5.2 Advisory Agency Responses

5.2.1 Department of Aboriginal and Torres Strait Islander and Multicultural Affairs (submitter 23)

5.2.1.1 Issue 1

NAC is committed to continuing its established relationship with Aboriginal and Torres Strait Islander people in the local area, including engagement through the Oakey Reconciliation Committee. A representative from the Oakey Reconciliation Committee currently sits on NAC's CRG and contributes to conversations regarding NAC's operations. NAC's commitment also encompasses an internal Equal Employment Opportunity Policy and Guidelines which aim to foster a workplace where employees feel that they are valued members of the organisation and that they are treated fairly.

Contact has been made with representatives from the Queensland Department of Aboriginal and Torres Strait Islander and Multicultural Affairs in relation to the revised Project. Discussions will take place between NAC and departmental officers regarding potential employment and business development opportunities for Aboriginal and Torres Strait Islander people.

5.2.2 Department of Defence (submitter 194)

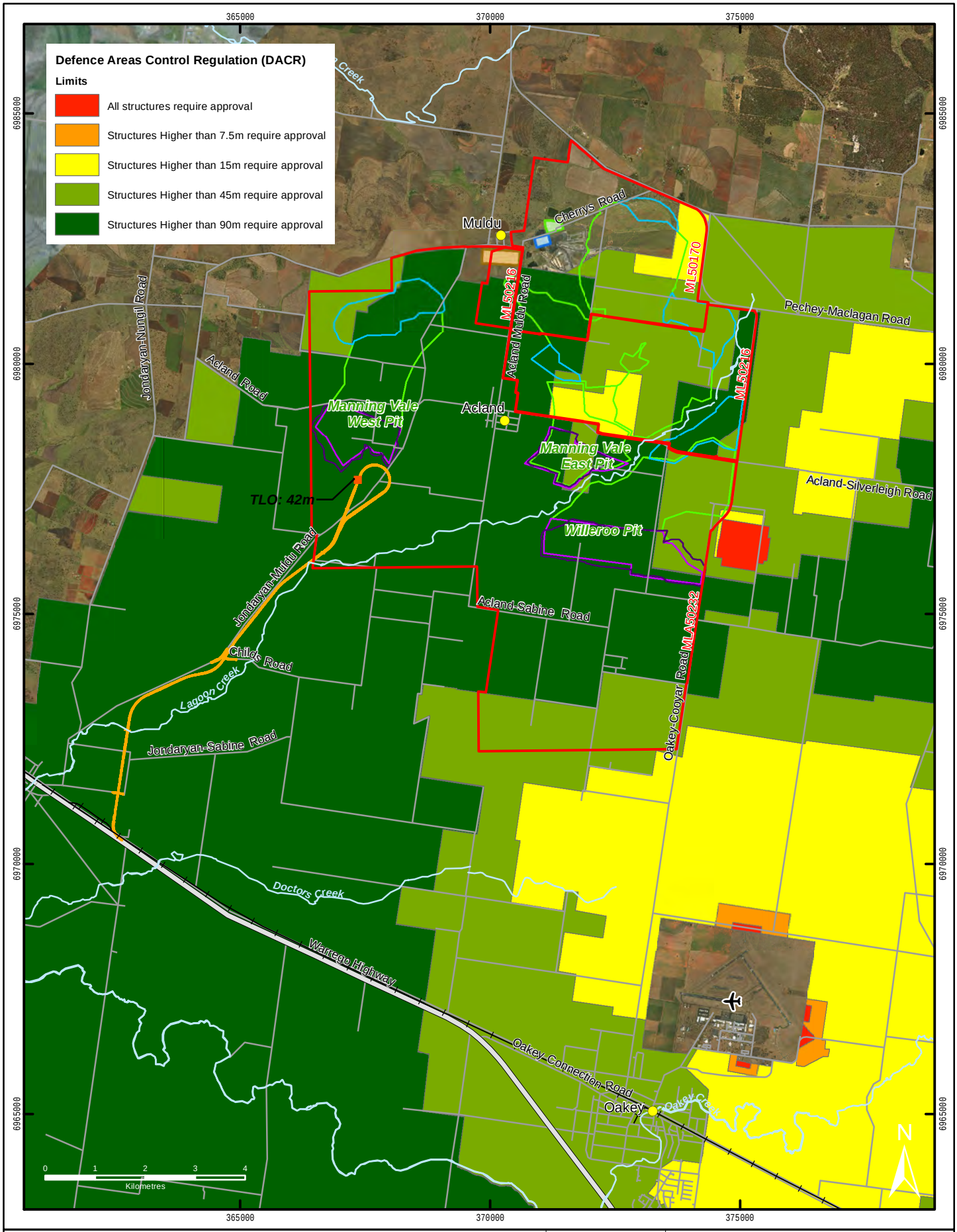
5.2.2.1 Issue 1

NAC recognises the significant effort and support from Defence in development of the AHMP to address previous concerns raised regarding circuit area flying restrictions, transit flying routes, light pollution, dust, air traffic radar considerations and outer marker instrument approaches and welcome Defence's general satisfaction of the AHMP.

NAC reviewed the Defence (Area Control) Regulations and will seek a specific assessment and approval through Defence if the height assessment criteria, as discussed in **Section 5.2.2.2** is triggered.

5.2.2.2 Issue 2

NAC takes note of the restrictions placed on the height of objects within a radius of approximately 15 km of Army Aviation Centre (AAC) Oakey as stipulated in the Defence (Area Control) Regulations. NAC will seek assessment and approval for any tall structures that is above 30 m above ground level within 30 km of the AAC Oakey, and any tall structures that is above 45 m above ground level elsewhere as depicted in **Figure 5.2-A** of the AEIS.



LEGEND

- Oakey Airport
- Towns and Localities
- Train Loadout Facility (TLO)
- Creeks
- Roads
- Highway
- Western Rail Line
- Revised Rail Spur and Balloon Loop Alignment
- Mining Tenements
- CHPP Precinct
- Material Handling Facility
- Mine Industrial Area

Disturbance Areas

- Area Pits
- Areas Voids
- Out of Pit Spoil Dumps
- Areas Depressed

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 5.2-A - Clearance Map for Defence (June 2014)

Scale 1:100,000 on A4
Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 24/08/2014 Path: I:\QENV2\Projects\QE06644\SpatialArcGIS\01_Figures\03_AE\SNACP_Section5.2.2\140619_NewHope_Figure5-2-A_ClearanceMapDefence.mxd

5.2.2.3 Issue 3

NAC provided a list of stakeholders engaged during the development of the AHMP as part of **Appendix J.17** of the draft EIS. NAC recognises that these stakeholders will change over time and will update stakeholder contacts as part of NAC's stakeholder engagement activities.

5.2.3 Department of Transport and Main Roads (submitter 236)

5.2.3.1 Issue 1

Additional intersection turning movement counts were undertaken on Wednesday, 29 May 2014 for the following intersections and at-grade level crossings:

Intersections

- Jondaryan-Sabine Road / Warrego Highway;
- Pechey-Maclagan Road / Cherrys Road;
- Acland-Sabine Road/Oakey-Cooyar Road; and
- West Duke Street / Warrego Highway.

Level crossing

- Davidson Street, Oakey;
- Bridge Street, Oakey;
- Davidson Rd, Oakey Cooyar Rd, Oakey; and
- Duke Street East, Jondaryan.

The traffic performance of each intersection outlined above has been analysed using the SIDRA 5 intersection analysis tool. The following traffic assumptions have been adopted for the assessment:

- The peak hour flows adopted for the assessment is based on the peak hour obtained from the traffic surveys. This is to ensure that a robust assessment has been undertaken to capture the worst possible scenario (i.e. peak background traffic and peak traffic related to revised Project area).
- The traffic growth factors used for this assessment are similar to the traffic growth factors adopted from **Chapter 13** of the draft EIS.
- The intersection performance criteria are outlined within **Section 13.11.1** of the draft EIS.
- The traffic volumes for the construction (2016) phase, the operation (2017) and ten year horizon phase were obtained from **Section 13.7** and **Section 13.8** of the draft EIS.
- The following scenarios were modelled for each intersection:
  - AM and PM peak hour, base case (2014) – current traffic based on the May 2014 intersection turning movement counts.

- AM and PM peak background traffic hour and peak construction traffic generation (2016) phase - a combination of peak hour traffic form the 2016 back ground traffic based on 2014 counts factored up with a 3.5 % per year traffic growth and the estimated peak hour project construction traffic.
- AM and PM peak hour, operation (2017) phase - a combination of peak hour traffic from the 2017 back ground traffic based on 2014 counts factored up with a 3.5 % per year traffic growth and the estimated peak hour project operation traffic
- AM and PM peak hour, ten year horizon (2027) phase - a combination of peak hour traffic from the 2017 back ground traffic based on 2014 counts factored up with a 3.5 % per year traffic growth and the estimated peak hour project operation traffic

The survey data obtained for the existing and proposed level crossings will be used for the ALCAM assessment. Note: A request has been submitted to QR to undertake an accredited ALCAM assessment.

The following sections outline the intersection assessment for each intersection outlined above. Refer to **Appendix K** of the AEIS for detailed SIDRA summary outputs for the intersection assessment undertaken below.

Intersection assessment

Performance Criteria

The operation for each intersection has been analysed using SIDRA 5 intersection analysis tool. This program assesses the operation of the intersection based on inputs relating to the layout and geometry of the intersection and traffic volumes. The key performance indicator for intersection is the Degree of Saturation (DoS) defined as the ratio of demand to available capacity for the most critical movement at the intersection.

The GARID guidelines define the following standard DoS thresholds:

- Priority- controlled intersection 0.80
- Roundabout 0.85
- Signalised intersections 0.90

The guidelines also notes that a DoS exceeding these thresholds indicates that an intersection is nearing its practical capacity and upgrades works may be required. If the DoS is above the threshold values, users of the intersections will experience increasing delays and queues.

Intersection delays are assessed based on the intersection Level of Service (LoS.) Where the LoS levels of an approach is D or greater, users of the intersection will experience increased delays and queues.

Jondaryan Sabine Road/ Warrego Highway

The existing layout of Jondaryan Sabine Road / Warrego Highway intersection and the length of the turn lanes are illustrated within **Figure 5.2-B**.

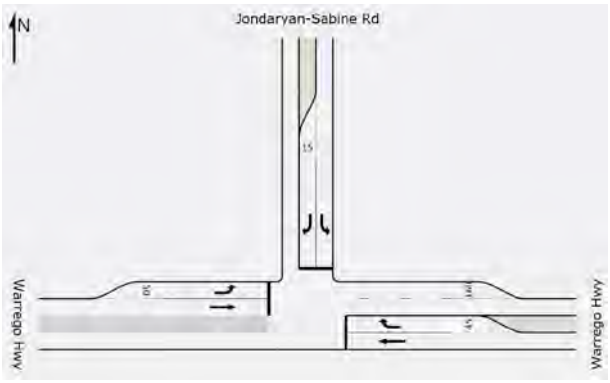


Figure 5.2-B: Existing intersection layout – Jondaryan Sabine Road/ Warrego Highway

This intersection was modelled as a signalised intersection to take account of the existing level crossing that is located 18m north of the intersection. The signal phasing adopted for the assessment of this intersection is illustrated within **Figure 5.2-C**. From the traffic survey undertaken (May 2014), the maximum time for a train crossing was 47 seconds. For a robust assessment, 60 seconds timeframe was adopted for the existing level crossing.

Figure 5.2-C: Signal phasing for Jondaryan Sabine Road/ Warrego Highway

The performance of the intersection for the base case (2014 traffic volumes), the peak construction (2016), the operation (2017) and the ten year horizon (2027) phase are summarised within **Table 5.2-A**.

Table 5.2-A: SIDRA summary results – Jondaryan Sabine Road/ Warrego Highway

Key destination	Period	Total Volume	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
Base Case (2014)					
Existing condition	Am	603	0.186	1.0	4.0
	Pm	593	0.174	0.8	3.4
Peak Construction (2016) phase					
Without revised Project	Am	947	0.200	1.0	4.2
	Pm	636	0.191	0.9	3.6
With revised Project	Am	762	0.266	3.3	16.7
	Pm	742	0.219	2.8	23.8

Key destination	Period	Total Volume	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
Operation (2017) phase					
Without revised Project	Am	953	0.265	1.4	12.8
	Pm	659	0.198	0.8	2.6
With revised Project	Am	752	0.286	2.6	10.8
	Pm	741	0.283	2.2	9.0
Ten year horizon (2027)					
Without revised Project	Am	953	0.265	1.4	12.8
	Pm	928	0.295	0.9	5.0
With revised Project	Am	780	0.380	3.1	13.5
	Pm	1011	0.367	2.3	12.8

[1]The Degree of Saturation (DoS) represents the ratio of demand to available capacity for the most critical movement at the intersection. A DoS of 0.90 represents a desirable maximum for acceptable operation of signalised intersection and roundabouts. For priority intersections a DoS above 0.80 indicates that more formal control is warranted.
[2] Maximum 95th percentile queue length for intersection

The results of the SIDRA testing for the intersection capacity impacts show that the Warrego Highway/Jondaryan-Sabine Road intersection would perform within the acceptable range of DoS, delays and queues for the peak construction (2016) phase, the operation (2017) phase and the ten year horizon (2027) phase.

The proximity of the existing level crossing to the Jondaryan Sabine Road/ Warrego Highway poses a safety issue. This is as heavy vehicles (approximately 19m) travelling southbound on Jondaryan-Sabine Rd approaching the Warrego Hwy are required to wait for an acceptable gap in traffic at the intersection. This results in the tail of the heavy vehicle being located over the tracks at the level crossing. There is also a safety risk with left turn queues (into Jondaryan Sabine Road) blocking the through traffic along Warrego Highway due to the delays cause by the level crossing.

The accredited ALCAM assessment should be reviewed to understand the issues and mitigation measures relating to the existing level crossing before NAC undertake any further safety analysis.

NAC is in discussion with TMR, QR and TRC in regards to the safe interaction of the existing Jondaryan Sabine Road/ Warrego Highway intersection with the level crossing.

Peachey –Maclagan Road/ Northern MIA Access Road

The existing layout of Peachey-Maclagan Road /Northern MIA Access Road intersection and the length of the turn lanes is illustrated within **Figure 5.2-D**. The intersection currently operates under a give-way control. Cherrys Road is a former public road within ML 50170 that is closed for public use. The former Cherrys Road alignment is used for internal access purposes. A new Northern Access road will be constructed for light vehicle access from Oakey-Cooyar Road. Therefore, all traffic that were traversing Cherrys Road will now use Northern MIA Access Road.

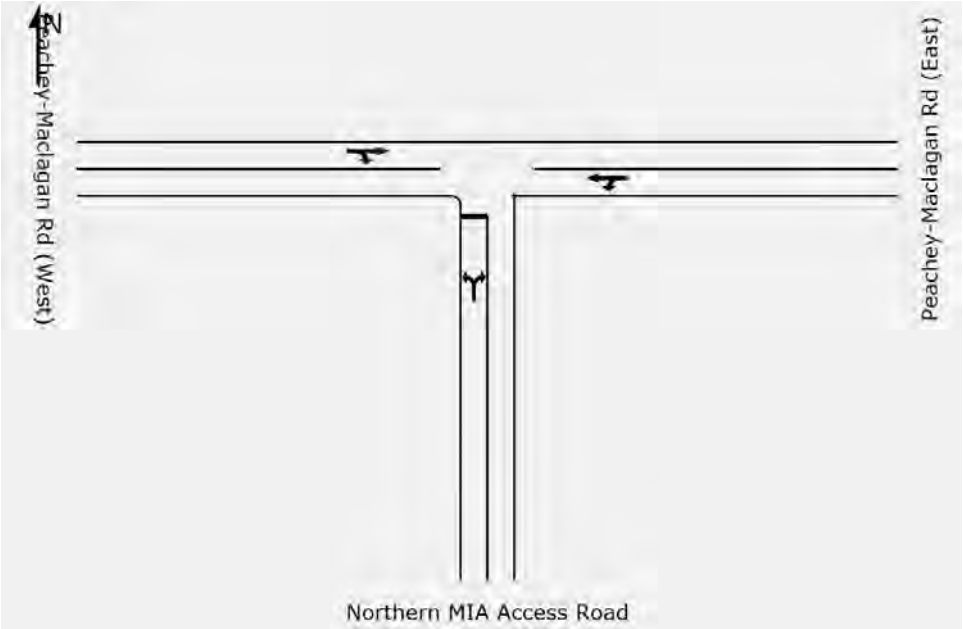


Figure 5.2-D: Existing intersection layout – Peachey Maclagan Road/ Northern MIA Access Road

The performance of the intersection for the base case (2014 traffic volumes), the peak construction (2016), the operation (2017) and the ten year horizon (2027) phase are summarised within **Table 5.2-B**

Table 5.2-B: SIDRA summary results – Peachey Maclagan Road/ Northern MIA Access Road

Key destination	Period	Total Volume	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
Base Case (2014)					
Existing condition	Am	81	0.025	0.7	1.0
	Pm	73	0.025	0.7	1.0
Peak Construction (2016) phase					
Without revised Project	Am	86	0.027	0.7	1.1
	Pm	78	0.027	0.7	1.1
With revised Project	Am	207	0.083	7.7	1.0
	Pm	199	0.150	7.4	4.4
Operation (2017) phase					
Without revised Project	Am	89	0.028	0.7	1.1
	Pm	46	0.028	1.0	1.1
With revised Project	Am	189	0.074	7.1	2.0

Key destination	Period	Total Volume	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
	Pm	199	0.073	7.4	2.0
Ten year horizon (2027)					
Without revised Project	Am	111	0.036	0.6	1.5
	Pm	67	0.041	0.8	1.7
With revised Project	Am	489	0.158	9.3	2.7
	Pm	226	0.078	0.8	1.7

[1]The Degree of Saturation (DoS) represents the ratio of demand to available capacity for the most critical movement at the intersection. A DoS of 0.90 represents a desirable maximum for acceptable operation of signalised intersection and roundabouts. For priority intersections a DoS above 0.80 indicates that more formal control is warranted.
[2] Maximum 95th percentile queue length for intersection

The results of the SIDRA testing for the intersection capacity impacts show that the Peachey-Maclagan Road /Northern MIA Access Road intersection would perform within the acceptable range of DoS, delays and queues for the peak construction (2016) phase, the operation (2017) phase and the ten year horizon (2027) phase.

Note: This intersection will be upgraded to a sealed intersection as part of the mine infrastructure. The improved intersections should be designed as close to a 90 degree t-section to improve sight distances. The design of the proposed intersection will be detailed within the Road Impact Assessment (RIA) report that will be undertaken during the detaileded design stage.

Acland Sabine Road/ Oakey-Cooyar Road

The existing layout of Acland Sabine Road/Oakey –Cooyar Road intersection and the length of the turn lanes is illustrated within **Figure 5.2-E**. The intersection currently operates under a give-way control.

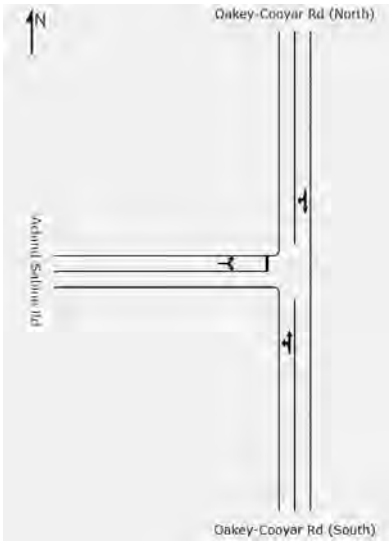


Figure 5.2-E: Existing intersection Layout –Acland Sabine Road/ Oakey –Cooyar Road

The performance of the intersection for the base case (2014 traffic volumes), the peak construction (2016), the operation (2017) and the ten year horizon (2027) phase are summarised within **Table 5.2-C**.

Table 5.2-C: SIDRA summary results – Acland Sabine Road/ Oakey –Cooyar Road

Key destination	Period	Total Volume	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
Base Case (2014)					
Existing condition	Am	93	0.035	0.8	1.4
	Pm	98	0.033	1.4	0.8
Peak Construction (2016) phase					
Without revised Project	Am	100	0.037	0.8	1.5
	Pm	104	0.035	1.3	0.9
With revised Project	Am	215	0.076	0.5	1.6
	Pm	220	0.080	0.8	3.4
Operation (2017) phase					
Without revised Project	Am	103	0.038	0.8	1.5
	Pm	107	0.035	1.3	0.8
With revised Project	Am	208	0.066	0.4	2.7
	Pm	213	0.063	0.8	2.1
Ten year horizon (2027)					
Without revised Project	Am	152	0.054	1.3	1.3
	Pm	152	0.050	1.5	1.2
With revised Project	Am	257	0.080	0.9	2.5
	Pm	257	0.079	1.1	2.6

[1]The Degree of Saturation (DoS) represents the ratio of demand to available capacity for the most critical movement at the intersection. A DoS of 0.90 represents a desirable maximum for acceptable operation of signalised intersection and roundabouts. For priority intersections a DoS above 0.80 indicates that more formal control is warranted.

[2] Maximum 95th percentile queue length for intersection

Acland-Sabine Road is expected to be the future access road for Acland. No project related traffic is expected to use Acland-Sabine Road. All mine related traffic will travel along Oakey-Cooyar road to access the mine via the Northern Access Road.

The results of the SIDRA testing for the intersection capacity impacts show that the Acland Sabine Road/ Oakey – Cooyar Road intersection would perform within the acceptable range of DoS, delays and queues for the peak construction (2016) phase, the operation (2017) phase and the ten year horizon (2027) phase.

Acland-Sabine Road is expected to be the future access road for Acland township. No project related traffic is expected to use Acland Sabine Road. All mine related traffic will travel along Oakey –Cooyar road to access the mine via the Northern MIA Access Road.

West Duke Street/ Warrego Highway

The existing layout of West Duke Street and Warrego Highway intersection and the length of the turn lanes is illustrated within **Figure 5.2-F**. The intersection currently operates under a give-way control.

