NORTHAMPTON GATEWAY
STRATEGIC RAIL FREIGHT INTERCHANGE

RAIL REPORTS

DOCUMENT 6.7

The Northampton Gateway Rail Freight Interchange Order 201X

Regulation No: 5 (2) (q)

RAIL REPORTS

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Northampton Gateway Strategic Rail Freight Interchange Order 201X

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Document No: 6.7

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Purpose of the Reports

1.0 This folder draws together in one location a number of Reports that have been prepared specifically in relation to the rail components of the Northampton Gateway Strategic Rail Freight Interchange. This introductory statement briefly explains the origins of each report, its purpose and relationship to the other Reports prepared.

2.0 Two Reports have been prepared by Victa Railfreight, a Rail Freight Consultancy Practice, which provides a range of support services to rail freight customers, operators and suppliers. Victa Railfreight have advised Roxhill (Junction 15) Ltd on all aspects of rail freight, including market consideration, capacity and terminal design and layout.

3.0 The Victa Railfreight Report at Appendix One examines the available freight capacity on the West Coast Main Line. The Report explains how the line is currently used, how additional paths could be created and how capacity might be used in the future. It then seeks to link this capacity to the forecast of traffic that will be generated by the Northampton Gateway SRFI. It concludes that there is sufficient capacity for the Northampton Gateway SRFI and other commitments on the network.

4.0 A second Report produced by Victa Railfreight, Appendix Two, describes the on-site layout of rail infrastructure, its key features and the rail operations that will take place on the site. This includes details of the Network Rail connections, reception sidings, signal control, headshunt, the intermodal terminal, the aggregates terminal, the rail connected warehouses and the potential for a rapid rail freight facility. It also considers the phasing of on-site rail infrastructures.

5.0 Appendix Three and Four are two Reports prepared by GB Railfreight. GB Railfreight are a freight operating company with some 750 employees and operating over 1800 paths a year. GB Railfreight operates services for GRS who have contracted to move their central Northampton aggregates terminal to Northampton Gateway. Because GB Railfreight are a freight operating company they are used to working directly with Network Rail to identify and plan for new paths. Their insight into freight capacity and market patterns is therefore considered to be helpful.

6.0 GB Railfreight has therefore prepared two Reports. The first sets out their view on the capacity of the rail network to provide paths for the Northampton Gateway SRFI. They conclude that there are a number of spare paths available and sufficient network capacity for the Northampton Gateway SRFI. Whilst their approach to the assessment of capacity differs slightly from that adopted by Victa Railfreight, their conclusion, in particular their overall capacity conclusions, closely mirrors those of Victa Railfreight.

7.0 GB Railfreight have produced a second Report which sets out their views on the market and future freight market patterns. This considers the potential for growth in both the intermodal freight market and the construction/ aggregates market.

VICTA RAILFREIGHT

Report for
Roxhill Developments Ltd.

Northampton Gateway
Strategic Rail Freight Interchange

West Coast Main Line south of Rugby: capacity for additional freight

10th May 2018

Victa Railfreight Ltd.

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1. Introduction

1.1. Roxhill (Junction 15) Limited is proposing a new Strategic Rail Freight Interchange (SRFI) at Northampton Gateway, adjacent to the M1 and the Northampton Loop Line, which forms part of the West Coast Main Line (WCML). This report examines the currently available freight capacity on the West Coast Main Line (WCML). As part of this analysis it explains how the line is currently used, and how additional paths could be created. It then goes on to assess how this capacity might be used in the future. It then links this capacity to the forecast of traffic that will be generated by the Northampton Gateway SRFI.

1.2. The report also describes how the Department for Transport (DfT) expects the HS2 project will provide additional freight paths.

1.3. In this report, where new train paths are quoted in one direction only, they will be balanced by the same number of paths in the opposite direction. The term '3 paths an hour' means 3 paths north and 3 paths south, or 6 trains per hour in total. There is a small imbalance in existing paths, which is normal.

1.4. Care must be taken with the term' day', which in various source material is used to mean either a 24 hour period, or activities during daytime hours (notionally between 06.00 – 22.00 when passenger trains run). In this report 'day' has the latter meaning, and operations over the 24-hour period are described as such.

1.5. This report uses standard railway terminology for directions; 'Down' refers to trains running north from London, and 'Up' refers to trains running south towards London.

1.6. This report does not consider the incremental freight capacity demands that would be generated if the Rail Central Blisworth SRFI site were developed as well as Northampton Gateway. The same capacity factors apply to both sites.

2. Glossary

DfT	Department for Transport
DIRFT	Daventry International Rail Freight Terminal
EAS	Engineering Access Statement
EMU	Electric Multiple Unit
ERTMS	European Railway Traffic Management System
FNPO	Network Rail Freight and National Passenger Operators Route
FOC	Freight Operating Company
HLOS	DfT High Level Output Statement for each Control Period
ORR	Office for Rail and Road
Reach stacker	Vehicle for lifting and moving intermodal containers
RFI	Rail Freight Interchange
RMG	Rail Mounted Gantry crane
SRFI	Strategic Rail Freight Interchange
TOC	Passenger Train Operating Company
WCML	West Coast Main Line
WTT	Working Timetable

3. Northampton Gateway

3.1. Site description

3.1.1. Northampton Gateway is a proposed Strategic Rail Freight Interchange; being located around 4 miles south of Northampton, and alongside the Northampton Loop of the West Coast Main Line. The SRFI will comprise the following key elements:

- Reception sidings, lying alongside the Northampton Loop, acting as the point where trains arrive from the main line and are despatched onto it
- An Intermodal Terminal, where containers are unloaded from arriving trains and fresh containers are reloaded to them prior to departure
- Rail served warehouses where freight can be unloaded from rail wagons on sidings directly adjacent to them
- A bulk aggregates terminal, where construction materials can be unloaded from dedicated trains and despatched to the Northampton area
- Potential for a Rapid Rail Freight terminal, where premium distribution goods can be loaded onto high speed freight trains for despatch across the UK

3.1.2. A more detailed description of the rail facilities provided within the SRFI and how they will operate can be found in the accompanying Internal Rail Operations Report. This report also includes phasing plans showing how the rail facilities will build up over time in line with the development of the overall site and the growth of freight traffic set out in Figure 1.

3.2. Location

3.2.1. The Northampton Gateway site lies adjacent to Junction 15 of the M1, 4 miles south of Northampton and 10 miles north west of Milton Keynes. It will be connected to the Network Rail West Coast Main Line (WCML). The WCML is the UK's most important rail corridor for both freight and passenger services.

3.2.2. The WCML runs from London to the West Midlands, the North West and Scotland, and is electrified throughout. Freight trains run using either diesel or electric traction.

3.2.3. In 2010 Network Rail estimated that 43% of all UK rail freight travelled on the WCML at some stage of its journey, and the proportion of intermodal freight that travels on it between UK container ports and key National Distribution Centres is even higher.

3.2.4. The WCML connects through London to core intermodal routes that run onwards to the UK's largest container ports at Felixstowe, Southampton and London Gateway (near Tilbury), together with the Channel Tunnel. Most intermodal freight trains arriving from the principal deep-sea ports will therefore arrive at Northampton Gateway from the south.

3.2.5. Freight trains will also run to the north via the WCML. Principal destinations are Scotland, the North East and North West, principally for traffic reforwarded from warehouses within the Northampton Gateway site or local area. This route will also be used to link Leicestershire quarries with the Aggregates Terminal in the SRFI. It is important to recognise this split in traffic, as a train arriving at Northampton Gateway from the south may use the same path as a train leaving Northampton Gateway to the north. This means that the aggregate number of WCML freight paths required to service the site may be less than the number of trains using the site, if two trains use the same London to Rugby path.

3.2.6. The WCML is cleared to Network Rail's W10 structure gauge, making it suitable for the carriage of 9' 6" containers. Network Rail intends to increase this to W12 to provide the capability to handle European swapbodies on standard platform wagons as the highest priority[1]. As such it provides the best rail access of any route on the national rail network.

3.3. Traffic volumes into Northampton Gateway

3.3.1. As part of scheme development, Roxhill has set out a forecast of train movements over the period covered by Network Rail's long term planning horizon (currently up to 2043). Each train path quoted applies to a train into the site and a balancing train out if it.

3.3.2. The forecast train movements are shown in Figure 1 below.

3.3.3. Up until the time when HS2 opens up in 2026 the traffic generated is relatively modest, in line with the start up and development of the site. We would expect there to be a need to run 3 trains to and from the south and 1 (aggregates) service to and from the north every day. Traffic will then build up over time, matched by the expected increase in WCML freight capacity provided by HS2.

3.3.4. It is expected that in the long term (2043) a total of 16 intermodal and/or bulk freight train pairs will serve the site every 24-hour period Monday - Friday. Of these 10 will operate between London and the SRFI, with 6 running north via Rugby. There is therefore a long-term need to identify at least 10 additional paths per 24 hours to the SRFI site from the south (London) direction. In the initial period following opening of the SRFI the demands will be much more modest.

[1] Network Rail Freight Network Study April 2017 Table3 (Page 7)

Figure 1: Forecast Northampton Gateway rail freight traffic volumes over time[2]

Northampton Gateway Forecast Rail Traffic Levels								
Train Type	Number of trains per 24 hours in each direction 2021		Number of trains per 24 hours in each direction 2026		Number of trains per 24 hours in each direction 2033		Number of trains per 24 hours in each direction 2043	
	Low forecast	High forecast	Low forecast	High forecast	Low forecast	High forecast	Low forecast	High forecast
75mph intermodal freight Towards Wembley	2	3	4	6	6	8	9	10
75mph intermodal freight Towards Crewe	0	0	0	1	1	2	2	4
Class 6 60mph bulk freight Towards Wembley	0	0	0	0	0	0	0	0
Class 6 60mph bulk freight Towards Crewe*	1	1	1	1	1	2	1	2
Event/year	SRFI Opens		HS2 Phase 2a Opens London Birmingham		HS2 Phase 2b Opens London M'chester/Leeds		NR Long term planning horizon	

Notes:

1. These are indicative estimates only, and do not distinguish loaded, part loaded or empty services, or origin and destination
2. * One Class 6 bulk freight path runs in the same times as one path already present in the WTT between Mountsorrel (Leics) and Northampton Castle Yard (which Northampton Gateway replaces)

3.3.5. As set out in Figure 1 the majority of freight trains running to and from Northampton Gateway are expected to arrive from and depart to the south, and that trains running to the north (typically towards Scotland or the North east) are in the minority. Some of these trains would run during the day, meaning the impact of overnight engineering closures on the operation of the SRFI would in any case be relatively minor.

3.3.6. These forecasts are not divided down into daytime and night-time periods, though in practice (in accordance with normal Freight Operating Company practice as noted in Figure 4 below) it is reasonable to assume that trains would be split around 50/50 between them. As a worst case and allowing for a slight variation in this proportion, the long term (2043) maximum number of paths required in both directions during daytime hours (06.00 – 22.00) is therefore likely to be 6.

3.3.7. Fewer paths are required running north towards Rugby and in practice, as outlined below, may not require discrete new paths. A maximum of 3 daytime paths would be required.

3.3.8. Additionally, DIRFT has produced forecasts that it plans to handle an additional 20 freight train pairs per 24 hours by 2033.[3] Therefore there is a need in the longer term to identify capacity for a maximum additional

[2] Note that there is an expectation that the aggregates terminal at Northampton Castle Yard will close and the activities will transfer to a new terminal within the Northampton Gateway site. A daily return bulk aggregates train path operates between Mountsorrel in Leicestershire and Castle Yard. This train is expected to run in the same path, extended south to the new terminal.

[3] DIRFT 3 Rail Operations Report (Document 7.8) WSP; Section 6.2

capacity of 36 trains per 24 hours (though in practice this is an over-estimate as some of these trains will run to the north while others arrive from the south or vice versa, and can effectively use the same paths either side of the terminals).

3.3.9. This report sets out why we believe that this capacity already exists, and will be boosted by the additional freight capacity created when HS2 opens.

4. DfT's and Network Rail's traffic growth forecasts

4.1. In 2016 DfT and Network Rail both updated their detailed traffic growth forecasts for the rail intermodal sectors. Intermodal[4] traffic is now the largest commodity moved by rail in the UK, comprising 40% of total rail freight volume. 26% of freight moved is aggregates for the construction industry. Northampton Gateway will handle both these commodities[5].

4.2. Network Rail

4.2.1. Network Rail published its draft Freight Network Study in April 2017. This contained rail freight growth forecasts derived from the Office for Rail and Road's (ORR) Freight Market Study for each of the rail freight sectors. In contrast to the traditional rail freight bulk commodity markets intermodal traffic is forecast to grow significantly every year over the next 30 years[6]:

Figure 2: Network Rail Intermodal growth forecasts

Table 3.1: Freight Market Study (2013) central case forecasts for rail freight in Great Britain

Commodity sector / sub-sector	Actual billion tonne kms in 2011	Forecast billion tonne kms in 2023	Forecast billion tonne kms in 2033	Forecast billion tonne kms in 2043	Forecast average annual growth 2011 to 2033
Ports & Channel Tunnel Intermodal	5.3	11.0	16.1	21.7	5.2%
Domestic Intermodal	1.1	7.1	13.4	21.2	11.9%

4.2.2. These traffic growth forecasts are not constrained by terminal or route capacity factors, both of which are addressed later in this report.

4.2.3. The Study sets out the assumptions on which this growth forecast is based and states "*Rail-connected warehousing sites[7] will expand from the current area of approximately 1.6 million square metres to approximately 5.9 million by 2023, 9.6 million by 2033 and 13.3 million by 2043. This reflects both growth of existing sites and the development of new sites [....]. These growth assumptions indicate that the study is taking a positive view of the ability of the market, including the planning system, to provide new sites. This reflects the government's commitment to their development, as set out in the Strategic Rail Freight Interchange (SRFI) policy guidance*[8]."

