Wallarah 2
COAL PROJECT

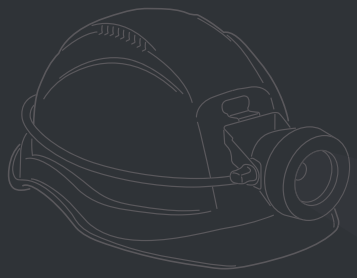
Wallarah 2 Coal Project

Environmental Impact Statement

April 2013

Appendix R

Rail Study



Hansen Bailey
ENVIRONMENTAL CONSULTANTS

Rail Management Consultants Australia Pty Ltd

ABN: 97 096 742 184

Rail Study for the Wallarah 2 Coal Project

Report

Rail Management Consultants Australia Pty Ltd
Sydney, February 2013

Table of Contents

List of Figures

List of Tables

Introduction

The Wyong Areas Coal Joint Venture (WACJV) is seeking to develop the Wallarah 2 Coal Project (W2CP) near Wyong on the Central Coast of New South Wales. Kores Australia Pty Ltd is the majority shareholder and Manager of the WACJV.

Development consent is sought by W2CP for the operation of an underground coal mine producing up to 5 Mtpa of thermal coal for up to 28 years. The Project is comprised of mine entries, an underground longwall mine, a coal handling plant and storage facilities, rail loop, coal loader and other associated underground mining infrastructure. The mine will produce a single thermal coal product to be marketed for export and domestic electricity generation.

The Project has been identified as a mining project as defined in Schedule 1 of State Environmental Planning Policy (Major Developments) 2005. Therefore WACJV is seeking Development Consent under Division 4.1 in Part 4 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) for the Project.

In January 2012, the Department of Planning issued the Director General's Requirements (DGRs) for the environmental assessment of the Project. Included in these DGRs was:

Traffic &Transport:

> ***Including a detailed assessment of the project on the capacity, efficiency and safety of the rail network, having regard to the strategic objectives for passenger and rail freight network (such as the Northern Sydney Freight Corridor project).***
>
> ***A description of the measures that would be implemented to maintain and/or improve the capacity, efficiency and safety of the road and rail networks in the surrounding area over the life of the project.***

RailCorp is the owner and operator of the Main Northern Railway line between the Project site and Broadmeadow. A short section of the track between Broadmeadow and Kooragang Island is on the ARTC managed network.

RailCorp and WACJV have been in discussions on the impact of the project's additional coal movement on the rail network's capacity and efficiency since late 2009. It was agreed that the specific issue of the Project impact on the Northern Sydney Freight Corridor (NSFC) project and the overall rail network be further assessed by a rail network modelling study. This modelling was undertaken by RailCorp using the RailCorp modelling system and incorporated the NSFC assumptions and the current network timetable (April 2012).

WACJV worked in close collaboration with RailCorp throughout this period, and with Rail Management Consultants Australia (RMCA) who were commissioned by WACJV for this purpose. This report on the outcomes of the RailCorp modelling has been prepared by RMCA but draws extensively from the RailCorp modelling, assessment and report (Wallarah 2 Coal Project – Operational Analysis for Future Access Requirements into Port of Newcastle by Rail, April 2012).

EMGA Mitchell McLennan provided input into the *Daily Train Forecast* discussions and opportunistic / interim train movements between Newstan and Port Kembla, the Macquarie Coal Preparation Plant at Teralba and Vales Point and projected Cobbora train movements (EMGA Mitchell McLennan, February 2013). EMGA also provided input into sections of this report dealing with level crossing impacts including closure times and the Draft NSW Freight and Ports Strategy (NSW Government, November 2012).

The ongoing safety of the rail network is determined by the normal operating standards, design protocols and requirements placed by the track operators (RailCorp and ARTC) on any business utilising the network, and as such is not seen as an issue over which WACJV has any impact. WACJV will meet all commitments in relation to safety placed upon it by the track operators.

This analysis of the Project rail system impacts will be included in the Environmental Impact Statement (EIS) to be submitted to the Department of Planning & Infrastructure.

Project Background

Ownership

The WACJV was formed in 1995 in response to invitations by the New South Wales government to submit a tender for the Wyong Coal Development Areas. Coal Operations Australia Limited (COAL), as manager of the WACJV was granted the right to explore the Wyong Coal Development Areas by the NSW Government in October 1995. As a result of a series of mergers/acquisitions, COAL eventually became a BHP Billiton subsidiary.

The interests of BHP Billiton were sold to the Kores Australia Pty Ltd (Kores) in 2005. Kores is the current manager of the Joint Venture. The project was renamed the Wallarah 2 Coal Project (W2CP) in 2006.

The composition of the WACJV is illustrated in Table 1 below:

Table 1 - Coal Joint Venture Ownership

Owner	Parent Company	Nationality	Percentage
Kores Australia Pty Ltd	Korea Resources Corporation	Korea	82.25
Catherine Hill Resources Pty Ltd	Sojitz Corporation	Japan	5.00
Kyungdong Australia Pty Ltd	Kyungdong Co Ltd	Korea	4.25
SK Australia (Wyong) Pty Ltd	SK Corporation	Korea	4.25
SK Networks Resources Pty Ltd	SK Networks Co Ltd	Korea	4.25
			100.00

Location

The Project is located approximately 70 kilometres south of Newcastle and 80 kilometres north of Sydney near Wyong on the Central Coast of New South Wales. The proposed mine infrastructure is immediately adjacent to the Main Northern Rail Line (Sydney to Newcastle) and the Sydney – Newcastle Freeway (F3 Freeway). The project location is shown in Figure 1.

The two main sites for surface facilities are:

- The Buttonderry (Hue Hue) site west of the freeway, which is the location for the main personnel transport facilities (the downcast shaft man-riding cage), the two ventilation shafts and the main office.
- The Tooheys Road (Bushells Ridge) site east of the freeway which is the location of the drift for transport of materials, coal conveyance to the surface, coal handling facilities and the rail load-out area.

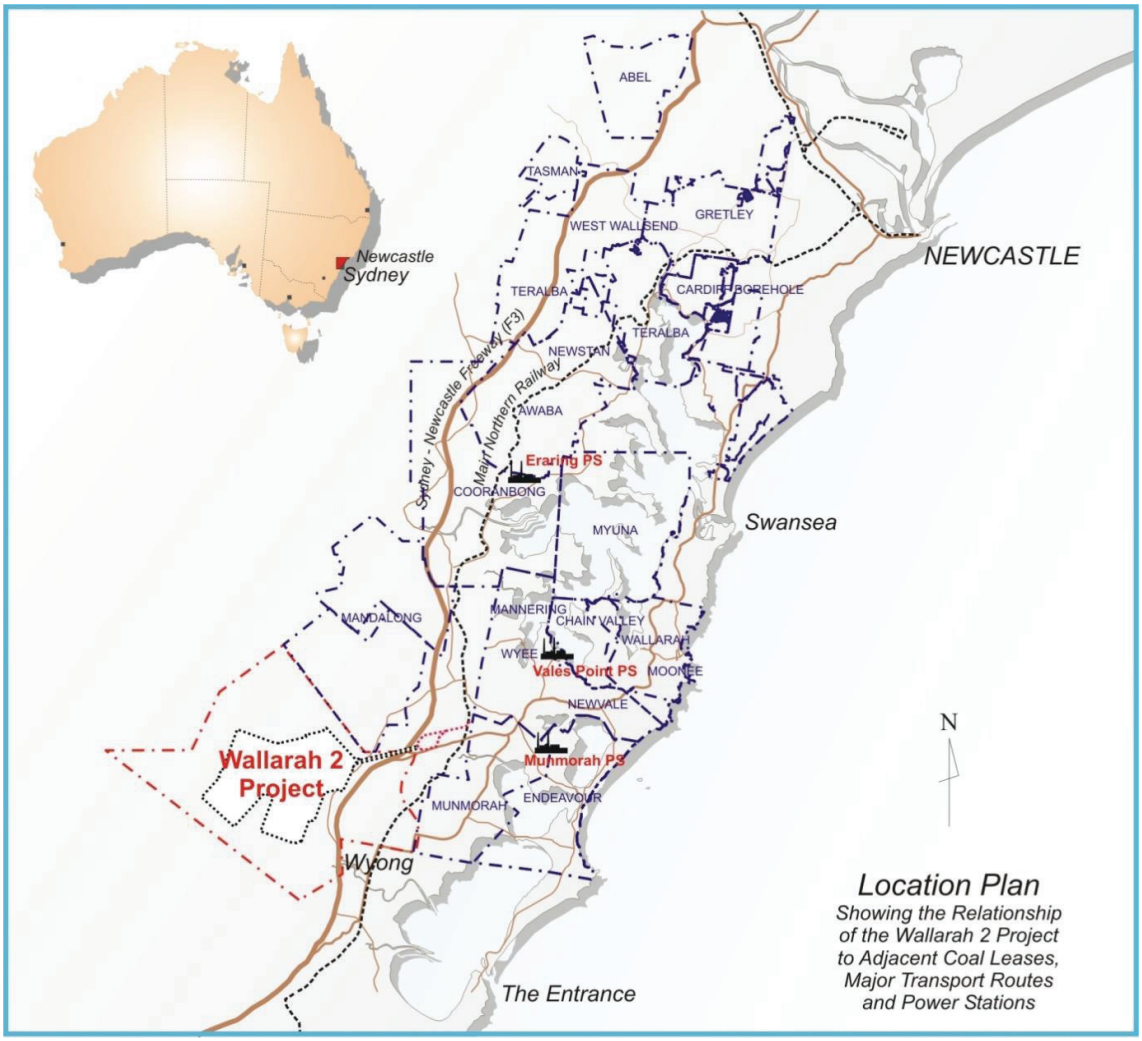


Figure 1 - Mine location map

Mine Operation

The project will involve the extraction of up to 5 million tonnes per annum of export quality thermal coal by underground longwall mining methods.

There will be no coal handling and preparation plant because coal quality is suitable for both the export and local electricity generation markets without the need for additional processing. All coal produced will be railed off site, either to Newcastle for export or to a domestic power station.

The currently proposed mine layout is shown in Figure 2.

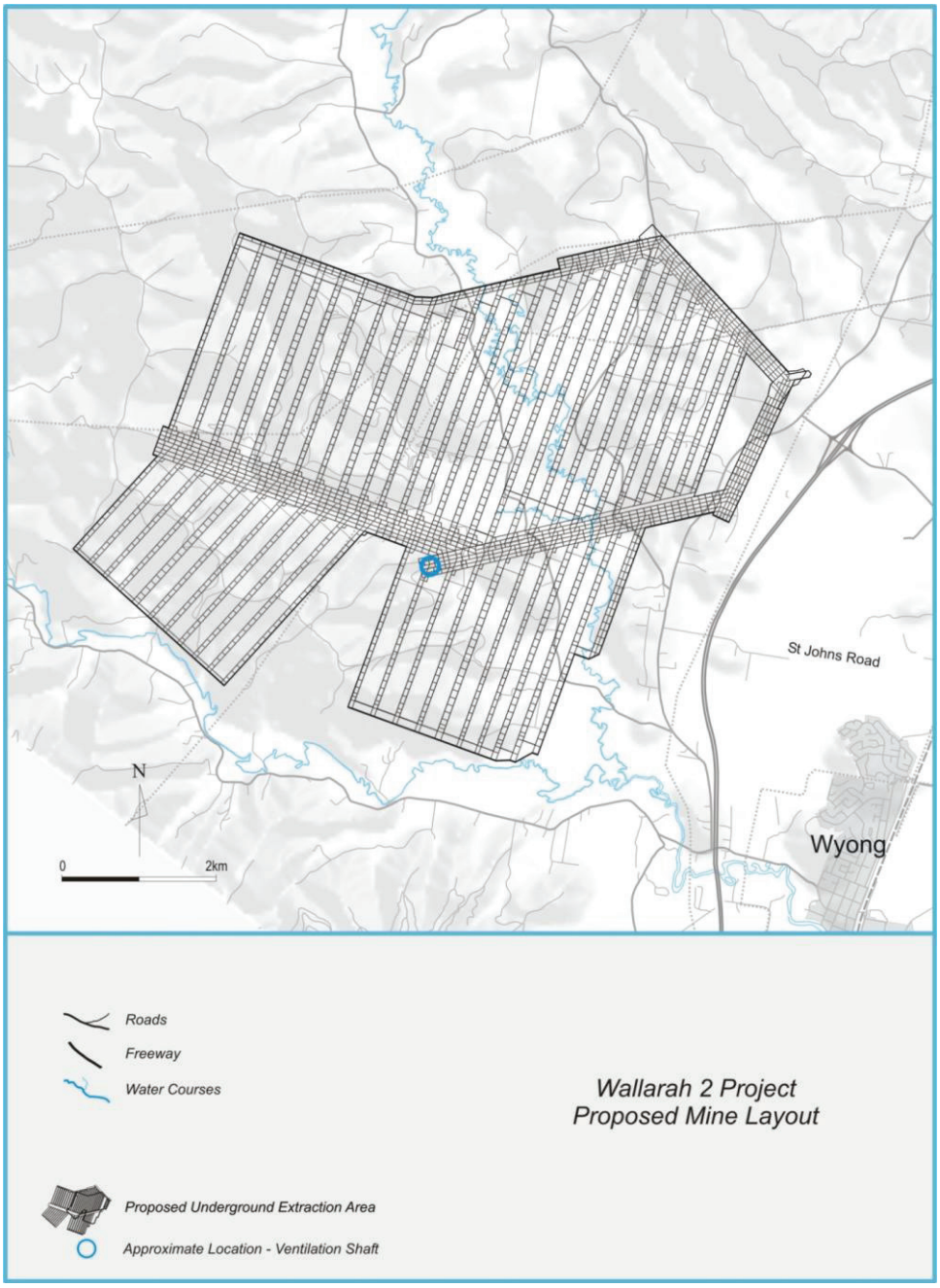


Figure 2 - Mine layout

Coal Handling / Loading

Final engineering design for the coal handling and loading facilities will be completed during the final feasibility study should the project receive development consent. This design will incorporate any specific conditions of consent and be carried out in consultation with all the involved rail transport stakeholders.

The conceptual design of the proposed facilities for handling, stockpiling and loading the coal at the Tooheys Road site consists of:

- A 4,000 t/h receival system
- A 50,000 tonne raw coal surge stockpile
- A 2,000 t/h raw coal reclaim, crushing and stacking system
- A 2,000 t/h stacker to stack crushed coal on the 250,000 tonne live product stockpile, or on an equal capacity emergency stockpile
- A portal bridge reclaimer that operates at 3,500 t/h
- A 3,500 t/h train loading system including a 250 tonne loading bin.
- A Spur and balloon loop off the main railway line with a capacity for three of the anticipated 3,500 t trains.

The train loader at Tooheys Road is designed to operate 24 hours per day, 7 days per week, and load trains at 3,500 t/h. There is adequate track length to store at least one train before the train loading bin and at least one train after the loading bin. Trains will travel in a clockwise direction around the loop.

The loop will access the Main Northern Line about 2 km south of Wyee station.

Train loading time is planned for less than 90 minutes.

The balloon loop design has planned a 40 kph speed limit except on the final approach to the loading bin where 15 kph is planned.

A general arrangement of the rail loop and coal handling infrastructure is shown in Figure 3.

Figure 3 - Mine rail loop

Rail System Description

The rail system description and the operations analysis was undertaken by the Network Access Division of RailCorp with this report drawing heavily from the RailCorp work and reporting. (Wallarah 2 Coal Project – Operational Analysis for Future Access Requirements into Port of Newcastle by Rail, April 2012).

Background

The development of the Project is expected to coincide with the implementation of the Northern Sydney Freight Corridor (NSFC) Stage 1 project. The NSFC is anticipating a general increase of rail traffic on the rail corridor that shall be shared by the Project's coal trains.

The NSFC project provides 48 additional interstate one way paths over and above the pre-existing freight paths, including interstate paths. The supporting analyses for Stage 1 took into account the estimates at that time of 13 "south of Newcastle" coal train path cycles.

Transport for NSW (TfN) and the Commonwealth have since negotiated a Memorandum of Understanding (MOU) for the future interstate freight capacity to be provided by the Stage 1 infrastructure enhancements on that basis.

This latest analysis by RailCorp integrates recent coal industry forecasts, and assessed future changes in train operations and train configurations to meet forecasted coal volumes.

The key elements of these developments are:

- The transition to new more powerful AC traction locomotives replacing existing DC diesel locomotives.
- Plans to operate up to double length trains for new long haul routes as part of the future coal haulages to Central Coast power stations, notably those from the proposed Cobbora Mine. The upgrade of existing mainline junctions at Eraring and Vales Point balloon loop for longer trains to clear sooner.
- An anticipated planning approval of the Project which includes a new balloon loop and rail loader exporting its production through Newcastle. This is expected to increase system throughput up to 5 Mtpa.
- A transition to 30 tonne axle load train operations and adopting homogenous train configurations with those operating already in the Hunter Valley.

The main Hunter Valley coal chain is managed by Australian Rail Track Corporation (ARTC) while the southern rail network from Wyong to Newcastle is almost wholly within RailCorp's network. A short section between the ARTC/RailCorp interface boundary near Woodville Junction and Kooragang Island branch line junctions near Warabrook is within the ARTC managed network.

The ARTC controlled coal and freight operations between Maitland and the export terminals at Port Waratah, Carrington and on Kooragang Island are supported by a full separation from all local Newcastle passenger services between Newcastle and Telarah. This is achieved by a dedicated set of two tracks east of Maitland called the "Coal Roads". These tracks have grade separated links at Hanbury and most recently at Sandgate, into the current three export terminals at Port Waratah/Carrington and on Kooragang Island. Passenger trains and non-coal freight operate on the adjoining two tracks, called the "Mains".

West of Maitland the interaction between coal, freight and passenger trains is minimal with 10 one way passenger trips per day being involved. East of Maitland, on the four separated track section, the daily suburban, regional & Countrylink movements are about 104 one way trips. Up to about 20 non-coal one way freight trips are involved each day.