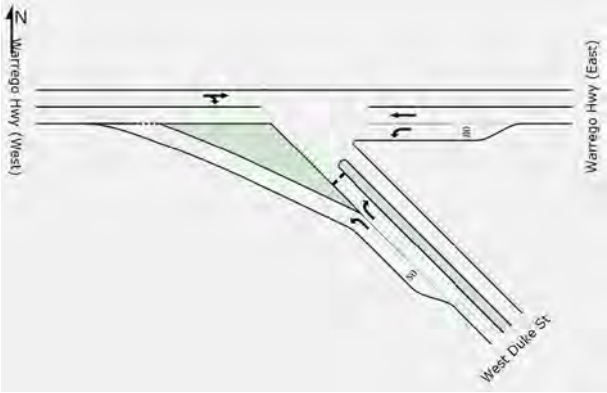


Figure 5.2-F: Existing intersection Layout – West Duke Street/ Warrego Highway

The performance of the intersection for the base case (2014 traffic volumes), the peak construction (2016), the operation (2017) and the ten year horizon (2027) phase are summarised within **Table 5.2-D.**

Table 5.2-D SIDRA summary results – West Duke Street/ Warrego Highway

Key destination	Period	Total Volume	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
Base Case (2014)					
Existing condition	Am	529	0.157	1.6	9.3
	Pm	545	0.180	1.2	10.2
Peak Construction (2016) phase					
Without revised Project	Am	567	0.168	1.7	10.3
	Pm	583	0.192	1.2	11.3
With revised Project	Am	577	0.173	1.7	10.6
	Pm	593	0.192	1.2	11.4
Operation (2017) phase					
Without revised Project	Am	587	0.174	1.8	10.8
	Pm	603	0.199	1.3	11.8
With revised Project	Am	596	0.176	1.8	11.0

Key destination	Period	Total Volume	Max DoS[1]	Average delay (sec)	Maximum 95th percentile queue length[2] (metres)
	Pm	613	0.201	1.3	12.1
Ten year horizon (2027)					
Without revised Project	Am	858	0.288	4.2	37.4
	Pm	880	0.297	2.5	24.4
With revised Project	Am	862	0.290	4.2	37.6
	Pm	903	0.300	2.7	25.8

[1]The Degree of Saturation (DoS) represents the ratio of demand to available capacity for the most critical movement at the intersection. A DoS of 0.90 represents a desirable maximum for acceptable operation of signalised intersection and roundabouts. For priority intersections a DoS above 0.80 indicates that more formal control is warranted.

[2] Maximum 95th percentile queue length for intersection

No project related traffic is expected to traverse West Duke Street. All project generated traffic is expected to traverse along Warrego Highway to get to Jondaryan township.

The results of the SIDRA testing for the intersection capacity impacts show that the West Duke Street/ Warrego Highway intersection would perform within the acceptable range of DoS, delays and queues for the peak construction (2016) phase, the operation (2017) phase and the ten year horizon (2027) phase.

There is an existing hazard at this intersection due to sub-standard intersection geometry. Heavy vehicles making turning movements at the Warrego Highway/West Duke Street intersection may track into adjacent vehicle lanes. Right turning movements from West Duke Street and left turning movements from Warrego Highway may cause this due to inadequate geometry and pavement width to accommodate the swept path of large HCVs (19 metre semi-trailers and larger). This is potentially hazardous for the traffic stream in the opposite direction**.**

TMR and TRC should undertake the appropriate intersection improvements to rectify the sub-standard geometry.

The results of the SIDRA assessment for key intersections indicate that the all intersections assessed has sufficient capacity to accommodate the additional traffic related to the construction and operation phase of the revised Project. The geometry and safety aspects of the intersection (road safety assessment) will be undertaken during the detail design stage and will be captured within the RIA report.

A detailed revised SIDRA assessment, intersection turn warrants and road safety assessment in accordance with DTMR's Road Planning and Design Manual can only be undertaken upon confirmation of the transport routes during the operation and construction phase for the revised Project RIA report which will be undertaken during the detailed design stage.

Detailed mitigation measures and strategies will be outlined within the RIA, RMP and the TMP which will be undertaken when the project execution contracts have been awarded.

5.2.3.2 Issue 2

Section 13.6.3 of the draft EIS provides the complete list of road closures. Acland-Silverleigh Road (between the Oakey-Cooyar and the eastern boundary of Acland) is the only state-controlled road that is proposed to be closed for the duration of the revised Project. Detail design of the road closures will be captured within the RIA report during the detailed design stage.

5.2.3.3 Issue 3

Refer to **Section 5.2.3.1** for details of the intersection assessment of Acland-Sabine Road/ Oakey-Cooyar Road. Acland Sabine Road will be the key access to Acland. All light vehicles accessing the revised Project site will do so via the Northern Access Road.

Note**:** Cherrys Road is a former public road within ML 50170 that is closed for public use. The former Cherrys Road alignment is used for internal access purposes. A new Northern Access road will be constructed for light vehicle access from Oakey-Cooyar Road.

5.2.3.4 Issue 4

Road coal transportation during the operational phase of the revised Project will mainly involve the haulage of product coal by licensed contractors as per the existing arrangement. Note that the current road based coal demand contracts are for 0.15Mtpa. This is expected to increase to 0.20Mpta for the revised Project phase. The expected tonnage and destination of the existing annual 0.15 Mtpa domestic demand are summarised within **Table 5.2-E**.

Table 5.2-E: Operation phase domestic haulage demand – tonnage and destination

Key destination	Tons per year
Queensland Region	
Acacia Ridge	39
Beaudesert	26,764
Ipswich	20,600
Kilcoy	5,880
Kingaroy	2,400
Labrador	1,140
Landsborough	1,800
Murarrie	46,604
Northgate	7,200
Oakey	5,760
Rockhampton	5,400
South Brisbane	3,300
Texas	1,920
Wallangarra	3,000
Warwick	4,020

Key destination	Tons per year
New South Wales Region	
Casino	1,433
Harwood	1,908
Inverell	7,200
TOTAL tons per year	**146,368**

The traffic generation and traffic distribution for the increase of 0.05Mtpa road base coal demand will be consistent with the existing local coal demands. It is therefore estimated that there will be a maximum of 24 two-way heavy vehicle movements per day associated with the local coal demand for the revised Project during operation phase. This estimation is based on the assumption that the each delivery vehicles has a 40 tonne capacity, operational activities occur 6 days a week with 52 weeks per year. Using the standard 0.10 peak hour factor, it is estimated that there will be a maximum of 4 two-way heavy vehicle movements during the peak hour. This is less than the estimated 6 two-way heavy vehicle movement outlined within **Section 13.8.4** of the draft EIS.

The road coal transportation will mainly be delivered via the realigned Jondaryan-Muldu Road and Warrego Highway via the Jondaryan Sabine Road and Warrego Highway intersection. Majority of heavy vehicle moments (85%) are heading east, taking a left turn into Warrego Highway.

Majority of the domestic coal haulage transportation will be undertaken by approved vehicles types for the given routes within the vicinity of the revised Project site,

The domestic coal haulage as outlined would have been captured within the existing turning movement counts undertaken on Wednesday, 29 May 2014 above.

5.2.3.5 Issue 5

Refer to **Section 5.2.3.1** for details of the intersection assessment undertaken for key intersections affected within the revised Project area. Intersection turning movement counts were undertaken on Wednesday, 29 May 2014 for those intersections that data was not available from DTMR and TRC. Refer to **Appendix J** of the AEIS (Intersection counts) for intersection survey data.

5.2.3.6 Issue 6

Refer to **Section 5.2.3.1** for details of the intersection assessment undertaken Jondaryan Sabine Road/ Warrego Highway. This Section further outlines any required intersection capacity upgrades. NHG will continue its current close consultation procedure with the relevant personnel within DTMR, TRC and QR to ensure an appropriate mitigation measure is implemented for this intersection. The agreed mitigation measure will be outlined within the RIA report which will be undertaken during the detailed design stage.

5.2.3.7 Issue 7

The SIDRA analysis undertaken for Warrego Highway and Jondaryan-Sabine Road intersection outlined within **Section 13.11.3** of the draft EIS includes all project traffic during the operation phase,

including the traffic generated by the haulage of domestic coal. All project traffic during the operation phase includes the following:

- 2017 operation phase traffic demand based on workforce, material and equipment traffic generation;
- "Road coal demand" for approximately 0.2 Mtpa annually which equates to 6 two-way heavy vehicle movement; and
- "Nominal" demand includes an additional 20 (two-way) movements during the peak periods to ensure the road network can accommodate any additional trip variation generated by the revised Project.

As outlined within **Section 5.2.3.4** of the AEIS, the latest detailed traffic estimation for the road coal demand are less than what was estimated within the initial traffic assessment. Therefore, the traffic impacts estimated within the initial assessment are more conservative (i.e. the worst case scenario).

Refer to **Section 5.2.3.1** for details of the intersection assessment undertaken for key intersections affected within the revised Project area. NHG will continue its current consultation process with DTMR and TRC regarding the required intersection capacity upgrades to ensure the proposed upgrades are approved and completed within an agreed timeframe. The proposed intersection upgrades will be captured within the RIA report which will be undertaken during the detail design stage.

5.2.3.8 Issue 8

The accredited ALCAM report from QR will outline the findings of the level crossing assessment undertaken on the key level crossings located within proximity to the revised Project site. NAC will ensure that appropriate discussion are undertaken with the DTMR Downs-South West Region and the relevant rail authority to ensure appropriate mitigation measures are implemented based on the design consideration outlined within the ALCAM report and subsequent discussion with the relevant authorities. Any necessary construction approvals will be sought once an agreement has been reached with the relevant authorities during the detailed design stage.

5.2.3.9 Issue 9

The current road based coal transportation is undertaken in accordance with *the Transport Infrastructure Act 1994* (TI Act). Currently all trucks owned by the domestic customers leaving the mine site have their loads covered.

NAC contracts with all domestic customers who currently comply with requirements outlined within *Load Restrain Guide 2nd Edition, 2004*.

5.2.3.10 Issue 10

The ALCAM report provided within **Appendix G.8** of the draft EIS was produced using the ALCAM tool. An accredited ALCAM report is being undertaken by the rail manager QR.

NHG will undertake the appropriate discussions with QR, Aurizon, DTMR and TRC to ensure the appropriate mitigation measures are implemented based on the proposed design considerations outlined within the ALCAM assessment that would be undertaken by QR.

5.2.3.11 Issue 11

Refer to **Section 5.2.3.4** of the AEIS for detailed information of the road based coal demand for the revised Project.

5.2.3.12 Issue 12

DTMR have provided clarification and information in regards to RMP and the TMP on Tuesday, 3 June 2014.

DTMR's Guidelines to assist in the preparation of the RMP commitments table will be reviewed when preparing the RMP during the detailed design stage. It is understood from DTMR documentation that the TMP report will generally describe how any required roadworks undertaken during the construction phase will be safely undertaken in accordance with the MUTCD.

Note that the RMP and TMP will be undertaken when the project execution contracts have been awarded. NHG will continue to consul TMR to ensure all stakeholders are satisfied with the outcomes of the RMP and TMP prior to the commencement of significant project related traffic.

5.2.3.13 Issue 13

The traffic assessment includes all the estimated trips generated by the construction traffic, as outlined within **Section 13.7** of the draft EIS. The estimated traffic generation and distribution outlined within **Chapter 13** of the draft EIS is the best possible estimated for a pre-feasibility design level. Travel routes and distribution can only be confirmed once the project execution contracts have been awarded, which is expected to occur in 2015. The RMP and the TMP will best capture the most up-to-date construction traffic volume and distribution estimation at the time of producing those plans.

5.2.3.14 Issue 14

Refer to **Section 5.2.3.4** of the AEIS for detailed information of the road based coal demand for the revised Project.

5.2.3.15 Issue 15

A detailed road safety assessment can only be undertaken upon confirmation of the transport routes for the revised Project. NAC will ensure appropriate road safety audits are undertaken during the detailed design stage to ensure the confirmed transport route road safety risks are adequately dealt with. Detailed mitigation measures and strategies will be outlined within RMP and the TMP which will be undertaken when the project execution contracts have been awarded.

5.2.3.16 Issue 16

The operation phase is unlikely to generate high volumes of domestic haulage within the road network, as no increase from current domestic tonnages are forecasted. However, NAC will ensure that the current measures stay in place to reduce the likelihood of product spill through covering loads and washing down vehicles prior to departure from the construction site is maintained during the operation phase also.

5.2.4 Department of Environment and Heritage Protection (submitter 332)

5.2.4.1 Issue 1

NAC has given notice in writing to the chief executive under Section 307 of the MR Act to partially abandon ML 50232. The boundaries for the revised Project are shown in **Section 5.1.2** of the AEIS. The Acland area is now excluded from the MLA. The relevant information contained within the draft EIS was used as supporting information for the application under Section 307 of the MR Act.

For additional information about this issue, please refer to **Section 5.1.2** of the AEIS.

5.2.4.2 Issue 2

NAC confirms that the extent of the surface rights area and the mining lease boundaries, as it relates to the revised Project, are as depicted in **Section 5.1.2** of the AEIS. The EA will be directly related to the mining activities as defined under Section 110 of the EP Act occurring within the ML boundaries. NAC understands its legal obligations to comply with its EA. In light of these obligations, NAC has prepared a series of environmental management plans for the revised Project. These Plans are located in **Appendix J** of the draft EIS. The Conservation Management Plan outlines a series of strategies which aim to protect and enhance the environmental values of Lagoon Creek and Bottle Tree Hill. This Plan is located in **Appendix J.6**.

5.2.4.3 Issue 3

Refer to the revised Regulatory Approvals Plan located **Appendix A**. In addition, reference should also be made to **Chapter 4** of the AEIS.

5.2.4.4 Issue 4

Refer to the revised Regulatory Approvals Plan located **Appendix A**. In addition, reference should also be made to **Chapter 4** of the AEIS.

5.2.4.5 Issue 5

Refer to the revised Regulatory Approvals Plan located **Appendix A**. In addition, reference should also be made to **Chapter 4** of the AEIS.

5.2.4.6 Issue 6

If the revised Project is approved, the amended EA will include the activities conducted on the current Stage 2 site as well as the proposed Stage 3 mining lease areas. NAC understands that all legitimate enquiries relating to the revised Project and the Mine will need to be addressed appropriately. NAC acknowledges that **Figure 3-1** of the LSMP (**Appendix J.18** of the draft EIS) should remove reference to Stage 3 and replace it with 'the New Acland Coal Mine'. NAC will ensure that this anomaly is corrected in the final LSMP should the revised Project be approved.

5.2.4.7 Issue 7

NAC confirms the definition of 'legitimate complaints' as a compliant that is either frivolous or vexatious in nature or is demonstrated through evidence to be genuine in nature. The framework to be implemented by NAC for the revised Project will mirror the current EA condition as follows.

All complaints received by the holder of this environmental authority relating to the environmentally relevant activity must be recorded in a suitable database with the following details:

(a) time and date of complaint;
(b) type of communication (telephone, letter, personal etc.);
(c) name, contact address and contact telephone number of complainant (Note: if the complainant does not wish to be identified then "Not identified" is to be recorded);
(d) response and investigation undertaken as a result of the complaint;
(e) name of person responsible for investigating complaint; and
(f) action taken as a result of the complaint investigation and signature of responsible person.

If the complaint is determined to be a legitimate complaint, NAC will liaise with the complainant to resolve their issues expediently. In addition, **Section 3.3** of the LSMP (**Appendix J.18** of the draft EIS) outlines the process of dealing with complaints. In addition the complaints procedure is outlined in **Section 5.1.5** of the AEIS.

5.2.4.8 Issue 8

NAC commits to provide interpreted data within a week, or earlier if possible, from DEHP requesting the data.

5.2.4.9 Issue 9

The AHPAC no longer exists as the purpose of this committee was to oversee the dealing as associated with particular items of local significance within Acland. As stated in **Chapter 3** of the draft EIS, Acland will remain and be managed through the implementation of the AMP. The AMP is located in **Appendix I** of the AEIS. In addition refer to **Chapter 6** of the AEIS for the appropriate amendment to the EM Plan.

5.2.4.10 Issue 10

Two meteorological datasets (2011 and 2012 datasets) for wind speed and wind direction, air temperature, relative humidity, mixing height and other micro-meteorological variable were prepared for the study area using the CALMET meteorological model during the preparation of the draft EIS.

Annual and seasonal windroses for the 2011 and 2012 meteorological datasets are presented in **Figure 5.2-G** and **Figure 5.2-H** respectively. A key parameter for the assessment of both the air quality and the noise assessment is the occurrence of stability classes. The occurrence of stability classes by season and time of day in each of the 2011 and 2012 meteorological datasets are presented in **Table 5.2-F**. Both the 2011 and 2012 meteorological datasets are similar with respect to the annual and seasonal windroses and the frequency of occurrence of stability classes.

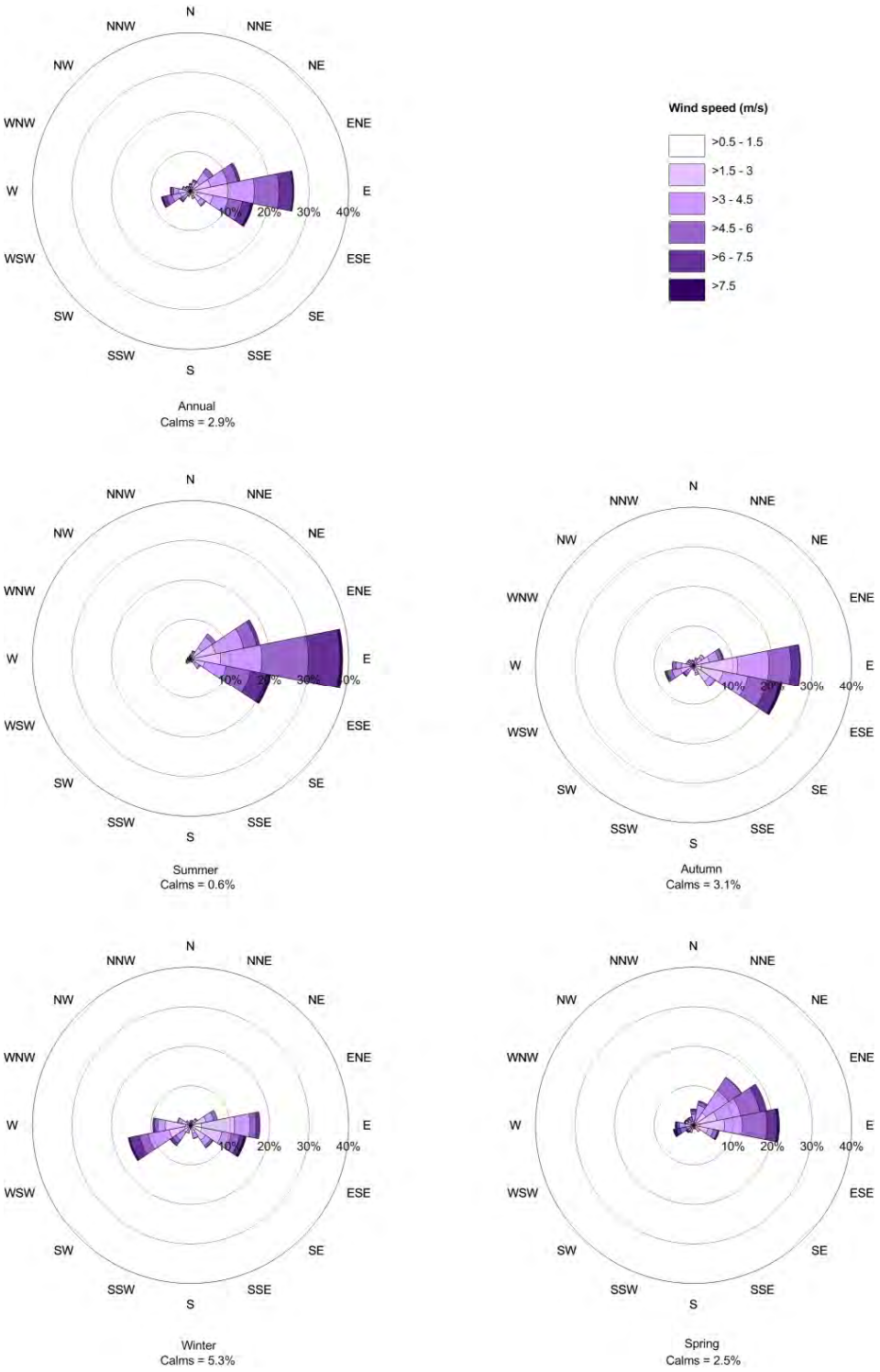


Figure 5.2-G Annual and season windroses for the 2011 meteorological dataset

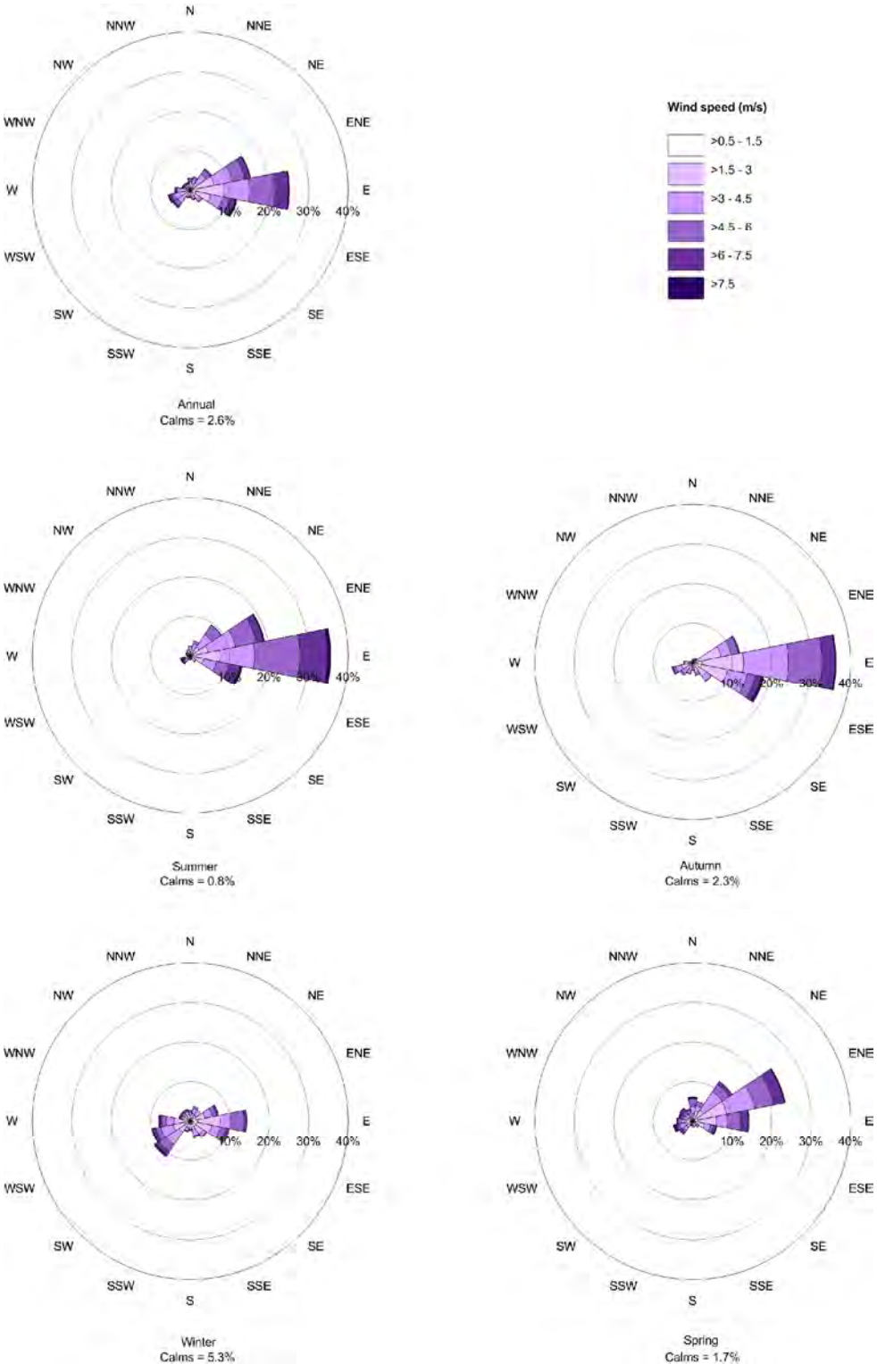


Figure 5.2-H : Annual and season windroses for the 2012 meteorological dataset

Table 5.2-F Occurrence of Stability Class by season and time of day in 2011 and 2012 datasets

Year	Season	Period	A	B	C	D	E	F
2011	Summer	Day	6%	23%	42%	29%	0%	0%
		Evening	0%	0%	0%	38%	40%	22%
		Night	0%	1%	7%	19%	28%	45%
		Total	3%	11%	22%	27%	17%	20%
	Autumn	Day	3%	24%	36%	33%	2%	2%
		Evening	0%	0%	0%	4%	31%	65%
		Night	0%	0%	4%	10%	17%	69%
		Total	1%	11%	18%	20%	12%	38%
	Winter	Day	1%	55%	33%	34%	4%	4%
		Evening	0%	0%	0%	2%	23%	75%
		Night	0%	0%	1%	5%	15%	79%
		Total	0%	11%	15%	18%	11%	44%
	Spring	Day	4%	30%	40%	26%	0%	0%
		Evening	0%	0%	0%	13%	47%	40%
		Night	0%	1%	9%	12%	24%	53%
		Total	2%	14%	22%	19%	17%	27%
	All Hours		**2%**	**12%**	**19%**	**21%**	**14%**	**32%**
2012	Summer	Day	6%	24%	39%	32%	0%	0%
		Evening	0%	0%	1%	44%	43%	12%
		Night	0%	1%	7%	21%	36%	35%
		Total	3%	11%	21%	30%	21%	15%
	Autumn	Day	2%	26%	32%	37%	1%	2%
		Evening	0%	0%	0%	13%	38%	50%
		Night	0%	0%	1%	11%	18%	70%
		Total	1%	12%	17%	23%	14%	34%
	Winter	Day	1%	21%	29%	43%	4%	2%
		Evening	0%	0%	0%	9%	29%	62%
		Night	0%	0%	1%	11%	18%	70%
		Total	0%	10%	14%	25%	13%	38%
	Spring	Day	6%	30%	33%	31%	0%	0%
		Evening	0%	0%	0%	18%	48%	34%
		Night	0%	2%	7%	17%	26%	48%
		Total	3%	15%	18%	23%	18%	24%
	All Hours		**2%**	**12%**	**17%**	**25%**	**16%**	**28%**

The air quality assessment was prepared using the 2011 meteorological dataset. A justification for the use of the 2011 meteorological dataset in the air quality assessment was provided in **Section 9.3.4** of the draft EIS. The analysis of meteorological outputs (windroses) within the modelling domain (**Figure 9-3** of the draft EIS) is consistent with the windroses recorded by the BoM from 2002-2013 (refer to **Figure 9-2** of the draft EIS). The 2011 year had the highest percentage of calms which can lead to poorer atmospheric dispersion. This is considered to be a conservative approach. Rainfall recorded in 2011 was not used as an input to estimating dust emissions or for air dispersion modelling (no wet deposition). The rainfall in 2011 has had no influence on the modelling results.

