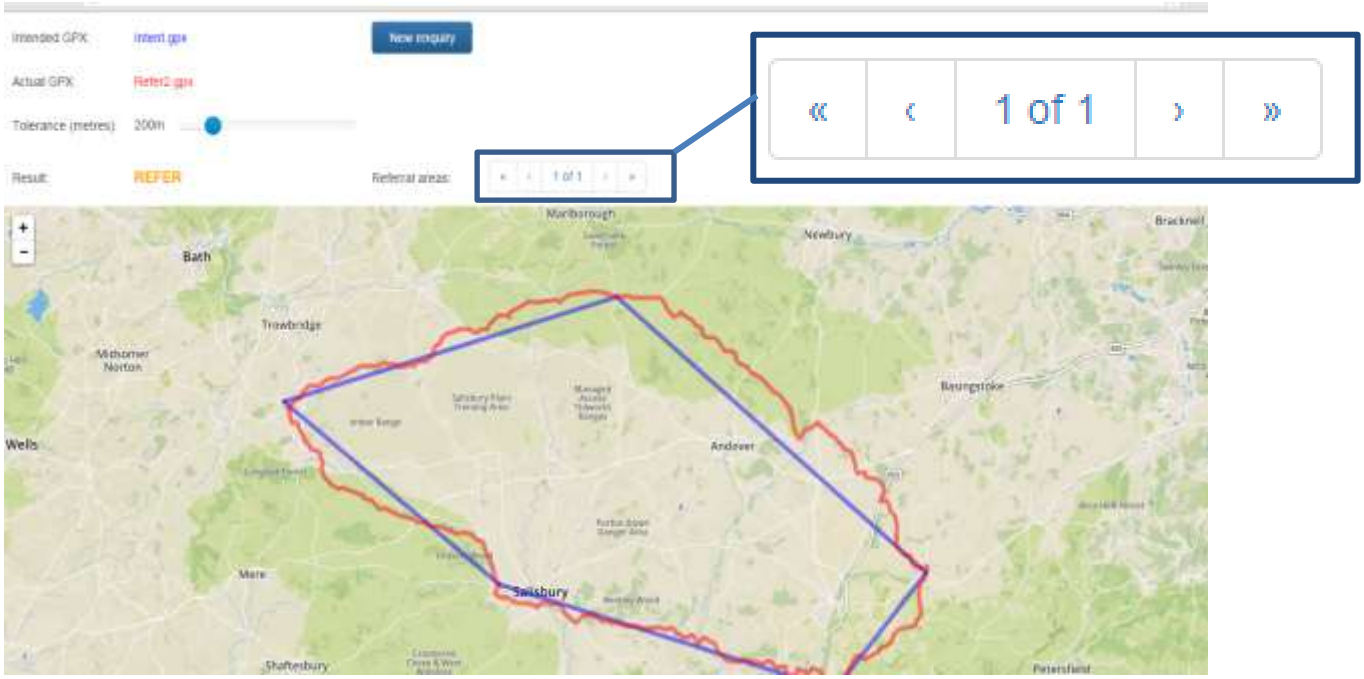


Figure 5. Example referred for further examination.

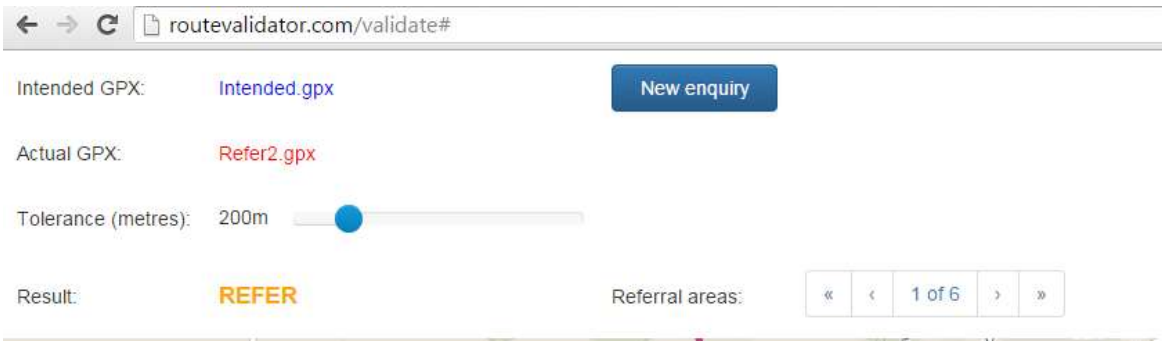


Figure 6a.

In this example the software has discovered six areas which need to be referred to the organiser

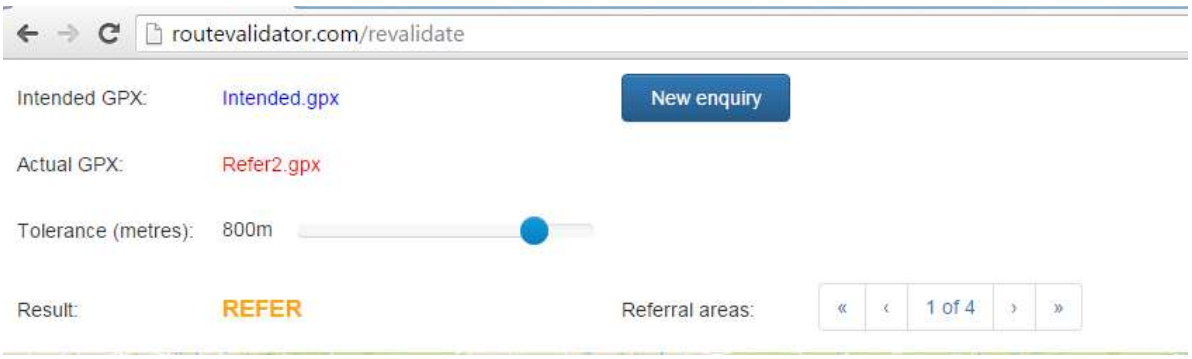


Figure 6b.