This operational environment contrasts with the "RailCorp" southern portion of the Hunter Valley coal chain. This network is very much a shared one with a much higher content of passenger traffic and with a wider focus on service reliability, particularly, for those trains whose workings integrate with the Central Coast and Sydney commuter operations.

Increased future coal operations face a much wider more intensive scale of integration with other services which include the following timetabled weekday passenger one way trips:

- Through Kotara (just south of Broadmeadow) the intercity, suburban and Countrylink movements are about 90 trips per day.
- Through Woodville Junction, including local depot and decanting movements there are about 130 trips per day.

Other challenges to future freight operations relate to the physical characteristics of this section of the network and its supporting infrastructure, including the overall smaller loading and unloading coal terminals within the RailCorp network. The following physical characteristics of the southern part of the network have shaped or constrained coal operations:

Having in close proximity a concentration of flat, slow junctions where freight and passenger routes interact. These are at Adamstown, (the southern end of Broadmeadow Yard), Woodville Junction, Islington Junction, Scholey Street and at Kooragang East Junction. These junctions impart the highest impact on through access because of their focal location where passenger and freight movements converge or diverge, and are at their densest. The projected trend to longer trains; including new NSFC 1500m long interstate paths, will impose further pressure in this area. This is because such trains need longer time margins to be clear of conflicting movements.

Poor alignment and slow 20 – 25 kph speeds on the Broadmeadow Up and Down Relief Lines also contribute to the above issues.

Freight overtaking and staging facilities in the Newcastle area are very limited. They presently comprise a 920 m long passing loop at Sulphide Junction and the Up and Down Broadmeadow Yard Relief tracks, which are limited to holding only one 1500m long train in each direction. The use of the latter is usually of short duration and conditional upon not blocking vital access to RailCorp's suburban passenger fleet depot when staged long trains cannot be advanced for operational reasons. *(Note: ARTC has proposed providing a new 1500m capacity refuge between Tarro and Hexham to stage southbound (Up) trains as an addition to Stage 1 NSFC works. This will provide supplementary support capacity when completed).*

Broadmeadow Yard's configuration dates from the early 1980s when the corridor was electrified. It remains suited only to short to medium length train operations. The yard is geographically constrained with very limited scope for redevelopment.

The undulating terrain on the Main Northern Line south of Broadmeadow contributes to significant running time differentials between freight and passenger services. These limit where freight trains can be pathed without causing reliability risks to other services.

Expansions of 30 tonne axle load based operations will also be subject to a 60kph maximum loaded running speeds or even lower, over sensitive structures especially bridges. Such impacts will then further widen running time differentials within the corridor.

All these factors have generally combined to limit the "south of Newcastle" rail system to comparatively smaller coal trains when compared with the rest of the Hunter Coal Chain. In turn, the smaller trains have also been more conducive to fitting in with a more intense passenger operation.

A diagram of the Wyong to Newcastle rail network is shown in Figure 4 below.

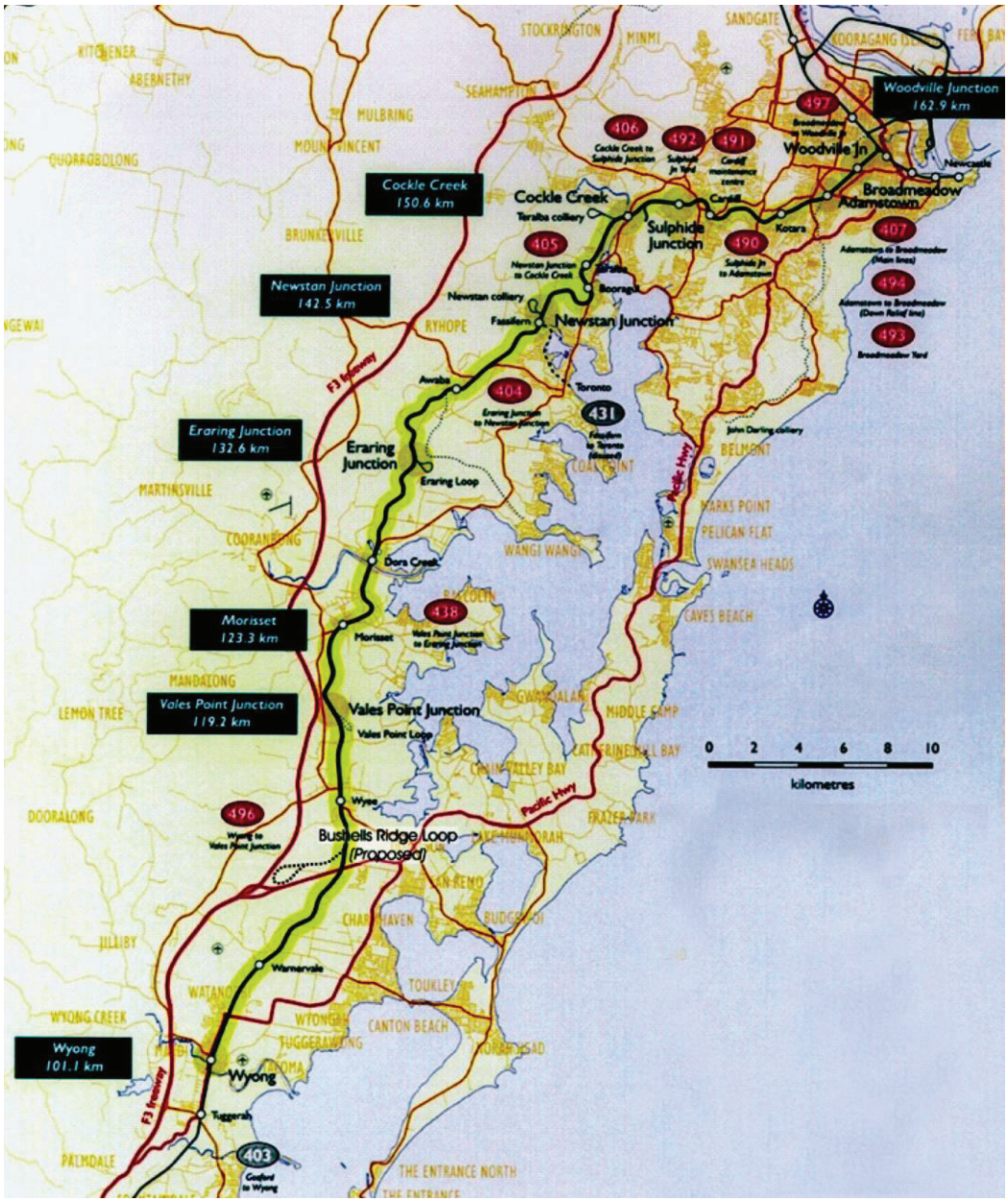


Figure 4 - Main Northern line

Coal Transport Task

Current project planning is that most of the product coal from W2CP will be destined for export markets. The coal quality produced at the mine, especially in the first 25 years, is of higher quality than the relatively high ash, medium energy, low cost coals typically burnt in domestic power stations (transport costs per unit of energy are not such a major cost issue for domestic utilities). The current Project development plans have focussed on this marketing strategy. Due to the proximity of the Vales Point and Eraring Power Stations some coal could also possibly be sold domestically to these utilities as a higher quality blending coal. However this would only occur on an occasional basis and would be subject to the required spare coal train paths being available on the day/days in question. This potential local domestic supply of coal is not therefore included in this assessment.

The maximum requirements for a concentrated rail campaign during peak production based on current standards, were that a total of 6 UP and 6 DOWN train paths should be available per day. This provides for approximately 20,000 tons of coal per day to be shipped from the mine to the port with sufficient total volume to assemble a Cape Size vessel cargo of 120,000 net tonnes over approximately 6 days.

W2CP Coal Transport

The export terminal facility used by the Project at Newcastle is expected to be the proposed new T4 Port Waratah Coal Services (PWCS) terminal. PWCS currently operates on a cargo assembly system in which stockpile space is allocated to a contracted shipper only at the appropriate time before the designated vessel is due to commence loading. This system maximises use of stockpile space and port capacity but places a limitation on the time in which an export cargo can be assembled.

Newcastle Coal Infrastructure Group (NCIG) operates the other terminal facility at Newcastle which utilises a dedicated stockpile arrangement. This system allocates permanent stockpile space for a producer and enables a more regular, less campaign focussed means of coal delivery to the port.

PWCS has not yet confirmed the exact operating methodology for T4 although it is understood the terminal operating processes may facilitate the use of dedicated stockpile access or varying cargo assembly times. If this were to occur, WACJV could rail coal with a largely constant daily schedule resulting in a reduced peak daily transport task.

Based upon a maximum annual production rate of 5 Mtpa annualised for both 320 and 365 days, a consist of 38 wagons x 120t (97t Net) at 98% loading efficiency requires the following average train cycles per day to assemble product coal at the port.

Table 2 - Train Cycles per Day Required (average)

Days Annualised	Trains Cycles per Day
320	4.33 (5)
365	3.79 (4)

WACJV may desire more concentrated rail haulage campaigns at times to assemble a full Cape Size vessel cargo of 120,000 net tonnes. Based upon a consist of 38 wagons x 120t (97t Net) at 98% loading efficiency as described above, the following maximum number of train cycles would be required to assemble the cargo load over a period of six days.

Table 3 - Train Cycles per Day Required (maximum)

Tonnes Required	Trains Cycles per Day
120,000	5.53 (6)

Rail System Capacity Assessment

The Railsys software was used by RailCorp for the modelling analysis. Railsys enables the modelling of future network infrastructure scenarios interposed with both currently scheduled and projected trains along with the capability of running existing or future trains. This includes the use of both new rolling stock and changed train configurations. These parameters were adjusted in various modelling scenarios to assess the most appropriate means of meeting the forecast transport task.

Methodology

The study covers the scheduled passenger train operation for the network section between the mine and the port. Additional freight trains were also entered into the timetable as per the freight train schedule, and additional coal movements based on the current understanding of likely peak coal daily haulage were considered. This peak requirement represents the times when all the system operators were running at their maximum required rate (ie cargo assembly rate for the exporting producers) and not their average annualised demand.

Based on likely expectations of coal haulage requirements, the analysis provides for daily 24 total coal cycles comprised as follows in Table 4. The considered cycles represent peak load and are in excess of any foreseeable daily operation which are more likely 4 – 5 cycles per day.

Table 4 - Daily Coal Train Forecast

Teralba to Newcastle exports (Xstrata)	**5** cycles
Newstan to Newcastle export (Centennial)	**5** cycles
Newstan to Port Kembla	**Opportunistic Only***
Eraring ex Cobbora (Eraring)	**3** cycles
Vales Point ex Cobbora (Delta)	**2** cycles
Teralba to Vales Point interim (Pre Cobbora) operations	**Interim Only***
Ex Lithgow & Mt Thorley cross regional	**3** cycles
Wallarah to Newcastle exports (W2CP)	**6** cycles
Total trains	**24 cycles**

Note* See further details of these trains in the discussion below

Additional opportunistic coal train cycles from Newstan Colliery to Port Kembla, and Interim short term cycles of trains from the Macquarie Coal Preparation Plant at Teralba via PWCS infrastructure to the Vales Point Power Station were not included in the analysis. These additional trains will not generally increase the future daily coal train forecast for the line, which is summarised in Table 4, as in the case of Newstan to Port Kembla, the additional train loads will be opportunistic and will only operate when spare train paths are available. In the case of the interim Teralba to Vales Point operations, the additional daily train movements are less than

the predicted future Cobbora daily train movements south of Newcastle that will occur after 2015, and will effectively cease once the replacement Cobbora coal train movements are operating.

In this analysis, the non-coal train operations were based on the passenger services plus the NSFC interstate paths, amended to retain existing schedule "B" and "C" freight paths. Added to these services were the 24 forecast coal train paths cycles that would be required for the 2015 and beyond haul task. These forecast coal paths were based on RailCorp's understanding of the expected coal demand and operating methodology from 2015,

Three scenarios were investigated but the following coal train consists were common for all three scenarios:

Teralba – To continue with the existing 80 x 120t wagon operation with present DC locomotives.

Newstan – To operate using the latest consists of new 50PHTH wagons hauled by 3AC locomotives.

Eraring – Be serviced by longer Cobbora trains. The adopted consist is 84x120t wagons hauled by 4AC locos. This is considered to be the most likely at this stage. Origin Energy is already looking at options to extend the balloon loop and install a new higher speed mainline junction to accommodate the longer trains.

Vales Point – Also be serviced by longer Cobbora trains running as 84x120t wagons hauled by 4AC locos but dividing at the Hexham new staging loop to run as two halves to Vales Point. Each half then returns independently to Port Waratah to amalgamate before returning to Cobbora. (This working has been applied in the modelling). Otherwise Delta would have to relocate its existing mainline junction about 1.45kms toward Newcastle and extend its balloon loop. For a single 84 wagon based receival per day, this work scope was considered not to be justifiable. The changes were instead limited to the existing 25kph junction and internal 10kph being upgraded in situ to 40kph to enable faster main line clearances.

Cross regional coal trains – The existing twice daily 45x100t services between the Mt Thorley area and Port Kembla have been retained. A third export service between the Lithgow area mines and Newcastle is continued.

Case 1: The current network with no infrastructure enhancement

> WACJV consists based upon adopting trains of 46x100t new wagons hauled by 3AC locomotives that are able to run loaded at 80kph – 20kph faster than the equivalent trains with 120t capacity wagons.

Case 2: Replicates Case 1 infrastructure and train operations except

> Wallarah trains now comprise 38x120t wagon trains hauled by 3AC locomotives but have a 60kph speed restriction.

Case 3: Replicates Case 1 train operations except

> Wallarah trains now comprise 38x120t wagon trains hauled by 3AC locomotives but have a 60kph speed restriction.

New 1,500m train capacity Up and Down passing loops are built north of Awaba to minimise urban impact, have their main line connections located on the limited available tangent track in the area and still be sited within the most reasonable gradient available in the area.

The Awaba loops were modelled with 1,700m holding length and 75kph turnouts at each end to assist faster entry and exits. The purpose was to enable trains to clear main lines quicker by providing train crews with longer stopping margins.

These margins would also provide a degree of "future proofing" to accommodate future train length increases driven by commercial factors and rail technological developments improving locomotive and wagon design technologies. These factors are already manifesting in this project and will introduce the next wave of restructuring of coal train operations in this corridor by mid decade.

An additional Up signal south of Awaba to improve train headways on the ascent up to Eraring Junction.

The cases can be summarised as follows:

Case 1: Existing infrastructure; W2CP trains with 46 x 100t wagons, 80kph

Case 2: Existing infrastructure; W2CP trains with 38 x 120t wagons, 60kph

Case 3: New Awaba loops, new Awaba Up signal; W2CP trains with 38 x 120t wagons, 60kph

Assumptions

An underlying assumption to all modelled scenarios was that ARTC would be able to dispatch and accept each of the shown "south of Newcastle" coal paths, including future W2CP train paths, through Kooragang East Junction at the times shown on the train graphs in Appendix 1. This assumption is significant because it requires that such trains would be dealt with in a timely manner in the ARTC lease area to ensure they presented into the Kooragang Island terminals and also departed those terminals on time, in order to dovetail into their allotted paths across the RailCorp network.

The analysis is also based on timetabled passenger and "background existing freight" services train timetables remaining consistent up to mid-decade and beyond.

It was also assumed for this scenario that WACJV would be adopting a 120t wagon fleet for its coal haulages based on this configuration being able to deliver about similar payloads per trip using 8 fewer wagons per trip to achieve this. This type of operation would also follow the established industry trends in the Hunter Valley toward more 120t based train operations.

Results

The modelling with the expansion of coal operations to 24 train cycles superimposed over existing freight and new NSFC interstate paths produces a busy network operation. The study conclusions come from analysis of the train graphs in Appendix 1. Each train graph shows a weekday 24 hour coal train program modelled for each of the examined scenarios.

In the case that all the shown freight paths on these graphs are taken up, the results indicate that network infrastructure enhancements would be required between Wyee and the junction to the Kooragang Branch in the ARTC lease area. The infrastructure enhancements would be required to improve "brittle and unviable" train paths and to deal with reliability constraints when coal and other freight paths converge. This particularly applies at the times where trains converge in a processional fashion through the network "choke points". These "choke points" are the series of slow speed junctions that extend from Broadmeadow Yard south end through to Kooragang East Junction on the ARTC lease area. The analysis assumed a network performance to schedule and a fully reliable, largely incident free coal chain operation. It did not include margins for temporary track speed delays, and for track inspection or other maintenance "white out" periods for movements along the rail corridor by track inspection vehicles. In actual operations each of these factors can affect network performance.

In the analysis, 320 days operation per year is the assumed core scenario for the W2CP coal train operations. This includes the required allowance for the effect of track possessions for maintenance, which are normally 4 weekends (8 days in total) per year. Also, the requirement for train paths per day to be suspended (ie white out periods) for use by track inspection

vehicles on the Sydney to Newcastle section of the rail corridor, is normally one train path per day or less in each direction, which in minimal in the context of the overall combined corridor passenger, coal and other freight train movements each day.

Summary of Project Mine Haulage Options Results

The following five tables specifically cover five scenarios for future Wallarah Mine haulages. The five scenarios represent the described three cases, as well as two sub-scenarios for the cases 1 and 2.

