

# Sizewell C DCO application, Rail Proposals

Preliminary technical review

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## Glossary of terms

Acronym or Term	Meaning
ALCRM	All Level Crossing Risk Model
Cadenza	Cadenza Transport Consulting Limited
DCO	Development Consent Order
EDF	EDF Energy
GRIP	Governance for Railway Investment Projects
LCOs	Level Crossing Orders
LXEU	Level Crossing Equivalent Unit
NR	Network Rail
ORR	Office for Rail and Road
PDRs	Permitted Development Rights
PROWs	Public Rights Of Way
SCC	Suffolk County Council
SEU	Signalling Equivalent Unit
SSRAs	Suitable and Sufficient Risk Assessment
TWAO	Transport Works Act Order
RNEP	Rail Network Enhancements Pipeline

## Executive Summary

EDF Energy (“EDF”) submitted a DCO to obtain permission to build a new nuclear reactor, ‘Sizewell C’ near Leiston in Suffolk. The transport strategy for materials submitted in the DCO is an ‘integrated’ strategy which makes more use of the road transport (>60%) than Suffolk County Council (SCC) consider acceptable. SCC considers that every effort should be made, and all opportunities explored, to maximise rail and sea transport to minimise the impacts of road haulage on the local communities in Suffolk.

SCC has commissioned AECOM to provide an independent view on whether the strategy proposed by Network Rail is appropriate and deliverable within EDF’s timescales to begin construction in 2025.

SCC advised (04 Sep 20) that EDF’s integrated transport proposals included the railway works to the Leiston branch, including the ‘Green Line’ option, the Saxmundham junction modifications and three freight trains per 24-hour period, to run outside the hours of passenger services. It was therefore agreed that the technical team should concentrate on amendments on the East Suffolk Line.

The purpose of this technical note is to capture the team’s emerging view on the documents available to assist SCC in developing its formal response to the EDF submission. To that end, the team has provided its initial response below to the following key questions:

- Why has Network Rail adopted the approach described in the rail-led proposal?
- To what extent is Network Rail’s approach appropriate as an industry solution?
- To what extent might the programme proposed by Network Rail be compressed?
- What alternate approaches might be worth exploring as a means of delivering a robust programme within EDF’s timescales?
- How might Suffolk County Council respond to this aspect of the DCO as submitted?

It has not been possible in the timescales provided to engage with Network Rail or EDF or any other stakeholders such as the Network Rail System Operator. We have not had sight of the Network Rail GRIP 2 study report, or any further documents outlining the railway proposals, therefore it has been necessary to take an experienced judgement view at this stage. We have not read all of the consultation documents available, and, given the compressed times to this project have undertaken a selective review of the identified documents.

### Why has Network Rail adopted the approach described in the rail-led proposal?

The linespeed for freight through the single track section is limited to 20 mph, which is far less than the 55 mph for passenger trains. The timetabled journey time for the single line section is 21.5 minutes for each passenger train, which does not leave much room in the hour for threading additional freight services through which are likely to take almost 40 minutes. Therefore it is necessary to both increase the linespeed for freight and find a means of allowing freight and passenger trains to pass on the loop.

The introduction of additional and faster services is likely to trigger the need for level crossing assessments on some 47 level crossings, and Network Rail’s initial view is that 45 may need upgrade or closure as a result.

### To what extent is Network Rail’s approach appropriate as an industry solution?

As far as we are able to deduce the reasons from the proposed solutions, it appears to us that Network Rail has presented its optimal solution. That is to say, it appears to have a logical basis and represent a reasonable position to take at GRIP 2 given the level of risk Network Rail is typically prepared to take at this stage. In the normal sequence of events, subsequent GRIP phases would be expected to challenge and refine the design, seeking a reduction in scope and costs where possible.

The 52-month programme from GRIP 3 to Infrastructure Delivery looks to be a reasonable first pass, and we anticipate would include allowance for the statutory consultation processes.

### To what extent might the programme proposed by Network Rail be compressed?

Although it may be possible to achieve time savings through a mixture of resource, scope and process solutions, these are not sequential and a great deal of overlap is likely e.g. a reduction in the number of level crossings may

achieve savings through a reduced scope and reduced need for specialist resource, but the benefit is not additive, nor is it easy to disaggregate.

In the natural course of projects, not every aspect goes as planned, and not every improvement is quite as positive as hoped. Therefore, an initial estimate on the savings possible is 3-8 months (up to 15%) overall with strategic adoption of the measures outlined above. A more detailed review is unlikely conclude that further savings would be possible.

### **What alternate approaches might be worth exploring as a means of delivering a robust programme within EDF's timescales?**

We have presented a series of alternate operational and infrastructure approaches that could be considered and discussed with the Network Rail teams. The operational approaches are aimed at avoiding or minimising changes to the level crossings and hence reducing programme duration and risk, though they may increase costs. The infrastructure approaches suggested are unlikely to be complete solutions in themselves, though they may form part of the discussion to provide a holistic solution.

It is possible that some or all of these propositions have been tried and rejected in GRIP 2 for robust reasons, but we consider that an ongoing conversation with Network Rail should seek to examine whether any of these might present a realistic prospect of being delivered by 2025 and in so doing provide the environmental benefit to society and business benefit to the railway industry.

### **How might Suffolk County Council respond to this aspect of the submitted DCO?**

We suggest that SCC's response could contain the following comments and challenges:

- We note that the GRIP 2 report was completed some 15 months ago, but it is not clear what further work, if any, has been taken to progress this since then.
- We would hope that Network Rail has been continuing to develop the scheme on behalf of EDF and should have a much better idea of the likely level crossing changes should be.
- The reports suggest that Network Rail has been conservative / cautious in its approach to date, and a third party approach (such as that used on the Northumberland Line recently) may be more focused on value and less constrained by process.
- SCC would ask for Network Rail's GRIP reports to be shared and would welcome discussion between Network Rail and SCC's advisors in the key disciplines including Level Crossings and Operations in order to test alternate strategies
- Passenger services on the route are fairly self-contained so we wish to explore to what extent Network Rail has considered re-casting the timetable to suit the introduction of freight services.
- We have considered potential operational and infrastructure solutions at conceptual level and consider there may be alternatives that require fewer infrastructure changes and hence may be more deliverable within the programme time remaining.

