SPECIALIST ASSESSMENT – RAIL CRITERION

PALMERSTON NORTH REGIONAL FREIGHT HUB MULTI CRITERIA ANALYSIS AND DECISION CONFERENCING PROCESS

PREPARED FOR KIWIRAIL

June 2020

CNI FREIGHT HUB

PHASE 2 – MULTI CRITERIA ANALYSIS

RAIL CRITERIA

Quality Assurance

Document History					
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1	17-Sep-2019	Issue for Information	Goncalo Sintra	Simone Hadley	N.A.
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PHASE 2 – MULTI CRITERIA ANALYSIS - RAIL CRITERIA

INTRODUCTION

The purpose of this document is to support the evaluation of possible sites for the future Central North Island Freight Hub. The document contains the Rail Criteria assessment for the Multi Criteria Analysis (MCA). The following assessment of the long list site options reflects only the rail criteria and shouldn't be considered without the analysis of the other criteria.

This report is a comparative assessment of long list site options to inform the MCA workshop #2.
This assessment has relied on the following information:

- Description of future activity;
- Master Plan Concept Design F;
- Workshop 2 Briefing: List of eight possible sites - long list site options;

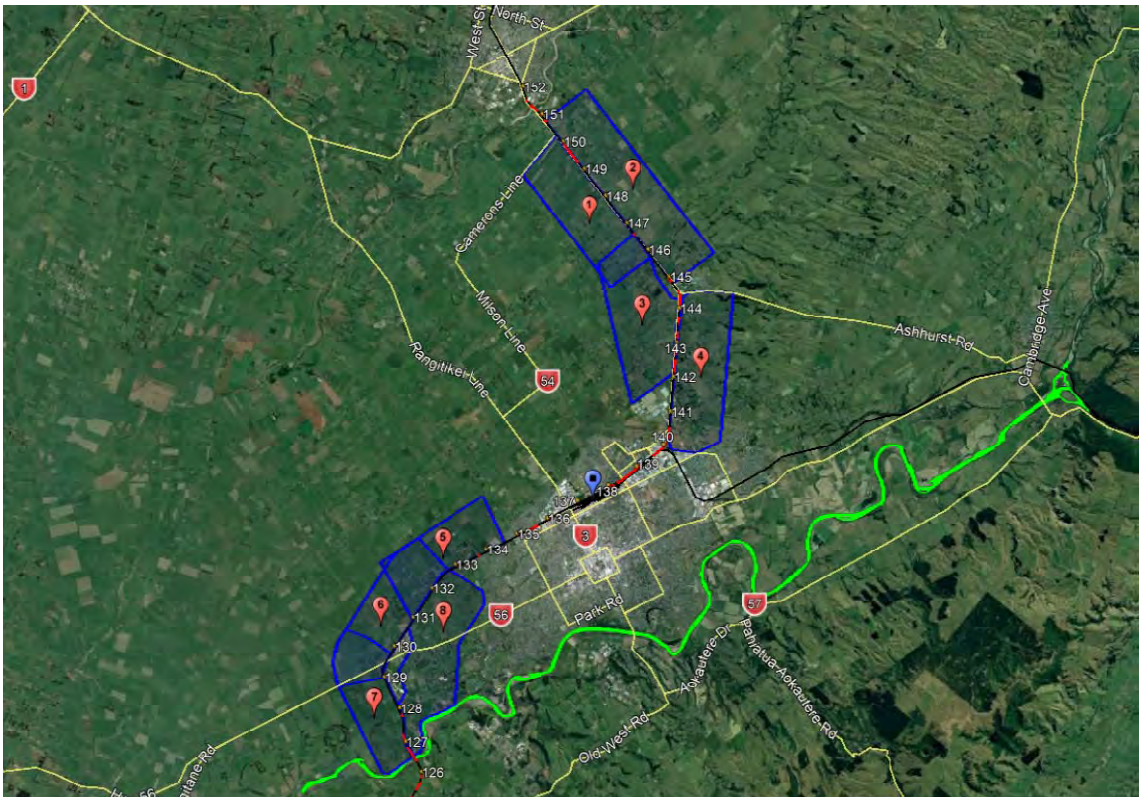

Figure 1: Possible locations for CNI Freight Hub

For the purpose of the present document the eight possible sites were named:

1. Bunnythorpe 1: West Side
2. Bunnythorpe 2: East Side
3. Bunnythorpe 3: West Side (Airport)
4. Bunnythorpe 4: East Side
5. Longburn 5: North Side
6. Longburn 6: North West Side
7. Longburn 7: West Side (River)
8. Longburn 8: South East Side

The existing yard was assessed based on the existing yard footprint.
Therefore, 9 possible sites were assessed for the CNI freight Hub.

9. Existing site

CRITERIA BEING ASSESSED

To evaluate the rail criteria the following sub criteria were considered:

- Rail network connectivity - ability to connect with existing /future rail networks;
- Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network;
- Other mode compatibility - any limitations produced by rail on road design, will this be well integrated with modes/network;
- Resilience & Operation;
- Safety – possibilities for improving operational safety;
- Connectivity to electrification infrastructure.

Each sub criteria was evaluated for each possible site and scored according to the scoring criteria. The numeric scoring criteria is related to the benefits that can be achieved.

	Criteria		
Score	Benefits	Impact	Difficulty
	• Rail • Economic	• Tangata whenua values • Natural environment (terrestrial and freshwater) • Noise and vibration • Heritage • Visual and landscape impacts • Community Cohesion • Fit with (regional) strategies / plans	• Engineering degree of difficulty • Connectivity • Property degree of difficulty • Resilience -Hazards • Cost
1	High Benefits	Low Impact	Low Difficulty
2	Medium High	Medium Low	Medium Low
3	Medium	Medium	Medium
4	Medium Low	Medium High	Medium High
5	Low Benefits	High Impact	High Difficulty

Table 1: 5-scale numeric score adopted

As presented in Table 1, lower scores represent higher benefits for Rail, so the sites with an overall lower score should be selected for the detailed site analysis.

For this Rail Criteria assessment it was considered that every site option had exactly the same ability to connect to the main line in terms of gradient; so that each location could be assessed on a similar basis and in order to enable a wide field of options to be assessed at this early stage.

Each sub criteria was scored according to the defined scoring criteria.

Sub Criteria	Scoring Criteria
a) Rail network connectivity - ability to connect with existing /future rail networks	Location served by NIMT Line. Scores were given on the following basis 1 = easy connection, 2 = constraints on one side, 3= major changes required to master plan layout to enable connection at both extremities, 4= adjusting masterplan concept and only one easy connection is possible or extensions are required to connect to the NIMT line, 5 = if no connection with NIMT line. Reduction factor shall be applied if major impact in Master Plan concept design is foreseen
b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.	Location suitable for freight forwarder access and future customers Possible additional private sidings; Client/customer access to Freight CPYs (proximity) 1 = optimal connectivity for future customers, with good potential for siding service and close to freight customer activity, 2= good connectivity for future customers, potential for siding service and near freight customers, 3= average connectivity for future customers, some siding service, close to some freight customers 4= limited business opportunities for freight partners, limited siding service, distant from future freight customers, 5= furthest from access

