Adani Mining Pty Ltd

NORTH GALILEE BASIN RAIL PROJECT

Additional information to the Environmental Impact Statement

Volume 1 Additional information to the Environmental Impact Statement

April 2014

This North Galilee Basin Rail Project report ("the Report") has been prepared by GHD Pty Ltd ("GHD") on behalf of and for Adani Mining Pty Ltd ("Adani") in accordance with an agreement between GHD and Adani.

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Table of contents

Table index

Figure index

Terms and abbreviations

Term and abbreviations	Definition
Adani	Adani Mining Pty Ltd
AEIS	Additional information to the North Galilee Basin Rail Project Environmental Impact Statement
Carmichael Project (Rail)	Rail component of the Carmichael Coal Mine and Rail Project
CH_4	Methane
CO_2	Carbon dioxide
NGBR Project footprint	The final rail corridor and all ancillary activities
Final rail corridor	A nominally 100 m corridor for the length of the NGBR Project, narrowing to a nominal 60 m width for the NGBR Project realignment.
GHG	Greenhouse gas
kL	Kilolitre
LOS	Level of service
N_2O	Nitrous oxide
NGBR Project	North Galilee Basin Rail Project
NGBR Project EIS	North Galilee Basin Rail Project Environmental Impact Statement
NGBR Project realignment	North Galilee Basin Rail Project realignment
NGBR Project realignment footprint	Final rail corridor and all ancillary activities as they apply to the NGBR Project realignment
Minor realignments	Various other minor realignments of the NGBR Project, other than the NGBR Project realignment
tCO_2-e	Tonnes carbon dioxide equivalent
TOR	Terms of Reference

1. Introduction

1.1 Project overview

Adani Mining Pty Ltd (Adani) proposes the construction and operation of the North Galilee Basin Rail Project (NGBR Project) – a multi-user, standard gauge, greenfield rail line that will transport coal from mines in the northern Galilee Basin to the Port of Abbot Point.

The NGBR Project EIS was prepared and assessed the potential impacts of the NGBR Project in accordance with the Terms of Reference (TOR) and EIS Guidelines. The public consultation phase for the NGBR Project occurred between 16 December 2013 and 11 February 2014, inclusive.

1.2 Purpose of the additional information to the EIS

Additional information to the NGBR Project Environmental Impact Statement (AEIS) has been prepared in response to the submissions made on the NGBR Project EIS during the public consultation phase and includes additional information related to amendments made to the description of the NGBR Project since the release of the NGBR Project EIS.

1.3 Structure of the AEIS

Section 2 of this report provides an overview of submissions received on the NGBR Project EIS, including the number and origin of submissions. Section 3 details changes to the description of the NGBR Project that have occurred subsequently to public consultation on the NGBR Project EIS. Sections 4 onward generally follow the chapter headings of the NGBR Project EIS. Within each of these sections, changes to the description of the NGBR Project are discussed in the context of that discipline, followed by a summary of the key issues raised by submissions on the NGBR Project EIS and general responses to each issue.

A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

The following appendices are also provided in Volume 2 of the AEIS:

- Appendix B Revised project description
- Appendix C NGBR Project realignment report
- Appendix D Revised matters of national environmental significance
- Appendix E Revised offsets
- Appendix F Revised terms of reference cross-reference
- Appendix G Revised commitments
- Appendix H Revised environmental management plan framework
- Appendix I Revised consultation
- Appendix J Revised legislation and approvals.

2. Submissions

2.1 Summary of submission process

This section provides an overview of the submissions received on the NGBR Project EIS with regards to category of submitter, format of submissions and key issues raised.

A total of 46 submissions were received on the NGBR Project EIS during the public notification period (December 2013 – February 2014). Submissions were sorted into four categories: advisory agency, organisation, landholder and individual. Each submission was reviewed to identify the nature of comments made and categorised according to the relevant EIS section, appendix or a technical area (e.g. ecology, air quality).

The Office of the Coordinator-General provided direction to Adani on response to individual issues raised in the submissions. Due to the recurrence of issues and/or the considered significance of certain issues, Adani and the Office of the Coordinator-General agreed to address these recurring key issues within the AEIS. Responses to individual submissions are provided in Volume 2 Appendix A Submissions register. Details of submitters are provided in the sections that follow.

2.2 Summary of submissions

2.2.1 Advisory agency submissions

A total of 22 submissions were received from 16 different advisory agencies, including 11 Queensland government departments, two government agencies and three local governments. Table 2-1 lists the advisory agencies that provided submissions on the NGBR Project EIS, in alphabetical order by agency name.

Submissions were received from three State agencies advising ‘no comment’ on the NGBR Project EIS (Department of Education, Training and Employment; Department of National Parks, Recreation, Sport and Racing; Department of Housing and Public Works). Advisory agency submissions were received in a number of formats including letters, submission forms and emails or a combination of formats.

Table 2-1 Advisory agency submissions

Advisory agency	Format
Department of Aboriginal and Torres Strait Islander and Multicultural Affairs	Letter
Department of Agriculture, Fisheries and Forestry	Submission form
Department of Education, Training and Employment	Email
Department of Environment and Heritage Protection	Submission form
Department of Health	Submission form
Department of Housing and Public Works	Email

Advisory agency	Format
Department of National Parks, Recreation, Sport and Racing	Letter
Department of Natural Resources and Mines	Submission form
Department of State Development, Infrastructure and Planning, Industry Development Unit	Submission form
Department of State Development, Infrastructure and Planning, Regional Planning	Email
Department of State Development, Infrastructure and Planning, Regional Services	Submission form
Department of State Development, Infrastructure and Planning, Strategic Policy	Email
Department of State Development, Infrastructure and Planning, Office of Major Projects	Email
Department of State Development, Infrastructure and Planning, Futures Unit	Submission form
Department of State Development, Infrastructure and Planning, Statutory Planning	Email
Department of Tourism, Major Events, Small Business and Commonwealth Games	Email
Department of Transport and Main Roads	Letter and submission form
Queensland Fire and Emergency Service	Submission form
Queensland Police Service	Submission form
Isaac Regional Council	Submission form
Mackay Regional Council	Letter
Whitsunday Regional Council	Letter and submission form

2.2.2 Organisations

Submissions were received from 18 organisations, including:

- Eight environmental focus groups
  - Greenpeace
  - North Queensland Conservation Council
  - Lock the Gate Alliance

  - Mackay Conservation Group
  - The Australia Institute
  - Peregian Beach Community Association
  - North Queensland Dry Tropics Ltd
  - Asia Pacific Strategy
- Two power companies
  - Ergon Energy
  - Powerlink Queensland
- Six resource companies
  - QCoal Group
  - Glencore Coal Australia
  - Evolution Mining Ltd
  - Barlyne Mining
  - GVK-Hancock Coal Infrastructure
  - Energy World
- One rail company
  - Aurizon
- One community interest group
  - Collinsville Business Women Inc.

It is noted that QCoal Group, Glencore Coal, Evolution Mining Ltd, Barlyne Mining Ltd and Energy World are also landholders. Table 2-2 lists organisations that provided submissions on the NGBR Project EIS, in alphabetical order by organisation name. Submissions were received in a number of formats including letters, submission forms and emails or a combination of formats.

Table 2-2 Organisation submissions

Organisation	Format
Greenpeace	Submission form
North Queensland Conservation Council	Letter
Lock the Gate Alliance	Submission form
Mackay Conservation Group	Letter
The Australia Institute	Submission form
Peregian Beach Community Association	Submission form
North Queensland Dry Tropics Ltd	Letter
Asia Pacific Strategy	Letter and submission form

Organisation	Format
Ergon Energy	Letter
Powerlink Queensland	Submission form
QCoal Group	Submission form
Glencore Coal Australia	Letter
Evolution Mining Ltd	Letter
Barlyne Mining	Letter
GVK-Hancock Coal Infrastructure	Submission form
Energy World	Submission form
Aurizon	Submission form
Collinsville Business Women Inc.	Submission form

2.2.3 Landholder submission

A submission was received from the holder of a grazing property crossed by the NGBR Project.

2.2.4 Individual submissions

Submissions were received from five individuals other than landholders within the NGBR Project final rail corridor (refer Section 2.2.3).

3. Project description

3.1 Overview

As part of ongoing refinement of the NGBR Project a number of realignments have occurred. The purpose of this section is to describe realignments and associated changes to the description of the NGBR Project that have occurred subsequent to public consultation on the NGBR Project EIS (refer Section 1.1).

The most significant of the realignments – termed the NGBR Project realignment – occurs between chainages 128.2 km and 205.3 km (refer Section 3.2). The potential impacts of the NGBR Project realignment are assessed in Volume 2 Appendix C NGBR Project realignment report. In addition to the NGBR Project realignment, various other minor changes have been made to the NGBR Project footprint. These changes are reflective of the ongoing refinement of the NGBR Project and are generally confined to the preliminary investigation corridor as defined in the NGBR Project EIS. One such realignment occurs in the vicinity of Mount Roundback, in order to avoid a rock art site of significant Indigenous cultural heritage potential, as identified in the NGBR Project EIS. The NGBR Project realignment and all other changes are further described in Section 3.5.

In addition to this summary of changes, NGBR Project EIS Volume 1 Chapter 2 Project description has been accordingly revised and is provided as part of the AEIS as Volume 2 Appendix B Revised project description – to be read in conjunction with the original.

It is also noted that the following aspects of the NGBR Project have not changed from the description of the NGBR Project provided in the NGBR Project EIS:

- Capital expenditure and operational expenditure
- Rail design criteria and ruling gradients
- Road crossing treatment criteria
- Bridge and culvert design criteria
- Afflux design criteria and flood immunity
- Construction and operation workforce.

3.2 NGBR Project realignment

Following publication of the NGBR Project EIS in December 2013, further consultation occurred with the State government and resource companies regarding mining and resource tenement interests traversed by the NGBR Project. The NGBR Project realignment was identified to accommodate requests to minimise known/potential sterilisation of coal resources and/or encroachment on existing mining tenements.

The realignment deviates to the east near the Bowen River and runs southward for approximately 77 km before re-joining the NGBR Project final rail corridor, as described in the NGBR Project EIS. The NGBR Project realignment coincides with the approved Alpha Coal Project for approximately 64 km and travels parallel the existing Aurizon-owned Newlands line for approximately 57 km, at a distance of approximately 50 m (refer Figure 3-1).

Consultation regarding the NGBR Project realignment involved Adani, the Department of Natural Resources and Mines, the Department of State Development, Infrastructure and Planning and the Office of the Coordinator-General and QCoal.

Several options for the NGBR Project realignment were discussed, with regards to:

- Minimising known/potential sterilisation of coal resources
- Minimising further sterilisation of agricultural land
- Maximising colocation opportunities with the proposed Alpha Coal Project and existing Newlands line and Northern Missing Link.

The NGBR Project realignment was agreed between all parties. Further discussions with the Office of the Coordinator General and the Department of State Development, Infrastructure and Planning confirmed that the proposed realignment more closely aligns with the Galilee Basin Coal Infrastructure Framework (State of Queensland 2013a) and Galilee Basin Development Strategy (State of Queensland 2013b). In addition, submissions received on the NGBR Project EIS from QCoal, the Department of Natural Resources and Mines, and Glencore confirmed a preference for the proposed NGBR Project realignment.

Adani is also engaged in ongoing consultation with the relevant landholders to inform them of changes to the NGBR Project.

3.3 Chainage

The NGBR Project realignment and various other minor realignments have affected the chainage of the NGBR Project. As such chainage points described in the NGBR Project EIS no longer apply to the NGBR Project.

Chainage for the NGBR Project has been recalculated for the AEIS. The NGBR Project EIS states that the NGBR Project begins at chainage 3.49 km. This location is now described as chainage 2.2 km. It is noted that the physical location of the start point has not changed.

The terminus of the NGBR Project is located at chainage 313.8 km. Again, the physical location of the end point, at the connection with the Carmichael Project (Rail) infrastructure, is unchanged from the NGBR Project EIS.

3.4 Key components

Key components of the NGBR Project and the degree of change between the NGBR Project EIS and NGBR Project AEIS are shown in Table 3-1 and Table 3-2.

Table 3-1 Key components (construction phase)

Component	Unit	NGBR Project EIS	NGBR Project AEIS
Construction camps	no.	5	5
Concrete batch plants	no.	5	5
Bridge laydown areas	no.	21	31
Track laydown areas	no.	46	42
Construction depot	no.	2	2
Construction yard	no.	1	1
Turning circles	no.	69	67

Component	Unit	NGBR Project EIS	NGBR Project AEIS
Cut length (total)	km	103	78
Cut volume (total)	m^3	15.28 million	9.27 million
Deep cut length (> 15 m depth)	km	4.5	2.1
Maximum cut depth	m	24.2	26.3
Fill length (total)	km	213.15	248
Fill volume (total)	m^3	15.68 million	15.76 million
Deep fill length (> 15 m>depth)	km	3.4	3.3
Maximum fill depth	m	24.5	19.4
Bridge crossings	no.	18	24
Bridge length (total)[1]	km	2.57[1]	2.97[2]

[1] 127 bridge spans at 20.2 m length

[2] 147 bridge spans at 20.2 m length

Table 3-2 Key components (operations phase)

Component	Unit	NGBR Project EIS	NGBR Project AEIS
Route length	km	303.4	311.6
Passing loops	no.	7	8
Public road treatments	no.	22	27
At-grade crossings	no.	13	12
Grade-separated crossings	no.	4	6
Possible closures	no.	5	9
Occupational crossings[1]	no.	54	77
At-grade crossings	no.	38	40
Grade-separated crossings	no.	16	37
Stock route crossings	no.	7	7
At-grade crossings	no.	4	4
Grade-separated crossings	no.	3	3
Rolling stock maintenance depot	no.	1	1

[1] Further refinement of occupational crossing treatments and identification of minor crossings or closures will be undertaken to support detailed design

3.4.1 Sensitive receptors

Nearest potential sensitive receptors were identified within approximately six kilometres of the NGBR Project realignment. This resulted in the identification of an additional four receptors, compared to the NGBR Project EIS. These additional receptors are termed R1, R2, R3 and R4 (refer Table 3-3). Furthermore, the NGBR Project realignment and other minor realignments have affected the distance from some sensitive receptors to the final rail corridor, compared to the NGBR Project EIS. Homesteads 8, 9, 11, 16 and 20 are now closer to the NGBR Project final rail corridor; the distances to homesteads 2, 3, 14, 15, 19 and 22 are unchanged; Homesteads 1, 2, 5, 6, 7, 10, 12, 13, 17, 18, 21 and 23 are now further from the final rail corridor.

The most significant changes to distances are due to the NGBR Project realignment. The potential impacts on affected receptors (homesteads 16, 17, 18, R1, R2, R3 and R4) are assessed in Volume 2 Appendix C NGBR Project realignment report. The impacts of this change and other minor realignments are discussed in following sections.

Table 3-3 Sensitive receptors

Homestead	Lot on plan	Distance from final rail corridor (m)	Distance from final rail corridor (m)	Difference (m)
		NGBR Project EIS	**NGBR Project AEIS**	
Homestead 1	255HR2027	2,690	2,706	+ 16
Homestead 2	3HR1712	1,152	1,152	0
Homestead 3	4SB687	2,198	2,198	0
Homestead 4	25SB353	2,581	2,582	+ 1
Homestead 5	1SB279	4,680	4,701	+ 21
Homestead 6	3SB514	3,776	4,141	+ 365
Homestead 7	76SP167797	5,674	5,941	+ 267
Homestead 8	355K124696	3,572	3,521	- 51
Homestead 9	5047PH370	2,071	1,869	- 202
Homestead 10	3SB236	2,877	2,992	+ 115
Homestead 11	86DK154	1,514	1,397	- 117
Homestead 12	3SP132678	6,158	6,159	+ 1
Homestead 13	14DK18	5,316	5,317	+ 1
Homestead 14	4914PH1791	3,863	3,863	0
Homestead 15	618PH2106	4,263	4,263	0
Homestead 16	62SP195387	3,819	721	- 3,098

Homestead	Lot on plan	Distance from final rail corridor (m)	Distance from final rail corridor (m)	Difference (m)
Homestead 17	4SP171921	2,772	10,932	+ 8,160
Homestead 18	1510SP171920	4,120	6,485	+ 2,365
Homestead 19	1DK244	4,931	4,931	0
Homestead 20	1943SP221555	4,694	4,372	- 322
Homestead 21	5088SM101	5,159	5,160	+ 1
Homestead 22	3821PH1304	1,059	1,059	0
Homestead 23	4SP116046	6,584	6,616	+ 32
Homestead R1[1]	2CP866147		2,938	
Homestead R2[1]	3SP171922		1,062	
Homestead R3[1]	689PH2015		3,764	
Homestead R4[1]	1CP905226		7,825	

[1] Additional homesteads identified due to the NGBR Project realignment

3.4.2 Property and tenure

A number of additional properties are now crossed by the NGBR Project, due to the NGBR Project realignment. These properties are as follows:

- Lot 1 on DK230
- Lot 2 on CP866147
- Lot 3 on SP171922
- Lot 14 on SP225054
- Lot 689 on SP251696

The NGBR Project realignment crosses another three properties that were considered in the NGBR Project EIS (Lot 618 on PH2106, Lot 62 on SP195387 and Lot 667 on PH1321). All properties crossed are assessed in Volume 2 Appendix C NGBR Project realignment report.

Other minor realignments and associated changes have meant the NGBR Project also crosses additional properties in areas outside of the NGBR Project realignment (Lot 10 on SP253665, Lot 11 on SP253665 and Lot 5086 on SM100).

Refer to Section 4.1 for further information on affected properties.

A number of additional resource tenures are now crossed by the NGBR Project realignment. The tenures include a number of exploration permits for coal (EPC), exploration permits for minerals (EPM), exploration permits for petroleum (EPP) and mining leases (ML), as follows:

- EPC 734
- EPC 977

- EPM18548
- EPP 742
- ML70434
- ML70436
- ML4748
- ML10351
- ML10355
- ML10356

The NGBR Project realignment crosses a number of resource tenures that were considered in the NGBR Project EIS. All properties crossed are assessed in Volume 2 Appendix C NGBR Project realignment report.

Other minor realignments and associated changes have not resulted in any additional resource tenures being crossed by the NGBR Project.

3.5 NGBR Project realignments and relocations

Realignments to the NGBR Project final rail corridor are listed in Table 2-1 and depicted in Figure 3-1. The majority or relocations of ancillary infrastructure have occurred in conjunction with a realignment of the NGBR Project final rail corridor. In this case, a range of chainages is provided to describe the area of the realignment and relocations. Ancillary infrastructure has been relocated to be adjacent to the NGBR Project final rail corridor, unless otherwise noted. Some additional relocations of ancillary infrastructure have occurred, which are not in conjunction with a realignment of the NGBR Project final rail corridor. These relocations are described by a single chainage.

Table 3-4 NGBR Project realignments and relocations

ID	Chainage	Ancillary infrastructure
1	5 km – 8 km	Relocated – Bridge laydown areas (3)[1] Relocated – Track laydown area Removed – Turning circle
2	9.4 km	Removed – Track laydown area
3	8 km – 14.5 km	Relocated – Track laydown area Relocated – Turning circle Relocated – Bridge laydown area Relocated – Concrete batch plant Removed – Turning circle
4	14.5 km – 18 km	Relocated – Construction camp 1 Relocated – Concrete batch plant
5	31 km	Resized – Rolling stock maintenance depot from 178 ha to 65 ha
6	40.3 km	Removed – Track laydown area

ID	Chainage	Ancillary infrastructure
7	47 km – 51 km	Relocated – Turning circle
8	59 km – 64.3 km	Relocated – Bridge laydown area (2) Relocated – Construction camp 2[2] Relocated – Concrete batch plant[2] Relocated – Track laydown area Relocated – Turning circle
9	64.3 km – 68 km	Relocated – Track laydown area Relocated – Turning circle
10	68 km – 73 km	Relocated – Turning circle (2)
11	74.5 km	Removed – Track laydown area
12	75 km – 78 km	Relocated – Turning circle
13	80.7 km	Removed – Track laydown area
14	81 km – 88 km	Relocated – Track laydown area Relocated – Turning circle
15	119 km – 128 km	Relocated – Turning circle Relocated – Construction camp 3 Relocated – Concrete batch plant Relocated – Track laydown area Removed– Track laydown area
16[3]	128.2 km – 205.3 km	Relocated – Turning circles (19) Relocated– Bridge laydown areas (4) Relocated – Track laydown area (10) Relocated – Construction camp 4 Relocated – Construction yard Relocated – Concrete batch plant Added – Bridge laydown areas (10) Added – Track laydown areas (3) Added – Temporary ballast stockpile
17	209 km – 218 km	Relocated – Bridge laydown area Relocated – Track laydown area Relocated – Turning circle (2)
18	226 km – 244 km	Relocated – Turning circle (4) Relocated – Track laydown area (3) Relocated – Bridge laydown area
19	249 km	Removed – Track laydown area Removed – Bridge laydown area
20	253 km	Removed – Track laydown area

ID	Chainage	Ancillary infrastructure
21	269 km	Relocated – Concrete batch plant[4] Relocated – Construction camp 5[4]
22	312 km	Removed – Construction depot[5]

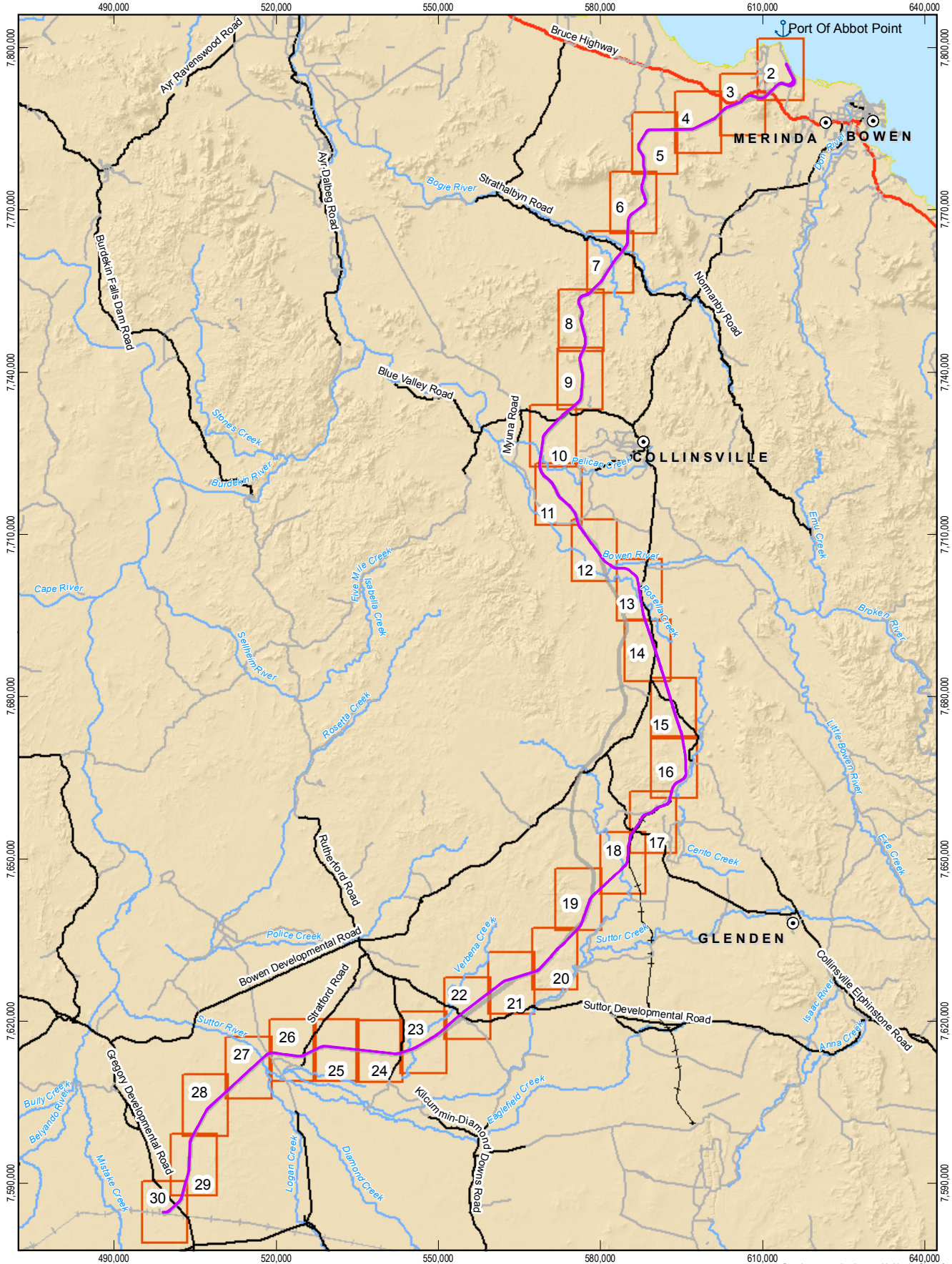
[1] Originally three discrete bridge laydown areas, consolidated into four laydown areas at two locations

[2] Relocated approximately 1.5 km from NGBR Project final rail corridor, adjacent to Strathalbyn Road

[3] The NGBR Project realignment; Refer to Volume 2 Appendix C NGBR Project realignment report

[4] Relocated approximately 1.8 km from NGBR Project final rail corridor, adjacent to Stratford Road

[5] The construction depot will be utilised for the NGBR Project, but will be established and maintained as part of the Carmichael Coal Mine and Rail Project and is therefore excluded from the NGBR Project footprint.



LEGEND

- Population centres
- Major Port
- Highway
- Main Road
- Local Road
- Carmichael Project (Rail)
- Railway
- Watercourse (Major)
- NGBR Project final rail corridor
- NGBR Project final rail corridor (EIS)
- Map Sheet

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Adani Mining Pty Ltd
North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
Date 28 Feb 2014

NGBR Project final rail corridor comparison - Index

Sheet 1 of 30
Figure 3-1

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145 Ann Street Brisbane QLD 4000 Australia T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

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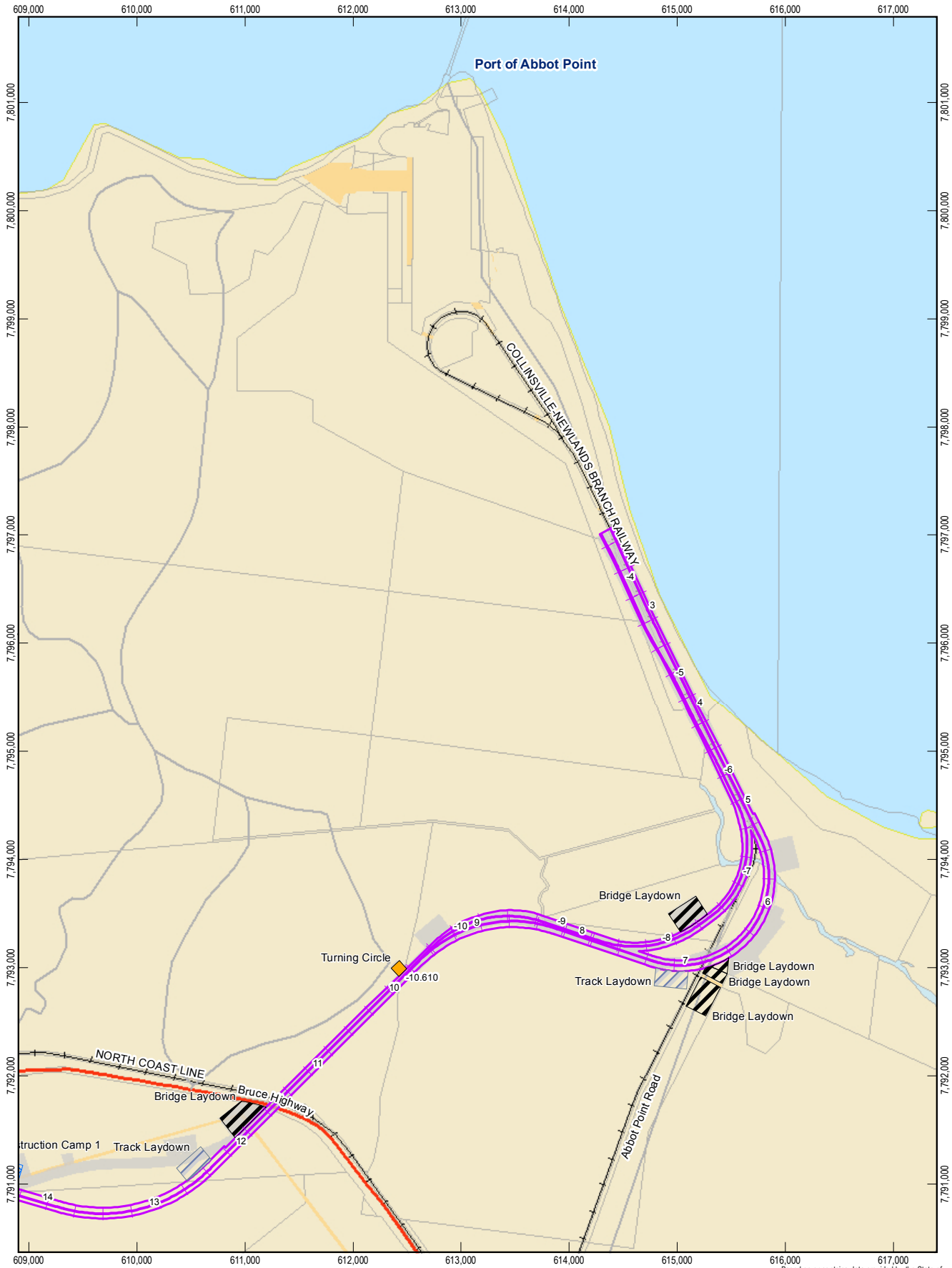

LEGEND

- Population Centres
- Major waterway crossing structures
- Highway
- Main road
- Local road
- Railway
- Watercourse (Major)
- Watercourse (Minor)
- Easement
- Lot
- Water
- Alignment functional areas
- Bridge laydown area
- Concrete batch plant
- Construction camp
- Construction yard
- Rolling stock maintenance yard
- Track laydown
- Turning circle
- Temporary ballast stock pile
- Carmichael Project (Rail)
- NGBR Project footprint (EIS)
- NGBR Project final rail corridor
- NGBR Project final rail corridor