4.2.4. The Freight Network Study therefore suggests that rail connected warehousing space needs to grow continuously over the next 30 years to support market growth, especially in the Domestic Intermodal sector[9]. This market growth will result in additional traffic on the Strategic Freight

[4] Intermodal freight is transported in containers or swapbodies, which can be transshipped between water, road and rail without the contents having to be unloaded

[5] Source: ORR Freight Rail Usage – published 1st March 2018, measured by gross tonne miles

[6] Network Rail: Freight Network Study Table 3.1 Page 23

[7] In this context 'rail-connected' means sites either provided with a direct rail connection, or warehousing sites within the SRFI boundary. See Section 4.88 of the DfT's National Policy Statement for National Networks

[8] Network Rail: Freight Network Study Appendix 4 Page 104

[9] Network Rail and the DfT categorise traffic into sectors. 'Ports Intermodal' refers to deep-sea containers landed at UK ports and then moved by rail, 'Domestic Intermodal 'refers to containers loaded in UK terminals and moved by rail to other UK terminals. See also Figure 3

Network[10], and in particular on the WCML. This additional traffic, specifically in the intermodal sub-sectors, is focussed on serving new and existing SRFIs.

4.2.5. The same Freight Network Study identifies that only relatively limited interventions are required to enhance capacity at the south end of the WCML between London and Rugby:

"Short term[11]

- *Grade separation and/ or additional track(s) in the Bletchley – Milton Keynes area to provide 775m train capability (passenger driven East West Rail scheme with associated freight benefits)*

Longer term[12]

- *Reduction of headways[13] on the Northampton loop: Designed to accommodate additional passenger and freight traffic including 1 freight tph*
- *Remodelling of Northampton station: provide network capacity by allowing freight services to pass Northampton station at a higher speed and reduce the speed differential between freight and passenger services."*

4.2.6. Other WCML key capacity interventions are identified by Network Rail as only being required north of Crewe, beyond the area considered in this report.

4.2.7. The Route Director Freight and National Passenger Operators (FNPO) manages provision of access for freight on the national rail network. The FNPO Route Strategic Plan, published in February 2018, sets out the latest freight growth forecasts. FNPO now considers that some earlier forecasting was optimistic, and has reviewed a range of market growth scenarios.

4.2.8. FNPO's conclusion is that national growth in overall railfreight traffic is likely to be 15.2% between 2016/17 and 2023/24, which equates to an overall compound annual growth rate for all railfreight of 2.1% per annum[14]. This masks the growth of intermodal and aggregates traffic (62% of all freight moved), which is balancing the decline in traditional railfreight commodities, such as coal and metals. We estimate that FNPO is forecasting growth in the intermodal and aggregates sectors of nearly 4% per annum.

4.2.9. FNPO recognises that provision of new terminals is a key precondition for this growth, and states an objective to "*Create conditions for further third-party investment in the network and terminals*". It defines this need being best provided by SRFIs:

4.2.10. "*Network capacity and capability enhancements are ineffective if there is insufficient terminal capacity to accommodate the traffic they enable, such*

[10] Delivering a Sustainable Railway, DfT 2007; "a core network of trunk freight routes, capable of accommodating more and longer freight trains, with a selective ability to handle wagons with higher axle loads and greater loading gauge, integrated with and complementing the UK's existing mixed traffic network."

[11] Network Rail Freight Network Study Table 8.6 Page 56 (the output assessment incorrectly refers to Carstairs)

[12] Network Rail Freight Network Study Table 8.8 Page 57

[13] A headway is the required timing gap that must be maintained between successive trains at any timing point.

[14] Network Rail FNPO Strategic Plan Page 26

capacity being a function of both the number of terminals and their respective individual capability…. Intermodal: Additional inland terminal facilities are required and this need is primarily addressed by Strategic Rail Freight Interchange (SRFI) developments…. FNPO's role varies from advocacy for planning consent through facilitation of physical connections to the provision of suitable capacity to run trains."[15].

4.2.11. The FNPO strategic plan then turns to specific policies, and in the LNW route section dealing with the WCML it identifies that additional terminal facilities in the Northampton area are a priority action: "*What we plan to do:*

- *Facilitate new terminal developments at Daventry, Northampton, West Midlands and Parkside*
- *Explore opportunities for new capacity through better paths, longer trains, faster and cleaner paths."*16

4.2.12. This demonstrates that Network Rail recognises the case for additional SRFIs in the Northampton area, and also accepts that though WCML capacity for freight trains is constrained, there are realistic options available to run more trains than the current timetable allows. Our analysis builds on this principle and shows how in practice there are more unused freight paths available than is required by Northampton Gateway.

4.3. Department for Transport

4.3.1. The DfT published its Rail Freight Strategy in September 2016. This sets out its forecast of future rail freight growth, the opportunities for enhancing modal shift from road to rail, and the policy interventions necessary to achieve this. Central to the analysis is a view that Ports Intermodal traffic will at least double in size by 2030. In the same timeframe Domestic Intermodal traffic is projected to nearly double.

4.3.2. It is important to note that, unlike Network Rail's forecasts, DfT's growth figures *are* constrained – that is they take into account the existing capacity of the Network Rail network and the availability of rail freight terminals to receive and handle traffic, and incorporate only declared policy interventions outlined in DfT's Control Period 5 High Level Output Statement (HLOS) of July 2012 or other more recent policy statements.

4.3.3. This accounts for the lower growth forecasts than in Network Rail's unconstrained growth figures, which demonstrates the value that infrastructure and terminal enhancements have on overall traffic forecasts.

4.3.4. DfT's constrained forecasts do however emphasise that growth relies on the provision of additional terminal capacity for both movements between the major import ports and inland railfreight terminals, and also for onward domestic distribution.

[15] Network Rail FNPO Strategic Plan Page 31
[16] Network Rail FNPO Strategic Plan Page 121

4.3.5. The relevant intermodal growth forecasts are shown in Figure 2 overleaf[17]. It should be noted that in the comments DfT specifically outlines the need for new terminal capacity as a key constraint. In other words DfT believes that unless additional terminal capacity is delivered its growth forecasts may not be achieved.

[17] Department for Transport: Freight Strategy Table 1 Pages 18–21: combined to only show intermodal traffic growth forecasts

4.3.6.

Figure 3: Table 1 DfT Freight Strategy: Freight Growth projections

NOTE ON GROWTH PROJECTIONS: The estimates of growth potential in this table represent "constrained" forecasts, i.e. they estimate the growth we might expect to see given the likely constraints on the network. These forecasts could be exceeded in practice depending on the measures taken to address these constraints. These figures are not calculated on the same basis as Network Rail's "unconstrained" forecasts set out in the 2013 Freight Market Study and are therefore not directly comparable.			
Commodity	**Actual freight lifted in 2011: Million tonnes**	**Projected freight lifted in 2030 in constrained scenarios: Million tonnes**	**Overview and constraints/ enablers**
Ports intermodal (deep sea containers arriving in the UK via ports)	15.1	High Constrained Forecast: 45.69 Central Constrained Forecast: 31.81 Low Constrained Forecast: 22.00	**Steady Growth** Overall volume of deep sea containers coming to the UK likely to show steady and strong growth. A move towards "mega-vessels" and larger ships is likely to favour rail given its strength in moving large volumes quickly. Possible scope to introduce new traffic flows via development of northern ports although concentration of population growth in the south-east means port traffic likely to remain concentrated in this region. Key constraints include: terminal capacity; gauge restrictions; and availability of freight paths.
Domestic intermodal (containers being transported within the UK)	2.3	High Constrained Forecast: 5.81 Central Constrained Forecast: 4.03	**Steady Growth** Growth is likely in this sector although domestic intermodal is not well suited to the "whole train load" model of rail freight – a credible method of aggregation/consolidation would help realise growth.
		Low Constrained Forecast: 2.78	Even without growth in the sector, there is scope for rail market share to grow if current long distance general haulage traffic could be shifted to rail. Constraints include: the need for bespoke logistics solutions to facilitate movement by rail; the need for a sufficient volume (critical mass) to justify trainload operations; the need for investment in specialist equipment; and - the key constraint to unlocking potential in this sector - availability / construction of suitable rail-connected terminal facilities including SRFIs.

4.4. Conclusion

4.4.1. Both the DfT and Network Rail expect Intermodal traffic to grow considerably over the next 30 years, and that it will at least double in volume in that period. They expect that new SRFI capacity will be a key facilitator of this growth, and they are confident that existing or currently planned route capacity will support this level of growth.

4.4.2. The DfT refers to the need for additional SRFIs in its 2014 National Policy Statement for National Networks:

"The Government has concluded that there is a compelling need for an expanded network of SRFIs. It is important that SRFIs are located near the business markets they will serve – major urban centres, or groups of centres – and are linked to key supply chain routes. Given the locational requirements and the need for effective connections for both rail and road, the number of locations suitable for SRFIs will be limited, which will restrict the scope for developers to identify viable alternative sites."[18]

[18] National Policy Statement for National Networks, DfT 2014: Section 2.56

5. West Coast Main Line capacity

5.1. WCML route description

5.1.1. The WCML is four tracked between London and Rugby. The Fast Lines are on the west, used by non-stop passenger trains running at up to 125 mph. The Fast Lines run at capacity during daytime periods, and there is no capability of running freight trains or additional Rapid Railfreight trains on them. The Slow Lines are on the east, used by stopping and semi-fast passenger services and all daytime freight trains.

5.1.2. The four tracks diverge at Hanslope Junction, north of Milton Keynes, and then rejoin at Rugby. The Fast Lines run direct to Rugby via Weedon, while the Slow Lines run to Rugby via the Northampton Loop past the Northampton Gateway site and then through Northampton station and past Daventry International Rail Freight Terminal (DIRFT) to Rugby.

5.1.3. The WCML is open continuously, though at night one pair of the four tracks is closed in sections for maintenance, and all trains use the remaining pair. Access to terminals on the Northampton Loop is maintained by ensuring that access is available from either the Milton Keynes or Rugby end at all times. There are very few night-time passenger services and therefore overnight route capacity for freight traffic is much increased.

5.2. WCML capacity

5.2.1. Network Rail summarises WCML route capacity in its LNW Route Specifications document,[19] which sets out current and proposed capacity and the works that are to be undertaken to support this.

5.2.2. For the Section between London and Rugby (including the Northampton Loop) Network Rail states that currently there is capacity for 73 freight trains in each direction per 24-hour period. This confirms our review of paths currently planned, as set out in our analysis below. In the same document Table 3.0 confirms that the number of paths will grow in line with the forecasts in the Freight Network Study (as set out in Figure 2 above). Importantly Network Rail does not qualify this growth with any explicit concerns on capacity.

5.2.3. Table 1.0 confirms that in the longer term Network Rail will be undertaking further works to enhance capacity for freight; gauge clearance to W12 to permit larger European swap body containers to be carried, ERTMS signalling[20] to provide greater capacity through reduced headways, and capacity reviews following the transfer of high speed services to HS2 Phases 1 and 2.

5.2.4. This is all consistent with Network Rail being confident that freight capacity will grow in the medium term. The Route Specifications does draw attention to capacity constraints (page 220): *"There are constraints on potential freight*

[19] LNW Route Specifications, Network Rail, 2017: Pages 169-172 and 220

[20] ERTMS is cab based digital signalling removing the need for observation of fixed signals

growth on the route, particularly around the Crewe independent lines and on the two track only section north of Preston. Across the route there are a number of loops, some of these are not long enough for current/ future freight requirements, and are not always located in the most appropriate location. Significant growth in both passenger and freight traffic will not be able to be accommodated North of Preston in the future."

5.2.5. This analysis demonstrates that Network Rail believes that its principal WCML capacity concerns lie north of Rugby - at Crewe and on the fells north of Preston, and it is not indicating any significant concerns on the section between London and Rugby via the Northampton Loop. It should be noted that the only specific reference to issues relates to capacity through Northampton station, and in this respect Northampton Gateway's location south of Northampton avoids this risk.

5.2.6. The Department for Transport's Rail Freight Strategy relies on an Arup report[21] to provide the technical detail. This report sets out the national network capacity constraints.

5.2.7. For the WCML it states "*The route modernisation completed in 2008 led to an increase in passenger services, and the route is now at full capacity in peak periods. There are at least three freight paths per hour south of Crewe, but this is already constraining growth at times. HS2 may provide some additional freight capacity between London and Crewe by diverting long distance passenger trains and running others at slower overall speeds. It will be important to ensure that sufficient additional freight capacity is provided as a dividend from the [HS2] project.*"

5.2.8. This report sets out the reasons why this is a pessimistic review of the current freight capacity between London and Rugby, which in practice is less constrained than sections further north[22].

5.3. Network Rail specifies[23] that the minimum interval between trains via the Northampton Loop (known as the headway) is 4 minutes.

5.4. In theory therefore, if all paths were used, and all trains ran at the same speed without stopping, it would be possible to run 15 trains per hour on the Northampton Loop.

5.5. Conflicting stopping patterns and point-to-point running times make relatively inefficient use of route capacity. In practice therefore, during daytime (06.00 – 22.00) when the WCML is used by both freight and passenger trains, maximum capacity on the Northampton loop is nearer 9 trains per hour in each direction. This provides sufficient timetabled margins to deliver robust performance for a mixed-use railway conveying semi-fast and stopping passenger services and 60 mph and 75mph freight trains.

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[21] Arup: Future Potential for Modal Shift in the UK Rail Freight Market Section 3.2.1 Page 23

[22] Between Rugby and Nuneaton there is only one down (northbound) line for all freight and passenger traffic, while between Rugeley and Stafford there is only one pair of tracks for all trains

[23] Network Rail Timetable Planning Rules: Headway values - MD105 Hanslope Jn To Rugby (Via Northampton)

6. WCML Train services

6.1. Passenger

6.1.1. WCML Passenger services operate on a 'standard hour' basis, differing only between the peak and off peak. This means that the same service pattern is repeated each hour. It follows therefore that if a freight path is viable in one off peak hour, it will automatically be available in all other off peak hours with the same passenger service pattern. This enables generalisations to be made on the availability of existing freight paths across the day, and the overall hourly number of freight services that could be operated.