Table 5 - Scenario 1.0 results

Scenario 1.0	**Based on Wyong coal trains running as 46 x 100t gross capacity wagons rated at 80kph speed, loaded, hauled by 3AC 4500HP type locomotives. It has no additional enroute mainline infrastructure such as passing loops.**		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
1	✓	✓	Wallarah arr. 1:25hrs & depart 2:40hrs. Both paths rated reliable.
2	✓	? ?	Wallarah arr. 4:43hrs as a reliable path. 1st option departs 6:08hrs. 2nd option path departs 6:34hrs. Both return options have risks. 1st option is tight at Adamstown, and relies on train ahead VP 02E being also on time. The second path option has tight margins through Broadmeadow & Warabrook areas.
3	?	?	Wallarah arr. at 9:16hrs, departs 11:47hrs. Empty path is tight through Islington Jcts. The return path has risks with tight margins in Wyee & Adamstown areas and risks delay to following N137 at Adamstown.
4	✓ ?	✓	Wallarah arr. at 14:40hrs, departs at 16:27hrs. Better option but has a 20min longer load time. 2nd option empty path Wallarah arr. 14:59hrs. It has risks due to tighter margins through Islington Jct and Broadmeadow. It is also "chased" by NT36 XPT. Sole return path is reliable & services both empty paths.
5	✓	? ?	Wallarah arr. at 16:57hrs, departs 18:23hrs. Empty path is reliable. The first return path has tight margins ahead of PM peak recorded N169 intercity service. Therefore with risk & not likely to be sustained nor approved. Wallarah arr. 16:57hrs depart 19:12hrs. This later path has risks through Warabrook and also runs amongst PM recorded passenger services. Also a doubtful option.
6	✓	✓	Wallarah arr. 22:10hrs, departs 23:55hrs. Both paths rated reliable.

Table 5 indicates that only 50% of modelled Wallarah cycles could be considered as reliable. This scenario would not provide an acceptable, long term sustainable reliable transport plan.

A sub option of Scenario 1 was investigated to determine if there was any potential to flex some of the problematic paths in Table 5 to improve their reliability and find new potential coal paths. The outcome of this option is shown in Table 6. Problematic paths were improved with this option and some new path opportunities were identified but these changes eliminated one interstate path each. This option is unlikely to be an acceptable outcome notwithstanding all the "flexed" cycles to varying degrees became viable.

Table 6 - Scenario 1.1 results

Scenario 1.1	**Reworking of Scenario 1.0 to assess how many NSFC interstate paths would need to be affected to improve coal pathing for Wyong Mine.**		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
1	✓	✓	Wallarah arr. 1:25hrs depart 2:40hrs. Both paths rated reliable.
2	✓	? ✓	Wallarah arr. 4:43hrs depart 6:08hrs or 6:24 hrs. Empty path reliable but both return options have risks. One is tight at Adamstown, and relies on train ahead VP 02E being also on time. The second path takes out interstate DF19 path to be viable and has a better margin through the Warabrook area.
3	✓ ?	✓ ✓ ?	Alternate 1/2 path Wallarah arr. 8:26hrs but it over runs UF30 interstate path. The return can depart either at 9:45hrs as a reliable path taking out DF31 interstate path, or at 10:40hrs taking out DF36 interstate path. 2nd empty path Wallarah arr. 9:16hrs. It has tight margin through Islington Jct. Its return run departs 11:47hrs behind NP23 Xplorer. It has tight headway into Adamstown and risks delays to following N137 intercity service.
4	✓ ✓ ?	✓ ✓	Three potential empty paths identified. First arrives Wallarah 12:35hrs. It runs over UF46 interstate path to achieve this. It can depart 14:20hrs but runs over DF50 interstate path. Both are reliable paths. 2nd empty path option arrives at Wallarah 14:41hrs as a reliable path. The 3rd empty path option arrives Wallarah 14:59hrs, but incurs risks Islington Jct – Broadmeadow and precedes NT36 XPT. The return path departs 16:27hrs as a reliable common path for 2nd and 3rd Up empty paths.

Scenario 1.1	Reworking of Scenario 1.0 to assess how many NSFC interstate paths would need to be affected to improve coal pathing for Wyong Mine.		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
5	✓	? ? ✓	Wallarah arr. 16:57hrs as a reliable path. It has now 3 return path options. 1st option departs 18:23hrs with narrow headway on PM peak recorded N169 intercity service. Therefore has a reliability risk to commuter service & not likely to be sustained or approved. 2nd option can depart 19:12hrs but it is tight through Warabrook and run amongst recorders. Also a doubtful option. 3rd option departs 19:46hrs on a reliable path but over runs DF72 interstate path.
6	✓	✓ ✓	Wallarah arr. 22:10hrs as a reliable path. It has two return options. The first departs at 23:35hrs and has a reliable path but takes out DF85 interstate path. The second return path departs 23:55hrs. It is also rated as reliable & would be the preferred option.

Table 7 shows the modelling outcomes for utilising a 38x120t wagon based train operation. This configuration aligns with the general direction that major rail operators are heading toward and one more likely to be adopted by W2CP. This type of consist has a similar payload capacity per trip with fewer wagons than the alternate 46 x 100t wagon consists. However, there is an operational offset as loaded 120t wagons are restricted to 60kph and a 40kph speed over a sensitive bridge between Kotara and Adamstown. In comparison newer 100t wagons can run at 80kph when loaded.

The modelling indicated the cumulative slower loaded running of 120t W2CP trains. The running time losses result in trains being 5 minutes later at Awaba, 8 minutes later at Sulphide Junction, and 9 minutes later through Broadmeadow. These running time losses have a notable impact on path viability, which indicates the sensitivity of the train sequencing on this corridor. Only one of the six cycles was now found to be reliable throughout a 24 hour cycle as shown in Table 7.

Table 7 - Scenario 2.0 results

Scenario 2.0	Based on Wyong coal trains running as 38 x 120t gross capacity wagons rated at 60kph speed, loaded, hauled by 3AC 4500HP type locomotives. It has no additional enroute mainline infrastructure such as passing loops.		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
1	✓	?	Wallarah arr. 1:24hrs as a reliable path. The now slower return path departing 2:40hrs needs to use Sulphide Loop but has slim margin to avoid delaying DF4 interstate path.
2	✓	X	Wallarah arr. 4:43hrs as reliable path. 1st path depart 6:08hrs but blocks N812 pass.
		X	The 2nd path departing 6:34 also now fails. It blocks N115 pass.
3	?	X	Wallarah arr. 9:16hrs with tight window through Islington Jct. Its return path departing blocks N137 intercity and no longer viable.
4	✓		Has two empty path options. 1st path arrives Wallarah at 14:39hrs as a reliable path.
	?		The 2nd path arrives Wallarah at 16:58hrs but has risks through Islington and Broadmeadow. It is also "chased" by NT36 XPT service.
		X	Only one return path is identified. It is blocked at Teralba Jct and no longer viable.
5	✓	X	Empty path arrives Wallarah 16:57hrs as a reliable path. The first return path option departs 18:23hrs & now blocks PM peak recorded N169 intercity service. No longer viable.
		?	Second return option departs Wallarah at 19:12hrs. This later path has risks through Warabrook but also runs amongst PM recorded passenger services. Would be a doubtful option.
6	✓	✓	Wallarah arr. 22:09hrs, depart 23:55hrs. Both paths rated reliable..

If additional speed restrictions across sensitive structures were to be identified and applied, the above modelled paths would become even more problematic.

A sub option of Scenario 2, called Scenario 2.1, was developed to investigate and identify a potential for flexing some of the problematic paths in Table 7 to improve their reliability and finding new potential coal paths. Table 8 shows the outcome. Only a few problematic cycles were improved and some new path opportunities were identified. But in essence, each improvement largely required the loss of one NSFC interstate path which almost wholly occurred within the sought after "core demand period" for such trains paths.

Table 8 - Scenario 2.1 results

Scenario 2.1	**Reworking of Scenario 2.0 to assess how many NSFC interstate paths would need to be affected to improve coal pathing for Wyong Mine.**		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
1	✓	✓	Wallarah arrival 1:25hrs as a reliable path. Return path departs 2:40hrs. Achieves reliability **but makes DF4 interstate path less reliable** past Sulphide Junction in the process.
2	✓	X ✓	Empty path arrives Wallarah 4:43hrs as a reliable path but has to run on Up Main through Broadmeadow. It has two return path options. 1st return path departs 6:08hrs and **blocks N813 pass** 2nd return path can depart earlier at 6:24hrs as a reliable path **but takes out DF19** interstate path in the process but needs to be on time through Warabrook.
3	✓ ?	X X X	Combined alternate 1+2 path arrives Wallarah 8:26hrs but it **over runs UF30 interstate path**. The 1st return path, Alt 1, departs 9:45hrs **taking out DF31 interstate path & it blocks N133.** Alt 2 return path departs at 10:40hrs over running **DF36 interstate path & blocks N135.** Sulphide Jct loop not usable. 2nd empty path arrives Wallarah 9:16hrs. It has tight margin through Islington Jct. Its return run departs 11:47hrs behind NP23 Xplorer. It now **blocks following N137 intercity service**.
4	✓ ✓ ?	✓ X	Three potential empty paths identified. First arrives Wallarah 12:34hrs. but it runs **over UF46 interstate path** to achieve this. It can depart 14:20hrs **but runs over DF50 interstate path**. Both are "reliable paths". 2nd empty path option arrives at Wallarah 14:40hrs as a reliable path. The 3rd empty path option arrives Wallarah 14:58hrs but incurs risks Islington Jct – Broadmeadow and precedes NT36 XPT. 2nd and 3rd Up empty paths have only one return path at 16:27hrs but is blocked at Teralba Jct & is no longer viable.

Scenario 2.1	Reworking of Scenario 2.0 to assess how many NSFC interstate paths would need to be affected to improve coal pathing for Wyong Mine.		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
5	✓	X ? ✓	Has one empty path arriving Wallarah at 16:57hrs as a reliable path. It still 3 return path options. 1st option departs 18:23hrs but now blocks PM peak recorder N169 intercity service. No longer viable. 2nd option can depart 19:12hrs but it is tight through Warabrook. Also a doubtful option. 3rd option departs 19:46hrs on a reliable path **but over runs DF72 interstate path.**
6	✓	✓ ✓	Wallarah arr. 22:09hrs as a reliable path. It has two return options. The first depart 23:35hrs as a reliable path **but takes out DF85 interstate path.** The second return path departs 23:55hrs. It is also rated as reliable & would be the preferred option.

This outcome is similar to that for Scenario 1.1, and unlikely to be an acceptable outcome.

The Table 7 and Table 8 results do not provide an acceptable transport outcome for this new mine and suggest an argument for network capacity enhancement by way of additional infrastructure to make the above train paths viable.

The purpose of Scenario 3 was to identify whether initial, modestly scaled new infrastructure works could be applied to resolve the problem locations within the rail network. The infrastructure works would increase operational robustness where loaded coal paths either were risk prone or became unviable due to insufficient headways or the lack of sufficiently wide windows to get across junctions. The resulting train paths are listed in Table 9.

The undulating terrain between Broadmeadow and the Central Coast, the spacing of the various coal terminals within this corridor, and the proximity to urban development were factors all considered in the choice of locating new passing loop sites at Awaba North.

Table 9 - Scenario 3 results

Scenario 3	Based on Wyong coal trains running as 38 x 120t gross capacity wagons rated at 60kph speed, loaded, hauled by 3AC 4500HP type locomotives. Includes Up & Down 1500m long train capacity passing loops at Awaba North. Also has an extra Up signal south of Awaba station to improve headways on the grades up to Eraring Junction.		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
1	✓	✓	Wallarah arrival is 01:24hrs Departs 02:40hrs. Both paths rated reliable without needing to refuge at Awaba.

Scenario 3	Based on Wyong coal trains running as 38 x 120t gross capacity wagons rated at 60kph speed, loaded, hauled by 3AC 4500HP type locomotives. Includes Up & Down 1500m long train capacity passing loops at Awaba North. Also has an extra Up signal south of Awaba station to improve headways on the grades up to Eraring Junction.		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
2	✓	✓	Arrives Wallarah at 03:43hrs depart 6:08hrs as a reliable path. The return path can now depart earlier at 05:07hrs also as a reliable path.
3	X ✓	X ✓ ?	1st option empty path arrives 06:42hrs depart 11:47hrs. Path works but runs amongst the AM peak recorders to Sydney & therefore not rated as sustainable. 1st return option departs 08:15hrs. Uses Awaba loop but has insufficient gap between NT33 XPT and DF28 interstate freight. **Blocks DF28.** This coal path becomes invalid. 2nd empty later path has better margins through Broadmeadow area. It arrives Wallarah at 09:15hrs as a viable path. 2nd return path departs 10:31hrs, uses Awaba loop to overcome previous problems with blocking N137. Now becomes available path with better margins through Broadmeadow. There is a 3rd return option requiring less stand time at Awaba loop. This path departs the loop at 11:30hrs but it has risks through Broadmeadow & Warabrook areas.
4	? ✓ ✓	✓ ✓ ✓	1st option empty path arrives at Wallarah at 10:49hrs but has tight margins in the Wyee area. 1st return option departs 12:27hrs. Uses Awaba loop to create a reliable return path. 2nd empty later path has better margins. It arrives at Wallarah at 14:00hrs as a viable path. 2nd return path departs 15:20hrs and also uses Awaba loop. A 3rd empty path option arrives at Wallarah at 14:44hrs. It also is a reliable path. Its return path departs Wallarah on a better path. It also uses Awaba loop to achieve this reliability.

Scenario 3	Based on Wyong coal trains running as 38 x 120t gross capacity wagons rated at 60kph speed, loaded, hauled by 3AC 4500HP type locomotives. Includes Up & Down 1500m long train capacity passing loops at Awaba North. Also has an extra Up signal south of Awaba station to improve headways on the grades up to Eraring Junction.		
Path Cycles ID	**Forward path status**	**Return path status**	**Modelling outcome** **✓ = feasible path ? = "brittle" @risk path X = unviable nor sustainable path**
5	✓ ✓	✓ X	1st option empty path arrives Wallarah as a viable path at 18:27hrs. Its return path departs 19:45hrs and also uses Awaba loop to create a reliable path. A 2nd empty path option arrives at Wallarah at 20:31hrs. Its return path departs 21:56hrs and is problematic. After brief refuge at Awaba loop has to **over run onto DF80 interstate path** north of Awaba to get its margin past other services into Broadmeadow.
6	✓ ✓	✓ ✓	1st option empty path arrives Wallarah as a viable path at 22:10hrs. Its return path departs 23:55hrs and is one of the only two path options which do not rely on Awaba loop to create a reliable return path. A 2nd empty path option arrives at Wallarah at 00:35hrs. Its return path can depart at 01:55hrs. It relies on using Awaba loop for its reliability. Note this second path's loading time overlaps 1st path cycle's loading time. Therefore only one of these two paths can operate concurrently.

The outcome is that six (6) return train paths can be comfortably identified between the Project and the Newcastle port facilities following the implementation of the listed infrastructure. The results show that constructing Up and Down new loops north of Awaba provides an overall more robust network operation for all operations on the network. It provides the best outcome of all the evaluated scenarios.

For Up (southbound) trains the analysis found that under an operation in which all trains run to time, a new Up passing loop at Awaba North would be used by two of the three identified 84 wagon Cobbora to Eraring coal train paths.

This analysis also incorporated into the modelling an additional signal installed south of Awaba station to provide closer headways for the climb up to Eraring Junction. It also enabled refuged trains to depart sooner from the passing loop.

For Down (northbound) W2CP trains the analysis similarly showed that eight of the nine loaded reliable return paths would depend upon the new Awaba North Down passing loop to be considered as reliable and deliverable. (There was also a 10th return path option that used the new Awaba loop).

This result was an almost complete opposite of the Table 7 results, which had also been based on the same train consists but with no new infrastructure. The Table 7 results showed only one complete reliable cycle being delivered whereas Table 9 results showed eight (8) pairs of complete reliable cycles being achieved.

Level Crossing Impacts

The modelling also examined the impacts on closure times at the St James Road level crossing at Adamstown and the Clyde Street level crossing at Islington. Combined with figures from the recent Cobbora Environmental Assessment (EMGA Mitchell McLennan September 2012), 432 minutes per 24-hour day (30% of each [24-hour] day) in total at St James Road and 463 minutes per day (32% of each day) at Clyde Street have been determined as existing closure times.

Based upon coal production as described in the ***W2CP Coal Transport*** section of this report, a theoretical maximum of 6 coal train cycles per day, 6 days a week could be required to assemble coal at the port of Newcastle. However, based on the overall 320 days per year operation for the W2CP coal trains, the average daily train movements will be at a more uniform rate of 4.33 coal train cycles per day on the average day.

Assuming similar future level crossing closure times for the coal trains as were reported in the recent Cobbora Environmental Assessment (EMGA Mitchell McLennan September 2012), which were 7-8 minutes typically in the loaded direction and 5-6 minutes typically in the empty direction, the additional W2CP coal trains will add approximately 56 minutes per day of level crossing closures from the additional project coal train movements. Adding the project trains to the existing closure times will therefore result in a cumulative closure of 488 minutes (34% of each day) and 519 minutes (36% of each day) at the St James Road and Clyde Street level crossings respectively.

The addition of the projected coal train movements from Cobbora using the line after 2015 (it will take several years, commencing from 2015, for the Cobbora project to reach full production) will also add an additional 40 minutes per day at full production, at each level crossing resulting in cumulative total closure times of 528 minutes (37% of each day) and 559 minutes (39% of each day) at the St James Road and Clyde Street level crossings respectively.

It should also be noted that the majority of the six available paths and travelling times are to occur in the evening and very early morning negating impacts associated with peak afternoon and morning vehicular traffic on St James Road and Clyde Street.

The existing level crossing delays at the St James Road and Clyde Street Level Crossings, and any projected future increases as a combined result of the W2CP and the Cobbora project coal train operations are an acknowledged concern of the NSW government's transport agencies. Detailed proposals are now identified by these agencies for the reduction and mitigation of current and projected future delays to road traffic, in particular at the St James Road level crossing at Adamstown.