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
Date 28 Feb 2014

NGBR Project final rail corridor comparison

Figure 3-1
Sheet 2 of 30

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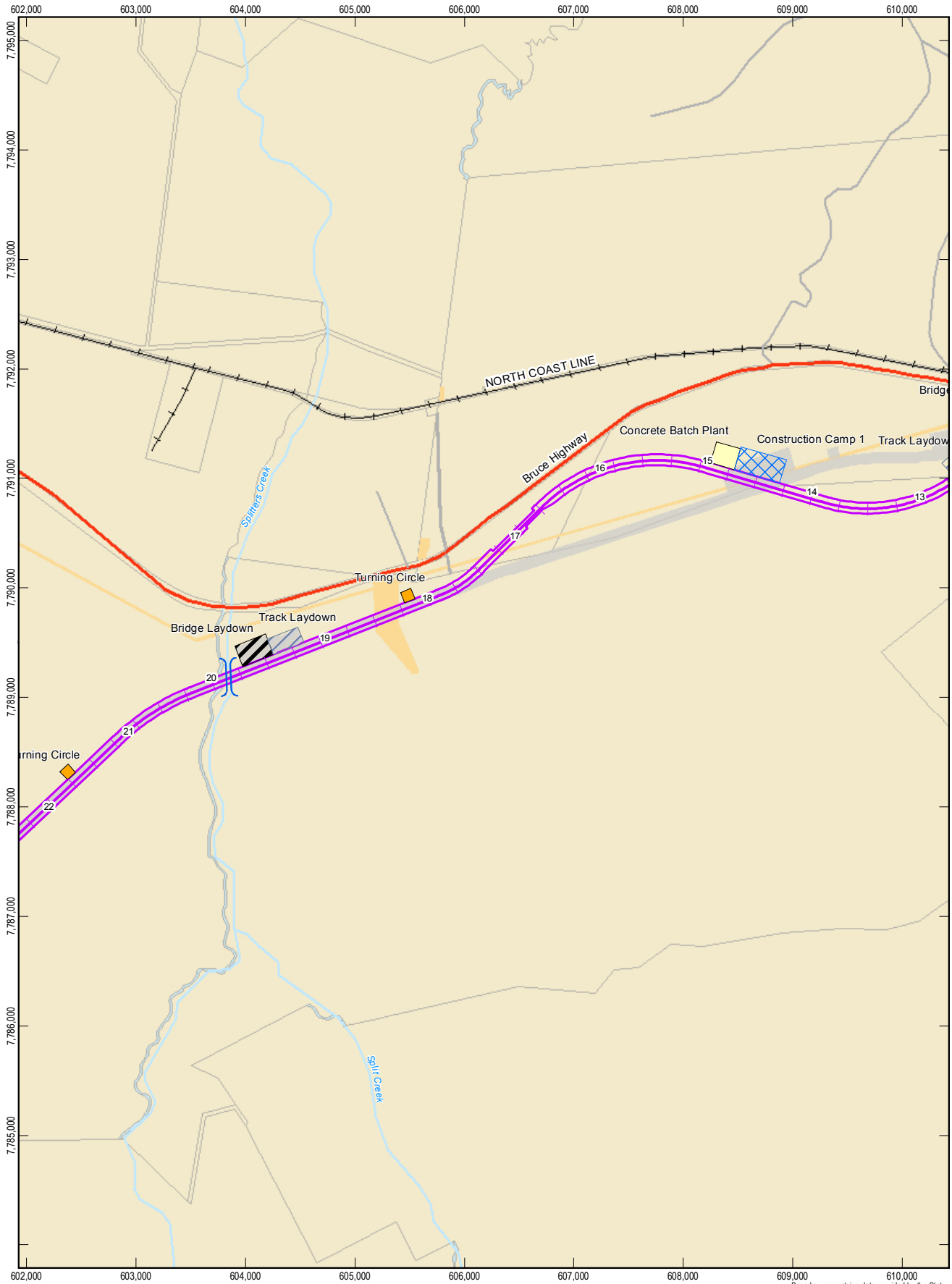

LEGEND

- Population Centres
- Major waterway crossing structures
- Highway
- Main road
- Local road
- Railway
- Watercourse (Major)
- Watercourse (Minor)
- Easement
- Lot
- Water
- Alignment functional areas
- Bridge laydown area
- Concrete batch plant
- Construction camp
- Construction yard
- Rolling stock maintenance yard
- Track laydown
- Turning circle
- Temporary ballast stock pile
- Carmichael Project (Rail)
- NGBR Project footprint (EIS)
- NGBR Project final rail corridor
- NGBR Project final rail corridor

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
Date 28 Feb 2014

NGBR Project final rail corridor comparison

Figure 3-1
Sheet 3 of 30

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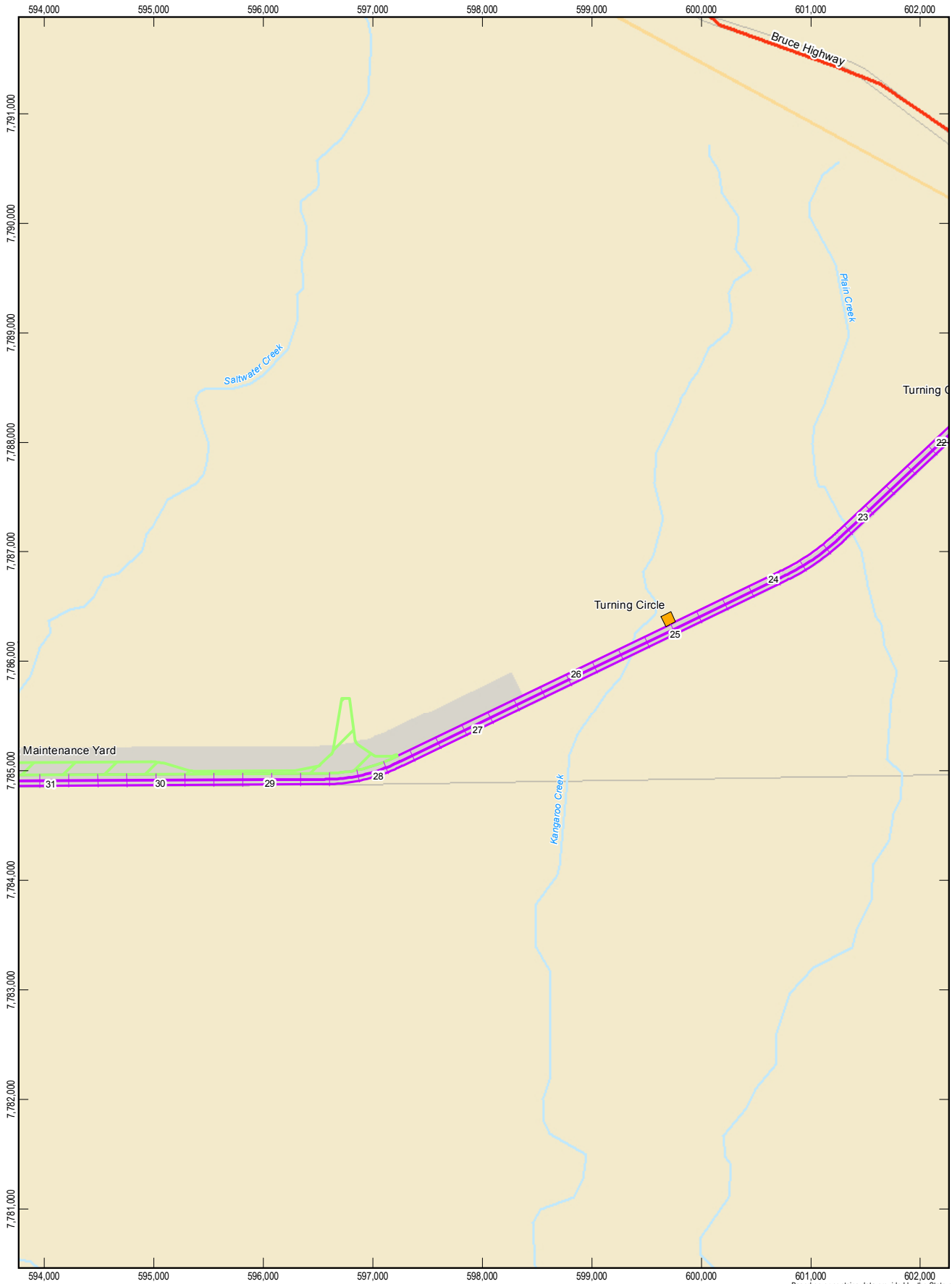

LEGEND

- Population Centres
- Major waterway crossing structures
- Highway
- Main road
- Local road
- Railway
- Watercourse (Major)
- Watercourse (Minor)
- Easement
- Lot
- Water
- Alignment functional areas
- Bridge laydown area
- Concrete batch plant
- Construction camp
- Construction yard
- Rolling stock maintenance yard
- Track laydown
- Turning circle
- Temporary ballast stock pile
- Carmichael Project (Rail)
- NGBR Project footprint (EIS)
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Figure 3-1
Sheet 4 of 30

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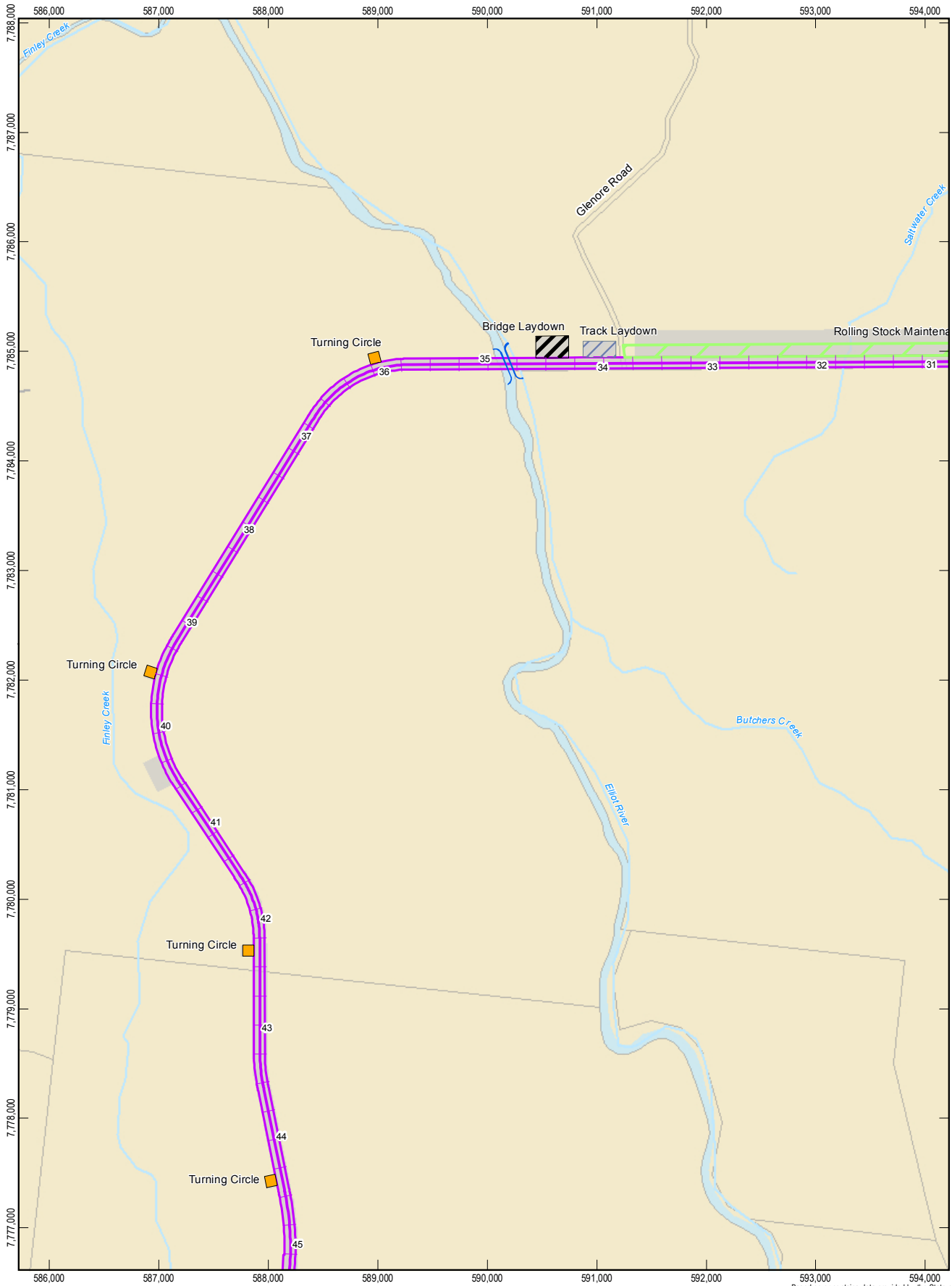

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- Population Centres
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Job Number 41-26457
Revision B
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Figure 3-1
Sheet 5 of 30

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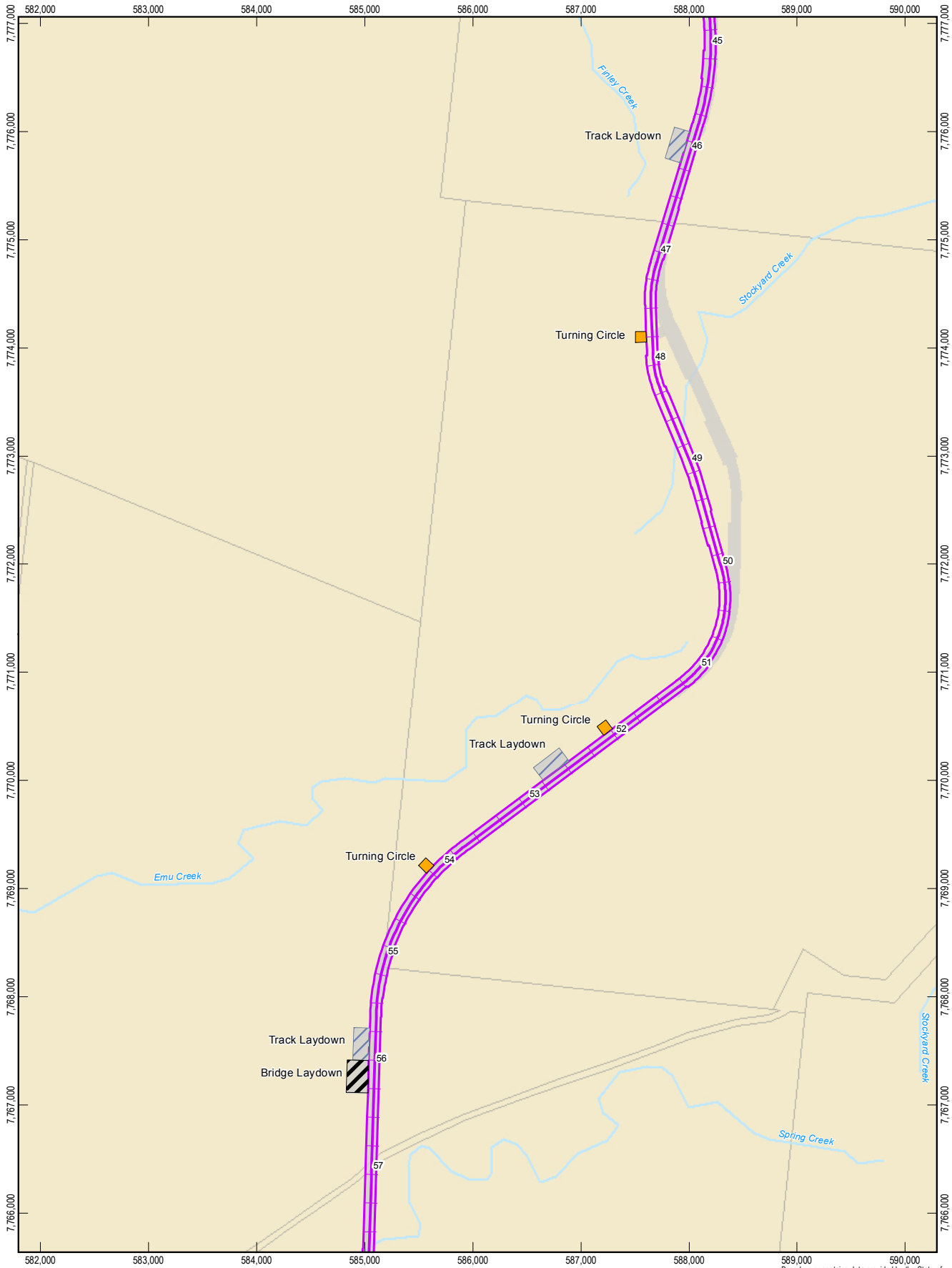

LEGEND

- Population Centres
- Major waterway crossing structures
- Highway
- Main road
- Local road
- Railway
- Watercourse (Major)
- Watercourse (Minor)
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Sheet 6 of 30

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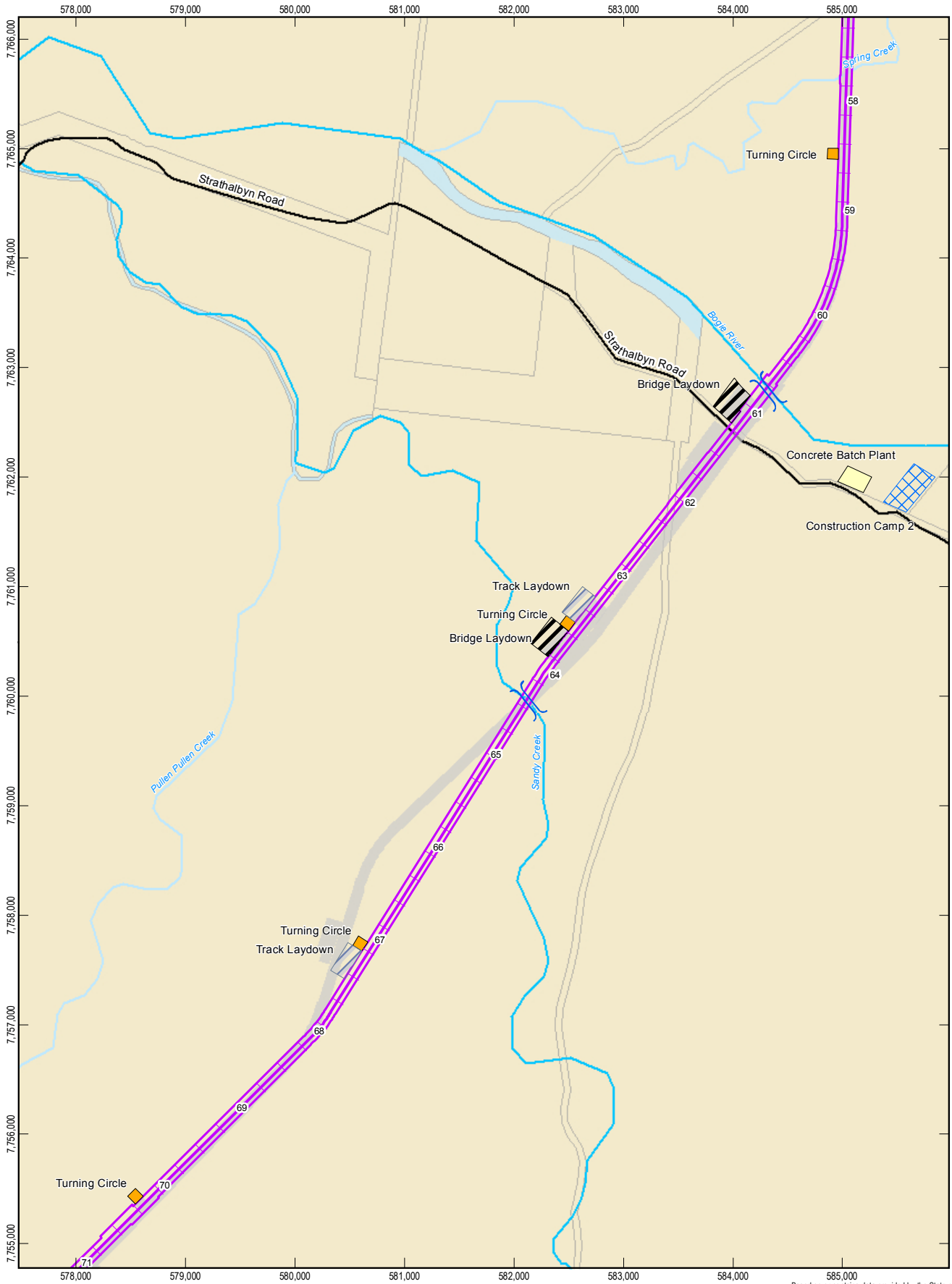

LEGEND

- Population Centres
- Major waterway crossing structures
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Job Number 41-26457
Revision B
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Figure 3-1
Sheet 7 of 30

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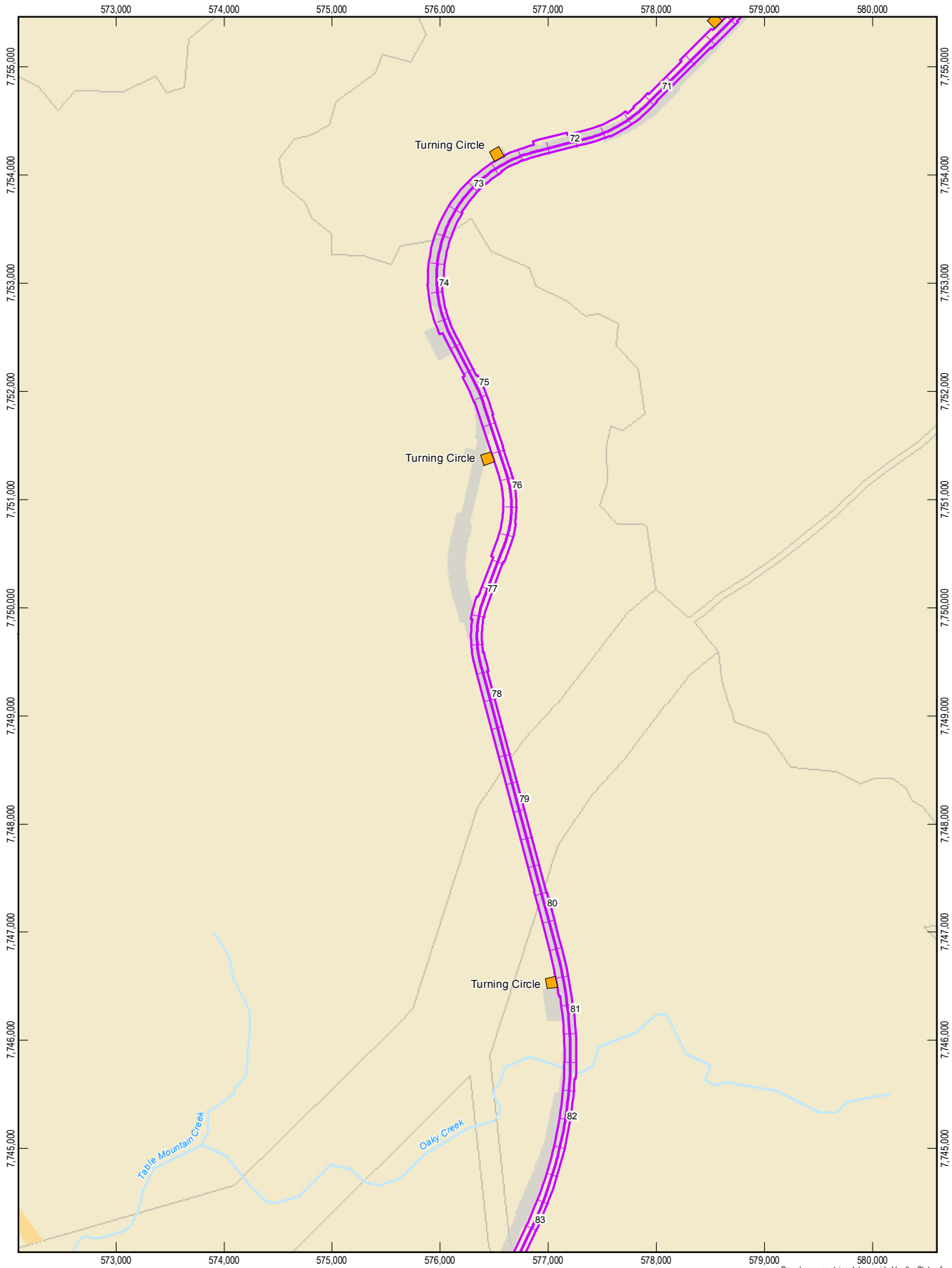

LEGEND

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Sheet 8 of 30

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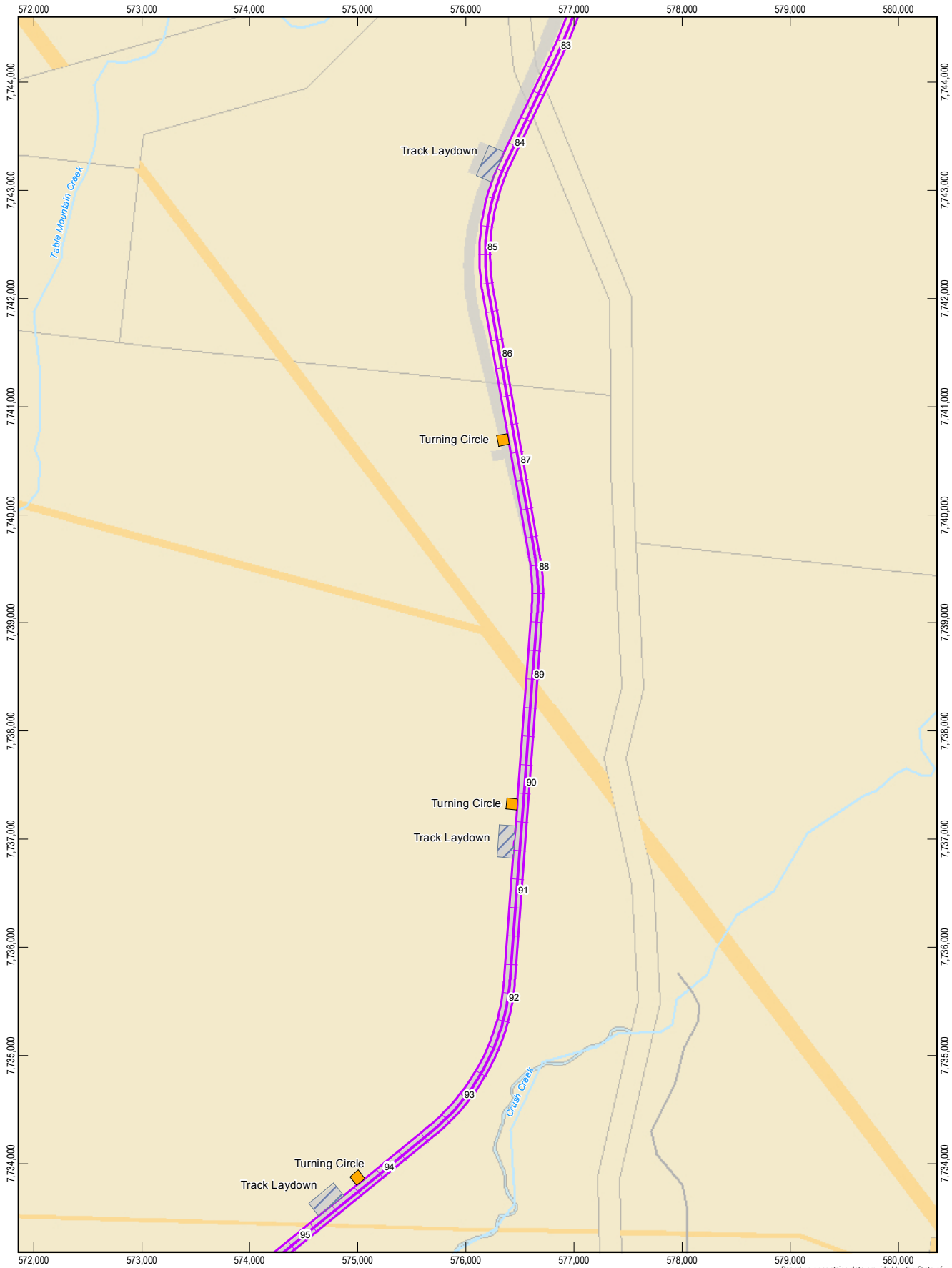

LEGEND

- Population Centres
- Major waterway crossing structures
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Kilometres

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Job Number 41-26457
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NGBR Project final rail corridor comparison

Figure 3-1
Sheet 9 of 30

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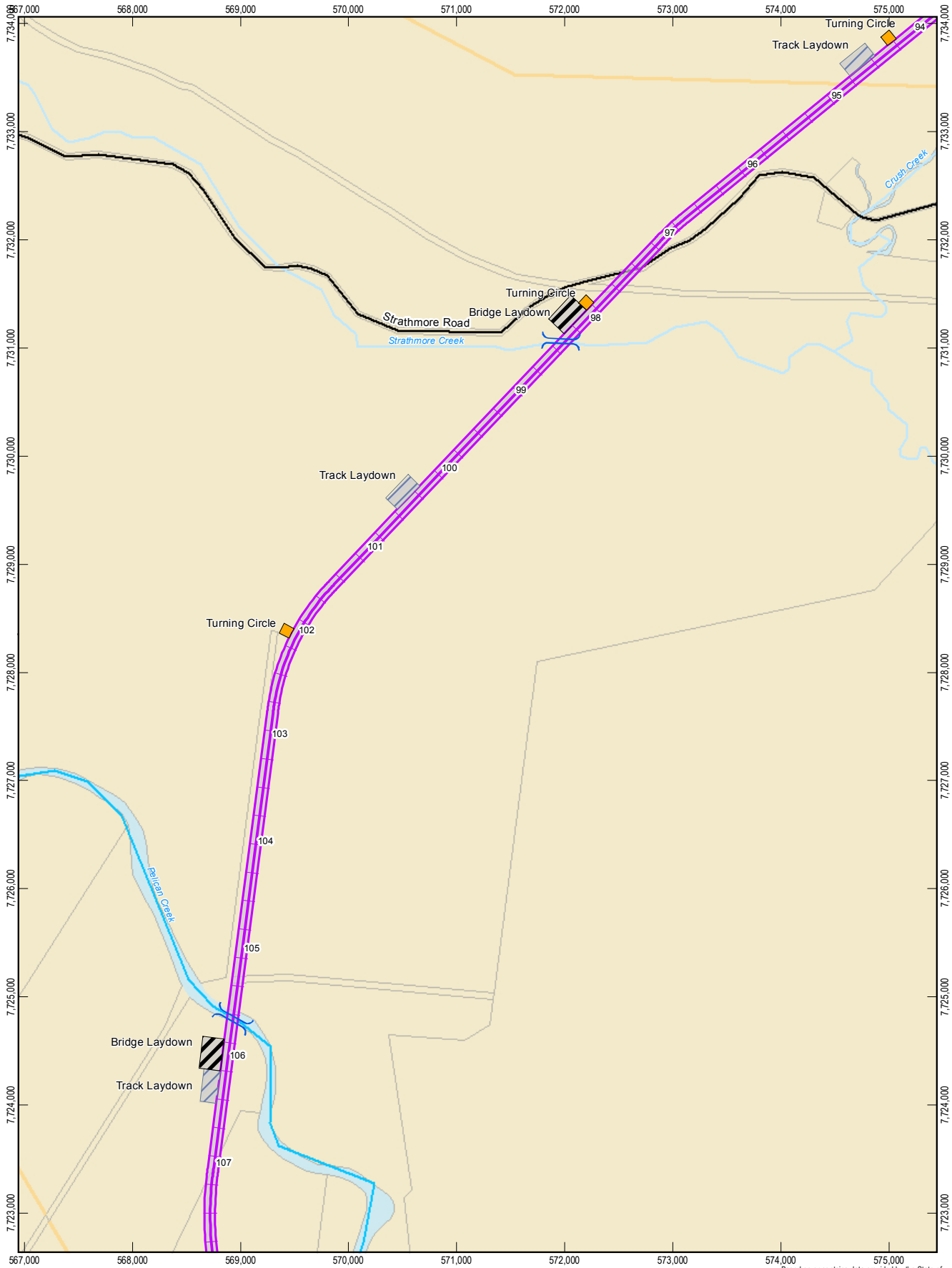

