

## 7 Option development

The Booz Allen Hamilton report provided a basis for the feasibility stage of the project.

The Project Manger then instigated an initial round of stakeholder meetings to reinforce the project brief and identify the key requirements of each stakeholder. This culminated in a project workshop.

In addition, a number of issues came forward that affected the outputs from the Booz Allen Hamilton report.

### 7.1 Project workshop

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The initial project workshop was held in May 2009 to provide a forum for each stakeholder to discuss the issues with both other stakeholder and the project team.

The purpose of the workshop was threefold; the reinforcement of previously identified key requirements for each stakeholder; to discuss the key options that will inform the appraisal process and achieve consensus on those that should be taken forward; and highlight key project risks, which were then reviewed in a separate risk workshop format.

Each workshop attendee was asked to prepare a list of top five "must have" objectives for the project and a list of top five "like to have" objectives for the project. In addition, they were asked to identify the five greatest risks for the project relating specifically to their own stakeholder area and five other risks that related to areas outside their own specific area. The risk items were recorded and used to inform the risk management process (See Section 14).

The workshop document, with includes the workshop outputs is included in Appendix F. Where, issues agreed in the workshop have subsequently been amended through the feasibility stage, these are shown as underlined text within the document.

The stakeholder objectives are included in Appendix G.

### 7.2 Timetable

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The workshop highlighted a key change in the assumptions supporting the timetable development and this was mandated by the Operations Department; that for the 2012 timetable onwards trains to/from Derry/Londonderry would cross at Coleraine, not at Bellarena as envisaged in the Booz Allen Hamilton report.

Operations recognised that the service patterns to/from Coleraine and Derry/Londonderry and Portrush vary on a seasonal basis. Crossing services at Coleraine allows a service from Belfast to be diverted to Portrush depending on demand. The complementary onward service to Derry/Londonderry would still able to achieve the correct crossing times between Coleraine and Derry/Londonderry and no alteration to the timetable would be required.

Therefore, the loop to support the 2012 timetable would be required close to Derry/Londonderry, with an additional loop to support the enhanced ½ hourly shuttle service between Coleraine & Derry/Londonderry located at Bellarena.

To support this change, during feasibility stage further timetable modelling was undertaken by Translink, which although based on the work carried out by Booz Allen Hamilton, allowed the project team to review the line speed requirements and loop positions to best optimise both these variables.

The results of the Translink modelling with Opentrack © are included in Appendix H.

### 7.3 Passing loop locations

The passing loop locations are set by the timetable requirements as outlined above.

The loop locations are shown in Appendix I.

