



**METRO NORTH
ORAL HEARING**

**PROOF OF EVIDENCE
DESCRIPTION OF DRAWINGS**

**Geoffrey Featherstone
Thursday 2nd April 2009**



Metro North Oral Hearing

Proof of Evidence

Description of Drawings

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QUALIFICATIONS AND EXPERIENCE AND OPENING REMARKS

- 1.1 My name is Geoff Featherstone and my position in the RPA is that of Metro North Project Engineer. I am a Chartered Civil Engineer, a Member of the Institution of Engineers Ireland and a Member of the Institution of Civil Engineers in the UK. I am also a member of the British Tunnelling Society.
- 1.2 I have been employed by RPA since October 2006 and my prime role has been to manage and work with RPA's engineering design consultants for Metro North who have produced the project reference design and the Railway Order drawings that reflect that design. I have been responsible for the checking of all the Railway Order Drawings in conjunction with a team of design engineers.
- 1.3 My previous experience over more than 35 years has been in the management of design and construction of major infrastructural projects in a wide range of disciplines but primarily related to major underground works. Most recently I was the Chief Resident Engineer employed by the construction supervisor for the Dublin Port Tunnel; that role included the technical supervision of the works and for the management of the design review.
- 1.4 My evidence is provided in two parts.

Firstly, I will list what drawings have been provided as part of the Railway Order application, the drawings provided being alignment, property and structures drawings. I will provide an explanation of the legends used for the alignment drawings and will explain the property tagging system used on the property drawings.

Secondly, I will describe each of the alignment and property drawings in particular to show the relationship between those two sets of drawings to demonstrate how the requirements for property acquisition have been determined. I will also describe the structures drawings which description will, in the case of in particular the underground stops, be supplemented by the evidence of John Smith.

DESCRIPTION OF DRAWINGS

I will deal first with a description of the drawings

The drawings are bound in eight separate books all of which are entitled Draft Railway Order 2008, Metro North, Plan of the Proposed Railway Works. The eight individual books are:

1. Alignment Details, Fingal County Council Area, Book 1 of 2 (Area MN101 to MN104), Belinstown to Santry Avenue.
2. Alignment Details, Dublin City Council Area, Book 2 of 2 (Area MN105 to MN107), Santry Avenue to St. Stephen's Green.
3. Property Details, Fingal County Council Area, Book 1 of 2 (Area MN101 to MN104), Belinstown to Santry Avenue.
4. Property Details, Dublin City Council Area, Book 2 of 2 (Area MN105 to MN107), Santry Avenue to St. Stephen's Green.
5. Structures Details, Fingal County Council Area, Book 1 of 2 (Area MN101 to MN104), Belinstown to Santry Avenue.
6. Structures Details, Fingal County Council Area, Book 2 of 2 (Area MN101 to MN104), Belinstown to Santry Avenue.
7. Structures Details, Dublin City Council Area, Book 1 of 2 (Area MN105 to MN107), Santry Avenue to St. Stephen's Green.
8. Structures Details, Dublin City Council Area, Book 2 of 2 (Area MN105 to MN107), Santry Avenue to St. Stephen's Green.

I will now describe each book in more detail

1. Alignment Details - Book 1 of 2

This book consists of 34 drawings. The first drawing shows the location of individual plans overlaid on a plan of Fingal County, 29 drawings are included which show the route in relation to its surroundings to a scale of 1/500 with cross-sections at 1/100 and 4 drawings showing a longitudinal section along the route. The route within Fingal County has been divided into four separate areas commencing at area no 101 in Belinstown and ending at area no 104 at Santry Avenue. This division is also used in the EIS which accompanies this application.

2. Alignment Details - Book 2 of 2

This book consists of 22 drawings. The first drawing shows the location of individual plans overlaid on a plan of Dublin City, 18 drawings are included which show the route in relation to its surroundings also to a scale of 1/500 with cross-sections at 1/100 and 3 drawings showing a longitudinal section along the route. The route within Dublin City has been divided into three separate areas commencing at area no 105 in Santry Avenue and ending at area no 107 at St. Stephen's Green. Again this division is also used in the EIS which accompanies this application.