6.1.2. During daytime periods the Fast Lines are fully occupied by 12 off-peak passenger trains an hour in each direction, increasing to 15 trains per hour in the peak. As all these services run at a speed of between 110 and 125 mph there is no capacity for slower (less than 110 mph) passenger or freight services on the Fast Lines in daytime hours (between 06.00 and 22.00).

6.1.3. The Slow Lines, which run via the Northampton Loop, are used by a relatively infrequent off peak passenger service, comprising 3 trains per hour from Milton Keynes to Northampton, Rugby and Birmingham. In the current Working Timetable (WTT)[24] this has left capacity for 4 well-established freight paths every daytime hour in each direction without compromising overall performance and punctuality, plus performance margins to ensure compatibility between passenger and freight services.

6.1.4. In peak periods 5 passenger trains an hour run from Milton Keynes to Northampton, which still provides route capacity for at least 2 paths for freight traffic every hour.

6.1.5. If Northampton Gateway handles Rapid Railfreight trains, we would expect them to run in timings analogous to these passenger trains. They would not be able to run on the Fast Lines during the day, and we believe that only the Slow Lines has the capacity to handle their entry and exit into a Rapid Railfreight Terminal.

6.2. Freight

6.2.1. All UK freight operators (FOCs) run freight services on the WCML. Within the Northampton Loop there is an aggregates terminals at Northampton, and an existing major intermodal freight terminal at DIRFT. Freight trains run at either 60 mph for bulk freight such as aggregates, or 75 mph for intermodal services.

6.2.2. Running times for a 75 mph freight train are broadly comparable with a semi fast London Midland service, as the faster maximum speed of the passenger train is balanced by its braking to a station stop, dwell time and

[24] The Working Timetable is the technical timetable for both freight and passenger trains, which contains much more information than the public timetable; including passing times at junctions, non-public services (freight and empty stock trains) and operating detail

acceleration[25]. This means that passenger and freight trains have roughly similar journey times and performance on the Slow Lines.

6.2.3. As Network Rail identifies in its Freight Network Study, this position applies as far as Northampton, but not through the station and beyond to Rugby, where linespeed issues and platform capacity act as greater capacity constraints. In the longer term (as set out in Section 4.2.5 above) Network Rail intends to address this to ensure that capacity is increased to match expected demand for paths.

6.2.4. At night freight trains run on either the Fast and Slow Lines to avoid sections shut for engineering works, but as there are no passenger trains running, this is achieved without restriction.

6.2.5. This is a valid approach for through freight services running in night hours for example between London and Birmingham and Manchester. However clearly terminals on the Northampton Loop (DIRFT and in future Northampton Gateway) need different treatment. Network Rail also has to provide continuous access to the Siemens passenger train maintenance depot at King's Heath, adjacent to Northampton station, as most train maintenance activity there takes place at night.

6.2.6. Network Rail plans its timetabled closures for engineering works through its Engineering Access Statement (EAS), which is a regulated document that governs the conditions on which the closures take place. The Northampton EASs are arranged so that access is always available to both DIRFT and King's Heath from either the Milton Keynes or Rugby end. In other words the possession site is treated as an island, and the route is kept clear from either end up to the worksite itself.

6.2.7. Freight trains from the direction that is blocked by engineering work access DIRFT by reversing at either Bletchley or Rugby, where suitable facilities are provided. This can inject a small delay into the train schedules but is a well practised process which guarantees night access to terminals on the Northampton Loop at all times. We would expect that the same process would be applied to Northampton Gateway.

6.2.8. There would be no reason why direct access from London to Northampton Gateway would be blocked except when Slow Line engineering works were located within the 4 miles between Hanslope Jn and the site. This only happens infrequently. DIRFT already operates successfully under a similar night time possession regime, and its operations are not impacted by it.

6.2.9. Network Rail has established a notional off peak daytime maximum capacity on the Northampton Loop of 4 freight paths[26] every hour in each direction; 1 electric and 2 diesel hauled 75 mph intermodal services and 1 diesel hauled

[25] For example 2N37 13.54 Euston to Northampton semi-fast passenger service takes 63½ minutes to run from Wembley Central to Northampton (pass to stop), while 4M87 11.18 Felixstowe to Trafford Park intermodal service takes 58½ minutes for the same journey (pass to pass)

[26] West Coast Main Line and Trans-Pennine Capacity and Performance Assessment; Network Rail report to ORR, October 2013 Appendix A (Page 75)

60 mph bulk service. One of these hourly paths is only available as far as Rugby, as opposed to terminals further north, and is therefore suited to servicing either the DIRFT or Northampton Gateway sites.

6.2.10. At night (between 22.00 and 06.00) only a few late evening and very early morning passenger services operate, and many more freight paths are available. The maximum number of freight train paths planned by Network Rail in any night hour is 9.

7. Freight train path analysis

7.1. Freight trains are not planned with the same regularity as passenger services. Some trains run only on specific days of the week, or trains from different origins or destinations may be planned to run in the same path, on the basis that on any day only one of these trains will actually run.

7.2. We have analysed the WTT freight paths planned for two weeks, commencing September 19th 2016 and July 10th 2017, representing typical periods unaffected by major incidents anywhere on the network. The majority of paths are 75 mph paths for intermodal trains, though there are a smaller number of 60 mph paths for bulk trains carrying commodities such as aggregates.

7.3. One of these 60 mph bulk paths is used currently by the aggregates service that runs from Mountsorrel in Leicestershire to Northampton Castle Yard, and a second path also exists in the current working timetable between Wembley and Northampton Castle. As is explained later in this report there is a great deal of flexibility in freight timetables, designed to allow operators to respond to customers' requirements at short notice.

7.4. In the future we expect that the aggregates services will run to the new terminal within the Northampton Gateway site – this is a straight substitution rather than an increase in the current traffic levels, though Roxhill's volume predictions provided to Network Rail do anticipate that the number of regular bulk trains might double (from 1 to 2 per day) in the longer term (see Figure 1**Error! Reference source not found.**).

7.5. For the core freight capacity analysis we have the existing ignored paths for Royal Mail non-passenger express freight services, which run at 100 mph and are in effect timed as passenger services, light engines and other passenger stock movements, which again are officially classed as freight trains but in effect are timed as if they are passenger services.[27] However as a number of these movements operate overnight we have adopted a cautious approach to capacity calculation and assumed that 2 such Rapid Railfreight or passenger stock movements operate in every night hour in each direction.

7.6. These reserved high-speed paths would be used by higher speed Rapid Railfreight services running to and from Northampton Gateway.

7.7. Figure 4 shows the freight paths that were present in the Working Timetable (WTT) on the WCML north of Milton Keynes on a standard weekday in July 2017. Paths that are planned to run on specific days of the week (e.g. Mondays Only, Wednesdays only or Tuesdays and Thursdays only) have been combined to present the maximum number of paths booked. Where more than one planned train uses a common path (for example a train that could run to Hams Hall, Ditton or Trafford Park but has the same timings as far as Rugby) these have been counted as one path:

[27] A light engine is a locomotive planned to move on its own, without being attached to a train. The majority of light engine movements are ad-hoc, but there are some regular workings in the WTT.

Figure 4: Trains planned to run in the Working Timetable per day, week commencing 10th July 2017

Paths	Total	Night-time 22.00 – 05.59	%	Daytime 06.00 – 21.59	%
Down (northbound)	62	29	47%	33	53%
Up (Southbound)	70	32	46%	38	54%

7.8. Paths were split fairly evenly across the daytime hours, with individual hourly peaks in both directions. The maximum number of daytime off-peak paths was 4 per hour in either direction. In the peak periods in the core direction (southbound in the mornings and northbound in the evening) the maximum number of freight paths per hour was 2, though there were more peak hour freight services running in the contra-peak direction[28]. It will be noted that during the morning passenger peak period, which is more concentrated than the more wider spread evening peak period, freight train services were at their most constrained. However this does demonstrate that freight paths were available even during peak periods.

7.9. At night the busiest hour was 03.00 – 03.59, when 6 northbound and 7 southbound operate.

7.10. Previous similar analysis carried out for 21st September 2016 demonstrates that this distribution of paths across the 24-hour period is a consistent feature of the Working Timetable.

Figure 5: Trains planned to run in the Network Rail Working Timetable on 21st September 2016

Paths	Total	Night-time 22.00 – 05.59	%	Daytime 06.00 – 21.59	%
Down (northbound)	70	31	44%	39	56%
Up (Southbound)	69	32	46%	37	54%

7.11. Analysis of the WTT to identify all available freight paths, shown in the two graphs below, confirms that off peak (06.00 – 06.59, 10.00 – 15.59 and 19.00 – 21.59) there is a maximum of 4 paths every hour in each direction available for freight trains, in line with Network Rail's statement to the Regulator in 2013 (see Section 6.2.9. above). During peak periods (06.00 – 08.59 and 16.00 – 18.59) this is restricted to 2 paths every hour in the peak direction

[28] Therefore there are 4 trains running from London to Rugby between 07.00 and 08.00, and three trains an hour running between Rugby and London between 17.00 and 19.00

only. At night (22.00 – 05.59) there are 7 paths every hour in each direction, and that in the 2016 analysis 9 freight paths were planned in each direction for at least one night hour. In accordance with the comments in section 7.5 above we have capped our estimate of night-time freight capacity at 7 paths per hour.

Figure 6: Freight trains planned per hour on the WCML north of Milton Keynes on 21st September 2016

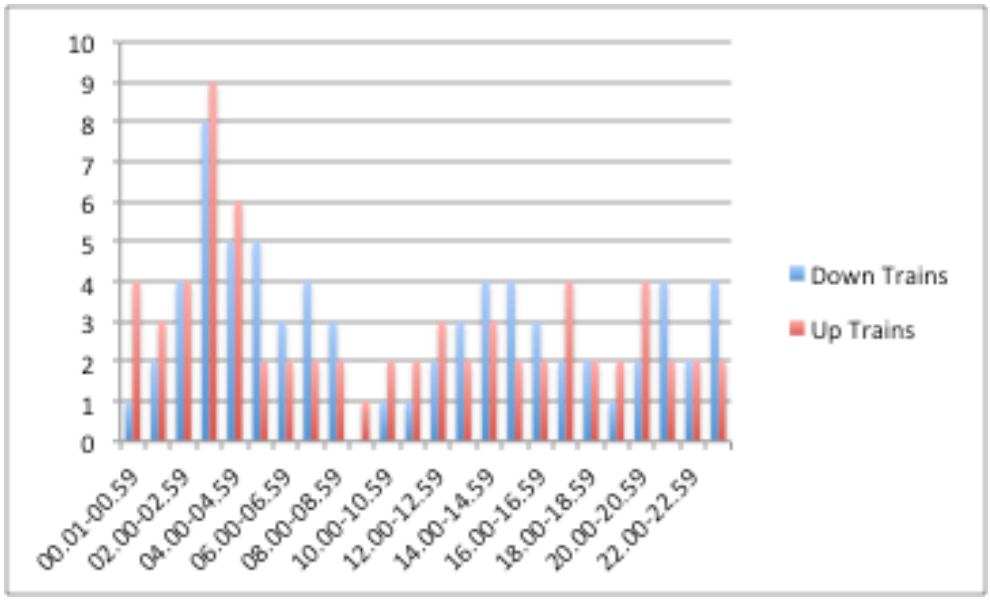
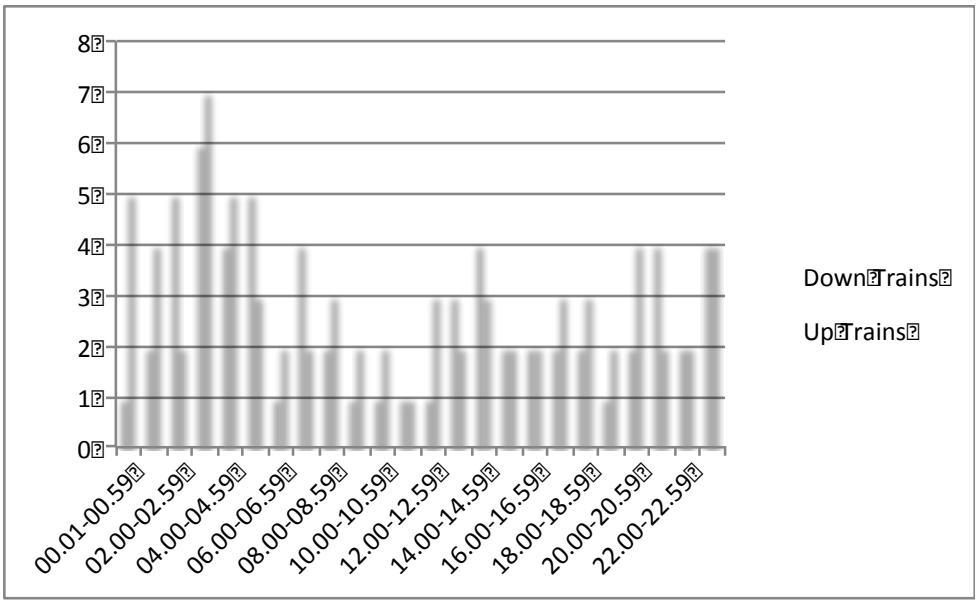


Figure 7: Freight trains planned per 24-hour period; WCML north of Milton Keynes week comm. 10th July 2017



7.12. Using a cautious evaluation this produces a theoretical maximum of 108 freight paths per 24-hour period in each direction (6 peak, 52 off peak and 56 night paths). It would be unrealistic for all these paths to be used, as

customer requirements and the need to match paths with timetables on WCML connecting routes (such as on the Great Eastern Main Line to and from Felixstowe or the London Tilbury and Southend line to London Gateway) lead to operators preferring trains to be run at specific times (hence the peak around 03.00), while some slower and heavier bulk trains may occupy more than one path.

7.13. Assuming maximum a network utilisation rate of 75% of total available paths is the best that should be targeted[29] this produces a maximum practical WCML freight capacity south of Rugby of around 81 paths in each direction per 24 hours. This suggests that, even using a cautious assessment of WCML capacity, at present the 72 paths actually planned on a typical day represents only 85% of the available paths. This means that at least 9 more long distance WCML freight paths could be run every day within the current timetable capacity, without impacting on current performance.