LEGEND

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Sheet 10 of 30

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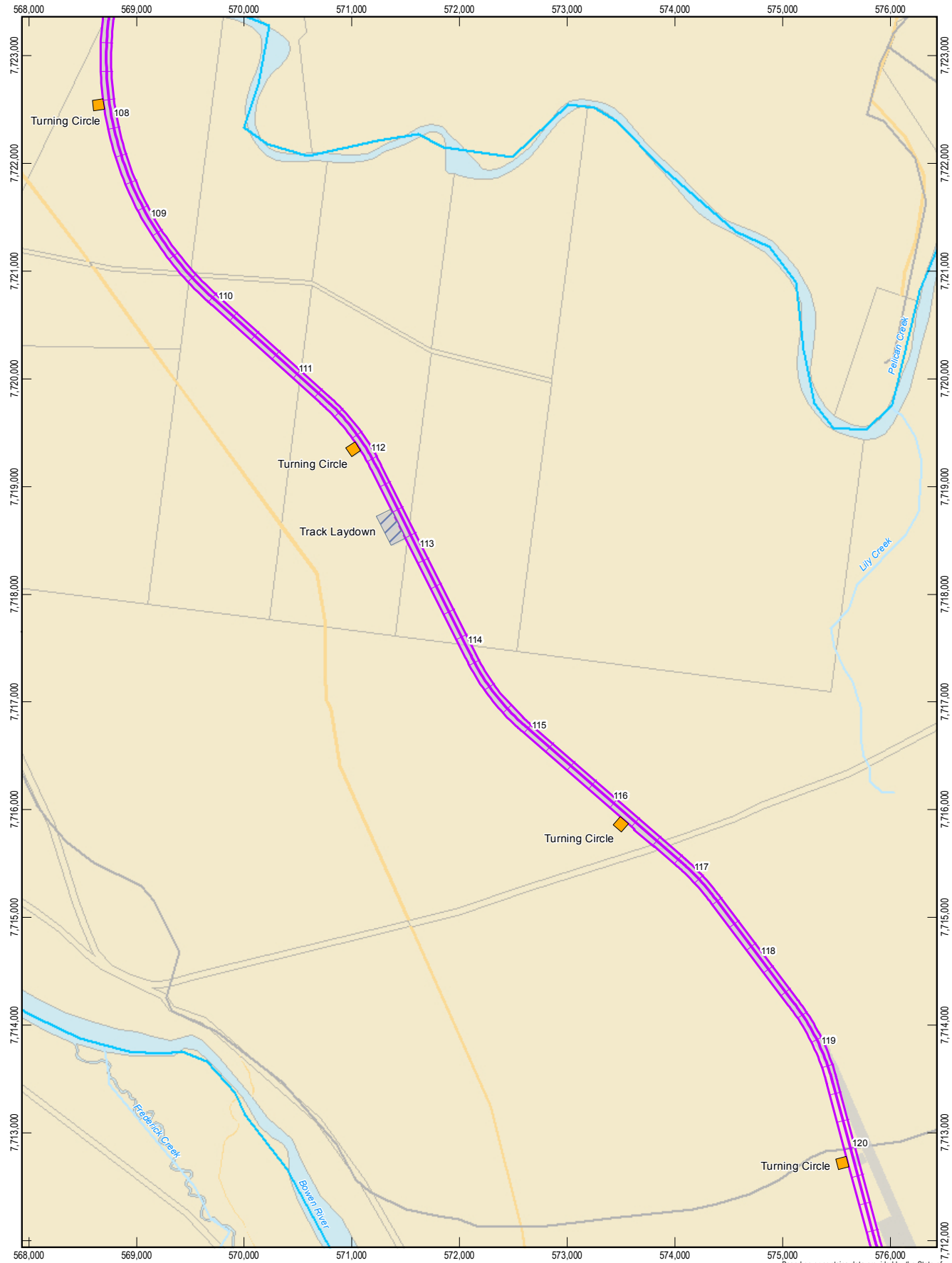

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NGBR Project final rail corridor comparison

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Sheet 11 of 30

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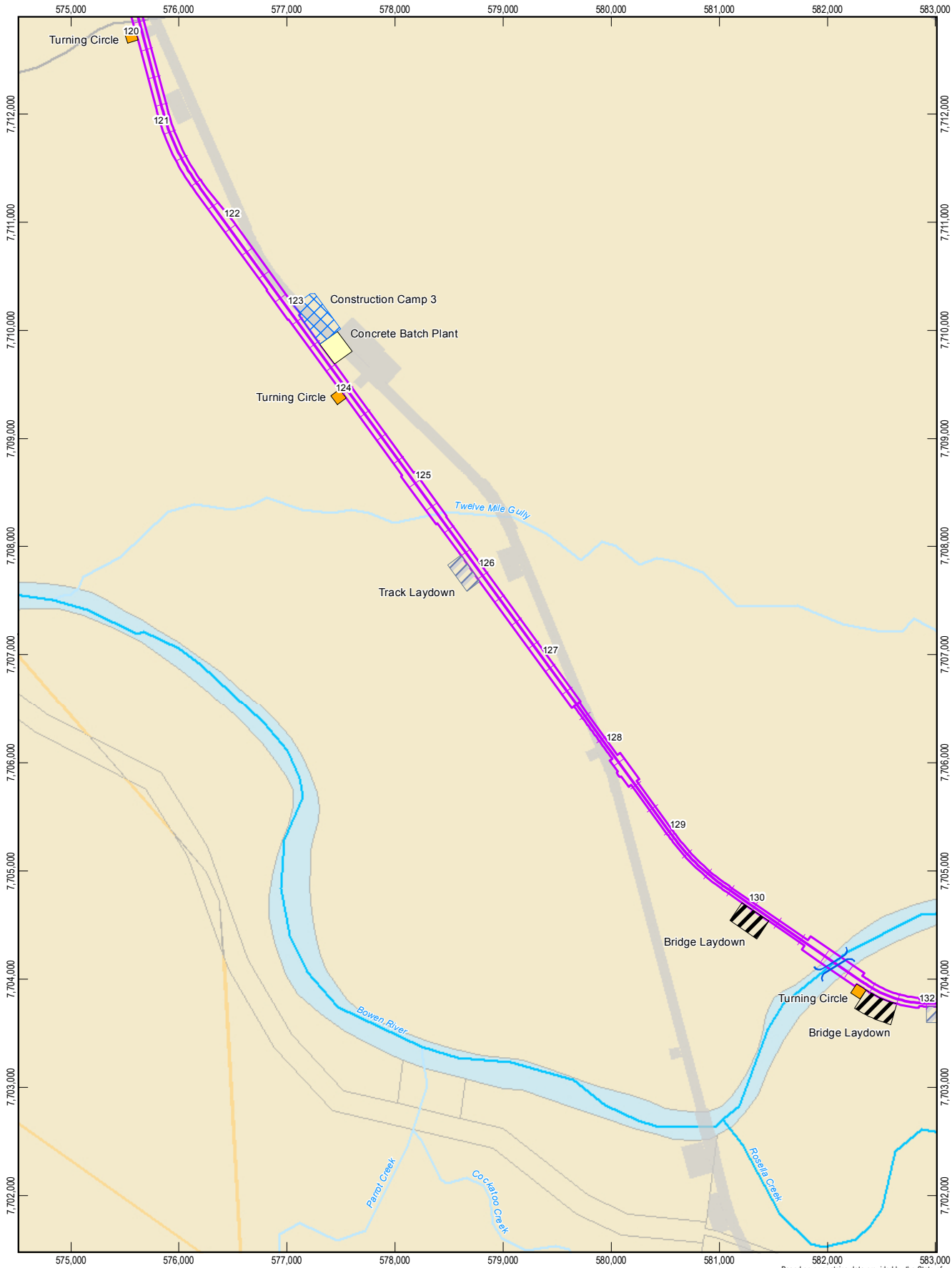

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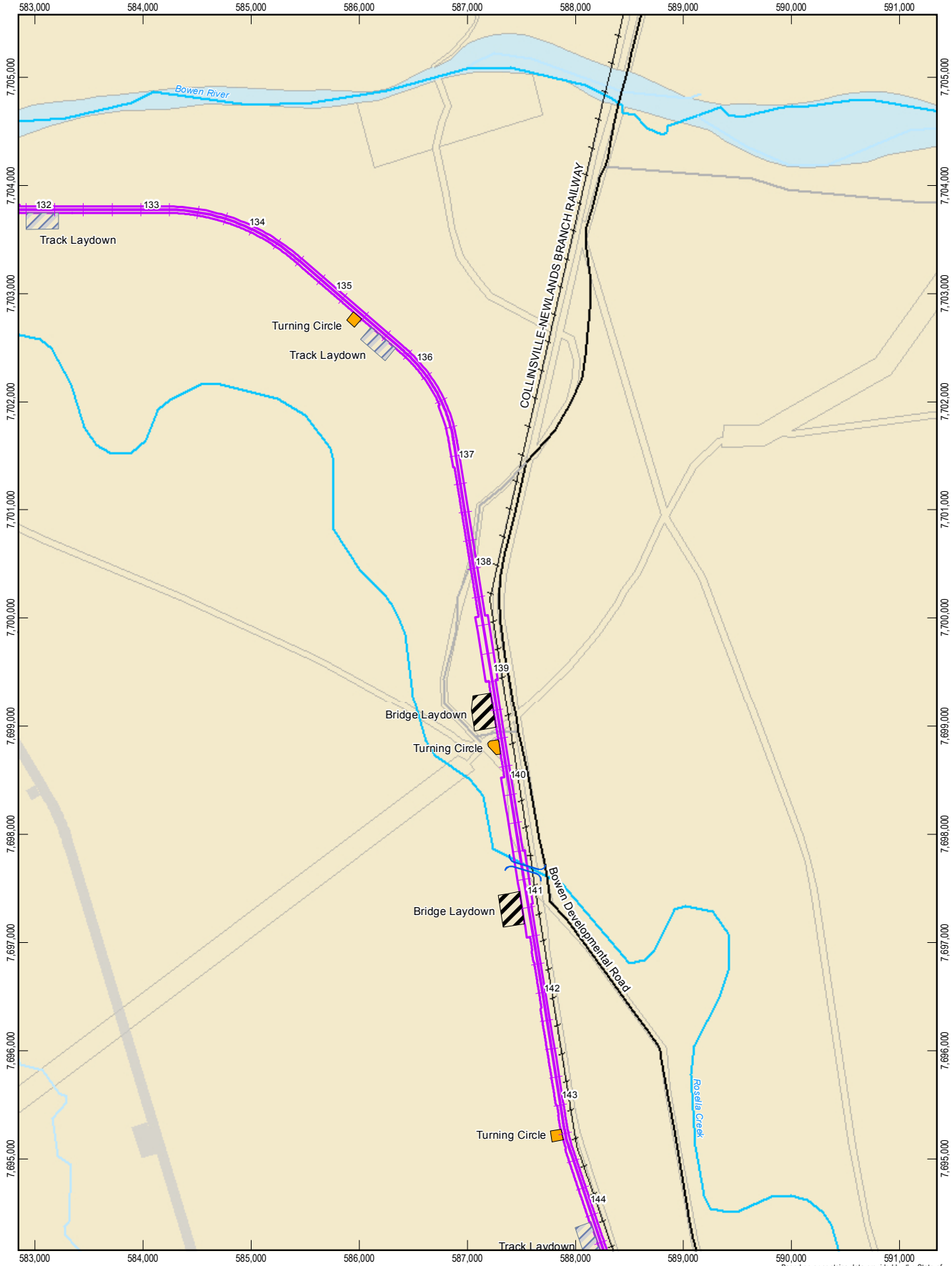

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Adani Mining Pty Ltd
North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
Date 28 Feb 2014

NGBR Project final rail corridor comparison

Figure 3-1
Sheet 13 of 30

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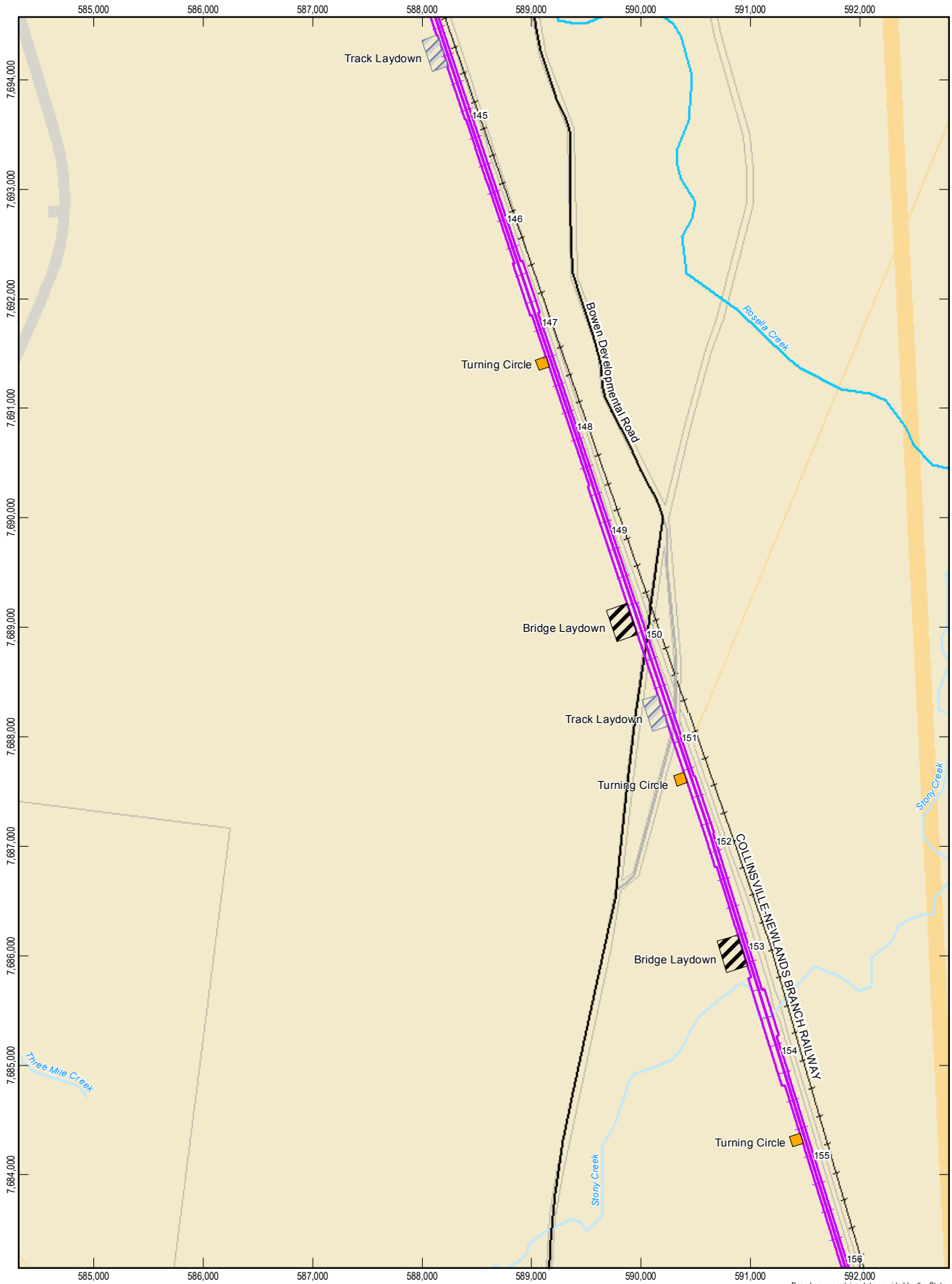

LEGEND

- Population Centres
- Major waterway crossing structures
- Highway
- Main road
- Local road
- Railway
- Watercourse (Major)
- Watercourse (Minor)
- Easement
- Lot
- Water
- Alignment functional areas
- Bridge laydown area
- Concrete batch plant
- Construction camp
- Construction yard
- Rolling stock maintenance yard
- Track laydown
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- Temporary ballast stock pile
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Sheet 14 of 30

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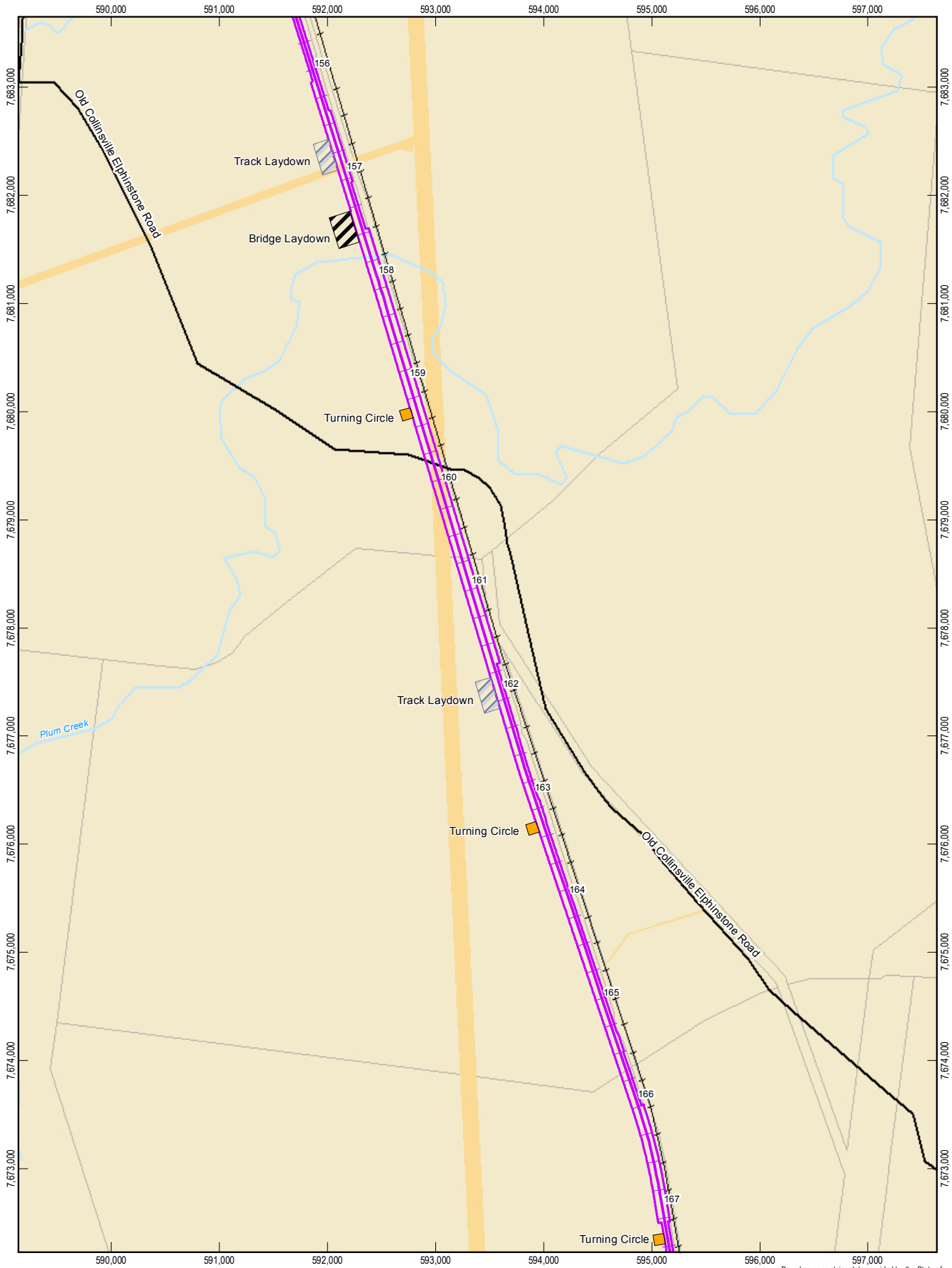

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- Population Centres
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Figure 3-1
Sheet 15 of 30

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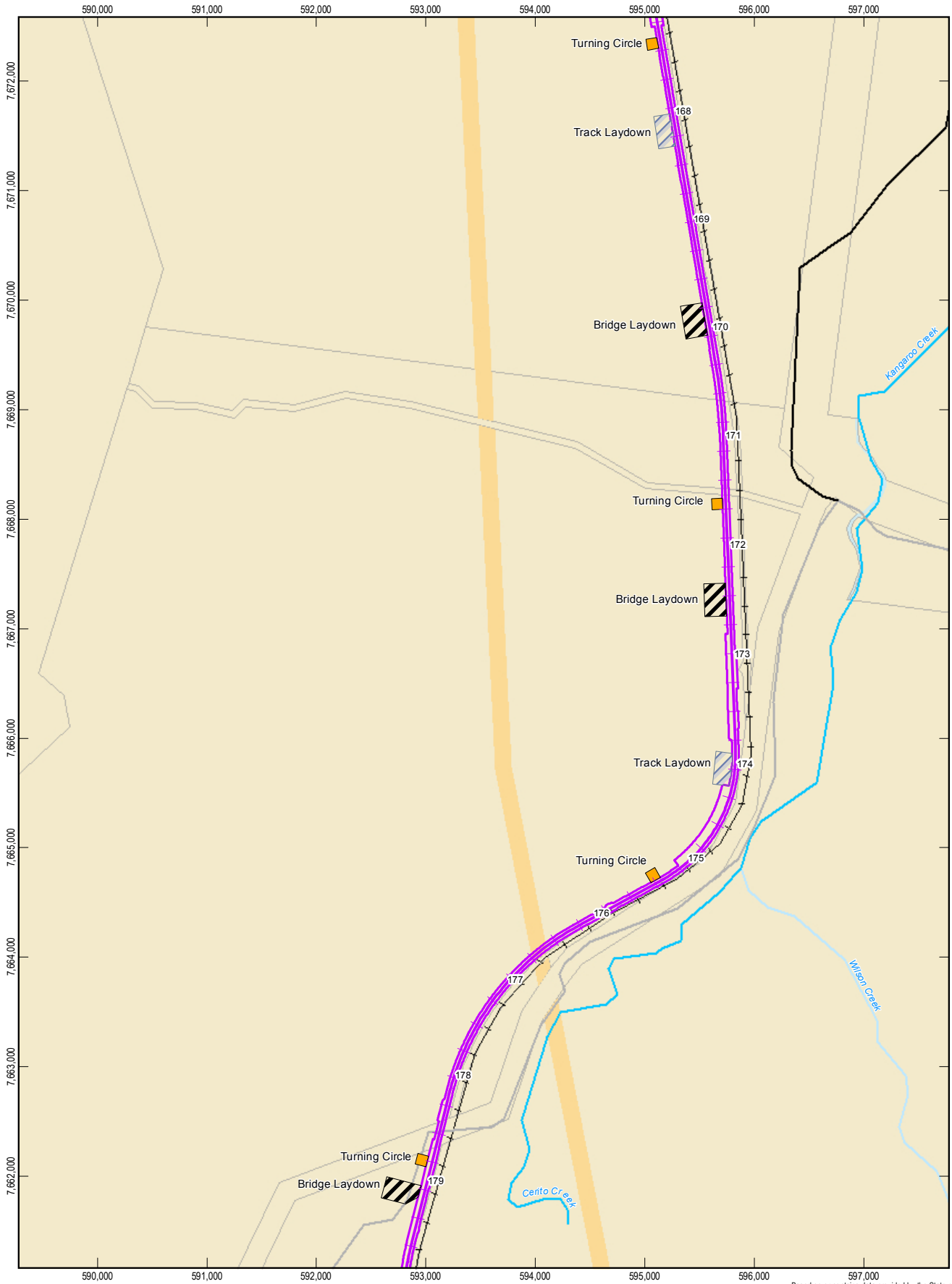

LEGEND

- Population Centres
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Sheet 16 of 30

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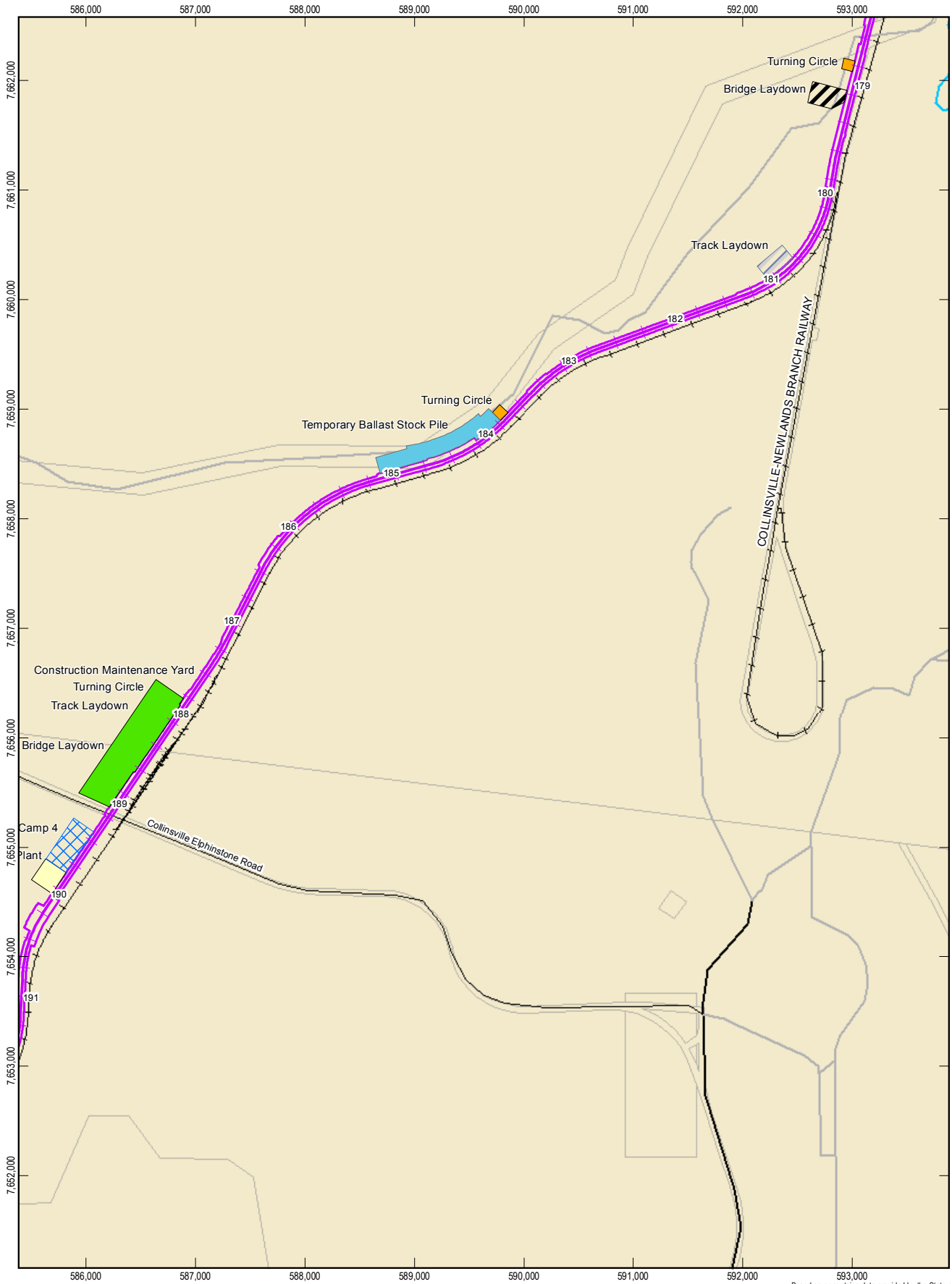

LEGEND

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Adani Mining Pty Ltd

North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
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Figure 3-1
Sheet 17 of 30

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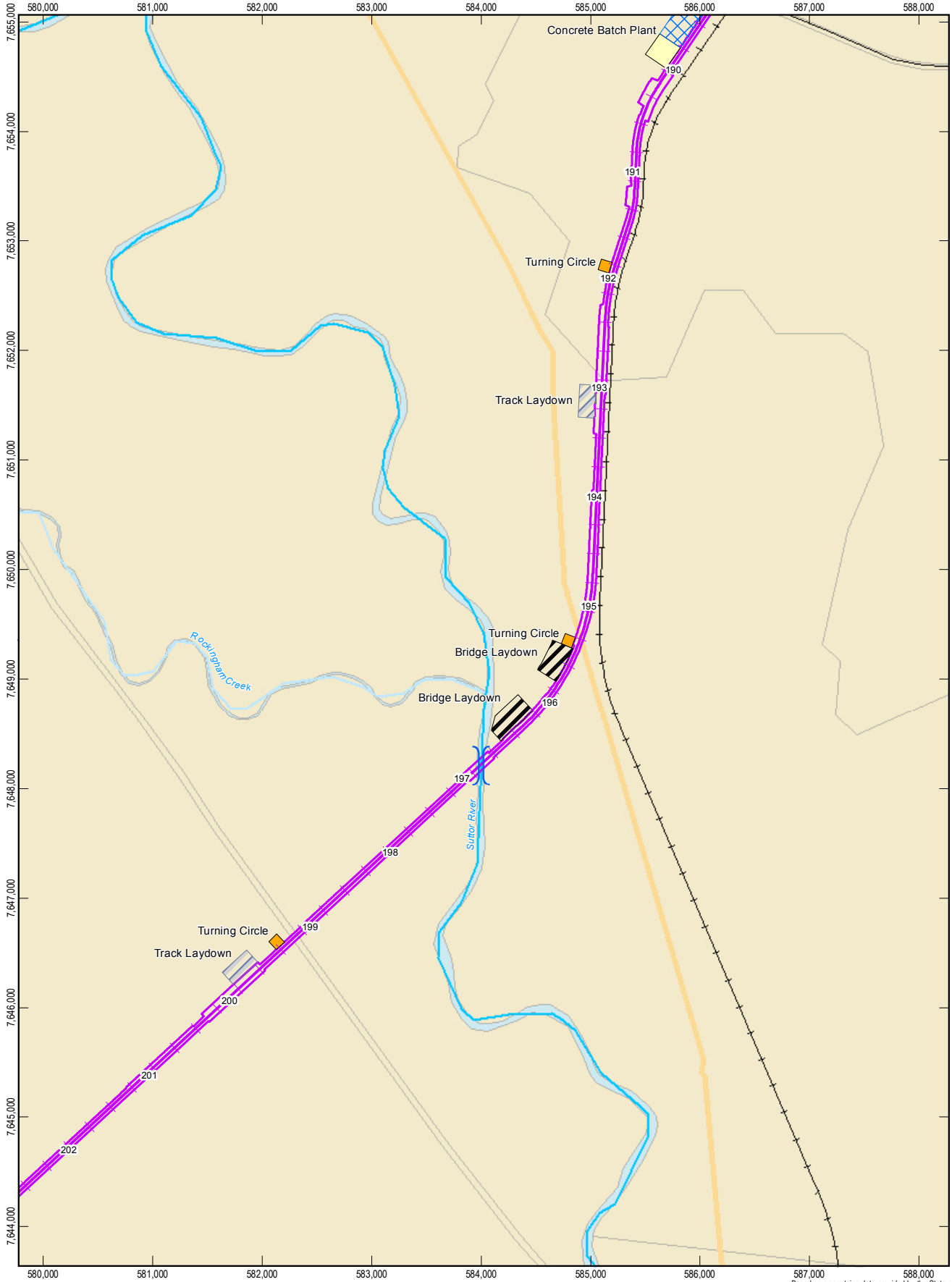

LEGEND

- Population Centres
- Major waterway crossing structures
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North Galilee Basin Rail Project AEIS

Job Number 41-26457
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NGBR Project final rail corridor comparison