In these two books of alignment details the 1/500 scale drawings are numbered using the following convention. All the drawings commence with the prefix MN-RO, the next number refers to the area which the drawing represents (for example 101, 102, etc) and the next two letters refer to match lines which indicate where the work on the drawing starts and ends (for example O-A, A-B and so on).

The following information as regards the metro system is shown on these drawings:

Above Ground Works

For drawings where the works are above ground the following information is provided and plan no. MN-RO 101 D-E shown illustrates the convention used:

- Above ground the rail lines are coloured orange with a grey shading to represent protected running and a yellow shading to represent where road traffic can cross metro at grade. Protected running is where road vehicles are excluded from running on the light metro vehicle lines (LMVs) and the majority of the line is in this category. There is only one place where road traffic can cross metro at grade, and that is actually shown on this particular drawing, shaded yellow.
- Arrows coloured black indicate the anticipated direction of travel of LMVs
- Arrows coloured red indicate the number of road traffic lanes and the anticipated direction of flow on the areas adjacent to the metro line.
- The location of the surface stop platforms are shown in a maroon colour.
- Trees that are proposed for removal are shown shaded on the drawings.
- The overhead contact system, that provides power to the LMVs, is shown on the drawings in a blue colour when above ground. The overhead wire is supported by poles and gantries.

Below Ground Works

For drawings where the works are below ground the following information is provided and plan no. MN-RO 107 O-A shown illustrates the convention used:

- The tunnel sections are shown hatched in grey with the rail lines in the tunnels shown dotted and coloured orange.
- Arrows coloured black indicate the anticipated direction of travel of LMVs
- The location of the underground stop platforms are shown in a hatched maroon colour.
- In underground sections the overhead contact system is not shown.

There are seven drawings showing the longitudinal profile of the line as shown in this example, plan MN-LN 103 O-O. These are to a horizontal scale of 1:2000 and a vertical scale of 1:250. These longitudinal profile drawings also set out the limits of acquisition of the substratum of lands (the Schedule 3 lands as detailed in the Metro North Railway Order). Allowance is made in the upper limit of acquisition of the Schedule 3 lands for the limits of deviation appropriate to the particular area and for the installation of rock support as necessary.

3. Property Details - Book 1 of 2

This book consists of 30 drawings. These drawings follow a similar format to the alignment drawings and show the property effects of the proposal. The numbering system is the same as that used on the alignment drawings except that the prefix RO is replaced by P.

4. Property Details - Book 2 of 2

This book consists of 19 drawings. These drawings also follow a similar format to the alignment drawings and show the property effects of the proposal. Again the numbering system is the same as that used on the alignment drawings except that the prefix RO is replaced by P.

In these two books of property details the following information is shown on the property drawings and reference is made to the drawing shown, plan no. MN-P 107 O-A.

- Firstly, the extent and location of property which is proposed for acquisition (the Schedule 2 lands as detailed in the Metro North Railway Order). Each individual plot of land is shaded grey and edged with a red line. A tag number identifies each individual plot. The tag number commences with the abbreviated area number (for example M7 represents area 107), the next number details the abbreviated match line number (for example O represents O-A) and then follows the letter A followed by a reference number. The Second

Schedule to this Railway Order is cross referenced with these tag numbers. These tag numbers are also used to identify areas where public and private rights of way are extinguished and the Ninth and Tenth Schedules respectively to this Railway Order are cross referenced with these tag numbers.

The extent of property acquisition includes for any allowance necessary to accommodate the limits of deviation as set out in the Railway Order or as further constrained by the particular requirements of the area under consideration.

- Secondly, the extent and location of substratum of lands which is proposed for acquisition (the Schedule 3 lands as detailed in the Metro North Railway Order). Each individual plot of land is shaded blue and edged with a red line. A tag number identifies each individual plot. As before, the tag number commences with the abbreviated area number, the next number details the abbreviated match line number and then follows the letter U followed by a reference number. The Third Schedule to this Railway Order is cross referenced with these tag numbers. These tag numbers are also used to identify where an acquisition of land (above the substratum acquired) is to be temporarily acquired and the Fourth Schedule to this Railway Order is cross referenced with these tag numbers. Similarly, these tag numbers are also used to identify areas where rights of way or other easements are required and the Fifth Schedule to this Railway Order is cross referenced with these tag numbers.