Sub Criteria	Scoring Criteria
	networks , no siding service, and furthest from freight customers, removal of major business from Palmerston North
c) other mode compatibility - any limitations produced by rail on road design, will this be well integrated with modes/network	Advantage when the rail line is in the same side of land/property; whether intervention on main roads required; objective is to reduce the number of main road crossings (different weight for primary and secondary roads). 1= Optimal location (compatibility of Hub with existing railway), 2= Rail on the same side, 3= not on the same side or major road impact, 4= major impact on key road networks, 5= multiple crossings, road interventions
d) Resilience & Operation	Matters which were taken into account are; northern site locations can reduce train traffic and time delays when travelling through the city eg potential reduction of 20% train traffic passing in Palmerston North City for northern areas as most traffic comes from north. Growth opportunities, residential area represents a constraint to growth, so a reduction of benefits was applied where the option is located adjacent to residential areas. Major infrastructure constraints to expansion are considered such as aerodromes, power lines highways. 1=northern location, away from existing or planned residential areas, and few infrastructure constraints, 2= northern location, close to existing or planned residential areas, some effect on major infrastructure, 3= not too close to existing or planned residential areas, minor effect on major infrastructure, 4= close to existing or future residential areas, adverse effects on major infrastructure. 5= adjacent to existing or future residential development, removal of major infrastructure required.
e) Safety – possibilities for improving operational safety	Master Plan concept was designed taking into consideration KiwiRail's and international safety standards. The number of level crossings required reduces the score. Major changes in the concept design might have impacts on safety, such as where the operational footprint is compromised a reduction is applied. Prevailing winds are also a factor as high winds can cause high stacks of empty containers to topple and can also result in effects of dust from yard operations on staff safety and neighbours and waterways. Accessibility of site (different access for emergency/rescue). 1=no road crossings, Master plan concept fully applied, low wind environment, good road access (emergency), 2= reduced road crossings, no changes to masterplan layout, no – low wind exposure, good emergency access, 3= some level crossings, some limits on masterplan concept, moderate wind conditions, average emergency access, 4= some level crossings, limits on masterplan footprint, moderate – high wind exposure, less direct access for emergency vehicles, 5= multiple road/level crossings, master plan footprint compromised, furthest emergency access distance, high wind area
f) Impacts to existing NIMT line. Connectivity to electrification infrastructure	Proximity to electrification, extension of electrification required 1= no change, already connected 2 =little work needed to connect network, 3 = moderate work needed to connect, 4 = extensive work to extend electrification, 5= significant extension of electrification works

Table 2: List of Rail sub criteria and scoring criteria

To take into consideration the different impacts of the sub criteria listed, a 'significance' factor was considered. The different weights assigned to each sub criteria reflect its importance and allow a better understanding of each site significance for the rail criteria.

For the 'weight' definition the impact on the following was considered:

- Future operations – yard life cycle;
- Business model – revenue streams;
- KiwiRail values;

Figure 3: KiwiRail values

- Impact on the level of infrastructure required to establish the new hub.

Weight	Justification for Weight	Sub Criteria
4	Impact on Rail Operations: Well-designed connections will ensure that multiple daily movements are safe and reduce time and operational costs. It is important that the Hub is compatible with the railway network to avoid inefficiencies. The weighting of '4' has been given as 'connectivity' has a short and long-term effect on Hub viability.	a) Rail network connectivity - ability to connect with existing /future rail networks
4	Impact on Business Model (revenue stream) and KiwiRail Values (Customer). Opportunities for connectivity and proximity to future freight customers is weighted '4' as it is an equally important criteria to that of rail network connectivity.	b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.
2	Impact associated with Yard Construction (initial investment). Initial cost can be recovered through yard life cycle. This criterion has been given less weight than other rail elements as development costs can be recovered and some impacts have been addressed elsewhere (e.g. Engineering degree of difficulty and connectivity -transport)	c) other mode compatibility - any limitations produced by rail on existing and future road design, will this be well integrated with modes/network
3	Impact on operations and initial investment. It is considered that this concept reflects operational needs. Impacts on growth opportunities and existing major infrastructure is weighted lower than 'rail connectivity' as it is less influential compared to operation.	d) Resilience & Operation
4	Impact on KiwiRail Values (Safety) and potential future yard operations. This criterion has been given a weighting of "4" as operational safety is as equally important as the similarly weighted criteria. Major changes in the masterplan concept design reduce the potential to handle the volumes in an environment where safety is optimised.	e) Safety – possibilities for improving operational safety
2	Impact on required infrastructure. This criterion has been given less weight than other rail elements as development costs can be recovered and some impacts have been addressed elsewhere (e.g. Engineering degree of difficulty and connectivity -transport)	f) Connectivity to electrification infrastructure

Table 3: List of Rail sub criteria, attributed weight and justification

COMPARATIVE ASSESSMENT

The eight selected sites and the existing site were evaluated and scored. Each site was scored for each sub criteria and the overall score for each site was defined accordingly to the formula:

$$Score\ weighted\ for\ site\ = \frac{\sum_a^f (weight\ x\ score)^1}{\sum_a^f weight}$$

Where:

- a to f represent the number of sub criteria (table 2)
- 'weight' represents the weight defined for each sub criteria (table 3)
- score weighted for site considering the scoring criteria (table 2) and 5-scale numeric scoring (table 1)

The detailed scoring is present in the Appendix One.

Table 3 presents a summary of the weighted score for each site.

	Score Weighted
Bunnythorpe 1: West Side	2.21
Bunnythorpe 2: East Side	2.37
Longburn 6: North West Side	2.58
Bunnythorpe 3: West Side (Airport)	2.58
Longburn 5: North Side	2.68
Bunnythorpe 4: East Side	2.84
Existing Site	3.05
Longburn 7: West Side (River)	3.21
Longburn 8: South East Side	4.11

Table 3: Site weighted score

The weighted score (above) has been converted to 'round up' the scoring to fit the 1=high to 5=low scale (below)

	Lower Limit	Upper Limit	**Overall score Equivalent**
Weight Score considering sub criteria	2.21	2.40	**1**
	2.41	2.60	**2**
	2.61	2.79	**3**
	2.80	2.99	**4**
	3.00		**5**

Table 4: Overall score definition

	Overall Score
Bunnythorpe 1: West Side	1
Bunnythorpe 2: East Side	1
Longburn 6: North West Side	2
Bunnythorpe 3: West Side (Airport)	2
Longburn 5: North Side	3
Bunnythorpe 4: East Side	4
Existing Site	5
Longburn 7: West Side (River)	5
Longburn 8: South East Side	5

Table 5: Overall score

[1] It's the sum of each individual score times the sub criteria weight.

At this stage no fatal flaws have been identified.

This assessment orders the sites in terms of Rail criteria preference. It was not possible to identify a clear preferred site, however, a short list of 4 sites is recommended for further assessment as these sites were assessed as having the lowest impact from a rail perspective:

- Bunnythorpe 1,
- Bunnythorpe 2,
- Longburn 6,
- Bunnythorpe 3,

Each site has its own particular constraints, so further investigation is required.