Figure 3-1
Sheet 18 of 30

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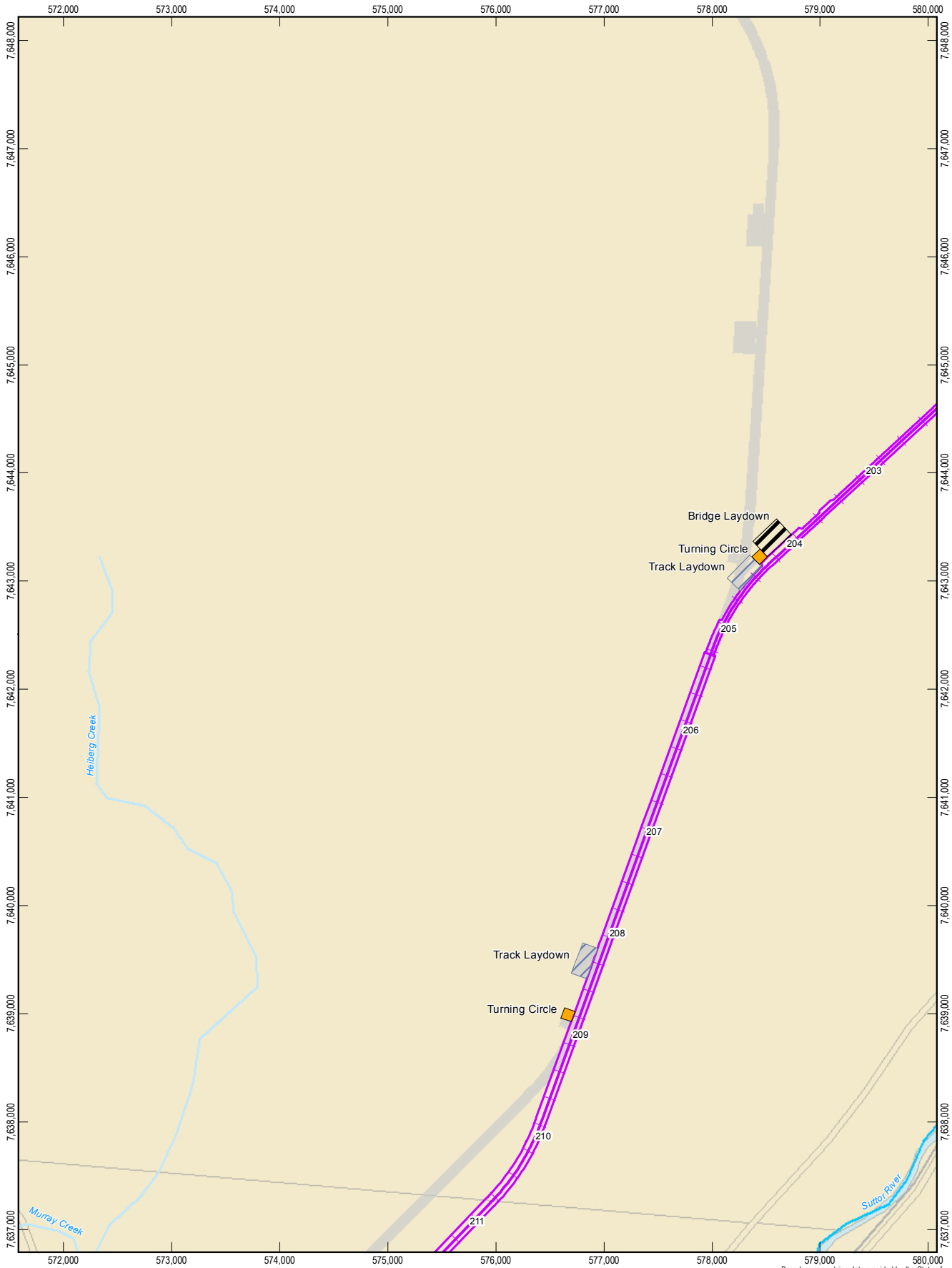

LEGEND

- Population Centres
- Major waterway crossing structures
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Kilometres

Map Projection: Transverse Mercator
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Adani Mining Pty Ltd

North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
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NGBR Project final rail corridor comparison

Figure 3-1
Sheet 19 of 30

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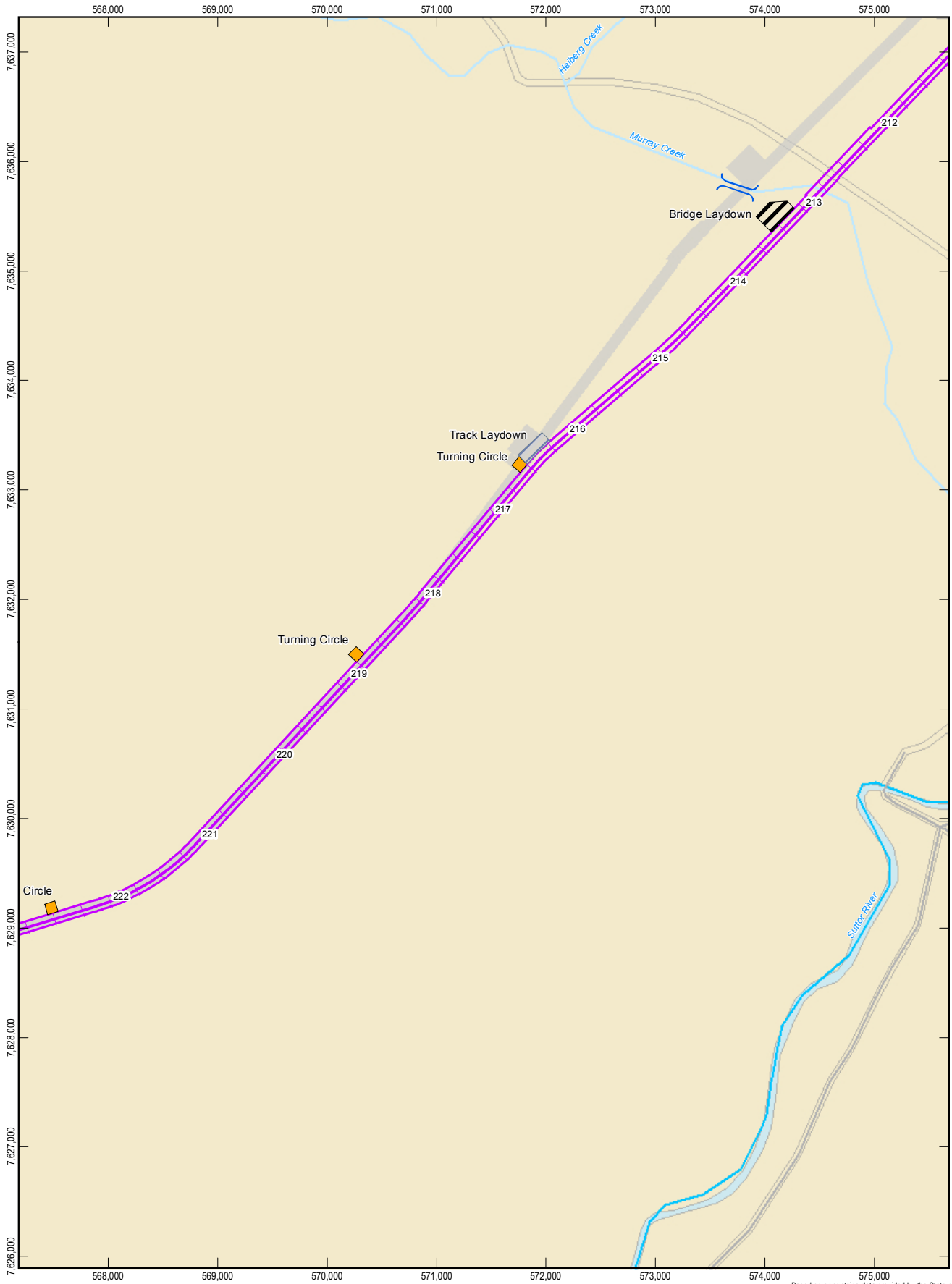

LEGEND

- Population Centres
- Major waterway crossing structures
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Figure 3-1
Sheet 20 of 30

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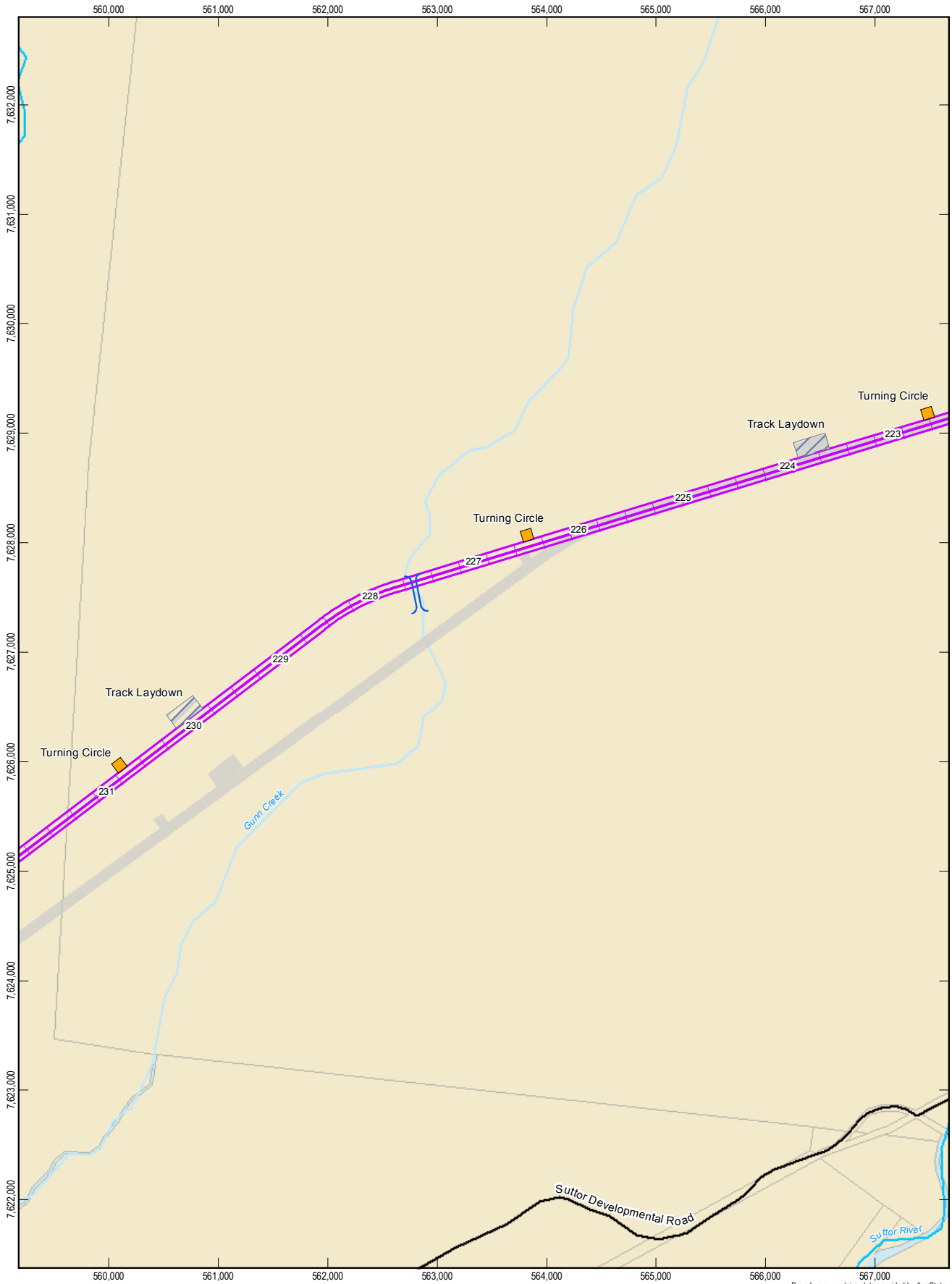

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Sheet 21 of 30

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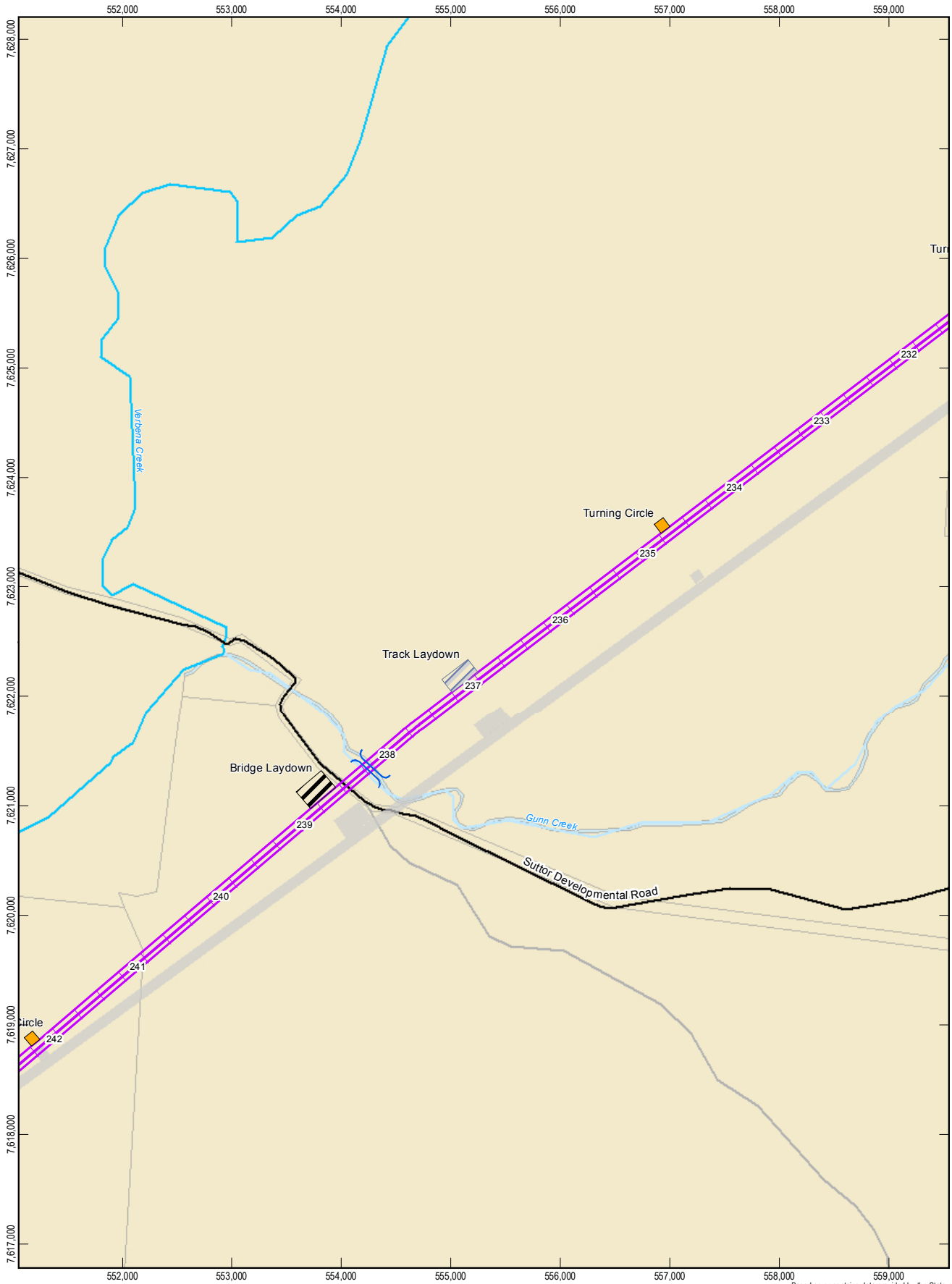

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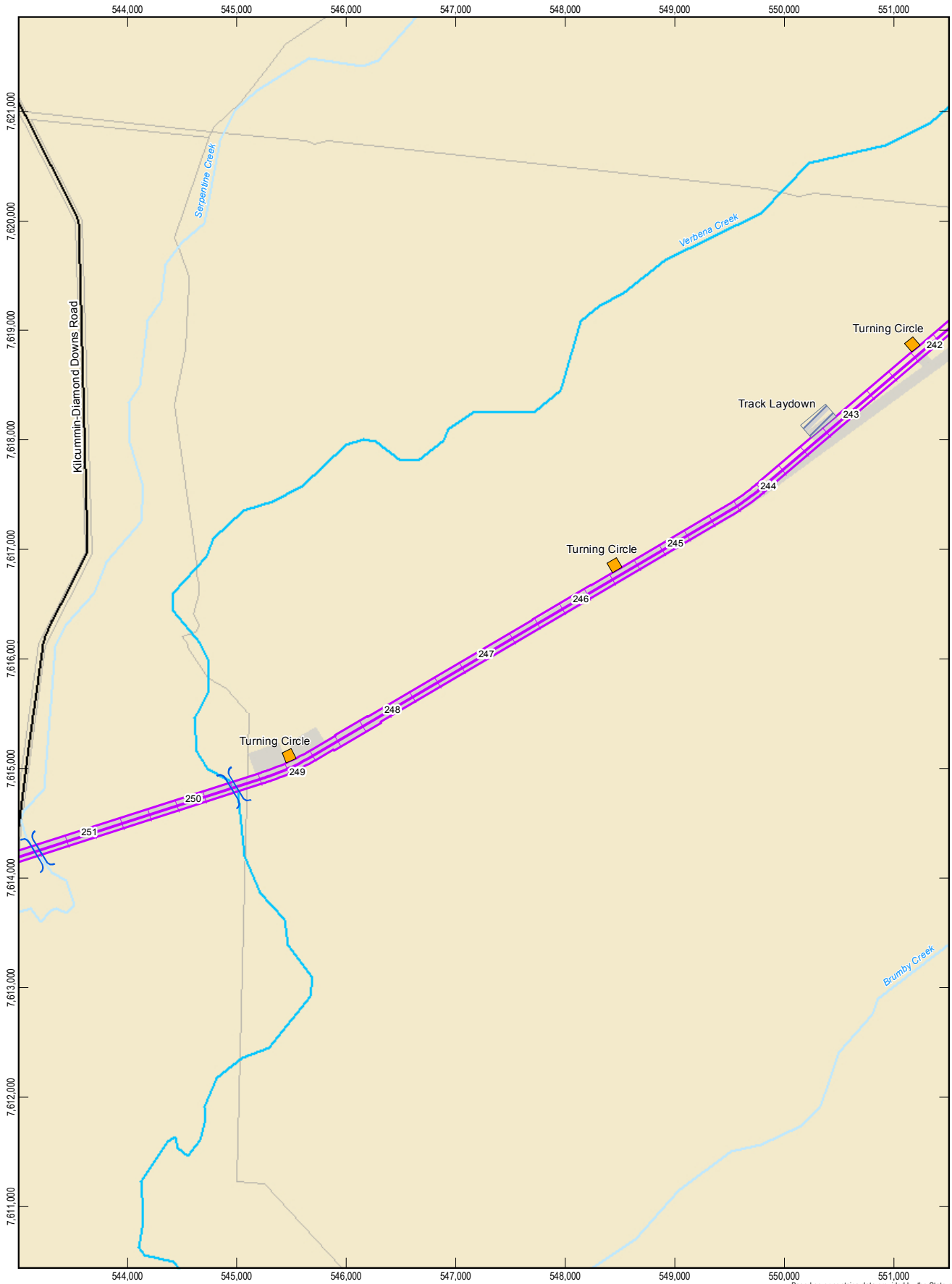

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North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
Date 28 Feb 2014

NGBR Project final rail corridor comparison

Figure 3-1
Sheet 23 of 30

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Adani Mining Pty Ltd
North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
Date 28 Feb 2014

NGBR Project final rail corridor comparison

Figure 3-1
Sheet 24 of 30

G:\41\26457\06 GIS\Maps\MXD\0001_Overview\41_26457_0025_rev_b.mxd

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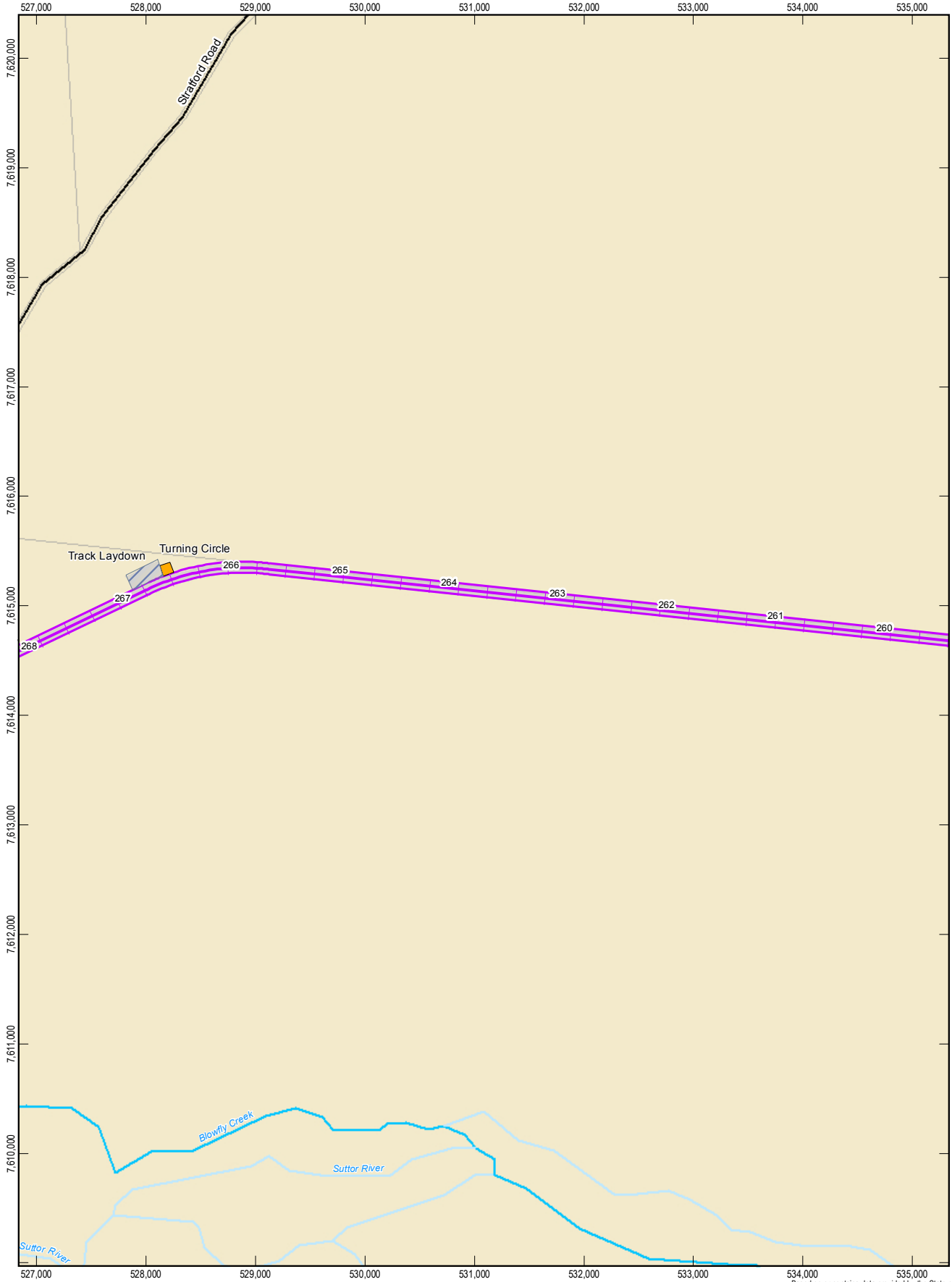

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Adani Mining Pty Ltd
North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
Date 28 Feb 2014

NGBR Project final rail corridor comparison

Figure 3-1
Sheet 25 of 30

G:\41\26457\06 GIS\Maps\MXD\0001_Overview\41_26457_0025_rev_b.mxd

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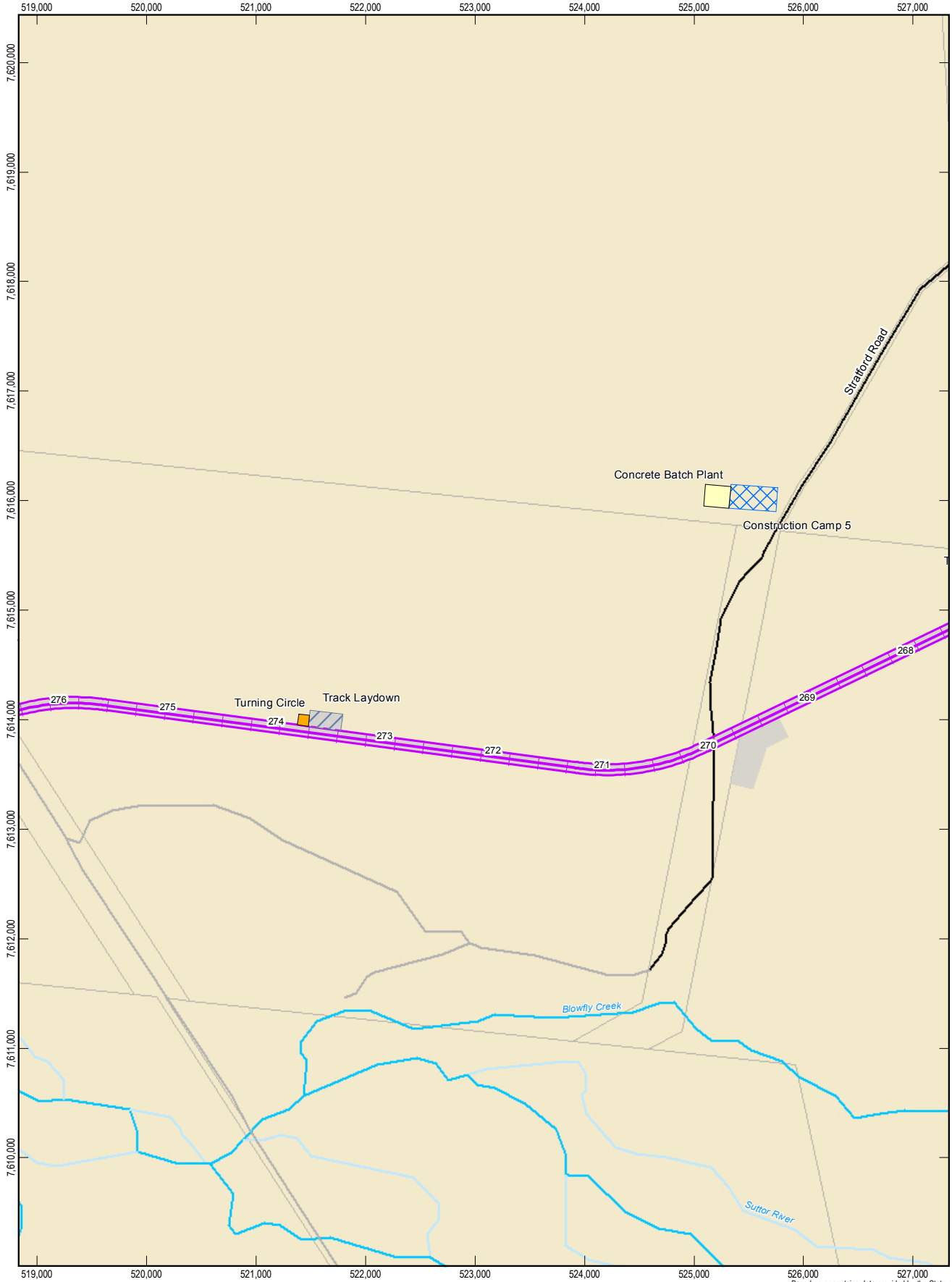

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Adani Mining Pty Ltd
North Galilee Basin Rail Project AEIS

Job Number 41-26457
Revision B
Date 28 Feb 2014

NGBR Project final rail corridor comparison

Figure 3-1
Sheet 26 of 30

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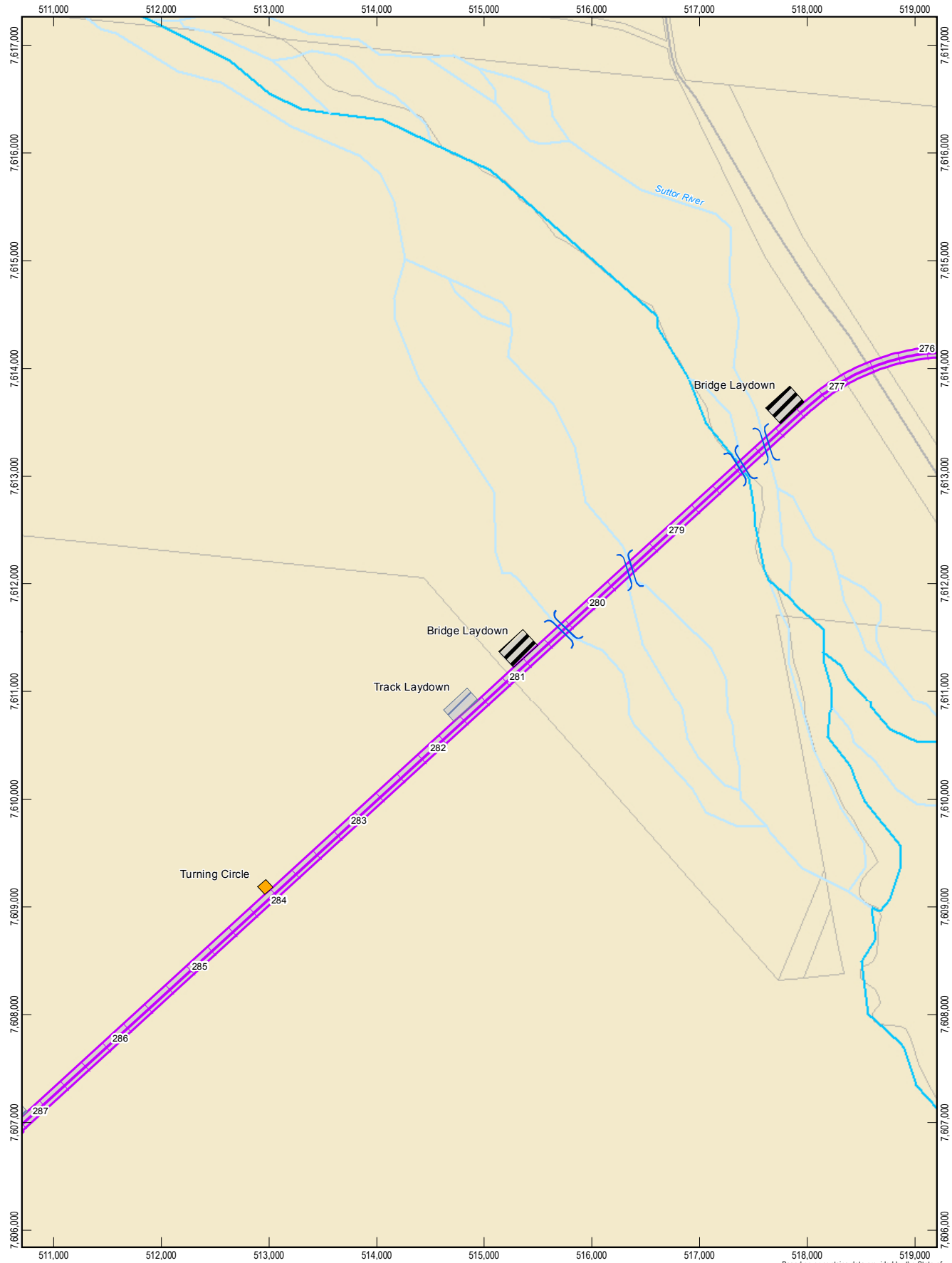