7.14. Network Rail in its Freight Network Study argues that not all of this additional capacity can be used between Rugby and Northampton as Northampton station is a pinch point, but it would be available for terminals such as Northampton Gateway (which is situated to the south of Northampton)

[29] This is consistent with International Union of Railways (UIC) Leaflet 406; Capacity, which sets out an approach where sufficient spare route capacity is retained to ensure that the network can recover from delays

8. Path utilisation

8.1. Many of the planned freight paths in the WCML timetable are not used every day of the week. Analysis of the data shows that in both periods studied 9 of the above WTT paths are only planned for use on one day per week and are unused on other days. Similarly many paths booked for every weekday are in reality used only occasionally, and are otherwise cancelled under Short Term Planning (STP)[30] arrangements. This means that for any given day of the week at least 9 more trains could be run in addition to the 9 unused paths described above, making a total of 18 spare paths per 24-hour period.

8.2. However analysis of the number of freight trains that actually run (as opposed to the number of non-conflicting paths planned in the WTT) is also low, further adding to available capacity.

8.3. Using data from Network Rail's TRUST[31] train performance monitoring system two typical 24-hour periods were chosen for analysis (Wednesday 21st September 2016 and Thursday 13th July 2017) and all trains that actually ran were plotted. This includes any additional trains planned at short notice that did not appear in the long-term timetable.

8.4. Analysis demonstrated the following utilisation of booked paths:

Figure 8: Freight trains actually planned and run on 21st September 2016

Paths	Total booked	Actually run 21/9	%	Night-time 22.00 – 05.59	Day / night %	Daytime 06.00 – 21.59	Day / night %
Down	70	26	37%	11	42%	15	58%
Up	69	26	38%	11	42%	15	58%

Figure 9: Freight trains actually planned and run on 13th July 2017

Paths	Total booked	Actually run 21/9	%	Night-time 22.00 – 05.59	Night %	Daytime 06.00 – 21.59	Day %
Down	62	32	52%	13	41%	19	59%
Up	70	29	41%	15	52%	14	48%

[30] Trains planned under Short Term Planning procedures are notified to Network Rail at short notice (1 or 2 weeks) and planned to run where there is space in the timetable on that particular day

[31] TRUST (Train Running Under System TOPS) is a Network Rail computer system which uses signalling data to track and record the real time progress of trains on the national rail network

Figure 10: Northbound freight trains per hour 21/9/16

Figure 11: Southbound freight trains per hour 21/9/16

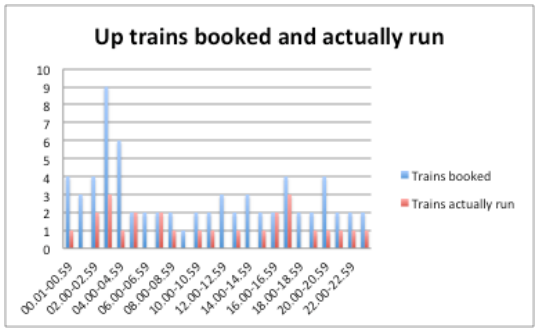


Figure 12: Northbound freight trains per hour 13/7/17

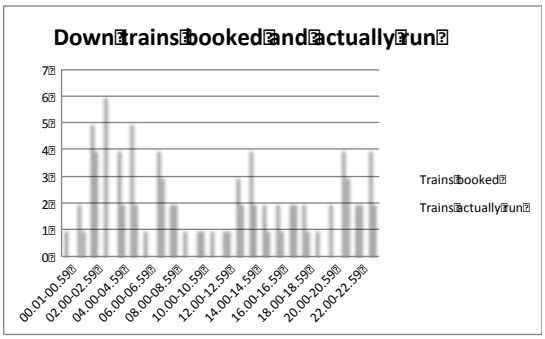
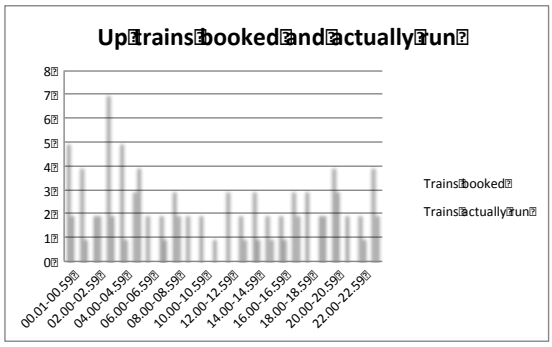


Figure 13: Southbound freight trains per hour 13/7/17



8.5. The analysis demonstrates that only 1 in 2 of freight trains that were booked to run actually did so on a sample day in a normal busy week in both years. This is normal practice within the freight industry and results from freight operators booking more paths than they actually need.[32] However it demonstrates that there is considerable scope to rationalise paths to use them more effectively.

8.6. Both Network Rail and the Office of Rail and Road (ORR) are aware of this issue and have taken steps to minimise inefficient working, and the railfreight industry and Network Rail hold regular Capacity Management Review Group meetings to identify opportunities for rationalisation. However there is still considerable commercial inertia, as Freight Operating Companies (FOCs) prefer to keep paths available to use on a contingency basis.

8.7. In April 2017 Network Rail announced[33] that it was abolishing 4,702 unused freight paths, and either returning them for use by other freight operators, or making them available to passenger operators. In the main this relates to paths in the north of England, which have become unused through the rapid decline in the volumes of coal and other bulk commodities that rail is now moving. It is understood that few, if any, of these released paths operated on the southern section of the WCML.

[32] Assessment of capacity allocation and utilisation on capacity constrained parts of the GB rail network; Sinclair Knight Mertz for ORR, August 2012 Appendix C: Analysis of freight path utilisation

[33] https://www.networkrail.co.uk/feeds/rail-freight-industry-and-network-rail-collaborate-to-increase-railway-capacity/

8.8. Unless capacity pressures become serious, overbooking of paths will continue. This in itself is an indication that freight capacity on the WCML is not yet at a premium for most operators.

8.9. What this demonstrates is that, even at peak periods where there might be expected to be a premium for commercially attractive paths, there is scope to run twice as many trains as normally operate at present. This would provide the ability to run another 30 trains per 24-hour period immediately without any infrastructure investment, merely by rationalising the utilisation of existing paths.

8.10. In extreme this might need regulatory intervention to enforce the release of paths. ORR and Network Rail have taken action on this in the past and could be expected to assist if it were demonstrated that commercial traffic opportunities were being jeopardised by paths being blocked by FOCs for anti-competitive reasons.

9. WCML freight capacity - conclusion

9.1. The conclusion of this analysis is that there should be immediate scope to plan up to 20 additional daily freight paths over those currently booked in the WTT by exploiting unused 'white space'[34] gaps in the WTT. In addition if growth led to demand for paths exceeding current supply it would be realistic to expect Network Rail to be able to reallocate a further 30 paths per day that are not currently being used regularly by FOCs.

9.2. In summary therefore it ought to be possible to run at least 50 additional freight services per 24 hour period on the WCML. In context that would treble current normal daily path utilisation without requiring material infrastructure upgrades between London and Northampton Gateway.

[34] 'White space' is the railway term for gaps in the timetable into which new train paths can be inserted

10. Future development of new WCML freight capacity

10.1. The DfT has promoted and received Royal Assent for a Hybrid Bill to construct the first phase of HS2, a new double track high-speed railway from Euston to Birmingham. This is designed to relieve some of the pressure on the WCML identified above. The DfT intends to recast the WCML passenger timetable once high speed services have been diverted off it south of Lichfield, to provide more capacity for semi-fast services serving intermediate locations.

10.2. A consequence of this recast will be that the DfT and HS2 will be able to create additional freight capacity on the Slow Lines to meet the growth forecasts set out in the DfT's Rail Freight Strategy.

10.3. This was recognised in 2013 by the HS2 Hybrid Bill Environmental Statement, which agreed with our analysis that only roughly half of the available WCML freight paths are actually used. Even allowing for some growth in WCML passenger services it commits to creation of up to two additional freight paths per hour following the introduction of HS2 services. This is designed specifically to respond to the intermodal growth that the Northampton Gateway SRFI scheme is catering for. It states [35]:

10.4. "*Currently, on the WCML, there are three standard off-peak freight paths per hour; although currently, approximately 1.5 paths an hour are used. The Government wishes to encourage more freight to shift from road to rail. Coupled with the rising costs of road transport, demand for rail freight paths is expected to increase over the next 15 years. Therefore, it is reasonable to assume that there may be insufficient capacity to meet the total demand for rail freight by the time the Proposed Scheme* [HS2 Phase 1] *is due to open in 2026. Based on a number of assumptions, many of which are the same as those used for the Economic Case for HS2, and its presumption for passenger services, there is still the potential for one to two additional freight paths in each direction between London and the Midlands, outside the peak periods of 07:00 – 10:00 and 16:00 – 19:00……., making a total of up to 20 - 40 additional freight paths a day (300 days a year)*".

10.5. More recently, in November 2015, DfT updated its analysis of West Coast Main Line freight capacity[36]. This confirms that HS2 is, in part, addressing the freight growth pressures identified in this report. It states in Sections 6.22-24:

10.6. "The market for moving containers between UK ports and inland distribution centres is expected to grow considerably as long term trade growth is anticipated to outperform UK economic growth.

Network Rail's overall forecasts, when applied to current West Coast demand, suggest that the requirement for WCML paths could nearly double by 2033

[35] HS2 Environmental Statement (Volume 3: Route wide effects) Table 5 Page 64

[36] DfT November 2015: Supplement to the October 2013 Strategic Case for HS2 Technical Annex - Demand and Capacity Pressures on the West Coast Main Line: Section 6

from 42 to 80 freight paths per day on the southern section of the WCML. This rises still further to over 100 paths in 2044.

Within this, demand for paths for intermodal freight traffic is expected to grow from 32 to 58 paths a day in 2033/34, by which point it will comprise approximately three quarters of total freight trains."

10.7. In Section 6.26 The DfT again makes it clear that HS2 will release freight capacity to meet this challenge:

10.8. "In essence, the available information [from] *HS2 Limited and the Train Service Specification (TSS) presented to the Hybrid Bill committee in January 2015 suggests that at least one extra freight train each hour – in each direction - could potentially operate post Phase One and that a second might be possible as well. This is due to the greater space that will be available on the Slow Lines from Euston once all "fast commuter" services to Milton Keynes and beyond switch to the Fast Lines to take the space currently used by inter-city trains."*

10.9. This policy objective has been reinforced in 2017. In September DfT set out in a letter[37] to ORR its "*assumptions for conventional and high speed services which will operate when HS2 opens*". The letter restates DfT's Strategic Case objectives for HS2, which include providing capacity for the growing railfreight sector (Section 15).

10.10. Sections 30-32 then confirm the service assumptions DfT is making for the southern WCML (which includes the section from London to Rugby and the Northampton Loop). DfT states "*The current assumption is that the total quantum of passenger trains using the southern WCML in peak hours will be unchanged. In off peak hours it is currently assumed that the total quantum will be slightly reduced, potentially creating opportunities for (for example) additional passenger or freight services or breaks in the timetable to support good performance.*"

10.11. This confirms that DfT's previous expectations on the increase of WCML freight capacity referred to above remain valid and achievable after the introduction of the various phases of HS2.

Thus it is clear that there are existing The DfT plans to allocate additional rail freight capacity on the West Coast Main Line after HS2 opens in 2026. This is intended to support the growth of Port and Domestic Intermodal freight identified in Section 4 above, and provides reassurance that plans are in place to support the growth of rail freight and provide the route capacity required to service new WCML SRFIs south of Rugby.

[37] DfT Letter to ORR Director, Railway Markets and Economics; 8th September 2017

11. Conclusions

11.1. The Northampton Gateway SRFI provides terminal capacity needed to help meet The DfT's intermodal freight forecasts and its Rail Freight Strategy, which identifies that there is a continuing need for terminal developments. It is linked to the West Coast main line corridor, which in itself is the most important rail freight corridor in the UK, linking the principal container ports with the markets they serve.

11.2. This report has reviewed whether there is sufficient capacity for the additional freight trains that will be required to service Northampton Gateway. In the early years of operation this would equate to 4 trains per day in and out of the SRFI, 1 of which will be an aggregates service to the new bulk terminal (replacing the current terminal at Northampton Castle). In total over the long term (by 2043) the Northampton Gateway traffic forecasts indicate this could grow to an additional 16 train paths per 24-hour period, matched by planned increases in WCML freight capacity following the opening of HS2.

11.3. This report demonstrates that the WCML Fast Lines are fully used by high-speed passenger services, and have no local capacity for either freight or Rapid Railfreight Traffic, all of which would travel on the Slow Lines during daytime hours.

11.4. WCML freight paths south of Rugby are evenly spread during the day and night periods. At present at least 15% of the available standard freight paths per 24-hour period in each direction are not being planned. Although care needs to be exercised in claiming these as available in all circumstances, it appears that in the short term at least a further 18 freight trains could run south of Rugby within the current timetable constraints.

11.5. The Northampton Gateway site lies to the south of some unresolved capacity issues at Northampton station and is not affected by them to a significant extent. Night-time access to the SRFI would be possible even when the Northampton Loop is closed overnight for planned engineering works.

11.6. Freight Operating Companies do not use all the paths currently reserved for them in the Network Rail Working Timetable. Analysis suggests that only 50% of paths booked in the timetable every day are currently actually used. Network Rail already seeks to reduce these unused paths, and analysis suggests that further capacity planning work could free an additional 30 freight paths per 24-hour period, without making any changes to the current infrastructure.

11.7. In summary therefore it ought to be possible to run at least 50 additional freight services per 24 hour period on the WCML south of Rugby. In context that would treble the number of daily freight trains running without requiring material infrastructure upgrades south of Rugby.

11.8. HS2, which is now under construction, will provide additional freight capacity on the WCML. The Department for Transport currently believes that the

opening of HS2 in 2026 will result in it being able to create between 20 and 40 new freight paths per day above those offered by the current Working Timetable.