In the Draft NSW Freight and Ports Strategy (NSW Government, November 2012), Item T-40 of the recommended works program proposes real time information is installed at the affected level crossings in the Newcastle area. This initiative is to commence at the St James Road level crossing at Adamstown, and will be used to advise motorists on train arrivals and expected road delays and to construct intersection improvements on alternative routes to make them more attractive. More significantly, in the longer term as identified under Item T-9 of the recommended works program, a Newcastle rail bypass corridor will be required. Corridor planning investigations are recommended to be undertaken to identify a corridor for preservation. These works will form part of the Northern Sydney Freight Corridor (NSFC) Stages 2 and 3 works.

Conclusion

The development of the Project is expected to coincide with the implementation of the Northern Sydney Freight Corridor (NSFC) Stage 1 project. The NSFC is being implemented in anticipation of a general increase of rail traffic on the rail corridor that shall be shared by the Project's coal trains. Forecast freight traffic increases on the rail corridor include general freight, interstate freight, coal export freight and domestic coal freight to the Lake Macquarie regional power stations.

The impacts of the project as part of that general increase in rail were therefore calculated to provide both an average and worst case scenario. The average daily cycles required to assemble product coal at the port based upon annualised 320 and 365 day calculations at full production is a maximum of five and four respectively. A worst case scenario may require on rare occasions concentrated rail haulage campaigns of up to six trains per day, six days per week.

Five scenarios were modelled to determine possible future Wallarah Mine haulages. Scenario 3, based on providing a new additional Up signal and Up and Down 1700m passing loops at Awaba, emerged as a suitable option to maintain train programming robustness for these significant expansions in interstate and coal freight as well as Newcastle related port redevelopment.

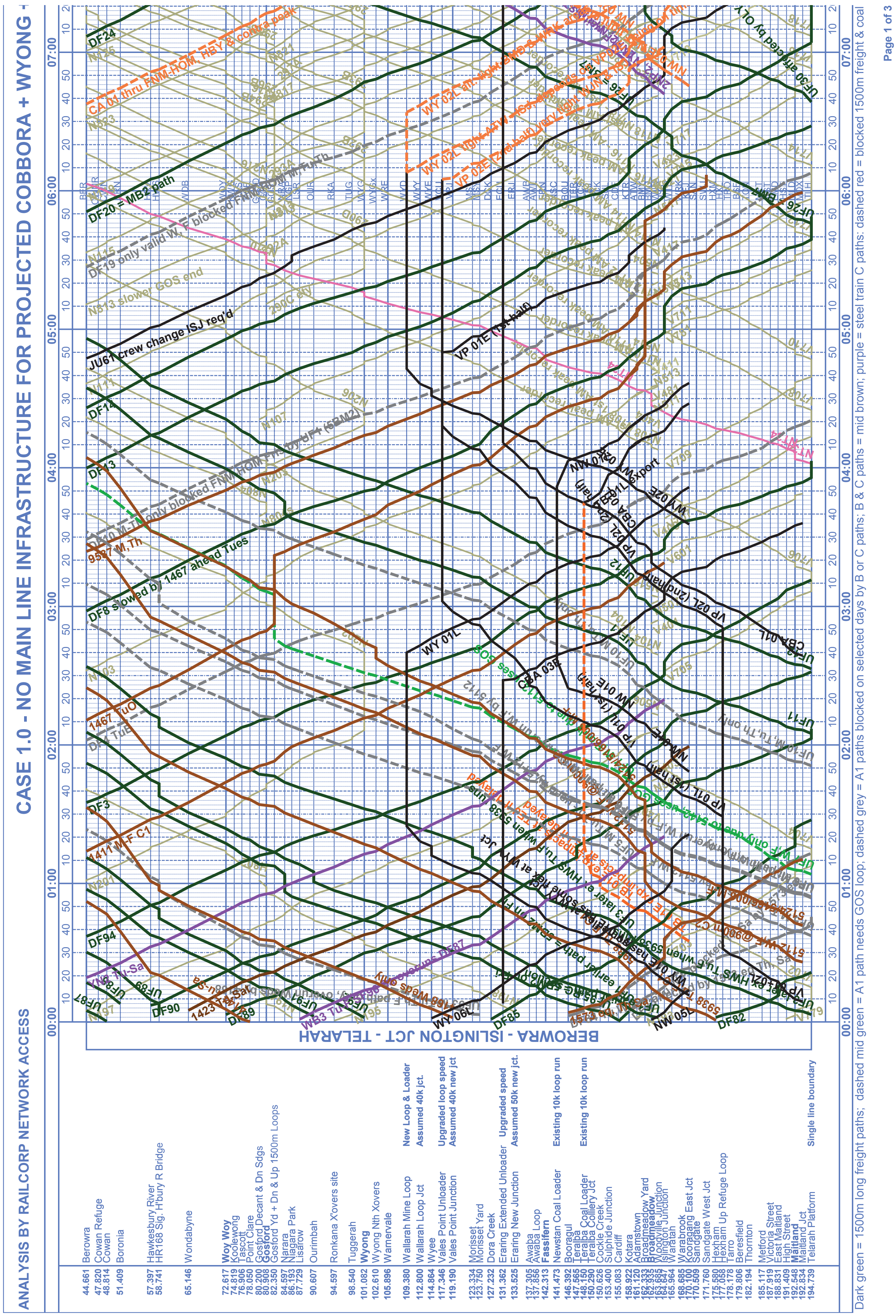
The following infrastructure enhancements are recommended for consideration in association with the expansion of general coal/freight services and the development of the Project:

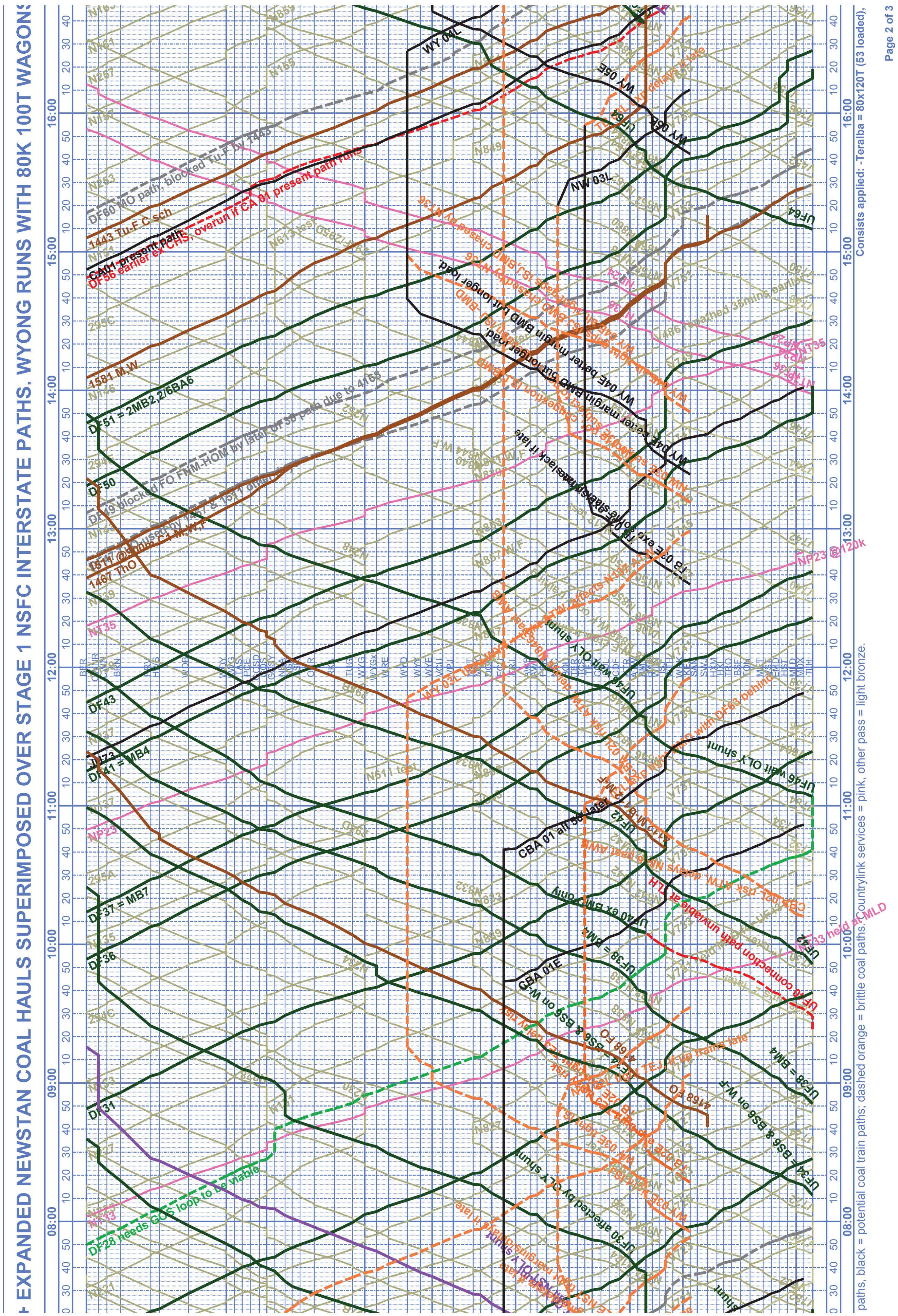
> The Awaba North area should be investigated for the siting and provision of Up and Down 1,700m long passing loops that are suitable for supporting the projected increase of coal haulage and provide reliability for general network operations including the operation of the 1,500m long interstate services. Such loops would also provide "future proofing" margin to cover technological developments particularly in coal haulage enabling the current shorter train consists to mines such as the Project to be increased in length. These loops should be fitted with 75kph entry and exit turnouts located on tangent track, which is available in the area.
>
> Additional Up signal to be installed as part of the new Awaba passing loops. In this analysis, this new signal was placed at 136.485km, about 750m south of Awaba station. The final location would need to be subject to the outcomes of signal design and on site sighting inspections.

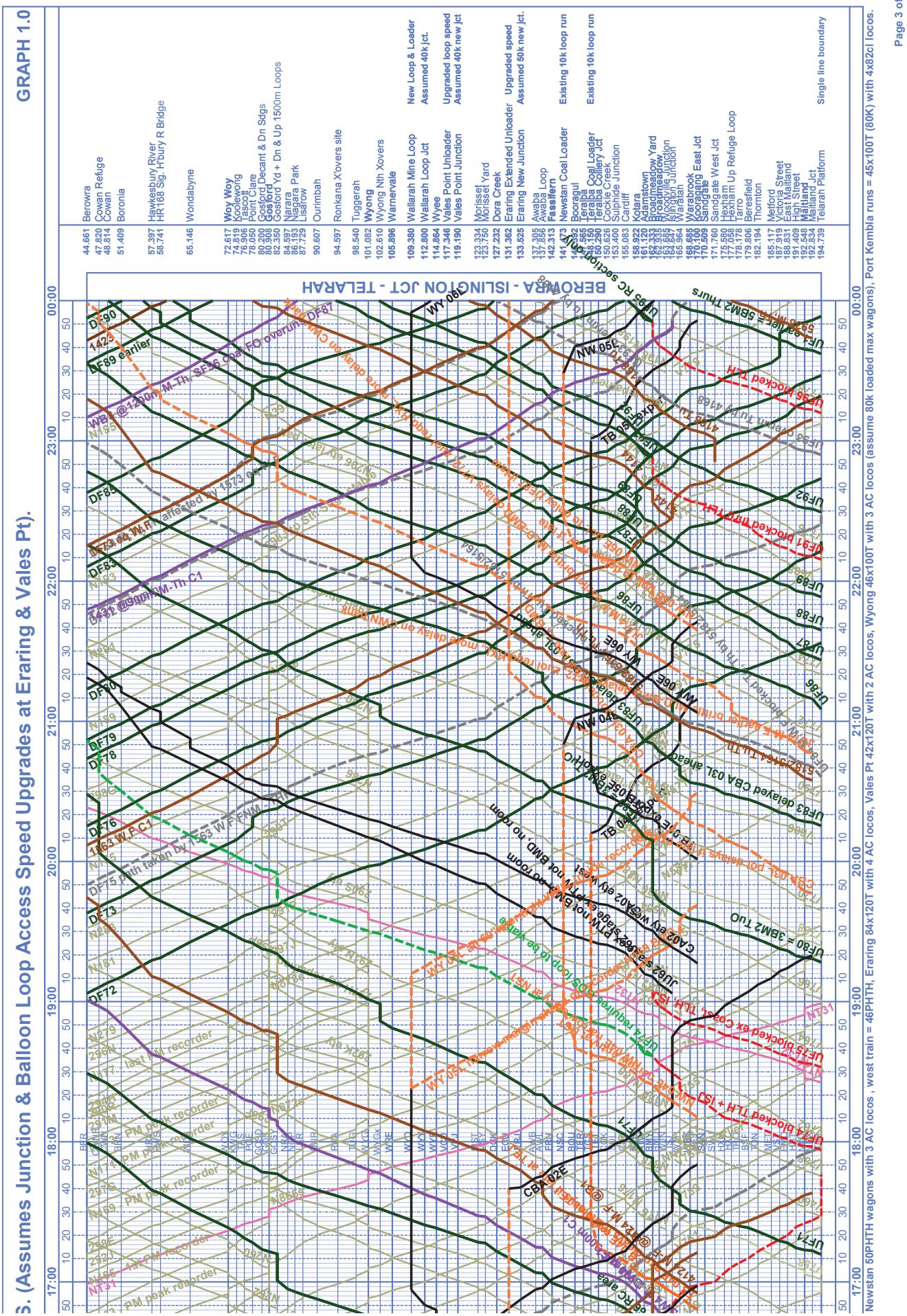
The ongoing implementation of the NSFC project will provide additional freight paths and consequently increase total freight movements on the ARTC and RailCorp networks between Sydney and Newcastle. These extra freight movements will result in impacts on the James Road and Clyde Street level crossings where delays to motorists will increase. This growth in freight movements is an aggregate of increased numbers of interstate freight trains, coal trains from Cobbora supplying domestic power stations and export coal trains to Newcastle port. This growth in demand provides a substantative base that would justify further assessment of bypass route options to the existing Main North Line through Broadmeadow.