APPENDIX ONE– DETAIL SCORE FOR RAIL CRITERIA

1. Rail Criteria				Bunnythorpe 1: West Side		Bunnythorpe 2: East Side		Bunnythorpe 3: West Side (Airport)	
Weight	**Justification for Weight (explained in table 3)**	**Sub Criteria**	**Scoring Criteria (defined in Table 2)**	Assessment	Score	Assessment	Score	Assessment	Score
4	Impact on rail operations (refer table 3)	a) Rail network connectivity - ability to connect with existing /future rail networks	Refer Table 2	Easy connection to NIMT line; but school and Marae nearby.	**3**	Easy connection to NIMT line. Offset from the existing line to avoid the aerodrome.	**2**	Some level of revision for Master Plan concept is foreseen to enable NIMT connection and avoid Bunnythorpe village.	**3**
4	Impact on Business Model (revenue stream) and KiwiRail Values (Customer) (refer table 3)	b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.	Refer Table 2	Far from possible private sidings, customer preference for closer to city location	**2**	Far from possible private siding, customer preference for location closer to city. Site located in the east side of railway line, reduced ease of connection.	**3**	Close to potential customers. Potential for customer sidings with good regional road connectivity.	**2**
2	Impact associated with Yard Construction (initial investment). (refer table 3)	c) other mode compatibility - any limitations produced by rail on existing and future road design, will this be well integrated with modes/network		Rail line between 2 roads. Constraints and impacts during construction can occur in road; additional costs for construction	**3**	Rail line between 2 roads. Constrains in site option; impacts during construction can occur in the road; additional costs for construction	**3**	Rail line in the opposite side. Constraints and impacts during construction can occur in road. Stream crossing. Possibly additional construction costs.	**3**
3	Impact on Operations and initial investment. (refer table 3)	d) Resilience & Operation	Refer Table 2	The site is not considered for future residential zones and other reserved recreation areas. Area served by the new external circular road.	**2**	Aerodrome can have impact on operations and can represent a growth constraint	**3**	Growth constraints due to proximity to industry and Bunnythorpe village. Possible limitation for afterhours operations	**3**
4	Impact on KiwiRail Values (Safety) and potential future yard operations (refer table 3)	e) Safety – possibilities for improving operational safety	Refer Table 2	Campbell Road would be the main future road and elevated crossing should be considered. Good accessibility to emergency. Good location for prevailing wind direction	**2**	Road connection to Colyton. Impact in Campbell Road. Good for emergency access. Good location for prevailing wind direction. Reduced road level crossings	**2**	Growth constraints due to proximity to industry and Bunnythorpe village. Close to industrial zone, more central location, less favourable wind conditions, some level crossings or road impacts	**3**
2	Impact on required infrastructure (refer table 3)	f) Connectivity to electrification infrastructure	Refer Table 2	Rail electrified	**1**	Rail electrified	**1**	Rail electrified	**1**
19			**Score with all Sub criteria**	**Overall Score[2]**	**13**		**14**		**15**
				Overall (Score x Weight)[3]	**42.00**		**45.00**		**49.00**
				Weighted Score	2.21		2.37		2.58

[2] The sum of individual scores without weighting

[3] The sum of each individual score times the sub criteria weight.

1. Rail Criteria				Bunnythorpe 4: East Side		Longburn 5: North Side		Longburn 6: North West Side	
Weight	**Justification for Weight (explained in table 3)**	**Sub Criteria**	**Scoring Criteria (defined in Table 2)**	Assessment	Score	Assessment	Score	Assessment	Score
4	Impact on rail operations (refer table 3)	a) Rail network connectivity - ability to connect with existing /future rail networks	Refer Table 2	Connection to NIMT line possible, with constraints on one side	**2**	Rail NIMT line in the same side. Not easy connection. No major adjustments to Master Plan concept required.	**3**	Rail NIMT in the same side (Longburn road crossing is addressed in safety).	**2**
4	Impact on Business Model (revenue stream) and KiwiRail Values (Customer) (refer table 3)	b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.	Refer Table 2	Close to potential customers. Private sidings will require level crossings since industrial area is on the other side	**3**	Number of overpasses on network, good connectivity (road), close to freight customers	**2**	Distant from north industrial area but close to Longburn industrial zone and a key client (Fonterra). Private siding close to hub	**2**
2	Impact associated with Yard Construction (initial investment) (refer table 3)	c) other mode compatibility - any limitations produced by rail on existing and future road design, will this be well integrated with modes/network		Rail NIMT line on the same side	**2**	On the same side for NIMT but with major impact on main road and bridge	**3**	Main road crossing in the middle of the area. Possible constraint/conflict with marshalling yard area requirements	**3**
3	Impact on operations and initial investment (refer table 3)	d) Resilience & Operation	Refer Table 2	No major operational issues for site boundaries. Growth constraints due to proximity to established lifestyle /residential area. Possible after-hours operations constraints	**4**	South location Longburn road (Road number 1 line & Rongatea) can have impact on growth opportunities. Future residential area to north is a constraint	**3**	South location Longburn roads (56 road & number 1) may have impact on growth opportunities, fewer residents impacted	**3**
4	Impact on KiwiRail Values (Safety) and potential future yard operations (refer table 3)	e) Safety – possibilities for improving operational safety	Refer Table 2	Several crossings required for rail access, some impact on masterplan footprint, prevailing wind issues	**4**	Several crossings required for rail access, fewer wind issues	**3**	Several crossings required for rail access, fewer wind issues	**3**
2	Impact on required infrastructure (refer table 3)	f) Connectivity to electrification infrastructure	Refer Table 2	Rail currently electrified, relocate or renew traction	**1**	Close to city and relatively easy to extend electrification	**2**	Considerable infrastructure needed to extend electrification to site.	**3**
19			**Score with all Sub criteria**	**Overall Score[4]**	**16**		**16**		**16**
				Overall (Score x Weight)[5]	**54.00**		**51.00**		**49.00**
				Weighted Score	2.84		2.68		2.58

[4] The sum of individual scores without weighting

[5] The sum of each individual score times the sub criteria weight.

1. Rail Criteria				Longburn 7: West Side		Longburn 8: South East Side		Existing Site	
Weight	**Justification for Weight (explained in table 3)**	**Sub Criteria**	**Scoring Criteria (defined in Table 2)**	Assessment	Score	Assessment	Score	Assessment	Score
4	Impact on rail operations (refer table 3)	a) Rail network connectivity - ability to connect with existing /future rail networks	Refer Table 2	Hub South connection might have impact with normal trains circulation.	**4**	Connections with NIMT will not be direct (curved), extensions will be required	**4**	New connections will be required. Master Plan concept not feasible in the current location. Productivity issues redeveloping a live site (through-put)	**3**
4	Impact on Business Model (revenue stream) and KiwiRail Values (Customer) (refer table 3)	b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.	Refer Table 2	Far from north industrial but close to Longburn industrial zone and key client (Fonterra). Existing private siding close to hub.	**2**	Potential conflict with major customer. Customer relationship affected.	**5**	No change on status quo. Opportunities for increases in rail capacity and revenue will be increasingly limited.	**4**
2	Impact associated with Yard Construction (initial investment)(refer table 3).	c) other mode compatibility - any limitations produced by rail on existing and future road design, will this be well integrated with modes/network	Refer Table 2	On same side as NIMT. Main road crossing in the middle of the site. Possible constraint/conflict with marshalling yard area	**4**	On same side of NIMT, but far from ideal. Road as per option 7	**4**	Existing connection. Yard expansion might require modifications to the existing connections.	**2**
3	Impact on operations and initial investment (refer table 3)	d) Resilience & Operation	Refer Table 2	South location, Longburn roads (SH56) can have impact on growth opportunities. River constraint	**3**	South location (additional operational time when compared to City North location) Limited capacity for growth. Area between existing industry and residential zones River constraint	**4**	Central location. Limited capacity for growth. Area between existing industrial and residential zones, adverse effects on major infrastructure	**4**
4	Impact on KiwiRail Values (Safety) and potential future yard operations (refer table 3)	e) Safety – possibilities for improving operational safety	Refer Table 2	No major safety concerns. Additional safety equipment might be required for flooding control, possible additional cost for emergency pump station (cost not considered), few wind issues, emergency access more extended	**3**	Major safety concerns. Close to residential, industrial multiple crossings can occur, few wind issues, emergency access more extended	**4**	Expansion of the existing yard will lead to congestion within the site and higher safety and congestion risks, few wind issues, good access for emergency	**3**
2	Impact on required infrastructure (refer table 3)	f) Connectivity to electrification infrastructure	Refer Table 2	Extensive infrastructure needed to connect electrification to site.	**4**	Considerable infrastructure needed to connect electrification to site.	**3**	Rail electrified	**1**
			Score with all Sub criteria	**Overall score [6]**	**20**		**24**		**17**
				Overall (Score x Weight)[7]	**61.00**		**78.00**		**58.00**
				Weighted score	3.21		4.11		3.05

[6] The sum of individual scores without weighting

[7] The sum of each individual score times the sub criteria weight.

Addendum to the Workshop 2 Rail Assessment

Reasons for the addendum

This addendum provides:

- A record of the reasons why area option 9 was fatally flawed at Workshop 2.
- A further assessment of the refined area options with the masterplan layout applied.

