DOCUMENT 6.7

The Northampton Gateway Rail Freight Interchange Order 201X

Regulation No: 5 (2) (q)

DRAFT RAIL OPERATION REPORT | OCTOBER 2017

www.northampton-gateway.co.uk
Report
Northampton Gateway: Operation of the internal rail layout
26th September 2017

1. **Introduction**
   1.1. Roxhill (Junction 15) Limited is proposing a new Strategic Rail Freight Interchange (SRFI) at Northampton Gateway, adjacent to the M1 Junction 15 south of Northampton. This report describes the internal track layout, its key features and the rail operations that will take place on site.

2. **Glossary**
   - DfT: Department for Transport
   - DIRFT: Daventry International Rail Freight Terminal
   - MU: Multiple Unit train (diesel or electrically powered)
   - ERTMS: European Railway Traffic Management System
   - FOC: Freight Operating Company
   - Reach stacker: Vehicle for lifting and moving intermodal containers
   - RFI: Rail Freight Interchange
   - RMG: Rail Mounted Gantry crane
   - SRFI: Strategic Rail Freight Interchange
   - WCML: West Coast Main Line
   - WTT: Working Timetable

3. **DfT and Network Rail operational expectations**
   3.1. The National Policy Statement for National Networks \(^1\) states that:
   
   "Applications for a proposed SRFI should provide for a number of rail connected or rail accessible buildings for initial take up, plus rail infrastructure to allow more extensive rail connection within the site in the longer term. The initial stages of the development must provide an operational rail network connection and areas for intermodal handling and container storage. It is not

---

\(^1\) DfT: December 2014: National Policy Statement for National Networks; Sections 4.88-9
essential for all buildings on the site to be rail connected from the outset, but a significant element should be.

As a minimum, an SRFI should be capable of handling four trains per day and, where possible, be capable of increasing the number of trains handled. SRFIs should, where possible, have the capability to handle 775 metre trains with appropriately configured on-site infrastructure and layout. This should seek to minimise the need for on-site rail shunting and provide for a configuration which, ideally, will allow main line access for trains from either direction.”

3.2. It follows that any new SRFI must be able to handle at least four full-length freight train paths per day operating on the main line in either direction, provide for rail connected warehousing on site and an intermodal terminal capability. To cater for the projected growth it needs to have the potential to handle more traffic in the future. Northampton Gateway meets (and exceeds) all these requirements.

3.3. Network Rail explains its requirement for 775m capability in its Freight Network Study2:

3.4. “Currently, 775m trains (including locomotive) represent the maximum length for intermodal trains. A long-term aspiration exists across the industry to research the possibility of running trains of even greater length. This study considers 775m the minimum baseline against which capability should be assessed and notes that if 775m is not achievable on a line of route, it is still an aspiration to maximise train length.

3.5. Capability to run 775m trains is also reliant on adequate loading and unloading facilities at ports and terminals, highlighting the need for integration across the industry.”

3.6. This makes it clear that Network Rail expects SRFIs to be able to handle the longest freight trains that can run on the national rail network.

3.7. The WCML, which serves the Northampton Gateway SRFI site, is electrified throughout between London and Scotland, using Network Rail’s standard 25kV AC overhead line equipment, and lines to London Gateway and Felixstowe are also electrified.

3.8. DfT’s Rail Freight Strategy published in 2016 explains the need to provide the potential for trains to be hauled by electric traction by stating:

3.9. “Furthermore, as further electrification of the network is completed, we anticipate that the FOCs3 will progressively increase their fleets of electrically-hauled or potentially bi-fuel locomotives. Electric traction provides greater haulage power and faster acceleration.”

---

2 Network Rail September 2016: Freight Network Study; Section 4.2.2 Page 29
3 ‘FOC’ is the industry acronym for a Freight Operating Company

Northampton Gateway: Operation of the internal rail layout
Page 2 of 15
3.10. Network Rail’s Freight Network Study again expands this ambition\(^4\):

3.11. “The conversion of the network to enable freight services to switch to electric traction is anticipated to have the following benefits:

- Increased network capacity through enhanced performance and average speed, enabling freight market growth
- Reduction in whole industry costs
- Improvements to capacity utilisation and network efficiency
- Environmental benefits when compared to diesel traction
- Improvement in the rail freight product to end users, for example through shortened journey times
- Industry confidence in the electrification programme to invest in electric locomotives."