11.9. Our conclusion is that Northampton Gateway's growth plans are consistent with Network Rail's and the DfT's intermodal traffic growth forecasts, which rely on the creation of SRFIs with good rail connections. Northampton Gateway's immediate freight train path requirements are for 4 trains per day, 3 to the south and 1 to the north. Spare capacity exists for these trains in the current working timetable.

11.10. In the long term (beyond 2033) train volumes will grow, with up to 10 trains per day running to the south and up to 6 trains running to the north. The volumes are likely to split with 50% of trains running during daytime hours and 50% during the night. Our analysis demonstrates that this capacity requirement can be met within the existing WCML freight capacity and it is likely that the opening of HS2 will release further freight capacity.

11.11. This current and released path availability will be sufficient to meet all the identified needs of Northampton Gateway and DIRFT, as well as other projected SRFIs and RFIs lying further north on the WCML.

Report for

Roxhill (Junction 15) Ltd.

Northampton Gateway:
Operation of the internal rail layout

10th May 2018

Victa Railfreight Ltd.

Table of Contents

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
ROC	Network Rail Regional Operations Centre
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 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."

[1] DfT: December 2014: National Policy Statement for National Networks; Sections 4.88-9

3.2. It follows that any new SRFI must be able to handle at least 4 full-length freight train paths per day operating on the main line in either direction, provide for rail connected warehousing on site and create 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 Study[2]:

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 FOCs[3] will progressively increase their fleets of electrically-hauled or potentially bi-fuel locomotives. Electric traction provides greater haulage power and faster acceleration.*"

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*

[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

[4] Network Rail September 2016: Freight Network Study; Section 5.4.1 Pages 36 and 37

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. The SRFI Reception Sidings will be electrified, and will be able to handle electrically hauled freight trains from the opening of the SRFI.

3.14. 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.

3.15. 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.

3.16. Direct Rail Services has purchased 10 of these locomotives (known as Class 88), and uses them on the intermodal trains it runs between DIRFT and Mossend for Stobart Rail and Tesco[6]. There is a growing expectation that other FOCs will focus future fleet acquisition on similar hybrid locomotives.

3.17. 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.

3.18. This report confirms that Northampton Gateway will provide the capability for maximum length trains and will be able to accommodate electric freight trains from the opening of the rail facilities.

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[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*."

[6] Campaign for Better transport news release June 2017: http://www.bettertransport.org.uk/blog/better-transport/new-dual-electric-and-diesel-locomotive-shows-rail-freight-moving-times

4. Northampton Gateway rail facilities

4.1.1. The Northampton Gateway site comprises seven elements of rail activity:

- Two main line connections, linking the SRFI to Network Rail WCML Northampton Loop routes to the north and south
- A set of three 775 metre electrified Reception Sidings
- A headshunt and run round loop to permit shunting moves around the site
- An Intermodal Terminal, with three tracks each 775m long
- Rail connections to over 60% of the warehouse plots, to provide either internal or external access for loading and unloading
- An Aggregates Terminal with dedicated sidings
- The potential for the future provision of a Rapid Railfreight Terminal

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

4.1.2. 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 2.

Figure 1: Northampton Gateway: Diagrammatic track layout

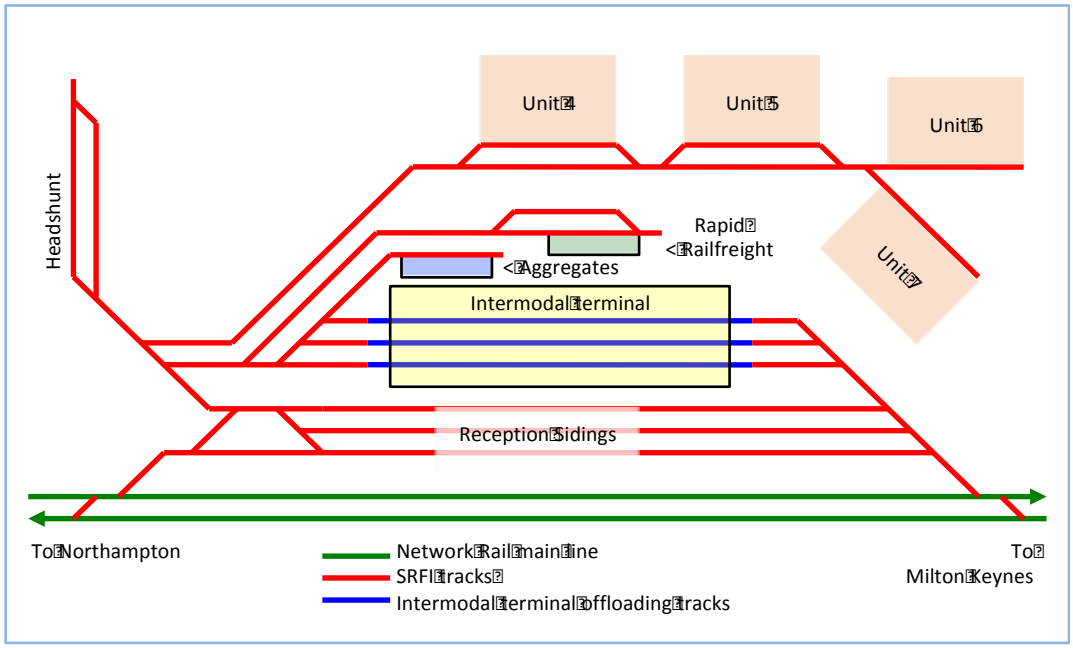
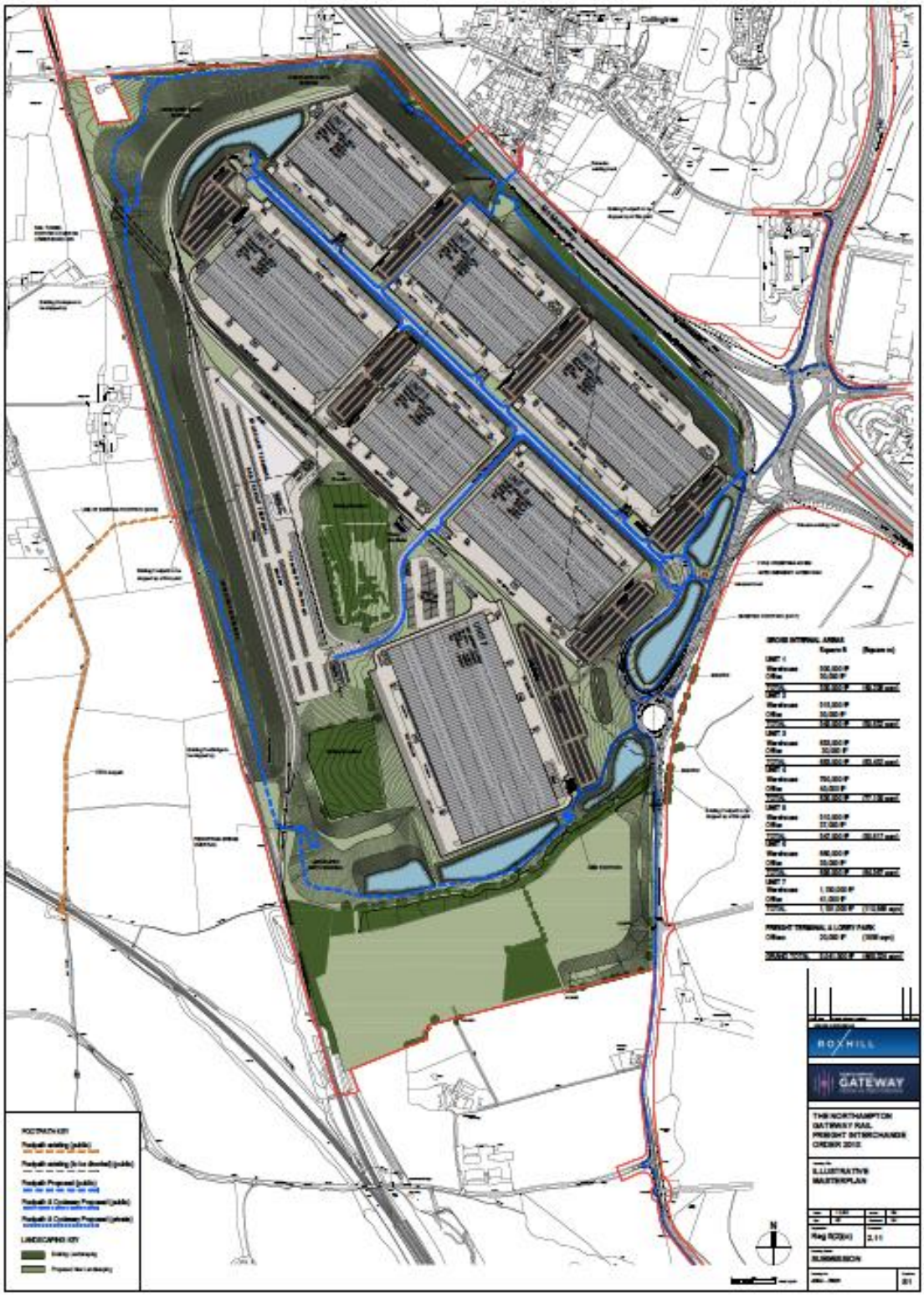


Figure 2: Northampton Gateway: Site layout



4.2. Network Rail connections

4.2.1. Extensive design work has been undertaken, including through on-going engagement with Network Rail, to determine an appropriate design for the rail infrastructure, both on site and to ensure that appropriate connections can be made to the Northampton Loop Line. The work undertaken demonstrates that there are no significant impediments to the delivery of the infrastructure proposed. Feasibility work on the detailed design of the Network Rail connections is continuing as part of the overall GRIP process. The general details of the connections are set out below.

4.2.2. 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.

4.2.3. 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 directly connected to all the key intermodal ports, SRFIs and Railfreight Interchanges (RFIs) in the UK.

4.2.4. 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 using the route. The majority of trains will arrive from the south (London) direction. The south connection pointwork will permit trains to enter the SRFI at a minimum permissible speed of 40 mph. It is intended that the junction signals will be provided with a system (known as flashing aspects) that will enable trains to run into the site at their maximum permitted speed, to minimise any impacts on other services.

4.2.5. From the north (Rugby) direction trains will enter at a speed of 20 mph. Fewer trains will use this direction, and are likely to be more lightly loaded.

4.2.6. Trains will leave the Reception Sidings at the same maximum speeds as those permitted for trains entering the SRFI.

4.2.7. The SRFI will be connected to the main line by single-track connections, which are sufficient for the volumes of freight traffic anticipated. 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 could be installed to provide additional 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 a maximum speed of 40 mph.

4.3.2. Reception Siding 1 will normally be used by all trains entering the site, and trains will be able to run into this siding without any restricting any other SRFI movements which are taking place. For example, while a train enters Reception Siding 1 from the south another main line train can leave to the north, or trains can be moved between the Reception Sidings and the Intermodal Terminal.

4.3.3. Reception Siding 3 will normally be used to form trains waiting to be despatched from the SRFI. Reception Siding 2 will provide capacity for additional trains entering or leaving the SRFDI, as will as allowing locomotives to transfer from one end of the train to the other.

4.3.4. Each siding will be 775 metres long, enabling the SRFI to accept the longest trains on the national rail network.

4.3.5. The Reception Sidings are parallel to the Intermodal Terminal, the rail-connected warehouses and the Aggregates Terminal. Trains will be moved from the Reception Sidings to these terminals via the headshunt.

4.3.6. Freight Operating Companies need to make efficient use of their resources, including locomotives, traincrew and wagons. The Reception Sidings have been configured to allow arriving locomotives to depart the site with return trains as soon as possible. In line with standard industry best practice additional sidings will be provided to stable main line locomotives between duties (including facilities for refuelling diesel locomotives), and store wagons requiring maintenance before they are reloaded.

4.3.7. Trains will be moved from Reception Siding 1 to the relevant terminals or rail connected warehouses, where they will be offloaded and where appropriate reloaded with goods for despatch to ports or other RFIs or on site warehousing. The next arriving train can run into Reception Line 1 as soon as it has been cleared, while Reception Siding 2 can be used by the next train if it is following closely. This will provide Network Rail with the confidence it needs that the SRFI is able to accept trains running towards it under all scenarios.

4.3.8. After reloading, the train will be moved back from the terminal to the Reception Siding 3 via the Headshunt, to be prepared to leave the SRFI and to wait for its 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.

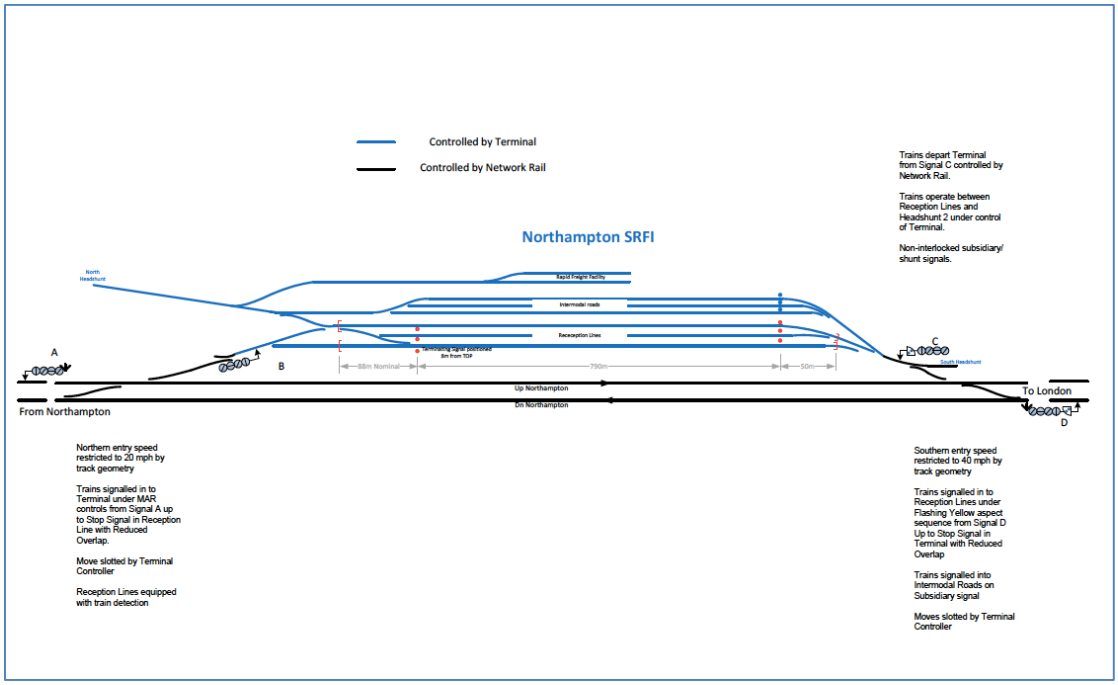
4.3.9. When the main line path is available the train will depart, and the Reception Siding line 3 will become available to make up the next departing train. It will also be possible for trains to depart directly to the main line from the Intermodal Terminals.