The noise assessment included an analysis of the 2012 meteorological dataset to determine if an assessment of noise impacts under worst-case meteorological conditions was required. The *Planning for Noise Control Guidelines* (EPA, 2004) recommend noise impacts under worst-case meteorological conditions be assessed if the frequency of temperature inversion conditions occur more than 30% of the total night-time period during winter.

5.2.4.11 Issue 11

Two meteorological datasets (2011 and 2012 datasets) were prepared for the Study area using the CALMET meteorological model during the preparation of the draft EIS. Both meteorological datasets were prepared using the same methodology as described in **Appendix G.6.1** of the draft EIS.

The air quality assessment was undertaken using the 2011 meteorological dataset. The noise assessment included an analysis of the 2012 meteorological dataset to determine if an assessment of noise impacts under worst-case meteorological conditions was required.

Planning for Noise Control Guideline (EPA, 2004) prescribes that the prevailing and worst case meteorological conditions must be determined as part of the noise assessment. The guideline recommends assessing for adverse wind and temperature inversion if inversion conditions occur for more than 30% of the total night-time period during winter (June, July and August). The night-time period for determining inversion frequency is from 6 pm to 7 am, which is the time period during which inversions are most likely.

Temperature inversion conditions are generally considered to be associated with Stability Class F.

The stability class data presented in the air quality and the noise assessments in the EIS were output from the CALMET meteorological model. The CALMET meteorological model generates a meteorological file which includes hourly gridded wind fields at multi levels. The stability classes are separated into six discrete classes known as the Pasquill-Gifford (P-G) classes and are estimated using the Turner method. The method estimates the effects of net radiation on stability from solar altitude, total cloud cover, and ceiling height. The stability class is estimated as a function of wind speed and net radiation (USEPA 2000).

The occurrence of stability classes by season and time of day in each of the 2011 and 2012 meteorological datasets are presented in **Table 5.2-F**. The frequencies of occurrence of stability classes are similar in both the 2011 and 2012 datasets.

The frequency of occurrence of Stability Class F over the night time period 6 pm to 7 am for seasonal data in 2011 and 2012 is presented in **Figure 5.2-I** to **Figure 5.2-L**.

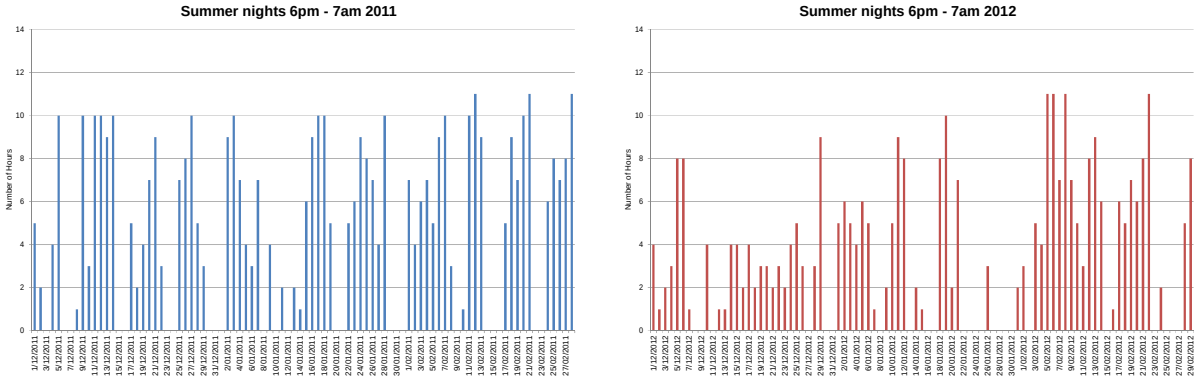


Figure 5.2-I Occurrence of Stability Class F during summer nights in 2011and 2012

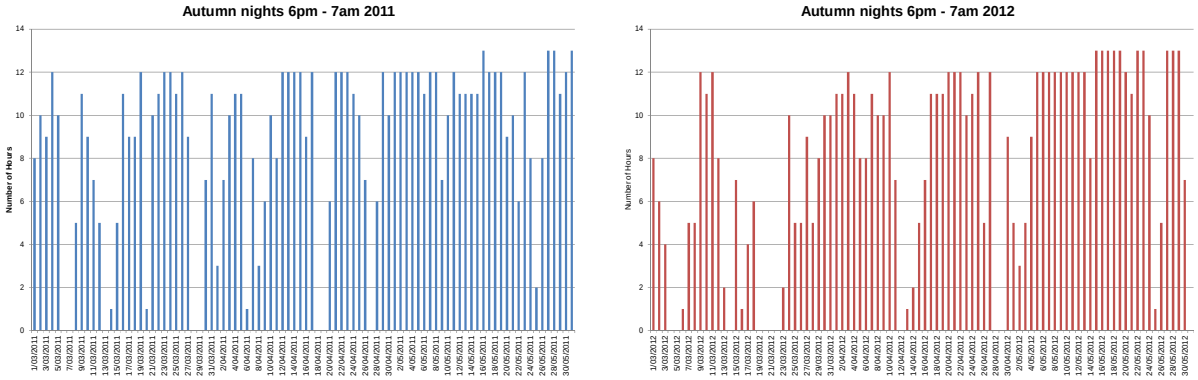


Figure 5.2-J Occurrence of Stability Class F during autumn nights in 2011 and 2012

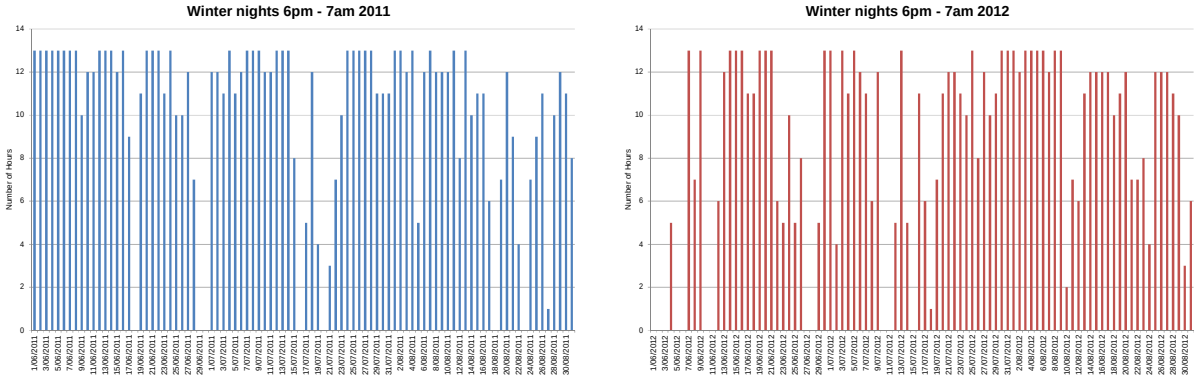


Figure 5.2-K Occurrence of Stability Class F during winter nights in 2011 and 2012

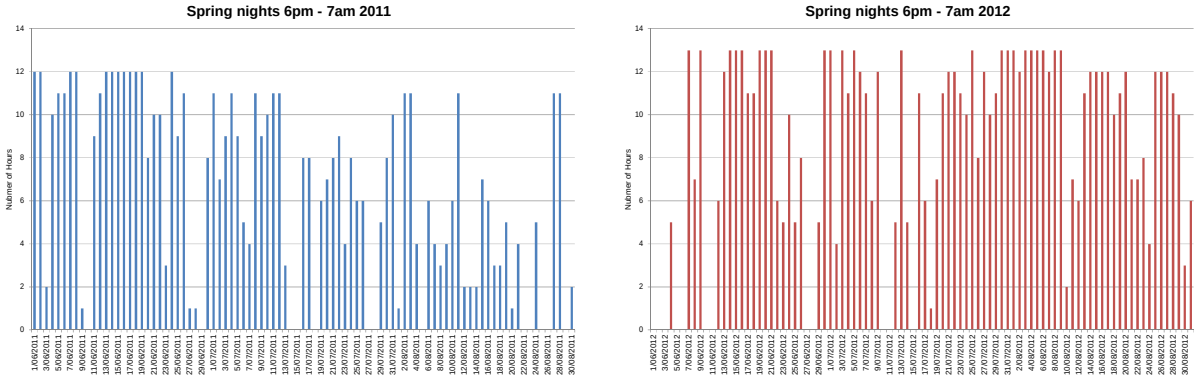


Figure 5.2-L Occurrence of Stability Class F during spring nights in 2011 and 2012

A summary of the frequency of occurrence of Stability Class F for both the 2011 and 2012 (6pm – 7am) datasets is presented in **Figure 5.2-M**. The datasets for the years 2011 and 2012 are similar with the frequency of occurrence of Stability Class F slightly higher in 2011 for all four seasons.

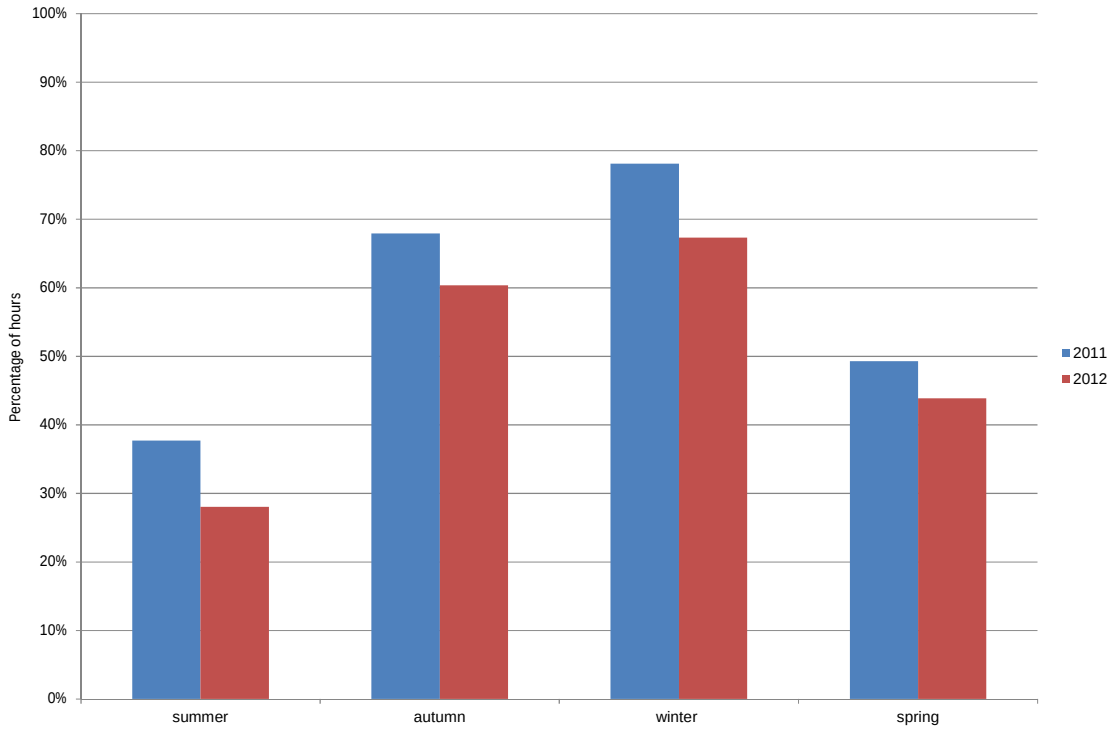


Figure 5.2-M Summary of frequency of occurrence for Stability Class F for 2011 and 2012 in night time period (6pm – 7am)

The choice of meteorological datasets is not considered to impact on the outcomes of either the air quality or the noise assessments:

- The air quality assessment used a 2011 meteorological dataset. In **Chapter 9** of the draft EIS, the highest predicted PM_{10} ground level concentrations occur during the cooler months of autumn and winter which is dominated by poor atmospheric dispersion (generally associated with Stability Class F). The frequency of Stability Class F was higher in 2011 than 2012 and is likely a more conservative meteorological dataset for air dispersion modelling.
- The *Planning for Noise Control Guidelines* (EPA, 2004) recommend noise impacts under worst-case meteorological conditions be assessed if the frequency of temperature inversion conditions occur more than 30% of the total night-time period during winter. The frequency of temperature inversion conditions occurs more than 30% in winter night time period for both the 2011 and 2012 meteorological datasets (refer to **Figure 5.2-M**). Noise impacts under worst-case meteorological conditions were assessed in **Section 11.7.3** of the draft EIS. Analysis of the 2011 meteorological dataset does not change the outcome of the noise impact assessment.

5.2.4.12 Issue 12

Background noise and ambient noise are two terms used when describing the noise environment for a noise impact assessment. These two terms are defined below.

- The background noise level relates to noise associated with the existing land uses in the absence of the source noise.
- The ambient noise level is defined as the totally encompassing sound in a given situation at a given time, composed of sound from all sources.

In terms of the noise impact assessment for the revisedProject, background noise is not considered to include the existing Mine while ambient noise is associated with all current land uses including the current mining operations and the background noise level.

The use of the terms ‘background noise’ and ‘ambient noise’ in **Chapter 11** of the draft EIS have been reviewed. In a limited number of instances these terms have been used incorrectly. Corrections to **Chapter 11** of the draft EIS are identified in **Chapter 6** of the AEIS.

5.2.4.13 Issue 13

NHG have implemented a trial TARP to manage noise from current operations at the Mine. In addition to the TARP, live trend observation and live audio monitoring have also been implemented (known as dashboard operation of noise monitoring). The dashboard operation allows intervention of equipment when trends indicate that compliance is unlikely to be achieved. The objective of these tools is to reduce the potential for observed nuisance and maintain compliance with the current noise objectives through a real-time monitoring program and the implementation of an adaptive management framework for noise emissions from the mining operations.

The monitoring component of the tools consists of:

- Real-time noise monitoring undertaken at Acland;

- Noise levels recorded and analysed every 10 minutes;
- Analysis of low frequency noise levels (<600 Hz) and noise recordings to determine if there is a risk of mining operations resulting in an exceedance of the EA conditions; and
- Isolation of source noise from an 'area of interest' (utilising the noise monitoring equipment's directional noise source capability.

In the event that monitoring indicates noise levels from mining operations may exceed of the EA conditions, NAC undertake the following actions:

- Communicate with operators to understand current operations and key sources of noise;
- Adjust operations (eg shut down plan, move equipment, suspend operations) to reduce noise levels;
- Determine if actions have reduced noise levels sufficiently to achieve compliance; and
- Take further actions as required to achieve compliance.

The effectiveness of implementing the tools can be seen in noise monitoring results recorded over the last three months.

5.2.4.14 Issue 14

The commitments register (**Appendix D** of the AEIS) has been updated to include a commitment to comply with the operational mining noise (all noise sources).

5.2.4.15 Issue 15

Table 11-13 of the draft EIS contained a typographical error for the equivalent sound pressure levels at various distances from the Reclaimer at the MHF. The equivalent sound pressure levels from the Reclaimer at the MHF in **Table 11-13** relate to a sound power level of 118 dB(A) as opposed to the actual sound power level of 109 dB(A). The sound power level of the Reclaimer at the MHF used in the noise impact assessment is 109 dB(A). This typographical error does not affect the noise modelling results or the outcomes of the noise impact assessment.

A corrected version of **Table 11.13** is included in **Chapter 6** of the AEIS.

5.2.4.16 Issue 16

NAC will prepare an Offset Area Management Plan (OAMP) that is consistent with the Commonwealth and Queensland governments' Biodiversity Offset policy requirements and describes how the revised Project's offsets will be managed. The OAMP will be a document that describes the location of the offsets, provides details on the ecological characteristics of the offset and sets out how the offsets will be managed to achieve the objectives of the OAMP.

Specifically, the OAMP will include:

- a detailed description of the vegetation and habitat that will be affected by the project and the extent of the impact including:

  - the type of threatened species or ecosystem,
  - the quality of habitat, population attributes such as recruitment or mortality, and landscape attributes such as habitat connectivity, and
  - and likely duration of the impact;
- a map (preferably digital) that clearly identifies the proposed offset area with Global Positioning System (GPS) points, including any areas subject to specific management actions;
- the regional ecosystems and essential habitat within the proposed offset area;
- the ecological equivalence assessment of the offset area and the date it was undertaken;
- the offset area management objectives and outcomes;
- the activities that will be undertaken to achieve the offset management objectives and outcomes;
- restrictions imposed on the use of the offset area to achieve the offset management objectives and outcomes;
- an analysis of the risks to achieving the management objectives and outcomes, actions to minimise the risks and remedial action that will be undertaken if any of the risks occur;
- a yearly schedule of management actions, to ensure achievement of the management objectives and outcomes;
- a monitoring and reporting program; and
- the estimated time until the offset management objectives and outcomes will be achieved.

NAC will consult regularly with DotE and DEHP during the development and implementation of the OAMP.

During 2013, NAC engaged Earthtrade as third party offset broker to investigate potential offset options for the revised Project. As part of this process, Earthtrade analysed:

- properties owned by NAC;
- properties that had been previously considered for acquisition for the revised Project;
- properties on the market suitable for potential acquisition; and
- current property owners who are known to Earthtrade and are willing to be engaged in offsetting for the revised Project.

Earthtrade has developed an offset options paper for the revised Project and provided an estimate of expected costs associated with the various offset options. Use of third party offset providers and full property purchase are amongst the main offset options under consideration by NAC. Based on work completed to-date, NAC believes it can acquire the necessary biodiversity offsets for the revised Project to meet both the Commonwealth's and the State's requirements. Offsets will be located on land owned by NAC adjacent to the revised Project and on properties owned by others.

In relation to a delivery line, NAC provides the following information that is based on gaining the necessary approvals during mid-2015. This timeline can be adjusted as required around the grant of the necessary approvals. The offset delivery timetable proposed by NAC is shown in **Table 5.2-G**.

Table 5.2-G: Proposed Offset Delivery Action Timetable

Timing	Offset Delivery Action
June - July 2014	NAC review of legal documents (Call Option and Financial Agreement).
August 2014	Undertake GIS of the target landholder's properties to verify ecosystem types and areas.
September 2014	Approach landholders, and conduct initial technical inspections of offset sites.
October 2014	Start compiling the OAMP for DotE and DEHP.
October 2014	Have landholder provide Letter of Intent, provide landholder with legal documents to commence their review.
October 2014 – January 2015	Negotiate legal documents with landholder.
December 2014	Submit OAMP to DotE and DEHP
January – May 2015	Finalise negotiations and enter into legal documents with the landholder.
January – March 2015	Negotiate:- 1. OAMP with DotE; 2. Deed of Agreement (DoA) with DEHP; and 3. Broker Agreement with Broker.
March - May 2015	Negotiate draft conditions offered by DotE and DEHP.
June 2015	Grant of Mining Lease 50232.
June - July 2015	Enter into DoA and Broker Agreement.
August – September 2015	Undertake field verification of those Regional Ecosystems that can be field verified prior to the wet season.
October – December 2015	Finalise management plans post field verification, negotiate with landholders, draft Offset Proposal to DotE and DEHP for those regional ecosystems that have been field verified and commence drafting Supplementary Offset Proposal for grassland regional ecosystems pending field verification.
January 2016	Submit Offset Proposal to DotE and DEHP for those regional ecosystems that have been field verified to start the assessment process.
January – March 2016	Assessment process by DotE and DEHP of Offset Proposal.
January - February 2016	Field verification of grassland regional ecosystem offset areas.
April 2016	Offer of legally binding mechanism to the landholders (for those that have been field verified).
February - March 2016	Finalise and submit Supplementary Offset Proposal to DotE and DEHP for their approval.
March – May 2016	Assessment process of DotE and DEHP of Supplementary Offset Proposal.
May 2016	Offer of legally binding mechanism made to the balance of Landholders.
June 2016	Offset areas legally secured.

5.2.4.17 Issue 17

NAC will prepare a monitoring and evaluation program for the Bluegrass offset area, that will form a part of the OAMP, described in **Section 5.2.4.16** of the AEIS.

The monitoring and evaluation program for the bluegrass offset areas will include a biocondition reference site, to be used as a standard site to compare the progress of the bluegrass offset site. NAC will endeavour to locate the biocondition reference site will be on land owned by NAC or in close proximity to the revised Project.