3.12. This explains why government and the rail industry considers it important that significant new rail freight terminals have the capability to accommodate maximum length trains, and where appropriate incorporate the potential to handle trains hauled by electric locomotives\(^5\).

3.13. European locomotive manufacturers have started to produce electric freight locomotives with a diesel engine to provide dual traction capability, using the diesel engine on a ‘last mile’ basis to work into non-electrified sidings.

3.14. These locomotives are able to operate over the entire rail network within the Northampton Gateway site, and provide a solution to running electric trains directly into the container offloading sidings, where overhead wires are not possible because of their conflict with container offloading equipment.

3.15. Direct Rail Services has purchased 10 of these locomotives (known as Class 88), and has just started to use them on the intermodal trains it runs between DIRFT and Mossend for Stobart Rail and Tesco\(^6\). In September DRS launched a tender for the acquisition of a further 10 of this type of locomotive, and there is a growing expectation that other intermodal operators will focus future fleet acquisition on similar hybrid locomotives.

3.16. Discussions are being held with Freight Operating Companies to determine the extent to which hybrid locomotives will be used for intermodal trains to and from Northampton Gateway, when it opens and in the longer term.

3.17. This report confirms that Northampton Gateway will provide the capability for maximum length trains and will be able to accommodate electric freight trains when the freight market requires.

---

\(^4\) Network Rail September 2016: Freight Network Study; Section 5.4.1 Pages 36 and 37

\(^5\) DfT 2009: Strategic Rail Freight Network – The Longer Term Vision; Section 20.1 “775 metre train length should be the design standard for new freight terminal developments and enhancement of existing terminals.”

4. **Northampton Gateway rail facilities**

4.1. The Northampton Gateway site comprises six specific elements of rail activity:

- Main line connections to the Network Rail WCML Northampton Loop
- A set of three 775 metre Reception Sidings
- A 775 metre headshunt and run round loop to permit shunting moves around the site
- A three track intermodal terminal, again of 775m capability
- Rail connections to four warehouses, to provide either internal or external access for loading and unloading
- A Rapid Railfreight terminal

The functionality of each of the elements of the track layout is discussed in turn below.

In principle the track layout will be in the format as shown in Figure 1 below. This layout is diagrammatic, and not to scale. The illustrative masterplan demonstrates how the rail infrastructure will sit within the overall scheme and is shown at
Figure 1: Northampton Gateway: Diagrammatic track layout

Figure 2.
Northampton Gateway: Site layout
4.2. Network Rail connections

4.2.1. The SRFI is connected directly into the Network Rail Northampton Loop. This is the West Coast Main Line (WCML) freight corridor, running from London to Scotland, serving the West Midlands, North Wales and the North West en route.

4.2.2. There will be connections to both the southbound and northbound lines in both directions, which means that trains will be able to enter and leave the site towards either London or Rugby. The WCML has connections to all parts of the country and, via the Channel Tunnel, Europe. This means that the site will be connected to all the key independent ports, SRFIs and Railfreight Interchanges (RFIs) in the UK.

4.2.3. Care has been taken to ensure that the connections can be used at as fast a speed as possible, to enable trains to enter and leave the Northampton Loop with the minimum of delay, and minimise impacts on other passenger and freight trains on the route. The pointwork on the connections will permit trains to run at a minimum permissible speed of 40 mph. It is intended that the junction signals into the site will be provided with a system (known as flashing aspects) that will enable trains to run into the site at their maximum permitted speed, again to minimise any impacts on other services.

4.2.4. Initially the site will be connected to the main line by single-track connections, which are sufficient for the volumes of freight traffic anticipated initially. However capability will be designed into the track layout to provide passive provision for a second parallel main line connection, which would allow trains to enter and leave the site from the same direction at the same time. When traffic levels build sufficiently these additional connections would be installed to provide parallel capability.

4.3. Reception Sidings

4.3.1. Trains will leave the main line as quickly as possible, running at the maximum speed permitted by the main line connections, and enter the Reception Sidings. They will run into the Reception Sidings, where trains are received from the WCML, at the same speed. Trains will leave the Reception Sidings at up to the same speed. Each siding will be 775 metres long, enabling the SRFI to accept the longest trains on the national rail network. Intermediate crossovers mid-way along the loops may also be added so that portions of trains can be split and reassembled.