# 1. Introduction

## 1.1 Context

EDF Energy (“EDF”) has submitted a DCO as to enable the delivery of a new nuclear reactor, ‘Sizewell C’ near Leiston in Suffolk. Its construction proposition involves an ‘integrated highways and railways transport’ strategy which makes more use of road haulage than Suffolk County Council (SCC) consider acceptable.

At the stage 3 consultation considerable details were included on a rail led strategy including improvements to the East Suffolk Line. This report relies on information contained within that document and knowledge that the previous consultation proposed a rail-based strategy was developed by Network Rail (NR) to stage 2 of Network Rail’s Governance for Railway Investment Projects (GRIP). The indicative programme from that exercise suggested a programme that EDF now feels places too much delivery risk on the railway upgrades proposed by Network Rail.

## 1.2 Brief

SCC would like an independent view on whether the strategy proposed by Network Rail is appropriate and deliverable within EDF’s timescales to begin construction in 2025.

SCC has asked AECOM for a targeted high level review of EDF’s railway proposition. AECOM has asked Cadenza Transport Consulting Limited (“Cadenza”) for assistance, having worked together on other similar projects recently.

## 1.3 Methodology

SCC has provided AECOM and Cadenza with various links to publicly available documents relating to EDF’s proposals. AECOM and Cadenza have obtained further railway industry reference documents and other publicly available information such as Google Earth Pro mapping.

SCC gave the AECOM and Cadenza technical leads a briefing on Friday 4th September 2020 and requested high level draft feedback by Tuesday 8th September.

The AECOM and Cadenza technical leads have reviewed the documents provided as shown in Appendix A. AECOM has focussed on the operational and timetable aspects, while Cadenza has focussed on the infrastructure, systems and consents aspects.

SCC advised (04 Sep 20) that EDF’s integrated transport proposals included the railway works to the Leiston branch, including the ‘Green Line’ option, the Saxmundham junction modifications and three freight trains each way per 24-hour period, to operate between 2300 and 0600. It was therefore agreed that the technical team should concentrate on amendments on the East Suffolk Line.

Together the team has then captured its findings in this technical note.

## 1.4 Purpose and structure of this document

The purpose of this technical note is to capture the team’s emerging view on the documents available to assist SCC in developing its formal response and representations to the EDF Development Consent Order (DCO) consultation. To that end, the team has provided its initial response below to the following key questions:

- Why has Network Rail adopted the approach described in the rail-led proposal?
- To what extent is Network Rail’s approach appropriate as an industry solution?
- To what extent might the programme proposed by Network Rail be compressed?
- What alternate approaches might be worth exploring as a means of delivering a robust programme within EDF’s timescales?
- How might Suffolk County Council respond to the DCO, specifically in terms of the removal of a rail led freight strategy?



This technical note adopts a structure that follows the sequence of questions above followed by Appendices containing profiles of the authors and a list of documents reviewed.

The work captured in this technical note is preliminary, based on very limited information and within very limited timescales. Some of the findings and conclusions identified here may be overturned in future as more information comes to light.

It has not been possible in the timescales provided to engage with Network Rail or EDF or any other stakeholders. We have not had sight of the Network Rail GRIP 2 study report, or any further documents outlining the railway proposals, therefore it has been necessary to take an experienced judgement view at this stage. We have not read in detail all of the consultation documents available, and, given the compressed times to this project have undertaken a selective review of the identified documents.

## 2. Why has Network Rail adopted the approach described in the rail-led proposal?

### 2.1 Summary of the rail-led proposal

The 2019 Stage 3 Pre-Application Consultation January 2019 Volume 1 Development proposals summarises the major changes to the East Suffolk Line as follows.

#### *8.5. Upgrades to the East Suffolk line (rail-led strategy)*

*8.5.1. Under the rail-led strategy, all trains bringing materials for the construction of Sizewell C would travel along the East Suffolk line as far as Saxmundham and then along the branch line towards Leiston.*

*8.5.2. At the Stage 2 consultation, we explained that due to the hourly passenger service operating between Ipswich and Lowestoft, combined with the existing sections of single track, there is very limited capacity on the line to accommodate the additional freight services required for the project. We explained that we were working closely with Network Rail to establish the upgrades required to increase the track capacity to accommodate the additional five freight trains a day, over and above the existing passenger timetable, and to identify the precise location of a 'passing loop' (a section of double track) on the East Suffolk line between Ipswich and Saxmundham in order to increase the capacity of the existing single track.*

*8.5.3. At Stage 2, we also noted that additional signalling would be required between Ipswich and Saxmundham to enable trains to be dispatched more efficiently along this section of line, and that a track crossover might also be required at Saxmundham to avoid a capacity constraint at the point where the track joins the Saxmundham to Leiston branch line.*

*8.5.4. The feasibility study carried out by Network Rail since the Stage 2 consultation has confirmed that all of the infrastructure upgrades described above would be required in order to support use of the East Suffolk line for up to five freight trains per day. In addition, the feasibility study confirmed that 45 level crossings along the route from Ipswich to the Saxmundham junction may require upgrading or closure and six bridges would potentially require strengthening.*

*2019 Stage 3 Pre-Application Consultation January 2019 Volume 1, page 256*

### 2.2 Timetable operations

To operate freight along the East Suffolk Line, a timetable path must be found between the existing passenger trains. Passenger trains are cleared to run at up to 55 mph on the single line section between Woodbridge and Saxmundham, but taking into account stops for stations, the block section from Woodbridge station to Saxmundham station is timetabled to take approximately 21.5 minutes in either direction.

Since it is a single line section, trains can only run in one direction at a time, so a total of 43 minutes in the hour is taken up by an off-peak service of one train per hour per direction, leaving approximately 17 minutes in the hour.

Non-nuclear-flask freight services are restricted to 20 mph in this section and, assuming non-stop travel at maximum allowable speed the whole way, might be expected to take 40 minutes to clear the section, stop to stop.