Fatal flaw of area option 9

At Workshop 2 as part of the presentation of the rail assessment, I recommended to the workshop participants that area option 9 should be fatally flawed. The reasons for this recommendation were:

- The site is surrounded by densely developed residential land which has the potential to inhibit 24/7 operations.
- The site is also surrounded by a dense land development pattern which restricts opportunities for new and/or larger freight operators to locate nearby to benefit from rail freight efficiencies.
- There are complexities/safety issues involved in redeveloping an active freight site.
- There are potential limitations on accessibility both into the site (new or improved accessways to create safer Heavy Goods Vehicles (HGVs) and Hub site manoeuvres) and to the CBD for HGVs, over time.
- As a result of the reasons listed above, there is limited capacity to meet growing national and regional freight demands and increase the capacity to move more goods by rail at the existing site.

The workshop participants agreed with the recommendation, the reasons for the recommendation and confirmed that area option 9 should be fatally flawed. Other criteria assessments also scored this option as having higher impacts, including noise and vibration, landscape and visual.

Further assessment

Several technical specialists had difficulty narrowing the site options to a short list of preferred sites without reference to the concept design within the initial site(s) limits.

The participants acknowledged that applying the concept design to the site locations would facilitate each their evaluations; since each possible site had different dimensions and several possible hub implementations.

As a result, after Workshop 2, the masterplan concept was applied to the wider site location options assessed in Workshop 2 but without sites 7, 8 and 9. As noted above, area option 9 was fatally flawed from a rail perspective and had potential high impacts on other criteria. Sites 7 and 8 had low benefits from a rail perspective and were also fatally flawed based on other criteria. The rail connection was included on these refined options, and the implications on connects to the North Island Main Trunk line were able to be clearly evaluated.

There were two layout options for areas 1 and 2 (Options 1a, 1b, 2a, 2b). Three layouts were originally developed for area 3, however only one layout was taken forward for assessment because the others did not meet the project objectives. Area 4 could only accommodate one layout option. There were significant constraints at the ends of areas 5 and 6, therefore the parts of these two areas without the constraints were combined to create site 5.

Assessments

The rail connection was included on the refined site options, and the implications for connecting to the North Island Main Trunk line were shown, providing extra information for the multi criteria assessment.

The assumptions considered for this high-level assessment are stated on the Workshop 2 main report; it was considered that every site option had exactly the same ability to connect to the main line in terms of gradient; so that each location could be assessed on a similar basis and in order to enable a wide field of options to be assessed at this early stage.

The footprint proposed for the site 5 layout takes areas from sites 5 and 6. The combined site layout more closely aligns with site 6 in the main Workshop 2 report, so the score attributed to site 5 is the same as the main report score for site 6.

Using site location overlays meant that the evaluation of each site addressed greater detail. However, even though the site option locations were reassessed with the master plan layout applied, the scores did not change from the original assessments in the Workshop 2 report.

The following table confirms the rail assessment and scoring for each of the site.

Site Option	Score	Assessment
Option 1a	1	No change to the rail criteria score and assessment in the Workshop 2 report
Option 1b	1	No change to the rail criteria score and assessment in the Workshop 2 report
Option 2a	1	No change to the rail criteria score and assessment in the Workshop 2 report
Option 2b	1	No change to the rail criteria score and assessment in the Workshop 2 report
Option 3	2	No change to the rail criteria score and assessment in the Workshop 2 report
Option 4	4	No change to the rail criteria score and assessment in the Workshop 2 report
Option 5	2	No change to the rail criteria score and assessment for site number 6 as site option 5 largely mirrors the evaluation site for option 6

Conclusion

The rail criteria evaluation considered; rail network connectivity, rail customer benefits, integrated network (road), resilience & operation, safety and electrification for the Workshop 2 assessment. The feasibility of master plan concept design implementation was further considered under each criteria.

Even though the site options locations were reassessed with the overlay, these more detailed hub layouts did not change the previous scores. For example, while sites 1 and 2 each had two hub layout options for the purposes of this assessment (ie option 1a and 1b, and 2a and 2b) the scores for each of the sub options remained consistent with the scores for the original 'parent' sites 1 and 2 in the Workshop 2 report as from a rail operational perspective the ability to meet the rail criteria did not change regardless of which end of these site options the layouts were placed (ie whether located in the northern or southern end of the area option). The evaluation supporting the scores for each sub criteria were not affected by the different layout options. Therefore, it was considered that the same site locations should be short listed for further investigation. The rail criteria evaluation recommended Sites 1, 2, 3, and 5.

CNI FREIGHT HUB

PHASE 2 – MULTI CRITERIA ANALYSIS

RAIL CRITERIA – Short List

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PHASE 2 – MULTI CRITERIA ANALYSIS - RAIL CRITERIA

INTRODUCTION

The purpose of this document is to support the evaluation of possible short-listed sites for the future Central North Island Freight Hub. The present document reflects the Rail Criteria assessment, one of the Multi Criteria Analysis (MCA) method.
The following comparative assessment of the short list site options reflects only the rail criteria and shouldn't be considered without the analysis of the other criteria.

This report is a comparative assessment to inform the MCA workshop #3.
This assessment has relied on the following information:

- Description of future activity;
- Master Plan Concept Design F;
- Possible footprints for short-listed sites:
    - Bunnythorpe 2: East Side
    - Bunnythorpe 3: West Side (Airport)
    - Bunnythorpe 4: East Side

CONSTRAINTS IDENTIFIED IN EACH SITE

The assumptions column presents the constraints identified for each site. The significance of each constraint is translated on the score defined for each sub-criteria.

CRITERIA BEING ASSESSED

To evaluate the rail criteria the following sub criteria were considered:

- Rail network connectivity - ability to connect with existing /future rail networks;
- Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network;
- Other mode compatibility - any limitations produced by rail on road design, will this be well integrated with modes/network;
- Resilience & Operation;
- Safety – possibilities for improving operational safety;
- Impacts to existing infrastructures and new infrastructures required for the future yard. This sub-criterion was refined (from the workshop 2 assessment) as each of the short-listed sites had the same level electrification infrastructure, which was the focus of this sub-criterion for the purposes of workshop 2.

Each sub criteria was evaluated for each possible site and scored accordingly to the scoring criteria. The numeric scoring criteria is related to the benefits that can be achieved.

	Criteria		
Score	Benefits	Impact	Difficulty
	• Rail • Economic	• Tangata whenua values • Natural environment (terrestrial and freshwater) • Noise and vibration • Heritage • Visual and landscape impacts • Community Cohesion • Fit with (regional) strategies / plans	• Engineering degree of difficulty • Connectivity • Property degree of difficulty • Resilience -Hazards • Cost
1	High Benefits	Low Impact	Low Difficulty
2	Medium High	Medium Low	Medium Low
3	Medium	Medium	Medium
4	Medium Low	Medium High	Medium High
5	Low Benefits	High Impact	High Difficulty

Table 1: 5-scale numeric score adopted

As presented in Table 1, lower scores represent higher benefits for Rail, so the sites with an overall lower score should be selected for the detail site analysis.

For Rail Criteria assessment it was considered that every site has the same gradient and equivalent direct access.

Each sub criteria was scored accordingly to the defined scoring criteria.