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Adani Mining Pty Ltd

North Galilee Basin Rail Project AEIS

Job Number	41-26457
Revision	B
Date	28 Feb 2014

NGBR Project final rail corridor comparison

Figure 3-1
Sheet 27 of 30

G:\41\26457\06 GIS\Maps\MXD\0001_Overview\41_26457_0025_rev_b.mxd

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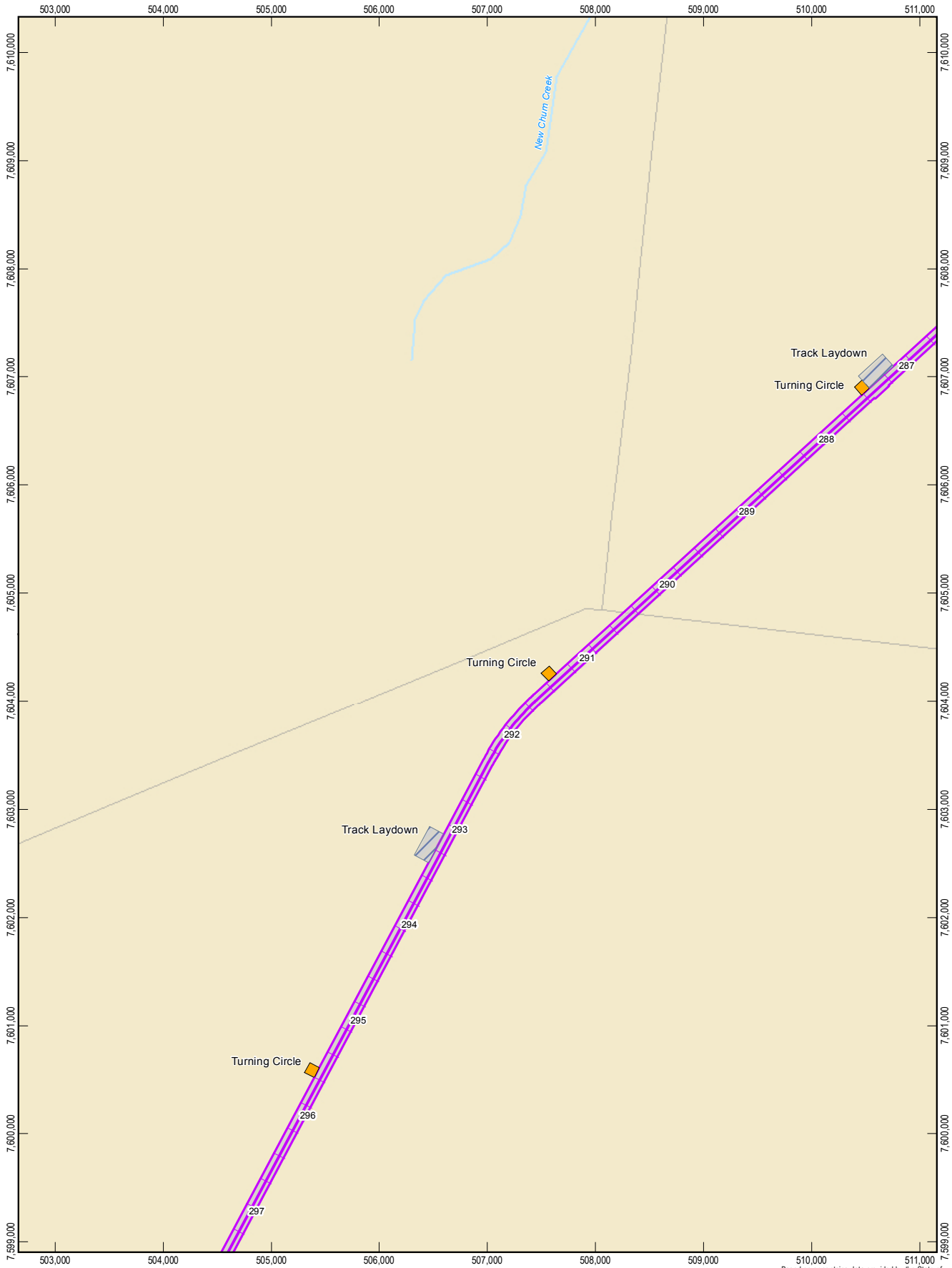

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Sheet 28 of 30

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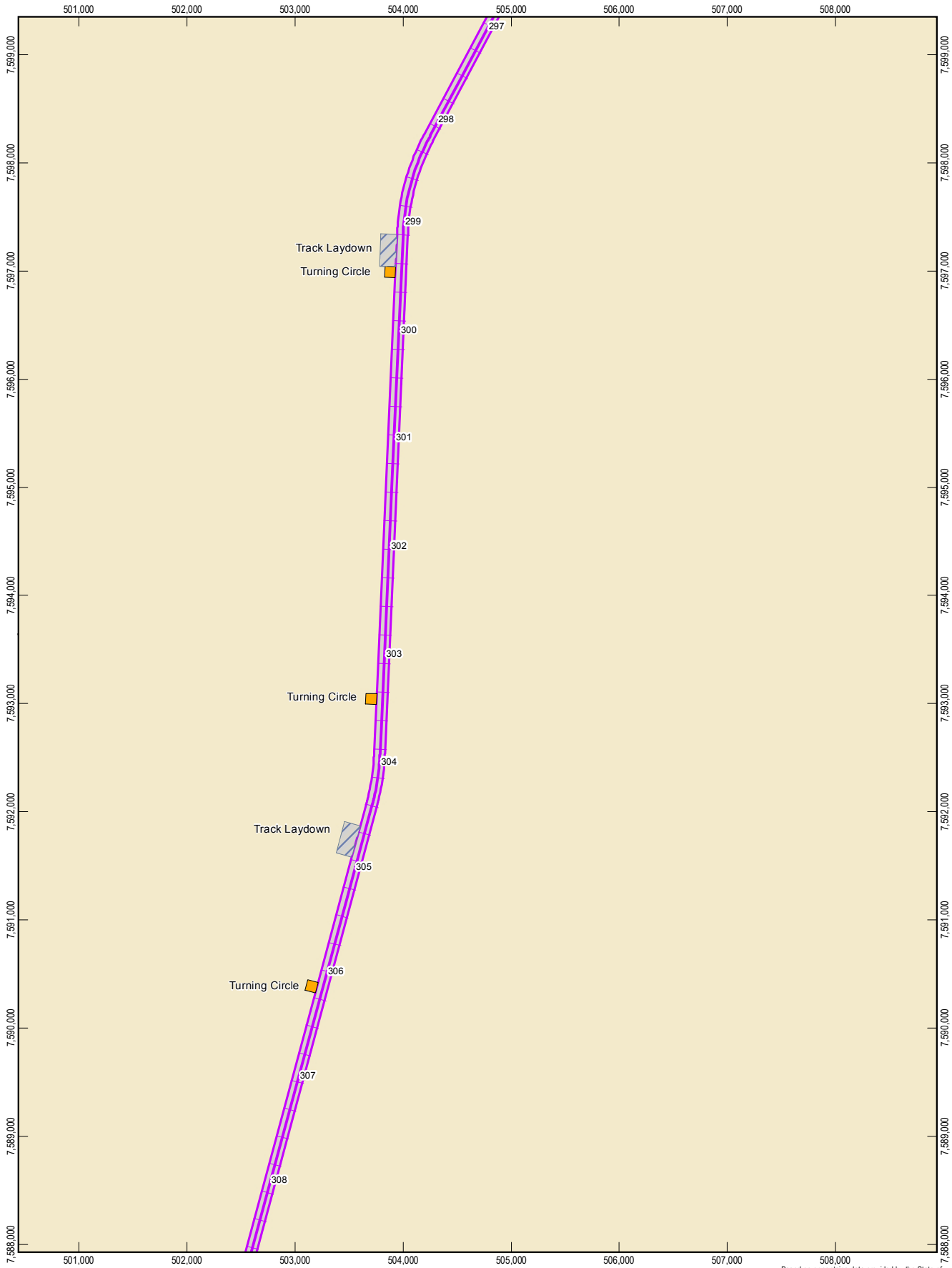

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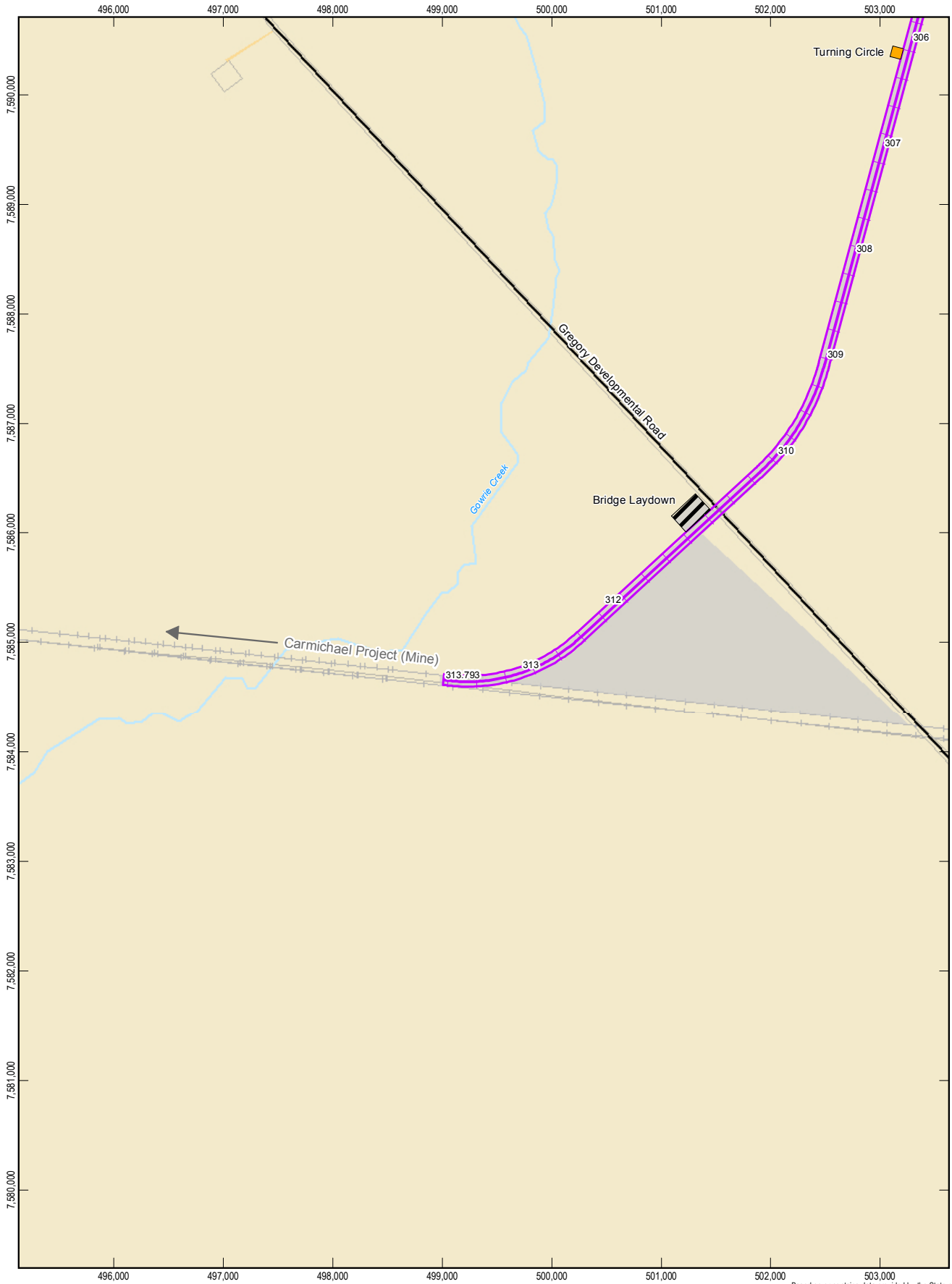

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4. Land use and tenure

4.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The following matters associated with land use and tenure may be affected:

- Properties crossed
- Occupational crossings
- Mineral and resource tenure.

The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential impacts of the NGBR Project realignment on land use and tenure, including the above matters.

4.1.1 Properties crossed

A number of additional properties are crossed due to changes to the NGBR Project (refer Section 3.4.2). The majority of the additional properties are due to the NGBR Project realignment (refer Volume 2 Appendix C NGBR Project realignment report). Additional properties are crossed due to other minor realignments.

Potential impacts to properties as a result of the NGBR Project realignment are not considered to be significant, given its alignment adjacent to the existing Newlands line and Northern Missing Link. Implementation of mitigation and management measures identified in the NGBR Project EIS is expected to result in minimal residual impacts to land use and tenure (refer Volume 2 Appendix C NGBR Project realignment report).

Potential impacts due to other minor realignments are also expected to be minor. With regard to the properties identified in Section 3.4.2: Lot 10 on SP253665 will be impacted over 1.1 ha during construction for establishment of bridge laydown areas and impacted over 10.7 ha for operation of the NGBR Project final rail corridor; Lot 11 on SP253665 will be impacted over 8 ha during construction for establishment of bridge laydown areas and impacted over 0.1 ha for operation of the NGBR Project final rail corridor; Lot 5086 on SM100 will be impacted over 14 ha during construction for establishment of concrete batch plant and a construction camp.

Lot 10 on SP253665 is an amalgamation of parts of three lots previously identified in the NGBR Project EIS (Lot 1 on RP748508, Lot 1 on RP748509 and Lot 3 on RP748510). The owner of this property was therefore previously consulted for the NGBR Project EIS, regarding impacts on the NGBR Project. Lot 11 on SP253665 is held by the same stakeholder. The landholder of Lot 5086 on SM100 was not previously identified for the NGBR Project EIS.

As committed in the NGBR Project EIS, Adani will consult with affected landholders regarding potential loss of land during construction and operation. The landholder of Lot 5086 on SM100 has been notified and will be included in ongoing consultation. Adani will also adhere to its land acquisition protocol (refer NGBR Project EIS Volume 2 Appendix R), whereby voluntary land access agreements or acquisition will be sought through negotiation with affected landholders.

Where voluntary acquisition is not successful, Adani may pursue compulsory acquisition via establishment of a state development area. It is noted that a state development area has been proposed as part of the Galilee Basin Development Strategy (State of Queensland 2013b), the bounds of which encompass the NGBR Project in its entirety.

4.1.2 Occupational crossings

A number of additional occupational crossings are proposed due to changes to the NGBR Project (refer Table 3-2). These additional crossings are due to the NGBR Project realignment (refer Volume 2 Appendix C NGBR Project realignment report). No additional crossings have been identified due to other minor changes to the NGBR Project at this time.

As committed in the NGBR Project EIS, any modifications to existing access tracks or occupational crossings will be undertaken in consultation with affected landholders.

4.1.3 Mineral and resource tenure

Mineral and resource tenures crossed by the NGBR Project realignment are assessed in Volume 2 Appendix C NGBR Project realignment report. It is not considered that other changes to the NGBR Project are of sufficient scale to have any potential for sterilisation or other bearing on the assessment of mineral and resource tenure undertaken for the NGBR Project EIS (refer NGBR Project EIS Volume 1 Chapter 3 Land use and tenure).

4.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Economic and social benefits – State royalties and community impacts
- Energy connection requirements – ancillary infrastructure
- Existing and proposed infrastructure – Potential impacts to high voltage transmission lines
- Good quality agricultural land – loss of cropping land resources and derived income
- Grazing industry – financial losses and impacts to grazing land
- Operation of grazing businesses – logistics of moving stock and maintaining property infrastructure
- Property acquisition – social impacts of compulsory acquisition
- Restricted areas – Potential impacts to Restricted Area 8
- Stock routes – Potential impacts of the NGBR Project at crossing locations; effectiveness of stock holding yards and potential impacts of coal dust
- Tenure – mining and petroleum tenure crossed by the NGBR Project.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

4.3 Response to comments

4.3.1 Economic and social benefits

The NGBR Project has undergone social impact assessment to assess impacts on the community (refer NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts).

With regard to royalties, it is considered by Adani that the opening up of the vast Galilee Basin coal reserves to mining (via the NGBR Project) is likely to be more economically significant than

the potential royalties that may be generated via the limited purported (and as yet undefined) mineral resources within the Evolution Mining tenements.

4.3.2 Energy connection requirements

Adani will continue to consult and liaise with relevant energy infrastructure owners – including Ergon Energy – during the design phase of the NGBR Project to ensure the securing of operational power requirements.

4.3.3 Existing and proposed infrastructure

Refinement of proposed treatments in the vicinity of high voltage power lines will be undertaken during detailed design of the NGBR Project, and in consultation with infrastructure holders, including Powerlink and Ergon Energy. Infrastructure agreements will also be developed with relevant existing infrastructure holders prior to commencement of construction.

4.3.4 Good Quality Agricultural Land

Opinions relating to good quality agricultural land have been noted. It is not considered accurate to suggest that impacts associated with the NGBR Project are too great on any one property. Valuation and compensation arrangements will continue to be developed in direct consultation with affected landholders.

It is also noted that should the Galilee Basin State Development Area be declared in accordance with the Galilee Basin Development Strategy (State of Queensland 2013b), the number of possible separate individual rail lines will be decreased accordingly with the objectives of the strategy and any associated planning scheme.

4.3.5 Grazing industry

NGBR Project EIS Volume 1 Chapter 3 Land use and tenure includes an assessment of potential impacts associated land use change, including impacts to good quality agricultural land. Whilst it is acknowledged that some impact to agricultural operations may result, the NGBR Project is in accordance with the Galilee Basin Development Strategy (State of Queensland 2013b). Valuation and compensation arrangements will continue to be developed in direct consultation with affected landholders.

4.3.6 Operation of grazing businesses

Flood modelling has been undertaken for the NGBR Project and is documented in NGBR Project EIS Volume 2 Appendix H2 Hydrology and hydraulics. All crossing structures for the NGBR Project, including the NGBR Project realignment, will be required to meet the relevant design criteria (refer Volume 2 Appendix B Revised project description). Flood modelling and analysis will continue during detailed design to further refine hydrological estimates and design of structures.

Adani is in ongoing consultation with affected landholders to establish specific details in regard to property impacts, including operational impacts. Any impacts to specific landholder infrastructure will be separately negotiated with the relevant parties.

4.3.7 Property acquisition

NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts describes impacts to landholder affected by the project. This includes impacts associated with acquisition of land.

4.3.8 Restricted areas

Adani will consult with the Department of Energy and Water Supply and the Department of Natural Resources and Mines in regard to development over Restricted Area 8.

4.3.9 Stock routes

Adani is committed to maintaining the continuity of all designated stock routes crossed by the NGBR Project. Consultation with the Department of Natural Resources and Mines; the Department of Agricultural, Fisheries and Forestry; local government and landholders will continue regarding existing stock routes to be traversed by the NGBR Project and appropriate crossing treatments.

It is not considered that the NGBR Project will have a significant adverse effect on the potential function of stock routes as environmental corridors. Adani is aware of the 'no let loss' and continued connectivity policy for the stock route network upheld by the Department of Natural Resources and Mines. Ongoing consultation with the Department of Natural Resources and Mines will be undertaken to determine the appropriate crossing treatments in light of this policy.

The provision of stock yards will also be considered through ongoing consultation with the relevant stakeholders. Stock yards will include a telephone landline with direct access to the controller. All landholders will have an agreement in place outlining the procedure for crossing and minimising the time for cattle being yarded.

It is noted that NGBR Project EIS Volume 1 Chapter 3 Land use and tenure refers a the crossing at chainage 117.11 km as a gazetted stock route. As indicated in Table 3-7 of that report and NGBR Project EIS Volume 1 Chapter 2 Project description, this crossing is in fact an unconstructed local road reserve. Volume 2 Appendix B Revised project description correctly identifies the crossing as an unconstructed road reserve. Due to minor realignments of the NGBR Project, the chainage of this crossing is now 116.6 km.

4.3.10 Tenure

Adani will continue to consult with affected tenement holders and the Department of Natural Resources and Mines in regard to how and when consent is required (if any) to be obtained.

In a meeting on 15 October 2013 between Adani, Evolution Mining Ltd, the Department of Natural Resources and Mines and the Department of State Development, Infrastructure and Planning it was discussed that NGBR Project will maintain the current alignment until further information is provided by Evolution Mining. It was noted that though the State Government is equally concerned about resource sterilisation, the Evolution tenements are still at exploration stage and Evolution Mining will need to develop timelines of its proposed Mining development over EPM 11147 and demonstrate resource definition prior to any change in the NGBR Project. It was also discussed that should Evolution Mining be concerned with sharing confidential data with Adani, it can instead share commercial-in-confidence data with the Department of Natural Resources and Mines and the Department of State Development, Infrastructure and Planning who can inform Adani at a high level of the outcomes whilst maintaining the commercially sensitive data in confidence.

Adani has discussed with QCoal and received written confirmation from QCoal on 3 February 2014 that the proposed NGBR Project realignment is acceptable. The same realignment plan has been provided in the submission which affirms common understanding on the NGBR Project realignment. Adani and QCoal agreed to the realignment of NGBR to minimise the impact on coal sterilisation of the Moranbah Coal Measures. A submission received on the

NGBR Project EIS from Glencore similarly identified a preference for the proposed NGBR Project realignment. Pursuant to grant of land access by Glencore, impact mitigation and compensation assessment shall be undertaken by Adani through a professional consultant.

Consultation between Adani and the Department of Natural Resources and Mines has been undertaken regarding potential impacts to tenure held by Barlyne Mining. In accordance with the outcomes of this consultation, Adani will continue to engage with Barlyne Mining with regard to potential impacts during detailed design of the NGBR Project.

5. Scenic amenity and lighting

5.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. An additional four sensitive receptors were identified, within approximately six kilometres of the NGBR Project realignment (refer Section 3.4.1). Distances to some of the nearest identified sensitive receptors have changed in comparison to the NGBR Project EIS (refer Table 3-3).

The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential impacts of the NGBR Project realignment on scenic amenity and lighting, including the additional receptors.

Distances to nearest identified sensitive receptors have not changed significantly due to other minor realignments (refer Table 3-3). The majority of changes have provided greater separation distance between the NGBR Project and nearest identified sensitive receptors. Those receptors with increased potential for impacts, excluding those affected by the NGBR Project realignment, are Homestead 8 (51 m closer), Homestead 9 (202 m closer), Homestead 11 (117 m closer) and Homestead 20 (322 m closer).

Minor impacts were predicted at Homestead 8 during construction, with no potential views expected during operation. Moderate impacts were predicted at Homestead 11, due to the elevation of the homestead with the presence of screening vegetation. Homestead 9 and Homestead 20 were not expected to have views of the NGBR Project during construction or operation to due their distance from the final rail corridor and the presence of screening vegetation. It is not anticipated that the identified minor realignments will have a significant impact on these sensitive receptors, beyond what was identified in NGBR Project EIS Volume 1 Chapter 4 Scenic amenity and lighting.

5.2 Summary of comments

No submissions were received that exclusively related to the assessment undertaken (refer NGBR Project EIS Volume 1 Chapter 4 Scenic amenity and lighting).

6. Topography, geology, soils and land contamination

6.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The following matters associated with topography, geology, soils and land contamination may be affected:

- Good quality agricultural land
- Strategic cropping land
- Contaminated land.

6.1.1 Good quality agricultural land

Changes to the NGBR Project may affect the total area of good quality agricultural land that is temporarily or permanently sterilised. The largest scale changes are due to the NGBR Project realignment. The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential impacts of the NGBR Project realignment on topography, geology, soils and land contamination, including good quality agricultural land.

Impacts due to other minor realignments are not considered to significantly alter the scale of impact described in NGBR Project EIS Volume 1 Chapter 5 Topography, geology, soils and land contamination.

The area of good quality agricultural land to be directly impacted by the NGBR Project totals 1,174 ha. Of this, 979 ha will be impacted by the final rail corridor while the remaining 195 ha will be impacted by temporary construction infrastructure – i.e. bridge and track laydown areas, concrete batch plant, turning circles and a construction camp.

6.1.2 Strategic cropping land

Changes to the NGBR Project may affect the total area of strategic cropping land that is temporarily or permanently sterilised. The largest scale changes are due to the NGBR Project realignment. The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential impacts of the NGBR Project realignment on topography, geology, soils and land contamination, including strategic cropping land.

Impacts due to other minor realignments are not considered to significantly alter the nature or scale of impact described in NGBR Project EIS Volume 1 Chapter 5 Topography, geology, soils and land contamination.

6.1.3 Contaminated land

A number of additional properties are crossed due to changes to the NGBR Project (refer Section 3.4.2). The majority of the additional properties are crossed by the NGBR Project realignment. Searches of the environmental management register (EMR) and contaminated land register (CLR) have been undertaken as part of Volume 2 Appendix C NGBR Project realignment report. Neither of the two additional properties affected by minor realignments (refer

Section 3.4.2) are listed on the EMR or CLR. Potential for encountering contaminated land on these properties is further minimised due to the relatively small area of proposed disturbance.

As committed in NGBR Project EIS Volume 1 Chapter 5 Topography, geology, soils and land contamination - a preliminary site investigation will be undertaken within the NGBR Project footprint, followed by a ground-truthing exercise at any sites that present a contamination risk.

6.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Acid sulfate soils – lack of surveys in coastal areas
- Erosion – impact of increased levels of erosion due to vegetation clearing
- Strategic cropping land – revised legislation and appropriate approvals.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

6.3 Response to comments

6.3.1 Acid sulfate soils

As committed to in NGBR Project EIS Volume 1 Chapter 5 Topography, geology, soils and land contamination, surveys of potential acid sulfate soils will be undertaken prior to construction of the NGBR Project. An acid sulfate soil management plan will be developed, if necessary, to manage and mitigate any potential impacts regarding acid sulfate soils. Investigations and management of acid sulfate soils will accord with the State Planning Policy and the latest version of the Queensland Acid Sulfate Soil Technical Manual: Soil Management Guidelines. This approach is consistent with the TOR for the NGBR Project, and is acceptable to the Department of Environment and Heritage Protection.

6.3.2 Erosion

As committed in NGBR Project EIS Volume 1 Chapter 5 Topography, geology, soils and land contamination, an Erosion and Sediment Control Plan will be developed. The plan will be made in accordance with following guidelines:

- Best Practice Erosion and Sediment Control. International Erosion Control Association (Australasia) (IECA 2008)
- Urban Stormwater Quality Planning Guidelines 2010 (DEHP 2010)

It is considered that the Erosion and Sediment Control Plan will adequately manage and mitigate any potential erosion and sedimentation related impacts.

6.3.3 Strategic cropping land

Proposed changes to the regulatory framework for development over strategic cropping land have been noted and will be considered in any future approval application. Updated approvals material is provided as Volume 2 Appendix J Revised legislation and approvals, which supersedes NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals.

7. Nature conservation

7.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The following values associated with nature conservation have the potential to be impacted:

- Endangered and of concern regional ecosystems (REs)
- Threshold REs
- Threatened ecological communities
- Potential habitat for listed species
- Watercourse vegetation
- Wetland protection areas and wetland REs.

A comparison of potential impacts to these values in the NGBR Project EIS and the NGBR Project AEIS is provided in Table 7-1. The following additional values were identified due to the NGBR Project realignment, other minor realignments and associated changes:

- Potential habitat for listed species
  - Bluegrass (*Dichanthium setosum*)
  - King bluegrass (*Dichanthium queenslandicum*)
- Endangered and of concern regional ecosystems
  - RE 11.9.5
  - RE 11.8.11
  - RE 11.8.13
  - RE 11.8.3.

The majority of changes to potential impacts to the identified values are due to the NGBR Project realignment. The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential impacts of the NGBR Project realignment on nature conservation, including the above matters.

It is considered that the scale of impact to values assessed in the NGBR Project EIS has not changed significantly. Furthermore, the impacts of the NGBR Project realignment to species not previously assessed in the NGBR Project EIS are not considered regionally significant.

As committed in NGBR Project EIS, any unavoidable residual impacts to the above values will be offset. An updated offset strategy is provided as Volume 2 Appendix E Revised offsets, which supersedes NGBR Project EIS Volume 2 Appendix O Offsets.

Table 7-1 Summary of potential impacts

Value	Species/community	Mapped potential impact area (ha)	
		NGBR Project EIS	**NGBR Project AEIS**
Threatened ecological communities	Brigalow (*Acacia harpophylla*) dominant and co-dominant	100.3	195.2
	Natural grasslands of the Queensland central highlands and the northern Fitzroy Basin	117.1	133.2
	Semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar regions	35.8	55.7
Threatened species listed under the EPBC Act	*Eucalyptus raveretiana*	64.6	175.4
	Bluegrass (*Dichanthium setosum*)	0.0	354.2
	King bluegrass (*Dichanthium queenslandicum*)	0.0	263.3
	Australian painted snipe	45.6	45.6
	Black-throated finch (southern)	2,143.4	1,836.2
	Koala	2,390.1	2,047.6
	Ornamental snake	246.6	421.6
	Squatter pigeon (southern)	1,788.1	1,361.8
Endangered and of concern regional ecosystems	RE 11.12.10	2.8	3.2
	RE 11.12.14	1.2	1.0
	RE 11.12.15	1.7	1.0

Value	Species/community	Mapped potential impact area (ha)	
		NGBR Project EIS	**NGBR Project AEIS**
	RE 11.12.16	1.7	1.0
	RE 11.12.18	0.4	0.3
	RE 11.12.21	13.0	13.2
	RE 11.11.13	4.6	4.6
	RE 11.11.18	2.0	2.0
	RE 11.9.1	0.1	7.5
	RE 11.9.10	25.5	34.0
	RE 11.9.12	42.9	42.3
	RE 11.9.5	0.0	1.0
	RE 11.8.11	0.0	0.8
	RE 11.8.13	0.0	7.5
	RE 11.8.3	0.0	4.2
	RE 11.4.2	1.8	1.8
	RE 11.4.5	0.4	0.4
	RE 11.4.6	0.1	0.1
	RE 11.4.8	20.6	20.6
	RE 11.4.9	48.4	54.7
	RE 11.4.11	8.2	8.2
	RE 11.3.1	18.2	21.9

Value	Species/community	Mapped potential impact area (ha)	
		NGBR Project EIS	**NGBR Project AEIS**
	RE 11.3.2	65.3	28.5
	RE 11.3.3	17.7	17.7
	RE 11.3.4	33.2	36.1
	RE 11.3.33	9.9	5.6
	RE 11.3.34	1.7	1.7
	RE 11.2.3	33.8	22.0
Threshold regional ecosystems	RE 11.4.11	8.2	8.2
	RE 11.3.5	30.5	28.9
Endangered and of concern high value regrowth	RE 11.12.21	2.3	13.2
	RE 11.4.8	1.8	20.6
	RE 11.4.9	5.1	54.7
	RE 11.12.14	0.7	1.0
	RE 11.12.15	1.0	1.4
	RE 11.12.18	0.2	0.3
	RE 11.2.3	0.5	22.0
	RE 11.3.4	0.9	36.1
	RE 11.4.5	0.8	0.4

Value	Species/community	Mapped potential impact area (ha)	
		NGBR Project EIS	**NGBR Project AEIS**
Listed species under the NC Act	*Bonamia dietrichiana*	832.9	757.9
	Eucalyptus raveretiana	64.6	175.4
	Squatter pigeon (southern)	1,788.1	1,361.8
	Black-necked stork	417.7	451.1
	Cotton pygmy-goose	63.3	53.6
	Freckled duck	63.3	63.3
	Little pied bat	2,494.7	2,139.6
	Black-throated finch (southern)	2,143.4	1,836.2
	Australian painted snipe	45.6	45.6
	Little tern	45.6	45.6
	Black-chinned honeyeater	2,110.8	1,828.2
	Square-tailed kite	2,260.4	1,955.6
	Ornamental snake	246.6	421.6
	Estuarine crocodile	62.8	173.6
	Brigalow scaly-foot	1,861.9	1,704.0
	Common death adder	2,494.7	2,139.6
	Eastern curlew	45.6	45.6
	Koala	2,390.1	2,047.6

Value	Species/community	Mapped potential impact area (ha)	
		NGBR Project EIS	**NGBR Project AEIS**
	King bluegrass (*Dichanthium queenslandicum*)	0.0	263.3
Watercourse vegetation	Stream order 1	115.5	195.6
	Stream order 2	34.1	82.6
	Stream order 3	31.3	58.4
	Stream order 4	14.3	38.4
	Stream order 5	15.2	40.9
	Stream order 6	15.3	18.2
Wetlands	Wetland protection area	17.7	9.5
	Wetland protection area (trigger area)	133.6	26.0
	Wetland RE	240.8	278.0
Connectivity		3,591.5	2,159.0
Marine fish habitat	RE 11.1.2	11.8	11.8

7.2 Update to studies

The potential impacts of changes to the description of the NGBR Project are summarised in Section 7.1. The following studies have been prepared to assess these potential impacts:

- Volume 2 Appendix C NGBR Project realignment report
- Volume 2 Appendix D Revised matters of national environmental significance
- Volume 2 Appendix E Revised offsets.