For the same pair of files, moving the slider to change the Tolerance distance to 800 m reduces the number of referrals to four.

In referral cases, by clicking on the arrows (or the numbers) the map can be zoomed in to each Referral area as shown in Fig 7

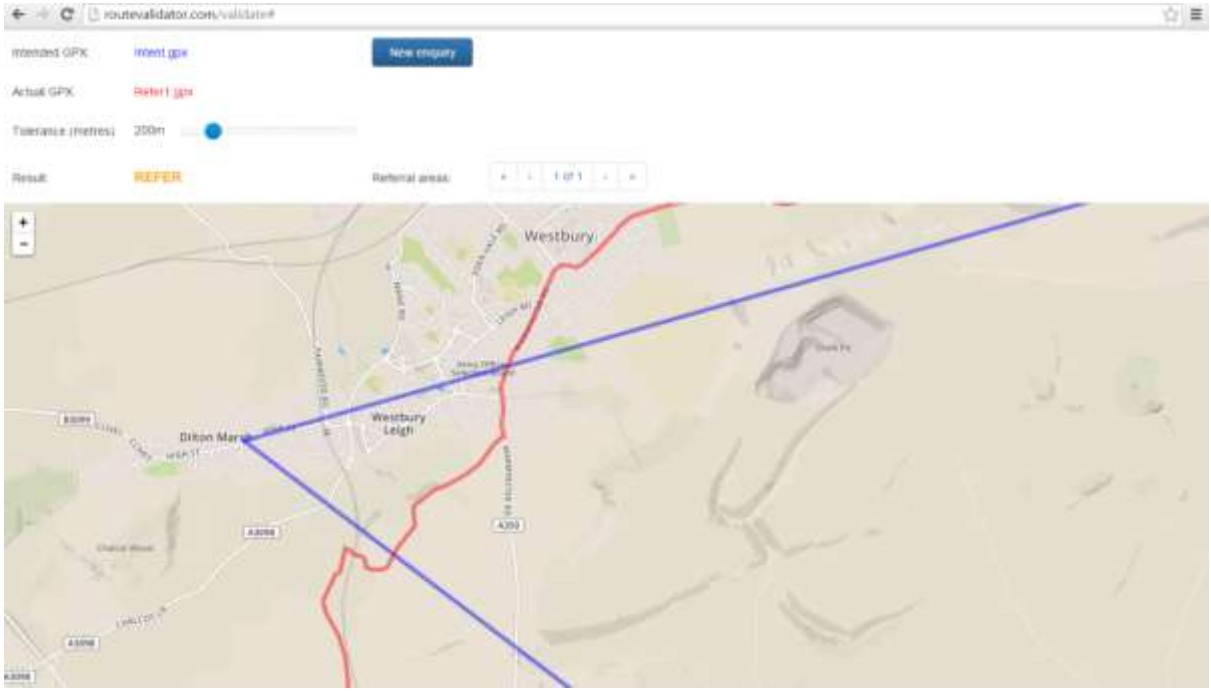


Fig 7. Zoomed-in to a Referral area.
The rider's track does not pass within the tolerance distance of the control (corner in the blue line). In this particular a control at Westbury rather than at Dilton Marsh gives a minimum distance between controls of 199km so visiting Dilton Marsh might be considered a 'must'. On the other hand a rider with paper PoP might say "the only shop in Dilton Marsh was closed so I got a receipt from Westbury" and have a reasonable expectation of having his ride accepted?

This zoomed-in display enables the Organiser to form an opinion on whether the rider has passed sufficiently close to the control. If there are further 'referral' areas they can be viewed using the right arrow (>) adjacent to the number box (see Fig 6).

In the case of controls where the location was given (in the paper specification) merely as the name of a substantial town it may be appropriate to adjust the tolerance distance and to take the Recalculate option before examining each referral areas. This will, more often than not, reduce the number of referral areas that are zoomed in upon for examination by the organiser. See Figs 6a and 6b for an example.

4) When the organiser has satisfied him/herself that the rider has visited all the controls correctly the 'actual' track can be further checked with the ValidateGPX program which confirms that the speed profile of the track corresponds to that of human powered machine and displays the total distance, distance points and gives an indication of height gain / AAA points.
5) With all the above checks completed the organiser should send the 'actual' GPX file to the Perm Sec along with his recommendation that the ride be validated. If there are any significant referral areas explanations as to why Organiser considers the ride should be validated must be attached.

6) Perms Sec may repeat any of the above checks, comparing the actual track against his 'file copy', or request further explanations from either Organiser or Rider before Validating / Recording the ride.

Additional Comments

The above process could be followed by simple transmission of files by email without necessity of sending Brevet Cards by mail.

However the Perms Sec currently carries out basic time & distance checks on the cards & receipts that he receives by mail.

It may therefore be desirable to provide this same information separate from the GPX file. This could be achieved in one of a number of ways:

Continued use of Brevet Cards on which the Rider is obliged to note the time of passing each control, before signing the back of the card.

A simple note of time/distance at each control (which provides the same information) could be completed by the rider and emailed to Organizer and thence to Perms Sec.