Sub Criteria	Scoring Criteria
a) Rail network connectivity - ability to connect with existing /future rail networks	Location served by NIMT Line. Scores were given on the following basis 1 = easy connection, 2 = constraints on one side, 3= major changes required to master plan layout to enable connection at both extremities, 4= adjusting masterplan concept and only one easy connection is possible or extensions are required to connect to the NIMT line , 5 = if no connection with NIMT line. Reduction factor shall be applied if major impact in Master Plan concept design is foreseen
b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.	Location suitable for freight forwarder access and future customers, Possible additional private sidings; Client/customer access to Freight CPYs (proximity) 1 = optimal connectivity for future customers, with good potential for siding service and close to freight customer activity, 2= good connectivity for future customers, potential for siding service and near freight customers, 3= average connectivity for future customers, some siding service, close to some freight customers 4= limited business opportunities for freight partners, limited siding service, distant from future freight customers, 5= furthest from access networks , no siding service, and furthest from freight customers, removal of major business from Palmerston North
c) other mode compatibility - any limitations produced by rail on road design, will this be well integrated with modes/network	Advantage when the rail line is in the same side of land/property; whether intervention on main roads required; objective is to reduce the number of main road crossings (different weight for primary and secondary roads). 1= Optimal location (compatibility of Hub with existing railway), 2= Rail on the same side, 3= not on the same side or major road impact, 4= major impact on key road networks, 5= multiple crossings, road interventions
d) Resilience & Operation	Matters which were taken not account are; northern site locations can reduce train traffic and time delays when travelling through the city e.g. potential reduction of 20% train traffic passing in Palmerston North City for northern areas as most traffic comes from north. Growth opportunities residential area represents a constraint to growth, so a reduction of benefits was applied where the option is located adjacent to residential areas or consolidated infrastructure such as aerodromes/airport. 1=northern location, away from existing or planned residential areas, and few infrastructure constraints, 2= northern location, close to existing or planned residential areas, some effect on major infrastructure, 3= not too close to existing or planned residential areas, minor effect on major infrastructure, 4= close to existing or future residential areas, adverse effects on

Sub Criteria	Scoring Criteria
	major infrastructure. 5= adjacent to existing or future residential development, removal of major infrastructure required.
e) Safety – possibilities for improving operational safety	Master Plan concept was designed taking into consideration KiwiRail's and international safety standards. The number of level crossings required reduces the score. Major changes in the concept design might have impacts on safety, such as where the operational footprint is compromised a reduction is applied. Prevailing winds are also a factor as high winds can cause high stacks of empty containers to topple, and can also result in effects of dust from yard operations on staff safety and neighbours and waterways. Accessibility of site (different access for emergency/rescue). 1=no road crossings, Master plan concept fully applied, low wind environment, good road access (emergency), 2= reduced road crossings, no changes to masterplan layout, no – low wind exposure, good emergency access, 3= some level crossings, some limits on masterplan concept, moderate wind conditions, average emergency access, 4= some level crossings, limits on masterplan footprint, moderate – high wind exposure, less direct access for emergency vehicles 5= multiple road/level crossings, master plan footprint compromised, furthest emergency access distance, high wind area
f) Impacts on existing infrastructures and new infrastructures required for the future yard	Impacts on existing infrastructures and new infrastructures required for the future yard 1= no change, no impacts on existing infrastructure; 2 =minor impacts on existing infrastructure and associated with low risk of conflict (e.g. only one infrastructure is affected); 3 = some infrastructure impacts on major utilities (e.g. Re-routing of high tension lines) 4 = high impacts on several existing infrastructure items (e.g. High tension lines; gas pipeline; water supply); 5= significant impacts on several existing infrastructure items (e.g.. High tension lines; gas pipeline; water supply)

Table 2: List of Rail sub criteria and scoring criteria

To take into consideration the different impacts of the sub criteria listed, a 'significance' factor was considered. The different weights assigned to each sub criteria reflect its importance and allow a better understanding of each site significance for the rail criteria.

For the 'weight' definition the impact on the following was considered:

- Future operations – yard life cycle;
- Business model – revenue streams;
- KiwiRail values;
- Impact on the level of infrastructure required to establish the new hub

Figure 3: KiwiRail values

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Weight	Justification for Weight	Sub Criteria
4	Impact on Rail Operations: Well-designed connections will ensure that multiple daily movements are safe and reduce time and operational costs. It is important that the Hub is compatible with the railway network to avoid inefficiencies. The weighting of '4' has been given as 'connectivity' has a short and long-term effect on Hub viability.	a) Rail network connectivity - ability to connect with existing /future rail networks
4	Impact on Business Model (revenue stream) and KiwiRail Values (Customer). Opportunities for connectivity and proximity	b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.

Weight	Justification for Weight	Sub Criteria
	to future freight customers is weighted '4' as it is an equally important criteria as that of rail network connectivity.	
3	Impact associated with Yard Construction (initial investment). Initial cost can be recovered through yard life cycle. The site footprint increased the level of detail, enabling a better evaluation of the network integration and site development and therefore this criterion has been given a higher weight in this assessment than in workshop 2. However, this criterion has still been given less weight than the other rail elements as development costs can be recovered and some impacts have been addressed elsewhere (e.g. Engineering degree of difficulty and connectivity - transport).	c) other mode compatibility - any limitations produced by rail on road design, will this be well integrated with modes/network
3	Impact on Operations (yard life cycle). It is considered that concept reflects operations' needs. Impacts on growth opportunities and existing major infrastructure is weighted lower than 'rail connectivity' as it is less influential compared only to operation	d) Resilience & Operation
4	Impact on KiwiRail Values (Safety) and potentially future yard operations. This criterion has been given a weighting of "4" as operational safety is as equally important as the similarly weighted criteria. Major changes in the masterplan concept design reduce the potential to handle the volumes in an environment where safety is optimised.	e) Safety – possibilities for improving operational safety
2	Impact on required existing infrastructure. This criterion has been given less weight than other rail elements as development costs can be recovered and some impacts have been addressed elsewhere (e.g. Engineering degree of difficulty and connectivity – transport)	f) Impacts on existing infrastructures and new infrastructures required for the future yard

Table 3: List of Rail sub criteria, attributed weight and justification

FATAL FLAWS

No fatal flaws were identified for any of the short listed sites.

COMPARATIVE ASSESSMENT

The eight selected sites and the existing site were evaluated and scored. Each site was scored for each sub criteria and the overall score for each site was defined accordingly to the formula:

$$Score\ weighted\ for\ site\ = \frac{\sum_a^f (weight\ x\ score)^1}{\sum_a^f weight}$$

Where:

- a to f represent the number of sub criteria (table 2)
- 'weight' represents the weight defined for each sub criteria (table 3)
- score weighted for site considering the scoring criteria (table 2) and 5-scale numeric scoring (table 1)

The detailed scoring is present in the Appendix One.

Table 3 presents a summary of the weighted score for each site.

[1] It's the sum of each individual score times the sub criteria weight.

	Score Weighted
Bunnythorpe 2: East Side	3.55
Bunnythorpe 3: West Side (Airport)	2.35
Bunnythorpe 4: East Side	4.15

Table 3: Site weighted score

The weighted score (above) has been converted to 'round up' the scoring to fit the 1=high to 5=low scale (below)

	Lower Limit	Upper Limit	**Overall score Equivalent**
Weight Score considering sub criteria	2.35	2.71	**1**
	2.72	3.07	**2**
	3.08	3.43	**3**
	3.44	3.79	**4**
	3.80	4.15	**5**

Table 4: Overall score definition

	Overall Score	Benefits
Bunnythorpe 2: East Side	4	Medium Low Benefits
Bunnythorpe 3: West Side (Airport)	1	High Benefits
Bunnythorpe 4: East Side	5	Low Benefits

Table 5: Overall score

This assessment orders the sites in terms of Rail criteria preference. It was possible to identify a technical preferred site for Rail:

- Bunnythorpe 3.