7.2.1 Dry season survey

A dry season ecological survey was undertaken over the NGBR Project final rail corridor, as described in the NGBR Project EIS, subsequent to the production of the NGBR Project EIS. The purpose of this survey was to reinforce the findings of surveys undertaken for the NGBR Project EIS and provide additional data on seasonality. An update to survey effort presented in the NGBR Project EIS is presented in Table 7-2. The results of this survey are not presented in the NGBR Project EIS. The details, results and implications of the dry season survey are therefore discussed here.

Table 7-2 Survey effort

Survey type	Number of sites		Total
	Post wet season[1]	**Dry season[2]**	
Quaternary sites (CORVEG)	350	105	455
Terrestrial fauna habitat assessment	50	53	103
Standardised Bird survey	47	88	135
Diurnal active search	34	88	122
Nocturnal survey	26	20	46
Nocturnal anabat sites	13	24	37
Nocturnal call playback	6	6	12
Bird surveys on eastern fringe of Caley Valley Wetland	3	1	4

1 Reflected in NGBR Project EIS

2 Survey effort undertaken subsequent to NGBR Project EIS

Across the NGBR Project EIS and subsequent surveys, targeted bird surveys were undertaken at 120 locations within mapped potential habitat for black-throated finch (19 post wet season; 101 dry season); Slow traverses were undertaken at 135 sites to identify squatter pigeon (47 post wet season; 88 dry season); Targeted searches for Ornamental snake were undertaken at 41 diurnal sites (20 post wet season; 21 dry season) and over 12 nights for nocturnal searches (6 post wet season; 6 dry season); Targeted searches for Brigalow scaly-

foot were undertaken at 31 diurnal sites (25 post wet season; 6 dry season) and over 12 nights for nocturnal searches (6 post wet season; 6 dry season); Targeted searches for striped-tailed delma were undertaken at four diurnal sites (1 post wet season; 3 dry season); and targeted koala habitat assessments and faecal pellet surveys were undertaken at 18 sites (10 post wet season; 8 dry season).

The dry season survey was undertaken over a 10 day period, between 1 and 10 October 2013. Weather experienced during the survey was typical of spring conditions for the region.

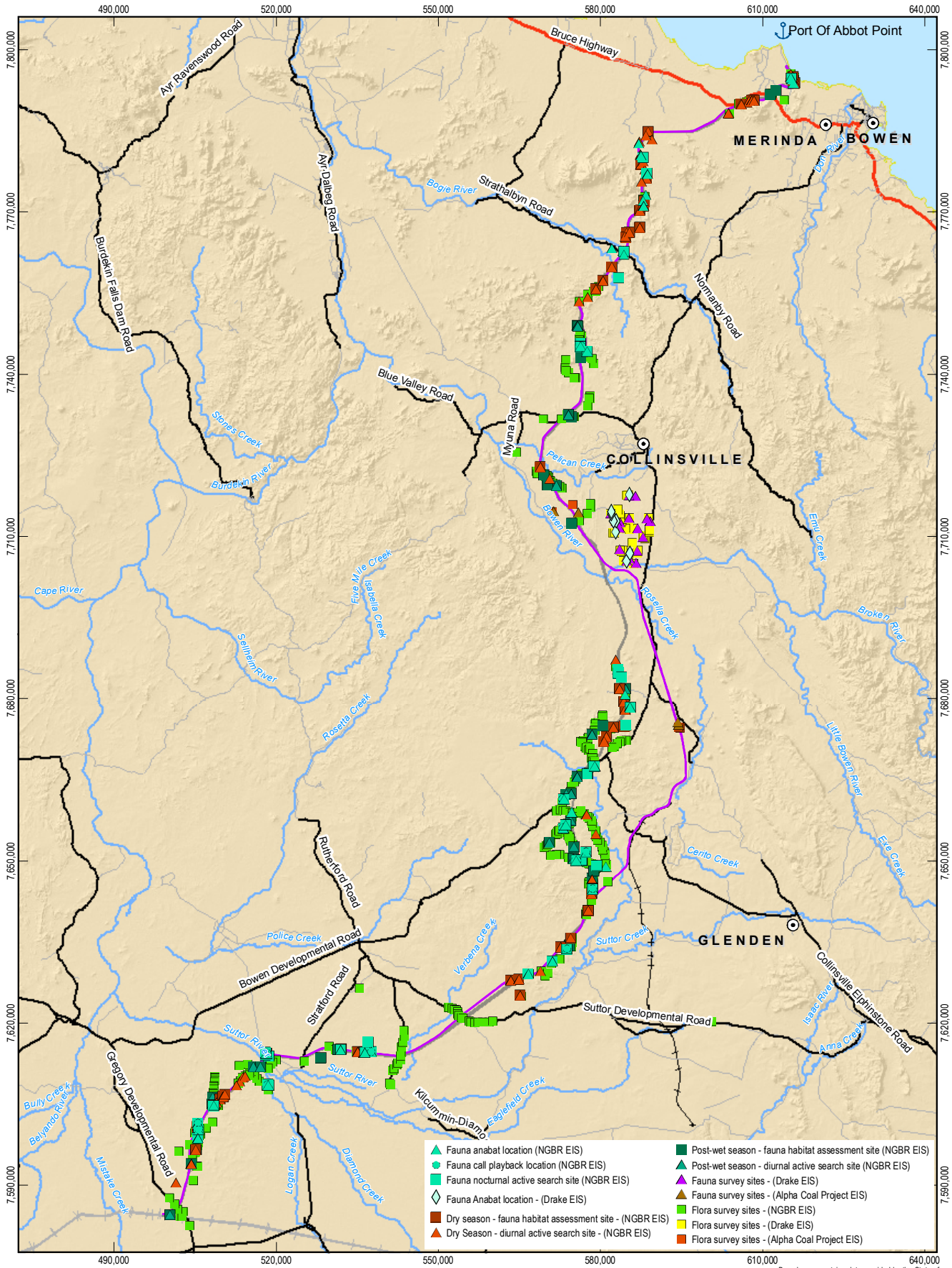
An additional 75 terrestrial flora species, eight aquatic flora species, 3 amphibian species, 11 reptile species, 1 mammal species and 18 bird species were identified during the dry season surveys. A total of seven conservation significant species were confirmed present:

- Squatter pigeon (*Geophaps scripta scripta*)
- Koala (*Phascolarctos cinereus*)
- Cotton pygmy-goose (*Nettapus coromandelianus albipennis*)
- Black-necked stork (*Ephippiorhynchus asiaticus*)
- Radjah shelduck (*Tadorna radjah*)
- Little pied bat (*Chalinolobus picatus*)
- Black ironbox (*Eucalyptus raveretiana*).

The findings of the dry season survey are not considered to significantly affect the findings of the NGBR Project EIS. Squatter pigeon, cotton pygmy-goose, black-necked stork, little pied bat and black ironbox had been confirmed present during post wet seasons surveys for the NGBR Project EIS. Radjah shelduck was known to occur based on previous records. Koala were considered likely to occur, and potential impacts to this species and potential habitat were discussed. As such, it is considered that the potential impacts to the species identified during the dry season survey are adequately discussed in the NGBR Project EIS.

This additional field effort is also reflected in Volume 2 Appendix D Revised matters of national environmental significance and Volume 2 Appendix E Revised offsets, and where relevant in Volume 2 Appendix C NGBR Project realignment report.

Figure 7-1 plots survey effort for the post-wet season survey as described in the NGBR Project EIS, the dry season survey described here, and relevant survey effort for the Alpha Coal Project EIS and Drake Coal Project EIS utilised in Volume 2 Appendix C NGBR Project realignment report.



LEGEND

- Population centres
- Major Port
- Highway
- Main Road
- Local Road
- Carmichael Project (Rail)
- Railway
- Watercourse (Major)
- NGBR Project final rail corridor
- NGBR Project final rail corridor (EIS)

Based on or contains data provided by the State of QLD (DNRM) [2014]. In consideration of the State permitting use of this data you acknowledge and agree that the State gives no warranty in relation to the data (including accuracy, reliability, completeness, currency or suitability) and accepts no liability (including without limitation, liability in negligence) for any loss, damage or costs (including consequential damage) relating to any use of the data. Data must not be used for marketing or be used in breach of the privacy laws.

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Kilometres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Adani Mining Pty Ltd
North Galilee Basin Rail Project AEIS

Job Number	41-26457
Revision	A
Date	27 Feb 2014

Survey effort

Figure 7-1

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145 Ann Street Brisbane QLD 4000 Australia T 61 7 3316 3000 F 61 7 3316 3333 E bnemail@ghd.com W www.ghd.com

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Data source: GA: Populated Places, Railway, Watercourse(2007); Adani: AEIS Option 9 Rev1 final rail corridor (2014), Carmichael Project (Rail) 18/06/2013; DNRM: Roads/2010; GHD: Survey effort (2013); Alpha Coal EIS: Survey effort (digitised for realignment) (2010); Drake EIS: Survey effort (Digitised for realignment) (2011). Created by:MS

7.3 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Approvals – Assessment of clearing against the Sustainable Planning Act 2009 and the Vegetation Management Act 1999
- Biodiversity values – Description of impacts to biodiversity generally, as opposed to values of conservation significance
- Caley Valley Wetlands – Consideration of the biodiversity and significance of Caley Valley wetland and potential impacts of the NGBR Project; Consideration of the Great Barrier Reef Strategic Assessment Coastal Zone
- Connectivity and fauna movement – Consideration of impacts to connectivity and identification and mitigation and management measures to preserve connectivity, fencing of the NGBR Project final rail corridor
- Ecological surveys – Adequacy of survey effort and establishment of seasonality; Identification and assessment of sensitive environmental areas
- Environmental Management Plan – Adequacy of management of water quality, staging of construction activities and fauna management on site
- Estuarine crocodiles – Likelihood of occurrence and potential hydrologic impacts
- Great Barrier Reef – Potential impacts to Great Barrier Reef and consideration of Great Barrier Reef Strategic Assessment (coastal zone)
- Monitoring – Inclusion of objective and auditable monitoring commitments
- Offsets – Identification and calculation of offsets for yakka skink, Brigalow communities and watercourse values; completion of ecological equivalence assessments
- Species impacts – Consideration and calculation of direct impact to ornamental snake, Australian painted snipe, black-throated finch and little pied bat
- Sustainable grazing program – Consideration of impacts to sites utilised by Agri-Science Queensland for monitoring of long-term vegetation change
- Weed and pest management – Management of impact of weeds on agriculture.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

7.4 Response to comments

7.4.1 Approvals

As stated in NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals, it is acknowledged that further information (in the form of detailed site layout designs and final site-based management material) to support future approvals will be provided prior to formal lodgement of applications with the relevant administering authorities. These may include assessment against the provisions of the *Sustainable Planning Act 2009* and the *Vegetation Management Act 1999*, including preparation of a property map of assessable vegetation. Updated approvals material is provided as Volume 2 Appendix J Revised legislation and

approvals, which supersedes NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals.

7.4.2 Biodiversity values

Cumulative impacts on biodiversity values have been considered in the manner required by the TOR for the NGBR Project. An update to the cumulative impact assessment is provided in Section 19.

7.4.3 Caley Valley Wetlands

The environmental impact assessment of the Caley Valley wetland in regard to the NGBR Project is based on environmental values relevant to current legislative requirements and the requirements of the TOR for the NGBR Project.

The NGBR Project will access the rail loop approved as part of the Abbot Point Coal Terminal 0 Project (EPBC 2011/6194). This rail loop does not form part of the NGBR Project and is not proposed to enter Caley Valley Wetland.

7.4.4 Connectivity

Impacts relating to fragmentation at localised and regional scales have been justified within sections 6.4 and 7.8 of NGBR Project EIS Volume 1 Chapter 6 Nature conservation. Areas of importance with relation to modelled potential habitat for threatened species and known wildlife corridors have also been highlighted as being more susceptible to fragmentation.

Species specific design measures will be researched for effectiveness from similar projects within the region and in consultation with species specialists. These design measures will be incorporated into the detailed design of the NGBR Project and species management plans. Proposed measures will be located in suitable habitat areas based on outcomes of targeted population surveys for each species confirmed present or considered likely to occur. Targeted population surveys are also proposed as a management outcome from the abovementioned sections of the NGBR Project EIS, which are to be undertaken to inform the detailed design of the NGBR Project.

A Fauna Crossing Strategy will be developed in consultation with, and for the approval of, the Department of Environment and Heritage Protection to mitigate potential impacts on fauna communities utilising habitat traversed by the NGBR Project. The Fauna Crossing Strategy will include fauna-friendly design principles for the design of culverts, bridges and other watercourse structures, particularly in important habitat areas of mapped remnant vegetation and habitat potentially suitable for threatened species. The Fauna Crossing Strategy will set design criteria for fauna-friendly features, including:

- Culverts with ledges that facilitate fauna movement
- Using grids that allow natural lighting
- Protecting and enhancing entries and exits
- Standard, four strand barbed wire fencing, with a plain top wire in sensitive areas.

As noted, fencing can impose negative impacts on wildlife, such as feeding, migration and breeding inhibition, especially where fauna passage is a priority. To provide a balance between the safety requirements of excluding cattle from the alignment and protection of native fauna, a plain top wire will be utilised in sensitive areas – with barbed wire elsewhere.

A comprehensive survey of ecological values will be undertaken confirm, among other values, the extent and condition of regional biodiversity corridors within the final rail corridor (refer Section 7.4.5). The comprehensive survey will therefore assist in the development of appropriate avoidance, mitigation and management measures related to connectivity – including the Fauna Crossing Strategy.

7.4.5 Ecological surveys

The approach to conduct limited survey effort in favour of ecosystem and habitat mapping has been accepted by the Department of Environment and Heritage Protection as an appropriate approach for linear projects. Additional terrestrial and aquatic ecology field surveys were undertaken in October 2013, which provide information regarding seasonality (refer Section 7.2).

A comprehensive survey of the ecological values of the final rail corridor will be undertaken to:

- Confirm state significant biodiversity values under the relevant offset policies
- Confirm the extent of matters of national environmental significance, including threatened ecological communities and potential habitat for species listed under the *Environment Protection and Biodiversity Conservation Act 1999*
- Confirm the extent and condition of regional biodiversity corridors within the final rail corridor
- Confirm the extent of watercourse vegetation
- Complete biocondition assessment of confirmed state significant biodiversity values or matters of national environmental significance
- Determine likely extent of potential groundwater dependent ecosystems.

The findings of the comprehensive survey of ecological values will be provided to the Department of Environment and Heritage Protection and the Department of the Environment

The comprehensive survey of ecological values will inform the development of the environmental management plan, the final offset package, fauna crossing strategy, subsequent vegetation clearing applications and associated property maps of assessable vegetation.

7.4.6 Environmental management plan

As stated in NGBR Project EIS Volume 2 Appendix P Environmental management plan framework, erosion and sediment control measures will be developed in consultation with the Department of Environment and Heritage Protection, to manage potential impacts to water quality. Comments addressing clearing and grubbing activities will be incorporated into the development of relevant management plans. Species management plans will be developed to control fauna management on site. An updated framework is provided in Volume 2 Appendix H Revised environmental management plan framework, which superseded NGBR Project EIS Volume 2 Appendix P Environmental management plan framework.

7.4.7 Estuarine crocodiles

The design of water crossing is aimed at minimising alteration to afflux and period of inundation for waterways. Maximum velocity and scour protection will also be considered in detailed design. Furthermore, any waterway barrier works applications will consider the provision of fauna passage. It is considered that this mitigation and management measure addresses potential impacts to aquatic fauna, including estuarine crocodiles.

7.4.8 Great Barrier Reef

Adani was not involved in the Great Barrier Reef Strategic Assessment, including the coastal zone component. The assessment of potential environmental impact to the Caley Valley wetland relied upon published information available at the time of writing of the NGBR Project EIS. This included documents which informed the Cumulative Impact Assessment of Abbot Point.

Additionally, matters of national environmental significance relevant to the NGBR Project in the vicinity of the Caley Valley Wetland are considered to be adequately described in NGBR Project EIS Volume 1 Chapter 7 Matters of national environmental significance, in accordance with the Commonwealth Government's final EIS Guidelines for the NGBR Project.

Reference to the *Great Barrier Reef Marine Park Act 1975* will be included in future development applications where relevant.

7.4.9 Monitoring

Comments regarding the inclusion of objective and auditable commitments within the proposed monitoring programs have been noted and will be considered in the further development of the environmental management plan for the NGBR Project.

7.4.10 Offsets

NGBR Project EIS Volume 1 Chapter 7 identifies 'indicative' quality scores for offsets and commits that further equivalence assessment will be undertaken by Adani to inform the finalisation of the offsets strategy for the NGBR Project (refer Volume 2 Appendix E Revised offsets)

Additionally, the extent of potential habitat for listed species likely to be impacted by the NGBR Project has been recalculated to reflect changes to the description of the NGBR Project that have occurred subsequently to public consultation on the NGBR Project EIS.

The estimated area of impact to watercourses is based on the mapped extent of associated regional ecosystems within a specified buffer distance of a watercourse. The buffer distance employed in the preparation of the offsets strategy is as follows:

- Stream orders 1 and 2 – 50 m
- Stream orders 3 and 4 – 100 m
- Stream orders 5 and up – 200 m.

The calculation of offsets is based on the regional ecosystem mapping version 6.1, as applicable during the production of the NGBR Project EIS. To enable comparison with the NGBR Project EIS, this regional ecosystem layer has been utilised in the preparation of the AEIS, including Volume 2 Appendix E Revised offsets.

It is noted that substantial changes to the *Vegetation Management Act 1999* and associated mapping have been implemented subsequently to public consultation on the NGBR Project EIS. These changes will be incorporated into the finalised offsets package for the NGBR Project, in addition to any other amendments to legislation and policy current at that time. Updated approvals material is provided as Volume 2 Appendix J Revised legislation and approvals, which supersedes NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals.

7.4.11 Species impacts

Assessment of threatened fauna and flora species has been conducted based on determination of likelihood of occurrence, considering species presence (via observation) or through mapping of potential habitat.

Where relevant, assessment of likelihood of occurrence and potential impacts has been undertaken in accordance with the species specific guidelines under the *Environment Protection and Biodiversity Conservation 1999*, which draws on a number of published data sources as well as primary field data.

Offsets have been proposed for any unavoidable residual impacts to matters protected under Commonwealth and State offsets policy (refer Volume 2 Appendix E Revised offsets).

7.4.12 Sustainable grazing program

An assessment of the existing monitoring locations based on coordinate data for these sites supplied by the Department of Agriculture, Fisheries and Forestry suggests that the long term woodland monitoring and vegetation change sites indicated will not be directly impacted by the NGBR project. The nearest monitoring location is GA 30, which is in excess of one kilometre from the NGBR Project.

7.4.13 Weed and pest management

NGBR Project EIS Volume 1 Chapter 6 Nature conservation provides details in regard to existing weed threats and proposed management and mitigation measures. As committed in the NGBR Project EIS, a Weed and Pest Management Plan will be prepared for the NGBR Project. The Weed and Pest Management Plan will align with the priorities of Isaac Regional Council and Whitsunday Regional Council with regards to weed and pest species, and Adani's responsibilities under the *Plant Protection Act 1989*, the *Chemical Usage (Agricultural and Veterinary) Control Act 1988* and the *Agricultural Chemicals Distribution Controls Act 1966*. The preparation of this plan is considered sufficient to manage the potential environmental and property impacts of weeds and pest species facilitated by the NGBR Project.

8. Matters of national environmental significance

8.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The following matters of national environmental significance have the potential to be impacted:

- Threatened ecological communities
- Potential habitat for listed species.

A comparison of potential impacts to these values in the NGBR Project EIS and the NGBR Project AEIS is provided in Table 7-1.

The following additional matters of national environmental significance were identified due to the NGBR Project realignment, other minor realignments and associated changes:

- Potential habitat for listed species
  - Bluegrass (*Dichanthium setosum*)
  - King bluegrass (*Dichanthium queenslandicum*).

Mapped potential impact area has changed for a number of matters of national environmental significance previously assessed in the NGBR Project EIS. Mapped potential impact has increased for *Eucalyptus raveretiana* (additional 110.8 ha) and ornamental snake (additional 175 ha); whereas it has decreased for black-throated finch (less 310.2 ha), koala (less 342.5 ha) and squatter pigeon (less 426.3 ha). Mapped potential impact area has increased for threatened ecological communities - Brigalow (*Acacia harpophylla*) dominant and co-dominant (additional 94.9 ha), natural grasslands of the Queensland central highlands and the northern Fitzroy Basin (additional 16.1 ha) and semi-evergreen vine thickets of the Brigalow Belt (north and south) and Nandewar region (additional 91.5 ha).

It is considered that the scale of impact to matters of national environmental significance assessed in the NGBR Project EIS have not changed significantly from that described. Furthermore, the impacts of the NGBR Project realignment to species not previously assessed in the NGBR Project EIS are not considered regionally significant.

Volume 2 Appendix D Revised matters of national environmental significance is an updated assessment of the NGBR Project, including the NGBR Project realignment, other minor realignments and associated changes (refer Section 3), which supersedes NGBR Project EIS Volume 1 Chapter 7 Matters of national environmental significance.

The NGBR Project realignment has been assessed in isolation in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential impacts of the NGBR Project realignment on matters of national environmental significance.

As committed in NGBR Project EIS, any unavoidable residual impacts to matters of national environmental significance will be offset in accordance with the *Environment Protection and Biodiversity Conservation Act 1999* Environmental Offsets Policy (refer Volume 2 Appendix E Revised offsets, which supersedes NGBR Project EIS Volume 2 Appendix O Offsets).

8.2 Update to studies

The potential impacts of changes to the description of the NGBR Project are summarised in Section 8.1. The following studies have been prepared to assess these potential impacts:

- Volume 2 Appendix C NGBR Project realignment report
- Volume 2 Appendix D Revised matters of national environmental significance
- Volume 2 Appendix E Revised offsets.

8.3 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Dust impacts – Coal dust impacts to Great Barrier Reef
- Regional and cumulative impacts
- Ecological surveys – Compliance with survey guidelines.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

8.4 Response to comments

8.4.1 Dust impacts

The NGBR Project does not include any port stockpiles or mining activities. Volume 2 Appendix C NGBR Project realignment report and NGBR Project EIS Volume 1 Chapter 10 Air quality provide an assessment of coal dust impacts from loaded and unloaded trains on the NGBR Project. The assessments conclude that emissions will be within the relevant criteria at sensitive receptors, even before controls are implemented in accordance with the proposed Coal Dust Management Plan (consistent with the Aurizon Coal Dust Management Plan).

8.4.2 Regional and cumulative impacts

The NGBR Project is designed to cater for up to 100 Mtpa coal, including from third parties, to serve the Galilee Basin and avoid/minimise multiple rail corridors being established by different proponents. The NGBR Project is proposed in accordance with the Galilee Basin Coal Infrastructure Framework (State of Queensland 2013a), Galilee Basin Development Strategy (State of Queensland 2013b) and south to north rail corridor precinct boundaries of the proposed Galilee Basin State Development Area – all of which promote the minimisation of impacts to landholders at a regionals scale.

8.4.3 Ecological surveys

The approach to conduct of limited survey effort in favour of ecosystem and habitat mapping has been accepted by the Department of Environment and Heritage Protection as an appropriate approach for linear projects. Additional terrestrial and aquatic ecology field surveys were undertaken in October 2013 (refer Section 7.2).

A comprehensive survey of the ecological values of the final rail corridor will be undertaken to:

- Confirm state significant biodiversity values under the relevant offset policies

- Confirm the extent of matters of national environmental significance, including threatened ecological communities and potential habitat for species listed under the Environment Protection and Biodiversity Conservation Act 1999
- Confirm the extent and condition of regional biodiversity corridors within the final rail corridor
- Confirm the extent of watercourse vegetation
- Complete biocondition assessment of confirmed state significant biodiversity values or matters of national environmental significance
- Determine likely extent of potential groundwater dependent ecosystems.

The findings of the comprehensive survey of ecological values will be provided to the Department of Environment and Heritage Protection and the Department of the Environment

The comprehensive survey of ecological values will inform the development of the environmental management plan, the final offset package, fauna crossing strategy, subsequent vegetation clearing applications and associated property maps of assessable vegetation

The assessment of potential environmental impact to the Caley Valley wetland relied upon published information available at the time of writing of the NGBR Project EIS. This included documents which informed the Cumulative Impact Assessment of Abbot Point.

9. Coastal environment

9.1 Amendments to the Project description

A number of minor realignments and associated changes occur within the mapped coastal zone of the NGBR Project (refer Table 3-4). It is not considered that these changes have any bearing on the assessment undertaken for the NGBR Project EIS (refer NGBR Project EIS Volume 1 Chapter 8 Coastal environment).

9.2 Summary of comments

No submissions were received that exclusively related to the assessment undertaken (refer NGBR Project EIS Volume 1 Chapter 8 Coastal environment). Submissions related to coastal planning instruments are dealt with in Section 20.3.

10. Water resources

10.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The following matters associated with water resources may be affected:

- Waterway crossings
- Properties crossed.

10.1.1 Waterway crossings

A number of additional waterway crossings are required due to changes to the NGBR Project (refer Table 3-2). These additional crossings are due to the NGBR Project realignment (refer Volume 2 Appendix C NGBR Project realignment report). No additional crossings have been identified due to other minor changes to the NGBR Project at this time.

All crossing structures for the NGBR Project will be required to meet the relevant design criteria (refer Volume 2 Appendix B Revised project description). Flood modelling and analysis will continue during detailed design to further refine hydrological estimates and design of structures in accordance with the relevant design criteria.

10.1.2 Properties crossed

Property-scale flood mapping at major waterway crossings was prepared for the NGBR Project EIS to support consultation with affected landholders.

Additional major waterway crossings are required for the NGBR Project realignment (refer Section 10.1.1). Other minor realignments occur at the site of major waterway crossings identified in NGBR Project EIS Volume 2 Appendix H2 Hydrology and hydraulics, including:

- Bogie River, near chainage 60.9 km
- Sandy Creek, near chainage 64.5 km
- Murray Creek, near chainage 213 km
- Upper Gunn Creek, near chainage 228 km
- Gunn Creek, near chainage 238 km.

As the associated realignments are minor, the crossing treatment methods identified in the NGBR Project EIS are expected to apply. However, a number of these changes occur in proximity to a sensitive receptor, such as Homestead 8 near Bogie River and Sandy Creek or Homestead 20 near Gunn Creek.

Additional property-scale flood mapping at major waterway crossings will be prepared as necessary for the NGBR Project realignment and other minor realignments, subject to ongoing flood modelling and analysis during detailed design. Additional flood mapping will be used in consultation with affected landholders and inform the valuation and compensation process, where necessary.

10.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Approvals – Applicability of the Water Resource (Burdekin Basin) Plan 2007; Riverine protection permit, water permits and groundwater extraction permits
- Flooding – Rainfall events considered in flood modelling
- Water sampling
- Water supply.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

10.3 Response to comments

10.3.1 Approvals

Comments relating to water resources approvals have been noted. Adani will obtain all necessary development permits prior to commencement of any construction works and exemption requirements will be considered in the assessment of future development application requirements. Adani will consult with the Department of Natural Resources and Mines regarding any determination and proposed diversion of a watercourse. Any relevant development permits related to this matter will be sought prior to construction.

Updated approvals material is provided as Volume 2 Appendix J Revised legislation and approvals, which supersedes NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals.

10.3.2 Flooding

A number of submissions were received on the consideration of flood events. Flood modelling has been undertaken for the NGBR Project and is documented in NGBR Project EIS Volume 2 Appendix H2 Hydrology and hydraulics. All crossing structures for the NGBR Project, including the NGBR Project realignment, will be required to meet the relevant design criteria (refer Volume 2 Appendix B Revised project description).

Flood maps are produced for all of the major waterways and these are discussed with the relevant landholders prior to the treatments being fully adopted. Landholder consultation is an ongoing and iterative process, and as such Adani will continue to incorporate any substantiated landholder advice regarding flood phenomena in further flood modelling during development of the project design. Flood mapping will be used in consultation with affected landholders and inform the valuation and compensation process, where necessary.

10.3.3 Water sampling

NGBR Project EIS Volume 1 Chapter 9 Water resources reports on the field sampling undertaken by Adani along with other sampling undertaken in recent years by other parties. The TOR for the NGBR Project requires a description of environmental values of the water resources in the area. It does not specify the extent of primary sampling required. Utilisation of available published data is an accepted practice for reporting.

10.3.1 Water supply

A construction water supply strategy was included in NGBR Project EIS Volume 2 Appendix H3 Construction water supply strategy. Potentially suitable water sources will continue to be refined during detailed design.

An indicative demand curve for total water supply volumes throughout construction is provided in Volume 2 Appendix B Revised project description. The total demand indicated on that figure is 4.5 GL for the entire construction period. Constructability analysis and planning, including the calculation of final total water demand for construction, will form part of detailed design which is ongoing. Adani will provide the Department of Natural Resources and Mines with further indicative total construction water supply volumes prior to lodgement of future development applications.

Additionally, the water supply strategy is continuing to be refined as part of the design phase of the Project. Where Adani seeks to access existing water sources, the access arrangements will be negotiated with individual landholders or licensees of water sources. This will include negotiation of arrangements to minimise any impacts to nearby homesteads. Adani will also check the specific location of hydrant supply points for requirements of permits.

The volume of water required for construction is considered relatively small with respect to the geographic extent of the NGBR Project and unlikely to result in a significant impact to local and regional supplies. New water sources will be subject to development applications which will include an assessment of impact to other users. These development applications do not form part of the NGBR Project EIS. Updated approvals material is provided as Volume 2 Appendix J Revised legislation and approvals, which supersedes NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals.

11. Air quality

11.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The following matters associated with air quality may be affected:

- Distance to sensitive receptors
- Location of construction camps.