Control	Distance	Time
Start	0	
Control 1	18 km	
Control 2	74 km	
Control 3	119 km	
Control 4	155 km	
Arrivée	203 km	

Fig 8a. Form provided by Organiser

Control	Distance	Time
Start	0	*07 h 01*
Control 1	18 km	*07 h 55*
Control 2	74 km	*10 h 34*
Control 3	119 km	*14 h 27*
Control 4	155 km	*16 h 19*
Arrivée	203 km	*19 h 16*

Fig 8b. Form completed by rider

In case of doubt, for either of the above, this written information can be checked against information extracted from the 'Actual' GPX file.

Further enhancement of the Routevalidator tool could display the time information on-screen adjacent to each control.

Any of the above would also give assurance that controls had been visited in the correct order.

[redacted]

Workflow 2

Scope

Traditional Perm (not DIY)

Perm Organiser has defined the ride as requiring mandatory route (because of the nature or number of controls that would be otherwise be needed using the default advisory route option)

Preparation

a) Organiser creates an "intended" GPX track (or series of tracks in the case of a long event)

This track follows the route that the organiser intends the rider to follow, which is also described in a routesheet. It may also be used by the rider for navigation purposes.

It is 'good practice' for the track to consist of no more than 500 trackpoints, so that it can be loaded onto, and followed by the largest number of devices. A track of between 400 and 500 points for a 200km event provides more than sufficient 'granularity' for routevalidator to make an adequate comparison.

Figure 1. An "intended" track (displayed on a GoogleMaps background).
This is actually from a 200km calendar event that required 4 'info' controls at locations where paper PoP is not available; mandatory route option would enable it to be offered as a perm.

b) Organiser sends GPX file to Perm Sec (or delegate) to check compliance with route sheet or other written details provided.

c) Perm Sec authorizes the Organiser to offer GPS validation and retains copy of 'Intended' file for each Perm authorized.

[redacted]

Process

1) After ride, rider submits GPX tracklog to Organiser.
2) Organiser loads 'Intended' GPX and 'Actual' GPX to routevalidator.com (Fig 2.) and hits the blue "Compare" button

Figure 2. Close-up of the routevalidator user interface.

Routevalidator.com checks whether 'Actual' GPX comes within a specified distance of each trackpoint in the 'Intended' file

The distance [displayed as Tolerance (metres)] defaults to 200 metres but can be varied between 10 metres and 1 km

If the Actual GPX comes within the tolerance distance at every trackpoint the word ACCEPT is displayed in green text above an outline map showing all of both Intended GPX (blue) and Actual GPX (red). Fig 3

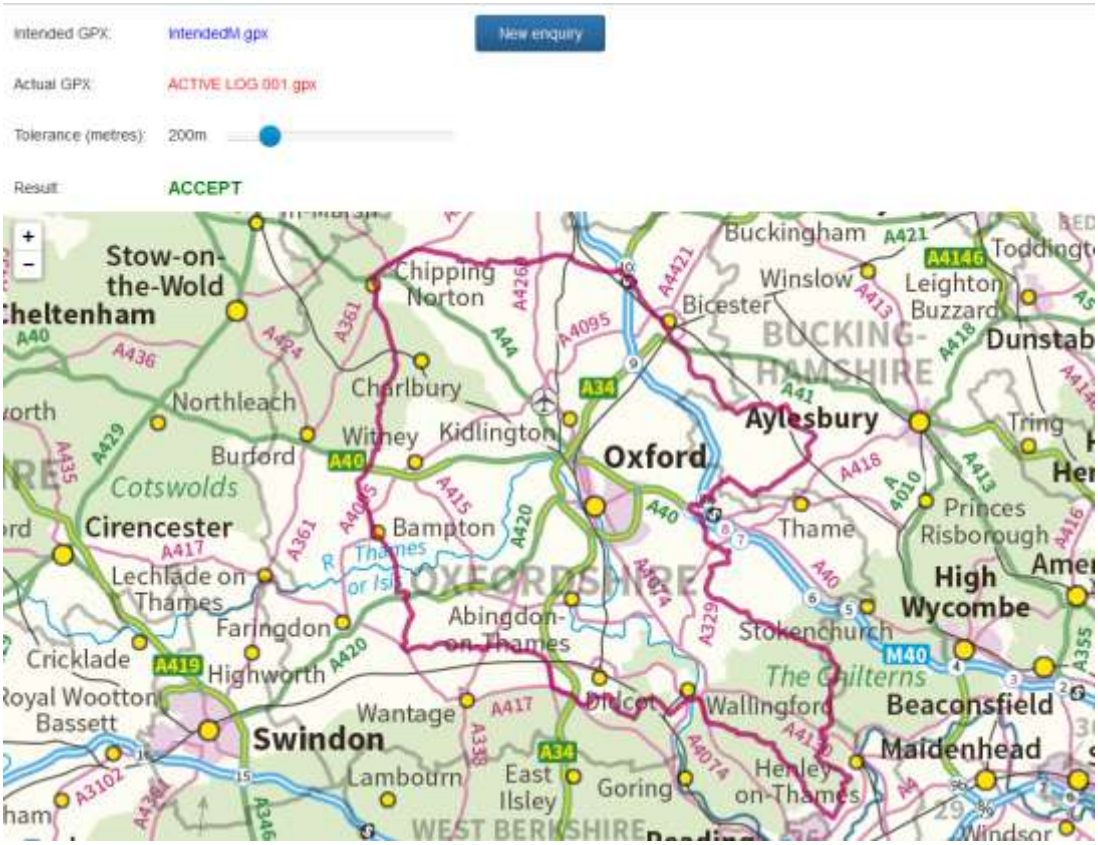


Figure 3. Example of ACCEPTable comparison.
Red (actual track) overlays blue (intended track) throughout = rider has followed route.

[redacted]

This map display enables the organiser to make an additional visual check that the intended journey has been completed.