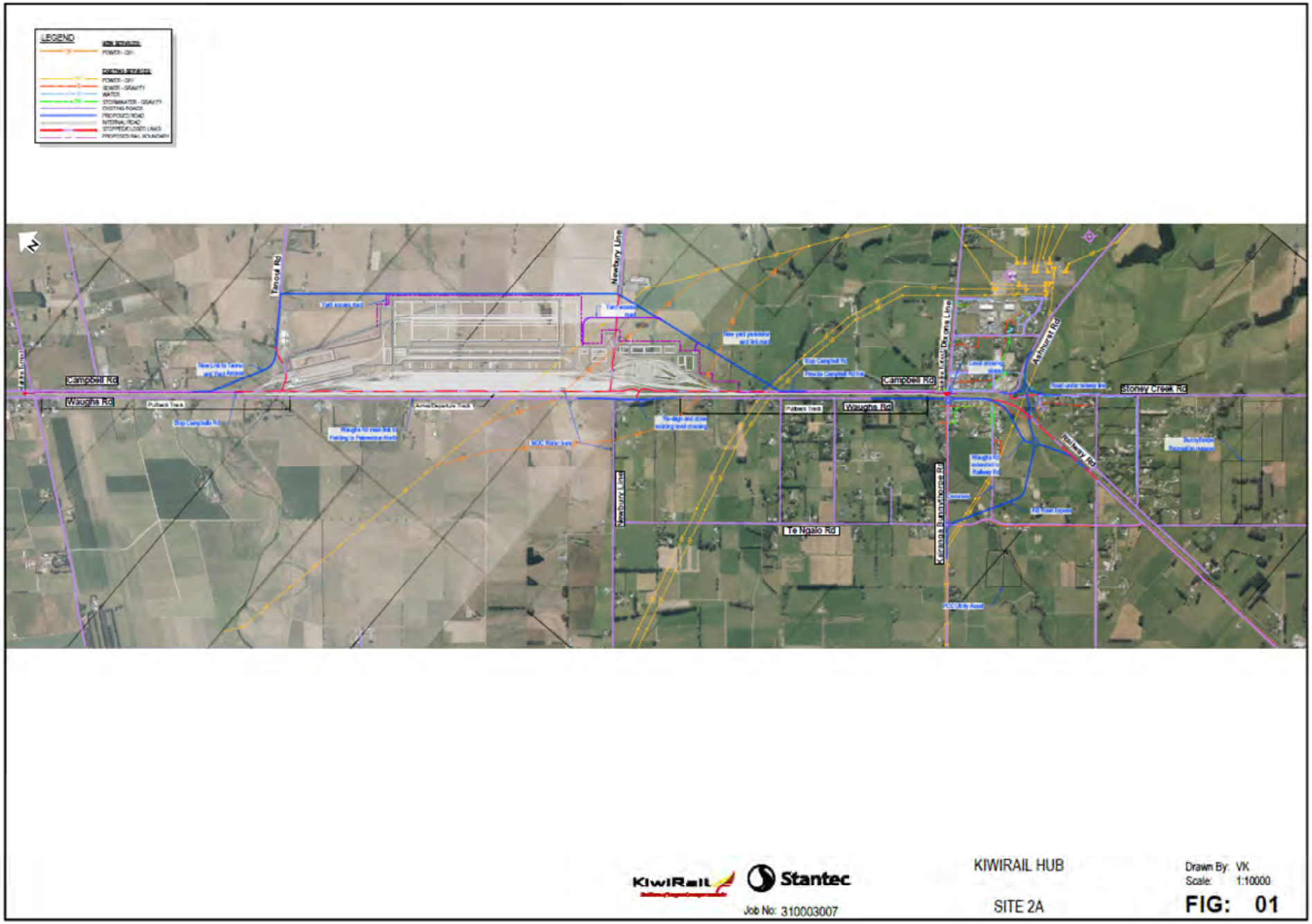
Further investigations might be required to confirm the technical preferred site.

APPENDIX ONE– DETAILED SCORE FOR RAIL CRITERIA

1. Rail Criteria				Bunnythorpe 2: East Side		Bunnythorpe 3: West Side (Airport)		Bunnythorpe 4: East Side	
Weight	**Justification for Weight (explained in table 3)**	**Sub Criteria**	**Scoring Criteria (defined in table 2)**	Assessment	Score	Assessment	Score	Assessment	Score
4	Impact on Operations (refer table 3)	a) Rail network connectivity - ability to connect with existing /future rail networks	Refer Table 2	Impact on the Master Plan concept is foreseen, additional bridges will be required for pullback track. Pullback close to significant cultural places. Connection to the NIMT line can be difficult to south.	**4**	Connection to NIMT line possible on both extremities. Major changes on the master plan concept design are foreseen. South pullback track going into Bunnythorpe.	**3**	Connection to NIMT line possible, the north connection is likely to be difficult to north. Underbridge will be necessary for yard access (south). Pullback track going into Bunnythorpe.	**4**
4	Impact on Business Model (revenue stream) and KiwiRail Values (Customer) (refer table 3)	b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.	Refer Table 2	Far from possible private sidings, customer preference for location closer to city. Relatively close to freight customers.	**3**	Close to potential customers. Ideal location for Clients with optimal connectivity. Partially in the NEIZ.	**1**	Railway Rd and marshalling area represent a boundary for industrial area access. Even though the location is close to future customers, the freight hub layout has the freight access on the east side, therefore the hub access will not be easy (difficult access from Fielding (North); conflict with residential zone).	**5**
3	Impact associated with Yard Construction (initial investment) (refer table 3)	c) other mode compatibility - any limitations produced by rail on existing and future road design, will this be well integrated with modes/network	Refer Table 2	Road impacts are foreseen and some mitigation actions might be necessary to reduce the impact on school access.	**4**	Rail line in the opposite side. Railway Rd re-alignment is required, it allows redefinition of freight / commuters uses. Best option for Freight trucks hub connection. The main road will serve the freight access.	**2**	Residential areas. Not in line with strategic NZTA freight movements, multiple crossings and road interventions are required.	**5**
3	Impact on Operations (yard life cycle) (refer table 3)	d) Resilience & Operation	. Refer Table 2	Allows expansion and wide options for hub implementation; it is not too close to residential Impacts on school and Marae are foreseen; the back shunt going past the Urupa (Maori Graveyard for the Marae) can potentially be an issue which will need addressing early.	**3**	Constraints in length, expansion opportunities and concept adjustments to west. Impact of the existing road is foreseen.	**3**	Growth constraints due to proximity to consolidated residential area. Possible conflicts with PN Airport. Possible limitation for afterhours operation.	**4**
4	Impact on KiwiRail Values (Safety) and potentially future yard operations (refer table 3)	e) Safety – possibilities for improving operational safety	Refer Table 2	Road connection to Colyton. Impact in Campbell road. Re-routing of Campbell Road required to keep traffic / operational safety. Some interactions with rail crossings (level crossings). Average accessibility to emergency. Average location for prevailing wind direction. Hi-tension cable (Transpower) passing well inside the site and will need major re-routing to keep the safety risk out of operational area, otherwise impacts on the master plan concept are foreseen CT and marshalling areas exposure to wind.	**4**	Good access for freight trucks. No conflicts between schools/residential access. Re-routing of Railway Road will keep traffic / operational safety. Hi-tension cable passing close to the northern end of the site and may be kept as it is. Possible crossings for both backshunts. Relatively good access to emergency vehicles. Medium exposure to wind, freight facilities can act as a shield to CT area.	**3**	Freight access can create safety issues; potential conflicts between schools/residential access. Access road to the east of the site will bring additional traffic safety issues. Possible crossings for both backshunts. High exposure to wind.	**4**
2	Impact on required infrastructure (refer table 3)	f) Impacts on existing infrastructures and new infrastructures required for the future yard	Refer Table 2	Transpower lines must be re-routed	**3**	Gas pipeline must be re-routed	**2**	Gas pipeline must be re-routed	**2**
			Score with all Subcriteria	**Overall score [2]**	**21**		**14**		**24**
				Overall (Score x Weight)[3]	71		47		83
20				Weighted Score	3.55		2.35		4.15
				Overall Evaluation	4		1		5

[2] The sum of individual scores without weighting
[3] The sum of each individual score time the sub criteria weight

APPENDIX TWO– SHORT LISTED SITES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Tancred Rd
Newbury Line
Te Ngaio Rd
Stoney Creek Rd
Ashhurst Rd
Railway Rd
KiwiRail
Stantec
Job No: 310003007
KIWIRAIL HUB
SITE 2A
Drawn By: VK
Scale: 1:10000
FIG: 01