11.1.1 Distance to sensitive receptors

An additional four sensitive receptors were identified, within approximately six kilometres of the NGBR Project realignment (refer Section 3.4.1). Distances to some nearest identified sensitive receptors have changed in comparison to the NGBR Project EIS (refer Table 3-3).

The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential impacts of the NGBR Project realignment on air quality, including homesteads 16, 17, 18, R1, R2, R3 and R4. Assessment was completed through additional modelling of potential impacts. Emissions at these receptors are expected to comply with the relevant criteria, even before proposed mitigation and management measures are implemented (similar to the Aurizon Coal Dust Management Plan).

Distances to nearest identified sensitive receptors have not changed significantly due to other minor realignments (refer Table 3-3). The majority of changes have provided greater separation distance between the NGBR Project and nearest identified sensitive receptors. Those receptors with increased potential for impacts, excluding those affected by the NGBR Project realignment, are Homestead 8 (51 m closer), Homestead 9 (202 m closer), Homestead 11 (117 m closer) and Homestead 20 (322 m closer).

Within NGBR Project EIS Volume 1 Chapter 10 Air quality, dust deposition, particulate matter less than 2.5 µm ($PM_{2.5}$), particulate matter less than 10.5 µm ($PM_{10.5}$) generated by the construction of the NGBR Project were found to meet the criteria in the *Environmental Protection (Air) Policy 2008* within 500 m of the centreline of the NGBR Project final rail corridor. PM_{10} and $PM_{2.5}$ generated by operation of the NBGR Project were found to meet the criteria in the *Environmental Protection (Air) Policy 2008* within 228 m (daily criterion) and 315 m (annual criterion), while total suspended particulates were met within 61 m. Dust deposition was expected to be well below the $2g/m^2$/month criterion at all locations within 200 m. Nitrogen dioxide was the most significant non-dust emission and was met within 7 m; All other non-dust emissions were not significant. Furthermore, model outputs do not account for proposed mitigation and management measures (similar to the Aurizon Coal Dust Management Plan).

Homestead 8, Homestead 9, Homestead 11 and Homestead 20 are all well outside the range of the above predictions (refer Table 3-3).

11.1.2 Location of construction camps

As stated in NGBR Project EIS Volume 1 Chapter 10 Air quality, construction camps will be positioned to minimise external impacts from the final rail corridor. All relocated construction camps are either in a similar position relative to the final rail corridor (construction camps 1, 3 and 4), or relocated further from the final rail corridor (construction camps 2 and 5). Given that construction camps will predominantly be occupied outside of general building hours, when

emission sources will be minimal, in addition to the transient or fleeting nature of construction activities in sections of the final rail corridor adjacent to the construction camps, the potential impacts to camp residents from is not expected to be significant.

11.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Baseline data – Collection of baseline data to inform impact assessment
- Dust impacts – Construction and operation; coal wagon covering
- Human health – Total suspended particulates at sensitive receptors; Human health risks at construction camps
- Modelling – Years selected in meteorological data
- Monitoring – Validation of modelled emissions.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

11.3 Response to comments

11.3.1 Baseline data

NGBR Project EIS Volume 1 Chapter 10 Air quality reports the data sources used to inform the description of baseline air quality environment. The TOR for the NGBR Project require a description of environmental values for air quality; it does not specify the requirement to conduct baseline air quality monitoring. The use of established monitoring sites is an accepted practice for reporting.

11.3.2 Dust impacts

Adani has committed to the development of a a Dust Management Plan and a Coal Dust Management Plan consistent with the Aurizon Coal Dust Management Plan. It is anticipated that this will include a requirement for veneering of loaded coal wagons. It is noted that ongoing research is being conducted by various parties to identify strategies for the management of coal dust. Adani will remain appraised of these studies and implement various mechanisms for coal dust management.

Fugitive dust control during construction will include frequent water applications, control of vehicle access, vehicle speed restrictions, site exit points to remove loose materials via washing of equipment and work stoppage under certain conditions (e.g. extreme wind gusts). Water will be applied by means such as trucks, water tanks, water wagons, water trailers hoses, or sprinklers at sufficient frequency and quantity during and after earthmoving operations. Exposed borrow pits and other excavated materials may be contained within perimeter silt fencing, watered, treated or covered as necessary.

Adani will consult with the Department of Environment and Heritage Protection during preparation of the Dust Management Plan and Coal Dust Management Plan.

11.3.3 Human health

Total suspended particulate is an air quality indicator in the *Environmental Protection (Air) Policy 2008* with a clearly defined objective for health and wellbeing. It is considered that the

assessment undertaken at sensitive receptors against the *Environmental Protection (Air) Policy 2008* therefore provides for the protection of human health.

Potential impacts to occupants of construction camps will be fully mitigated to avoid any potential health risks.

11.3.4 Modelling

The air quality assessment for the NGBR Project EIS was undertaken with reference to the guideline Application requirements for activities with impacts to air (DEHP 2013). The guideline references guidance on dispersion modelling based on practice in New South Wales and Victoria. Both of these require a year-long dataset, 90% complete (New South Wales) and "ensure that seasonal variations are included" (Victoria).

The emphasis is on a quality dataset representative of meteorological conditions within the vicinity so that all possible combinations of worst case meteorology are included. The variation from year to year is captured in the statistical approach of analysis of the modelling output – extremes are selected and any year will contain these. The reason for the different years above is due to the quality and completeness of the data. Further, if data spans over several years, a screening methodology is used to select a year without extremes of too wet or too dry.

11.3.5 Monitoring

Air quality modelling has been undertaken in accordance with the TOR for the NGBR Project and relevant standards. Monitoring of construction and operation activities will be undertaken if required as a condition of the development approval.

All complaints relating to air quality (including dust emissions) will be recorded and managed in accordance with the complaints management procedure. Corrective action will be undertaken in accordance with the environmental management plan if the complaint is validated.

12. Greenhouse gas

12.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. Due to these changes, a revised greenhouse gas inventory has been prepared (refer Section 12.2).

12.2 Greenhouse gas inventory

12.2.1 Overview

A revised greenhouse gas (GHG) inventory has been prepared for the NGBR Project, incorporating the NGBR Project realignment, other minor realignments and associated changes. The method for estimating greenhouse gas emissions is as described in NGBR Project EIS Volume 1 Chapter 11 Greenhouse gas. The mitigation and management measures identified in the NGBR Project EIS are considered sufficient to abate greenhouse gas emissions from the NGBR Project as much as practicable.

12.2.2 Methodology

Carbon content per hectare has been recalculated based on the location on the alignment with the highest carbon content, determined by comparing 13 locations which were distributed along the NGBR Project. As explained in the NGBR Project EIS, this approach is considered to yield a highly conservative estimate of emissions associated with vegetation clearing. The exclusion of sequestration from rehabilitation activities also provides a measure of conservatism.

12.2.3 Greenhouse gas inventory

Construction

The GHG emissions for the construction phase of the NGBR Project were calculated based on estimated energy usage from plant and machinery and vegetation removal.

The total GHG emissions for the construction phase of the NGBR Project were estimated to be 1,335 kt CO_2-e.

Removal of vegetation for the final NGBR Project footprint was estimated to be the largest emission source for the construction phase of the NGBR Project, accounting for 79.6 per cent of emissions, followed by diesel use associated with the operation of plant and machinery accounting for 20.4 per cent.

A construction GHG emissions inventory is summarised in Figure 12-1 detailed in Table 12-1.

Operations

The GHG emissions for the operations phase of the NGBR Project were calculated based on estimated energy usage from plant and machinery, operation of the rail line and electricity requirements.

The total scope 1 and scope 2 GHG emissions for the operations phase of the NGBR Project were estimated to be 70,454 kt CO_2-e over the 90 year design life of the NGBR Project. Scope 1 emissions were estimated to be 57,524 kt CO_2-e and scope 2 emissions were

estimated to be 12,930 kt CO_2-e. Based on a 90 year design life, average annual operational emissions were calculated to be 783 kt CO_2-e per annum.

An operations GHG emissions inventory is summarised in Figure 12-2 and detailed in Table 12-2. Diesel usage for the life of the NGBR Project, on which operational diesel emissions were based, is provided in Table 12-3.

Figure 12-1 GHG inventory breakdown (construction)

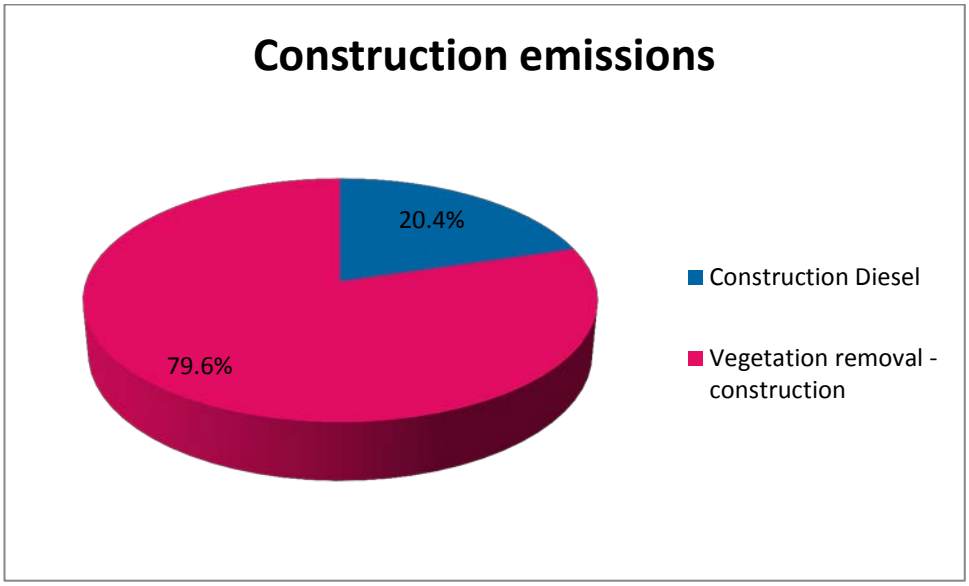

Figure 12-2 GHG inventory breakdown (operations)

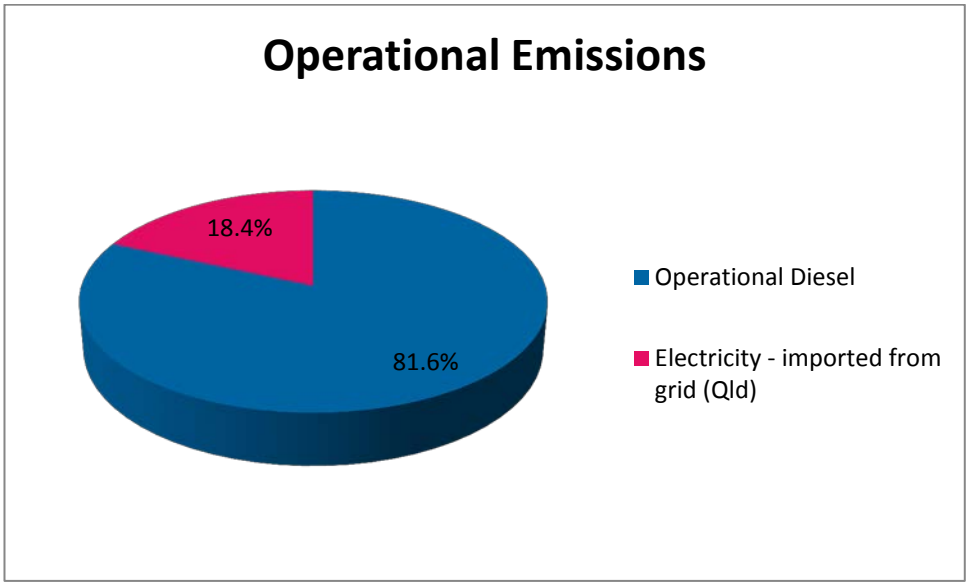

Table 12-1 GHG inventory (construction)

Emissions source	CO_2	CH_4	N_2O	Scope 1	Scope 2	Total	Proportion
Diesel usage	271,386	392	784	272,562	-	272,562	20.4 %
Vegetation removal	1,062,666	-	-	1,062,666	-	1,062,666	79.6 %
Total	**1,334,052**	**392**	**784**	**1,335,228**	**-**	**1,335,228**	**100%**

Note – All values are measures in tonnes of CO_2 equivalent (t CO_2-e)

Table 12-2 GHG inventory (operations)

Emissions source	CO_2	CH_4	N_2O	Scope 1	Scope 2	Total	Proportion
Electricity from grid	-	-	-	-	12,929,760	12,929,760	18.4 %
Diesel usage	57,021,734	8,240	494,408	57,524,382	-	57,524,382	81.6 %
Total						**70,454,142**	**100%**

Note – All values are measures in tonnes of CO_2 equivalent (t CO_2-e)

Table 12-3 Estimated diesel usage (operations)

Year	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026-2105
Mtpa	4	20	30	40	50	60	70	80	90	95	100
Subtotal (kL)[1]	10,000	50,000	75,000	100,000	125,000	150,000	175,000	200,000	225,000	237,500	20,000,000
Total (kL)											**21,347,500**

[1] Based on assumed 2.5 litres of diesel per tonne of coal

12.2.4 Conclusion

The estimated scope 1 and scope 2 GHG emissions (CO_2, N_2O and CH_4) of the NGBR Project are as follows:

- 1,335 kt of scope 1 and scope 2 CO_2-e, over the two year construction period
- 783 kt of scope 1 and scope 2 CO_2-e, each year of operation
- 71,789 kt of scope 1 and scope 2 CO_2-e, over the 90 year life of the NGBR Project.

The primary source of emissions during construction was found to be vegetation clearing, totalling 79.6 per cent of the construction inventory. The primary source of emissions during operation was found to be diesel usage, totalling 81.6 per cent of the operations inventory.

While GHG emissions are an unavoidable consequence of the construction and operation of the NGBR Project, a number of mitigation measures are proposed that will reduce these emissions as much as practicable.

Further sequestration through securement or purchase of offsets will be considered in the future stages of the NGBR Project, with preference given to offsets certified under the Commonwealth Government National Carbon Offset Standard.

Mitigation of GHG will be supported by an overall approach to energy efficiency, including development of an energy efficiency review program that will identify additional initiatives and technology that may be integrated into the NGBR Project.

13. Noise and vibration

13.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The following matters associated with noise and vibration may be affected:

- Distance to sensitive receptors
- Location of construction camps.

13.1.1 Distance to sensitive receptors

An additional four sensitive receptors were identified, within approximately six kilometres of the NGBR Project realignment (refer Section 3.4.1). Distances to some nearest identified sensitive receptors have changed in comparison to the NGBR Project EIS (refer Table 3-3).

The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential noise and vibration impacts of the NGBR Project realignment, including homesteads 16, 17, 18, R1, R2, R3 and R4. Noise due to construction and operation of the NGBR Project realignment was predicted to exceed the relevant criteria at Homestead 16 and Homestead R2. It was also considered that blasting criteria has the potential to be exceeded at these receptors. Mitigation measures identified in NGBR Project EIS Volume 1 Chapter 12 Noise and vibration are considered to apply to the NGBR Project realignment. Additional mitigation such as screening barriers, bunds, or noise mitigating works at sensitive receptors, was proposed where operational noise monitoring validates the predictions in Volume 2 Appendix C NGBR Project realignment report.

Distances to nearest identified sensitive receptors have not changed significantly due to other minor realignments (refer Table 3-3). The majority of changes have provided greater separation distance between the NGBR Project and nearest identified sensitive receptors. Those receptors with increased potential for impacts, excluding those affected by the NGBR Project realignment, are Homestead 8 (51 m closer), Homestead 9 (202 m closer), Homestead 11 (117 m closer) and Homestead 20 (322 m closer).

Within NGBR Project EIS Volume 1 Chapter 12 Noise and vibration, noise during construction was expected to exceed the relevant criteria at Homestead 8, Homestead 9 and Homestead 11. Airblast overpressure was predicted to exceed the relevant criterion at Homestead 11. Vibration during construction was not expected to be significant at any of the nearest identified sensitive receptors. It is considered that the mitigation and management measures identified in the NGBR Project EIS will accommodate any increase to construction noise associated with minor realignments at sensitive receptors.

Within the NGBR Project EIS, operation noise was predicted to exceed the relevant night time criteria of 55dB $L_{Aeq,9h}$ at Homestead 2 and Homestead 22. Homestead 2 is 1,152 m from the final rail corridor, while Homestead 22 is 1,059 m from the final rail corridor; the nearest of the homesteads relevant to minor realignments is Homestead 11, at 1,379 m from the final rail corridor. It is therefore considered that there is potential for operational noise to exceed the relevant criterion at Homestead 11, however it is not anticipated that operation noise will exceed the relevant criteria at Homestead 8, Homestead 9 or Homestead 20, due to separation distance. It is considered that the mitigation and management measures identified in the NGBR

Project EIS will accommodate any increase to operation noise associated with minor realignments at sensitive receptors.

Table 13-1 NGBR Project EIS noise impacts

Activity	Predicted noise			
	Homestead 8	Homestead 9	Homestead 11	Homestead 20
Construction noise	35.4[1] dB(A) L_{Aeq}	43.4[2] dB(A) L_{Aeq}	43.9[2] dB(A) L_{Aeq}	31.3 dB(A) L_{Aeq}
Airblast overpressure	107.4 dB(linear)	114.2 dB(linear)	118.2[3] dB(linear)	103.9 dB(linear)
Operation noise	44.8 (dB $LA_{eq,9h}$)	50.3 (dB $LA_{eq,9h}$)	53.8 (dB $LA_{eq,9h}$)	40 (dB $LA_{eq,9h}$)

[1] Greater than or equal to ICNG noise management level for work outside standard working hours (35 dB $L_{Aeq(15min)}$)

[2] Greater than or equal to ICNG noise management level for work outside standard working hours (35 dB $L_{Aeq(15min)}$)

[3] Greater than or equal to the *Environmental Protection Act 1994* criterion (<115 dB)

As committed to in the NGBR Project EIS, operational noise monitoring will be undertaken to validate model predictions. Additional mitigation, such as screening barriers, bunds, or noise mitigating works at sensitive receptors, will be employed where operational noise monitoring confirms that noise or vibration criteria are exceeded.

13.1.2 Location of construction camps

As stated in NGBR Project EIS Volume 1 Chapter 12 Noise and vibration, construction camps will be positioned to minimise impacts from the final rail corridor. All relocated construction camps are either in a similar position relative to the final rail corridor (construction camps 1, 3 and 4), or relocated further from the final rail corridor (construction camps 2 and 5). Given that construction camps will predominantly be occupied outside of general building hours, when emission sources will be minimal, in addition to the transient or fleeting nature of construction activities in sections of the final rail corridor adjacent to the construction camps, the potential impacts to camp residents from noise is not expected to be significant.

13.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Construction – duration of exceedences, noise prediction method, additional mitigation
- Modelling – validation, modelling method, consideration of multiple rail corridors
- Sensitive receptors – inclusion of construction camps.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

13.3 Response to comments

13.3.1 Construction

NGBR Project EIS Volume 1 Chapter 12 Noise and vibration describes the maximum noise levels during construction. At this time it is not possible to describe the duration of exceedences

as a number of variables and assumptions have been utilised to determine the maximum impact. Actual noise experienced at a sensitive receptor is likely to be lower than predicted and short term, given that:

- Equipment would not operate at full power for the entire time
- Certain types of equipment for a given activity will be present for brief periods of time
- Equipment would be moving around the final rail corridor
- Noise emissions from equipment working in cuttings may be reduced.
- Proposed management measures take account of the exceedences.

NGBR Project EIS Volume 1 Chapter 12 Noise and vibration describes additional mitigation measures where operational noise criteria are found to be exceeded (following operational monitoring) at a sensitive receiver, such as:

- Construction of screening and barriers or bunds
- Noise mitigating building works at sensitive receptors, such as double glazing.

NGBR Project EIS Volume 2 Appendix J Noise and vibration describes the noise modelling procedure in detail, which is based on CadnaA. CadnaA is a computer program for the calculation, assessment and prognosis of noise propagation. Construction environmental noise propagation was calculated according to ISO 9613-2, Acoustics – Attenuation of sound during propagation outdoors. Ground absorption, reflection, terrain and relevant shielding objects are taken into account in the calculations. The model takes account of climatic conditions and ground conditions (specifically humidity).

13.3.2 Modelling

NGBR Project EIS Volume 1 Chapter 12 Noise and vibration describes monitoring of vibration undertaken for coal rail coal trains on the Australian Rail Track Corporation rail network in the Hunter Valley. Monitored trains included those operated by Pacific National and Aurizon. The monitoring indicated a low probability of human comfort or structural vibration criteria being reached more than 40 m from the rail line. Additional rail vibration assessments of the same network for trains similar to those to be used for the NGBR Project resulted in similar findings, with negligible vibration levels at distances greater than approximately 50 m from the rail line. Vibration levels from the operation of the NGBR Project were expected to be consistent with the above findings. Baseline vibration monitoring was undertaken at a number of sensitive receptor locations. Specific monitoring for validation of model outputs has not occurred to date.

Modelling of combined noise impacts from multiple rail corridors was not initially undertaken due to the separation distances. Volume 2 Appendix C NGBR Project realignment report includes modelling of existing and proposed infrastructure where the impacts are likely to be cumulative in the vicinity of the NGBR Project realignment.

NGBR Project EIS Volume 2 Appendix J Noise and vibration describes the noise modelling which is based on CadnaA. CadnaA is a computer program for the calculation, assessment and prognosis of noise propagation. Construction environmental noise propagation was calculated according to ISO 9613-2, Acoustics – Attenuation of sound during propagation outdoors. Ground absorption, reflection, terrain and relevant shielding objects are taken into account in the calculations. The model takes account of climatic conditions, ground conditions and timing of noise emissions to provide a 24hr assessment of potential noise.

The NGBR Project is not expected to product low frequency noise, as defined in the DEHP draft low frequency noise guideline. As such, low frequency noise has not been modelled.

13.3.3 Sensitive receptors

Workers camps are not defined as sensitive receptors by the *Environmental Protection (Noise) Policy 2008*. As described in NGBR Project EIS Volume 1 Chapter 12 Noise and vibration, the policy does not apply to rail projects and as such assessment against the sleep disturbance criterion is not required. Assessment has been undertaken against the more stringent NSW Rail Infrastructure Noise Guideline criterion which also captures night time impacts.

Potential impacts to occupants of construction camps will be fully mitigated to avoid any potential health risks. Construction camps will be positioned to minimise external impacts from the final rail corridor or associated construction laydown or turning areas, as well as any internal emission sources such as generators or parking areas. Construction camp designs will manage and mitigate noise impacts by incorporating enclosed meals, living and sleeping quarters which will be mechanically ventilated and insulated to protect residents. Given that construction camps will predominantly be occupied outside of general building hours, when emission sources will be minimal, in addition to the transient or fleeting nature of construction activities in sections of the final rail corridor adjacent to the construction camps, the potential impacts to camp residents from noise is not expected to be significant.

14. Waste

14.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. Waste volumes stated in NGBR Project EIS Volume 1 Chapter 13 were indicative only, for the purpose of identifying potential waste streams and appropriate waste management options. The waste assessment undertaken for the NGBR Project EIS is therefore considered to apply equally to the NGBR Project realignment, other minor realignments and associated changes.

14.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Waste generation – Types of waste and potential disposal locations
- Weed and pest management – Management of food and organic waste.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

14.2.1 Waste generation

Assessment of potential waste types, quantities and potentially suitable local government disposal facilities are included in NGBR Project EIS Volume 1 Chapter 13 Waste.

14.2.2 Weed and pest management

NGBR Project EIS Volume 1 Chapter 13 Waste provides details of specific waste management strategies including those relevant to waste with the potential to attract pest species.

15. Transport

15.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequent to public consultation on the NGBR Project EIS. The following matters associated with transport may be affected:

- Approach roads
- Location of construction camps.

15.1.1 Approach roads

Collinsville-Elphinstone Road will be utilised due to the NGBR Project realignment, in addition to other roads identified in the NGBR Project EIS. The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report including an assessment of potential impacts of the NGBR Project realignment on Collinsville-Elphinstone Road.

15.1.2 Location of construction camps

Construction camp 2 will be relocated approximately 1.5 km from NGBR Project final rail corridor, adjacent to Strathalbyn Road (refer Section 3.5). Strathalbyn Road was the proposed access road for construction camp 2 in NGBR Project EIS Volume 1 Chapter 14 Transport. As such, the assessment of traffic impacts to Strathalbyn Road in the NGBR Project EIS is considered to apply to the construction camp 2 relocation.

It should be noted that an assessment of the Strathalbyn Road and Bowen Developmental Road intersection was not included in the NGBR Project EIS, due to a lack of available turning count data. However, this intersection will be assessed with observed traffic count data in the detailed RIA stage.

The average annual daily traffic along Bowen Developmental Road (adjacent the intersection of Strathalbyn Road) is estimated to be 1,329 vehicles per day during the peak construction year of the NGBR Project (2015). Construction traffic at this time is expected to add approximately 89 vehicles per day, or an increase of approximately 7 per cent. This additional volume of traffic is not expected to significantly impact on the level of service of Bowen Developmental Road, which is anticipated to remain operating at level of service A.

Construction camp 4 will also be relocated due to the NGBR Project realignment however the potential impacts on transport due to the relocation of construction camp 4 are considered in Volume 2 Appendix C NGBR Project realignment report.

15.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Increased traffic – Increased traffic during construction and operation
- Construction workforce – Driver fatigue
- Emergency response – Increased crashes
- Existing and proposed infrastructure – Characterisation of constraints on Newlands system and other proposed developments; Interaction with Alpha Coal Project

- Haul and access roads – Use of haulage routes; Maintenance and rehabilitation of haul and access roads
- Management plans – Traffic and pavement impact assessment and management plans
- Occupational and stock crossings – Consultation and design
- Road access and crossings – Proposed intersections and crossings
- Road works – Upgrade and maintenance of roads
- Safety – Level crossings
- Traffic growth – Consideration of traffic growth in road impact assessment
- Traffic management and road use – Consultation with Queensland Police Service.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

15.3 Response to comments

15.3.1 Increased traffic

Traffic and transport impacts are assessed in Volume 2 Appendix C NGBR Project realignment report and NGBR Project EIS Volume 1 Chapter 14 Transport. The traffic assessment concludes that an acceptable level of service for all key transport routes will be maintained during construction and operation of the NGBR Project.

NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts states that the majority of the construction workforce is expected to be fly-in-fly-out (approximately 80 per cent) while local workers may need to reside in workers camps during shifts. The provision of construction camps will minimise transport requirements for workers while on shift.

Specific management measures for local roads and State-controlled roads will be developed through the road impact assessment, road use management plan, traffic management plan and infrastructure agreements. Adani is in ongoing discussions with Isaac Regional Council and Whitsunday Regional Council regarding local road infrastructure, and with the Department of Transport and Main Roads regarding State-controlled road infrastructure. Adani will also consult with Queensland Police Service for the development of the road use management plan and traffic management plan.

15.3.2 Construction workforce

NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts states that the majority of the construction workforce is expected to be fly-in-fly-out (approximately 80 per cent). As stated, the requirement for construction camps is to minimise transport requirements for workers while on shift as well as manage safety, including driver fatigue.

The traffic management plan for the NGBR Project will include measures to manage driver fatigue in accordance with Department of Transport and Main Roads strategies and any obligations under the *Heavy Vehicle National Law Act 2012*.

15.3.3 Emergency response

Adani commits to engage with emergency service providers, including Queensland Fire and Emergency Services and Queensland Police Service, for input into the composition of the

Emergency Response Team and development of the Emergency Management Plan for the NGBR Project (refer Volume 2 Appendix Revised environmental management plan framework).

15.3.4 Existing and proposed infrastructure

The NGBR Project accords with the Queensland Government's Galilee Basin Development Strategy (Queensland Government 2013b) and its inherent first mover advantage policy. Given the level of uncertainty with regard to the approved and proposed projects of other proponents (due to timing, financial close, etc.), Adani is proceeding on the basis that its railway will be built first, with any other subsequent railway developments to grade separate crossings over Adani. Similarly, should another proposed/approved railway be constructed prior to the NGBR Project construction commencing, Adani would commit to grade separation of its crossing/s of that/those railways, consistent with the NGBR Project design criteria for grade separation of existing operational railways.

15.3.5 Haul and access roads

Adani had discussions with Whitsunday Regional Council on 9 August 2013 in regard to local roads and other matters relating to road transport. Adani will continue to consult with Whitsunday Regional Council in regard to transport. Adani has committed to the preparation of a road impact assessment and road use management plan which will include details of local roads that are directly affected during construction, including roads impacted by the transport of quarry materials.

A road impact assessment will be prepared prior to construction commencing for all key roads and approaches to key intersections in the study area. The road impact assessment will identify locations on the road network where a detailed pavement impact assessment is required. A pavement impact assessment will be prepared and submitted to the Department of Transport and Main Roads/Council prior to construction commencing. The pavement impact assessment will assess the impact of construction traffic on the life of the affected road pavements and recommend remedial measures. The extent of the remedial measures and compensation will be determined through an infrastructure agreement process, involving Adani, the Department of Transport and Main Roads and local councils.

15.3.6 Management plans

As committed in the NGBR Project EIS, Adani will develop a traffic impact assessment and pavement impact assessment (forming the road impact assessment), road use management plan and traffic management plan, in consultation with the Department of Transport and Main Roads for State-controlled roads and local governments for local roads, prior to commencement of construction.

Adani will continue to consult with Whitsunday Regional Council, Isaac Regional Council and the Department of Transport and Main Roads, as required, and provide the relevant management plans within the necessary timeframes for approval prior to construction.

15.3.7 Occupational and stock crossings

Adani had discussions with Whitsunday Regional Council on 9 August 2013 and provided a presentation about crossing requirements (including stock routes) and proposed treatments within the Whitsunday Regional Council local government area.

On 30 October 2013, Whitsunday Regional Council confirmed that the Adani basic design is consistent with Council's Development Manual. Consultation will continue to be undertaken with

Whitsunday Regional Council with regard to local road and stock route crossings (in concert with the Department of Natural Resources and Mines).

15.3.8 Road access and crossings

As detailed in Volume 2 Appendix B Revised project description, Adani proposes the construction of grade separation (rail over road) at the Bruce Highway and grade separation (rail under road) for the Bowen Developmental Road. As such, no delays to road transport will occur in relation to these crossings.

Adani will continue to consult with the Department of Transport and Main Roads for the development of an infrastructure agreement which includes details in regard to future grade separation of the Suttor Development Road.

Adani will provide the Department of Transport and Main Roads with road chainages for all proposed crossing and intersection design details as part of the road impact assessment.

15.3.9 Road works

As committed in the NGBR Project EIS, Adani will develop a traffic impact assessment and pavement impact assessment (forming the road impact assessment), road use management plan and traffic management plan, in consultation with the Department of Transport and Main Roads for State-controlled roads and local governments for local controlled roads, prior to commencement of construction.

Adani will continue to consult with Whitsunday Regional Council, Isaac Regional Council and the Department of Transport and Main Roads, as required, regarding agreements for road maintenance and upgrade to accommodate the NGBR Project.

15.3.10 Safety

The design of level crossings incorporates multiple design features to ensure the highest level of safety and practicality – including fencing, gating and holding yards as necessary. As committed in NGBR Project EIS Volume 1 Chapter 14 Transport, assessment of all proposed level crossings will be undertaken in accordance with the Australian Level Crossing Assessment Manual, during detailed design of the NGBR Project.