The monitoring and evaluation program will include an annual program of monitoring activities, objectives and targets that will be monitored and actions to be implemented following the review of the monitoring results. The monitoring and evaluation will also provide a reporting schedule to provide reports to both DotE and DEHP on the status of the offset and its progress to the achievement of objective of the offset.

5.2.4.18 Issue 18

NAC will provide spatial data to DEHP of the offset locations once the offset sites have been confirmed. The spatial data will include lot on plan details and GPS coordinates of the offset site of both the areas to be cleared for the revised Project and the offset sites.

5.2.4.19 Issue 19

NAC has successfully translocated and re-established *Homopholis belsonii* following the construction of the Wetalla water pipeline from Toowoomba to the Mine, in 2008 and 2009. The translocated plants were watered twice a week for a four month period from December 2008 to April 2009. In addition to the regular twice a week watering, supplementary waterings of the plants was made. Each of the four translocation sites were watered with an additional 10 litres on eight occasions.

Soil conditions were assessed following the translocation of plants, to determine the need for, and frequency of watering. The assessment of the soil conditions and the need for plant watering was made visually.

With the translocation program for the revised Project, NAC will water the translocated plants twice a day during the first week following the translocation, then once a day for the second week. The plants will then been watered as required, based on local weather conditions. As part of the monitoring program, presented in the TSTP located in **Appendix L** of the AEIS, the translocated plants will be inspected each week until the plants are successfully established. The need for watering of the translocated plants will be determined at each weekly inspection. The need for watering will be assessed by inspecting soil and ground conditions at each translocation site, plant health (presence of leaf wilt) and incidence of rain.

5.2.4.20 Issue 20

Section 6 of the TSTP has been revised to incorporate monitoring for five year period and ongoing monitoring for the life of the offset.

5.2.4.21 Issue 21

NAC currently collect bluegrass seed and uses the species in the rehabilitation of disturbed areas within the Mine. NAC will continue to collect bluegrass seed and make use of the species in mine

rehabilitation. NAC will also collect the seed of other species from the bluegrass community and use this seed in rehabilitation.

5.2.4.22 Issue 22

Re-location of the threatened grassland species to the Conservation Zone

NAC will investigate the potential for the translocation of the identified threatened species to suitable habitat located in the conservation management zone along Lagoon Creek within the revised Project area. NAC believes there is merit in this suggestion from DEHP, particularly as the Lagoon Creek area will already be subject to suitable management protocol to protect and enhance the quality of vegetation and will be protected from direct disturbance by mining operations and other associated activities. As part of this approach, NAC will identify a suitable mechanism to protect the translocation sites in perpetuity. NAC will modify its CZMP and TSTP to incorporate the translocation activities involving the conservation management zone along Lagoon Creek within the Study area. DEHP and DotE will be regularly consulted in relation to this matter and will receive new copies of any updated management plans.

Exclusion of stock from the Conservation Zone

As originally stated in **Section 7.2** of the CZMP (**Appendix J.6** of the draft EIS), to efficiently control fire fuel loads following good growing seasons, NAC may undertake targeted grazing within the revised Project's conservation management zone. This specific use of grazing will be very limited in terms of application (timing and extent), will be closely managed and monitored to minimise impacts, and will not be applied to any newly planted areas. The APC will provide advice and manage all targeted grazing undertaken for this purpose within the revised Project's conservation management zone.

Apart from the purpose of efficient fire control, grazing will generally be excluded from the revised Project's conservation management zone. The APC's grazing and other farming activities may require periodic crossing of the revised Project's conservation management zone. The APC will ensure that crossing of the revised Project's conservation management zone is kept to an operational minimum, that no excessive disturbance is caused by crossing events, and that crossing events will avoid sensitive areas (e.g. newly planted areas).

NAC will address fencing and signpost requirements for the revised Project's conservation management zone to increase the level of protection and minimise the risk of accidental disturbance.

Lagoon Creek restoration to a functional condition

The CZMP together with the KSMP (**Appendix B** of the AEIS) set out NAC's plans to restore and regenerate vegetation within the conservation zone. Techniques such as natural regeneration, direct seeding and tree planting will be used to improve the quality and integrity of vegetation and habitat within the zone. The management of weeds and limited use of grazing will also be used aid in the restoration of the vegetation along the Creek and within the conservation zone. Vegetation within the conservation zone is already regenerating, in some parts and these areas of regeneration will allowed and encouraged to expand with the aim of establishing a functioning ecosystem.

The Queensland Government's Method for the Establishment and Survey of Reference Sites for BioCondition: Version 2 (July 2011) is provided in Appendix A of the CZMP (**Appendix J.6** of the draft EIS) and is also directly referenced in relation to establishing reference sites and rehabilitation criteria. NAC acknowledges the importance of applying the guidance provided in this scientific document during the establishment of reference sites and the development of rehabilitation criteria for the revised Project's conservation management zone.

5.2.4.23 Issue 23

Baseline water quality conditions are described in the draft EIS in sufficient detail to determine the potential impacts and risks of the revised project to surface waters, through the use of water quality guidelines. NHG commits to extending the existingcharacterisation of baseline water quality conditions in the draft EIS through ongoing data collection, prior to the revised Project construction. These additional data will be required for the purposes of monitoring compliance with EA conditions. As agreed at the meeting with advisory agencies on 16 April 2014, additional baseline data are not required at this time for the purpose of impact assessment. The ephemeral flow conditions of waterways within the revised Project site requires regular monitoring involving rapid responses to rain events in order to comprehensively describe water quality conditions.

NHG commits to develop and implement a Receiving Environment Monitoring Program (REMP) in consultation with the DEHP, which will be structured around the existing monitoring program as described in the draft EIS, and additional baseline data collected prior to construction. The REMP will describe the objectives of water quality monitoring, show the location of all monitoring sites, and describe the methods that will be implemented to determine water quality in upstream reference sites, within mine storages and downstream of mining activities. The REMP will be developed in accordance with the ANZECC/ARMCANZ (2000) water quality guidelines. **Table 5.2-H** provides typical water quality values for the existing mine water management storages.

Table 5.2-H Typical Water Quality Readings – Existing Sedimentation and Environment Dams

Year	Median	Range
EC (µs/cm)	1990	250 – 8,200
pH	8.6	7.6 -10.1
Suspended Solids (mg/L)	103	1 - 4800
Sulphate (SO_4^{2}) (mg/L)	166	7- 710

The readings indicate that median values for some aspects of water quality within the sediment and environment dams are within the guideline value or within the ranges observed at the background water quality sampling sites (**Chapter 5**, page 5-16, **Table 5-6**). However, it should be noted that the background water quality sites are located downstream of the current mine and could therefore be impacted by mining activities to some extent. While background water quality sampling is likely to be largely unaffected by releases from the mine water management system (as only one period of historical releases occurred during the 2010/2011 wet season), further monitoring is desirable to confirm any conclusions about background water quality. Median EC values are significantly higher than the Condamine River guideline of 500 µs/cm.

It is noted that the revised Project's EA will include end of pipe release limits for EC, PH, Suspended Solids and Sulphates. However, these limits will be further refined following further characterisation of the baseline conditions. Until this time the following trigger levels presented in **Table 5.2-I** are proposed, for further discussion with DEHP. Sampling for metals, metalloids, nutrients and hydrocarbons will also be conducted in dams that are proposed to form part of the mine water management release system. This will be undertaken in accordance with Table 3 of the model water conditions for coal mines in the Fitzroy Basin. Monitoring will be undertaken until such time as hazard assessment can demonstrate that these contaminants do not pose a risk to the receiving environment from mine affected water.

NHG recognise that receiving environment monitoring will be a key component of the proposed release condition and acknowledge that this will involve receiving water contaminate trigger levels to further provide controls over the mine water management release system.

Table 5.2-I Preliminary Receiving Waters Contaminate Trigger Levels

Year	Median	Monitoring Frequency
EC (µs/cm)	1500	Daily during release
pH	6.5 - 8.5	
Suspended Solids (mg/L)	1000	
Sulphate (SO_4^{2}) (mg/L)	250	

5.2.4.24 Issue 24

Table E-1 of the Executive Summary of the draft EIS summarises the potential impacts of the revised Project on environmental and social values, and includes proposed mitigation measures. For aquatic ecology, "no diversion of Lagoon Creek" is not a potential impact, and is replaced with "changes to water quality and stream geomorphology". Potential impacts of the revised Project on surface water quality are described in **Section 5.14** of the draft EIS. Potential impacts of the revised Project on aquatic ecology values are described in **Sections 8.5** and **8.6** of the draft EIS.

5.2.4.25 Issue 25

Key activities which may result in an impact on surface water quality or aquatic ecology values (and proposed mitigation measures) are provided in **Table 8-13** and **Section 5.14** of the draft EIS. In summary, the key activities which may result in an impact include:

- Conducting mining activities in the vicinity of Lagoon Creek;
- Construction of a haul road crossing at Lagoon Creek;
- Installation of new water management structures;
- Construction of a rail spur and balloon loop through the flood plain of Lagoon Creek; and
- Controlled releases from water storages.

Key mitigation measures include:

- Works within streams conducted during the dry season;
- Flood levees constructed;

- Riparian buffer zones maintained;
- Erosion and sediment management plan to be implemented; and
- Controlled discharges to be regulated.

5.2.4.26 Issue 26

Refer to **Chapter 6** of the AEIS.

5.2.4.27 Issue 27

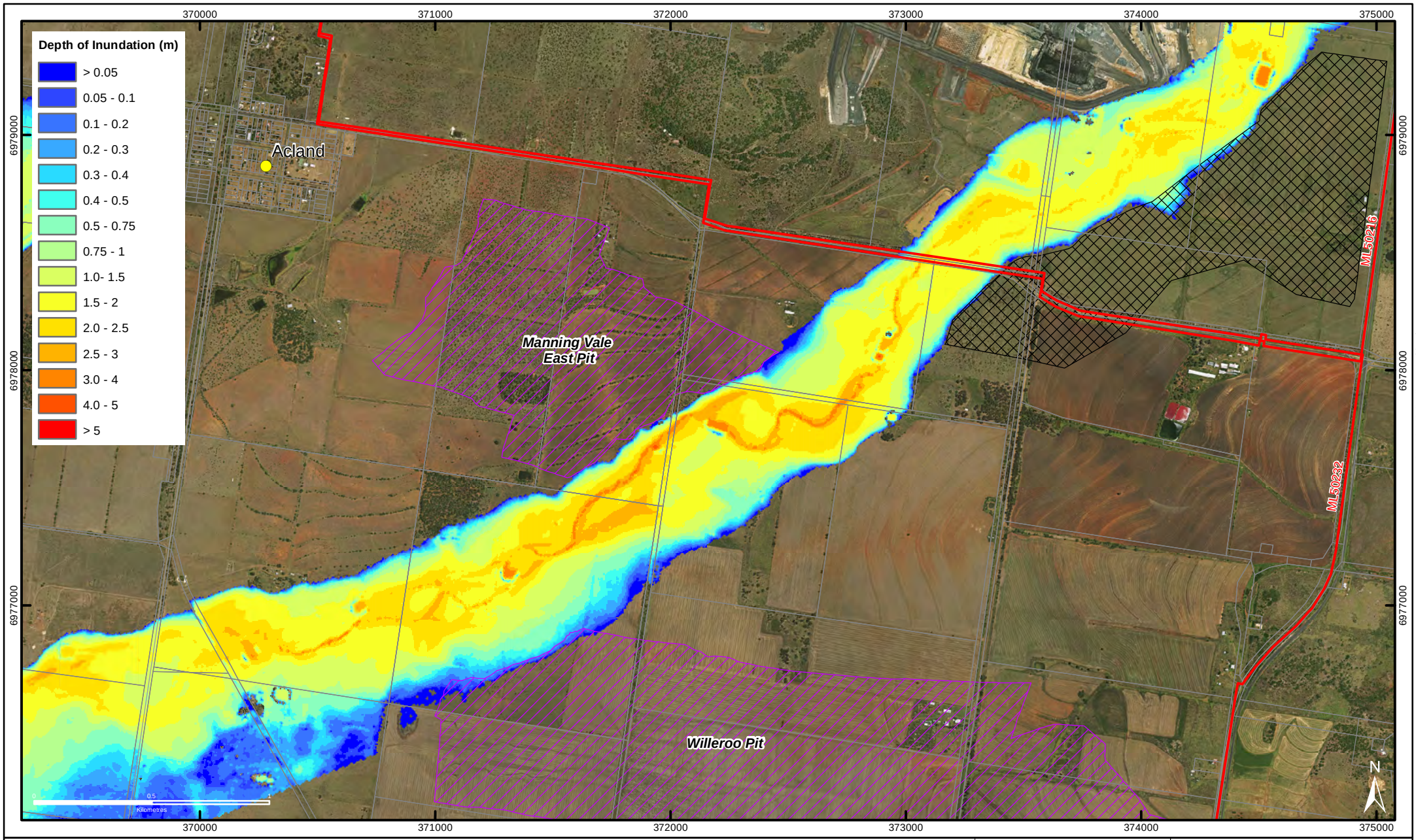
Refer to **Section 5.2.4.23**.

5.2.4.28 Issue 28

The following clarification is provided regarding DEHP's request for clarification as to the permanency of the Flood Levees. The Flood Levees will be removed at the end of operations as part of the revised Project's rehabilitation plans. The Flood Levee footprint will be as far as practical returned to natural surface as part of the revised Project's final landform.

A potential impact of the revised Project is the impact of the final landform on flood behaviour. To mitigate this impact NAC have committed to the design and construction of a final depressed landform that is largely located outside the extent of the Probable Maximum Flood (PMF). This commitment was made during the EIS process based on the results of the flood impact assessment. This commitment was made to be implemented as part of the detailed design of the depressed landform. This design is currently in progress.

Figure 5.2-N illustrates the approximate extent of the revised final landform presented relative to the existing PMF extent. It is noted that the PMF extent presented in Figure 5.2-N is the PMF based on terrain that does not include any flood levees. That is the flood extent is wider than that during mining operations and therefore the final landform is further away from Lagoon Creek than the mining activities during operations.



LEGEND

- Towns and Localities
- Roads
- Cadastre
- Mining Tenements
- Final Landform - Rehabilitated Spoil
- Final Landform - Depression

NEW HOPE GROUP

SINCLAIR KNIGHT MERZ SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 5.2-N - Final Landform Depth PMF

Scale 1:21,000 on A4

Projection: Australian Geodetic Datum – Zone 56 (AGD84)

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Figure 5.2-N illustrates that the final landform will be located marginally within the PMF extent with all levees removed. However it is noted that the extent as to which the depressed landforms encroach on the PMF is very minor and in areas where the predicted depth of flooding is less than 200 mm. Therefore it is not expected that depressed landform will impact on the PMF extent or behaviour. Any water that would flow into the depressed landform would be less than 1 ha of area over a depth of less than 200 mm. This volume is negligible relative to the volume of water in a PMF event. Given this and the extremely low probability of a PMF event occurring the impact is considered to be negligible.

Figure 5.2-N also illustrates that the toe of the rehabilitated out-of-pit dump to the north east of the Willeroo pit will also extend into the final landform. To examine the impact of this on the PMF the final landform was modelled and compared to that without the dump. The impact assessment found that any impacts from the final landform would be highly localised covering an area of less than 2 ha with a maximum increase in the flood level of 30 mm. Increase in peak velocities are also highly localised and expected to remain below 1 m/s and as such scour and erosion is not expected over areas of established vegetation. Importantly, no changes to the flood or flow regime were predicted downstream of this area and there are no changes predicted in the vicinity of Jondaryan. Given the extremely low probability of the occurrence of a PMF and that the impacts are very minor and localised the impact is not considered to impact on the environment, stability of the final land form or future land uses.

As outlined above the detailed design of the final landform is currently in progress. Any further refinements to the design will seek to achieve a lesser level of impact than that outlined above.

5.2.4.29 Issue 29

Details of 'minor works' proposed within the vicinity of Lagoon Creek were described in Section 8.5 of the draft EIS. Buffer zones will be maintained for activities occurring adjacent to Lagoon Creek, such as removal of terrestrial vegetation. However, it is not possible to maintain a complete buffer zone at the locations where creek crossings will be constructed. Creek crossings will be constructed for the access road to the Willaroo resource area and for the rail spur. The likely impact of such works on the aquatic ecology values of Lagoon Creek was described in Section 8.5.4 of the draft EIS. In summary, the likely impacts include:

- Loss of riparian and instream habitat;
- Decline in water quality;
- Construction of instream barriers; and
- Death of fauna during construction stages.

Section 8.6.3 of the draft EIS described the mitigation measures to be put in place to reduce the impact of minor works within Lagoon Creek. In summary, mitigation measures include:

- Locating creek crossings at established crossing points where possible;
- Construct crossings in accordance with the Queensland code of environmental compliance for exploration and mineral development projects ;
- Conduct works during the dry season where possible;
- Provide for the passage of aquatic fauna;

- Monitoring of water quality, aquatic flora and fauna before, during and after construction works;
- Implement the CZMP; and
- Implement the KSMP.

The revised Project includes an operational separation distance of approximately 150 m from the banks of Lagoon Creek to the edge of the mining pits, which includes a 50 m buffer adjacent the creek for conservation purposes. Further details on the basis for the buffer zone were provided in **Section 5.7.1** of the draft EIS.

Where Lagoon Creek is clearly braided into multiple waterways, the operational offset zone will be determined from the edge or banks of the network of channels, to avoid the boundary of the 'no disturbance' buffer being located within the creek itself. Where the channel is indistinct, a line of best fit for the bank habitat will be determined by environmental staff, which defines the area of aquatic ecology habitat values. This approach of commencing the buffer zone at the creek bank will avoid the boundary of the buffer zone being located within the creek itself.

5.2.4.30 Issue 30

The cross section in **Figure 5.2-O** depicts a 50 m offset buffer that extends from the high bank of Lagoon Creek and will not be disturbed or utilised for any mining activity. This undisturbed buffer extending from 0 m to 50 m will extend along the length of Lagoon Creek within the mine lease. The area that extends from outside the 50 m buffer to the mine pit will be disturbed and utilised for various mine infrastructure and activities as follows (note that distances are metres from the high bank of Lagoon Creek):

- 50 m up to 100 m – a 50 m corridor for a light vehicle access road and associated infrastructure;
- 100 m up to 125 m – a 25 m allowance for a flood levee to protect the mine pit and associated infrastructure from potential flooding from Lagoon Creek;
- 125 m up to 140 m – a 15 m corridor for additional mine roads and surface water drainage infrastructure; and
- 140 m up to 150 m – a 10 m corridor is to be utilised for the construction of a pit crest safety bund to protect vehicles from accidentally driving into the mine pit.

Each of the nominated corridor widths will be minimised where possible during detailed design.

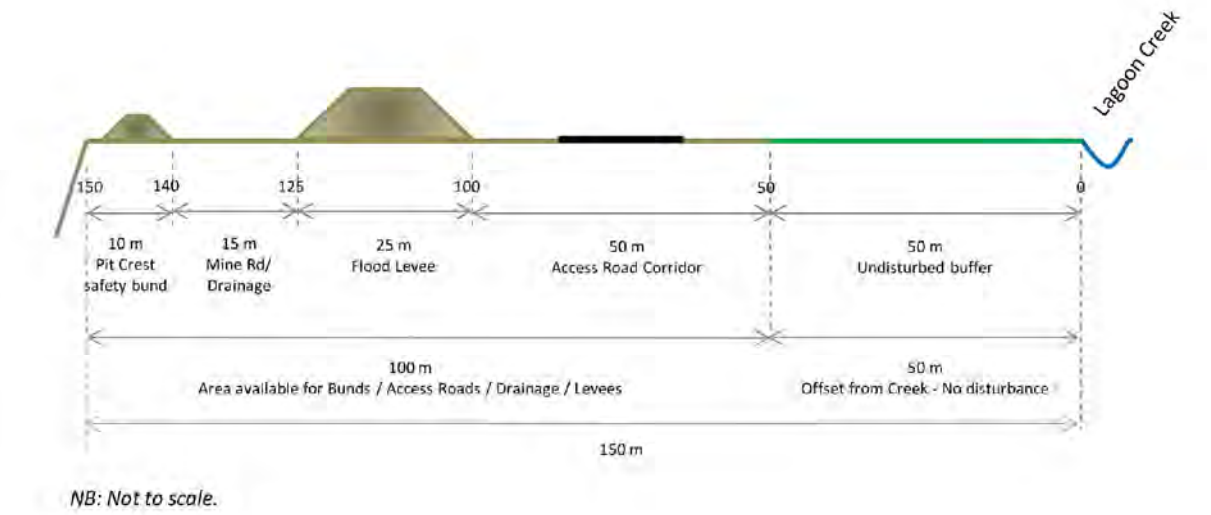


Figure 5.2-O Lagoon Creek Offset Cross Section

5.2.4.31 Issue 31

The water balance modelling utilises stochastic hydrology. That is the historical rainfall data series is analysed for statistical trends over months, years and decades and used to create replicates of the historical data set that are statistically relevant. This data set is then used to assess the ability of the mine water management system to manage future climate extremes. In general the historical data set is closely represented by the 50th percentile of the 500 climate replicates. However, the stochastic replicates also allow the model to predict the mine water management system's response to potential future climate extremes of drought and increased rainfall intensity. The system's performance is presented for the 95th and 5th percentile to illustrate a high degree of confidence in the system's ability to manage the uncertainty and variability associated with the future climate.

This is illustrated in **Figure 5.2-P** with the annual rainfall exceedance probability plotted for the historical serries plotted along with the stochastic data replicates. It is also noted that the stochastic replicates include a number of events that are as large and if not larger than historically observed events (such as the January 2011 flood event) as well as a number of years of below average rainfall.