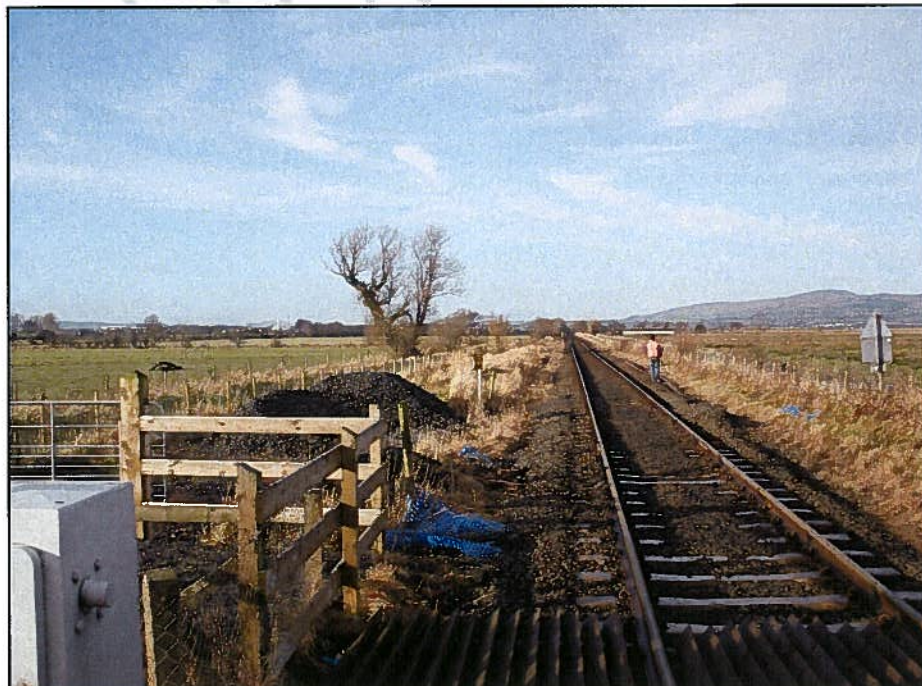
#### 7.3.1 Eglinton Loop

To provide an hourly service between Derry/Londonderry and Coleraine, a passing loop is required in the vicinity of the closed station at Eglinton. This will provide one path per hour in each direction between Coleraine and Derry/Londonderry.

The location identified by the project team and confirmed as suitable by the Opentrack© modelling process is between 87.5MP and 88MP.



Photograph 3 – Location of Eglinton Loop at 87.75MP looking east



Photograph 4 – Location of Eglinton Loop at 87.75MP looking west

This location was chosen for a number of reasons as outlined below: -

- The location fits with the timetable modelling carried out by NIR with the Opentrack® software
- Sufficient land is available to provide an 800m loop at this location without significant earthworks
- The land available for the loop is all within NITHCo ownership
- The proposed site has an existing road connection to the A2 and there is sufficient land available to provide a Park & Ride scheme, although this would require the purchase of additional land adjacent to the railway line.

### 7.3.2 Bellarena Loop

To provide a half-hourly service between Derry/Londonderry and Coleraine, a passing loop is required in the vicinity of Bellarena Halt.

During feasibility stage, extensive modelling by both Booz Allen Hamilton and NIR confirmed that the optimum loop location for the proposed timetable was in this area. In conjunction with the loop at Eglinton, this would provide two paths per hour in each direction between Coleraine and Derry/Londonderry.

At this stage, rail patronage is not expected to require the provision of the second loop prior to 2020, rather than 2018. Therefore, the second loop is shown as an option within the Economic Appraisal options.



**Photograph 5 – Location of Bellarena loop looking east; the new station will be located beyond the level crossing**

A key factor highlighted in the Booz Allen Hamilton report was the location of the halt serving the Limavady area, which is presently deemed to be served by the halt at Bellarena.

Therefore, in association with the provision of a passing loop at Bellarena, it has been recognised that a new station would need to be provided to facilitate DDA requirements.

The project scope, if a new loop is provided, has included for the provision of two new platforms, complete with lighting, shelters and signage, as well as the provision of DDA compliant access from the Seacoast Road to each platform. Inter-platform access will be achieved via the level crossing. The proposed loop and new platforms can be



accommodated within the current NITHCO boundaries at this location, negating the need to purchase additional land.

However, if no loop is provided the existing station will be retained until the new loop is provided.



Photograph 6 – Location of Bellarena loop looking west

#### 7.4 Operational advantages of two loops

With the provision of only a single loop at Eglinton to facilitate the initial hourly service, there is no opportunity to provide any additional train paths between Coleraine and Derry/Londonderry above those required for the 2012 standard service i.e. one path per hour in each direction.

The provision of the second loop at Bellarena would provide up to two paths per hour in each direction between Coleraine and Derry/ Londonderry. This would facilitate both permanent way trains and special trains, such as those run by the RPSI until the introduction of the half-hourly service.

#### 7.5 Dynamic versus static passing loops

The Booz Allen Hamilton study looked at the option of providing both dynamic and static type loops.

However, the work carried out in support of the feasibility study identified that the proposed loops would be co-located with the existing station at Bellarena and a proposed park and ride site at Eglinton.

A dynamic loop which allows two trains to pass at speed, would require a higher capital outlay, as the dynamic loop would be approximately 4000m (2.6 miles) long (assumed by BAH) in comparison to 800m for the static loop (determined by timetable requirements, train length and signalling overlaps).