To each of these times, junction re-set time and timetable resilience allowances are likely to be added, so there simply is not the time in the current timetable and track configuration to fit the trains onto the track and maintain a regular hourly timetable.

It is not entirely clear why the freight speed is limited to 20mph, though there are several possible causes, including: limiting track damage, reducing risk at specific level crossings, positioning of signals for level crossing 'strike-in' points, and weak underbridge structures. All of these are resolvable with further investment in the railway, but of these, the changes to level crossings present the greatest programme risk as described further in section 2.3.

To mitigate the effect of slow freight trains, Network Rail proposed to double the maximum allowable freight run speed to 40 mph, taking a minimum 24 minutes to traverse the single line block section, given a 15mph restriction leaving Woodbridge onto single line. This is still not fast enough to maintain a reliable service, so a passing loop is proposed.

By Stage 4 Consultation, the location of the passing loop was relocated from Wickham Market station to a position a couple of miles south of the station and extended from approximately 500 m to approximately 900 m long, presumably to allow longer trains and/or to allow the freight to enter/leave the loop at a reasonable speed and avoid blocking the primary line for too long.

The introduction of the loop would also create new signal block sections within the single line section, allowing a freight train to follow a preceding passenger train into the single-track section earlier.

Although we have not yet been able to carry out an assessment of the timetable, it is surmised that this strategy would enable a reasonable timetable to be developed that allowed the through movements of freight.

## 2.3 Level crossing alterations

One of the important features of this route is the 47 level crossings from Ipswich to Saxmundham junction. Some of these were upgraded earlier this year<sup>1</sup>, however in the absence of detailed information from NR it is not possible to confirm what further upgrades may be needed to accommodate either faster or more frequent freight services. Any increase in the number of services on the route will increase the risk profile at most level crossings and may require further upgrades.

Each level crossing would need to go through several stages:

- 9-day census: to establish current usage patterns. Not just numbers and types of users but capturing any risky behaviours.
- ALCRM reports: The All Level Crossing Risk Model (ALCRM) is a calculation model to determine the overall risk profile of each level crossing given specific inputs. This can only be carried out by Network Rail, and AECOM/Cadenza's experience on the Northumberland Line has been that this can take 6 months or more to complete.
- Suitable and Sufficient Risk Assessment (SSRAs): A structured approach to develop a report concluding the most appropriate solution.
- Consultation: Level Crossing Orders (LCOs) statutory consultation process with the Office for Rail and Road (ORR), relevant land owners, and the statutory duty holders for the railway and the highway.
- Preparation of Ground Plans (for highway level crossings with proposed changes): Very detailed drawings compliant with a specific standard for duty holder signoff.
- Design and construction of the level crossings.
- Obtain agreement with duty holders to stop up or divert Public Rights Of Way (PROWs) by private treaty or Transport and Works Act Order (TWAO).

This is a lengthy process and resource constrained at specific points. Network Rail's insistence that the analysis must be done by them has been a programme critical path problem elsewhere. The ORR has very limited staff, with perhaps ten individuals covering all the level crossings in the country, but in practice it is fewer than this because some staff take on policy or managerial roles, and the individual likely to cover the Suffolk patch is also likely to be the same person we are working with in Northumberland. Thus, their rate of review of the level crossing proposals is likely to be constrained and this could present a programme risk.

## 2.4 Other infrastructure and systems

Network Rail has flagged up that perhaps six bridges may need to be strengthened. This would require a review of the latest structural assessments and new inspections if the latest inspections were too old or not available.

The proposal for a passing loop has been identified above as having an operational imperative. The location of the passing loop appears sensible, seeming to avoid including level crossings within it, which would further

<sup>1</sup> <https://eastsuffolklines.co.uk/upgrade-improves-safety-and-reduces-wait-time-at-manual-crossings>

increase crossing risk. It is not clear how the length has been calculated or what the acceptable speed over the crossings at each end is, so it is not possible to consider whether this is the right length, but it seems reasonable in principle.

The increase in freight traffic may drive additional track maintenance or even upgrade to cope with the additional tonnage, and the costs of this may be one aspect to EDF's desire to restrict the number of freight trains using the route.

The existing and proposed signalling systems are barely described, other than to identify eight new signals relating to the loop. It may depend a little on exactly how the signals are counted, but it could well be the right answer for a loop that is bi-directional on both sides, as would be needed in this situation. It is not clear how the existing system protecting two trains from being on the same piece of track is to be replaced, but we would assume that the single line is re-signalled to be consistent with the adjacent signalling system (unknown).

Unlike the LCOs / TWAO, all of these works are likely to be constructed within the railway boundary within Permitted Development Rights (PDRs) unless new permanent accesses and/or temporary access rights are required.

## 2.5 Indicative programme

The AECOM notes from the initial meeting with SCC indicate:

*...indicative delivery timescales provided by Network Rail as below based on a Summer 2019 commission:*

*Phase 2 Rail-Led Option, Main-Line Upgrade, Loop Option 3, Junction Option 4 (54xSEU's, 33xLXEU's) 96 mons Mon 01/07/19 Fri 06/11/26*

*GRIP 3 (Option Selection) 9 mons Mon 01/07/19 Fri 06/03/20*

- *GRIP 4 (Single Option Development / Concept Design) 12 mons Mon 08/02/21 Fri 07/01/22*

- *GRIP 5-6 (Detailed Design, Construction, Testing & Commissioning) 27 mons Mon 12/12/22 Fri 03/01/25*

- *Rail Infrastructure ready for 5FTPD 0 days Fri 03/01/25 Fri 03/01/25*

- *GRIP 7 (Scheme Handback) 6 mons Mon 06/01/25 Fri 20/06/25*

- *GRIP 8 (Project Closeout) 18 mons Mon 23/06/25 Fri 06/11/26*

It should be noted that at time of writing, we understand the GRIP 3 stage has not been started, and hence this programme is already delayed by 15 months, which implies the infrastructure readiness date of Jan 2025 would also be 15 months delayed, representing nearly 30% of a 52 month programme and a revised delivery date of approximately March 2026 if GRIP 3 commenced immediately.