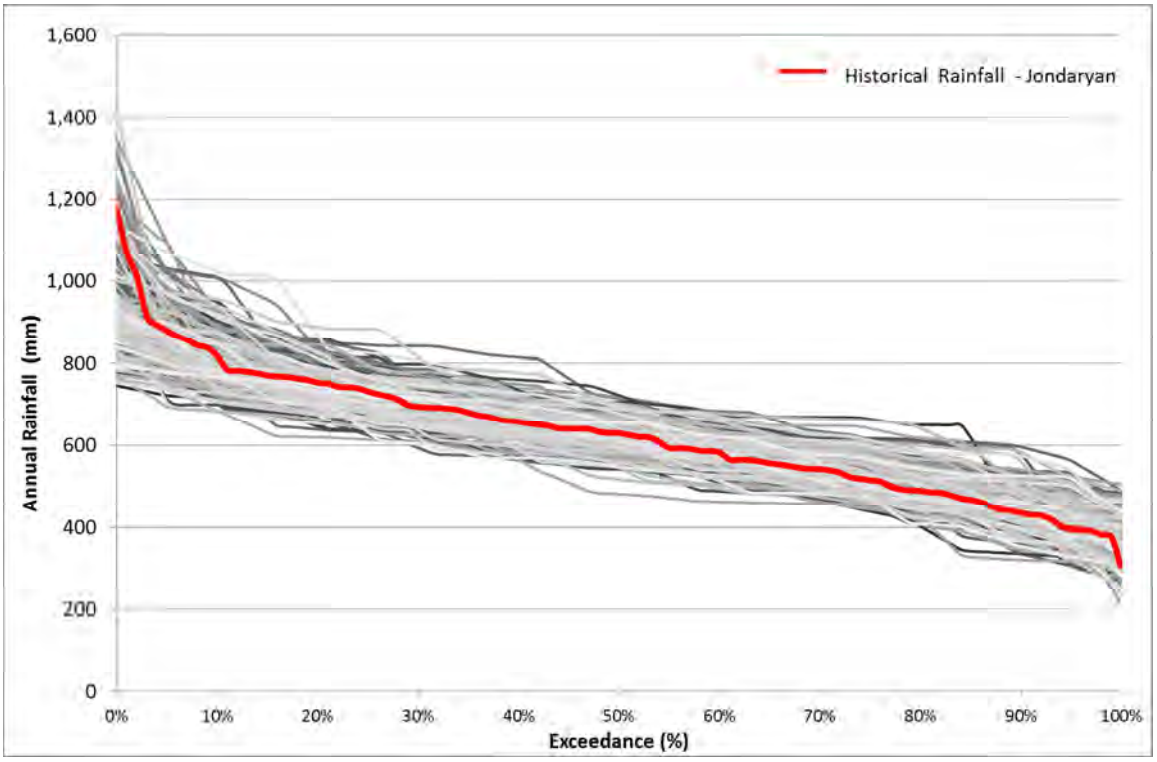


Figure 5.2-P Stochastic vs Historical Rainfall

5.2.4.32 Issue 32

The dark orange arrows in **Figure 5-32** of the draft EIS were displayed in error as these arrows were attached to the base graphic and should have been removed. The updated Schematic is presented in **Figure 6.2-B**, **Chapter 6** of the AEIS. As discussed in **Section 5.13.4** of the draft EIS, there is proposed to be a controlled release strategy for the Project site water management. This controlled release strategy is illustrated in the updated water balance model schematic. The other off-site discharges noted in this schematic are from the overflow of the storages, which would be in accordance with the EA.

5.2.4.33 Issue 33

The highly ephemeral flow characteristics of Lagoon Creek make sampling of fish and macro-invertebrates during wet season conditions extremely difficult. Flow events are generally only of short duration (hours) and are interspersed by prolonged periods of dry conditions with no flow. The aquatic habitats of Lagoon Creek are comprised primarily of dams or large pools, separated by dry creek bed. The descriptions of the aquatic ecology values of the revised Project within the draft EIS are considered appropriate for the purposes of impact assessment. NHG commits to conducting more detailed sampling of aquatic environmental values, including water quality prior to construction works commencing. The purpose of the monitoring will be to establish baseline environmental conditions, prior to any influence of the revised Project's activities. A REMP will be developed in consultation with DEHP, and will describe the objectives and methods of monitoring. NAC will give consideration to including seasonal macro-invertebrate assessments at relevant sites as part of the process of developing the REMP. One additional wet season survey (at least two weeks following a flow event)

and one additional dry season survey will be conducted. The current methodology and sites in the draft EIS will be retained. An additional control site located upstream of the existing mine will be included in future monitoring activities.

The highly ephemeral nature of the Lagoon Creek system makes the area unsuitable habitat for Murray Cod. While the creek does contain woody debris, a habitat for Murray Cod, such areas are devoid of water for the vast majority of the time and therefore are not suitable habitat for Murray Cod. The suitability of habitat within Lagoon Creek for Murray Cod is described in **Chapter 8** of the draft EIS. Additional sampling of water holes during the wet season will be conducted to confirm the absence of Murray Cod at the site, and provide additional characterisation of baseline aquatic values.

5.2.4.34 Issue 34

Refer to **Section 5.2.4.33**.

5.2.4.35 Issue 35

The risk assessment completed in **Chapter 8** of the draft EIS is consistent with the Risk Management Principles and Guidelines AS/NZS ISO 31000:2009. In particular, page 1 of the guidelines notes that risk is often expressed in terms of a combination of the consequences of an event (including changes in circumstances) and the associated likelihood of occurrence. Such an approach that was taken to the assessment of risk to aquatic ecology values from the revised Project.

5.2.4.36 Issue 36

The description of erosion and bank stability within **Section 8.4.2** of the draft EIS relates to the aquatic habitat condition of the Oakey Creek Sub-catchment, as described by Phillips and Moller (1995) in the State of the Rivers Report series. NHG has provided a summary of the findings of this report, as part of a Regional Catchment Overview in **Chapter 8** of the draft EIS. The statement that erosion occurred along 87% of stream lengths does not apply directly to Lagoon Creek, which was not surveyed as part of the State of the Rivers Report series. NHG is not in a position to provide a more detailed description of the types of erosion observed by Phillips and Moller (1995). Surveys by NHG at Lagoon Creek did identify some areas of erosion, the primary cause of which appeared to be flow events and cattle access to stream banks.

5.2.4.37 Issue 37

Table 8-8 of the draft EIS provided information on the seasonal and spatial variation of water quality. However, results that exceeded the water quality objective had not been shaded in red. A corrected version of the table is provided below in **Table 5.2-J**.

Table 5.2-J Seasonal and Spatial Variation of Water Quality

		Wet season		Dry season		
		Lagoon Creek				Wilkie Creek
Variable	**WQOs**	**LCU1 (US)**	**AH4 (DS)**	**AE4 (DS)**	**AE2 (DS)**	**WC**
Flow	na	Yes	Yes	No	No	No
Temperature* (°C)	-	23.9	21.9	26.89	26.34	11.3
Dissolved oxygen (%)	90-110%	15.0	44.3	65.61	95.23	50.0
pH	6.5-7.5	7.0	7.6	8.52	8.91	7.0
Electrical conductivity (µS/cm)	<500	240	240	642.1	463.1	111.5
Turbidity (NTU)	<25	8.6	19	20.45	33.35	401.5
Total nitrogen (mg/L)	<0.25	1.400	1.200	nd	nd	2.150
Ammonia (mg/L)	<0.010	0.350	0.060	nd	nd	0.065
Dissolved inorganic nitrogen (mg/L)	<0.015	0.020	0.020	nd	nd	0.205
Total phosphorus (mg/L)	<0.030	0.150	0.310	nd	nd	0.270
Filterable reactive phosphorus (mg/L)	<0.015	0.052	0.180	nd	nd	0.025

Note – 'na' indicates not applicable, 'nd' indicates no data available. All water quality objectives (WQOs) apply to the protection of slightly to moderately disturbed aquatic ecosystems (ANZECC 2000, DERM 2009). Red values indicate exceedances of the relevant guideline, or outside of guideline range. US indicates the site is upstream of the Mine on Lagoon Creek, DS indicates the site is downstream of the Mine on Lagoon Creek. Lagoon Creek data is sourced from Chapter 5. Wilkie Creek data is sourced from SKM (2012).

5.2.4.38 Issue 38

Water quality data from long term monitoring at the DNRM Oakey Creek at Fairview gauging station was presented in **Table 2-4** of **Appendix J.4** of the draft EIS. It is noted that the average recorded flow at the Oakey Creek gauge at Fairview at the times when water quality monitoring was undertaken is low at <1 m^3/s. Based on the flow exceedance curve, this suggests the majority of sampling occurred during periods of low flow. This indicates that water quality results at the Oakey Creek at Fairview gauging station are representative of low flow conditions, which occur most commonly within the waterway. Results for EC and pH decrease during high flow events, which occur infrequently. NHG did graph available data for flow and EC at the Oakey Creek at Fairview gauging station, to develop a flow salinity relationship as suggested by DEHP. However, no strong relationship was evident, primarily due to the very small number of data points involving moderate to high flows. NHG will discuss the data for Oakey Creek at Fairview with DEHP in more detail with a view to developing suitable EA conditions.

5.2.4.39 Issue 39

Manganese data were reviewed for all monitoring sites, as the result of 490 µg/L for site LCU1-SKM appears to be erroneous (at least a factor of 10 higher than the manganese results at other sites). The review of data confirmed the result of 490 µg/L for LCU1-SKM, as reported by the laboratory. The

dissolved manganese result for the same site was only 1 µg/L. Therefore, there should be a low reliance placed on the total manganese result, and it is possible that the high result was generated through sample contamination or laboratory error. Alternatively, although unlikely, a large quantity of manganese bound to particulate matter may have caused the high total manganese result. Further manganese data will be collected following development and implementation of the REMP.

5.2.4.40 Issue 40

The suite of analytes included in water quality monitoring for the EIS stage of the revised Project included pesticides, which are not expected to be generated by coal mining. The need for inclusion of pesticides in future monitoring activities will be further considered during development of the REMP. Monitoring of contaminants produced by agricultural land uses rather than mining (such as pesticides) may be useful for determining whether a future impact detected by water quality monitoring is mining-related, or a consequence of other land uses in the catchment. In this context, the frequency of monitoring of key indicators of agriculture may be less than contaminants more relevant to mining activities.

5.2.4.41 Issue 41

Appendix G.3.2 has been removed from the draft EIS. The cumulative risk assessment is provided for another catchment. This data was provided to demonstrate typical results from an independently published cumulative impact assessment on release from mine water management systems. However, as this data was for another catchment and as no data was available for cumulative impact assessments for the Condamine area the data was deemed to be unnecessary and therefore the appendix has been removed.

5.2.4.42 Issue 42

It is noted that in the last decade controlled releases from the mine water management system have only occurred during the December 2010 January 2011 wet season. Therefore the majority of the water quality sampling at the Oakey Creek at Fairview gauge would be unaffected by releases from the mine water management system. A review of the water quality during the release period of 12th of October 2010 to the 25th of March 2011did not identify any changes to ambient water quality that could be attributed to controlled releases. It is noted that between December 2010 and January 2011, during which the majority of the water was released, Jondaryan received over 300 mm of rainfall (approximately half the yearly average). While the event itself (2 days, 10th to 11th of January) was likely to be in the order of a 1 in 10 to 1 in 20 AEP event the cumulative rainfall totals over the one and two month period were significantly rarer. The predicted exceedance probabilities for cumulative rainfall events over 7, 14, 20, 30, 60, 100 and 120 day periods were calculated for 100+ year period of historical rainfall data recorded at the Jondaryan Post Office rainfall gauge. These totals are presented in **Table 5.2-K**. The results compared to the January 2011 event totals over the same number of days suggests that the total volume of rainfall that fell within the period surrounding and including January 2011 was in the order of a 1 in 75 to 1 in 200 AEP event. This indicates that historically releases have only occurred during and following an extremely wet period.

NHG will discuss the data for Oakey Creek at Fairview with DEHP in more detail with a view to developing suitable EA conditions. The revised Project's EM Plan will be revised in response to these discussions.

Table 5.2-K Exceedance Probability of Cumulative Rainfall Totals

AEP (1 in Y)	Cumulative Rainfall (mm)						
	7 day	14 day	20 day	30 day	60 day	100 day	120 day
Dec 10 and Jan 11 total	**176**	**201**	**310**	**402**	**804**	**1542**	**1605**
5	137	166	194	222	442	918	878
10	161	192	225	256	510	1069	1014
15	**175**	**206**	242	276	549	1154	1092
20	184	216	254	290	577	1214	1147
50	214	245	290	334	667	1400	1324
75	226	258	**306**	354	707	1481	1403
100	235	267	316	369	736	**1538**	1460
200	256	287	342	**404**	**806**	1676	**1599**
500	283	314	374	452	901	1857	1788
1000	303	333	398	489	975	1994	1935

5.2.4.43 Issue 43

The water quality guidelines adopted for Lagoon Creek, as described in **Appendix J.4** (**Section 2**, page 8) are based upon a slightly to moderately disturbed ecosystem.

5.2.4.44 Issue 44

Table 3.4.3 of the AWQG outlines a method for correcting the trigger values for Cadmium, Chromium III, Copper, Lead, Nickel and Zinc in freshwaters. The information presented in **Tables 2-2** and **2-5** of **Appendix J.4** of the draft EIS were not sufficiently clear on whether the results for metals had been corrected for hardness. To provide further clarity, the results of water quality sampling are presented in **Table 5.2-L** for Chromium III, Copper, Nickel and Zinc, which are the four metals analysed for which a hardness correction is relevant. The results show that only one result (copper at Site AE4) exceeded the hardness corrected trigger level.

Table 5.2-L Dissolved metals concentrations and comparison with hardness-corrected trigger level

		Sampling Site			
Water quality variable	**Unit**	**LCU1**	**LCD1**	**AE4**	**DS1**
Hardness	mg/L	95	84	98	110
Chromium III	µg/L	<2 (8.5)	<2 (7.7)	<2 (8.7)	<2 (9.6)
Copper	µg/L	2 (3.7)	3 (3.4)	4 (3.8)	3 (4.2)
Nickel	µg/L	5 (29.3)	2 (26.4)	4 (30.1)	4 (33.2)
Zinc	µg/L	<2 (21.3)	<2 (19.2)	6 (21.9)	<2 (24.1)

Note: Hardness-corrected trigger level shown in brackets following the laboratory result. Shading indicates an exceedance of the hardness-corrected trigger level.

5.2.4.45 Issue 45

Table 5-3 in **Chapter 5** of the draft EIS, which is identical to **Table 2-2** in **Appendix J.4** of the draft EIS, has some technical inconsistencies which have been addressed in a revised version (

Water quality variable	Guideline Value	Water quality variable	Guideline Value
pH	6.5-7.5	Metals (Dissolved)	
EC (µS cm-1) $	<500	Arsenic (As) (mg L-1)	<0.013
Turbidity (NTU)	<25	Cadmium (mg L-1)*	<0.0002
Dissolved oxygen (DO) (% saturation (mg L-1)	90-110%	Chromium III (Cr) (mg L-1)*	<0.0033
Total suspended solids (TSS) (mg L-1)	-	Copper (Cu) (mg L-1)*	<0.0014
Hardness (CaCO3) (mg L-1)	-	Lead (mg L-1)*	<0.0034
Sulphate (SO4)* (mg L-1)	-	Nickel (Ni) (mg L-1)*	<0.011
Ammonia (NH3) (mg L-1)	<0.010	Zinc (Zn) (mg L-1)*	<0.008
Dissolved inorganic nitrogen (DIN) (mg L-1)	<0.028	Manganese (Mn) (mg L-1)	1.9
Total nitrogen (TN) (mg L-1)	<0.25	Mercury (Hg) (mg L-1)	<0.00006
Total phosphorus (TP) (mg L-1)	<0.030	Beryllium (Be) (mg L-1)**	
Filterable reactive phosphorus (FRP) (mg L-1)	<0.015	Vanadium* (V) (mg L-1)**	
TPH C6 - C9 Fraction* (mg L-1)		Cobalt* (Co) (mg L-1)**	
TPH C10 - C36 Fraction* (mg L-1)		Barium* (Ba) (mg L-1)**	

Notes: * indicates requirement for hardness correction of trigger values (TVs). (**) Indicates trigger values are not specified in AWQG. All trigger values derived from AWQG except for $ which is derived from the QWQG.

The following amendments to the table have been made:

- The guideline value for Chromium III has been revised from 0.0027 to 0.0033 mg/L;
- Chromium and Cadmium have been indicated to have hardness algorithms;
- Clarification has been provided that TPH, Beryllium, Vanadium, Cobalt and Barium do not have a hardness correction; and
- The Dissolved Inorganic Nitrogen guideline has been updated from 0.015 to 0.028 mg/L.

Table 5.2-M Updated water quality variables and guideline values

Water quality variable	Guideline Value	Water quality variable	Guideline Value
pH	6.5-7.5	Metals (Dissolved)	
EC (µS cm^{-1}) $	<500	Arsenic (As) (mg L-1)	<0.013
Turbidity (NTU)	<25	Cadmium (mg L-1)*	<0.0002

Water quality variable	Guideline Value	Water quality variable	Guideline Value
Dissolved oxygen (DO) (% saturation (mg L^{-1})	90-110%	Chromium III (Cr) (mg L-1)*	<0.0033
Total suspended solids (TSS) (mg L^{-1})	-	Copper (Cu) (mg L-1)*	<0.0014
Hardness ($CaCO_3$) (mg L^{-1})	-	Lead (mg L-1)*	<0.0034
Sulphate (SO_4)* (mg L^{-1})	-	Nickel (Ni) (mg L-1)*	<0.011
Ammonia (NH_3) (mg L^{-1})	<0.010	Zinc (Zn) (mg L-1)*	<0.008
Dissolved inorganic nitrogen (DIN) (mg L^{-1})	<0.028	Manganese (Mn) (mg L-1)	1.9
Total nitrogen (TN) (mg L^{-1})	<0.25	Mercury (Hg) (mg L-1)	<0.00006
Total phosphorus (TP) (mg L^{-1})	<0.030	Beryllium (Be) (mg L-1)**	
Filterable reactive phosphorus (FRP) (mg L^{-1})	<0.015	Vanadium* (V) (mg L-1)**	
TPH C6 - C9 Fraction* (mg L^{-1})		Cobalt* (Co) (mg L-1)**	
TPH C10 - C36 Fraction* (mg L^{-1})		Barium* (Ba) (mg L-1)**	

Notes: * indicates requirement for hardness correction of trigger values (TVs). (**) Indicates trigger values are not specified in AWQG. All trigger values derived from AWQG except for $ which is derived from the QWQG.

5.2.4.46 Issue 46

The Oakey Creek gauge at Fairview is located over 38 km downstream of the revised Project site and approximately 45 km downstream of the proposed discharge point. Water quality at the monitoring site is influenced by both Oakey Creek and Lagoon Creek. Water quality at the Oakey Creek at Fairview site is discussed in S**ection 2.3.2** of **Appendix J.4** of the draft EIS. In summary, the site has high turbidity in relation to the guideline value of 25 NTU, high pH in relation to the guideline range of 6.5 to 7.5 and high EC in relation to the guideline of 500 µS/cm. Water quality changes during flow events, with EC values dropping to below the guideline value, and pH values reducing slightly. The high pH and EC values may be a result of the high alkalinity and salinity of soils in the Oakey Creek sub-catchment.

5.2.4.47 Issue 47

Refer to **Section 5.2.4.46**.

5.2.4.48 Issue 48

Figure 2-1 of **Appendix J.4** of the draft EIS has been updated to illustrate the location of current mine discharge points, water quality monitoring sites and a proposed compliance point. The location of such sites will be further refined in consultation with DEHP during the development of the REMP. The location of monitoring sites has also been checked with site descriptions in the draft EIS, with corrected locations illustrated in **Figure 5.2-Q**. Site AE2 is the same as Site AH2, Site AE1 is the same as Site AH1, Site AE4 is the same as Site AH4 and Site AE5 is the same as Site AH5.

Currently the mine discharges from ED1, ED2, ED 3 and ED4. However, historically only ED3 and ED 1 have been required to discharge. The location of these storages is located on **Figure 5.2-R.** NHG

will consult with DEHP regarding any proposed refinement of monitoring sites, to provide further confidence that they are fit for purpose.

LEGEND

- Towns and Localities
- Existing Release Point
- Proposed Release Point

Proposed Dam

- Environment Dam
- Sediment Dam

Existing Dam

- Environment Dam
- Process Water
- Sediment Dam
- Roads
- Creeks
- Revised Rail Spur and Balloon Loop Alignment
- Jondaryan-Muldu Road Diversion
- Mining Tenements
- Stage 3 Pit Areas

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 5.2-Q - Location of Water Management Structures

Scale 1:62,000 on A4
Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 24/08/2014 Path: I:\QENV2\Projects\QE06644\Spatial\ArcGIS\01_Figures\03_AEIS\05_SurfaceWaterResources\140512_NewHope_SurfaceWaterResources_Figure5-2-Q_WaterManagementStructures.mxd

LEGEND

- Towns and Localities
- Sample Site
- Existing Release Point
- Proposed Release Point
- Proposed Compliance Point
- Roads
- Creeks
- Revised Rail Spur and Balloon Loop Alignment
- Jondaryan-Muldu Road Diversion
- Mining Tenements
- Stage 3 Pit Areas

NEW HOPE GROUP

SINCLAIR KNIGHT MERZ SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 5.2-R - Water Quality Sample Sites

Scale 1:60,000 on A4
Projection: Australian Geodetic Datum – Zone 56 (AGD84)

Produced: 28/08/2014 Path: I:\QENV2\Projects\QE06644\SpatialArcGIS\01_Figures\03_AEIS\05_SurfaceWaterResources\140512_NewHope_SurfaceWaterResources_Figure5-2-R_LocationsOfWaterManagementSites.mxd

5.2.4.49 Issue 49

Refer to **Section 5.2.4.48**.

5.2.4.50 Issue 50

Water will be released from the mine water management system only during times of flow, or following a period of flow in Lagoon Creek. The period of flow will be defined by the NHG's existing water monitoring stations as the point at which water levels drop to baseline conditions. Following this period only good quality water with an EC of similar magnitude to the background Lagoon Creek water quality can be released from the mine water management system. The purpose of this approach is to allow the release of any good quality water (from any undisturbed or partially rehabilitated area's) that may have been captured by the mine water management system to be released to the creek. This prevents this good quality water being stored on-site and increasing in salinity due to evaporation. This approach also minimises the impact of the mine on the volume of water available to downstream users.

The proposed release conditions are presented in **Appendix C** of the AEIS and **Section 5.13.4** of the draft EIS. NHG will discuss the data for Oakey Creek at Fairview with DEHP in more detail with a view to developing suitable EA conditions. The revised Project's EM Plan will be revised in response to these discussions.

5.2.4.51 Issue 51

Refer to **Section 5.2.4.50** of the AEIS.

5.2.4.52 Issue 52

Refer to **Chapter 6** of the AEIS.

5.2.4.53 Issue 53

The floodplain management infrastructure associated with the existing operations and future mine is defined in **Chapter 5**, **Table 5-14** of the draft EIS and illustrated in **Figure 5-31**. In the current operations, uncontrolled releases occur from the environmental dams, as all overflows from the existing sediment dams flow into the existing environment dams. **Figure 5-31** has been updated to further clarify which dams are existing (ED1, ED2, ED3 and ED4) and which dams are proposed as part of the revised Project (ED5, ED6, ED7 and ED8) and is presented in **Figure 5.2-R**. Locations ED6 and ED7 contain existing farm dams.

In the revised Project the purpose of the sedimentation dams will be to capture and store sediment-laden runoff from disturbed areas. The two proposed sediment dams will be located near the out of pit dumps and may be staged to move progressively with the mine plan. The dams will be designed to capture a 1 in 10 ARI year 24 hour storm event, with events larger than this event will overflow with flows eventually reaching the creek. Water quality sampling will be undertaken to confirm the designation of these storages as sedimentation dams is appropriate. The environment dams will have a very small natural catchment with most of the inflows to the environment dams being controlled by

water pumped from the pit. Therefore the risk of uncontrolled overflows from the environment dams will be much rarer and is considered to only occur during rare or extreme flood events when there would be significant dilution. This practice is consistent with current industry standards.

NAC currently recycles and reuses the majority of the water captured at site. The revised Project will continue this practice. As a result water recycled back to the central storages of the process water dams and return pond will include water of different qualities. However, this recycle is an integral part of the sites ability to reuse mine affected water. As far as practical the NAC seek to separate water transferred between storages of different water qualities.