4.3.2. Northampton Gateway will have an operational control room, which with Network Rail’s Signalling Centre will jointly control the Reception Sidings, so that the main line operator has confidence that an empty track is available for arriving trains.

4.3.3. The Reception Sidings are parallel to the intermodal terminal and the rail-connected warehouses. Trains will be shunted to both via the headshunt.

4.3.4. Freight Operating Companies need to make efficient use of their resources, including locomotives, traincrew and wagons, and the Reception Sidings have
been configured to allow arriving locomotives to depart the site with fresh trains as soon as possible. In line with normal industry practice additional sidings will be provided to stable main line locomotives between duties, and store wagons requiring maintenance before they are reloaded.

4.3.5. Trains will be moved from the Reception Sidings to the intermodal terminal or rail connected warehouses, where they will be offloaded and reloaded with goods for despatch to ports or other RFIs or on site warehousing. After reloading the train will be moved back from the terminal to the Reception Sidings via the Headshunt to be prepared to leave the SRFI and to wait for their main line path. Trains will normally depart the SRFI between three to four hours after arrival (allowing time to prepare the train for main line despatch and wait for its timetabled path). While it is waiting to depart following trains that have arrived later will be moved into the terminals for unloading.

4.3.6. When the main line path is available the train will depart, and the Reception Siding track will become available for the next arriving train. It will also be possible for trains to depart directly to the main line from the Railfreight and Rapid Rail Freight terminals.

4.4. **Headshunt**

4.4.1. The Reception Sidings are served by a 775 metre long headshunt, which will provide the method of repositioning trains into the intermodal terminal and rail connected warehouses. This headshunt can be operated independently of the main line, which means that trains can be moved around the site without interruption.

4.4.2. Main line locomotives can be used on the headshunt for shunting and repositioning whenever required. It will be provided with a run round loop so that train locomotives can change ends, and so that trains can be sorted prior to despatch. However normally it is expected that trains will be moved around the site by internal locomotives.

4.5. **Intermodal terminal**

4.5.1. Trains will be shunted into the intermodal terminal, where the terminal will unload containers and replace them with new containers in between 2 and 3 hours. The intermodal terminal will be the destination for most trains arriving at the site. It will comprise three 775-metre tracks, served by Rail Mounted Gantry (RMG) cranes and reach stackers, which load and unload the containers from the wagons to ground.

4.5.2. Containers will be taken from the RMG area to storage locations by reach stackers, or loaded directly to road vehicles for onward distribution within the site or via the trunk road network. At the same time fresh containers will be brought into site, and again will either be loaded direct to the train by the RMG or placed in storage by a reach stacker. The Intermodal Terminal will be controlled by a computerised inventory system that will track and manage all container movement and storage.
4.5.3. Intermodal Terminals cannot be electrified, as the overhead wires would prohibit container offloading. However there will be cases where the trains will depart from the terminal directly to the main line. FOCs are likely to use hybrid diesel and electric locomotives for this operation, or it may be appropriate to install overhead wiring to a point just short of the RMG runs on each terminal track, so that electric locomotives could be attached to trains prior to despatch.

4.5.4. Once reloaded, the train will either be moved back to the Reception Sidings for later despatch in a suitable train path, or will leave directly from the Intermodal Terminal to the main line.

4.6. Rail connected warehouses

4.6.1. A proportion of the warehouses on site will be capable of being directly rail connected. The layout of the sites will be determined by the specific needs of each tenant. At SRFIs some tenants require a large unloading area with no cover, operated by reach stackers or forklift trucks, while other tenants may prefer the rail tracks to enter the warehouse itself so that wagons can be unloaded under cover and in ambient temperatures. These different demands will be reflected in the final designs for the warehouses at Northampton Gateway – both options can be accommodated at different locations on the site.

4.6.2. Trains will be moved into the warehouse loading areas by internal shunting locomotives, and positioned ready for unloading and reloading. Once loading operations have finished, the shunting locomotive will take the wagons back to the Reception Sidings to be formed into a train for despatch.