In addition, the co-location of the station stops with the loops would negate the dynamic nature of the loop but can be used to advantage in the static loop option as the station dwell time for passenger boarding / alighting is offset against the time required for the signal interlocking to release the routes during operation.

Therefore, the dynamic loop option has been discounted at this stage.

## 7.6 Loop configuration

The passing loops on the Larne Line are configured with a fast and a slow loop with only the slow loop signalled for bi-directional running and this has been found to severely limit operational flexibility.

Therefore, the loops between Coleraine and Derry/Londonderry will be configured in a fast entry – slow exit configuration and will be fully signalled for bi-directional running.

A run-round at Derry/Londonderry is required for permanent way maintenance trains and will also facilitate steam excursions. This has been located in the vicinity of the 94.7MP and more detail is included in Sections 8.6 & 9.4 below.

## 7.7 Speed profiles

In consultation with the Permanent Way Department, Operations modelled both the 2012 and 2018 timetables to identify and confirm the necessary speed profiles to achieve the required sectional times to facilitate the timetable.

The agreed speed profiles are set out below: -

- 40mph Coleraine to Bann Bridge

The Bann Bridge will be limited to a speed of 40mph following refurbishment. As the distance between the bridge and Coleraine station is limited, there is no advantage in having a speed limit greater than 40mph.

- 70mph Bann Bridge to Castlerock

The line between the Bann Bridge and Castlerock runs parallel to the Bann Estuary and the track alignment is restricted, limiting the maximum speed on a number of curves to 70mph. Therefore, 70mph has been set at the line speed limit for this section of track.

- 90mph Castlerock to Limavady Junction

To the west of Castlerock the track alignment is predominantly straight with gentle curvatures, providing an opportunity for running up to the maximum permitted speed on Northern Ireland Railways of 90mph, until Limavady Junction.

- 50mph Limavady Junction

At the site of the former Limavady Junction station, line speed is limited by the severe curvature of the track at this location. There is also a reverse curve leading on to Broharris Bridge, a way-beam bridge which on straight track would be limited to 80mph.

- 90mph Limavady Junction to Foyle Bridge

To the west of Limavady Junction the track alignment provides an open alignment with ample opportunities for high speed running up to a maximum of 90mph.

- 70mph Foyle Bridge to Signal No. LY394 (94.75MP)

Between the Foyle Bridge and the proposed run-round at 94.75MP, the alignment of the line through Rosses Bay and the approach to Derry/Londonderry restricts the track geometry, limiting speed to 70mph.

- 40mph 94.75MP – Derry/Londonderry Waterside Station

The half-mile from the run-round loop at 94.75 to Waterside Station is limited to 40mph.

With these speed profiles, trains will be able to achieve the necessary sectional times between stations to achieve the overall timetable. However, a further review will be undertaken during detailed design to identify any areas where further line speed enhancements can be achieved.

## 7.8 Limavady Junction curve

The track alignment through the former station at Limavady Junction is on located on a significant curve and the track geometry limits the maximum speed to 50mph.



**Photograph 7 – Limavady Junction curve, with abandoned station platform**

There are approximately 11 miles to the east and 13 miles to west, where after renewal works, the line speed will be 90mph and as trains would have to slow down to 50mph for this restriction and then accelerate again to 90mph, the project team investigated the option to increase the line speed through this area to 90mph.

The track to the east of the former station is located on embankment which forms part of the local flood defences in the vicinity of the Burnfoot River, which the railway crosses on Broharris Bridge immediately to the west of the former station.

A review of the requirements to increase line speed highlighted that significant civil engineering works would be required, including the construction of a new embankment and a bridge across the Burnfoot River, the capital cost of which could easily exceed three million pounds. In addition, the time saving achieved would only be in the region of 40 seconds, an advantage that could easily be negated by a delay at CODA or by other operational issues.

The expected high cost for the works, coupled with a minimal timetable impact led the project team to conclude that the works provided an extremely poor cost benefit ratio and this option has been omitted from the feasibility stage.