The DCO as submitted does not include any improvements to the East Suffolk Line other than at the junction with the Leiston Branch at Saxmundham.

### 3. To what extent is Network Rail's approach appropriate as an industry solution?

#### 3.1 Preliminary response

Without access to the original GRIP 2 document, it is not possible to assess the detail, but as far as we are able to deduce the reasons from the proposed solutions, it appears to us that Network Rail has presented its optimal solution.

That is to say, it appears to have a logical basis and represent a reasonable position to take at GRIP 2. In the normal sequence of events, subsequent GRIP phases would be expected to challenge and refine the design, seeking a reduction in scope and costs where possible, though in practice, further investigations often lead to a greater scope in response to unforeseen conditions.

The 52 month programme from GRIP 3 to Infrastructure Delivery looks to be a reasonable first pass, and we anticipate would include allowance for the statutory consultation processes. The ORR advises that LCOs typically take 12-24 months to complete, but to achieve the 12-month end of the scale requires very great efficiency in the whole process which, as we have commented, cannot be guaranteed.

## 4. To what extent might the programme proposed by Network Rail be compressed?

### 4.1 Resource solutions

Our preliminary view is that the greatest risk to the programme is the resource capability to process the various level crossing assessments and changes. This might be improved by:

- Early agreement with Network Rail to commit to service level agreements for the delivery of the ALCRM reports within, say, 4 weeks. It may be that the promoter would need to cover the costs of additional resource within Network Rail to deliver this, and make representation (as AECOM/Cadenza has done) to Network Rail for third parties to be allowed to use the model, perhaps under 'license'.
- Early engagement with the ORR to agree a programme of works, so that it is able to gear up to review the SSRAs in a timely manner.
- Early engagement with legal consent expertise to ensure that the consenting strategy covers the powers needed for stopping up and diverting PROWs alongside preparing and executing the LCO powers.
- Ensure that Network Rail and/or the supply chain has the capacity to develop the SSRAs and Ground Plans in bulk. Note that for some types of level crossings, it may be possible to group similar crossings into one SSRA for efficiency.
- Design the level crossing solutions on the basis of a 'conservative best guess' approach, while the census, ALCRM and SSRAs are being developed, accepting that some will need to be re-done as a result of the findings of the formal assessment process, but in the meantime, the overall design delivery will be ahead of programme.
- Work with Network Rail as early as possible to consider each level crossing against different permutations of timing, frequency and speed of freight trains to determine what might be possible without major changes to level crossings infrastructure. This would be 'reverse engineering' to determine what the level crossings are able to accommodate, and design the timetable around this in order to minimise impacts on the programme.

Possible improvement in programme duration to infrastructure complete: 2-10 months estimated

### 4.2 Scope solutions

It is possible that Network Rail would itself identify opportunities to improve the solution through the normal GRIP process, though independent challenge can also be helpful. It seems likely to us that a scope challenge would have the following effects:

- Reduction in the number of level crossings to be upgraded or altered, particularly given the works completed earlier this year.
- Increase in the costs of level crossing closures (through the requirement to replace some with footbridges).
- Reduction in the degree of interventions to the underbridges.
- Possible increase in allowable freight speed – perhaps tempered by the extent of track damage anticipated as a result and consequentially the quantum of track renewals proposed. We would hope that track works themselves would be refined and reduced back down if senior leadership is supportive.
- Additional/improved signalling to support closer spacing of trains following through the single line section
- Deliver as many changes within PDRs as soon as possible as advanced works, in parallel with the consenting process activities so that as little as possible is left once the legal powers are granted.

Unfortunately, several of these would result in increased costs in order to deliver improved performance. Most would have little or no impact on the programme to construction, though a few months may be saved if a significant number of level crossing changes could be removed from the scope and works within the boundary could be delivered early.

Possible improvement in programme duration to infrastructure complete: 4-10 months estimated.

### 4.3 Process solutions

Over the last few years, Network Rail has become much more open to the idea of working with third party projects to deliver railway projects, though this is typically aimed at new stations rather than route upgrades. The process of getting access to site, record drawings and Network Rail's engineers for discussion and formal review is governed through a (Basic) Asset Protection Agreement, which can often take a long time to prepare and resolve.

Other processes, such as the Rail Network Enhancements Pipeline (RNEP) have been introduced to streamline delivery, though this is a new process and the DfT is still working through the detail of how to conduct stage gate reviews efficiently.

Nevertheless, with strong local and national political support, it may be possible to develop a scheme outside the GRIP process, but connected with it at key points, which can lead to more effective delivery. This does require political support as mentioned, along with a proactive and positive relationship with Network Rail.

Possible improvement in programme duration to infrastructure complete: 2-4 months estimated

### 4.4 Programme compression summary

Although it may be possible to achieve savings in the order of the estimates above, these are not sequential and a great deal of overlap is likely e.g. a reduction in the number of level crossings may achieve savings through a reduced scope and reduced need for specialist resource, but the benefit is not additive, nor is it easy to disaggregate.

In the natural course of projects, not every aspect goes as planned, and not every improvement is quite as positive as hoped. Therefore an initial estimate on the savings possible is 3-8 months overall with strategic adoption of the measures outlined above.

## 5. What alternate approaches might be worth exploring as a means of delivering a robust programme within EDF's timescales?

### 5.1 Operational approaches

#### 5.1.1 Run all five freight trains at night

In this scenario, the five freight trains would continue to run at 20 mph through the night after the passenger services had stopped. We are not sure why the current proposals are limited to three trains at night, save for noise impact on local residents, possible concerns about maintenance access hours for the railway, and signaller operating hours. We also note the recent comments by EDF in the East Anglian Daily Times (10 Sep 20) that EDF aims 'to increase the number of trains deliveries from three to four', though no further information is given over what further changes are proposed to enable this.

To enable all five trains to run at night, it may be necessary to carry out track works to improve ride quality and reduce noise. Similarly, strategic placement of noise barriers or sleeper pads to reduce sound and vibration may help. Given the prospect of a few freight trains at night versus many more lorries during the day, it may be that residents prefer the night freight option.