5.2.4.54 Issue 54

NAC notes that **Table 2-1** on page 7 of **Appendix J.4** and **Table 5-2** of **Chapter 5** should include cultural and spiritual values as Environmental Values for Lagoon Creek. An updated table is provided in **Chapter 6** of the AEIS.

Flowing springs and the Gummingurru Aboriginal Site are recognised as having cultural and spiritual value within the Upper Oakey Creek Sub-catchment. Mitigation measures in place to protect environmental values will also be effective in mitigating impacts on cultural and spiritual values, by maintaining the natural condition of culturally significant sites. A detailed assessment of cultural heritage matters is provided in **Chapter 12** of the draft EIS.

5.2.4.55 Issue 55

Refer to **Section 5.2.4.31** of the AEIS.

5.2.4.56 Issue 56

It is noted that the annual controlled release volume presented in **Figure 5-35** of the draft EIS and **Figure 5-3** of the Water Management Plan - **Appendix J.4** presents the total volume predicted to be released over a given year. That is at the 99th percentile of the probabilistic rainfall (very wet year) there is predicted to be 190 ML released in the year 2026. An updated chart is provided in **Figure 5.2-S** below.

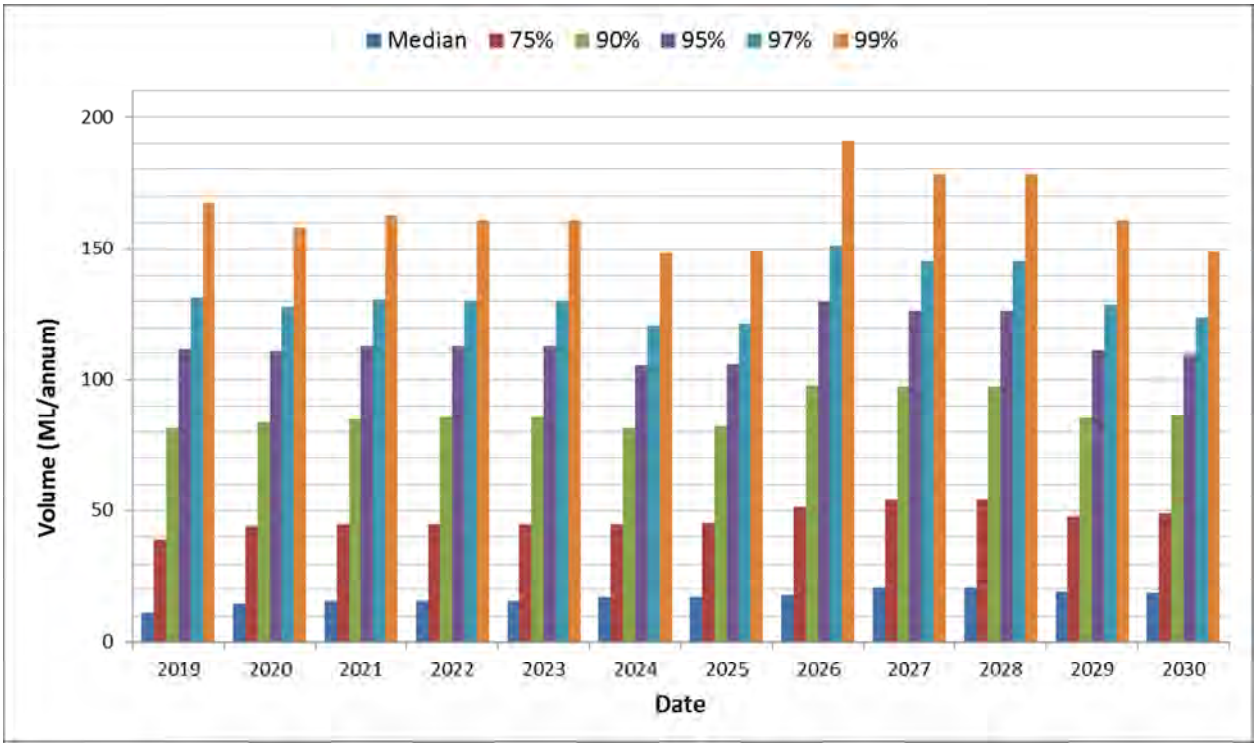


Figure 5.2-S Annual Controlled Release Volume

As per the above comment it is noted that there is a typographical error in the second sentence of the first paragraph on page 80 of **Chapter 5** and the sentence should read. "*The results indicate that in an average year only minor releases in the order of 20 ML/year will be made to Lagoon Creek with releases increasing to a maximum of **170** ML/year in the 1 % exceedance probability (very wet year)*."

5.2.4.57 Issue 57

Refer to **Section 5.2.4.31**.

5.2.4.58 Issue 58

NAC will commit to monthly monitoring of basic water quality parameters (EC, pH, Suspended Solids and Sulphate) within the proposed sedimentation and environment dams. In addition to this, annual pre wet season monitoring will be undertaken for storages with proposed release conditions, unless they are dry, to test for a broader range of water quality parameters, including metals and metalloids, nutrients and hydrocarbons. The objective of monitoring, location of sampling sites and monitoring parameters will be described in the REMP, which will be developed in consultation with DEHP. The revised Project's EM Plan will be revised in response to these discussions.

5.2.4.59 Issue 59

Refer to **Chapter 6** of the AEIS.

5.2.4.60 Issue 60

Refer to **Section 5.2.4.38**.

5.2.4.61 Issue 61

Refer to **Section 5.2.4.42**.

5.2.4.62 Issue 62

In relation to water quality data presented in **Table 3-14** of **Appendix J.19** of the draft EIS, the following clarifications are provided in response to questions from DEHP:

- The number of samples used to characterise water quality at Oakey Creek at Fairview was n=127 (temperature), n=59 (turbidity), n=65 (pH), n=57 (dissolved oxygen), n=114 (sulphate) and n=115 (EC).
- The number of samples used to characterise water quality at LCU1 was n=43 (temperature), n=41 (suspended solids), n=61 (pH), n=26 (sulphate) and n=55 (EC).
- The number of samples used to characterise water quality at LCD1 was n=50 (temperature), n=57 (suspended solids), n=83 (pH), n=71 (sulphate) and n=74 (EC).
- The number of samples used to characterise water quality at LCD2 was n=36 (temperature), n=27 (suspended solids), n=60 (pH), n=50 (sulphate) and (EC).
- The ranges refer to the maximum and minimum value recorded.
- The units used for Dissolved Oxygen (DO) in Lagoon Creek should be % saturation rather than ppm.
- The time of sampling at Lagoon Creek sites is provided in 24 hour time for 23 January 2008 and 24 January 2008. The times are 13:25 (Site 1), 15:40 (Site 2), 17:30 (Site 3), 14:30 (Site 4) and 15:20 (Site 5).

5.2.4.63 Issue 63

Water quality data for sites LCD1 and LCD2 are presented as part of the characterisation of baseline water quality conditions in the draft EIS (**Table 3-14** of **Appendix J.19**) for the revised Project for which approval is being sought. While the sites represent the baseline conditions for the revised Project, it is recognised that they are located downstream of the existing mining activity, and therefore are not appropriate for use as control sites for monitoring the potential influence of mining related activities generally. NAC will develop a detailed REMP for approval by DEHP. The REMP will include upstream control sites, sites within the mine site and sites located downstream of mining activities. It is recognised that Sites LCD1 and LCD2 would not be appropriate control sites for the purposes of assessing the environmental impacts of mining activities, as described in the REMP. Baseline water quality data without sites LCD1 and LCD2 will be further defined.

5.2.4.64 Issue 64

A very high EC value of 8089.6 µS/cm was recorded at Site 3 within Lagoon Creek on 23 January 2008 (**Table 3-14**, **Appendix J.19** of the draft EIS). This result is an order of magnitude higher than

the EC result for other sites within Lagoon Creek, which ranged from 463 to 642 µS/cm (n=4). The high EC value for Site 3 can be considered an outlier and is unlikely to be representative of the EC values within the waterway in general. Such a result may have been caused by an error in the water quality instrument which recorded the data. One possible exception to this conclusion is that at times during periods of dry weather, small stagnant pools will form along Lagoon Creek, and these may have high levels of EC as a result of evaporation and concentrations of salts within the remaining waters of the pool. **Photograph 5-2** in **Chapter 5** of the draft EIS provides an illustration of how such pools may form during dry periods, following a rainfall event. In this context, small isolated pools containing water with high EC would be a temporary feature of the Lagoon Creek waterway at certain times.

The pH values at all sampling sites within Lagoon Creek ranged from 8.03 to 8.91 (n=5), which is well above the guideline of 6.5 to 7.5 (**Table 3-14**, **Appendix J.19**). These high pH values are likely to be a consequence of alkalinity and salinity in the soils of the surrounding sub-catchment. A 'first flush effect' from runoff from the surrounding catchment following a rain event is likely to occur in this ephemeral waterway, with high pH and EC values during the first phases of the flow event, which are relatively short in duration (hours to days). During periods of sustained flow from continuous rainfall, the EC and pH would be expected to gradually decrease, following the influence of the 'first flush' period.

5.2.5 Department of Health (submitter 410)

5.2.5.1 Issue 1

NAC will be subject to stringent groundwater conditions set in its EA; these will include groundwater quality limits. NAC will implement a comprehensive groundwater management regime which will include groundwater quality monitoring and reporting. This regime is described in **Appendix J.5** of the draft EIS. In addition, NAC are required to comply with the provisions of the Water Act with regard to make good arrangements.

5.2.5.2 Issue 2

The revised Project is expected to comply with the ambient air quality objectives in the EPP (Air) provided NAC successfully implement a comprehensive air quality management strategy including a dust forecasting system, real time air quality monitoring and adaptive air quality management through the suspension or modification of mining activities to reduce dust emissions.

The proposed air quality monitoring program was described in **Section 9.5.4** of the draft EIS with locations presented in **Figure 9.37** of the draft EIS. The sites have been selected based on the results of the modelling assessment which has identified these locations as having the highest potential for air quality impacts.

$PM_{2.5}$ monitoring results at Balgowan presented in **Section 9.3.5** of the draft EIS is considered sufficient data to establish a baseline concentration for the draft EIS. Twenty-seven $PM_{2.5}$ samples were collected in the period from December 2011 to April 2012. The 70^{th} percentile of $PM_{2.5}$ monitoring results was adopted as 24 hour average baseline concentration for the air quality assessment. A 70^{th} percentile pollutant concentration is accepted as an estimate of the 24 hour average background data to determine cumulative impacts (EPA Victoria, 2001).

NAC will liaise with key regulatory agencies including Darling Downs Hospital and Health Service (DDHHS) with respect to air quality monitoring for the revised Project.

5.2.5.3 Issue 3

As the revised Project relates to the expansion of an existing operation, much of the workforce will maintain their employment at the mine and will not experience a change to their housing and accommodation needs. NAC will seek to source local employees for the revised Project wherever possible. The use of local people for employment is not expected to put an additional burden on the region's accommodation resources.

As described in the draft EIS, if Stage 3 proceeds, NAC's current operational workforce of 300 people is expected to increase by 38 to 338 people in 2018, and to a total of 435 people in 2024. The draft EIS assumed 70% of new employees could be found in the Toowoomba region, and 30% would move to either the local area or other parts of the Toowoomba region.

For the start-up of Stage 3 operations in 2018, 38 new employees, including up to 12 non-local workers, would be required. Assuming 60% of those were married and 40 % were single, and if 50% settled in the Jondaryan-Oakey- Goombungee district, a maximum of six houses would be required in the local area. In the Toowoomba region as a whole, there would be a requirement for 8-10 houses across the region. Some families and single workers would purchase houses, and others would rent. As such, demand for housing for NAC employees during 2018-2023 is unlikely to impact negatively on housing affordability in the local area or the Toowoomba region, or on access to housing for low income households.

Peak operations would be reached in 2024, when the workforce is expected to increase by a further 97 people to 435 employees. This would see an addition of approximately 30 non-local employees settling across the region, and would induce demand for some 22 dwellings. This is considered a negligible requirement and is not likely to impact on housing affordability in Toowoomba, particularly as Toowoomba has an adequate supply of land for residential growth and will have increased its housing stock by 2024. In all a maximum of approximately 32 dwellings would be required for Stage 3 employees by 2024.

Chapter 5.1.10 of the AEIS provides clarification of the demand for housing during operations. There are currently a range of housing and accommodation options available in the SIA study area. There were 132 houses, apartments or townhouses for sale in Oakey (7 May 2014, realestate.com.au), at a range of price points from $149,000 to $538,400, and 30 rental properties available starting from $150 per week. At the same time, there were 897 houses, apartments or townhouses for sale in Toowoomba City and suburbs, priced from $91,000 to $1.1million and over 400 rental properties available, starting from $130 per week (7 May 2014, realestate.com.au). This suggests there is an active real estate market that would be expected to cover the small demand associated with the Project, particularly as any increased demand will be spread across several years.

Furthermore, a range of strategies to minimise any potential for the revised Project to impact on housing affordability and availability are outlined in **Section 5.2.3** of the SIMP **(Appendix J.14** of the

draft EIS**)**. Key strategies aimed at minimising a potential decrease in housing availability and affordability include:

- Maximise local employment opportunities to minimise the number of new workers moving to the area.
- Encourage employees to seek accommodation in areas with housing capacity and ability to support growth.
- Provide employees with information about appropriate housing options, including share housing.
- Continue consultation with local real estate agents, accommodation providers, elected representatives and government agencies to understand local housing availability, monitor potential changes, opportunities or concerns.

In addition, housing availability and affordability will be discussed as part of the CRG meetings if concerns emerge to determine if additional local strategies are needed.

The revised SIMP is provided in **Appendix E** of the AEIS.

5.2.5.4 Issue 4

The revised Project is expected to generate a small increase in traffic movements during the construction and operation phases. No significant impacts are anticipated to the safe operation of local roads and infrastructure, including to school bus services. **Chapter 13** of the draft EIS, provides a range of mitigation measures to minimise potential impacts on traffic and transport, including:

- Traffic control measures designed for the safe movement of vehicles, pedestrians and cyclists accessing the residential properties in the vicinity of the revised Project site will be provided.
- Working hour arrangements will be modified and haulage tasks avoided during peak traffic periods and school drop-off and pick-up times.
- Established truck routes and arterial roads will be used for the haulage of construction materials and spoil in order to minimise truck traffic on local roads.
- Construction works will be staged to minimise traffic congestion effects.
- Traffic conditions during the construction period will be monitored in order to identify and address any negative impacts.
- The local community will be adequately notified about proposed changes to local traffic conditions due to construction activities, including the provision of advanced notice, clear signage of changed traffic conditions and as required, traffic control personnel.
- Prior to the commencement of any roadwork, bus operators and the local community will be notified about potential delays or disruptions to school bus services and other travel arrangements.
- Adequate consultation is undertaken with the appropriate regulatory authorities.

NAC will continue to meet with representatives of Queensland Health through the ongoing CRG meetings or other appropriate avenues. The SIMP will be discussed with stakeholders as required, including with CRG representatives.

5.2.5.5 Issue 5

In addition to the management measures outlined in **Appendix J.9** of the draft EIS, NAC will continue to take all reasonable steps to keep the revised Project site free of pests and vermin. Management of pests and vermin will also be consistent with the pest management plans set by the TRC. NAC undertakes periodic consultation with the TRC to keep up-to-date with pest management issues. Any required amendments to the Pest and Weed Management Plan (PWMP) will be made accordingly. The APC will assist NAC with pest management related matters relating to the revised Project and its surrounding land. The implementation of the PWMP will ensure compliance with the *Public Health Act 2005* and Division 3 of the *Public Health Regulation 2005*.

In general, the revised Project's pest management procedures have been designed to achieve the following broad objectives:

- promotion of an integrated approach to pest management;
- promotion of employee and contractor awareness about the impacts of pests;
- to reduce the economic, environmental and social impacts of pests;
- to reduce the establishment and spread of pests through a commitment and enforcement regime;
- adopt best practice approach to pest management; and
- improve the protection of environmentally sensitive areas located within the revised Project site.

NAC acknowledges that throughout the construction and operation phases of the revised Project, there will be a number of itinerate workers visiting the site on a regular basis. In light of this, NAC will update its existing PWMP in accordance with QH's document, "Guidelines to minimise mosquito and biting midge problems in new developing areas" and the *Public Health Act 2005* and Division 2 of the *Public Health Regulation 2005*.

The APC also provides expertise in relation to NAC's pest management practices and will add significant value in updating the PWMP for the revised Project.

5.2.5.6 Issue 6

NAC will commit to attaining all relevant licenses and will comply with food safety requirements outlined within the *Food Act 2006* for the revised Project.

5.2.6 Department of Agriculture, Fisheries and Forestry (submitter 416)

5.2.6.1 Issue 1

Information was provided on a variety of waterway barrier issues to assist NHG comply with relevant legislation and codes during construction phases of the revised Project. This information is received

with thanks and will be incorporated into future project activities, to achieve compliance with DAFF requirements.

5.2.7 Department of Education, Training and Employment (submitter 420)

5.2.7.1 Issue 1

Although NAC does not have percentage of workforce targets, NAC currently implement an Equal Employment Opportunity Policy to facilitate equal access to employment opportunities for under-represented groups.

NAC also maintain an apprenticeship program to provide opportunities for local school-leavers, in a range of disciplines including mining and agriculture, run internal training programs to up-skill existing and new employees and work with local recruitment firms to target local people, and diverse population groups.

Section 5.2.2 of the SIMP (**Appendix J.14** of the draft EIS) outlines a range of strategies aimed at targeting under-represented groups in the workforce and facilitating equal employment opportunities. In addition, the revised SIMP is provided in **Appendix E** of the AEIS.

5.2.8 Department of the Environment (submitter 443)

5.2.8.1 Issue 1

NAC notes that both *Digitaria porrecta* and *Bothriochloa biloba* were delisted by the Commonwealth on 13 December 2013. Consequently, these species will no longer be assessed by the DoTE during its evaluation of the AEIS.

5.2.8.2 Issue 2

EPBC Calculator

The EPBC offset calculator has been updated to show that 100% of the offset will be provided as a direct offset. The revision of the offset calculator is based on a revision of the calculator inputs, to bring each of the calculator sheets for the relevant MNES in line with each other.

The revised EPBC offset calculator for the MNES that will be offset are provided in **Appendix M**. Explanation of the scored used in the Offset calculator are also provided in **Appendix M. Figure 2** of the Biodiversity Offset Strategy shows the location of the Biocondition survey sites.

Offset management measures

As described in the Biodiversity Offset Strategy (**Appendix M** of the AEIS), NAC will implement a range of measures to see the quality of the offset sites improve. These measures will include:

- management of grazing to stop:
  - the physical disturbance of plants from trampling and grazing by stock;

  - the enrichment of the soil through the spread of stock manure; and
  - the introduction and spread of weeds to offset sites;
- weed control and management to remove invasive weed species from the offset sites, with the aim of providing adequacy space and resources for the growth of target species and community;
- feral animal control to remove the potential for regenerating or recovering areas from physical disturbance caused by feral animals and spread of weeds from feral animals;
- fencing offset areas where appropriate to clearly demarcate the extent of the offset, to help in the management of the offset site and restrict the movement of stock and feral animals into the offset areas; and
- implementation of a regular monitoring program to:
  - observe and record to achieving the management objectives of the offset site;
  - inform NAC on the effectiveness of the offset management measures and to guide the ongoing management of the offsets; and
  - refine the management of the offsets, where management measures need to be modified.

The specific actions to be undertaken by NAC for the management and delivery of the offsets will be contained in the OAMP. The OAMP will be prepared in consultation with both the DoTE and the DEHP. The content of the OAMP is presented in **Section 5.2.8.3**.

Offset tenure and security

NAC will place a covenant over the offset sites, to provide long term protection of the offset area. NAC will select one of three options for protecting the offsets, these will be either:

- as a gazettal as a protected area (e.g. a nature refuge) under the Queensland Nature Conservation Act 1992;
- as a voluntary declaration of an area of high nature conservation value under the Queensland *Vegetation Management Act 1999*; or
- a covenant under the Queensland *Land Title Act 1994* or Queensland *Land Act 1994*.

5.2.8.3 Issue 3

The species that NAC intends to translocate are all grasses. These plants are small plants that are able to adapt to movement, through translocation, as has been the case with the successful translocation of *Homopholis belsonii*. The species to be translocated are *Homopholis belsonii*, *Digitaria porrecta* and *Bothriochloa biloba*. These are all grass species that are found within the Study area and on adjacent properties, where the offset sites for the bluegrass threatened ecological community and these species are located.

Techniques for the translocation of these species will include:

- removal of grazing from the translocation site;

- construction of fences around translocation site and removal of threats, such as stock, feral animals and weeds;
- pre-translocation site assessment of the impact and translocation site, to check plant health in readiness of translocation;
- site preparation of the translocation site to prepare the soil bed;
- collection of plants to be translocated;
- placement of translocated plants at translocation site; and
- watering of translocated plants.

NAC is committed to the translocation of the three grass species that were listed as threatened species under the EPBC Act during the environmental assessment of impacts from the revised Project. However, two of the listed species, *Digitaria porrecta* and *Bothriochloa biloba*, were delisted on 14 December 2013. Despite the delisting of these two species, NAC will offset the impact of the revised Project on the delisted species, as well as *Homopholis belsonii*.

The TSTP has been updated to incorporate information from the listing advice and conservation advice for *Homopholis belsonii,* and is provided in **Appendix L** of the AEIS.

Homopholis belsonii

The conservation advice for *Homopholis belsonii* lists the following matters as threatens to the species:

- clearing of habitat for agriculture, development or pasture improvement;
- overgrazing of habitat by domestic stock;
- invasion of habitat by introduced weeds; and
- clearing of habitat for mining.

The management of the offset for *Homopholis belsonii* will exclude agricultural activities, limit grazing to the extent that it is used to assist with the management of fire risk, remove weeds and be excluded from mining activities. The translocation sites are on land owned by the NHG.

These threats are reflected in the priority actions for the species, as outlined in the conservation advice and these actions are to be undertaken by NAC, as part of the management of the revised Project's impact on the species. Priority actions for the conservation of *Homopholis belsonii*, as committed to by NAC are:

- removing habitat loss, disturbance and modification of habitat;
- control of invasive weeds;
- management of trampling, browsing and grazing;
- awareness raising of the species in the local community; and
- encouraging recovery of the species are additional sites.

5.2.8.4 Issue 4

It is noted that the revised Project is undergoing a request for advice from the IESC. The submission to the IESC accompanying the request for advice was presented as **Appendix H.2** of the draft EIS. The response to the IESC's advice is now presented as **Appendix N** of the AEIS.

5.2.8.5 Issue 5

The updated numerical modelling report, presented as **Appendix F** of the AEIS, provides details of the modelled geographic extent and thickness of each aquifer in the enclosed figures, with the exception of the Marburg Sandstone. The Marburg Sandstone is modelled across the entire model domain at a constant thickness of 250 m.

The updated numerical modelling report provides enclosed figures illustrating the location of DNRM-registered groundwater bores in relation to predicted groundwater drawdown.