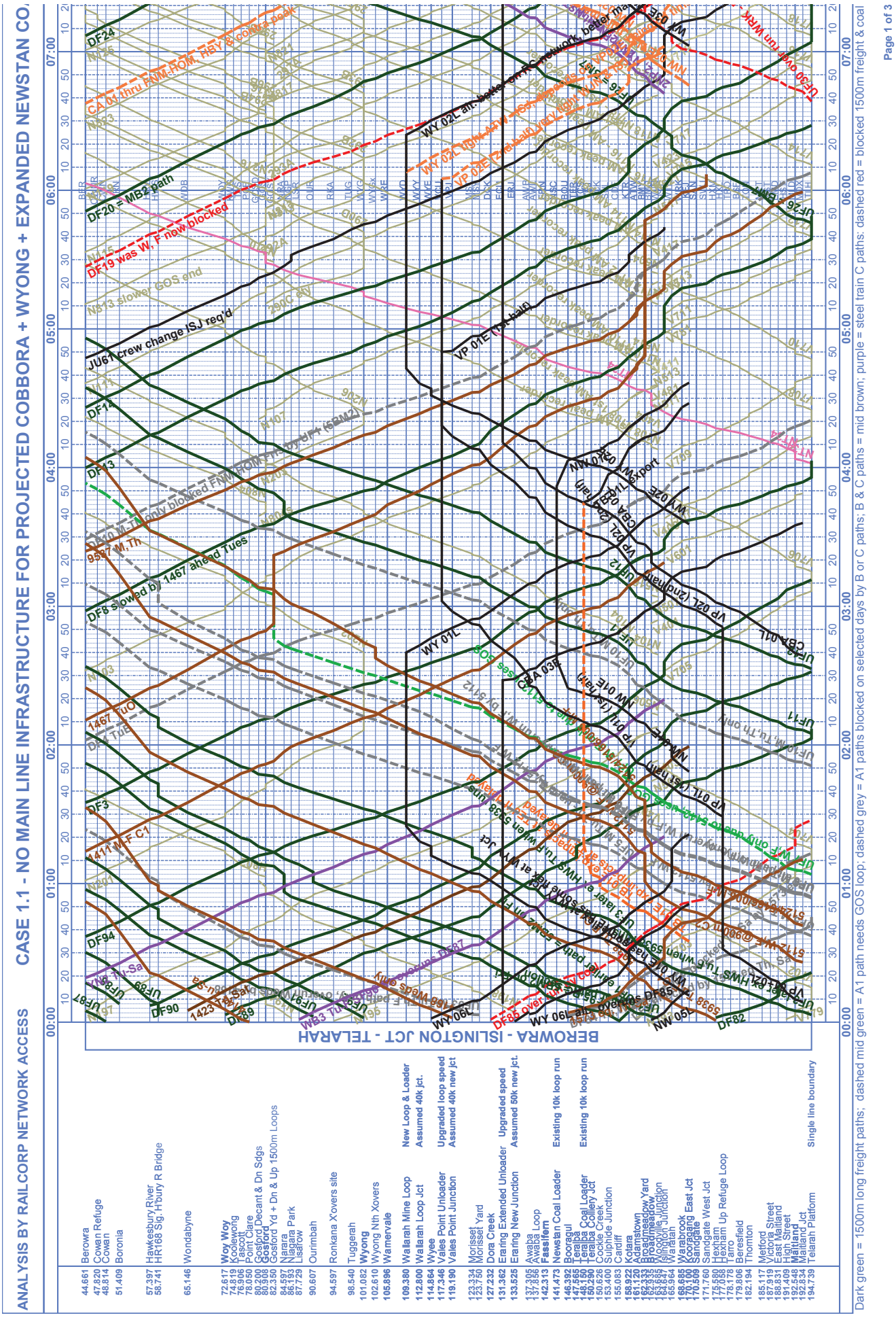
Appendices

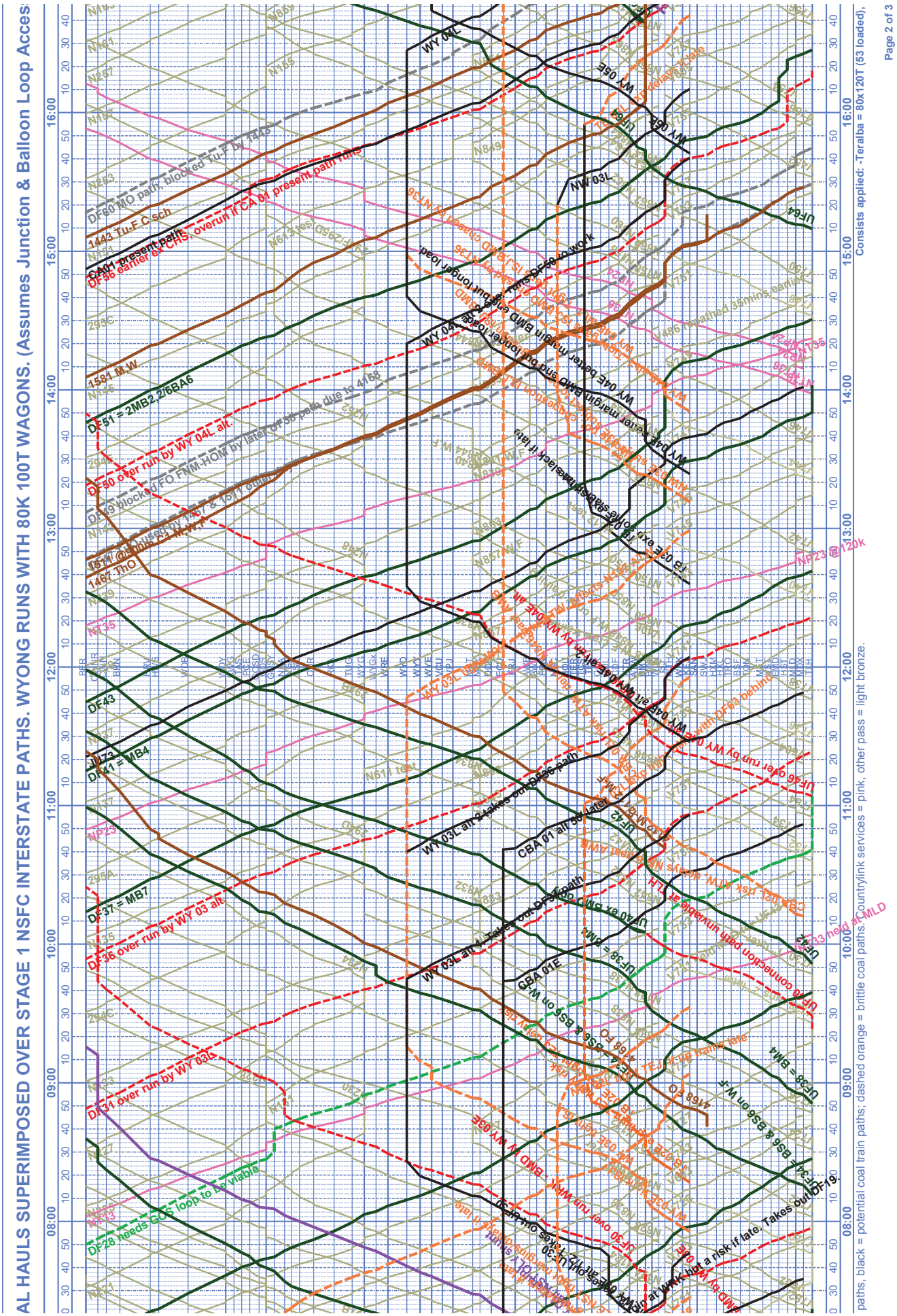
Detailed train graphs for the 5 investigated scenarios.

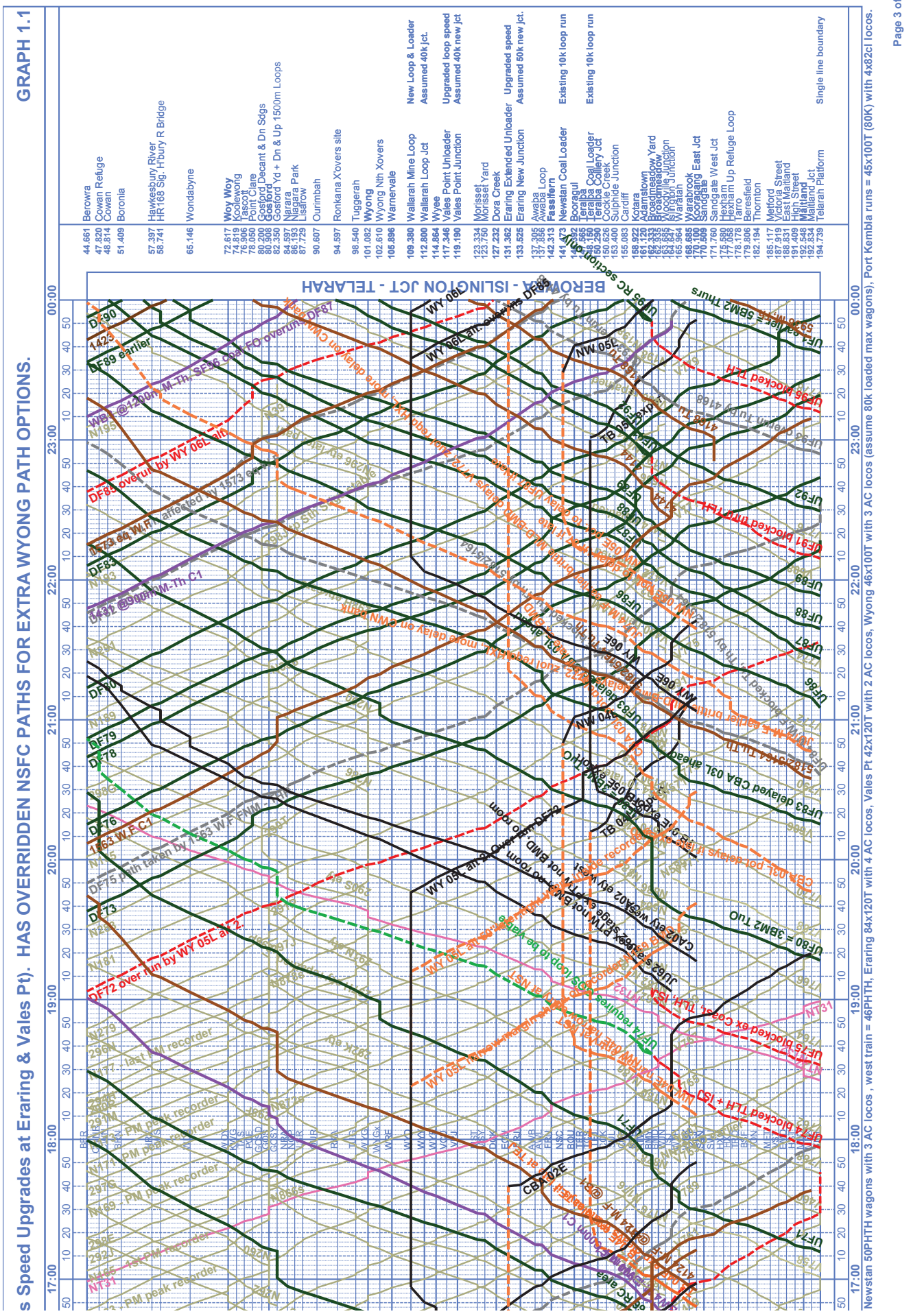

CASE 1.0 - NO MAIN LINE INFRASTRUCTURE FOR PROJECTED COBBORA + WYONG +
ANALYSIS BY RAILCORP NETWORK ACCESS
BEROWRA - ISLINGTON JCT - TELARAH
Dark green = 1500m long freight paths; dashed mid green = A1 path needs GOS loop; dashed grey = A1 paths blocked on selected days by B or C paths; B & C paths = mid brown; purple = steel train C paths; dashed red = blocked 1500m freight & coal
Page 1 of 3

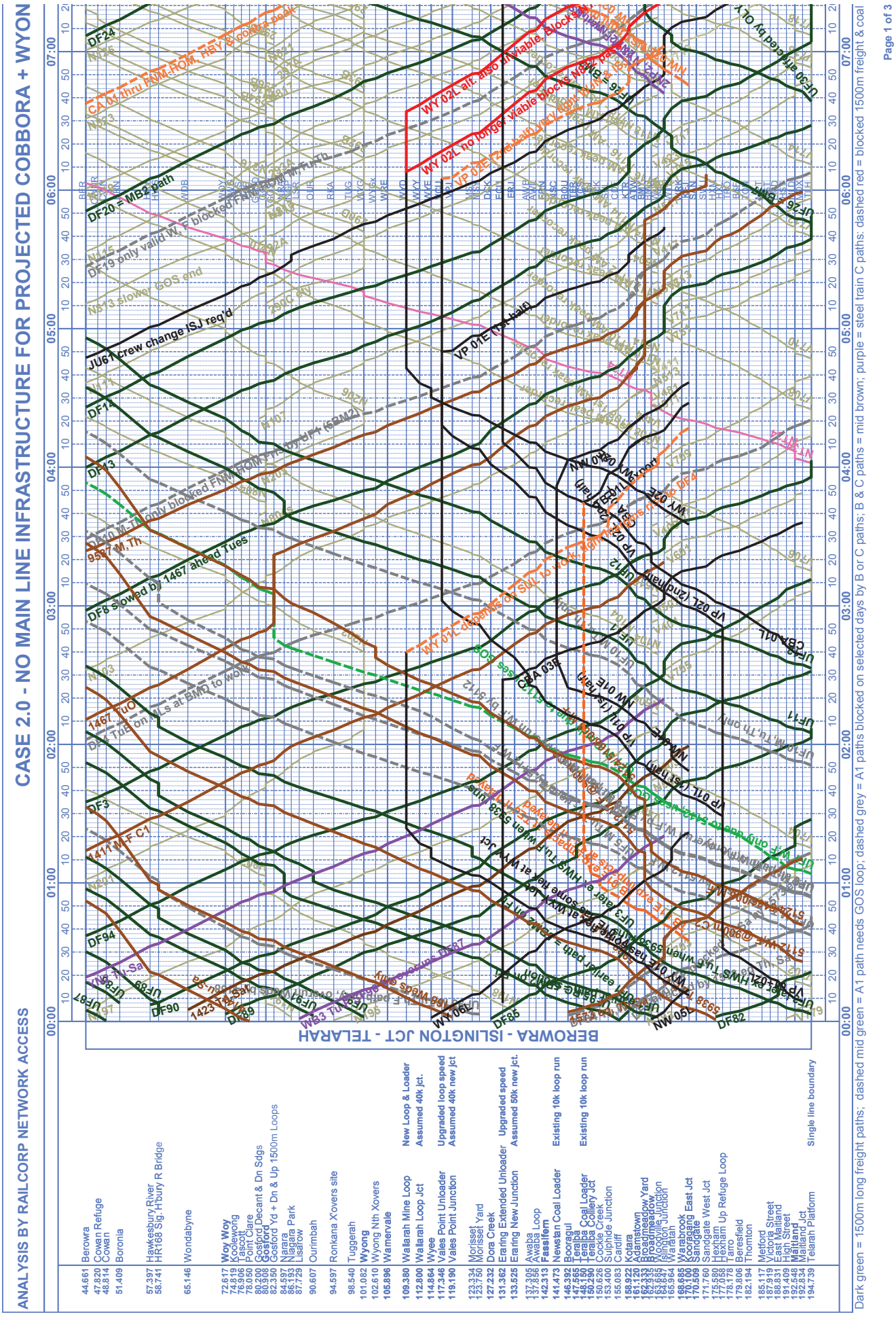

+ EXPANDED NEWSTAN COAL HAULS SUPERIMPOSED OVER STAGE 1 NSFC INTERSTATE PATHS. WYONG RUNS WITH 80K 100T WAGONS
Page 2 of 3
Consists applied: -Teralba = 80x120T (53 loaded),
paths, black = potential coal train paths; dashed orange = brittle coal paths; countrylink services = pink, other pass = light bronze.

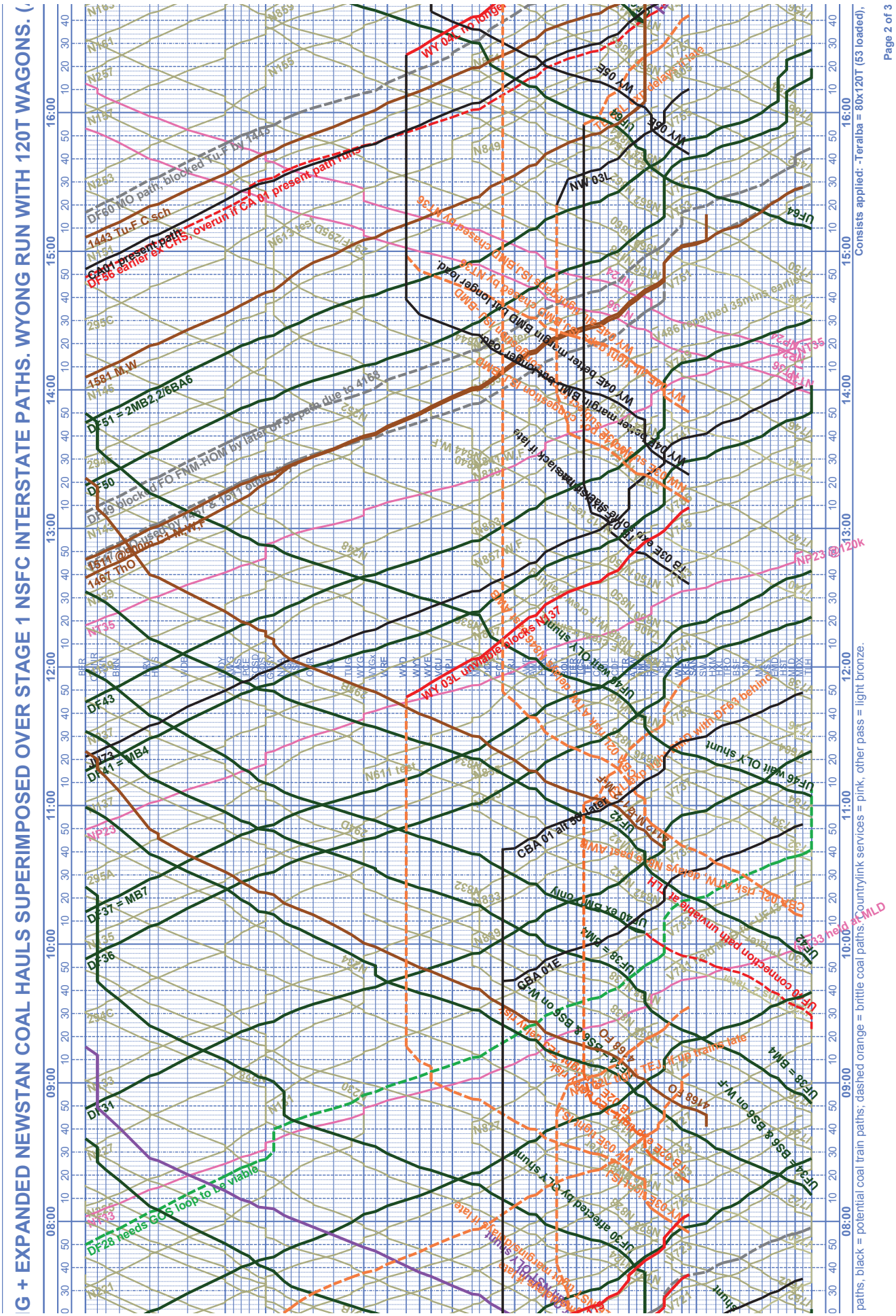

GRAPH 1.0
S. (Assumes Junction & Balloon Loop Access Speed Upgrades at Eraring & Vales Pt).
BEROWRA - ISLINGTON JCT - TELARAH
Berowra
Cowan Refuge
Cowan
Boronia
Hawkesbury River
HR168 Sig. H'bury R Bridge
Wondabyne
Woy Woy
Koolewong
Point Clare
Gosford Decant & Dn Sdgs
Gosford
Gosford Yd + Dn & Up 1500m Loops
Narara
Niagara Park
Lisarow
Ourimbah
Ronkana X'overs site
Tuggerah
Wyong
Wyong Nth X'overs
Warnervale
Wallarah Mine Loop
Wallarah Loop Jct
Wyee
Vales Point Unloader
Vales Point Junction
Morisset
Morisset Yard
Dora Creek
Eraring Extended Unloader
Eraring New Junction
Awaba
Awaba Loop
Fassifern
Newstan Coal Loader
Booragul
Teralba
Teralba Coal Loader
Teralba Colliery Jct
Cockle Creek
Sulphide Junction
Cardiff
Kotara
Adamstown
Broadmeadow Yard
Broadmeadow
Islington Junction
Waratah
Warabrook
Sandgate
Sandgate East Jct
Sandgate West Jct
Hexham
Hexham Up Refuge Loop
Tarro
Beresfield
Thornton
Metford
Victoria Street
East Maitland
High Street
Maitland
Telarah Jct
Telarah Platform
New Loop & Loader
Assumed 40k jct.
Upgraded loop speed
Assumed 40k new jct
Upgraded speed
Assumed 50k new jct.
Existing 10k loop run
Existing 10k loop run
Single line boundary
Newstan 50PHTH wagons with 3 AC locos , west train = 46PHTH, Eraring 84x120T with 4 AC locos, Vales Pt 42x120T with 2 AC locos, Wyong 46x100T with 3 AC locos (assume 80k loaded max wagons), Port Kembla runs = 45x100T (80K) with 4x82cl locos.
Page 3 of 3