If the proposed options are limited to three trains because the signaller hours are limited, it may be appropriate for EDF to pay for additional signallers during the construction period. It is also likely to be necessary to retain engineering access hours, though this could perhaps be built into 'rest days' when EDF could manage without freight services.

It may be necessary for the Green line option to be extended or include three or more sidings to facilitate temporary storage and/or rapid unloading.

This approach would add capital cost to this element of the scheme but it might avoid changes elsewhere to the level crossings and thereby simplify delivery significantly.

#### 5.1.2 Run longer trains

If three trains per night is acceptable, perhaps each train could be lengthened to cover the equivalent of five trains. This would allow the existing integrated solution to accommodate the freight volume required without additional major intervention and programme risk. We note, however, that we don't know how long the current trains are intended to be, though we understand from SCC that the intended loading is approximately 500 tonnes, which gives a train length of approximately 150m which seems too short. Typical tonnages for aggregate trains are well over 1000 tonnes, even as much as 3,000 tonnes with sufficient traction power.

For three trains to cover the loading of five trains, each train would need to be 60% longer which would have several consequential impacts as a solution:

- Longer sidings needed at the Leiston terminus and any other loops or temporary sidings on route from the source / destination
- Heavier trains may require additional locos or cause difficulties keeping to the timetable
- Signalling block sections may need to be altered if the trains become too long, which would be very expensive

#### 5.1.3 Run trains night and day

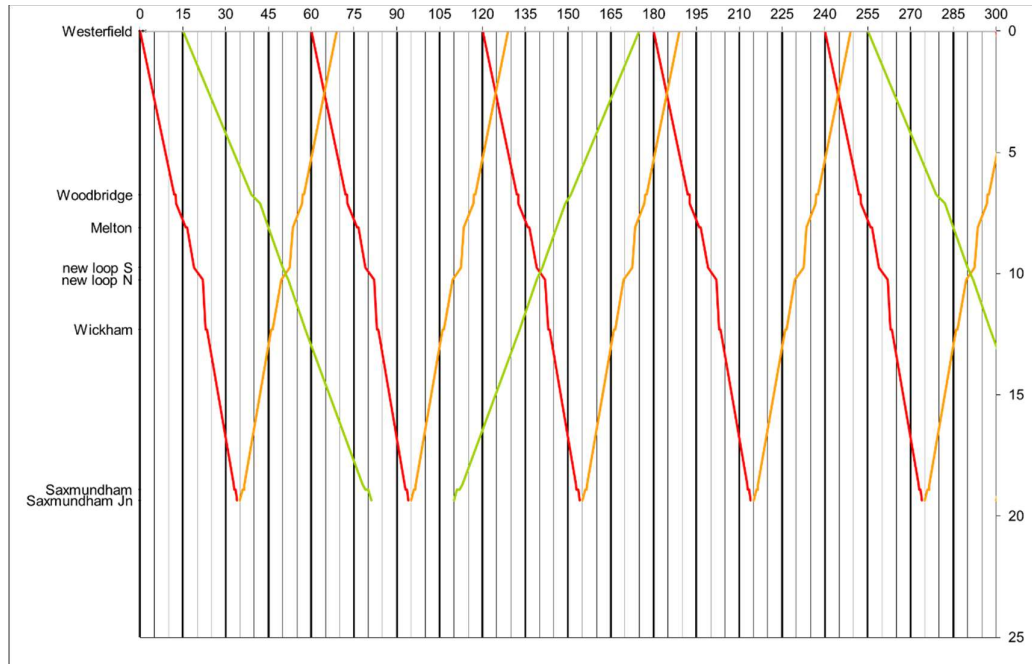
If three trains run at night and the passenger timetable were altered to feed just two trains through in the day, then the five train requirement could be achieved.

It is likely that this solution would require passenger services on the East Suffolk line to lose their clock face timetable, squeezing services closer together to free up two or three slots long enough for a 20 mph freight to thread through the train timetable with room to spare for disruption.



This strategy is illustrated in Figure 1 below with red lines indicating the northbound passenger service, the orange lines as the southbound passenger service, and the green as the freight in either direction.

**Figure 1 Use of passing loop to accommodate 20mph freight**



The graph shows the time in minutes across the X-axis and distance from Westerfield on the Y axis, working towards Saxmundham junction at the bottom left. Services before and after these points are not shown because they are on dual track thereafter which means that services in opposite directions may pass without conflict, though a service in the same direction may catch up.

The strategy shown here assumes the freight will run through at current 20mph linespeed limits, with the passenger trains pausing in the passing loop. Although it would be normal for the passenger train to take priority at the passing loop, the time taken for the freight to slow and then clear the section would probably add more delay to the passenger service than the strategy illustrated here, though in practice it could result in a more reactive arrangement between the freight and passenger trains.

The clear risk to this option is that delays to either the passenger or freight services could make this difficult to recover. However, the benefit is that the level crossing study would only need to consider an increase in trains per day from 35 to 40 (+14%) rather than an increase in speed as well, and therefore fewer level crossings are likely to need upgrade, and hence the delivery risk is much reduced.

### 5.1.4 Run trains seven days per week

We are not clear what the EDF strategy is for running trains at weekends, but given the likely reduction in passenger services at these times, it may be possible to retain the proposed 3 freight trains per day on week days, but increase the number of freight services at weekends to make up the difference.

If the total number of freight trains became too high for the timetable or for public acceptance or for unloading/loading in the sidings, then it may be possible to increase the length of each train as per section 5.1.2 in combination.

## 5.2 Infrastructure approaches

### 5.2.1 Two passing loops in the single line section

The principle here would be to create two passing loops at roughly 1/3 and 2/3 the distance along the single line section with a view to creating the opportunity for freight to work its way up the section between passenger trains.