Table 5.2-S and **Table 5.2-T** in **Section 5.2.9.24** present groundwater drawdown details at each potentially affected DNRM-registered groundwater bore, where the source aquifer is known in the DNRM database. Groundwater is not the mine's primary water source. Groundwater from the Marburg Sandstone is not currently relied upon at all.

5.2.8.6 Issue 6

As described in **Section 5.2.9.23**, during the original model development as part of the draft EIS, the calibration procedure involved simulating the Mine's operation with and without the inclusion of barrier faults in the model. The results of this procedure indicated that in order to best represent the compartmentalisation of the Walloon Coal Measures and the resulting monitoring bore responses, the faults which have been previously mapped by NAC are best simulated as barrier 'Walls' in the model. **Section 5.2.9.23** provides more details.

5.2.8.7 Issue 7

The complete data set for groundwater quality from monitoring bores associated with the Mine was presented as **Appendix G.4.3** of the draft EIS, and the complete data set for groundwater quality from monitoring bores within the revised Project site was presented as **Appendix G.4.4** and **Tables 6-13** and **6-14** of the draft EIS.

Table 5.2-N below presents a statistical summary of all water quality data for the revised Project site monitoring bores. **Table 5.2-O** below presents a statistical summary of all water quality data for the existing Mine monitoring bores.

Table 5.2-N Groundwater quality summary for the revised Project site

Revised Project Site		Walloon Coal Measures	Tertiary Basalt
TDS (mg/L)	Min	1,240	330
	Max	6,610	330

Revised Project Site		Walloon Coal Measures	Tertiary Basalt
	Mean	3,208	330
EC (uS/cm)	Min	2,130	
	Max	10,340	
	Mean	5,256	
pH	Min	6.8	8.2
	Max	7.4	8.2
	Mean	7.1	8.2
Hydroxide Alkalinity as CaCO3 (mg/L)	Min	<1	<1
	Max	<1	<1
	Mean	<1	<1
Carbonate Alkalinity as CaCO3 (mg/L)	Min	<1	<1
	Max	<1	<1
	Mean	<1	<1
Bicarbonate Alkalinity as CaCO3 (mg/L)	Min	195	
	Max	527	
	Mean	413	
Arsenic (mg/L)	Min	<0.001	
	Max	0.003	
	Mean	0.0025	
Cadmium (mg/L)	Min	<0.0001	
	Max	0.001	
	Mean	0.001	
Chromium (mg/L)	Min	<0.001	
	Max	0.008	
	Mean	0.008	
Copper (mg/L)	Min	<0.001	
	Max	0.004	
	Mean	0.002	
Lead (mg/L)	Min	<0.001	
	Max	0.009	
	Mean	0.005	
Nickel (mg/L)	Min	<0.001	
	Max	0.002	
	Mean	0.002	
Zinc (mg/L)	Min	0.005	
	Max	0.046	
	Mean	0.011	
Mercury (mg/L)	Min	<0.0001	
	Max	<0.0001	
	Mean	<0.0001	

Table 5.2-O Groundwater quality summary for the existing Mine

Revised Project Site		Walloon Coal Measures	Tertiary Basalt
TDS (mg/L)	Min	332	774
	Max	13,900	3,790
	Mean	3,604	2,045
EC (uS/cm)	Min	530	1,250
	Max	19,800	4,890
	Mean	5,812	3,209
pH	Min	6.0	7.2
	Max	8.5	8.1
	Mean	7.6	7.7
Hydroxide Alkalinity as CaCO3 (mg/L)	Min	<1	<1
	Max	<1	<1
	Mean	<1	<1
Carbonate Alkalinity as CaCO3 (mg/L)	Min	<1	<1
	Max	<1	<1
	Mean	<1	<1
Bicarbonate Alkalinity as CaCO3 (mg/L)	Min	67	220
	Max	1117	980
	Mean	517	616
Calcium (mg/L)	Min	2	70
	Max	889	370
	Mean	202	189
Magnesium (mg/L)	Min	<1	29
	Max	799	279
	Mean	146	168
Sodium (mg/L)	Min	88	84
	Max	2740	446
	Mean	852	237
Potassium (mg/L)	Min	<1	1
	Max	31	8
	Mean	11	3
Chloride (mg/L)	Min	92	85
	Max	5840	1220
	Mean	1515	678
Sulphate (mg/L)	Min	1	11
	Max	2820	360
	Mean	389	163
Fluoride (mg/L)	Min	<0.1	<0.1
	Max	1.3	1.2
	Mean	0.3	0.3
Total N (mg/L)	Min	0.1	0.3
	Max	22	22

Revised Project Site		Walloon Coal Measures	Tertiary Basalt
	Mean	2.4	6.6
Arsenic (mg/L)	Min	<1	<1
	Max	94	15
	Mean	9.4	4.3
Aluminium (mg/L)	Min	1	<1
	Max	2000	460
	Mean	161	37
Iron (mg/L)	Min	49	50
	Max	7800	7800
	Mean	1818	916
Copper (mg/L)	Min	<1	<1
	Max	73	16
	Mean	5.1	3.5
Manganese (mg/L)	Min	2	<1
	Max	1250	45
	Mean	138	57

5.2.8.8 Issue 8

As described in **Section 5.2.9.23** and in **Appendix F** of the AEIS, updated numerical modelling has been undertaken, including an assessment of model sensitivity and uncertainty. This new modelling supersedes the previous groundwater modelling for the revised Project's EIS.

Appendix F also presents details of the methodology used to develop the model lateral boundary conditions.

5.2.8.9 Issue 9

It is noted that NAC has engaged a specialist consultant to undertake Peer Review of the groundwater modelling undertaken for the revised Project's EIS and AEIS. The Peer Review report is contained within **Appendix F** of the AEIS.

5.2.8.10 Issue 10

The updated groundwater modelling technical addendum, presented as **Appendix F** of the AEIS, provides details regarding the sources of data used during the model development. These same data sources were relied upon for the conceptual model development presented in the draft EIS, with the addition of:

- Surface geology mapping sourced from the Queensland Department of Natural Resources, Mines & Energy (now DNRM) published geological mapping. It should be noted that more accurate

surface geological mapping (SRK Consulting, 2006) was used in the updated groundwater modelling as discussed in **Section 5.2.9.23** of the AEIS.

- The Commonwealth Bureau of Meteorology GDE Atlas.
- Various groundwater consultant reports prepared for NAC in support of the existing Mine.

The uncertainties associated with the quality of data used as a basis for the conceptual and numerical model development have been accounted for in the model build and calibration process described in **Appendix F** and in **Section 5.2.9.23** of the AEIS. During model calibration, the weighting of calibration targets considered the reliability of the data source, with a higher weighting assigned to data assessed to have a greater reliability. For example, groundwater monitoring data collected by NAC from dedicated monitoring bores installed as part of the Mine's monitoring network (discussed in **Chapter 6** of the draft EIS) were assigned a higher calibration weighting than data from private farm bores sourced from the DNRM registered bore database. Furthermore, where specific data is unavailable to support or disprove hydrogeologic assumptions of the conceptual model, such as hydraulic separation between the Tertiary Basalt aquifer and the Walloon Coal Measures, the numerical model has been developed using the more conservative assumptions, such as complete hydraulic connection in that particular case.

5.2.8.11 Issue 11

It is acknowledged that although the primary permeability and porosity of the clay-matrix interburden associated with the Walloon Coal Measures is relatively low, there is the potential for secondary porosity and permeability development through fracturing. Although there is a lack of specific hydraulic testing data for the interburden, the numerical model takes potential secondary porosity and permeability into account by conservatively modelling the Walloon Coal Measures as a bulk unit and calibrating to regional bore water levels.

5.2.8.12 Issue 12

Transmissivity values presented in the draft EIS are derived directly from aquifer testing analytical solutions, and are not calculated using a conversion from hydraulic conductivity and measured aquifer thickness.

5.2.8.13 Issue 13

A discussion of the effects on groundwater quality from the formation of void lakes was provided in the draft EIS. **Appendix F** and **Section 5.2.9.23** of the AEIS describe the updated numerical modelling in relation to depressed landform (rehabilitated final void) lake formation.

Updated lake salinity analytical modelling based on the updated numerical groundwater model presented in **Appendix F** of the AEIS has shown that, due to the effects of incident rainfall and local runoff, in the long term the lakes are not expected to become highly salinisied. The highest predicted lake salinity occurs in the Manningvale West depressed landform, with a predicted lake salinity of around 2,100 mg/L compared to around 4,100 mg/L for native groundwater in the Walloon Coal Measures. As such, a density contrast between the lakes and native groundwater that might overcome the overall inwards evaporation-driven hydraulic gradient between the depressed landform lakes and

the surrounding Walloon Coal Measures aquifer is not expected to occur. Overall groundwater flow will continue to be towards the depressed landforms in the long term, and therefore no impact on groundwater quality is expected from the revised Project post-mining.

5.2.8.14 Issue 14

As presented in **Section 5.10.4** of the draft EIS, there is uncertainty in the definition of peak flows from the 1 in 1000 AEP flood event. This range of uncertainty is not uncommon for rare events such as a 1 in 1000 AEP. The peak flow adopted by the 1 in 1000 AEP is within the expected range from the Flood Frequency Analysis (FFA) and consistent with the peak flows derived for Jondaryan for the Queensland Reconstruction Authority (QldRA).

A sensitivity analysis was undertaken whereby the peak flows from the 1 in 1,000 AEP flow hydrograph were increased by 20% to examine the implications of a higher 1 in 1,000 AEP flood peak. The sensitivity assessment indicated that the relative levels of impacts associated with the revised Project were not changed as a result of the increased peak flows.

It is noted that the Flood Levees will provide the revised Project with flood protection from a PMF event half a meter freeboard. This is well in excess of the 1:1000 AEP required by legislation. This should provide a high degree of confidence that the NAC will satisfy legislative requirements for flood protection.

5.2.8.15 Issue 15

The final landform will be located outside the PMF flood extent. Please refer to **Section 5.2.4.28** for a more detailed explanation.

5.2.9 Department of Natural Resources and Mines (submitter 444)

5.2.9.1 Issue 1

The following additional information is provided with respect to impacts on water users.

Section 5.4 of the draft EIS includes a spells analysis for impacts to the existing water user on Lagoon Creek. The spells analysis indicates there are some, albeit minor impacts on flow resources by reducing the duration of flow at the 90th percentile and increasing the interval between flows at the 50th and 90th percentile. However, it is noted that this analysis is conservative as it assumes the catchment removed by the revised Project is in affect for the full 117 years of data. Furthermore the analysis assumes that the catchment area is reduced by 10km^2 for this entire period, a 5% reduction in catchment. In reality, the life of the mine's operations is only 20 years and staged mining operations combined with progressive rehabilitation further minimise the percentage of catchment disturbed by the system. This is presented in **Table 5.2-P**.

Table 5.2-P Reduction in catchment area as a percentage

Year	2019	2021	2023	2025	2029	Average
Reduction in catchment area	4.3%	4.0%	2.3%	1.8%	2.6%	3.0%

The event analysis in **Section 5.4** indicates that the revised Project is unlikely to impact on the Environmental Flow Objectives defined under the *Water Resource Plan (Condamine and Balonne) Plan 2004.*

The Water Resource Plan (Condamine and Balonne) Plan 2004 also defines Water Allocation Security Objectives (WASO) for the basin. These are defined under Division 2 Water allocation security objectives as:

> **13 Performance indicators for water allocation security objectives**
>
> The performance indicators for the water allocation security objectives are—
>
> (a) the annual volume probability; and
>
> (b) the 45% annual volume probability.
>
> **14 Water allocation security objectives**
>
> For making a decision mentioned in section 18(2), the water allocation security objectives are that—
>
> (a) the annual volume probability for a water allocation group be not less than the annual volume probability for the group immediately before the decision is made; and
>
> (b) the 45% annual volume probability for a water allocation group be not less than the 45% annual volume probability for the group immediately before the decision is made.

However, at the time of writing the WASO's for Lagoon Creek were still under development. In lieu of this the following commentary is provided with regards to the potential for the revised Project to impact on the volumetric probability for the water allocation group.

As outlined in **Table 5.2-P** above it has been estimated that at the peak of operation, the revised Project may lead to the 200 km^2 catchment being reduced by a maximum of 8.7 km^2, which corresponds to a 4.33% of the total catchment area. However, this will only occur for 2 years and throughout the life of the mine, with an average reduction of 3% of the life of mine.

The WASO is that the Annual volume probability (AVP) for unsupplemented water = % simulation years that volume of water that can be taken by the group => nominal volumes for the group. Assuming the nominal volumes for the group remain the same, and that the relationship between catchment area and volume of flow is linear than we can conservatively assume that the unsupplemented AVP will be reduced by 3%. However, in reality this will only occur for the duration of the mining operations, which is 20 years.

The historical flow series for Lagoon Creek as provided by DISTIA was used to examine the influence of this 3% reduction flow volume over the 20 year life of mine. Eleven replicates of the flow series were created. In each series the mine and subsequent reduction in catchment area was simulated in a different decade. The purpose of this was to demonstrate the potential for the revised Project to impact on flow volumes and hence AVP, with allowance for climate variability. The analysis found that for the 50th percentile the mean annual volume was reduced by approximately 0.5%, with the 75th percentile (25% probability of exceedance) reducing the mean annual volume by less than 0.8%. This is considered to be a very small impact and the revised Project is considered unlikely to have a notable impact on the WASO and volumetric reliability of water in the system.

Given the above analysis, the potential impact on downstream water users (including stock and domestic), as a result of the revised Project is considered minor. However, the NAC have also committed to the following measures to reduce the revised Project's impacts on downstream water users

- reducing the interference with clean catchments, undisturbed catchments will be diverted away from disturbed areas so that runoff will contribute to the Lagoon Creek flows and water resources available for downstream users.
- Proactive and progressive rehabilitation of the site. This progressive rehabilitation will enable more of the catchment to be diverted back to the creek thereby enabling runoff from this catchment area to contribute to flows in Lagoon Creek.
- protecting and rehabilitating the creek corridor through both a no disturbance area and offset area. This will improve background water quality.
- controlled releases from the site water management system through the proposed release condition. This will allow good quality water to be released from the site during periods of flow.

5.2.9.2 Issue 2

Refer to **Chapter 6** of the AEIS.

5.2.9.3 Issue 3

NAC will consult with the DNRM in relation to the realignment of the Jondaryan-Muldu Road and proposed road closure/alterations and will ensure continuity and operability of the stock route. It should be noted that the Jondaryan-Muldu Road is an 'inactive' stock route that possesses no water facilities in the vicinity of the revised Project. NAC has not witnessed any use of the Jondaryan-Muldu Road stock route in its eight years of operation in the Acland district. It is also noted that the stock route is administered by DNRM and managed by TRC.

5.2.9.4 Issue 4

NAC has given notice in writing to the chief executive under Section 307 of the MR Act to partially abandon ML 50232.

The boundaries for the revised Project are shown in **Section 5.1.2** of the AEIS. The relevant information contained within the draft EIS was used as supporting information for the application under Section 307 of the MR Act.

For additional information about this issue, please refer to **Section 5.1.2** of the AEIS.

5.2.9.5 Issue 5

Refer **Section 5.2.9.3**.

5.2.9.6 Issue 6

NAC is currently not in the position to respond to this request for further information. Should the revised Project be approved, NAC are currently undertaking detailed design studies for the construction elements of the revised Project. During this phase of development, NAC will engage with suitable suppliers of gravel materials, identify the location and quantities of suitable materials required for the construction phase of the revised Project. These activities will be subject to NAC's construction tendering processes.

5.2.9.7 Issue 7

NAC acknowledges that there are two State Land non-road reserves within MLA 50232 – (lot 62 AG2962 RES14096 & lot 87 AG3429 RES16087). The 2 reserves identified in this section are held under the trusteeship of the TRC and owned by the State of Queensland. Reserve 14096 (described as Lot 62 on plan AG2962) is dedicated for Sanitary Depot purposes and Reserve 16087 (described as Lot 87 on plan AG3429) is dedicated for park purposes. APC has acquired both reserves from the State of Queensland and received confirmation that Council agree to relinquish trusteeship of Lot 62 in AG2962 and Lot 87 in AG3429 on 18 October 2010. Compensation Agreement by NAC with the State Government was executed on 11 October 2010.

5.2.9.8 Issue 8

Refer to **Section 5.2.9.3**

5.2.9.9 Issue 9

The SCL Act was repealed on 13 June 2014. The revised Project is expected to comply with the RPI Act and subordinate legislation. The requirements to rehabilitate the land post-development will be assessed (as required) under the RPI framework through the DSDIP. Further information on the implications of the RPI Act to the revised Project is provided in **Section 5.1.2** of the AEIS.

5.2.9.10 Issue 10

As stated in **Section 12.3.1** of the draft EIS, the only statutory Aboriginal party for the whole of the area of MDL 244, including those areas out of which MLs 50170 and 50216 have been granted and MLA 50232 is being sought, comprises those people who together were the registered native title claimant for the former Western Wakka Wakka People native title claim.

In accordance with Section 87 of the ACH Act, NAC will require an approved CHMP for the revised Project unless an exemption applies under Section 86 of the ACH Act. One such exemption would be triggered if the revised Project were the subject of an 'existing agreement' for the purposes of the ACH

Act. In this regard, NAC possesses a signed 'Co-operation Agreement' with the Western Wakka Wakka People dated 15 October 2003 and a fully executed CHMP dated 14 July 2006. These agreements apply to the land within MDL 244, which encompasses MLs 50170, 50216 and MLA 50232.

Analyses undertaken for the route of the rail spur and the area of MLA 50232 indicate that native title has been extinguished over the whole of these areas. In the circumstances, the proposed grant of the mining leases and of any other statutory approvals or tenure for the revised Project do not require agreement with the native title parties.

5.2.9.11 Issue 11

NAC is committed to undertaking further soil surveys to update the Topsoil Management Plan (TMP) and the Final Land Use and Rehabilitation Plan (FLURP), located in **Appendix J.3** and **J.2** of the draft EIS respectively. These soil surveys will be undertaken in compliance with the relevant legislation, with consideration to state guidelines, and following the methods in the Australian Soil and Land Survey (ASLS) series of handbooks. Further soil surveys to update the TMP will be undertaken prior to the commencement of topsoil stripping, and relative to the staging of the revised Project. These soil surveys will include strategies for managing the volume of topsoil resources available.

It is the experience of NAC that sufficient topsoil resources are available for the rehabilitation of the Mine. Based on the soil survey undertaken for the draft EIS it is expected that sufficient topsoil resources will also be available for rehabilitation of the revised Project. No requirement to acquire additional topsoil resources outside the Project disturbance area is anticipated.

5.2.9.12 Issue 12

It is important to note that determination of post-mining land suitability is an iterative process involving the characterisation and mass balance of the mine soil materials, landform design, development of rehabilitation criteria, and the monitoring and reporting of land suitability against these criteria.

Final landform elevation data has been used to provide an estimate of slope as shown in **Figure 5.2-T** which shows batter slopes of final land forms including out-of-pit dumps and depressed landforms with gradients of 15-30% (8.5-17°). "On the Eastern Darling Downs, slopes steeper than 8% that can be cultivated (with care) for improved pastures, and such cultivation is typically one-off. The upper slope limit for preparing land for improved pastures then becomes a function of safety and stability of the machinery to be used (Biggs pers comm. 2014).

While the initial post-mining land use could be described as improved pasture (sowing of selected pasture species into constructed soils), the final post-mining land use is expected to be grazing of (the equivalent of) native pastures, requiring minimal inputs. As confirmed by Biggs pers. comm. (2014), the cultivation required to prepare the post-mining constructed soils for sowing is likely to be one-off.

If slope criteria for land suitably classes for improved pastures were applied, the batter slopes could be assumed to be Class 5 (grazing) land suitability. However, NAC is confident that the proposed batter slopes with gradients ranging from 15-30% can be rehabilitated to enable the long-term post-mining land use of grazing of native pastures, which would be considered Class 4 (grazing) land suitability.

The post-mining land suitability will be further influenced by grazing management strategies, which will be determined following the post-mining land suitability assessment of the constructed stable landforms. The grazing management strategies will be developed with consideration to state guidelines and, if required, in association with the Department of Agriculture, Fisheries and Forestry (DAFF).

Elevated Landforms

Post-mining grazing of final landforms will be managed such that grazing predominantly takes place on the plateaued areas. The plateaued area of the Manning Vale West elevated landform is expected to be returned to Class 3 land suitability (grazing). For the reasons outlined in the above paragraphs of this section, the slopes of the elevated landforms are expected to be returned to Class 4 (grazing) land use suitability. Due to the limited size of the plateaued land area, the Manning Vale East elevated landform is expected to be returned to Class 4 (grazing) land suitability.

Depressed Landforms

Recent updated groundwater modelling has been completed including long term post-mining modelling (modelled as 300 years post-mining). Permanent lakes are predicted to form in all three depressed landforms (refer to **Section 5.2.9.13** of the AEIS).

Updated analytical modelling of salinity in the pit lakes (refer to **Section 5.2.9.13** of the AEIS) based on the updated numerical groundwater model shows that at the end of the modelled time period (300 years) the highest predicted lake salinity occurs in the Manning Vale West depressed landform, with a predicted lake salinity of around 2,100 mg/L, compared to around 4,100 mg/L for native groundwater in the Walloon Coal Measures. Salinity in the Manning Vale East and Willeroo depressed landforms is predicted to be 270 mg/L and 365 mg/L respectively (refer to **Section 5.2.9.13** of the AEIS) at the end of the modelled period.

The no adverse effects range for total dissolved solids (salinity) for beef cattle in the *Australian and New Zealand Guidelines for fresh and marine water quality: Volume 3 - Primary industries* (ANZECC, 2000) is 0-4,000 mg/L. Accordingly, salinity in the depressed landforms is within the no adverse effects range for beef cattle at the end of the modelled period (300 years).

As the Manning Vale West and Willeroo depressed landforms are expected to be net gaining water bodies, salinity levels are expected to continue to rise beyond the modelled period of 300 years, however water levels are expected to stabilize due to evaporations losses. Accordingly it has been assumed that in the long term salinity levels in the Manning Vale West and Willeroo will eventually result in water in these depressed landforms becoming unsuitable for stock watering.

The Manning Vale East depressed landform is expected to be a net losing water body (with sub-surface flow from Manning Vale East going into the Manning Vale West or Willeroo depressed landforms). Salinity levels in the Manning Vale East depressed landform are expected stabilise and accordingly water in this depressed landform is expected to be suitable for stock watering in the long term.

With consideration to the above post-mine land suitability (grazing) has been amended for the depressed landforms based on the further review of slope information and the updated groundwater model. Depressed landforms are considered to be Class 5 (grazing) land suitability as the landforms will become lakes.