If the rider has not come within the Tolerance (metres) distance of each trackpoint the word REFER (in Orange text) is displayed in place of the word ACCEPT, as shown in Fig 4

There is also a box showing how many discrepancies (Referral areas) the software has discovered.

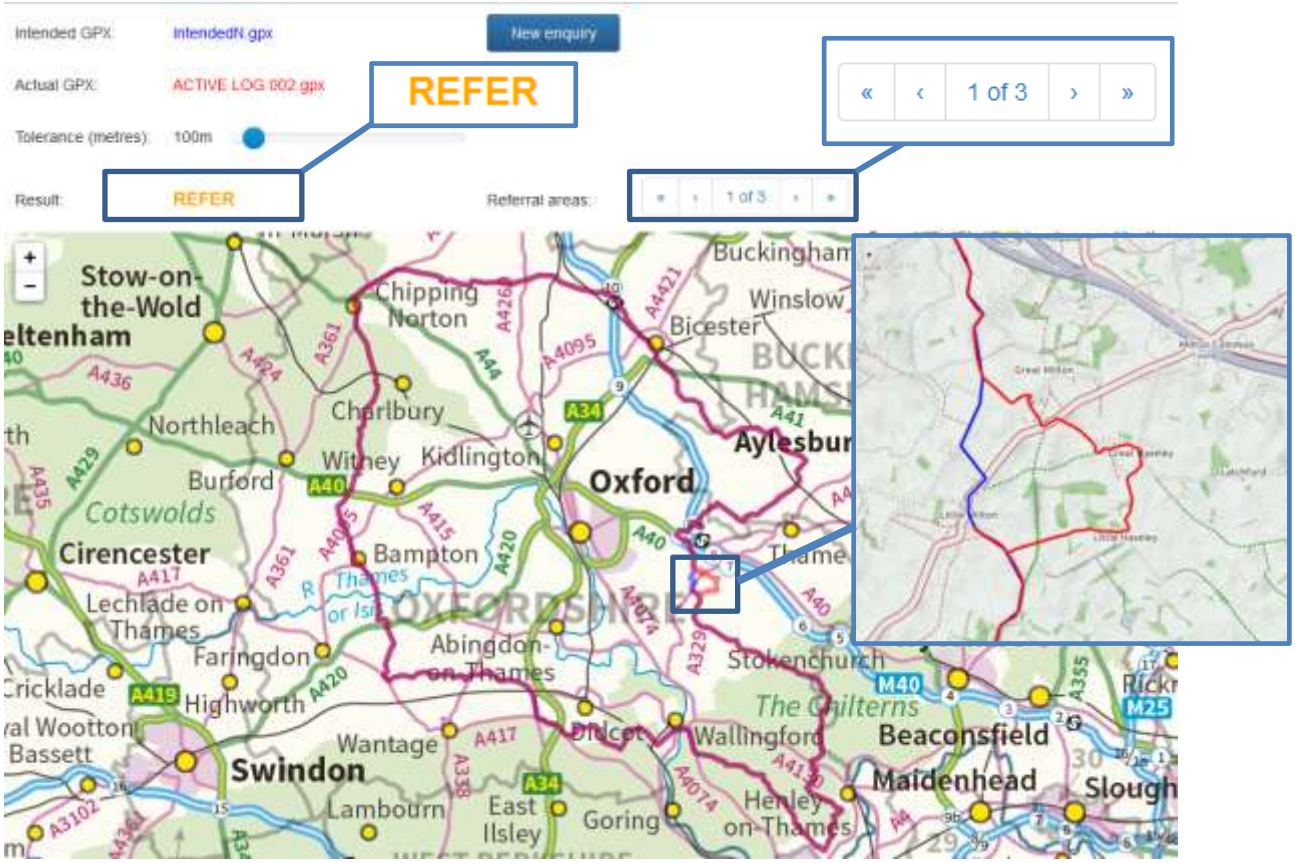


Figure 4.

Example referred for further examination. Enlargement highlights a discrepancy between intention and actual ride that is (just) visible even at small scale.

Some of these discrepancies may be minor deviations from the intended route and moving the Tolerance slider will enable some of them to be eliminated as shown in Fig 5a through 5d

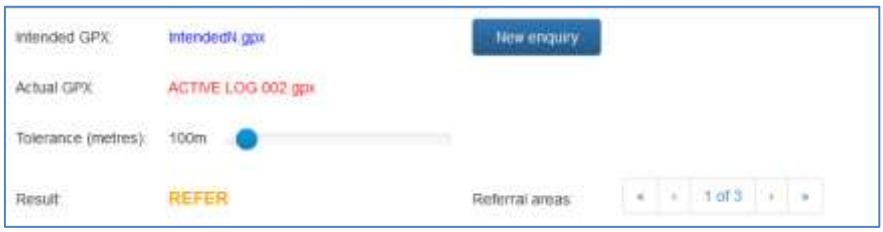


Figure 5a.

With tolerance at 100m routevalidator has identified three areas which need to be referred to the organiser

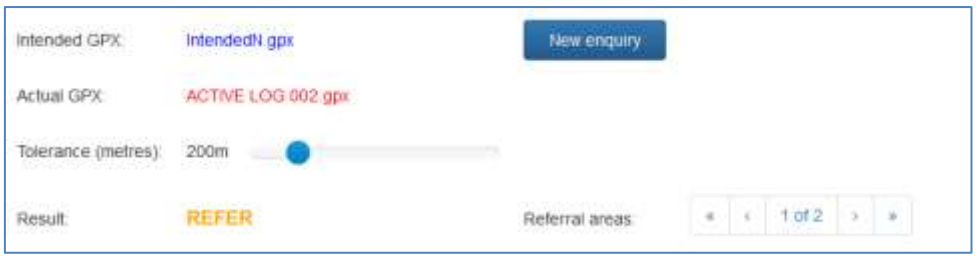


Figure 5b.
The slider has been moved back to its default position of 200m. There are now only 2 referral areas.