The extent of substratum acquisition includes for any allowance necessary to accommodate the limits of deviation. It also allows for the requirements for rock anchors, soil nails and the like that are necessary to support the tunnel and Stop excavations.

- Next, the extent and location of land which is proposed to be temporarily acquired (the Schedule 4 lands as detailed in the Metro North Railway Order). Each individual plot of land for the most part is hatched in grey and edged with a blue line. However where it is also proposed to acquire substratum land below a plot to be temporarily acquired this plot is shaded blue and edged with a red line. A tag number identifies each individual plot. Again, the tag number commences with the abbreviated area number, the next number details the abbreviated match line number and then follows the letter T followed by a reference number. Where both substratum and temporary acquisition of a plot is proposed the letter T is replaced by the letter U and a note of explanation appears on the drawing linked to that tag number. The Fourth Schedule to this Railway Order is cross referenced with these tag numbers.
- Next, the extent and location of land over which it is proposed to acquire rights of way or other easements (the Schedule 5 lands as detailed in the Metro North Railway Order). Each individual plot is hatched in yellow and edged with a red line with the exception of plots also proposed for substratum acquisition (of which there are only two). These two plots are shaded blue and edged with a red line. An example of this is not shown on the plan currently being displayed.

A tag number identifies each individual plot. The tag number commences with the abbreviated area number, the next number details the abbreviated match line number and then follows the letter W followed by a reference number. Where both rights of way and substratum land is acquired the letter W is replaced with the letter U. The Fifth Schedule to this Railway Order is cross referenced with these tag numbers. These tag numbers are also used to identify areas where public rights of way may be extinguished and the Ninth Schedule to this Railway Order is cross referenced with these tag numbers.

- Finally, the location of basements or parts thereof that it is proposed is acquired (the Schedule 6 lands as detailed in the Metro North Railway Order). Each basement is shown with a tag number. The tag number commences with the abbreviated area number, the next number details the abbreviated match line number and follows the letter B followed by a reference number. The Sixth Schedule to this Railway Order is cross referenced with

these tag numbers. Some of these basements will lie above an area of proposed substratum acquisition.

5. Structures Details - Book 1 of 2 (Fingal County Council area)

This book 5 consists of 30 drawings. The first drawing shows the location of structures that are to be constructed within areas MN 101 to MN 104. Fifteen drawings relate to Stop details, six depict the depot at Belinstown and seven the multi storey car park also at Belinstown. In addition a single drawing details the possible alternative that may be considered for the Airport Stop.

6. Structures Details - Book 2 of 2 (Fingal County Council area)

This book consists of 25 drawings. The first drawing shows the location of further structures that are to be constructed within areas MN 101 to MN 104. Seventeen drawings relate to details of culverts, underpasses and bridge and viaduct details, two depict ventilation structures, one depicts staff and public facilities at park and ride Stops and four set out substation details

7. Structures Details - Book 1 of 2 (Dublin City Council area)

This book consists of 35 drawings. The first drawing shows the location of structures that are to be constructed within areas MN 105 to MN 107. 31 drawings relate to Stop details and three detail the emergency shaft at St. Patrick's College

8. Structures Details - Book 2 of 2 (Dublin City Council area)

This book consists of 28 drawings. The first drawing shows the location of further structures that are to be constructed within areas MN 105 to MN 107. 24 drawings relate to Stop details and two detail the temporary Liffey Bridge. In addition a single drawing details the possible alternatives that may be considered for the city centre Stops.

The structures drawings in these last four books show elements of the proposal in greater detail than that shown on the alignment drawings. These drawings are referenced on the alignment drawings by outlining them using a green hatched line and by noting the relevant number of the drawing.

Mr. Inspector that now completes my evidence in relation to my description of the drawings.

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