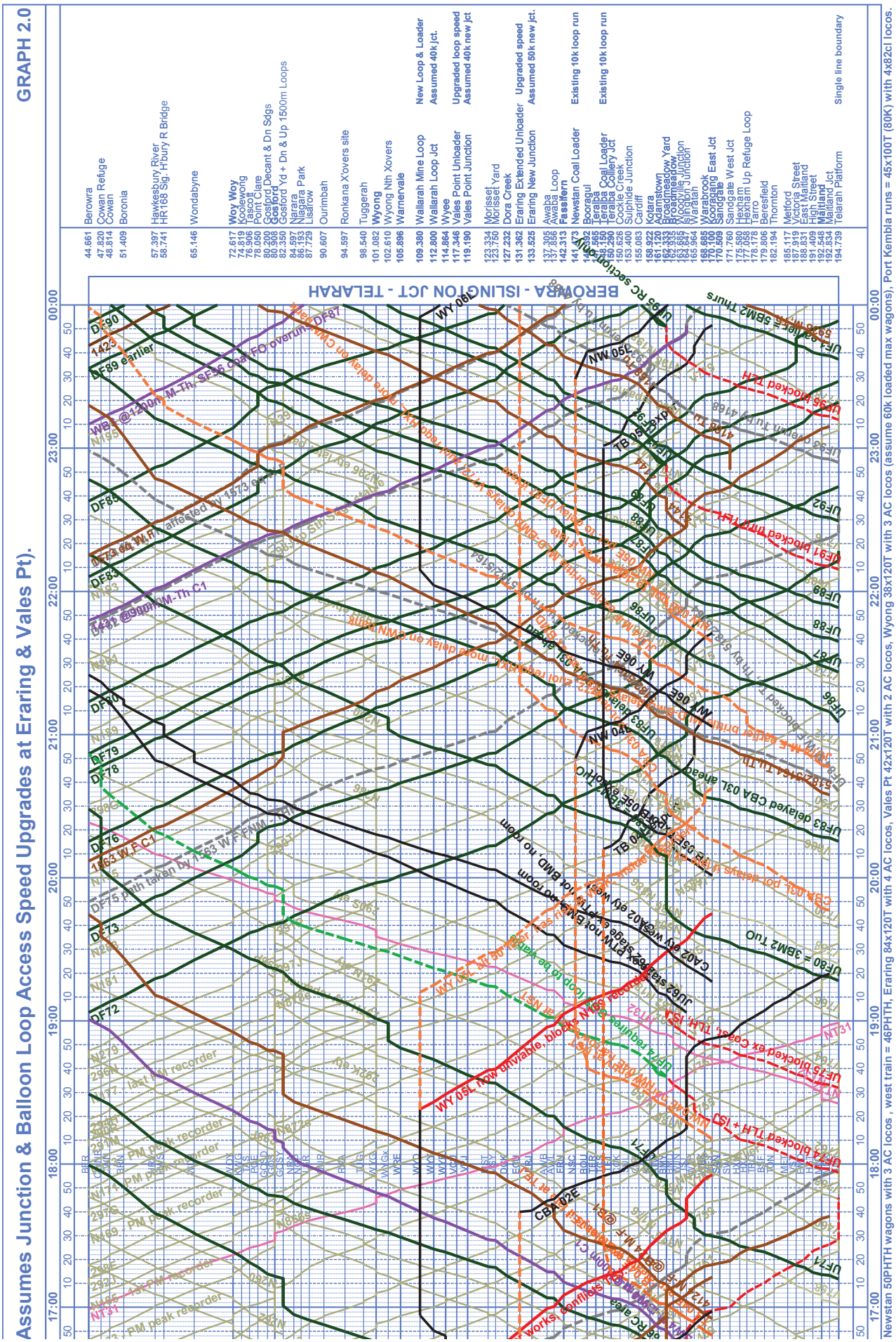

ANALYSIS BY RAILCORP NETWORK ACCESS
CASE 1.1 - NO MAIN LINE INFRASTRUCTURE FOR PROJECTED COBBORA + WYONG + EXPANDED NEWSTAN CO.
BEROWRA - ISLINGTON JCT - TELARAH
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
DF24
DF20 = MB2 path
DF19 was W, F now blocked
JU61 crew change ISJ req'd
DF14
DF13
DF8 slowed by 1467 ahead Tues
DF3
1411 M-F C-1
DF94
DF90
DF89
DF82
WY 02L
WY 01L
WY 06L
WY 05E
VP 01E
VP 02L
DF85
DF86
Dark green = 1500m long freight paths; dashed mid green = A1 path needs GOS loop; dashed grey = A1 paths blocked on selected days by B or C paths; B & C paths = mid brown; purple = steel train C paths: dashed red = blocked 1500m freight & coal
Page 1 of 3

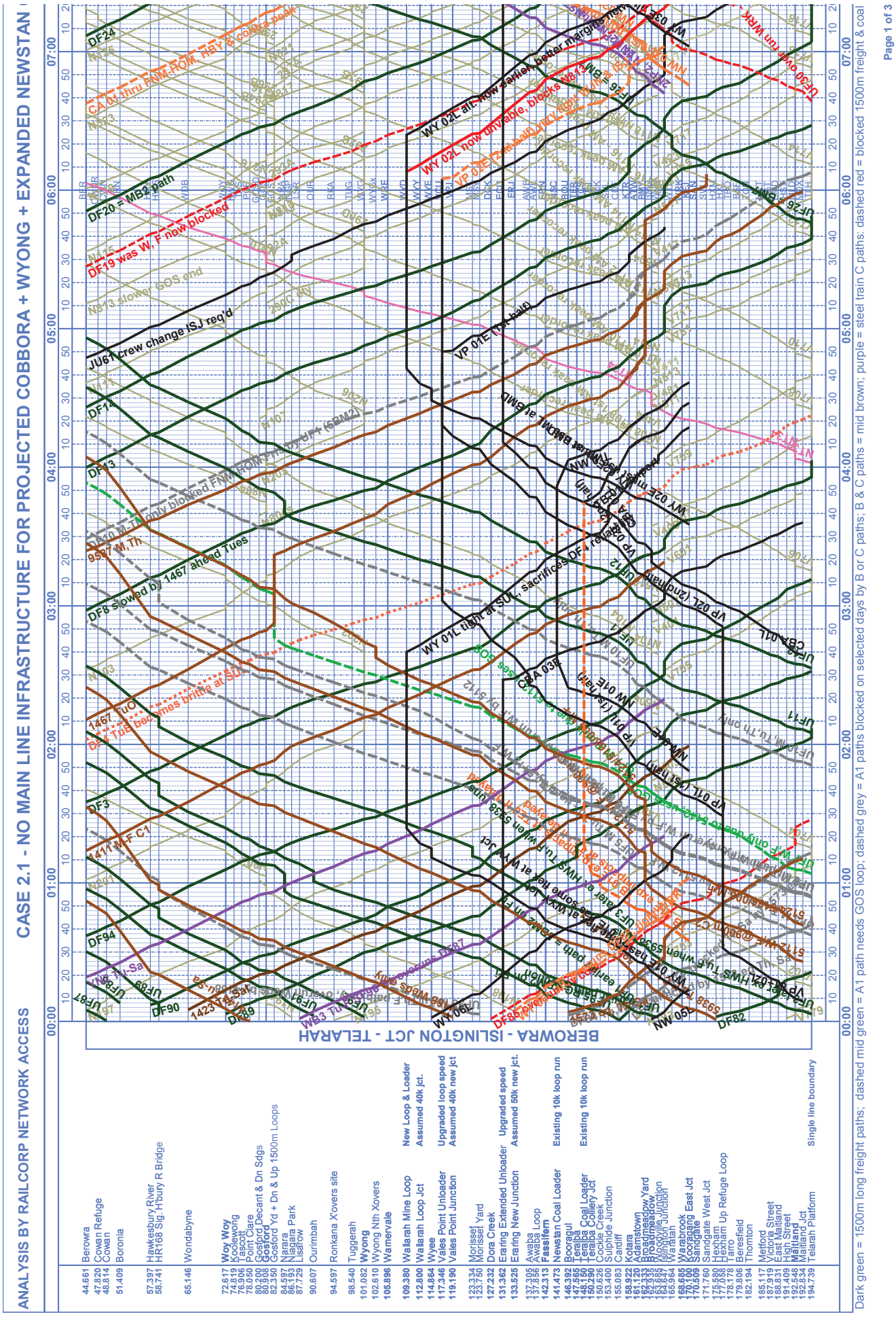

AL HAULS SUPERIMPOSED OVER STAGE 1 NSFC INTERSTATE PATHS. WYONG RUNS WITH 80K 100T WAGONS. (Assumes Junction & Balloon Loop Acces
Page 2 of 3
Consists applied: -Teralba = 80x120T (53 loaded),
paths, black = potential coal train paths; dashed orange = brittle coal paths. Countrylink services = pink, other pass = light bronze.
WY 04L
WY 05E
NW 03L
1443 Tu-F C sch
DF60 MO path, blocked Tu-F by 1443
DF56 earlier ex CRS, overun if CBA 01 present path runs
CBA01 present path
1581 M W
DF51 = 2MB2 2I6BA6
DF50 over run by WY 04L alt
DF49 blocked FO FNM-HQM by later DF36 path due to 4168
1511 @ Broadmeadow
1467 ThO
DF43
DF41 = MB4
DF37 = MB7
DF36 over run by WY 03 alt
DF31 over run by WY 03L
DF28 needs GOS loop to be viable
WY 03L alt 2 takes out DF56 path
CBA 01 alt 36 later
CBA 01E
4168 FO
DF30 over run WY 05E
DF19
Takes out DF19
a risk if late
WY 05E alt
WY 04E alt
DF50 over run by WY 04L alt
DF36 over run by WY 03 alt
DF31 over run by WY 03L
DF28 needs GOS loop to be viable
WY 03L alt 2 takes out DF56 path
CBA 01 alt 36 later
CBA 01E
4168 FO
DF30 over run WY 05E
DF19
Takes out DF19
a risk if late
WY 05E alt
WY 04E alt
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00

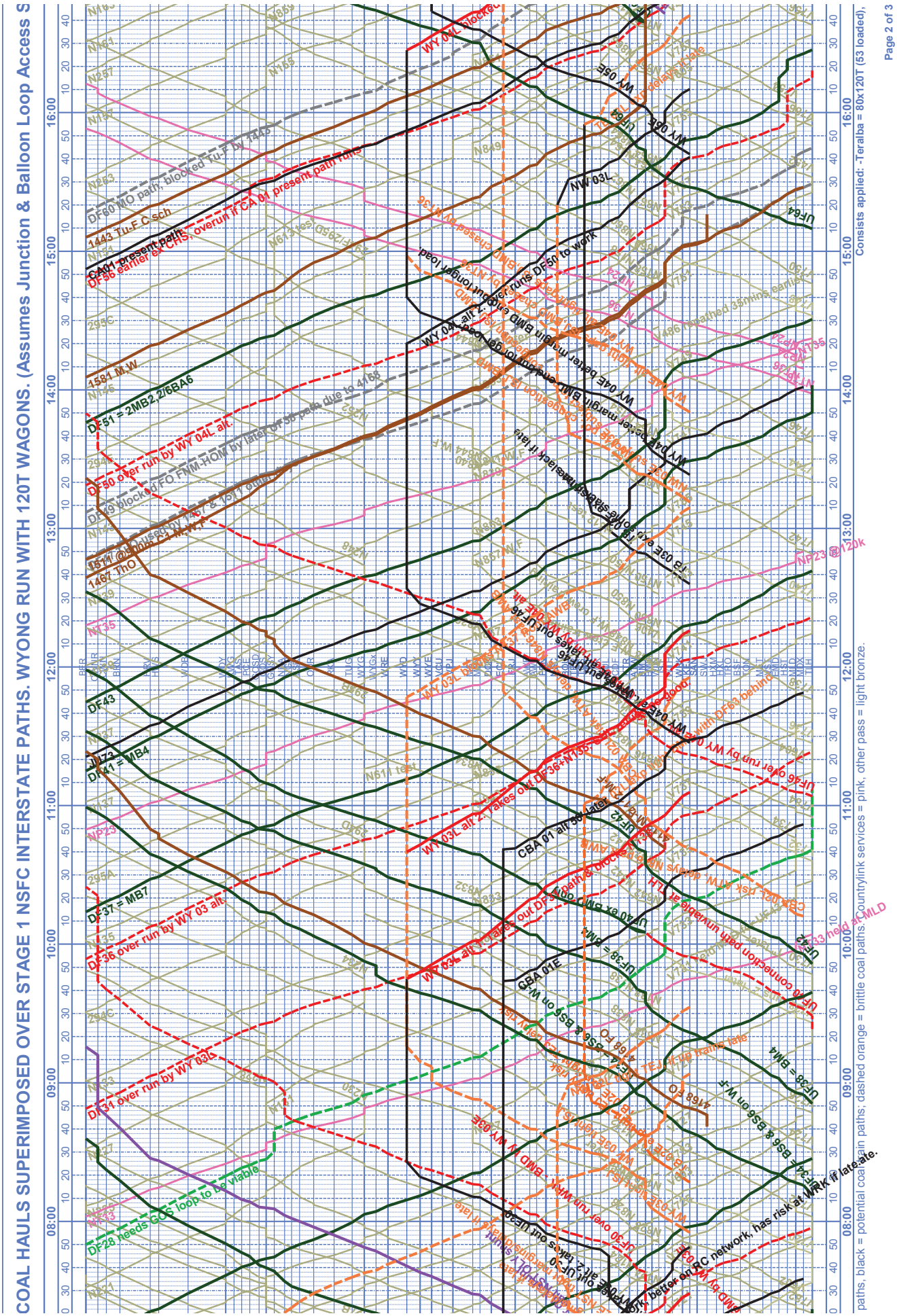

GRAPH 1.1
s Speed Upgrades at Eraring & Vales Pt). HAS OVERRIDDEN NSFC PATHS FOR EXTRA WYONG PATH OPTIONS.
BEROWRA - ISLINGTON JCT - TELARAH
Berowra
Cowan Refuge
Cowan
Boronia
Hawkesbury River
HR168 Sig. H'bury R Bridge
Wondabyne
Woy Woy
Koolewong
Tascott
Point Clare
Gosford Decant & Dn Sdgs
Gosford
Gosford Yd + Dn & Up 1500m Loops
Narara
Niagara Park
Lisarow
Ourimbah
Ronkana X'overs site
Tuggerah
Wyong
Wyong Nth X'overs
Warnervale
Wallarah Mine Loop
Wallarah Loop Jct
Wyee
Vales Point Unloader
Vales Point Junction
Morisset
Morisset Yard
Dora Creek
Eraring Extended Unloader
Eraring New Junction
Awaba
Awaba Loop
Fassifern
Newstan Coal Loader
Booragul
Teralba
Teralba Coal Loader
Lake Macquarie Jct
Cockle Creek
Sulphide Junction
Cardiff
Kotara
Adamstown
Broadmeadow Yard
Broadmeadow
Islington Junction
Islington
Waratah
Warabrook
Kooragang East Jct
Sandgate
Sandgate West Jct
Lenaghan Up Refuge Loop
Tarro
Beresfield
Thornton
Metford
Victoria Street
East Maitland
High Street
Maitland
Maitland Jct
Telarah Platform
New Loop & Loader
Assumed 40kt jct.
Upgraded loop speed
Assumed 40k new jct
Upgraded speed
Assumed 50k new jct.
Existing 10k loop run
Existing 10k loop run
Single line boundary
Newstan 50PHTH wagons with 3 AC locos , west train = 46PHTH, Eraring 84x120T with 4 AC locos, Vales Pt 42x120T with 2 AC locos, Wyong 46x100T with 3 AC locos (assume 80k loaded max wagons), Port Kembla runs = 45x100T (80K) with 4x82cl locos.
Page 3 of 3

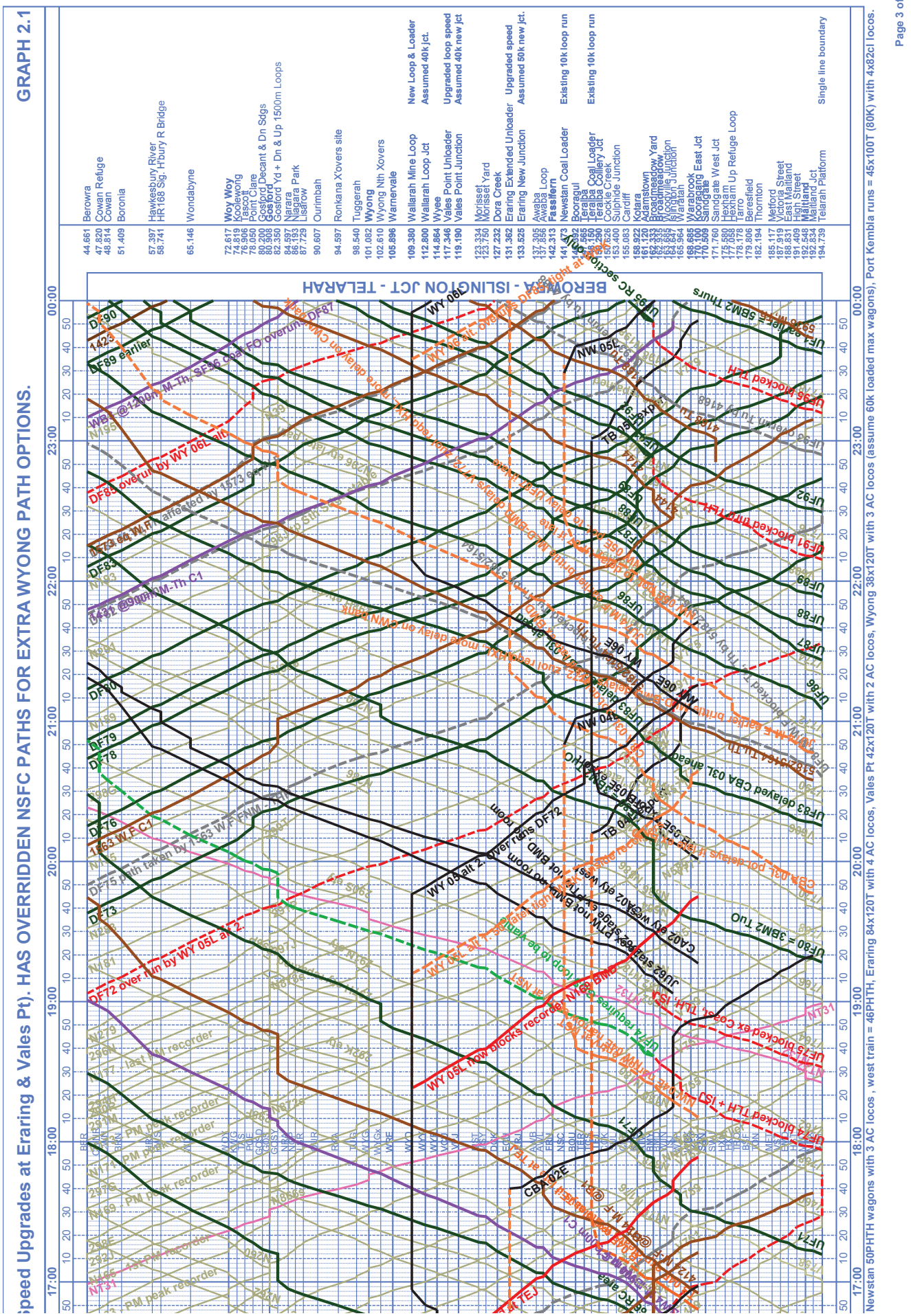

ANALYSIS BY RAILCORP NETWORK ACCESS
CASE 2.0 - NO MAIN LINE INFRASTRUCTURE FOR PROJECTED COBBORA + WYON
BEROWRA - ISLINGTON JCT - TELARAH
Page 1 of 3
Dark green = 1500m long freight paths; dashed mid green = A1 path needs GOS loop; dashed grey = A1 paths blocked on selected days by B or C paths; B & C paths = mid brown; purple = steel train C paths: dashed red = blocked 1500m freight & coal