4.4. Signal control

4.4.1. Trains on the Northampton Loop are controlled by signals operated by the Network Rail Regional Operations Centre (ROC) at Rugby. It is important that Network Rail does not have to be responsible for internal movements within the SRFI, and for this reason Northampton Gateway will have a separate operational control room, which will control all depot signalling. The SRFI signalling will confirm to Network Rail's standards, so that trains can be interchanged seamlessly between the main line and the Reception Sidings.

4.4.2. The signalling of the SRFI main line connections, Reception Sidings and connections to the terminals, is shown in the diagram below:

Figure 3: Northampton Gateway main line signalling interface arrangements. Network Rail controlled signals and track shown in black, Northampton Gateway SRFI controlled track in blue



4.4.3. The Northampton Gateway control room will interface directly with the Rugby ROC, to ensure that trains approaching the site can enter without delay. This will be facilitated by the use of electronic acceptance messages, a process known as 'slotting'. When a train is approaching the SRFI the Rugby ROC signaller will request acceptance of the train into the Reception Sidings. The Northampton Gateway controller will select the siding into which the

train will run, and will give a 'slot' to the ROC signaller. This will guarantee that the route remains clear for the train until it arrives.

4.4.4. Once the train has arrived in the Receptions Sidings, the Northampton Gateway controller will take over and operate the internal signalling to control the movement of the train to the unloading sidings. When the train is ready to return to the main line the Northampton Gateway controller will signal it back into the Reception Sidings. The controller will then contact the Rugby ROC signaller to ask for a main line path. When the path is available the Rugby ROC signaller will set the main line exit signal for the route, and the Northampton Gateway controller will operate the internal signals to set the route from the Reception Siding, which will allow the train to depart.

4.4.5. This form of divided signalling control provides Network Rail with confidence that it can clear arriving trains off the main line without delaying following through services, but avoids it having to be involved in internal movements. The same system is used at other SRFIs, including at DIRFT and Hams Hall. Safe working of trains and protection of the main line is assured by the use of signalling equipment that confirms to railway Group Standards.

4.5. Headshunt

4.5.1. The Reception Sidings are served by a 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.

4.5.2. 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, while the main line locomotive will be used to return an earlier train to its origin point.

4.6. Intermodal Terminal

4.6.1. 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.

4.6.2. 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 outbound 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.

4.6.3. 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.

4.6.4. 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.

4.7. Aggregates Terminal

4.7.1. An Aggregates Terminal will be located next to the Intermodal Terminal. This terminal will unload and store construction materials (principally crushed stone) for the construction industry. It will replace an existing Aggregates Terminal located immediately north of Northampton station, at Castle Yard. The existing bulk aggregates trains, which run to Castle Yard from Leicestershire or Somerset, will be diverted to run to Northampton Gateway.

4.7.2. Aggregates trains are shorter than intermodal trains. A 400 metre train can carry over 2,000 tonnes of stone, and this is the normal length of an aggregates train.

4.7.3. Bulk aggregates trains arriving at Northampton Gateway will run into Reception Siding 1. The wagons will be transferred to the Aggregates Terminal, where they will be unloaded and the stone moved to storage locations. Once empty the wagons will be moved back to Reception Siding 3, and will depart back to the quarry.

4.8. Rail connected warehouses

4.8.1. 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.

4.8.2. Intermodal containers can be ISO deep-sea containers, curtain sided containers customised to facilitate direct road deliveries, or refrigerated containers for chilled and frozen goods. Each container type requires different handling, and these specific facilities will be provided in accordance with individual customer requirements.

4.8.3. These different demands will be reflected in the final designs for the warehouses at Northampton Gateway – all options can be accommodated at different locations on the site.

4.8.4. 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.

4.9. Provision for a Rapid Railfreight Terminal

4.9.1. Rapid Railfreight is a untested new market, but a number of Freight Operating Companies as well as the DfT have expressed an interest in its development. Whilst this market is in its infancy and its future development is not yet clear, the Northampton Gateway site has been configured to enable a Rapid Railfreight facility to be delivered in the future.

4.9.2. The Rapid Railfreight facility would utilise the rail infrastructure put in place for the main terminal (NR connections, signalling, Reception Sidings, headshunt) and would therefore benefit from this infrastructure investment. This would minimise the future level (and therefore cost) of additional infrastructure needed for the Rapid Railfreight facility. This will provide substantial support to the development of Rapid Railfreight, and will facilitate early start up of new traffic by making the terminal economically deliverable.

4.9.3. The Northampton Gateway site is therefore designed to allow for such a facility. The Rapid Railfreight Terminal 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.

4.9.4. 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.

4.9.5. The loading platform will be covered, so that goods can be transhipped under cover without risk of damage to sensitive or perishable cargoes.

4.9.6. 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

[7] DfT 2016: Rail Freight Strategy; Section 76

[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 currently operates a fleet of Class 325 four-car Multiple Units for the carriage of letter mail on the WCML

round loop, so that the train engine on locomotive hauled trains can swap ends. 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

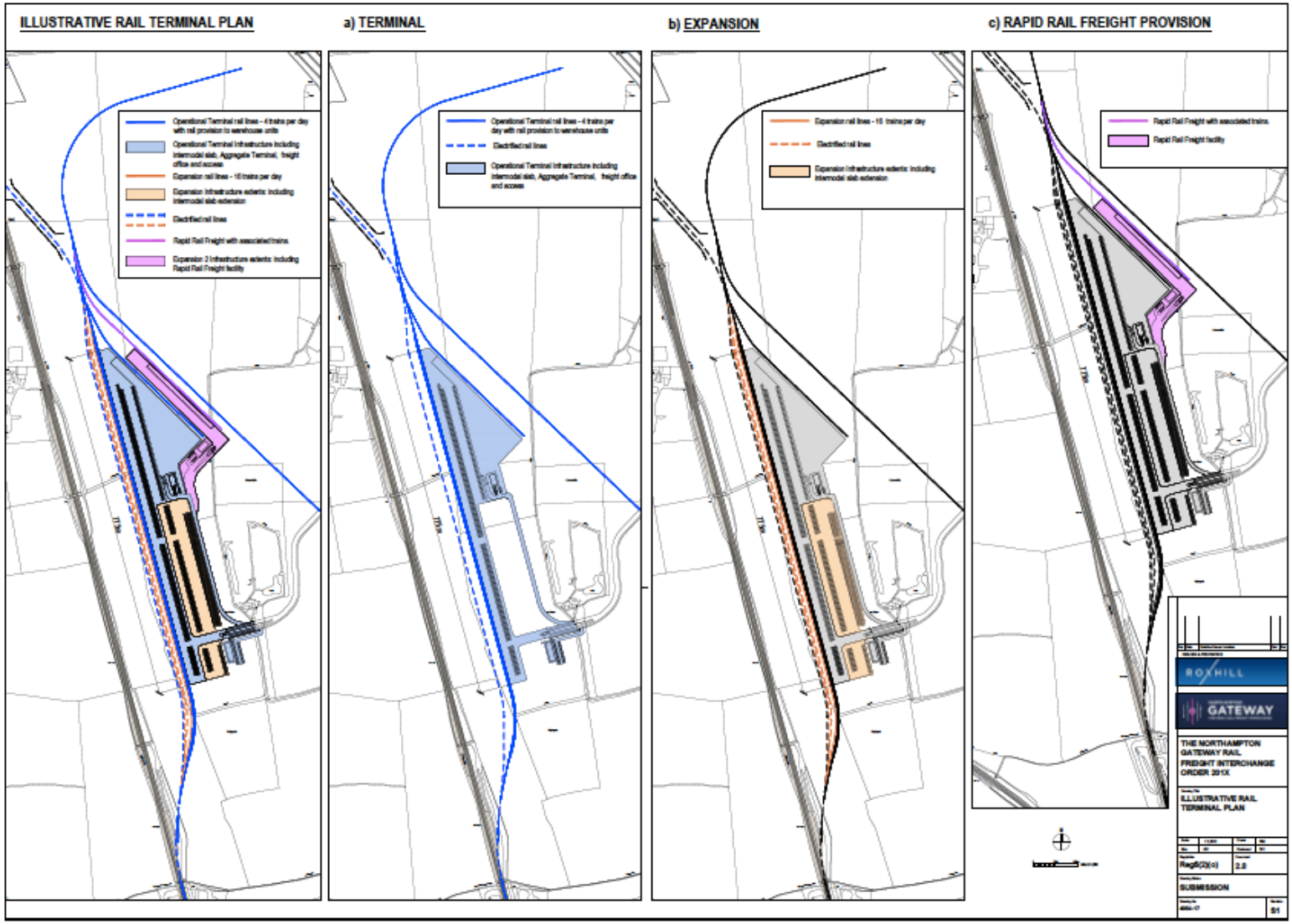
5.1. It is likely that the creation of rail facilities on site will be phased, reflecting the overall site development phasing. The Intermodal Terminal will be constructed as part of the initial phase of site development prior to the occupation of any warehousing.

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

5.4. The Rapid Railfreight Terminal will be added in line with expected market developments.

Figure 4: Potential phasing of rail sidings development



Northampton Gateway: Operation of the internal rail layout

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, including the Intermodal Terminal, Aggregates Terminal, rail served warehouses and the Rapid Railfreight Terminal.

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 5: Trains arrive in the Reception Sidings

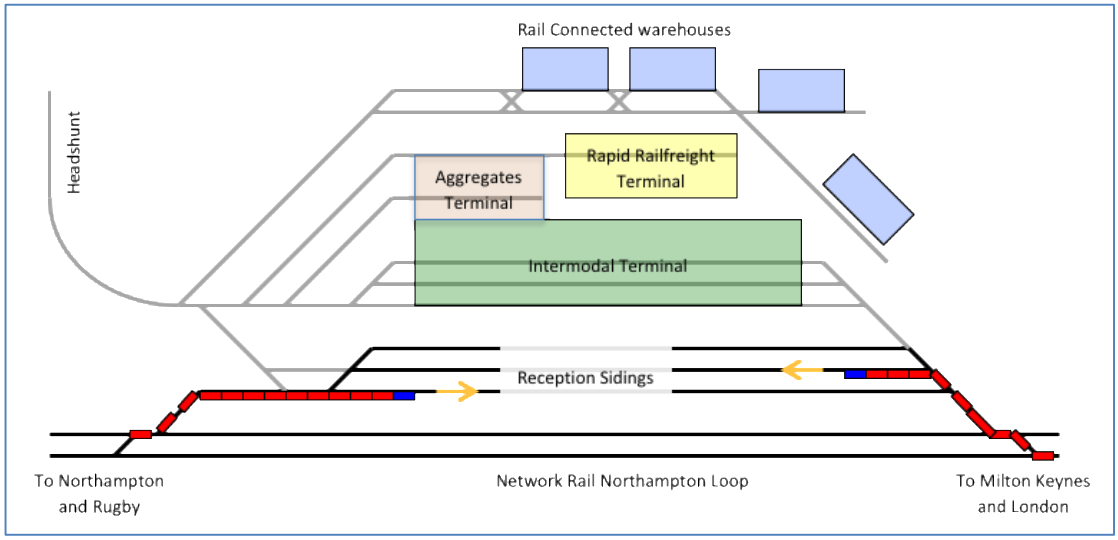


Figure 6: Trains are moved to the terminals for unloading (this could either be to the main terminal, the Aggregates Terminal, to an individual warehouse or its yard, or in the future potentially to a rapid railfreight facility)

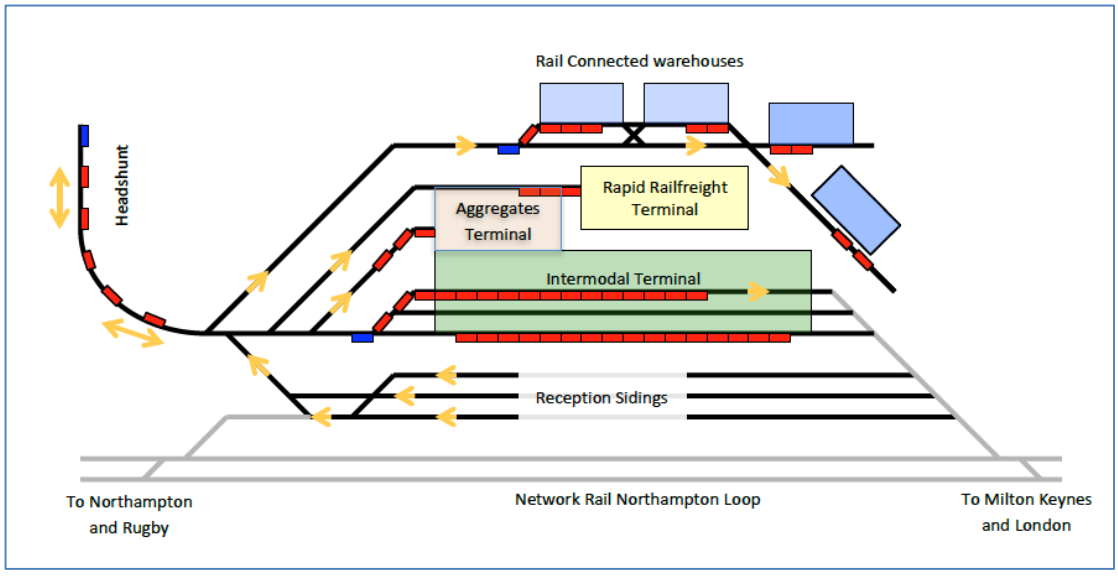


Figure 7: When reloaded, trains are moved back to the Reception Sidings for despatch