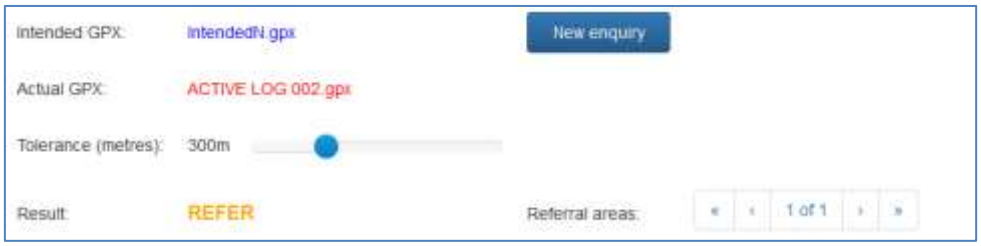


Figure 5c
If the Tolerance is increased to 300m by moving the slider further to the right there is now only a single area to be looked at by the organiser in this example.

Figure 5d
With the slider at its maximum of 1km tolerance the actual track matches the intended track.[3]

In cases where the organisers wishes to look in closer detail at the discrepancy(ies) between intention and actual rider (called Referral areas), clicking on the arrows (or the numbers) the map can be zoomed in sequentially to each area as shown in Fig 6.

In this example the rider (red track) is travelling south-to-north and has been unable to continue along the intended route (blue) due to a closed road at Little Milton, and has been obliged to double-back and find an alternative route.

On an 'advisory route' such a diversion would not be noteworthy, but with 'mandatory route' it might be considered normal for a rider to advise the organizer of the circumstances, even though, as Figure 5d shows the actual discrepancy falls within a tolerance of 1 km.

[3] This is presented as an example ONLY. The actual tolerance allowed may be at the discretion of the Permanents Secretary or even at that of the Organiser.

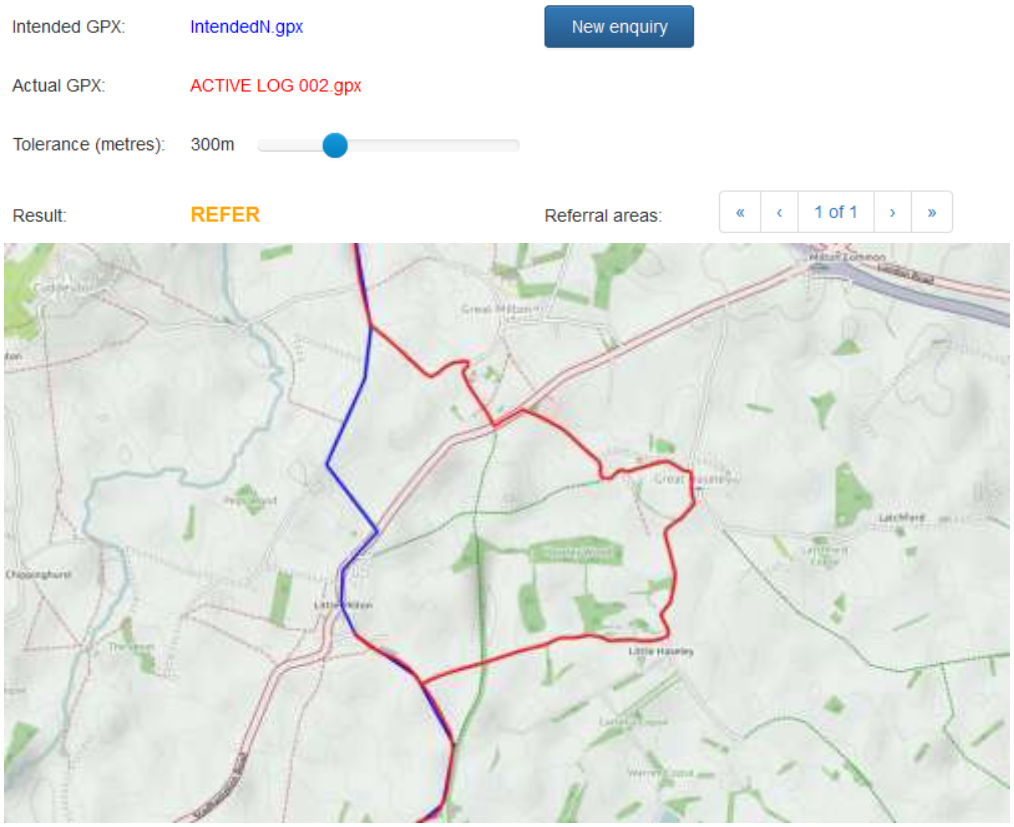


Fig 6. Zoomed-in to a Referral area.

3) When the organiser has satisfied him/herself that the rider has followed the intended route, the 'actual' track can be further checked with the ValidateGPX program which confirms that the speed profile of the track corresponds to that of human powered machine and displays the total distance, distance points and gives an indication of height gain / AAA points.
4) With all the above checks completed the organiser should send the 'actual' GPX file to the Perm Sec along with his recommendation that the ride be validated. If there are any significant referral areas explanations as to why Organiser considers the ride should be validated should be attached.
5) Perms Sec may repeat any of the above checks, comparing the actual track against his 'file copy', or request further explanations from either Organiser or Rider before Validating / Recording the ride.

Additional Comments

The above process could be followed by simple transmission of files by email without necessity of sending Brevet Cards by mail.