15.3.11 Traffic growth

A background growth rate of 3% p.a. was adopted for all impacted SCR's based on the assessment of historical growth rates (last 10-years i.e. 2000-2010) sourced from the Department of Transport and Main Roads. Following further consultation, the Department of Transport and Main Roads have noted and accepted the growth rates applied in the NGBR Project EIS.

Further site based information regarding the final intersection location and actual traffic counts (AM and PM) will be provided as part of the road impact assessment to be submitted for approval as part of the project detail design phase. The road impact assessment will include individual growth rates supplied by the Department of Transport and Main Roads.

15.3.12 Traffic management and road use

Adani will consult with Queensland Police Service in the development of the traffic management plan for the Project and ensure this includes specific requirements in regards to the role of Queensland Police Service. Adani will continue to work closely with Queensland Police Service

and other emergency service providers, including Queensland Fire and Rescue Service, with regards to services and emergency response that may be required during development of the NGBR Project.

16. Cultural heritage

16.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS.

The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report. The report contains an assessment of potential impacts of the NGBR Project realignment on Indigenous and non-Indigenous cultural heritage. It is noted that numerous artefact scatters and an isolated find identified in NGBR Project EIS Volume 1 Chapter 15 Cultural heritage are registered in the section of corridor now excluded from the NGBR Project due to the NGBR Project realignment.

A search of the relevant registers for places or items of Indigenous and non-Indigenous was undertaken within two kilometres from either side of the NGBR Project final rail corridor for NGBR Project EIS. Minor realignments and associated changes to the description of the NGBR Project have not resulted in any crossings of registered places or items. One such realignment occurs in the vicinity of Mount Roundback, in order to avoid a rock art site of significant Indigenous cultural heritage potential, as identified in the NGBR Project EIS.

As committed in NGBR Project EIS Volume 1 Chapter 15 Cultural heritage, a comprehensive cultural heritage survey will be undertaken, prior to commencement of construction, involving all relevant Native Title and Traditional Owner stakeholders, in accordance with duty of care under the *Aboriginal Cultural Heritage Act 2003*. An archaeological survey will also be undertaken to identify non-Indigenous heritage.

16.2 Update to studies

The potential impacts of changes to the description of the NGBR Project are summarised in Section 16.1. The following studies have been prepared to assess these potential impacts:

- Volume 2 Appendix C NGBR Project realignment report
- North Galilee Basin Rail Project Additional Environmental Impact Statement Cultural Heritage Technical Addendum Report (ELH 2014; refer Volume 2 Appendix C NGBR Project realignment report).

16.3 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Cultural heritage management
- Dust and vibration impacts
- Flora and fauna
- Indigenous cultural heritage impacts
- Non-indigenous cultural heritage impacts.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

16.4 Response to comments

16.4.1 Cultural heritage management

Cultural heritage assessment have been undertaken in accordance with the requirements of the TOR for the NGBR Project and having regard to cultural heritage management plans in place between Adani and each of the Native Title parties impacted by the NGBR Project.

16.4.2 Dust and vibration impacts

In accordance with the provisions of the Juru – Adani NGBR Cultural Heritage Management Plan, a survey was undertaken from Abbot Point to Splitters Creek, including Mt Roundback. Following that survey, the Juru-appointed Archaeologist provided Adani with a survey report. A key recommendation of that report was realignment of the rail corridor away from the registered cultural heritage site (rock art and shelter site) GJ:A31, with a recommended minimum 300 m buffer around that site. Adani accepted this recommendation and then commissioned a further survey of the Mt Roundback Realignment between the Bruce Highway and Splitters Creek. A subsequent survey report for the Mt Roundback Realignment was received by Adani in February 2014. That report confirmed that from an archaeological point of view, the results of the cultural heritage survey and assessment of the proposed realignment determined that there were no significant archaeological constraints or issues identified.

The mandated process from this point under the cultural heritage management plan is that a Juru – Adani cultural heritage committee meeting will now be held to discuss and finalise a cultural heritage progress report and to agree Aboriginal cultural heritage arrangements for the Mt Roundback Realignment. The cultural heritage committee is the decision making body under the terms of the cultural heritage management plan for deciding on Aboriginal cultural heritage management arrangements.

16.4.3 Flora and fauna

In accordance with the provisions of the Juru – Adani cultural heritage management plan, a survey was undertaken from Abbot Point to Splitters Creek, including Mt Roundback. Following that survey, the Juru appointed Archaeologist provided Adani with a survey report. The report noted that Saltwater Creek is a significant cultural landscape that was traditionally used for fishing, gathering, hunting and living/camping. The report contained a recommendation that the width of the rail corridor at the Saltwater Creek crossing, and clearing of riparian vegetation be minimised as much as possible, and monitoring be carried out for initial ground disturbance works at the crossing. Adani proposed at the subsequent cultural heritage committee meeting held on 9 December 2013 that Adani will seek to minimise its project footprint in this area, and monitoring will be undertaken in relation to initial ground disturbance activities. The cultural heritage committee accepted the Adani response. There are no project activities planned for the coastal dune system east of the Abbot Point Road.

16.4.4 Indigenous cultural heritage impacts

In accordance with the provisions of the Juru – Adani cultural heritage management plan, a survey was undertaken from Abbot Point to Splitters Creek, including Mt Roundback. Following that survey, the Juru appointed Archaeologist provided Adani with a survey report. The report noted that although exposures of whitish clay were observed, there was no definitive archaeological evidence for Aboriginal quarrying of the reported ochre within the project corridor. No recommendation was made by the report in relation to this item.

In accordance with the Cultural Heritage Management Plan, impacts to previously unregistered and unassessed items or places of Indigenous cultural heritage significance will be mitigated by:

- Undertaking comprehensive cultural heritage surveys with all Native Title and Traditional Owner stakeholders
- Generating survey reports to provide detailed assessment and management recommendations
- Assessing significance of any cultural heritage.

Survey and management of Indigenous cultural heritage will be undertaken in accordance with Adani's duty of care under the *Aboriginal Cultural heritage Act 2003*. In the event of a find, Traditional Owners will be engaged.

16.4.5 Non-indigenous cultural heritage impacts

In accordance with the Cultural Heritage Management Plan impacts to previously unregistered and unassessed items or places of non-Indigenous cultural heritage significance will be mitigated by:

- Undertaking comprehensive archaeological survey in accordance with the Department of Environment and Heritage Protection Guideline 'Carrying out a heritage survey'
- Generating survey reports to provide detailed assessment and management recommendations
- Assessing significance of any cultural heritage

Survey and management of non-Indigenous cultural heritage will be undertaken in accordance with Adani's duty of care under the *Queensland Cultural Heritage Act 1992*. In the event of any archaeological find, a qualified archaeologist will be engaged.

17. Social and economic impacts

17.1 Amendments to the Project description

As stated in Section 3.1, the following aspects of the NGBR Project have not changed from the description of the NGBR Project provided in the NGBR Project EIS:

- Capital expenditure and operational expenditure
- Construction and operation workforce.

Furthermore, the NGBR Project realignment does not alter the key urban localities and local government areas identified in NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts. An assessment of the potential impacts to additional properties crossed by the NGBR Project realignment is provided in Volume 2 Appendix C NGBR Project realignment report.

As the key social and economic features of the NGBR Project are unchanged, it is considered that the assessment of social and economic impacts undertaken for the NGBR Project EIS continues to apply to the NGBR Project, including the NGBR Project realignment, other minor realignments and associated changes (refer NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts).

17.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Construction camps – Planning approvals and legislative requirements
- Construction workforce – Regional employment and security in camps
- Economic analysis – Methods of analysis and consideration of alternatives
- Employment – Local employment initiatives
- Local benefits – Operational expenditure in the region
- Local transport – Road upgrades around Moranbah airport
- Tourism – Direct and indirect impacts.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

17.3 Response to comments

17.3.1 Construction camps

Construction camps that are located along the NGBR Project final rail corridor are expected to minimise vehicular movements during construction and thus minimise associated road and social/community impacts (safety, dust, noise, etc.). Further consideration will be given to the use of existing accommodation infrastructure during detailed design. Adani will continue to consult with relevant State and local government agencies in this regard. All camps will be developed in accordance with relevant legislative requirements.

17.3.2 Construction workforce

The NGBR Project EIS presents an estimated proportion of fly-in-fly-out (approximately 80 per cent) versus drive-in-drive-out workforce requirements including the sourcing (and training) of approximately 20 per cent of the peak workforce from the local region. Whilst this case is presented in the NGBR Project EIS as a best estimate of the likely proportion of local/regional employment, the assessment does not limit the potential for flexibility in relation to origins of the workforce. As committed in NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts, Adani will undertake initiatives to build capacity for local and regional business. Adani is committed to ongoing consultation with various representatives in each of the Mackay, Isaac and Whitsunday Regional Councils during development of the NGBR Project.

Adani will undertake ongoing engagement with QPS for advice to manage security, behaviour and offending issues at the workers camps. A Workforce Management Plan incorporating a Code of Conduct – as detailed in NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts – will be developed in consultation with the Queensland Police Service.

17.3.3 Economic analysis

The economic assessment of the NGBR Project was undertaken in accordance with the TOR for the NGBR Project and assessment requirements of Government Agencies. The input-output method is an economic impact assessment method, whereas cost-benefit analysis is an economic evaluation method. The objective of the economic assessment required by the TOR for the NGBR Project is to identify the potential economic impacts of the project, including the direct and indirect impacts. The input-output methodology is one method of estimating such impacts as it focuses on economic activity impacts and enables direct and indirect contributions to output and employment to be estimated from inputs in the form of spending during both the construction and operational periods. This method, therefore, is consistent with the outputs sought from the TOR for the NGBR Project.

In contrast, cost-benefit analysis estimates cost and benefits (monetised and non-monetised) of a project using discounted cash flow analysis. Unlike the input-output method, the outputs from a cost-benefit analysis would be the net present value, internal rate of return and benefit-cost ratio. These indicators are decision making indicators to determine whether a project should go ahead or not go ahead (e.g. if net present value is greater than zero, then it is prudent to invest) and to prioritise investment options. The cost-benefit analysis method essentially measures the net worth of a project, not its economic impacts. Cost benefit analysis is data intensive, requires forecast of revenues and benefits, and is generally done internally before the proponents of a project decide to proceed or not proceed.

Additionally, in relation to the economic cost of direct loss of threatened ecological communities, environmental offsets are designed to provide offsets for impacts to matters of environmental value. The requirement for environmental offsets is based on equivalent environmental value not economic value.

17.3.4 Employment

The NGBR Project EIS presents an estimated proportion of fly-in-fly-out versus drive-in-drive-out workforce requirements including the sourcing (and training) of approximately 20 per cent of the peak workforce from the local region. Whilst this case is presented in the NGBR Project EIS as a best estimate of the likely proportion of local/regional employment, the assessment does not limit the potential for flexibility in relation to origins of the workforce. As committed in the

NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts, Adani will undertake initiatives to build capacity for local and regional business.

Adani will continue to consult with the Department of Aboriginal and Torres Strait Islander and Multicultural Affairs during the project design phase regarding indigenous employment initiatives.

17.3.5 Local benefits

Table 16-6 in NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts provides an estimate of the economic inputs to the Mackay, Isaac and Whitsunday region. As committed in NGBR Project EIS Volume 1 Chapter 16 Social and economic impacts, Adani will undertake initiatives to build capacity for local and regional business. Where available this will include future information regarding local expenditure.

The location of the rolling stock maintenance infrastructure toward the Abbot Point end of the NGBR Project is considered suitable for operational reasons. The proposed location is highly accessible from the Bruce Highway and relocation to Collinsville is not considered necessary. The NGBR Project is expected to contribute positively to the economy of Collinsville.

17.3.6 Local transport

As committed in the NGBR Project EIS, Adani will develop a traffic impact assessment and pavement impact assessment (forming the road impact assessment), road use management plan and traffic management plan, in consultation with the Department of Transport and Main Roads for State-controlled roads and local governments for local controlled roads, prior to commencement of construction.

Adani will continue to consult with Whitsunday Regional Council, Isaac Regional Council and the Department of Transport and Main Roads, as required, regarding agreements for road maintenance and upgrade to accommodate the NGBR Project.

17.3.7 Tourism – direct and indirect impacts

Potential impacts to environmental values have been considered in the NGBR Project EIS and appropriate mitigation and management measures included to minimise potential impacts. The NGBR Project is considered unlikely to have any impact on the tourism values of the region. Adani will continue to consult with relevant tourism organisations in the region during the project design phase.

18. Climate and natural hazards

18.1 Amendments to the Project description

The climate and natural hazards assessment previously undertaken (refer NGBR Project EIS Volume 1 Chapter 17 Climate and natural hazards) is considered that the assessment continues to apply to the NGBR Project, including the NGBR Project realignment, other minor realignments and associated changes.

As committed in the NGBR Project EIS, a Risk Management Plan will be developed and implemented for the NGBR Project and will include preventative and responsive mitigation measures to reduce the overall risk of potential hazards.

18.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Climatic conditions – Methodology for describing existing climatic conditions
- Flooding and storm surge – Consideration of flooding.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

18.3 Response to comments

18.3.1 Description of existing climate conditions

A number of submissions were received on the methodology used to describe the existing climate and the consideration of climate change. It is noted that the assessment undertaken for the NGBR Project is consistent with the TOR. Regional climatic data has been utilised variously throughout the NGBR Project EIS, as relevant to each assessment. The availability of particular climatic parameters at observation stations is one factor that determines which stations are used in a given description of existing climate conditions.

18.3.2 Consideration of flooding

A number of submissions were received on the consideration of flood events. Flood modelling has been undertaken for the NGBR Project and is documented in NGBR Project EIS Volume 2 Appendix H2 Hydrology and hydraulics. All crossing structures for the NGBR Project, including the NGBR Project realignment, will be required to meet the relevant design criteria (refer Volume 2 Appendix B Revised project description). Flood modelling and analysis will continue during detailed design to further refine hydrological estimates and design of structures.

One submission raised the issue of storm surge in Caley Valley Wetland, regarding the rail loop at Abbot Point. The NGBR Project will access the rail loop approved as part of the Abbot Point Coal Terminal 0 Project (EPBC 2011/6194). This rail loop does not form part of the NGBR Project and is not proposed to enter Caley Valley Wetland.

19. Cumulative impacts

19.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The cumulative impact assessment provided in NGBR Project EIS Volume 1 Chapter 19 Cumulative impacts considers the NGBR Project and other current and proposed projects at a regional scale. As such, this previous assessment is considered to continue to apply to the NGBR Project.

The location of the NGBR Project realignment in the vicinity of the existing Newlands line creates potential for cumulative air emissions, noise and vibration beyond that described in the NGBR Project EIS. The NGBR Project realignment has been assessed in Volume 2 Appendix C NGBR Project realignment report, including quantification of cumulative air, noise and vibration impacts with the Newlands line. A general update of the cumulative impact assessment for the NGBR Project EIS is provided in the following sections.

It is not considered that other changes to the NGBR Project are of sufficient scale to have any bearing on the assessment of cumulative impacts undertaken for the NGBR Project EIS (refer NGBR Project EIS Volume 1 Chapter 19 Cumulative impact assessment).

19.1.1 Climate, natural hazards and climate change

As discussed in NGBR Project EIS Volume 1 Chapter 17 Climate and natural hazards, following the implementation of proposed mitigation measures, three hazards remain ranked with a medium residual risk given the measure of consequence, namely the risk of extreme heat and extreme precipitation causing flooding or inundation of critical infrastructure. Details of these risks as they result from the NGBR Project realignment are discussed in Volume 2 Appendix C NGBR Project realignment report.

As the design criteria that apply to the NGBR Project realignment generally apply to the NGBR Project, it is considered that the residual risks and management measures identified in the NGBR Project EIS apply. As such, cumulative impacts are considered to be low.

19.1.2 Land use and tenure

As discussed in NGBR Project EIS Volume 1 Chapter 3 Land use and tenure, residual land use impacts resulting from the NGBR Project are anticipated to be minimal. Details of these impacts as they result from the NGBR Project realignment are discussed in Volume 2 Appendix C NGBR Project realignment report.

The key finding of the cumulative impact assessment was that as the NGBR Project will be in accordance with the Galilee Basin Coal Infrastructure Framework (State of Queensland 2013a) and Galilee Basin Development Strategy (State of Queensland 2013b) cumulative impacts were considered to be low. This assessment is considered to apply equally to the NGBR Project realignment.

In addition, it is noted that the NGBR Project realignment minimises known/potential sterilisation of coal resources and/or encroachment on existing coal tenements. Further, as the majority of the NGBR Project realignment runs parallel to the Newlands line, severance of properties at a landscape scale is reduced compared to the NGBR Project presented in the NGBR Project EIS.

19.1.3 Scenic amenity and lighting

As discussed in NGBR Project EIS Volume 1 Chapter 4 Scenic amenity and lighting, the majority of sensitive visual receptors in the area of the NGBR Project would experience minor or negligible impacts. The NGBR Project realignment is likely to alter the level of visual impact experienced at some of these receptors, as discussed in Volume 2 Appendix C NGBR Project realignment report.

They key finding of the cumulative impact assessment was that as the NGBR Project will be in accordance with the GBCIF, cumulative impacts were considered to be low. This assessment is considered to apply equally to the NGBR Project realignment. Further, as the majority of the NGBR Project realignment runs parallel to the Newlands line, cumulative impacts to receptors that may experience both the NGBR Project and the Newlands line – such as transient views from Bowen Developmental Road – are reduced.

19.1.4 Topography, geology, soils and land contamination

As discussed in NGBR Project EIS Volume 1 Chapter 5 Topography, geology, soils and land contamination, residual impacts of the NGBR Project were anticipated to be predominantly of local significance. Details of these impacts as they result from the NGBR Project realignment are discussed in Volume 2 Appendix C NGBR Project realignment report. The main potential for cumulative impacts was identified as resulting from fragmentation of good quality agricultural land and strategic cropping land with other proposed projects.

The key finding of the cumulative impact assessment was that as the NGBR Project will be in accordance with the GBCIF, cumulative impacts were considered to be low. This assessment is considered to apply equally to the NGBR Project realignment. Further, as the majority of the NGBR Project alignment runs parallel to the Newlands line, fragmentation and land sterilisation impacts are expected to be reduced compared to the NGBR Project presented in the NGBR Project EIS.

19.1.5 Nature conservation

Potential impacts discussed in the NGBR Project EIS Volume 1 Chapter 6 Nature conservation relate primarily to clearing of:

- Endangered and of concern regional ecosystems
- Threshold REs
- Threatened ecological communities
- Potential habitat for protected species
- Watercourse vegetation
- Wetland protection areas and wetland regional ecosystems.

As committed in NGBR Project EIS Volume 1 Chapter 6 Nature conservation, any unavoidable residual impacts to the above values will be offset. An updated offset strategy is provided as Volume 2 Appendix E Revised offsets.

The key finding of the cumulative impact assessment was that as the NGBR Project will be in accordance with the GBCIF, cumulative impacts to REs and threatened species are not expected to be significant. The NGBR Project realignment, minor realignments and associated changes alter the area of impact to these values, compared to the NGBR Project EIS.

Furthermore, a number of additional values not previously assessed in the NGBR Project EIS are impacted by changes to the NGBR Project (refer Section 7.1).

It is considered that the scale of impact to values assessed in the NGBR Project EIS has not changed significantly. Furthermore, the impacts of the NGBR Project realignment to species not previously assessed in the NGBR Project EIS are not considered regionally significant.

Considering the scale of potential impacts and the provision of offsets for any unavoidable residual impacts, the cumulative impacts of the NGBR Project, including the NGBR Project realignment, are expected to be low.

19.1.6 Matters of national environmental significance

It is considered that the scale of impact to values assessed in the NGBR Project EIS has not changed significantly. Furthermore, the impacts of the NGBR Project realignment to species not previously assessed in the NGBR Project EIS are not considered regionally significant.

A detailed cumulative assessment on matters of national environmental significance is provided in Volume 2 Appendix D Revised matters of national environmental significance.

19.1.7 Water resources

The impacts of the NGBR Project, including the NGBR Project realignment, on water resources are expected to be relatively minor and temporary. As such, there is low potential for cumulative impacts to occur.

The majority of the NGBR Project realignment runs parallel to the Newlands line and Northern Missing Link, at a distance of approximately 50 m. Potential cumulative impacts with the Newlands line include coal dust impacts to water quality. It is considered that management of coal dust in generally consistent with the Aurizon Coal Dust Management Plan (Aurizon 2010) will mitigate these impacts.

Cumulative hydraulic and hydrologic also have the potential to occur where the NGBR Project realignment runs parallel to the Newlands line and Northern Missing Link, due to their respective waterway crossing treatments. All crossing structures for the NGBR Project, including the NGBR Project realignment, will be required to meet the relevant design criteria (refer Volume 2 Appendix B Revised project description).

Potential impacts during construction will be bound to specific locations or timeframes and are thus unlikely to interact with similar impacts from the Newlands line.

19.1.8 Air quality

The key finding of the cumulative impact assessment was that the NGBR Project was that significant dust impacts would not be likely providing proponents implemented standard control measures during construction and operation. As the NGBR Project and other projects would be in accordance with the GBCIF, cumulative impacts would be predominantly confined to a single corridor.

Approximately 57 km of the NGBR Project realignment runs parallel to the Newlands line and Northern Missing Link, at a distance of approximately 50 m. Assessment of air emissions from the NGBR Project and the Newlands line, up to its approved and committed capacity of 50 mtpa, has been undertaken in Volume 2 Appendix C NGBR Project realignment report.

19.1.9 Noise and vibration

The key finding of the cumulative impact assessment was that as the NGBR Project will be in accordance with the GBCIF, cumulative impacts would be confined to a single corridor. As such, the number of sensitive receptors with the potential to be impacted is minimised.

Approximately 57 km of the NGBR Project realignment runs parallel to the Newlands line, at a distance of approximately 50 m. Assessment of the NGBR Project and the Newlands line, up to its approved and committed capacity of 50 mtpa, has been undertaken in Volume 2 Appendix C NGBR Project realignment report.

19.1.10 Waste

The key finding of the cumulative impact assessment was that no residual impacts from waste were expected to result from the NGBR Project. The quantities of waste generated by the NGBR Project are not expected to change significantly as a result of the NGBR Project realignment. Therefore it is expected that Adani's waste management strategy for the NGBR Project will accommodate the NGBR Project realignment. As such, the potential for cumulative impacts remains low.

19.1.11 Transport

The key finding of the cumulative impact assessment for the NGBR Project was that as the level of service (LOS) on key roads will be LOS C or higher during construction, and LOS B during operation. Potential traffic growth due to other regional projects was considered in background traffic demands.

A traffic assessment has been undertaken for the NGBR Project realignment (refer Volume 2 Appendix C NGBR Project realignment report). The assessment concludes that LOS on key roads will be similarly maintained to a satisfactory level. A road use management plan will be prepared for the NGBR Project, including the NGBR Project realignment, in consultation with key stakeholders. As such, the potential for cumulative impacts remains low.

19.1.12 Cultural heritage

Potential impacts to cultural heritage identified in NGBR Project EIS Volume 1 Chapter 19 Cultural heritage was that residual impacts were only expected for unregistered or otherwise unexpected items or places of cultural heritage.

A cultural heritage assessment has been undertaken for the NGBR Project realignment (refer Volume 2 Appendix C NGBR Project realignment report). It is also noted that a minor realignment near chainage 16.5 km, in the vicinity of Mount Roundback, is proposed to avoid a registered rock art site (refer Volume 2 Appendix C NGBR Project realignment report).

As committed in NGBR Project EIS Volume 1 Chapter 15 Cultural heritage, a comprehensive cultural heritage survey will be undertaken, prior to commencement of construction, involving all relevant Native Title and Traditional Owner stakeholders, in accordance with duty of care under the *Aboriginal Cultural Heritage Act 2003*. An archaeological survey will also be undertaken to identify non-Indigenous heritage. As such, the potential for cumulative impacts to Indigenous and non-Indigenous cultural heritage remains low.

19.1.13 Social and economic impacts

The NGBR Project realignment is not expected to significantly change the workforce, capital and operational expenditure, regional stakeholders involved in the NGBR Project. The local

content strategy for the NGBR Project will leverage a range of economic and social benefits for the region of the NGBR Project through increased employment and business development opportunities. As such, the cumulative impact assessment undertaken for the NGBR Project EIS is considered applicable to the NGBR Project realignment for these regional scale issues.

Property scale impacts such as land access and fragmentation have the potential to change as a result of the NGBR Project realignment. An assessment of the potential impacts of the NGBR Project realignment on land use and tenure has been undertaken (refer Volume 2 Appendix C NGBR Project realignment report). A key finding of the cumulative impact assessment was that as the NGBR Project will be in accordance with the GBCIF, cumulative property scale impacts will be low. This assessment is considered to apply equally to the NGBR Project realignment.

19.1.14 Hazard, risk, health and safety

A risk management plan will be developed for the NGBR Project, including the NGBR Project realignment. The cumulative impact assessment concluded that the implementation of this plan would appropriately reduce the risk of hazardous events.

19.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Cumulative impacts of heavy vehicle movements
- Inclusion of additional projects in cumulative impact assessment
- Level of detail of cumulative impact assessment.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

19.3 Response to comments

19.3.1 Cumulative impacts of heavy vehicle movements

A submission was received noting the number of significant projects in the region of the NGBR Project that will lead to an increase in heavy vehicle movements on the regional road network.

As committed in the EIS, Adani will develop a traffic impact assessment and pavement impact assessment (forming the road impact assessment), road use management plan and traffic management plan, in consultation with the Department of Transport and Main Roads for State-controlled roads and local governments for local controlled roads, prior to commencement of construction. Adani will also consult with the Queensland Police Service with regards to the timing, quantity and notification of oversize vehicle movements.

19.3.2 Inclusion of additional projects in cumulative impact assessment

A number of submissions were received suggesting the inclusion of additional projects in the cumulative impact assessment undertaken for the NGBR Project. It is noted that approved and existing projects are reflected in the background air quality, noise and vibration, water quality and so forth. As such, any approved and existing projects were not explicitly assessed within the cumulative impact assessment for the NGBR Project.

19.3.3 Level of detail of cumulative impact assessment

A submission was received on the level of detail of the cumulative impact assessment. The level of detail provided in the cumulative impact assessment is considered to adhere to the TOR for the NGBR Project, which require a summary of potential cumulative impacts. The potential impacts of other projects in the region of the NGBR Project were characterised with reference to publicly available environmental assessments.

20. Legislation and approvals

20.1 Amendments to the Project description

As described in Section 3, a number of changes to the description of the NGBR Project have occurred subsequently to public consultation on the NGBR Project EIS. The identification of legislation and approvals provided in NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals is based on the proposed activities entailed in the NGBR Project. Although the proposed activities have not changed, a number of legislative changes have made it necessary to prepare updated approvals material. Updated approvals material is provided as Volume 2 Appendix J Revised legislation and approvals, which supersedes NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals

As a section of the NGBR Project realignment enters the area defined by the *Nebo Shire Planning Scheme 2008*, an assessment against this scheme is provided in Volume 2 Appendix C NGBR Project realignment report and reproduced in Volume 2 Appendix J Revised legislation and approvals.

20.2 Summary of comments

Submissions on the NGBR Project EIS raised the following issues:

- Approvals relating to ancillary construction facilities
- Application of relevant legislation and planning implements
- Adherence to safety legislation.

Responses to the above issues are provided in the following section. A detailed register of submissions and individual responses to each submission is provided in Volume 2 Appendix A Submissions register.

20.3 Response to comments

20.3.1 Details of ancillary construction facilities

Submissions were received requesting a greater level of detail for concrete batching plants, quarries and borrow areas, to allow for planning approvals. Development applications for ancillary infrastructure will be made, as necessary, to relevant administering authorities.

As stated in NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals, it is acknowledged that further information (in the form of detailed site layout designs and final site-based management material) to support future approvals will be provided prior to formal lodgement of applications with the relevant administering authorities. Updated approvals material is provided as Volume 2 Appendix J Revised legislation and approvals, which supersedes NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals

20.3.2 Relevant legislation and planning implements

A number of submissions were received to clarify approval triggers and identify additional relevant planning instruments (refer Volume 2 Appendix A Submissions register). These have been noted and will be considered in preparing the relevant application documentation.

A number of submissions reference legislation and planning instruments that have come into effect subsequently to the production of the NGBR Project EIS. It is noted that the NGBR Project EIS reflects policies and planning instruments in effect at the time of writing.

Relevant legislation and planning instruments, including reforms to Queensland's vegetation management laws, will be considered in preparing the relevant application documentation.

Updated approvals material is provided as Volume 2 Appendix J Revised legislation and approvals, which supersedes NGBR Project EIS Volume 1 Chapter 20 Legislation and approvals.

20.3.3 Safety during construction

A number of submissions raised the issue of safety during construction, with particular regard to the *Electrical Safety Act 2002*. Adani will ensure compliance with the relevant health and safety legislation during the construction and operation of the NGBR Project. Adani will continue to consult with Powerlink and Ergon Energy during detailed design of the NGBR Project to ensure compliance with regard to electrical safety, and incorporation of specific requirements for management of electrical safety in the associated infrastructure agreements.

21. Environmental management

Potential impacts associated with the NGBR realignment have been assessed across a range of environmental disciplines and are discussed in detail within each section for the NGBR realignment report (refer Volume 2 Appendix C NGBR Project realignment report).

No management, mitigation or monitoring measures are proposed for the NGBR realignment that differ substantially from those proposed within the NGBR Project EIS. It is also considered that submissions received on the NGBR Project EIS have not warranted a substantial change to the measures proposed in the NGBR Project EIS. As such the environmental management framework established in NGBR Project EIS is considered to be sufficient to manage the potential impacts of the NGBR Project, including the NGBR Project realignment, other minor alignments and associated changes.

An updated framework is provided in Volume 2 Appendix H Revised environmental management plan framework. Adani will continue to develop the environmental management plan for the NGBR Project, including sub-plans for specific aspects of the environment, such as flora and fauna, noise and vibration, waste and traffic (amongst others). Any conditions or recommendations contained with the Coordinator-General's Evaluation Report on the NGBR Project will be incorporated and further developed within the environmental management plan, prior to the commencement of early works.

The final environmental management plan for the NGBR Project will additionally define the roles and responsibilities for environmental management staff, their training requirements, and the monitoring and internal auditing of environmental management plan, to ensure its full implementation and effectiveness.

Additional commitments for the NGBR Project are compiled in Volume 2 Appendix G Revised commitments.

22. References

Department of Environment and Heritage Protection (DEHP) 2013, Application requirements for activities with impacts to air, retrieved February 27, 2014, from http://www.ehp.qld.gov.au/era/air-impacts-em960.

State of Queensland 2013a, Galilee Basin Coal Infrastructure Framework – Rail and port, retrieved June 29, 2013, from http://www.dsdip.qld.gov.au/infrastructure-planning-and-reform/galilee-basin-infrastructure-framework-rail-and-ports.html.

State of Queensland 2013b, Galilee Basin Development Strategy, retrieved February 10, 2014, from http://www.dsdip.qld.gov.au/resources/plan/galilee-basin-strategy.pdf.

GHD

145 Ann Street Brisbane QLD 4000
GPO Box 668 Brisbane QLD 4001
T: (07) 3316 3000 F: (07) 3316 3333 E: bnemail@ghd.com

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