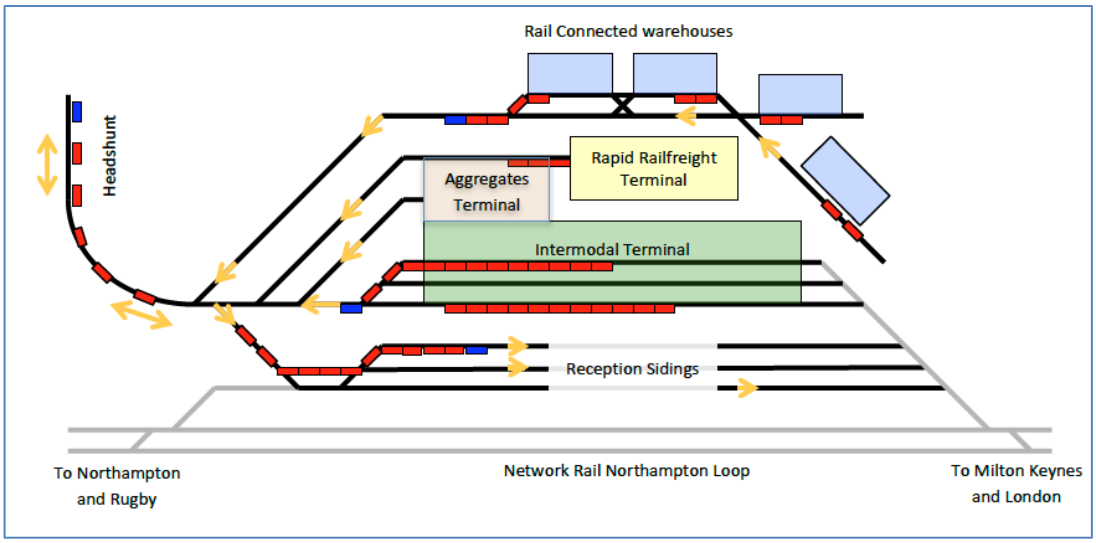
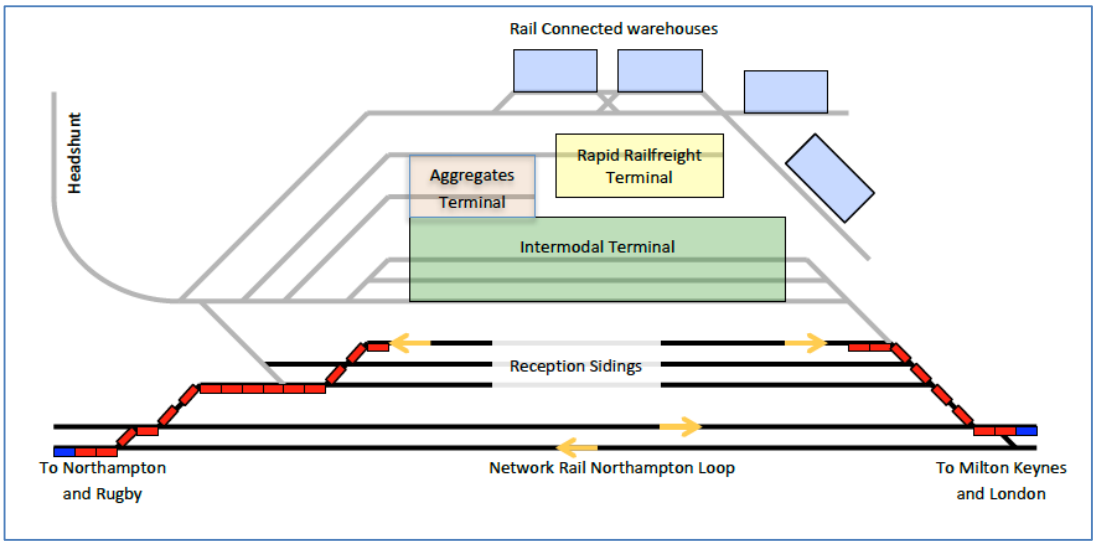


Figure 8: Trains depart onto the main line to the north and south



GB Railfreight

CAPACITY REPORT FOR

NORTHAMPTON GATEWAY STRATEGIC

RAIL FREIGHT INTERCHANGE

(dated May 2018)

General Information for this report:

This report has been prepared by Ian Kapur, Head of Capacity Planning at GB Railfreight Limited. Ian joined GB Railfreight in 2004, in its early years, and quickly became the main timetable planner for what has now become a very successful Freight Operating Company in the UK, and also into Europe via the Channel Tunnel.

Ian has steadily built up GB Railfreight's timetable from just over 300 paths in 2005 to over 1800 paths in 2018, as the company's business has grown in many areas, but particularly the Intermodal, aggregates, biomass and automotive sectors. He now heads a seventeen-strong Timetabling and Engineering Access team at GB Railfreight. Ian is also responsible for all of GBRf's Track Access Contracts, with the various infrastructure owners in the UK, and leads on the contractual side of timetabling between GB Railfreight and Network Rail.

As well as dealing with the company's own growing timetabling requirements every day of the year, Ian Kapur sits on the Network Rail Class Representative Committee, which makes decisions on changes to the rules governing national timetabling, and has also been a member of the Access Disputes Timetabling Pool of Members which hears detailed timetabling disputes between operators and Infrastructure Managers. Ian also advises many cross-industry groups on detailed aspects of accommodating rail freight over newly enhanced infrastructure to best effect.

GB Railfreight is one of the rail freight industry's great success stories. Launched in 1999, the business has now been built up to a team of over 750 employees, with a turnover in excess of £120m, and is one of the fastest growing companies on the railway. The company moves a wide range of commodities by rail, including Intermodal, Coal, Biomass, Aggregates, Gypsum, Automotive, Petroleum to name a few. The company operates over 1000 trainloads a week, moving 15% of Britain's rail freight with extremely high reliability. GB Railfreight also timetables, plans and runs the Serco Caledonian Sleeper services between London and Scotland.

The GB Railfreight Timetabling Team specialises in finding capacity on the network, for new business, where it may not be immediately obvious, as has been shown in a recent example of establishing brand new, regular Trans-Pennine freight paths for a bulk freight flow from the Port of Liverpool. GB Railfreight's success rate in establishing newly-bid paths is second to none and has been critical in pushing forward the expansion of the company.

1. Executive Summary:

1.1 There are spare freight paths, available in the current West Coast Main Line timetable, for the running of additional railfreight services. These can cater for both Class 4 Intermodal and Class 6 bulk commodities and have been designed with freight running characteristics in mind.

1.2 GB Railfreight believes that, from 06:00 to 00:00 (Mon-Fri), there are at least 22 paths available for new flows in the current timetable (December 2017) and at least 36 paths available for new freight flows from 00:01 to 06:00. These capacity figures are from current "white space" in the timetable; validated Strategic Capacity paths and also diverting existing Northampton Castle Yard bulk aggregate freights into Northampton Gateway.

1.3 This gives GB Railfreight assurance that there is, currently, enough network capacity for a new Northampton Gateway terminal to be, robustly, served by rail.

2. West Coast Main Line (WCML) Lines and Services:

2.1 The West Coast Main Line, between London and Rugby (via Northampton), is a four-track mixed traffic route, with trains able to follow each other at 3 minute intervals on the Fast Lines and 4 minute intervals on the Slow Lines, and onward from Hanslope Junction via Northampton to Rugby.

2.2 As well as being host to nine 125mph InterCity services in each direction each hour, the WCML Fast Lines are also regularly used by 110mph London North Western passenger services, as well as some 100mph Royal Mail trains each day operated by DB Cargo. These run both via the Fast Lines, and on a few occasions, via the Slow Line and the Northampton Loop. They are faster than regular freight services and are slotted into the timetable like a passenger service. There are nine Royal Mail paths in the timetable, running between Willesden and Warrington/Shieldmuir. These may give an example of how any future premium logistics services could run in a busy mixed traffic timetable on the WCML.

2.3 On the Slow Lines, north of Milton Keynes via Northampton, there are three services in each direction, each hour, and also four freight paths in each direction, each hour, with three of these available all the way between London and Crewe (Basford Hall). Many of these freight paths are taken up each hour and, at certain times of day, there are not enough to satisfy demand for the desired time of travel.

3. WCML Available Capacity:

3.1 For the section between London and Rugby, GB Railfreight believes that there is capacity for more than 73 freight trains in each direction per 24-hour period. Since April 2014, there have been many WCML paths removed from the timetable, and their Firm Access Rights extinguished. At the start of the December 2017 Timetable, GBRf can see 65 WTT freight paths in the timetable, each day, on Mondays to Fridays.

3.2 On top of this, there is very definitely still space in the timetable for new freights to be pathed, reasonably spread throughout the day and evening. I believe this amounts to 16 paths on Mondays to Fridays.

3.3 Also contained in the timetable, there are already validated strategic capacity paths which may not be visible to every planner. These have been developed with new freight traffic very much in mind and I believe there are 6 available, reasonable quality, strategic capacity paths for use on the WCML, between London and the West Midlands or Crewe.

3.4 Taking all of this into consideration, GB Railfreight believes that there are 87 freight path opportunities available throughout the day and evening (Mon-Fri), with many more in the hours of 00:01 to 06:00.

3.5 Given there are very few, or no, passenger trains overnight, and even taking into account the fact that the WCML is timed as a two-track railway overnight, far more than 4 freights per hour are able to run in the early hours of the morning. It isn't straightforward to put a number to how many could be accommodated, however a total of between 10 and 12 each hour should be comfortable, even taking good performance levels into account.

3.6 For example, the number of spare, available, northbound freight paths on the WCML, overnight on a two-track railway, can conservatively be shown to be as follows:

From 00:01 to 01:00 5 spare paths
From 01:01 to 02:00 9 spare paths
From 02:01 to 03:00 6 spare paths
From 03:01 to 04:00 3 spare paths
From 04:01 to 05:00 7 spare paths
From 05:01 to 06:00 6 spare paths

That equates to a total of 36 spare freight paths on the southern end of the WCML between 00:01 and 06:00.

3.7 Even fewer of the 87 freight paths are taken up on Saturdays, with the WCML passenger service in a similar pattern to that on Monday to Friday. There is ample scope for more freight trains between London and Rugby (via Northampton) over the weekend, with a relatively low take-up on Saturdays and very few on Sundays.

4. Path Utilisation:

4.1 GB Railfreight has been instrumental is pushing forward the Capacity Management Review Group (CMRG), from April 2014 onwards, where every freight path that isn't used is regularly assessed for whether or not it either:

a) Not deemed of any further use and is completely removed from the timetable.

b) Deemed useful for future freight growth and kept intact in the working timetable.

c) Deemed useful for future freight growth but needs part of the path altering to make it more useful to freight operators and their customers.

There has been a huge amount of work carried out over the last 3½ - 4 years and the current changes to timetabled freight paths, UK wide, are as follows:

Total number of freight paths examined (as at August 2017) = 4,941.
Number of freight paths completely removed = 3,855.
Number of freight paths kept and/or altered for strategic capacity = 1,086.

Much rationalisation of paths has already taken place but there are still at least 6 strategic capacity paths on the southern end of the WCML which can be used for new traffic.

5. WCML Engineering Access:

5.1 Network Rail's engineering works, on the West Coast Main Line, are planned and reported through the Engineering Access Statement. Although the current Engineering Access Statement blocks the Northampton Lines at various parts of the night, as often as every other week, it may be that a reduced engineering pattern can be negotiated with Network Rail to give access as far as the southern entrance into Northampton Gateway, far more often, as it is relatively close to Hanslope Junction. This may permit Intermodal services, from the south, accessing Northampton Gateway more regularly that is currently achievable under the current access rules.

6. Accommodating Network Rail's Traffic Growth Forecasts:

6.1 There has been much discussion regarding required infrastructure to cater for growth in freight services, particularly Intermodal, aggregates and biomass traffic. GB Railfreight does not believe that any additional tracks, between Bletchley and Milton Keynes, are to be built as that project is too difficult and too expensive to fund. With East-West Rail to open and provide even more passenger and freight traffic towards Milton Keynes and the WCML, there is, however, definitely a need for more capacity in this area.

6.2 For deep-sea Intermodal traffic from the Port of Southampton, which is forecast to be a big freight growth commodity, freight capacity will be needed along the Oxford – Bletchley – Milton Keynes corridor, especially to new terminals such as Northampton Gateway. Indeed, Intermodal traffic out of the Port of Southampton is exactly the traffic that is being targeted by the new terminal at Northampton Gateway.

6.3 On the North-South axis, there is currently capacity for 4 trains per hour between London (Wembley) and Daventry via Northampton. In the medium term, there need to be fewer occasions of splitting passenger trains at Northampton station, then building the timetable in such a way that freight services have better paths through the Northampton area for this to increase. However, other interventions such as a 3 minute headway may also be needed.

6.4 There are ready-made aggregate paths available to run into Northampton Gateway now. The bulk 60mph paths, currently in the timetable to Northampton Castle Yard (2 paths from the north; 5 paths from the south) could readily be diverted into Northampton Gateway for the same end-customer.

7. Conclusions:

7.1 Taking all of the above detail into account, GB Railfreight is clear that, south of Rugby, there are many available freight paths which could cater for both Class 4 Intermodal and Class 6 bulk services. There are also sufficient paths to cater for Intermodal and bulk services accessing Northampton Gateway from the north entrance.