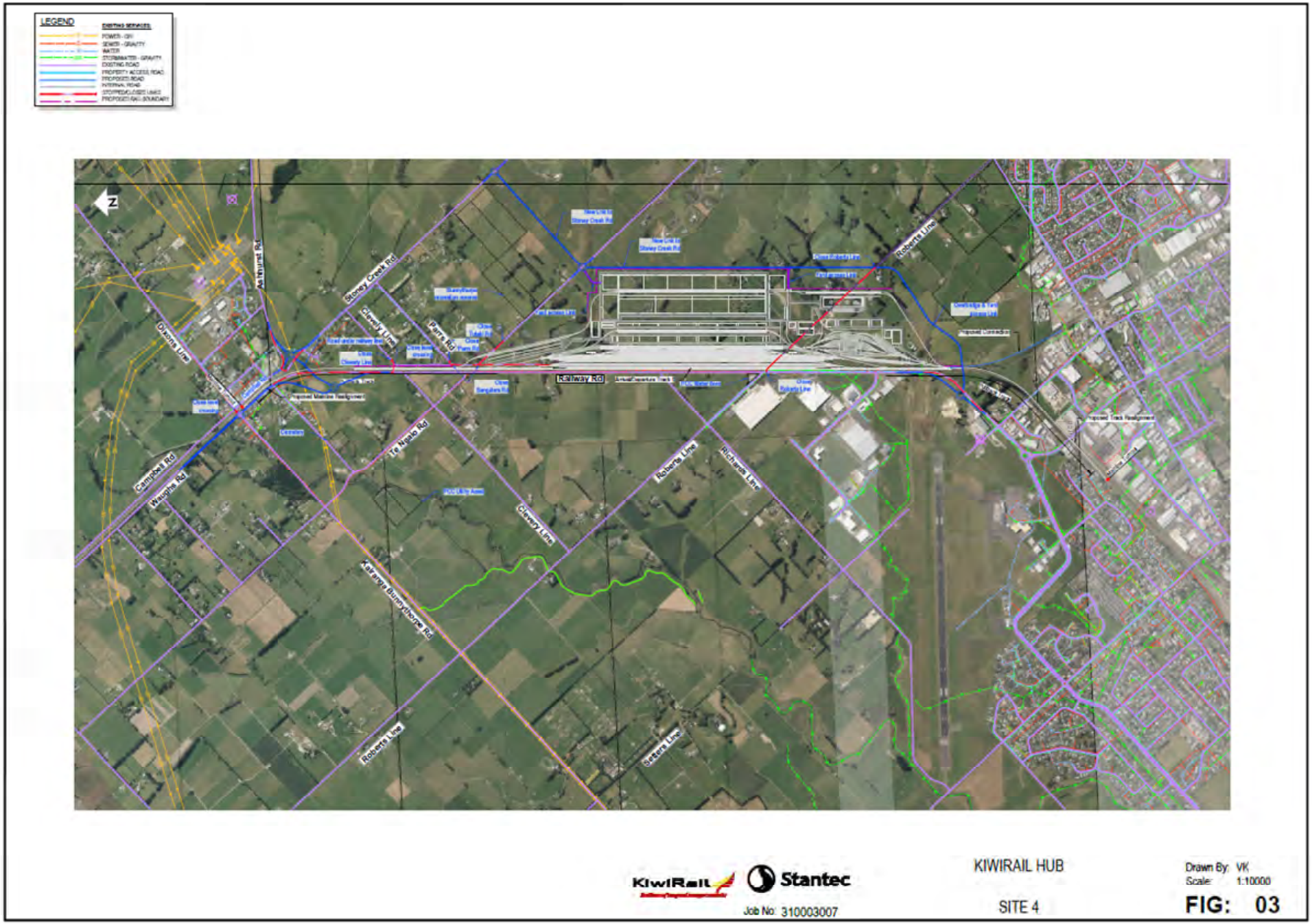
KIWIRAIL HUB

SITE 3C

Job No: 310003007

Drawn By: VK
Scale: 1:10000

FIG: 02


LEGEND
N
Stoney Creek Rd
Railway Rd
Roberts Line
Ashhurst Rd
Dijkstra Line
Campbell Rd
Napier Rd
Te Ngaio Rd
Clevedy Line
Richards Line
Setters Line
KiwiRail
Stantec
Job No: 310003007
KIWIRAIL HUB
SITE 4
Drawn By: VK
Scale: 1:10000
FIG: 03

Addendum to the Workshop 3 Rail Assessment

Reasons for the addendum

This addendum provides:

- reasons for changing the total number of sub criteria used to assess site options (from six to three)
- reasons for a change in the overall site scores; by changing the scoring methodology and reducing assessment criteria

The revisions reflect the discussion at the MCA Workshop in Palmerston North on 20 November 2019. The rail criteria assessment presented at the workshop considered the impacts and level of intervention required to mitigate the effects on the existing infrastructure. At the workshop it became clear that some criteria had been used in other assessments or were no longer relevant when considering only sites in the north east of the investigation area, and all were adjacent to the electrified line.

Reduction in assessment criteria

The rail sub criteria evaluation for workshop 3 originally comprised of six sub criteria. Following workshop 3, this was reduced to three sub-criteria. The three new site layout options prepared for Workshop 3 showed much clearer detail when applied to each site location. This enabled the likely impacts on site operations and yard construction to be clarified.

It was determined that given elements of criteria (c) 'other mode compatibility' were relatively consistent between the three shortlisted options this could be removed as it did not materially differentiate the site options and had a relatively low weighting.

Criteria (d) 'Resilience & Operation' was removed as all the short-listed site options were in the north of the search area and some elements were transferred into new criteria 'c' including potential physical limits on expansion.

Criteria (f) 'impacts on existing infrastructure and new infrastructure required for the yard' was deleted as the matters considered were already accounted for in the 'engineering degree of difficulty' criteria. However, matters such as overhead line impacts on hub operations have been included in the rail assessment under the sub criterion 'Safety, resilience and future yard operations'.

Change in scores

Following workshop 3, the scoring approach was also reviewed and two scoring elements were changed, being:

- the approach to the benefits analysis; and
- individual scores changed to reflect the reduced criteria

Scoring for workshop 2 was based on a mathematical formula approach which arranged the highest and lowest scores from the initial weighted assessment into lower and upper limits, and then added intervals to the scores to have enable a comparative assessment of the site's benefits. This part of the methodology was removed following Workshop 3. For the purposes the assessment following workshop 3, the weighted score was rounded to keep the scoring process consistent with some of the other specialist assessments.

The total score for each site was slightly changed as a result of reducing the number of individual criteria as noted above.

Conclusion

The removal of three of the assessment criteria following workshop 3 did not change the site options preference compared to the original report. The above described changes are set out in full in the following report format.

CNI FREIGHT HUB

PHASE 2 – MULTI CRITERIA ANALYSIS - RAIL CRITERIA

INTRODUCTION

The purpose of this document is to support the evaluation of possible short-listed sites for the future Central North Island Freight Hub. The present document reflects the Rail Criteria assessment, one of the Multi Criteria Analysis (MCA) criteria.

The following comparative assessment of the short list site options reflects only rail criteria and shouldn't be considered without the analysis of the other criteria.

This report is a comparative assessment to inform the MCA workshop #3. This assessment has relied on the following information:

Description of future activity;

Master Plan Concept Design F;

Possible footprints for short-listed sites:

- Bunnythorpe 2: East Side
- Bunnythorpe 3: West Side (Airport)
- Bunnythorpe 4: East Side

CONSTRAINTS IDENTIFIED IN EACH SITE

The assumptions column presents the constraints identified for each site. The significance of each constraint is translated on the score defined for each sub-criteria.