However the Perms Sec currently carries out basic time & distance checks on brevet cards & receipts that he receives by mail for advisory routes.

Careful consideration therefore needs to be given as to whether something equivalent is necessary for mandatory route events which are, presumably, all to be validated by means of the GPX file.

Further enhancement of the Routevalidator tool could, for example, display the time and distance information on-screen at intervals around the route.

[redacted]

Workflow 3

Scope

DIYxGPS

Rider has requested use of mandatory route (because the nature or number of controls required using the default advisory route option is not practical)

Preparation

a) Rider creates an “intended” GPX track (or series of tracks in the case of a long event)

A track of between 400 and 500 trackpoints for a 200km event provides more than sufficient ‘granularity’ for routevalidator to make an adequate comparison.

Figure 1. An “intended” track (displayed on a GoogleMaps background).

b) Rider sends “intended” GPX file to Organizer to check compliance with nominal distance and any regulatory requirements.

c) Organizer authorizes ride, subject to receipt of satisfactory tracklog.

Process

1) After ride, rider submits GPX tracklog to Organiser.
2) Organiser loads ‘Intended’ GPX and ‘Actual’ GPX to routevalidator.com (Fig 2.) and hits the blue “Compare” button

Figure 2. Close-up of the routevalidator user interface.

Routevalidator.com checks whether 'Actual' GPX comes within a specified distance of each trackpoint in the 'Intended' file

The distance [displayed as Tolerance (metres)] defaults to 200 metres but can be varied between 10m and 1km

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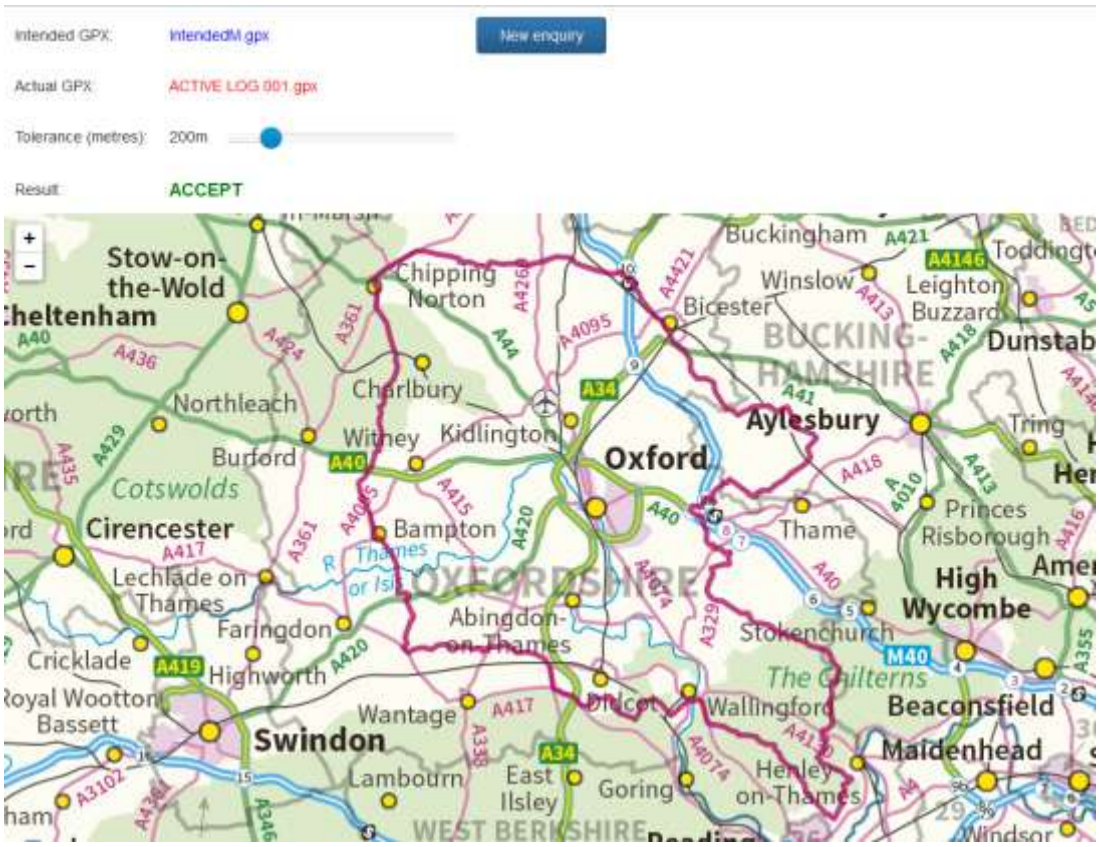


Figure 3. Example of ACCEPTable comparison.
Red (actual track) overlays blue (intended track) throughout = rider has followed route.

This map display enables the organiser to make an additional visual check that the intended journey has been completed.

If the rider has not come within the Tolerance (metres) distance of each trackpoint the word REFER (in Orange text) is displayed in place of the word ACCEPT, as shown in Fig 4

[redacted]

There is also a box showing how many discrepancies (Referral areas) the software has discovered.