7.2 GB Railfreight believes that, from 06:00 to 00:00 (Mon-Fri), there are at least 22 paths available for new freight flows in the current (December 2017) timetable and at least 36 paths available for new freight flows from 00:01 to 06:00.

7.3 This gives GB Railfreight assurance that there is, currently, enough network capacity for a new Northampton Gateway terminal to be robustly served by rail.

Ian Kapur.
Head of Capacity Planning.
GB Railfreight Ltd.

GB Railfreight

REPORT ON CURRENT AND

FUTURE FREIGHT MARKET PATTERNS

(dated May 2018)

General Information for this report:

This report has been prepared by Ian Kapur, Head of Capacity Planning at GB Railfreight Limited. Ian joined GB Railfreight in 2004, in its early years, and quickly became the main timetable planner for what has now become a very successful Freight Operating Company in the UK, and also into Europe via the Channel Tunnel.

Ian has steadily built up GB Railfreight's timetable from just over 300 paths in 2005 to over 1800 paths in 2018, as the company's business has grown in many areas, but particularly the Intermodal, aggregates, biomass and automotive sectors. He now heads a seventeen-strong Timetabling and Engineering Access team at GB Railfreight. Ian is also responsible for all of GBRf's Track Access Contracts, with the various infrastructure owners in the UK, and leads on the contractual side of timetabling between GB Railfreight and Network Rail.

As well as dealing with the company's own growing timetabling requirements every day of the year, Ian Kapur sits on the Network Rail Class Representative Committee, which makes decisions on changes to the rules governing national timetabling, and has also been a member of the Access Disputes Timetabling Pool of Members which hears detailed timetabling disputes between operators and Infrastructure Managers. Ian also advises many cross-industry groups on detailed aspects of accommodating rail freight over newly enhanced infrastructure to best effect.

GB Railfreight is one of the rail freight industry's great success stories. Launched in 1999, the business has now been built up to a team of over 750 employees, with a turnover in excess of £120m, and is one of the fastest growing companies on the railway. The company moves a wide range of commodities by rail, including Intermodal, Coal, Biomass, Aggregates, Gypsum, Automotive, Petroleum to name a few. The company operates over 1000 trainloads a week, moving 15% of Britain's rail freight with extremely high reliability. GB Railfreight also timetables, plans and runs the Serco Caledonian Sleeper services between London and Scotland.

The GB Railfreight Timetabling Team specialises in finding capacity on the network, for new business, where it may not be immediately obvious, as has been shown in a recent example of establishing brand new, regular Trans-Pennine freight paths for a bulk freight flow from the Port of Liverpool. GB Railfreight's success rate in establishing newly-bid paths is second to none and has been critical in pushing forward the expansion of the company.

1. 2013 Freight Market Study:

1.1 Network Rail's Freight Market Study, published in October 2013, https://cdn.networkrail.co.uk/wp-content/uploads/2016/11/Freight-Market-Study.pdf looked at the various rail freight market sectors at the time and projected their growth potential through to 2023, 2033 and 2043 as part of the Long Term Planning Process. The sectors were studied in varying degrees of detail, for example, with domestic and deep-sea Intermodal growth evaluated in some detail and other sectors such as aggregates, automotive and biomass not so much.

1.2 The reported commodity growth figures were unconstrained, in that they took no account of whether or not the railway infrastructure could actually support the predicted freight growth, along with passenger growth figures.

1.3 This study, backed up by the Freight & National Passenger Operators Route (FNPO) Strategic Plan (December 2017 revised version), showed that growth in both the import and export of containerised goods is likely, achievable and desirable. The growth rate was stated as 5% compound growth per annum until 2043.

1.4 The 2013 Freight Market Study had anticipated compound growth in construction materials, especially bulk aggregates, of approximately 1% per annum. However, since 2012, rail-borne construction growth has been over 3.5% per annum. This is particularly significant for rail routes around the London & South East area given that fast-growing aggregate volumes need to use the same infrastructure (albeit mainly on the Slow Lines) as growing passenger volumes.

1.5 Since that time, during the four years from October 2013 to 2017, the market sectors have not behaved in the predicted manner, for a number of reasons. This has included changes to Government energy policy, for example, resulting in far less coal being moved on the network, and a lower build rate of rail-served warehousing than expected. Coupled with this, higher than projected volumes in the aggregates, automotive and biomass sectors have been moved by rail.

2. 2017 Revised Freight Growth Forecast:

2.1 Taking all of this into account, Network Rail has just commissioned MDS Transmodal to re-visit the freight forecasts so that a single freight traffic forecast can be used for Network Rail's Control Period 6 (2019-2024) plans.
This is required, in the next few months, so as to inform baseline income levels, asset management plans and costs at a route level before the Office of Rail & Road consults on its CP6 Draft determination on 31st August 2018.

2.2 The methodology is broadly consistent with that previously employed but with the main difference being that MDS Transmodal has applied network capacity constraints to the forecasting, along with high and low market growth scenarios, in order to present a more realistic forecast.

2.3 A simple approach to capacity constraint has been applied – rail freight capacity through seven known bottlenecks, across the network, has been limited to 20% above that required in 2016/17. The study is, also, only looking at growth through to 2024 however Network Rail considers that this piece of work has produced a robust analysis in terms of separate scenarios for future traffic levels.

2.4 In broad terms, MDS Transmodal predicts a total growth in freight tonnes lifted of between 22% (low market growth) and 49% (high market growth) from 2016/17 to 2023/24. Most of this growth is expected towards the end of CP6, reflecting the impact of freight enhancements delivered during the control period.

2.5 The FNPO Route of Network Rail considers that the rail freight growth levels can be achieved but only if the appropriate framework is put in place to develop infrastructure capability and capacity. Central to this growth is the development of terminals such as Strategic Rail Freight Interchanges (SRFIs) and other bespoke railhead facilities, such as concrete batching plants and aggregates distribution points.

3. Intermodal Markets:

3.1 The transporting of maritime containers is a very well-established rail market and is forecast for large growth, in the 2013 Freight Market Study period, to 2043. For the Revised Freight Growth Forecast, it has also been assumed that deep sea container port growth will keep pace with demand as existing and planned developments are thought to provide enough capacity for the revised demand by 2023/24.

3.2 This increase to deep-sea port Intermodal traffic has been, and will continue to be, brought about by the lengthening of current Intermodal services, up to 121 SLUs (2,541ft) as well as the introduction of brand new container trains onto the network. Some of the current, longer, Intermodal trains can be between 96 and 100 SLUs so there is still scope for lengthening these to 121 SLUs, which is the equivalent of approx. 440ft or 6-7 additional wagons. Current services, in some cases, are also able to carry more tonnage per wagon to cater for growth.

3.3 Located south of the busy passenger workings at Northampton station, the proposed Northampton Gateway terminal is ideally situated to receive full-length Intermodal services from the prime container ports of London Gateway (via Camden or South Tottenham) and Southampton. GB Railfreight has found that, for these particular flows, there is suitable and sufficient West Coast Main Line and other network freight capacity.

3.4 In addition, given the new terminal's position, it is also easily possible to divert any of the current freight paths from London Gateway, Port of Felixstowe or Port of Southampton into Northampton Gateway terminal.

3.5 Domestic Intermodal growth is forecast to follow a similar pattern to deep-sea port Intermodal, but will be particularly boosted by the building of more rail-served warehousing. It is very price-sensitive and can switch to road at short notice.

3.6 Since the base year of 2016/17, the main growth in deep sea port traffic has been at London Gateway. However, largely due to the economies of scale, its rail-mode share has been lower than at Felixstowe or Southampton. The Port of Felixstowe has increased its rail traffic by 21%, largely due to the opening of the new North Terminal, longer trains and some new train paths on the Felixstowe branch. The Port of Southampton has increased its rail traffic by 17%.

3.7 It is worth pointing out that three new compliant freight paths were found on the Felixstowe branch by GB Railfreight, by spending time optimising the timetable along the branch and further afield on the network. I believe similar improvements and additions can be found, where necessary, on the West Coast Main Line and other parts of the network.

3.8 With regard to the growth forecast, the Revised Freight Growth Forecast and the predicted market growth, for an origin to destination tonnes carried basis, is between 49% (low market growth) and 67% (high market growth) growth from 2016/17 to 2023/24.

3.9 Converting the Revised Freight Growth Forecast figures into daily freight paths, services for Intermodal are predicted to increase as follows:

a) Deep-Sea Port Intermodal: from 123 daily trains (2016/17 baseline) to 175 daily trains (low market growth ; 2023/24) and 196 daily trains (high market growth; 2023/24).

b) Domestic Intermodal: from 19 daily trains (2016/17 baseline) to 58 daily trains (low market growth ; 2023/24) and 62 daily trains (high market growth; 2023/24).

c) Channel Tunnel Intermodal: from 3 daily trains (2016/17 baseline) to 4 daily trains (low and high market growth; 2023/24)

These figures are based on "average cargo tonnes per train by commodity/sector" and also include the empty return services.

4. Construction/Aggregates Market:

4.1 The Revised Freight Growth Forecast has looked, carefully, at construction materials and the predicted market growth, for an origin to destination tonnes carried basis, is between 4.7% (low market growth) and 14.2% (high market growth) growth from 2016/17 to 2023/24. For the high market growth scenario, some of the forecast major schemes could be very rail orientated as the volumes involved provide the economies of scale that are ideal for rail. Major schemes that support high aggregates growth include HS2, Heathrow Airport's third runway, new nuclear power stations at Sizewell C and Hinkley Point and the Thames Super Sewer, to name a few.

4.2 Although there is some uncertainly regarding which schemes will occur and when, and to where in-coming materials and out-going spoil will go, the projects mentioned in 4.1 are the ones expected to take place and to have a marked effect on bulk movements of rail freight on the network.

4.3 An example of how these projects can affect rail is the start-up of the HS2 Project in London, with spoil-away trains, from Willesden Euroterminal and West Ruislip (combined), expected to add between 10 and 15 trains per day, each way, from these two terminals alone. The rail routes around inner-London will need to be able to cope with these amounts of traffic and GB Railfreight has been pushing Network Rail to build these paths into the Working Timetable (WTT) as capacity for freight.

4.4 Converting the Revised Freight Growth Forecast figures into daily freight paths, services for construction materials are predicted to increase from 135 daily trains (2016/17 baseline) to 176 daily trains (low market growth; 2023/24) and 230 daily trains (high market growth; 2023/24). These figures are based on "average cargo tonnes per train by commodity/sector" and also include the empty return services.

4.5 The section of route from Wembley Yard to Northampton Gateway is currently capable of taking 75mph Class 4 services, or 60mph Class 6 services, hauled by a single Class 66 locomotive, with over 4,600 tonnes (trailing load) and a train length of 121 SLUs (2,541ft).

4.6 Once again, the siting of Northampton Gateway, south of the busy Northampton station, is better suited than the existing Northampton Castle Yard for deliveries of aggregates traffic from the Mendips, such as the existing Working Timetable train paths from Whatley Quarry (East Somerset). Other originating flows, that would be suited to approaching Gateway from the South, are from Great Torr Works (Merehead Quarry), Tytherington Quarry, Avonmouth, Angerstein Wharf, Isle of Grain (Kent) and Moreton-on-Lugg, to name but a few.

5. Northampton Gateway and serving the buoyant Aggregates Market:

5.1 Background

The aggregates company, GRS Roadstone Ltd., Has agreed terms with Roxhill to relocate their Castle Yard facility in the centre of Northampton to the Northampton Gateway site./ GB Railfrieght provide rail services to GRS. The existing Castle Yard railhead has handled anything between 225,000 tonnes and up to over 400,000 tonnes of aggregate, with over 98% sold exclusively by GRS Ltd. The move to Northampton Gateway will facilitate growth and provide an enhanced rail facility.

5.2 Current Market

The town of Northampton, and its surrounding area, remains a strong aggregates market, locally, due to its proximity to the M1, M6, A45 and A14 major routes and the fact that Northampton is, clearly, centrally placed in England. Distribution Centres at Swan Valley (Junction 15 and Junction 15A), significant housing schemes to the west of Northampton and along the A45 to the east, plus major investment at Northampton University have recently seen strong volumes through the railhead.

5.3 Future Market

Looking forward, GRS believes there will be a year-on-year increase of aggregates in this area, through to 2020, of approx. 5% per annum.

The confidence, for these figures, is based on the following projects particular to Northampton and the surrounding area:

- "Smart Motorway" enhancement of the M1, between Junctions 13 and 15
- Continued significant house building within the Northampton area, especially North West and East of the town
- Continued development of North Milton Keynes
- A major £1.5billion, 22 mile, upgrade to the A14 roadway, which is currently the largest Civil Engineering contract in the United Kingdom
- The Northampton rail terminal being an additional railhead to serve HS2 construction works. This is, very much, in addition to the Luton and Banbury railheads
- A healthy local "spot market" taking good aggregate volumes
- The development of Northampton (Town) railway station and housing scheme, backed by Northampton Borough Council and Network Rail

5.4 Northampton Gateway Construction:

Roxhill Developments Ltd. ha committed to having the rail terminal at Northampton Gateway open for first occupation. This, therefore, offers a huge advantage in Gateway being able to be used for supplying aggregates for the construction of the whole site, thus reducing the Heavy Goods Vehicle movements to and from site, and on the M1 Motorway.

5.5 Material Supply

A large proportion of the aggregates move at Castel Yard is Granite, predominantly coming from Mountsorrel Quarry in Leicestershire. However, the supply is not exclusive to Mountsorrel and other sources will, and can, be used - Limestone from Dove Holes, Tunstead and Dowlow, all in Derbyshire, and also Granite from Cliffe Hill and Bardon Hill in Leicestershire. This is supplemented by sand from Norfolk.

Based on 20 tonne wagons, the supply of aggregates, by rail, into Northampton Castle Yard, is taking between 11,000 and 20,000 vehicles off the M1 motorway, between Junctions 21A and 16, each year.

In summary, even taking into account the 2017 Revised Freight Growth Forecast figures, both the Intermodal and Aggregates markets offer good growth potential for rail freight.

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