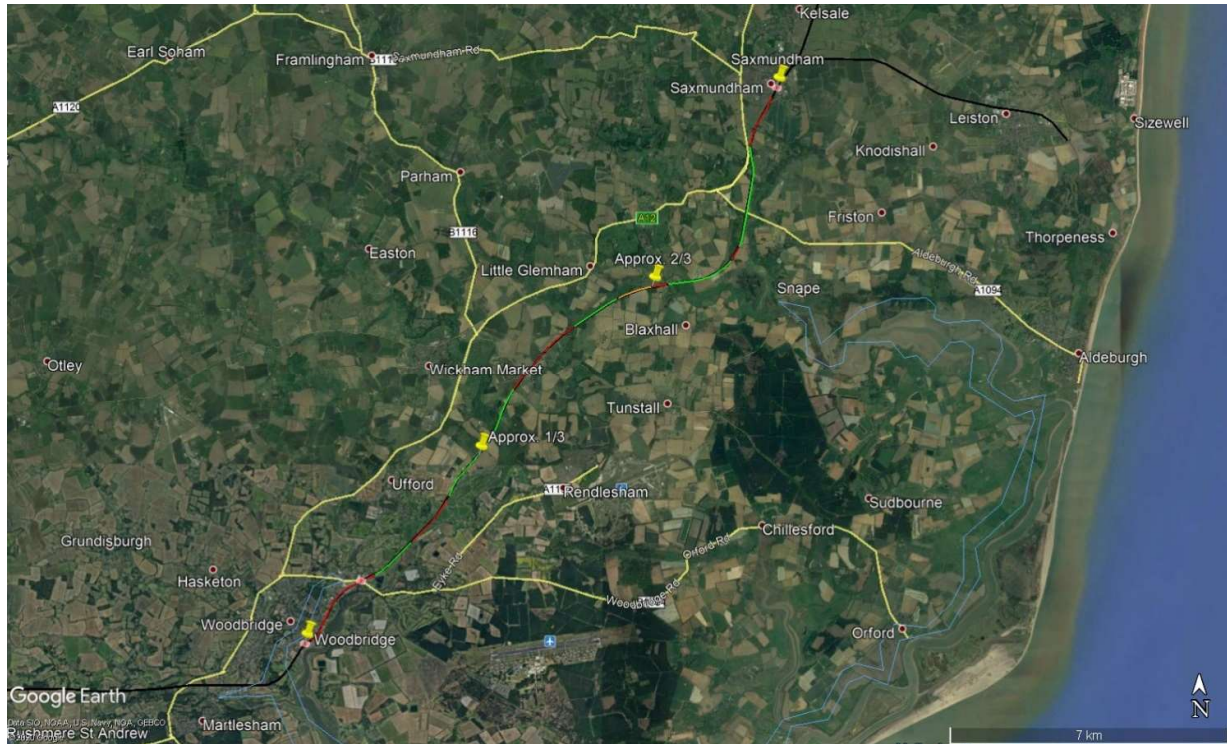
**Figure 2: Initial assessment of potential loop locations**

Figure 2 illustrates in green the sections where a loop may be possible without conflicting with level crossings, in order to simplify arrangements. It would require signalling modifications to accommodate the new switches, significant track slew/relaying, and possible embankment works.

Where this might help is in allowing existing line speeds and passenger train operating patterns to remain but for freight to weave its way through in short steps. However, we have not yet been able to model the off-peak timetable or assess the practicality of this.

There are drawbacks with this approach, apart from cost:

- Operators will generally try to keep freight moving because it takes a long time to get up to speed and a long time to stop, which has detrimental impacts on the other rail operations. For freight to stop in a loop, then start up and run for just a few miles before stopping again is very inefficient. Although freight services are often less time-sensitive than passenger services, it does have a cost.
- Dependency on passing loops is restrictive when dealing with disrupted operations.
- Since it is likely that the increase in services will drive level crossing assessments and possible upgrades throughout anyway, there may be very little advantage to attempting to retain the existing freight speed in order to avoid making changes to level crossings.

Given the drawbacks of this approach, we would consider that this would have a low chance of adding sufficient value on its own to be worth pursuing, though the principles explored may have value in conjunction with other solutions suggested.

### 5.2.2 A freight holding loop south of Woodbridge junction

A passing loop off the Down line south of Woodbridge junction would potentially allow a northbound freight to wait up while a passenger train passed, and then follow close behind as soon as the section were clear. This proposal would benefit from the addition of at least one new track section within the single line so that the faster passenger train could clear the entry to the single line section quicker and hence make more efficient use of the timetable path. At the other end, the Leiston branch line serves to provide a similar function.

Without a full understanding of the timetable it is not possible to confirm the suitability of this solution, but there are some potential drawbacks we note below.

- The closest likely location for a holding loop south of Woodbridge junction is also south of Woodbridge station and is only about 830m long between Broomheath and The Avenue, which is further away from the junction than desirable.
- This approach might only gain win back 5-10 minutes from the hourly timetable given the relative journey time differentials of passenger and freight trains through the single line section.
- The holding loop would require purchase of land.
- It is likely that the increase in services will drive level crossing assessments and possible upgrades throughout anyway, so the provision of a holding loop may not in itself allow the freight line speeds to be retained and save the cost and risk of level crossing upgrades.

Given the drawbacks of this approach, we would consider that this would have a low chance of adding sufficient value on its own to be worth pursuing, though the principles explored may have value in conjunction with other solutions suggested.

### 5.3 Alternate approaches summary

It is possible that some or all of these propositions have been tried and rejected in GRIP 2 for robust reasons, but we consider that an ongoing conversation with Network Rail should seek to examine whether any of these might present a realistic prospect of being delivered by 2025 and in so doing provide the environmental benefit to society and business benefit to the railway industry.

## 6. How Might Suffolk County Council Respond to the Transport Strategy as Submitted in the DCO?

### 6.1 Guiding principles

As far as we are able to discern without access to Network Rail's work, we consider that they appear to have to have taken an optimal approach that is logical, if a little conservative, which is reasonable at GRIP 2.

The extent of level crossing assessments is a programme risk, but we are aware that some changes have been made since the GRIP 2 report. What is not so clear is whether Network Rail has continued to develop the scheme since GRIP 2. The design may have moved on, in which case lessons on programme acceleration from Northumberland Line would have more chance of success.