4.7. Rapid Railfreight Terminal

4.7.1. Rapid Railfreight is anticipated to be a growing market, in which a number of Freight Operating Companies have expressed interest. Roxhill wishes to be able to accommodate that interest in the future if there is a specific interest. The proposal is therefore designed to allow for such a facility. This facility comprises a 200m long covered platform, with cross-dock facilities from a wide road circulation area. This will enable palletised goods to be moved directly from the deck of road vehicles into dedicated rail vehicles.

4.7.2. The loading platform will allow a train of up to ten 20-metre vehicles to be loaded at one time. Emerging government and industry strategy envisages that trains would be unloaded at city centre destinations stations (such as Euston or Manchester Piccadilly)7. Most of these stations have ample overnight capacity and road access to suitable unloading areas. The normal length of station platforms is between 200 and 250 metres, and thus trains loaded at the Rapid Railfreight facility could be unloaded at most major stations on the UK national rail network.

---

7 DfT 2016: Rail Freight Strategy; Section 76
4.8. The loading platform will be covered, so that goods can be transhipped under cover without risk of damage to sensitive or perishable cargoes.

4.9. We expect that high-speed express freight trains will either comprise a locomotive and high speed railfreight vehicles, or repurposed or specifically manufactured passenger Multiple Unit trains\(^8\). The platform will have a run round loop, so that the train engine on locomotive hauled trains can swap ends. Direct access to and from the north will be possible, allowing trains to run direct to and from the North West and Scotland, while trains to the south, to London, the South East and even Europe (via the Channel Tunnel) will only need one simple reversing move using the headshunt.

5. Site phasing

5.1. The creation of rail facilities on site will be phased, reflecting the overall site development phasing. The intermodal terminal will be constructed as part of the initial phase of site development prior to the occupation of any warehousing.

5.2. As traffic grows additional sidings will be installed to accommodate the increasing number of trains. Illustrative plans of the terminal and its expansion are shown overleaf.

5.3. The terminal would initially be configured to handle at least four trains per day, with appropriate terminal facilities. As traffic increases the track layout will be enhanced and the intermodal terminal expanded.

---

\(^8\) A Multiple Unit is a passenger train with traction equipment integrated into the coaches, and a cab at each end to enable it to reverse at terminal stations. Multiple Units are also suitable for carrying lightweight rapid rail freight. Royal Mail operates a fleet of Class 325 four-car Multiple Units for the carriage of letter mail on the WCML
Figure 3: Potential first phase of rail sidings development
Figure 4: Potential second stage of rail sidings development

EXPANSION 1

- Existing rail lines
- Previous phase installed rail lines
- Expansion 1 rail lines - 8 to 10 trains per day
- Expansion 1 Infrastructure extents: including intermodal slab extension

Area: 2.269 Hectares / 5.61 Acres
Figure 5: Potential third stage of rail sidings development

EXPANSION 2

- Existing rail lines
- Previous phase installed rail lines
- Expansion 2 rail lines with Gantry Cranes - 16 trains per day. Additional lines as requested by warehouses
- Expansion 2 infrastructure extents: including intermodal slab extension, additional lorry parking and potential Rapid Rail Freight facility

Area: 4.453 Hectares / 11.00 Acres

Gantry Crane
6. **Rail operations**

6.1. This final section provides a set of simple illustrations, showing the way in which trains and cargoes will be moved around the site for every train that arrives and departs. These movements are explained in the text above. The track layout is shown diagrammatically and is a simplified version of the final phase connections that will actually be installed.

6.2. The diagrams show the sequence of operations for trains arriving and departing the site, and how trains are moved to and from unloading areas.

6.3. The Network Rail Regional Operations Centre at Rugby, which controls all main line movements, will supervise train movements to and from the national rail network. The terminal operator will control train movements within the site.

6.4. In the diagrams a line of red blocks represents wagons formed into a train. The blue block represents a main line or shunting locomotive, and its position at the front or back of the train. The yellow arrows represent the directions of movement.
Figure 6: Trains arrive in the Reception Sidings

Figure 7: Trains are moved to the terminals for unloading
Figure 8: When reloaded, trains are moved back to the Reception Sidings for despatch

Figure 9: Trains depart onto the main line to the north and south