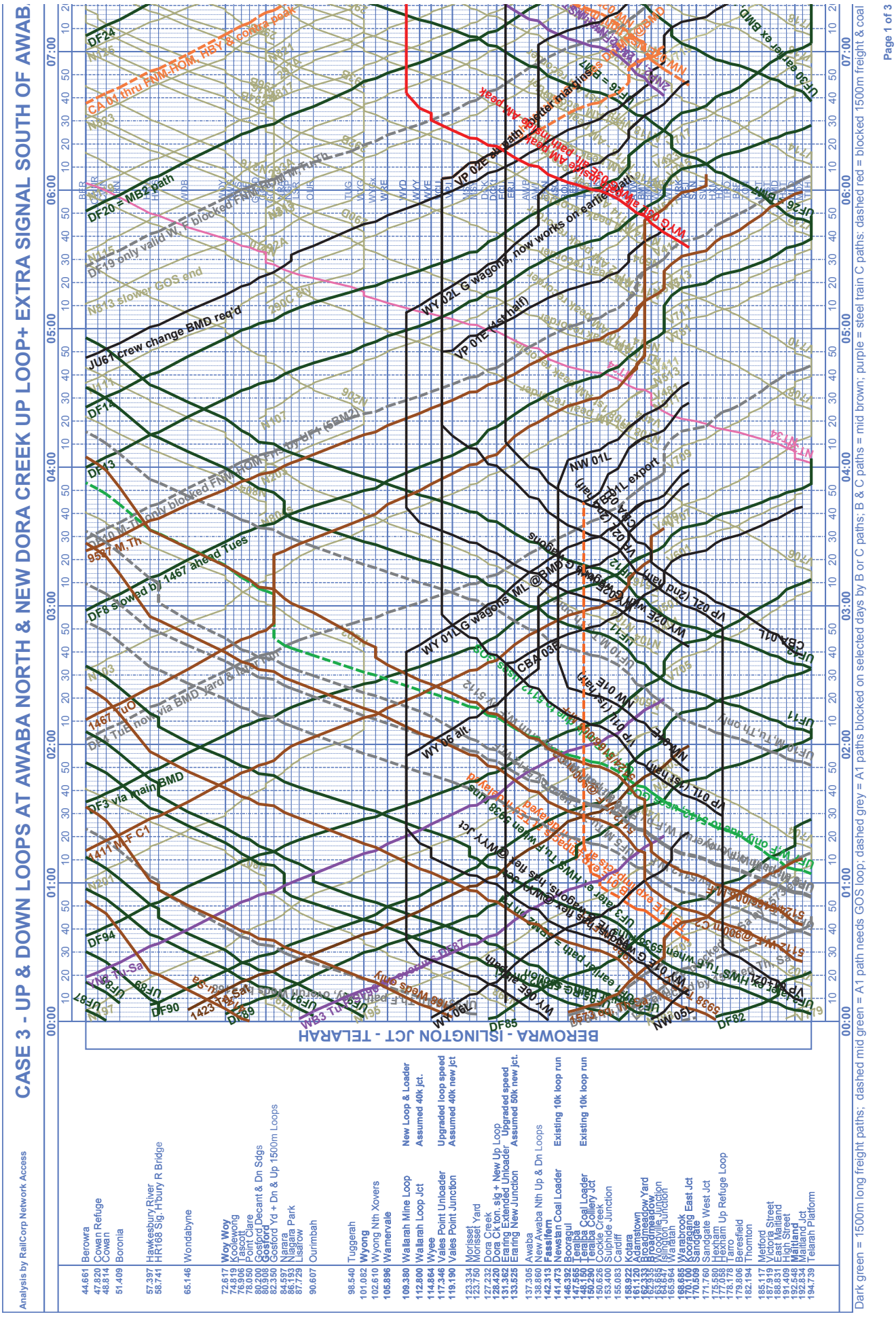

G + EXPANDED NEWSTAN COAL HAULS SUPERIMPOSED OVER STAGE 1 NSFC INTERSTATE PATHS. WYONG RUN WITH 120T WAGONS. (
paths, black = potential coal train paths; dashed orange = brittle coal paths. Countrylink services = pink, other pass = light bronze.
Consists applied: -Teralba = 80x120T (53 loaded),
Page 2 of 3
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
WY 04L no longer
WY 05E
WY 06E
WY 03L
1443 Tu-F O.sch
DF60 MO path, blocked Tu-F by 1443
DF56 earlier ex CHS, overun if CA 01 present path runs
CA01 present path
1581 M.W
DF51 = 2MB2, 2/6BA6
DF50
DF49 blocked if FO,FNM,HOM by later pur 55 pcls due Jq 4/168
1511 @ Mdbro 04 hrs 14T & 15T comb
1467 ThO
DF43
DF41 = MB4
DF37 = MB7
DF36
DF31
DF28 needs GOS loop to be viable
WY 03L unchanged, blocks NT37
DF40 West OLX shunt
DF46 West OLX shunt
DF42
CBA 01 all 56 BSA on WF
CBA 01E
DF38 = BMA
DF30 arrested by OLX shunt
NP23 @ 120k
DF33 held at MLD
DF40 connection path unusable at
DF38 = BMA
DF34 BS6 & BS6 on WF
A168 FO
DF30 connection path unusable at
DF30 connection path unusable at

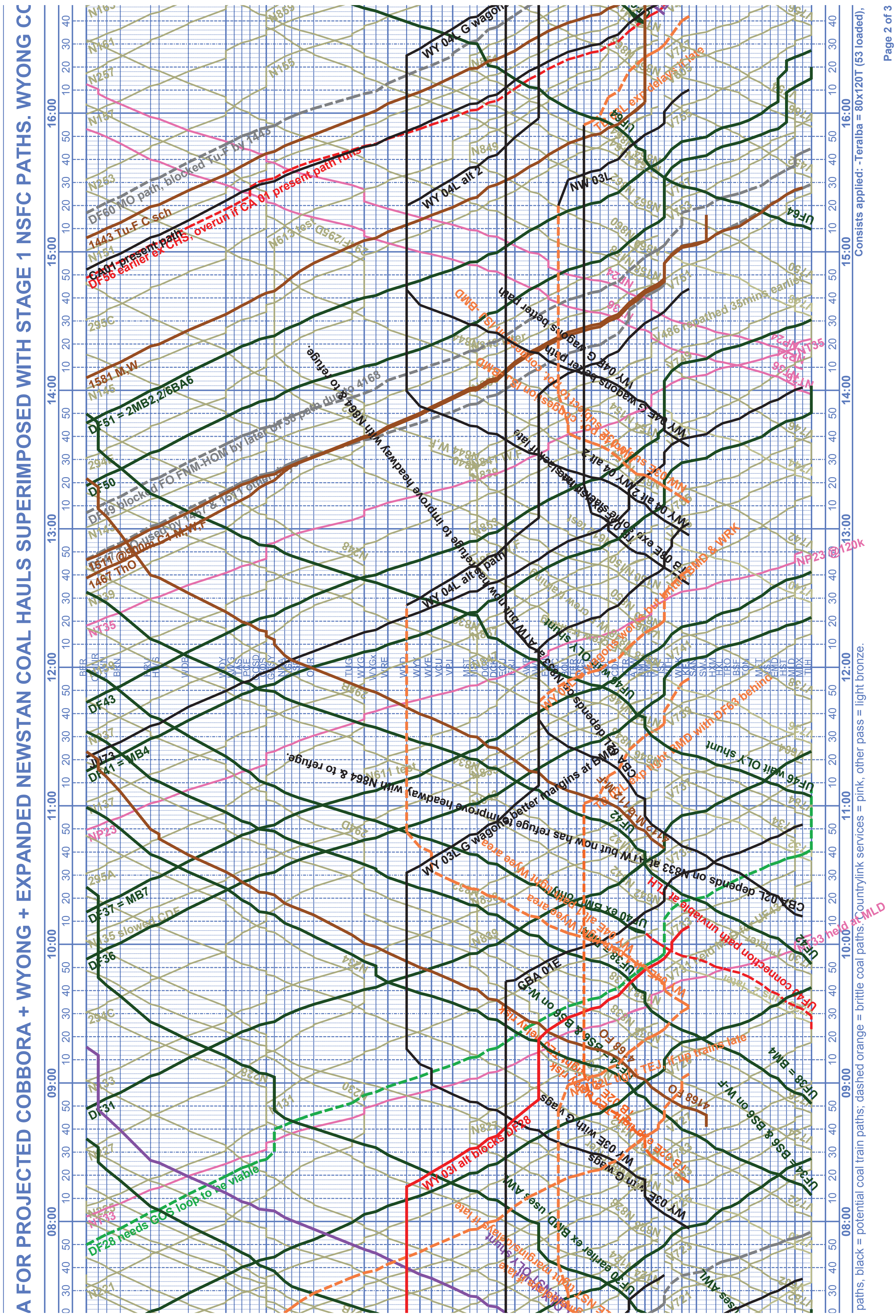

GRAPH 2.0
Assumes Junction & Balloon Loop Access Speed Upgrades at Eraring & Vales Pt).
BEROWRA - ISLINGTON JCT - TELARAH
Berowra
Cowan Refuge
Cowan
Boronia
Hawkesbury River
HR168 Sig. Hbury R Bridge
Wondabyne
Woy Woy
Koolewong
Booker Bay
Point Clare
Gosford Decant & Dn Sdgs
Gosford
Gosford Yd + Dn & Up 1500m Loops
Narara
Niagara Park
Lisarow
Ourimbah
Ronkana X'overs site
Tuggerah
Wyong
Wyong Nth X'overs
Warnervale
Wallarah Mine Loop
Wallarah Loop Jct
Wyee
Vales Point Unloader
Vales Point Junction
Morisset
Morisset Yard
Dora Creek
Eraring Extended Unloader
Eraring New Junction
Awaba
Awaba Loop
Fassifern
Newstan Coal Loader
Booragul
Teralba
Teralba Coal Loader
Teralba Colliery Jct
Cookie Creek
Sulphide Junction
Cardiff
Kotara
Adamstown
Broadmeadow Yard
Broadmeadow
Islington Junction
Waratah
Warabrook
Sandgate
Sandgate East Jct
Sandgate West Jct
Hexham
Hexham Up Refuge Loop
Tarro
Beresfield
Thornton
Metford
Victoria Street
East Maitland
High Street
Maitland
Telarah Jct
Telarah Platform
New Loop & Loader
Assumed 40k jct.
Upgraded loop speed
Assumed 40k new jct
Upgraded speed
Assumed 50k new jct.
Existing 10k loop run
Existing 10k loop run
Single line boundary
Newstan 50PHTH wagons with 3 AC locos , west train = 46PHTH, Eraring 84x120T with 4 AC locos, Vales Pt 42x120T with 2 AC locos, Wyong 38x120T with 3 AC locos (assume 60k loaded max wagons), Port Kembla runs = 45x100T (80K) with 4x82cl locos.
Page 3 of 3