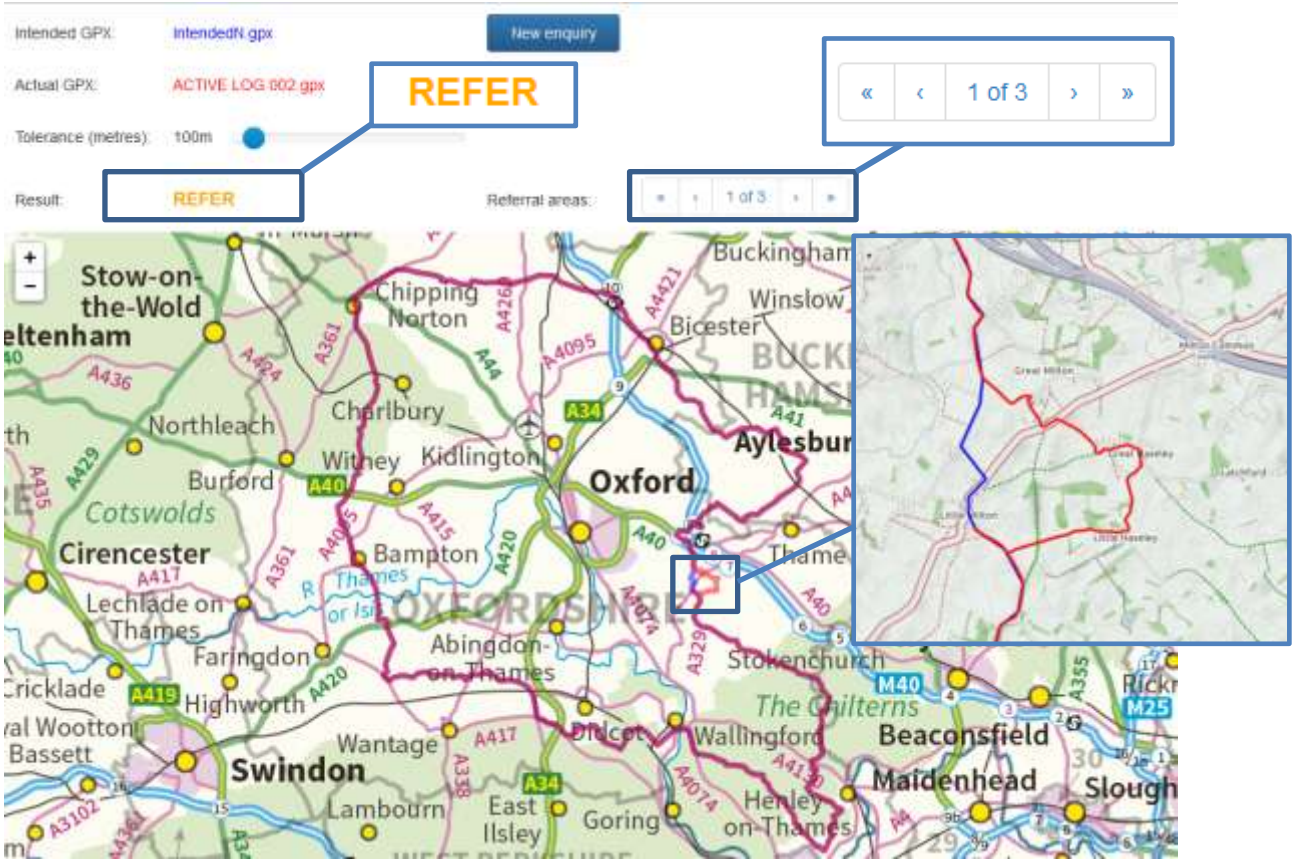


Figure 4.

Example referred for further examination. Enlargement highlights a discrepancy between intention and actual ride that is (just) visible even at this scale.

Some of these discrepancies may be minor deviations from the intended route and moving the Tolerance slider will enable some of them to be eliminated as shown in Fig 5a through 5d

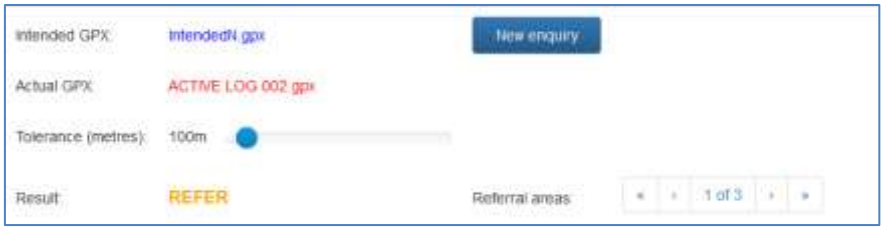
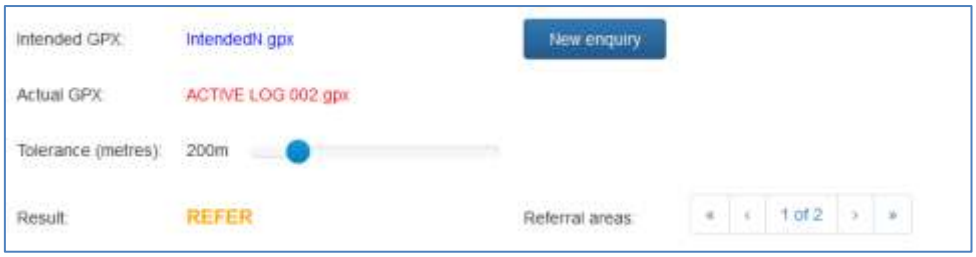


Figure 5a.

With tolerance at 100m routevalidator has identified three areas which need to be referred to the organiser



[redacted]

Figure 5b.

The slider has been moved back to its default position of 200m. There are now only 2 referral areas.

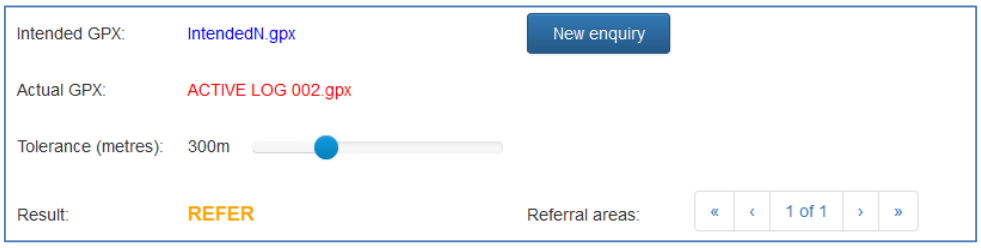


Figure 5c

If the Tolerance is increased to 300m by moving the slider further to the right there is now only a single area to be looked at by the organiser in this example.