There is a natural inclination to retain a 'clockface' passenger timetable i.e. services depart at the same times past each hour, but this is a fairly self-contained route between Ipswich and Lowestoft, and there may be opportunities to re-cast the timetable to accommodate freight services if an irregular service is acceptable to stakeholders.

However, we have also presented some ideas in concept that should be discussed with Network Rail to examine whether they might offer a viable alternative.

### 6.2 Suggested response points

We suggest that SCC's response could contain the following comments and challenges:

- We note that the GRIP 2 report was completed some 15 months ago, but it is not clear what further work, if any, has been taken to progress this since then.
- We would hope that Network Rail has been continuing to develop the scheme and should have a much better idea of the likely level crossing changes should be given different permutations of timing, frequency and speed of freight trains.
- The reports suggest that Network Rail has been conservative / cautious in its approach to date, and a third party approach (such as that used on the Northumberland Line recently) may be more focused on value and less constrained by process.
- SCC would ask for Network Rail's GRIP reports to be shared and would welcome discussion between Network Rail and SCC's advisors in the key disciplines including Level Crossings and Operations in order to test alternate strategies
- Passenger services on the route are fairly self-contained so we wish to explore to what extent Network Rail has considered re-casting the timetable to suit the introduction of freight services.
- We have considered potential operational and infrastructure solutions at conceptual level and consider there may be alternatives that require fewer infrastructure changes and hence may be more deliverable within the programme time remaining.

## Appendix A Author profiles

### Claire Falkiner BCom, MSc MIRO, MCIHT

Associate Director, AECOM

Claire has 30 years of experience in rail-based operational planning in the UK and Ireland. Claire has worked for train operating companies, government bodies and major infrastructure project teams, gathering extensive knowledge of rail industry systems and processes. This includes national timetable planning/operations/performance as well as the interfaces with fares/ticketing/reservations systems. She has applied a number of operational modelling tools, including Railsys and VISION, in addition to developing spreadsheet-based analysis. Claire has particular experience in analysing the relationships between practical operational and commercial/financial issues, both at an early stage of scheme development and on established corridors. Specific projects of relevance include:

- **Warrington Borough Council - Warrington West Operational Modelling:** Project Manager for Railsys operational modelling study determining impacts of new station on busy railway between Manchester and Liverpool. Development of new timetable and stopping pattern around complex capacity constraints at either end of route. Assessment of infrastructure interventions including revised signalling.
- **Network Rail/DfT – Line Speed Improvements Strategic Outline Business Cases:** Project Manager for three separate Strategic Outline Business Cases for investment in line speed improvements, to facilitate new stations and enhanced frequency on South Wales relief lines, North Wales coast and Wrexham-Bidston route.
- **Network Rail – Maesteg frequency enhancement:** Timetable development and operational modelling to assess feasibility of increasing frequency of heavy rail service on Maesteg branch to 2 tph, through upgrading existing loop. Detailed analysis of actual timings, including token working and variations in vehicle performance.
- **Abellio Rail Cymru - Cardiff Valleys capacity enhancement W&B franchise bid team:** Major element of larger study into improving capacity of Cardiff area railway network. Primary areas of responsibility - strategic transport planning issues, light /heavy rail evaluation, operational simulation and passenger demand/revenue/crowding forecasting.
- **Welsh Government – Carmarthen-Aberystwyth re-opening:** Initial feasibility of rail-based options to improve connectivity between West and Mid-Wales. Identification of alternatives to former rail alignment, including new tunnelling. Led multi-disciplinary team of civil engineers, geo-technical advisors, transport planners, property/consent advisors, operational analysts and environmental experts in high level creation of options and multi-criteria assessment.

### Julian Sindall MSc(Eng) MEng CEng FICE MAPM MIAM

Director, Cadenza Transport Consulting Ltd

Julian is a Chartered civil engineering professional with more than 25 years' experience in a wide range of transport projects in the UK, mainland Europe and the Middle East. He is a specialist in railway feasibility projects, with more than 15 years' experience of developing new routes and stations for railways from the initial idea through feasibility stages and to public inquiry. He provides a 'whole system' approach to route definition, incorporating the needs of the major railway disciplines and balancing those with the physical, geographical, transport, social, political, financial, commercial and economic environment. He has worked on high speed, freight, main line, light rail and metro railways and also provides independent technical reviews on work at a similar stage by other consultants. Specific projects of relevance include:

- **Northumberland Line Feasibility study (UK):** Technical manager / feasibility specialist advisor for the AECOM multidisciplinary team developing an alternative GRIP 2 design for reinstating passenger services on the Ashington-Blyth-Tyne freight route. Prepared the Technical Summary Report, represented the engineering team to the project Steering Group and led the technical presence at public consultation and individual land owner stakeholder engagement. Created the concept of using the new stations as Economic Development Opportunities to support the project aims of regeneration and led social value initiatives.

- **Lakes Line Feasibility study (UK):** Provided technical feasibility support for the Lakes Line Community Rail Partnership to identify and assess options for the location of a passing loop to increase capacity on this single track railway, as well as specific improvements at two other stations. Outputs included a technical report in non-specialist language and indicative cost estimates.
- **HS2 Phase 2b Strategic Alternatives, (UK):** Developing concept designs and design commentaries for a range of interventions for strategic alternatives to HS2 Phase 2b on behalf of Atkins for the Department for Transport. The work included flyovers, tunnels, and route widening schemes.
- **HEx depot relocation (2015-6, Slough Borough Council, UK):** Provided independent technical advice on HS2/Network Rail's proposed relocation of the Heathrow Express (Hex) depot at Langley and developed alternate options to meet Slough Borough Council's objectives. Was Slough BC's rail technical expert witness to the HS2 Select Committee of MPs leading to commercial agreement between the parties.
- **Independent technical review of Crossrail 2 central section (UK):** Provided an independent technical review of the Crossrail 2 technical feasibility work by Hyder Consulting on the central London tunnels and stations providing: a balanced review of the project progress to date and recommendations for changes.
- **Etihad Rail Stage 2 Concept Design (UAE):** Provided project support as trouble-shooter to resolve intractable problems with principles of station design, systems engineering and route proposals for this 500km, £6bn freight / passenger railway through the UAE desert.
- **Košice to Vienna Broad Gauge Study (Slovakia and Austria):** Led multidisciplinary design team developing pre-feasibility study of a 500km, £6bn broad gauge freight railway across the mountains and plains of Slovakia and Austria with associated transshipment facilities.