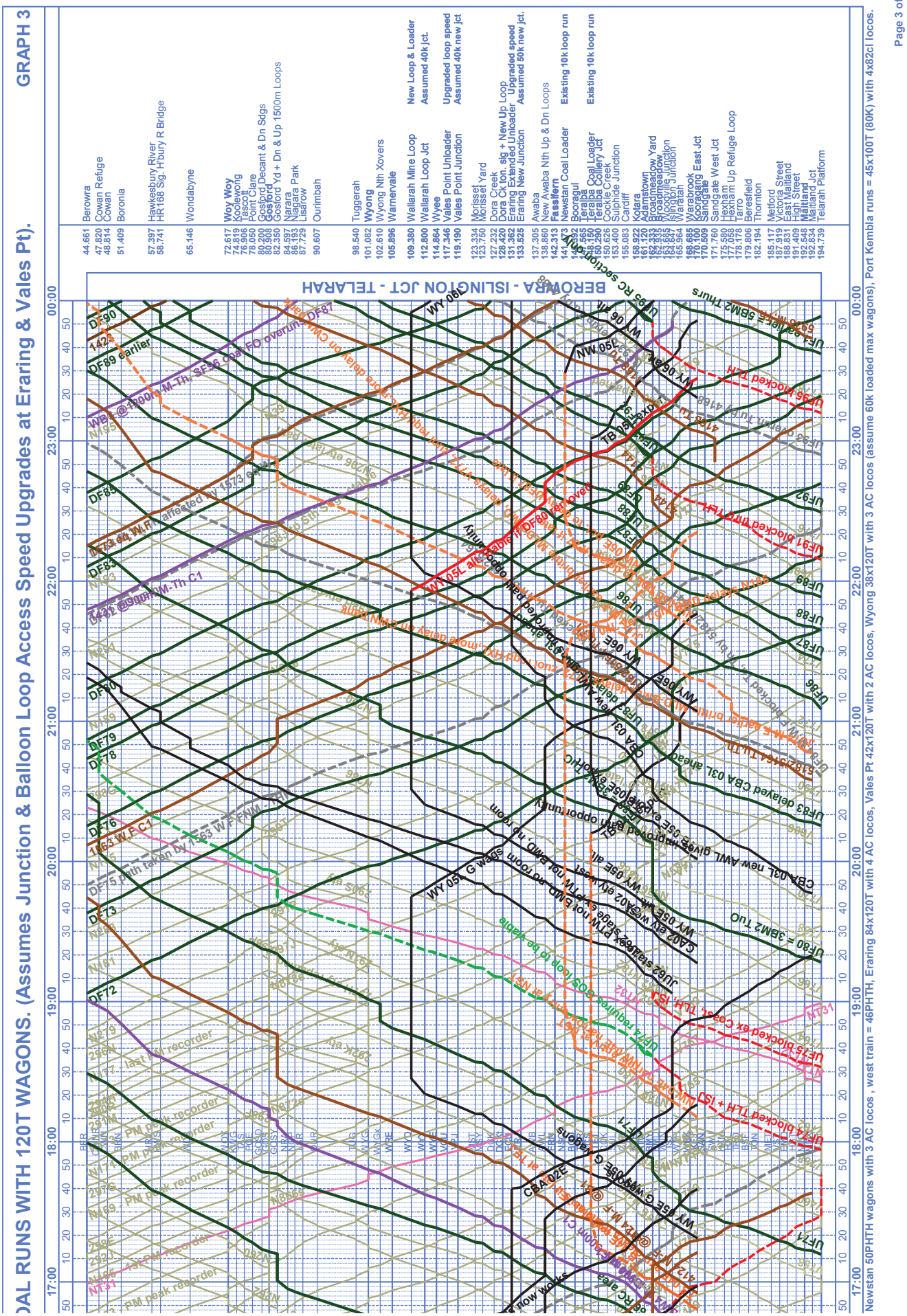

ANALYSIS BY RAILCORP NETWORK ACCESS
CASE 2.1 - NO MAIN LINE INFRASTRUCTURE FOR PROJECTED COBBORA + WYONG + EXPANDED NEWSTAN
BERORWA - ISLINGTON JCT - TELARAH
00:00
01:00
02:00
03:00
04:00
05:00
06:00
07:00
Berowra
Cowan Refuge
Cowan
Boronia
Hawkesbury River
HR168 Sig. H'bury R Bridge
Wondabyne
Woy Woy
Koolewong
Tascott
Point Clare
Gosford Decant & Dn Sdgs
Gosford Yd + Dn & Up 1500m Loops
Narara
Niagara Park
Lisarow
Ourimbah
Ronkana X'overs site
Tuggerah
Wyong
Wyong Nth Xovers
Wamervale
Wallarah Mine Loop
Wallarah Loop Jct
Wyee
Vales Point Unloader
Vales Point Junction
Morisset
Morisset Yard
Dora Creek
Eraring Extended Unloader
Eraring New Junction
Awaba
Awaba Loop
Fassifern
Newstan Coal Loader
Booragul
Teralba
Teralba Coal Loader
Teralba Colliery Jct
Cockle Creek
Sulphide Junction
Cardiff
Kotara
Adamstown
Broadmeadow Yard
Broadmeadow
Islington Junction
Waratah
Warabrook
Kooragang East Jct
Sandgate
Sandgate West Jct
Hexham
Hexham Up Refuge Loop
Tarro
Beresfield
Thornton
Metford
Victoria Street
East Maitland
High Street
Maitland
Maitland Jct
Telarah Platform
New Loop & Loader
Assumed 40k jct.
Upgraded loop speed
Assumed 40k new jct
Upgraded speed
Assumed 50k new jct.
Existing 10k loop run
Existing 10k loop run
Single line boundary
DF24
DF20 = MB2 path
DF19 was W, F now blocked
DF14
DF13
DF8 slowed by 1467 ahead Tues
DF3
DF94
DF90
DF89
DF87
DF82
CA 01 thru FMM-ROM, HSY & coal to peak
JU61 crew change ISJ req'd
1467 TuO
DF1 Tu,Th becomes prime at SUL
1411 M,F C-1
1423 Tu,Sat
WY 02E all, now earlier, better margins
WY 02L now unviable, blocks
VP 02E (Crowders Nest)
VP 01E (Hanson)
WY 01L tight at SUL, sacrifices DF4 reliability
WY 03E
WY 06E
WY 01E
VP 02L (2nd train)
VP 01L (1st train)
NW 01E
NW 02E
NW 03E
DF4
DF2
DF11
DF12
DF10
DF7
DF6
DF5
DF1
DF81
DF83
DF84
DF85
DF86
DF88
DF91
DF92
DF93
DF95
DF96
DF97
DF98
DF99
DF100
DF101
DF102
DF103
DF104
DF105
DF106
DF107
DF108
DF109
DF110
DF111
DF112
DF113
DF114
DF115
DF116
DF117
DF118
DF119
DF120
DF121
DF122
DF123
DF124
DF125
DF126
DF127
DF128
DF129
DF130
DF131
DF132
DF133
DF134
DF135
DF136
DF137
DF138
DF139
DF140
DF141
DF142
DF143
DF144
DF145
DF146
DF147
DF148
DF149
DF150
DF151
DF152
DF153
DF154
DF155
DF156
DF157
DF158
DF159
DF160
DF161
DF162
DF163
DF164
DF165
DF166
DF167
DF168
DF169
DF170
DF171
DF172
DF173
DF174
DF175
DF176
DF177
DF178
DF179
DF180
DF181
DF182
DF183
DF184
DF185
DF186
DF187
DF188
DF189
DF190
DF191
DF192
DF193
DF194
DF195
DF196
DF197
DF198
DF199
DF200
DF201
DF202
DF203
DF204
DF205
DF206
DF207
DF208
DF209
DF210
DF211
DF212
DF213
DF214
DF215
DF216
DF217
DF218
DF219
DF220
DF221
DF222
DF223
DF224
DF225
DF226
DF227
DF228
DF229
DF230
DF231
DF232
DF233
DF234
DF235
DF236
DF237
DF238
DF239
DF240
DF241
DF242
DF243
DF244
DF245
DF246
DF247
DF248
DF249
DF250
DF251
DF252
DF253
DF254
DF255
DF256
DF257
DF258
DF259
DF260
DF261
DF262
DF263
DF264
DF265
DF266
DF267
DF268
DF269
DF270
DF271
DF272
DF273
DF274
DF275
DF276
DF277
DF278
DF279
DF280
DF281
DF282
DF283
DF284
DF285
DF286
DF287
DF288
DF289
DF290
DF291
DF292
DF293
DF294
DF295
DF296
DF297
DF298
DF299
DF300
DF301
DF302
DF303
DF304
DF305
DF306
DF307
DF308
DF309
DF310
DF311
DF312
DF313
DF314
DF315
DF316
DF317
DF318
DF319
DF320
DF321
DF322
DF323
DF324
DF325
DF326
DF327
DF328
DF329
DF330
DF331
DF332
DF333
DF334
DF335
DF336
DF337
DF338
DF339
DF340
DF341
DF342
DF343
DF344
DF345
DF346
DF347
DF348
DF349
DF350
DF351
DF352
DF353
DF354
DF355
DF356
DF357
DF358
DF359
DF360
DF361
DF362
DF363
DF364
DF365
DF366
DF367
DF368
DF369
DF370
DF371
DF372
DF373
DF374
DF375
DF376
DF377
DF378
DF379
DF380
DF381
DF382
DF383
DF384
DF385
DF386
DF387
DF388
DF389
DF390
DF391
DF392
DF393
DF394
DF395
DF396
DF397
DF398
DF399
DF400
DF401
DF402
DF403
DF404
DF405
DF406
DF407
DF408
DF409
DF410
DF411
DF412
DF413
DF414
DF415
DF416
DF417
DF418
DF419
DF420
DF421
DF422
DF423
DF424
DF425
DF426
DF427
DF428
DF429
DF430
DF431
DF432
DF433
DF434
DF435
DF436
DF437
DF438
DF439
DF440
DF441
DF442
DF443
DF444
DF445
DF446
DF447
DF448
DF449
DF450
DF451
DF452
DF453
DF454
DF455
DF456
DF457
DF458
DF459
DF460
DF461
DF462
DF463
DF464
DF465
DF466
DF467
DF468
DF469
DF470
DF471
DF472
DF473
DF474
DF475
DF476
DF477
DF478
DF479
DF480
DF481
DF482
DF483
DF484
DF485
DF486
DF487
DF488
DF489
DF490
DF491
DF492
DF493
DF494
DF495
DF496
DF497
DF498
DF499
DF500
DF501
DF502
DF503
DF504
DF505
DF506
DF507
DF508
DF509
DF510
DF511
DF512
DF513
DF514
DF515
DF516
DF517
DF518
DF519
DF520
DF521
DF522
DF523
DF524
DF525
DF526
DF527
DF528
DF529
DF530
DF531
DF532
DF533
DF534
DF535
DF536
DF537
DF538
DF539
DF540
DF541
DF542
DF543
DF544
DF545
DF546
DF547
DF548
DF549
DF550
DF551
DF552
DF553
DF554
DF555
DF556
DF557
DF558
DF559
DF560
DF561
DF562
DF563
DF564
DF565
DF566
DF567
DF568
DF569
DF570
DF571
DF572
DF573
DF574
DF575
DF576
DF577
DF578
DF579
DF580
DF581
DF582
DF583
DF584
DF585
DF586
DF587
DF588
DF589
DF590
DF591
DF592
DF593
DF594
DF595
DF596
DF597
DF598
DF599
DF600
DF601
DF602
DF603
DF604
DF605
DF606
DF607
DF608
DF609
DF610
DF611
DF612
DF613
DF614
DF615
DF616
DF617
DF618
DF619
DF620
DF621
DF622
DF623
DF624
DF625
DF626
DF627
DF628
DF629
DF630
DF631
DF632
DF633
DF634
DF635
DF636
DF637
DF638
DF639
DF640
DF641
DF642
DF643
DF644
DF645
DF646
DF647
DF648
DF649
DF650
DF651
DF652
DF653
DF654
DF655
DF656
DF657
DF658
DF659
DF660
DF661
DF662
DF663
DF664
DF665
DF666
DF667
DF668
DF669
DF670
DF671
DF672
DF673
DF674
DF675
DF676
DF677
DF678
DF679
DF680
DF681
DF682
DF683
DF684
DF685
DF686
DF687
DF688
DF689
DF690
DF691
DF692
DF693
DF694
DF695
DF696
DF697
DF698
DF699
DF700
DF701
DF702
DF703
DF704
DF705
DF706
DF707
DF708
DF709
DF710
DF711
DF712
DF713
DF714
DF715
DF716
DF717
DF718
DF719
DF720
DF721
DF722
DF723
DF724
DF725
DF726
DF727
DF728
DF729
DF730
DF731
DF732
DF733
DF734
DF735
DF736
DF737
DF738
DF739
DF740
DF741
DF742
DF743
DF744
DF745
DF746
DF747
DF748
DF749
DF750
DF751
DF752
DF753
DF754
DF755
DF756
DF757
DF758
DF759
DF760
DF761
DF762
DF763
DF764
DF765
DF766
DF767
DF768
DF769
DF770
DF771
DF772
DF773
DF774
DF775
DF776
DF777
DF778
DF779
DF780
DF781
DF782
DF783
DF784
DF785
DF786
DF787
DF788
DF789
DF790
DF791
DF792
DF793
DF794
DF795
DF796
DF797
DF798
DF799
DF800
DF801
DF802
DF803
DF804
DF805
DF806
DF807
DF808
DF809
DF810
DF811
DF812
DF813
DF814
DF815
DF816
DF817
DF818
DF819
DF820
DF821
DF822
DF823
DF824
DF825
DF826
DF827
DF828
DF829
DF830
DF831
DF832
DF833
DF834
DF835
DF836
DF837
DF838
DF839
DF840
DF841
DF842
DF843
DF844
DF845
DF846
DF847
DF848
DF849
DF850
DF851
DF852
DF853
DF854
DF855
DF856
DF857
DF858
DF859
DF860
DF861
DF862
DF863
DF864
DF865
DF866
DF867
DF868
DF869
DF870
DF871
DF872
DF873
DF874
DF875
DF876
DF877
DF878
DF879
DF880
DF881
DF882
DF883
DF884
DF885
DF886
DF887
DF888
DF889
DF890
DF891
DF892
DF893
DF894
DF895
DF896
DF897
DF898
DF899
DF900
DF901
DF902
DF903
DF904
DF905
DF906
DF907
DF908
DF909
DF910
DF911
DF912
DF913
DF914
DF915
DF916
DF917
DF918
DF919
DF920
DF921
DF922
DF923
DF924
DF925
DF926
DF927
DF928
DF929
DF930
DF931
DF932
DF933
DF934
DF935
DF936
DF937
DF938
DF939
DF940
DF941
DF942
DF943
DF944
DF945
DF946
DF947
DF948
DF949
DF950
DF951
DF952
DF953
DF954
DF955
DF956
DF957
DF958
DF959
DF960
DF961
DF962
DF963
DF964
DF965
DF966
DF967
DF968
DF969
DF970
DF971
DF972
DF973
DF974
DF975
DF976
DF977
DF978
DF979
DF980
DF981
DF982
DF983
DF984
DF985
DF986
DF987
DF988
DF989
DF990
DF991
DF992
DF993
DF994
DF995
DF996
DF997
DF998
DF999
DF1000
Dark green = 1500m long freight paths; dashed mid green = A1 path needs GOS loop; dashed grey = A1 paths blocked on selected days by B or C paths; B & C paths = mid brown; purple = steel train C paths: dashed red = blocked 1500m freight & coal
Page 1 of 3


COAL HAULS SUPERIMPOSED OVER STAGE 1 NSFC INTERSTATE PATHS. WYONG RUN WITH 120T WAGONS. (Assumes Junction & Balloon Loop Access S
Page 2 of 3
Consists applied: -Teralba = 80x120T (53 loaded),
paths, black = potential coal train paths; dashed orange = brittle coal paths. Countrylink services = pink, other pass = light bronze.
08:00
09:00
10:00
11:00
12:00
13:00
14:00
15:00
16:00
DF43
DF41 = MB4
DF37 = MB7
DF28 needs GOS loop to be viable
DF36 over run by WY 03L
DF31 over run by WY 03L
1581 M.W
DF51 = 2MB2 2/6BA6
DF50 over run by WY 04L alt.
1511 @ Bulahdelah
1467 ThO
DF60 MO path, blocked Tu-F by 1T40
1443 Tu-F C sch
CA01 present path
DF56 earlier ex CRH, overun if CA 01 present path runs
WY 04L blocked
WY 05E
WY 06E
NW 03L
UF64
DF5n to work
WY 04E later
WY 03L alt. rates ok: DF36+1T35
CBA 01 alt 36 later
CBA 01E
UF38 = BM4
UF42
UF34
UF30
UF26
UF22
UF18
UF14
UF10
UF38 = BM4
UF34 = BS6 & BS6 on WF
1T68 FO
1T35 FO
1T18 05E
NP23 @ 120k
NP23 need at MLD
DF36 over run by WY 03L alt
DF50 over run by WY 04L alt
DF39 blocked FO FNM-HQM by later DF36 path due to 4168
1467 & 1511 delay
1443 Tu-F C sch
DF60 MO path, blocked Tu-F by 1T40
CA01 present path
DF56 earlier ex CRH, overun if CA 01 present path runs
1581 M.W
DF51 = 2MB2 2/6BA6
DF43
DF41 = MB4
DF37 = MB7
DF28 needs GOS loop to be viable
DF31 over run by WY 03L
WY 04L blocked
WY 05E
WY 06E
NW 03L
UF64
DF5n to work
WY 04E later
WY 03L alt. rates ok: DF36+1T35
CBA 01 alt 36 later
CBA 01E
UF38 = BM4
UF42
UF34
UF30
UF26
UF22
UF18
UF14
UF10
UF38 = BM4
UF34 = BS6 & BS6 on WF
1T68 FO
1T35 FO
1T18 05E
NP23 @ 120k
NP23 need at MLD


GRAPH 2.1
Speed Upgrades at Eraring & Vales Pt). HAS OVERRIDDEN NSFC PATHS FOR EXTRA WYONG PATH OPTIONS.
BEROWRA - ISLINGTON JCT - TELARAH
Berowra
Cowan Refuge
Cowan
Boronia
Hawkesbury River
HR168 Sig. H'bury R Bridge
Wondabyne
Woy Woy
Koolewong
Tascott
Point Clare
Gosford
Gosford Decant & Dn Sdgs
Gosford Yd + Dn & Up 1500m Loops
Narara
Niagara Park
Lisarow
Ourimbah
Ronkana X'overs site
Tuggerah
Wyong
Wyong Nth X'overs
Warnervale
Wallarah Mine Loop
Wallarah Loop Jct
Wyee
Vales Point Unloader
Vales Point Junction
Morisset
Morisset Yard
Dora Creek
Eraring Extended Unloader
Eraring New Junction
Awaba
Awaba Loop
Fassifern
Newstan Coal Loader
Booragul
Teralpa
Teralpa Coal Loader
Teralpa Colliery Jct
Cockle Creek
Sulphide Junction
Cardiff
Kotara
Adamstown
Broadmeadow Yard
Broadmeadow
Islington Junction
Islington
Waratah
Warabrook
Kooragang East Jct
Sandgate
Sandgate West Jct
Lenaghan Up Refuge Loop
Tarro
Beresfield
Thornton
Metford
Victoria Street
East Maitland
High Street
Maitland
Maitland Jct
Telarah Platform
New Loop & Loader
Assumed 40kt jct.
Upgraded loop speed
Assumed 40k new jct
Upgraded speed
Assumed 50k new jct.
Existing 10k loop run
Existing 10k loop run
Single line boundary
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00
Newstan 50PHTH wagons with 3 AC locos , west train = 46PHTH, Eraring 84x120T with 4 AC locos, Vales Pt 42x120T with 2 AC locos, Wyong 38x120T with 3 AC locos (assume 60k loaded max wagons), Port Kembla runs = 45x100T (80K) with 4x82cl locos.


CASE 3 - UP & DOWN LOOPS AT AWABA NORTH & NEW DORA CREEK UP LOOP+ EXTRA SIGNAL SOUTH OF AWAB
Analysis by RailCorp Network Access
BEROWRA - ISLINGTON JCT - TELARAH
Dark green = 1500m long freight paths; dashed mid green = A1 path needs GOS loop; dashed grey = A1 paths blocked on selected days by B or C paths; B & C paths = mid brown; purple = steel train C paths: dashed red = blocked 1500m freight & coal
Page 1 of 3


A FOR PROJECTED COBBORA + WYONG + EXPANDED NEWSTAN COAL HAULS SUPERIMPOSED WITH STAGE 1 NSFC PATHS. WYONG CC
paths, black = potential coal train paths; dashed orange = brittle coal paths, countrylink services = pink, other pass = light bronze.
Consists applied: -Teralba = 80x120T (53 loaded),
Page 2 of 3


GRAPH 3
OAL RUNS WITH 120T WAGONS. (Assumes Junction & Balloon Loop Access Speed Upgrades at Eraring & Vales Pt).
BEROWRA - ISLINGTON JCT - TELARAH
Berowra
Cowan Refuge
Cowan
Boronia
Hawkesbury River
HR168 Sig. Hbury R Bridge
Wondabyne
Woy Woy
Koolewong
Point Clare
Gosford Decant & Dn Sdgs
Gosford
Gosford Yd + Dn & Up 1500m Loops
Narara
Niagara Park
Lisarow
Ourimbah
Tuggerah
Wyong
Wyong Nth Xovers
Warnervale
Wallarah Mine Loop
Wallarah Loop Jct
Wyee
Vales Point Unloader
Vales Point Junction
Morisset
Morisset Yard
Dora Creek
Eraring Extended Unloader
Eraring New Junction
Awaba
New Awaba Nth Up & Dn Loops
Fassifern
Newstan Coal Loader
Booragul
Teralba
Teralba Colliery Jct
Cockle Creek
Sulphide Junction
Cardiff
Kotara
Adamstown
Broadmeadow Yard
Broadmeadow
Islington Junction
Waratah
Warabrook
Sandgate East Jct
Sandgate
Sandgate West Jct
Hexham
Hexham Up Refuge Loop
Tarro
Beresfield
Thornton
Metford
Victoria Street
East Maitland
High Street
Maitland
Maitland Jct.
Telarah Platform
New Loop & Loader
Assumed 40k jct.
Upgraded loop speed
Assumed 40k new jct
Assumed 50k new jct.
Existing 10k loop run
Existing 10k loop run
17:00
18:00
19:00
20:00
21:00
22:00
23:00
00:00
Newstan 50PHTH wagons with 3 AC locos , west train = 46PHTH, Eraring 84x120T with 4 AC locos, Vales Pt 42x120T with 2 AC locos, Wyong 38x120T with 3 AC locos (assume 60k loaded max wagons), Port Kembla runs = 45x100T (80K) with 4x82cl locos.
Page 3 of 3