CRITERIA BEING ASSESSED

The rail criteria are:

- Rail network connectivity - ability to connect with existing /future rail networks
- Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network
- Safety, resilience and future yard operations

Each sub criteria was evaluated for each site and scored accordingly to the scoring criteria. The numeric scoring criteria is related to the benefits that can be achieved.

	Criteria		
Score	Benefits	Impact	Difficulty
	• Rail • Economic	• Tangata whenua values • Natural environment (terrestrial and freshwater) • Noise and vibration • Heritage • Visual and landscape impacts • Community Cohesion • Fit with (regional) strategies / plans	• Engineering degree of difficulty • Connectivity • Property degree of difficulty • Resilience -Hazards • Cost
1	High Benefits	Low Impact	Low Difficulty
2	Medium High	Medium Low	Medium Low
3	Medium	Medium	Medium
4	Medium Low	Medium High	Medium High
5	Low Benefits	High Impact	High Difficulty

Table 1: 5-scale numeric score adopted

As presented in Table 1, lower scores represent higher benefits for Rail, so the sites with an overall lower score should be selected for the detail site analysis.

Each sub criteria was scored according to the defined scoring criteria.

Sub-Criteria	Scoring Criteria
a) Rail network connectivity - ability to connect with existing /future rail networks	Degree of difficulty for rail connectivity to NIMT Line. 1=Easy connection to NIMT. 2= constrained at one end , 3= connections equally difficult at each end, additional structures might be required to enable a full connection, 4= connections difficult at both ends, one side significant difficulties and additional structures required, Score 5 =connection with NIMT line is highly problematic, number of bridges/underpasses,
b) Impact on business delivery, service and KiwiRail Values	Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network. 1 = optimal connectivity for future customers; close to freight customer activity, compatible with existing railway, away from existing or planned residential areas, and few infrastructure constraints*, 2= good connectivity for future customers, near freight customers, close to existing or planned residential areas, some effect on major infrastructure*, 3= average connectivity for future customers, close to some freight customers, not too close to existing or planned residential areas, minor effect on major infrastructure*, 4 = limited business opportunities for freight partners, distant from future freight customers, close to existing or future residential areas, adverse effects on major infrastructure*, 5= furthest from access networks , and furthest from freight customers, removal of major business from Palmerston North, multiple crossings, road interventions, adjacent to existing or future residential development, removal of major infrastructure* required. *Infrastructure constraints associated future freight customers accessibility and service.
c) Safety, resilience and future yard operations	Master Plan concept was designed taking into consideration KiwiRail's and international safety standards. The number of level crossings required reduces the score. Major changes in the concept design might have impacts on safety, such as where the operational footprint is compromised a reduction is applied. Prevailing winds are also a factor as high winds can cause high stacks of empty containers to topple and can also result in effects of dust from yard operations on staff safety and neighbours and waterways. Accessibility of site (different access for emergency/rescue). 1=no road crossings, Master plan concept fully applied, low wind environment, good road access (emergency) , no impacts on major existing infrastructure**, 2= reduced road crossings, no changes to masterplan layout, no – low wind exposure, good emergency access, minor impacts on major existing infrastructure** 3= some level crossings, some limits on masterplan concept, moderate wind conditions, average emergency access, 4= some level crossings, limits on masterplan footprint, moderate – high wind exposure, less direct access for emergency vehicles, high impacts on major existing infrastructure** 5= multiple road/level crossings, master plan footprint compromised, furthest emergency access distance, high wind area, significant impacts on major existing infrastructure** ** Impacts on existing infrastructure such as HT powerlines, gas pipelines

Table 2: List of Rail sub criteria and scoring criteria

As there are only three sub criteria, each was weighted equally. The criteria also encapsulate KiwiRail's corporate values, as set out in the diagram below.

Figure 3: KiwiRail values

FATAL FLAWS

No rail related fatal flaws were identified for any of the shortlisted sites.

COMPARATIVE ASSESSMENT

Each site was scored for each sub criteria and the overall score for each site was defined accordingly to the formula:

$$Score\ weighted\ for\ site\ = \frac{\sum_a^c (weight\ x\ score)^1}{\sum_a^c weight}$$

Where:

- 'a' to 'c' represent the number of sub criteria (table 2)
- 'weight' represents the weight defined for each sub criteria (table 3)
- score weighted for site considering the scoring criteria (table 2) and 5-scale numeric scoring (table 1)

The detailed scoring is present in Appendix One.

Table 3 presents a summary of the weighted score for each site.

	Weighted Score
Bunnythorpe 2: East Side	4.00
Bunnythorpe 3: West Side (Airport)	2.67
Bunnythorpe 4: East Side	3.67

Table 3: Site weighted score

In order to classify the rail benefits the final score was defined by rounding the weighted score

	Overall Score	Benefits
Bunnythorpe 2: East Side	4	Medium Low Benefits
Bunnythorpe 3: West Side (Airport)	3	Medium Benefits
Bunnythorpe 4: East Side	4	Medium Low Benefits

Table 4: Overall score

It was possible to identify a technically preferred site for Rail as Bunnythorpe 3. Further investigations are required to confirm the technical preferred site.

[1] It is the sum of each individual score x the sub-criteria weight

APPENDIX ONE– DETAILED SCORE FOR RAIL CRITERIA

1. Rail Criteria				Bunnythorpe 2: East Side		Bunnythorpe 3: West Side (Airport)		Bunnythorpe 4: East Side	
Weight		**Sub Criteria**	**Scoring Criteria (defined in table 2)**	Assessment	Score	Assessment	Score	Assessment	Score
4	Impact on rail network operations (connecting the site to the regional and national network) refer Table 3	a) Rail network connectivity - ability to connect with existing /future rail networks	Refer Table 2	Connection over Campbell Road to NIMT line/or close Campbell Road. Connection to the NIMT line can be difficult to south. Additional bridge over named stream will be required for southern pullback track.	**4**	Connection over Railway Road to NIMT line /or close Railway Road. Latter will not require bridges.	**3**	Connection to NIMT line easy (adjacency). Underbridge would be necessary for yard access (south).	**3**
4	Impact on Business delivery and service and KiwiRail Values refer Table 3	b) Rail customer benefits - travel time, potential capacity, opportunities to increase the volume of freight moved through and to and from the region, the opportunities to reduce delays on the network.	Refer Table 2	Furthest from Palmerston North town centre and Tremaine Avenue. Furthest from Palmerston North airport in transport report	**4**	Close to potential customers and freight users Proximate to Airport.	**2**	Access not as well aligned with intended road freight flow. Proximate to Airport. Close to residential areas. Not in line with strategic NZTA freight movements, multiple crossings and road interventions are required	**4**
4	Safety, resilience and future yard operations/service refer Table 3	c) Safety resilience and future yard operations	Refer Table 2	Re-routing of Campbell Road required to avoid provision of level crossings. Good response time for accessibility to emergency services. Average location relative to prevailing wind direction. Hi-tension cable (Transpower) passing well inside the site and will need major re-routing to reduce the safety risk out of operational area. This option would require removal of this aerodrome nil impact.	**4**	Railway Rd re-alignment better accommodates hub and through freight activities. Shorter response time for accessibility to emergency services (incl. proximity to major hospital). Hi-tension cable passing close to the northern end of the site and may be kept as it is, will have lesser effect on operations than site 2. Prevailing winds Less effect on Palmerston North Airport than site 4	**3**	Shorter response time for accessibility to emergency services (incl. proximity to major hospital). No overhead lines. Possible conflicts with Palmerston North Airport in the long term. Some level crossings foreseen Residential areas. High exposure to winds.	**4**
12			**Score with all Sub-criteria**	**Overall score [2]**	**12**		**08**		**11**
				Overall (Score x weight)[3]	48		32		44
				Weighted Score	4.00		2.67		3.67
				Overall Evaluation	4		3		4

[2] The sum of individual scores without weighting

[3] The sum of each individual score times the sub criteria weight