Figure 5d

With the slider at its maximum of 1km tolerance the actual track matches the intended track.[4]

In cases where the organizer wishes to look in closer detail at the discrepancy(ies) between intention and actual ride (called Referral areas), clicking on the arrows (or the numbers) the map can be zoomed in sequentially to each area as shown in Fig 6.

In this example the rider (red track) is travelling south-to-north and has been unable to continue along his/her intended route (blue) due to a closed road at Little Milton, and has been obliged to double-back and find an alternative route.

On an 'advisory route' such a diversion would not be noteworthy, but with 'mandatory route' it might be considered normal for a rider to advise the organizer of the circumstances, even though, as Figure 5d shows the actual discrepancy falls within a tolerance of 1 km.

[4] This is presented as an example ONLY. The actual tolerance allowed may be at the discretion of the Permanents Secretary or even at that of the Organiser.

[redacted]

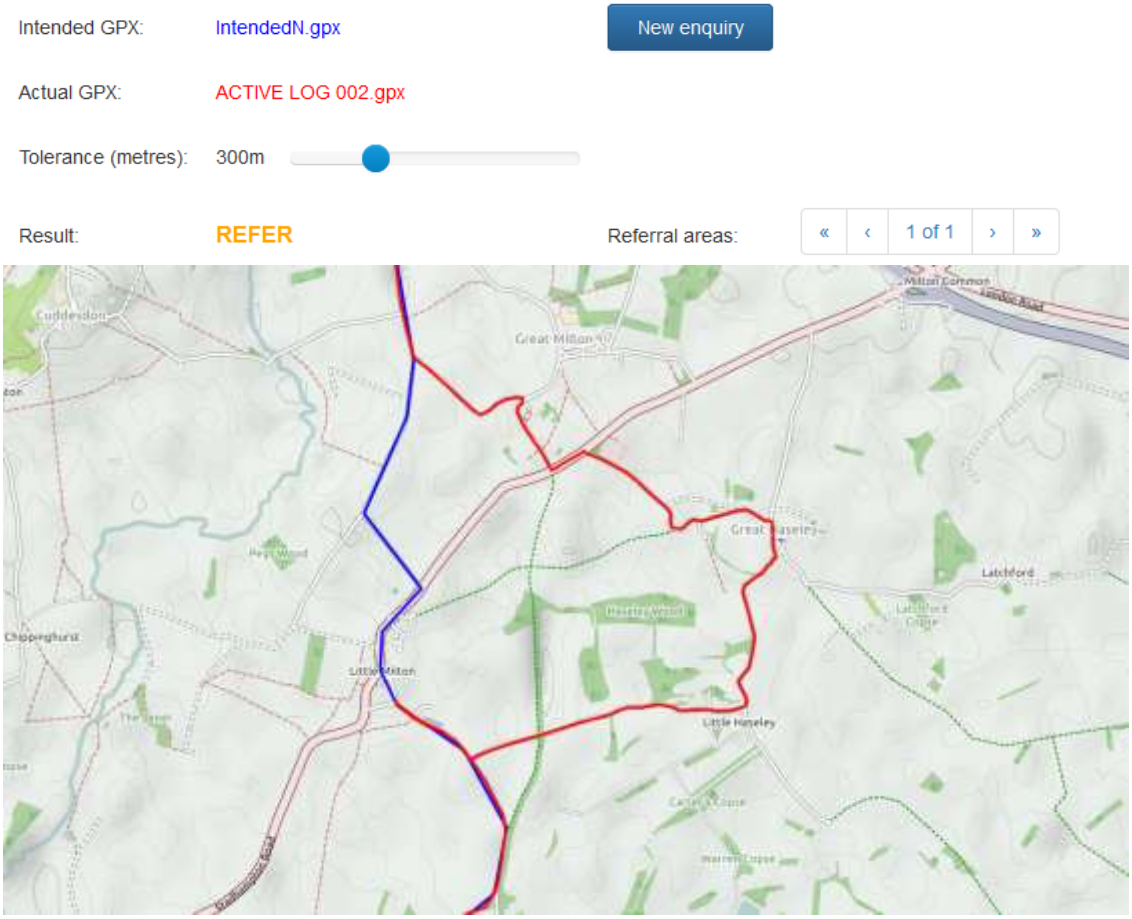


Fig 6. Zoomed-in to a Referral area.

3) When the organiser has satisfied him/herself that the rider has followed the intended route satisfactorily, the 'actual' track can be further checked with the ValidateGPX program which confirms that the speed profile of the track corresponds to that of human powered machine and displays the total distance, distance points and gives an indication of height gain / AAA points.
4) With all the above checks completed the organiser should send both the 'intended' and 'actual' GPX files to the Perm Sec along with his recommendation that the ride be validated. If there are any significant referral areas, explanations as to why Organiser considers the ride should be validated should be attached.
5) Perms Sec may repeat any of the above checks, or request further explanations from either Organiser or Rider before Validating / Recording the ride.

Additional Comments

The above process could be followed by simple transmission of files by email without necessity of sending Brevet Cards by mail, in exactly the same way as is currently done for DIYxGPS.

However it would clearly be desirable in all three cases for both intended and actual tracks to be uploaded to some AUK controlled server.

To be discussed: Possible application of routevalidator to enhance the existing process for advisory route DIYxGPS.