## SIMON MIDDLETON MEng (Hons) CEng FICE FPWI

Regional Director, AECOM

Simon has over 20 years' experience in the rail and infrastructure market and is Director for AECOM's Eastern Region Rail Business – leading a team of 50 multi-disciplinary rail designers, with revenues in excess of £10M pa. Simon's background includes the planning design and delivery of rail projects in both the UK and Australia. Specific projects of relevance include:

- **Northumberland Line – RNEP Design Phase:** Simon continues to act as Project Director as the Northumberland Line moves forward towards its delivery Phase. Simon has been influential in driving new ways of working that are promoted through the Project SPEED (Swift, Pragmatic, Efficient, Enhancement Delivery) Programme, that is focused on accelerating the delivery of the programme and reducing costs.
- **Northumberland Line OBC:** Simon was Project Director for the ongoing development of the design to support the Outline Business Case (OBC) for the Northumberland Line. This significant piece of work was delivered in half the timescales of traditionally delivered rail projects of this scale and resulted in DfT releasing funding the associated Decision to Design through RNEP.
- **Northumberland Line SOBC:** AECOM are undertaking a number of tasks to progress the Northumberland Line scheme to support its progress through the Department for Transport's (DfT) 2018 guidance on the Rail Network Enhancements Pipeline (RNEP). Simon has acted as the consultant's project director and supported the development of the infrastructure requirements that are required to open the line for passenger services. This includes inputs from various rail disciplines and coordination with the transport planning and business case teams to provide inputs into the Strategic Outline Business Case for the scheme.
- **WMCA Rail Advisor Framework (£30M - 4 years):** Set up joint venture with specialist SME and led AECOM input into successful bid for £30M Rail Advisory Framework with West Midlands Combined Authority and Coventry City Council. The Rail Advisors Framework will enable the Council to draw on SLC Rail's unique expertise in conceptualising and developing rail schemes and unlocking third party funding and AECOM's wide ranging expertise in managing and delivering rail projects. The activities covered by the framework will be for grant funded projects only, and will include developing business cases for rail projects, negotiating new funding models, project planning, project and programme management, timetable performance modelling and station operation planning. The initial framework is being placed by Coventry

City Council, with access also available to West Midlands Combined Authority (WMCA) and Solihull Metropolitan Borough

## Appendix B – Reference Documents

Table 2 List of documents received/obtained

Date Rec'd	Reference	Title	Summary of contents
03/09/20	2020-08-26 SCC – EDF Summary	SCC / Sizewell C Rail Strategy August 2020	Notes from a meeting between Steven Merry and Simon Middleton
03/09/20	Volume 2 TRACKmaps Sep 2006 p9	Railway track Diagrams Eastern	Track layout schematic
03/09/20	<a href="https://www.edfenergy.com/sites/default/files/edf-szc4-sumdoc_digital_compressed.pdf">https://www.edfenergy.com/sites/default/files/edf-szc4-sumdoc_digital_compressed.pdf</a>	Consultation Summary document Sizewell C Stage 4 Pre-Application Consultation Summer 2019	Updated transport proposals
03/09/20	<a href="https://edf.thirdlight.com/pf.tlx/ysyceAyLRmwf">https://edf.thirdlight.com/pf.tlx/ysyceAyLRmwf</a>	Stage 1 Transport Strategy Supporting Document Version 4 Final	Description of the freight movement strategy
03/09/20	SZC_Bk8_8.4_Planning_Statement_2020.pdf	The Sizewell C Project 8.4 Planning Statement Revision 1.0 May 2020	Planning Statement
03/09/20	Sectional Appendix extracts EA1430-002 to 007 and EA1520-001	Sectional Appendix extracts EA1430-002 to 007 and EA1520-001	Local linespeed restrictions and infrastructure locations
04/09/20	<a href="https://www.edfenergy.com/energy/nuclear-new-build-projects/sizewell-c/proposals">https://www.edfenergy.com/energy/nuclear-new-build-projects/sizewell-c/proposals</a>	Sizewell C proposals	Home page of consultation website
04/09/20	<a href="https://edf.thirdlight.com/pf.tlx/YZfYZmqYUoBpQ">https://edf.thirdlight.com/pf.tlx/YZfYZmqYUoBpQ</a>	Sizewell C Stage 3 Pre-Application Consultation January 2019 Vol 2A	Preliminary Environmental Information including the Green Rail Route and Other Rail Improvements
04/09/20	<a href="https://edf.thirdlight.com/pf.tlx/FVFMA3FMgCGVZ">https://edf.thirdlight.com/pf.tlx/FVFMA3FMgCGVZ</a>	Sizewell C Stage 3 Pre-Application Consultation January 2019 Volume 1 Development proposals	Ch8 Rail and Ch9 Level crossings
04/09/20	Working Timetable extracts May20-Dec20	Working Timetable extracts May20-Dec20	Industry railway timetable details
04/09/20	Flood zone from Saxmundham to Sizewell	Flood zone from Saxmundham to Sizewell	Environment Agency Flood Zone mapping extract
04/09/20	Number of passengers to or from Wickham Market station 2018-19	Number of passengers to or from Wickham Market station 2018-19	Extract of data tables featuring Wickham Market
04/09/20	2018-320-001 Level Crossing images SIZ	2018-320-001 Level Crossing images SIZ	4-way images of level crossings on the Leiston branch
04/09/20	2018-320-002 Level Crossing images Woodbridge - Saxmundham	2018-320-002 Level Crossing images Woodbridge - Saxmundham	4-way images of level crossings on the East Suffolk Line single line section
10/09/20	East Anglian Daily Times 10 September 2020	East Anglian Daily Times 10 September 2020	Advert by Sizewell C in the East Anglian Daily Times on 10 <sup>th</sup> September 2020 referring to the proposed increase in the number of trains from 3/day to 4/day