Backfilled Mine Pit Areas

Similar to pre-mining conditions, backfilled mine pit areas will be returned to relatively flat grades. In addition to slope gradient, other important land suitability limitations in Queensland are those that relate to slope (erosion, safe use of machinery), and soil depth in relation to plant available water (either insufficient or too much). Most cropping/ pasture systems in Queensland are limited by soil moisture rather than nutrients or other factors. In regard to these factors as they apply to the revised Project area the following should be noted:

- Cracking clays (Vertosols) are a dominant soil type in the revised Project area. The land suitability slope limitation (for water erosion) defines a maximum slope of 6% for Class 2 (grazing) land suitability, and 9% for Class 3 (grazing) land suitability on these soils. The slope limitation is less stringent for other soil types. Slope data show that, post-mining, the backfilled mine pits will have slopes which are less than <6%. Therefore, these land areas will be less affected by the slope (erosion) limitation.
- Because Vertosols and other soils with high clay content that may grade to Vertosols (Dermosols) are dominant in the Project area, water availability is not considered a pre-mining land suitability limitation. NAC has demonstrated through rehabilitation monitoring programs that the soils of rehabilitated land areas can be constructed to an adequate depth such that water availability is not expected to be a land suitability limitation.

Considering these factors, and providing that NAC manages the soils appropriately (such as returning soil materials with a higher class pre-mining land suitability to the backfilled mine pit areas where practicable), the backfilled mine pit areas are expected to be returned to Class 2 (grazing) land suitability, with the minimum standard for these land areas being Class 3 (grazing) land suitability.

NAC considers the return of the backfilled mine pit areas to Class 2 to be achievable for the following reasons:

- Post-mine landform designs show that the backfilled mine pit areas will have slope gradients <6%;
- The dominant soil types of the project area have adequate soil depth and water holding capacity; and
- The topsoils and subsoils of these dominant soil types can be returned to a depth such that water availability will not be a limiting factor.

Following completion of the further soil surveys proposed in **Section 5.2.9.11 o**f the AEIS, the TMP and FLURP will be updated to include management strategies for the return of backfilled mine pit areas to Class 2 (grazing) land suitability.

It is important to note that post-mine land use suitability is rarely achieved immediately following landform construction and revegetation. Rehabilitation will be monitored over time, and there will be opportunity for improvement as the rehabilitation program progresses.

Table 5.2-Q provides a summary of the pre and post-mining land suitability for the mining areas, based on the changes to the proposed post-mining land suitability presented in this Section.

Table 5.2-Q Pre and Post Mine Land Suitability – Grazing (Mining Areas)

Land Suitability Class	Area within Disturbance Footprint (ha)*		% of Disturbance Area	
	Pre-mining	Post- Mining	Pre-mining	Post- Mining
Class 1	236	0	16%	0%
Class 2	1,112	576	77%	40%
Class 3	45	171	3%	12%
Class 4	45	79	3%	6%
Class 5	0	611	0%	42%
Total	1,438	1,438	-	-

The areas presented in **Table 5.2-Q** exclude the rail and road corridors which were presented in Chapter 4 of the draft EIS. This excluded area equates to 99 ha. Post disturbance road and rail corridors will become Class 5 (grazing) land suitability. Post mining the total area of Class 5 (grazing) land suitability including road and rail corridors will be approximately 640 ha (44% of disturbance area) and the total disturbance footprint within MLA 50232 is approximately 1,466 ha (refer to **Table 5.1.2-B** of the AEIS).

Table 5.2-R provides a summary of the pre and post-mining land suitability for the mining areas as presented in **Table 4-24** of the draft EIS.

Table 5.2-R Pre and Post Mine Land Suitability – Grazing (Mining Areas)

Land Suitability Class	Area within Disturbance Footprint (ha)*		% of Total Disturbance Area	
	Pre-mining	Post- Mining	Pre-mining	Post- Mining
Class 1	239	0	16%	0%
Class 2	1,176	0	77%	0%
Class 3	74	881	5%	57%
Class 4	47	630	3%	41%
Class 5	0	26	0%	2%
Total	1,537	1,537	-	-

Notes:

1. *The disturbance footprint comprises the mining and infrastructure areas within the revised Project site.
2. For the purpose of reporting pre and post mine land suitability it has been assumed that the road diversions are Class 5 post-mining.
3. Adapted from Table 4-24 of the draft EIS.

Summary

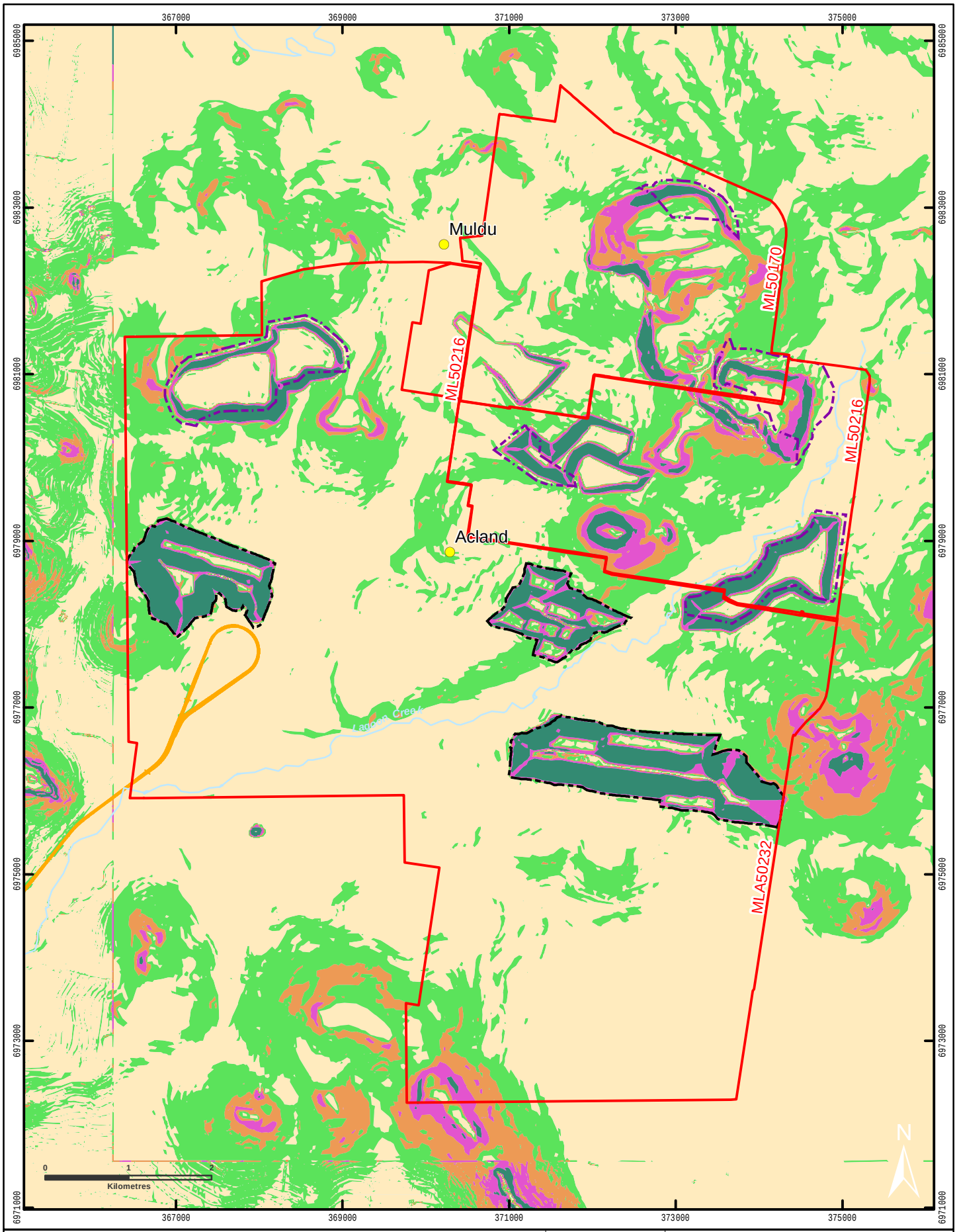
The post-mine land suitability (grazing) for the disturbed mining areas has been amended based on the further reviews (i.e., updated groundwater modelling) undertaken for the AEIS and is shown in **Figure 5.2-U**. In summary the key changes include:

- There has been a substantial increase in the class 5 amount as depressed landforms are now all considered to be Class 5 (grazing) land suitability as all depressed landforms will become lakes. The area of depressed landforms which will become Class 5 (grazing) land suitability is approximately 611 ha.
- The Manning Vale West elevated landform is considered to become Class 3 (grazing) land suitability for plateaued areas and Class 4 (grazing) land suitability on the slopes, on the basis that the landforms will support a grazing land use in the long-term.
- The Manning Vale East elevated landform is considered to be Class 4 (grazing) land suitability.
- With the exception of road diversions, other land disturbed by mining activities excluding the above is returned as Class 3 (grazing) land suitability. However for backfilled mine pit areas it is anticipated that provided NAC manages the soils appropriately (such as returning soil materials with a higher class pre-mining land suitability to the backfilled mine pit areas where practicable), the backfilled mine pit areas are expected to be returned to Class 2 (grazing) land suitability, with the minimum standard for these land areas being Class 3 (grazing) land suitability.
- As presented in the draft EIS it has been assumed that road and rail diversions will be Class 5 (grazing) land suitability.

The primary changes to the proposed post-mining land suitability in the AEIS are the increase in land to be returned to Class 2, 4 and 5 (grazing) land suitability, and a decrease in land to be returned to Class 3 (grazing) land suitability as a result of NAC commitment to aim to return backfilled mine pit areas to Class 2 (grazing) land suitability. With the exception of the depressed landforms, the return of disturbance areas to a post-mining land use of grazing is considered achievable and has been successfully demonstrated through grazing trials and rehabilitation monitoring undertaken for the Stage 2 Mine by NAC (refer to **Section 5.1.2** of the AEIS). Water from the Manning Vale East depressed landform is expected to support grazing (e.g. stock watering) in the long term.

NAC acknowledges that the return of the depressed landforms to Class 5 (grazing) land suitability due to these areas due to the formation of lakes has resulted in a substantial increase in Class 5 post-mining in comparison to the EIS. NAC has made a commitment to aim to return backfilled mine pit areas in the AEIS to Class 2 (grazing) land suitability (previously presented as Class 3 (grazing) land suitability in the EIS). NAC considers the return of the backfilled mine pit areas to Class 2 to be achievable for the following reasons:

- Post-mine landform designs show that the backfilled mine pit areas will have slope gradients <6%;
- The dominant soil types of the project area have adequate soil depth and water holding capacity; and
- The topsoils and subsoils of these dominant soil types can be returned to a depth such that water availability will not be a limiting factor.



LEGEND

- Towns and Localities
- Creeks
- Revised Rail Spur and Balloon Loop Alignment
- Mining Tenements
- Areas Depressed
- Out of Pit Spoil Dumps

Slope Gradient

- Slopes 0-3%
- Slopes 3-6%
- Slopes 6-9%
- Slopes 9-15%
- Slopes >15%

NEW HOPE GROUP

SINCLAIR KNIGHT MERZ SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 5.2-T - Post Mining Landform Slope Gradients

Scale 1:60,000 on A4

Projection: Australian Geodetic Datum - Zone 56 (AGD84)

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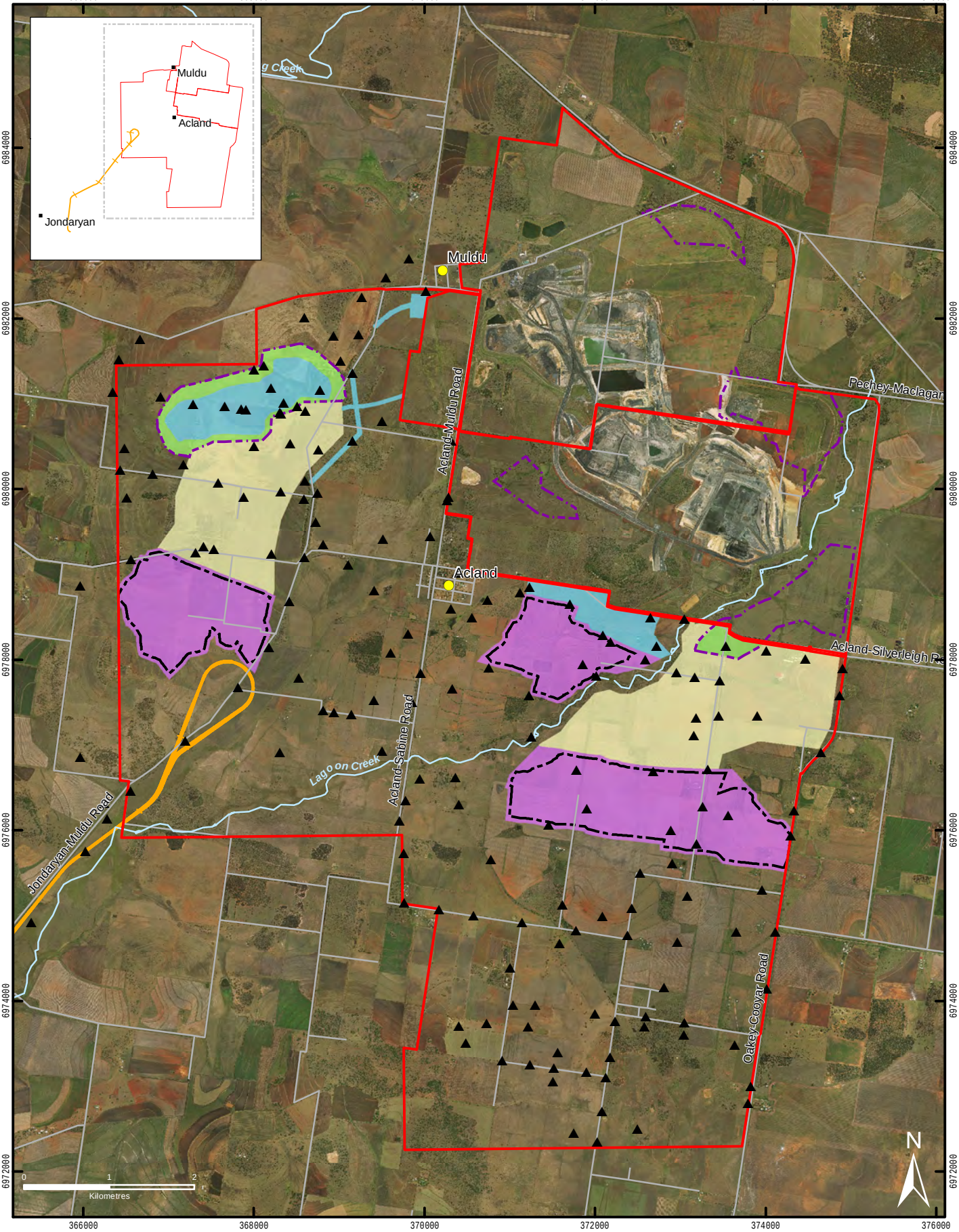

LEGEND

- Towns and Localities
- Soil Survey Locations
- Creeks
- Roads
- Revised Rail Spur and Balloon Loop Alignment
- Mining Tenements
- Areas Depressed
- Out of Pit Spoil Dumps

Grazing Suitability

- Suitability Class 2
- Suitability Class 3
- Suitability Class 4
- Suitability Class 5

NEW HOPE GROUP

SKM

NEW ACLAND COAL MINE STAGE 3 PROJECT

Figure 5.2-U - Amended Post revised Project Land Suitability (Grazing) – Mining Area

Scale 1:60,000 on A4

Projection: Australian Geodetic Datum - Zone 56 (AGD84)

Produced: 24/08/2014 Path: i:\QENV2\Projects\QE06644\SpatialArcGIS\01_Figures\03_AEIS\04_LandResources\140717_NewHope_LandResources_Figure5-2-U_AmendedRevisedPostLandSuitabilityGrazing.mxd

5.2.9.13 Issue 13

Recent updated groundwater modelling has been completed (refer to **Appendix F** of the AEIS) including long term post-mining modelling (modelled as 300 years post-mining). Permanent lakes are predicted to form in all three depressed landforms. The maximum depths of the lakes that are predicted to form are around 33 m in the Manningvale West depressed landform, 18 m in the Manning Vale East depressed landform, and 22 m in the Willeroo depressed landform. On the basis that the depressed landforms will become permanent lakes, the land suitability within the depressed landform is considered to be Class 5 (refer to **Section 5.2.9.12** of the AEIS).

As described in the updated groundwater modelling report (**Appendix F** of the AEIS), modelling of the depressed landform lake evolution post-mining includes application of direct rainfall and local runoff to the depressed landforms, in addition to groundwater inflow to the depressed landforms. As such, it has been deemed appropriate to calculate lake salinities post-mining using an analytical model that uses the following groundwater and surface water modelling outputs:

- groundwater inflow to each void (groundwater model, refer to **Appendix F** of the AEIS);
- lake water levels (groundwater model, refer to **Appendix F** of the AEIS);
- void surface water catchment areas (surface water model, refer to **Chapter 5** of the draft EIS); and
- constant runoff salinity of 268 mg/L (surface water model, refer to **Chapter 5** of the draft EIS).

The following assumptions have been made in the analytical model:

- average annual rainfall of 640.7 mm/year;
- average rainfall salinity of 10 mg/L;
- catchment runoff factor of 0.3;
- constant average ambient groundwater salinity of 4,100 mg/L for the Walloon Coal Measures (refer to **Chapter 6** of the draft EIS); and
- lake salinity cannot decrease below the runoff salinity of 268 mg/L.

Salinity in the lakes in the depressed landforms has been calculated to the year 2330, corresponding to the end if the groundwater model post-mining stress period. The calculations show that maximum lake salinity concentrations are expected to vary between each depressed landform, according to the predicted groundwater inflow to each depressed landform, the surface area of the lake in each depressed landform, and the surface water catchment area of each depressed landform. Predicted lake salinity concentrations at the end of this time period include:

- 2,100 mg/L for the Manning Vale West depressed landform;
- 270 mg/L for the Manning Vale East depressed landform; and
- 365 mg/L for the Willeroo depressed landform.

As the Manning Vale West and Willeroo depressed landforms are expected to be net gaining water bodies, salinity levels are expected to continue to rise beyond the modelled period of 300 years however water levels to be stable due to evaporations losses. The Manning Vale East depressed

landform is expected to be a net losing water body with sub-surface flow from Manning Vale East going into the Manning Vale West or Willeroo depressed landforms. Salinity levels in the Manning Vale East depressed landform are expected to stabilise in the long term.

With consideration to the above post-mine land suitability (grazing) has been amended for the depressed landforms based on the further review of slope information and the updated groundwater model. Depressed landforms are considered to be Class 5 (grazing) land suitability as the landforms will become lakes.

Geochemical characterisation (refer to **Section 4.7** of the draft EIS) indicates that mine wastes are mainly non-saline to moderately saline and unlikely to adversely affect water quality post-closure. Accordingly, the relative contribution of saline materials from batter slopes is expected to be lower compared to groundwater inputs from the Walloon Coal Measures. Future revisions to the water quality modelling in depressed landforms model will be undertaken if required once further characterisation of soil materials and mine wastes (overburden) has been completed as the mine progresses.

Use of competent materials for rehabilitation is proposed in the FLURP including avoiding the placement of sodic materials near the surface. Where the sodic materials cannot be avoided the use of ameliorants (e.g. gypsum) will be applied where required as per the FLURP and **Section 4.7.6** of the draft EIS.

5.2.9.14 Issue 14

The development of draft completion criteria for ungrazed rehabilitation pastures after open-cut mining in central Queensland (Grigg, Emmerton and McCallum, 2007) was incorrectly omitted from the reference list in **Chapter 23** of the draft EIS. Reference was made to Grigg et al. (2007) in the discussion on Rehabilitation Success Criteria presented in **Chapter 4** and in **Appendix J.1** of the draft EIS.

Land suitability assessment techniques applied in Queensland specify that slopes steeper than 15% are unsuitable for the grazing of improved pastures. This is based on both the safety, and practicality, of using machinery on slopes steeper than 15% to prepare the land for the sowing of pasture species (cultivation). Further information on the implication of slope in regard to the expected post-mining land suitability is provided in **Section 5.2.9.12**.

5.2.9.15 Issue 15

NAC has made a commitment to undertake further soil surveys to update the TMP prior to the commencement of topsoil stripping. Further information on this commitment is provided in **Section 5.2.9.11** of the AEIS.

5.2.9.16 Issue 16

Refer to **Section 5.2.9.3**

5.2.9.17 Issue 17

Refer to Errata in **Chapter 6** of the AEIS.

5.2.9.18 Issue 18

Refer to **Section 5.2.9.1** of the AEIS.

5.2.9.19 Issue 19

Refer to Errata in **Chapter 6 of the AEIS.**

5.2.9.20 Issue 20

Refer to Errata in **Chapter 6 of the AEIS.**

5.2.9.21 Issue 21

It is noted that the statement on page 87, **Section 5.15** of **Chapter 5** "*No licenced surface water users were identified on Lagoon Creek*" is incorrect and should read "***One*** *surface water licence holder was identified on Lagoon Creek with the next closest downstream user located after the Oakey Creek confluence 19 km downstream of the revised Project site. Therefore, the impacts of the revised Project to downstream users and the environment are expected to be* ***negligible***". Further information on this is provided in **Section 5.2.9.1** of the AEIS.

5.2.9.22 Issue 22

NAC acknowledges that **Section 6.1** of the draft EIS should include reference to amending moratorium notice 'Condamine Catchment Underground Water Area' 13 July 2012 as the legislative instrument under the Water Act that limits the take of water in the area.

5.2.9.23 Issue 23

Updated groundwater modelling, including a sensitivity and uncertainty analysis, has been undertaken for the revised Project since the draft EIS. Full details of the updated modelling are presented in **Appendix F** of the AEIS. The model update has been undertaken to incorporate various advisory agency submissions on the draft EIS.

The groundwater assessment presented in the draft EIS has been updated as a result of the project becoming subject to assessment of impacts on water resources in June 2013. The following provides a summary of the changes that have occurred to the groundwater assessment since the release of the draft EIS in January 2014.

The groundwater model reported in the draft EIS is classified as a 'Class 2' numerical model (SKM 2012). The use of the 'Class 2' numerical model in determining the potential impacts on groundwater resources was considered appropriate for the purpose of meeting the ToR for the revised Project. In addition, a State level preliminary assessment of the 'Class 2' numerical model was considered fit-for-purpose by the DNRM. Therefore, the 'Class 2' model was used for the assessment of potential

groundwater impacts from the revised Project and as such was reported in the revised Project's draft EIS (SKM, 2013). The data inputs to the 'Class 2' numerical model used for the draft EIS included groundwater information available at the time of the development of the 'Class 2' numerical model, such as existing groundwater monitoring data from the Mine, bore logs and the then DERM (now DEHP) database.

Given the additional reporting requirements as a result of the introduction of the Commonwealth Water Trigger under the EPBC Act in June 2013 and the formation of the Independent Expert Scientific Committee (IESC) in November 2012 the NHG commissioned Jacobs (formerly SKM) to update the 'Class 2' numerical model used for the groundwater impact assessment for the revised Project's draft EIS based on additional information received since the release of the draft EIS. The additional information used to update the 'Class 2' numerical model included:

- Additional groundwater monitoring data and bore logs;
- Additional baseline study results and specialist studies such as:
    - Landholder bore baseline surveys; and
    - Inpit review of faults and their effects on groundwater flow;
- Light Detection and Ranging (LiDAR) survey data;
- Final Office of Groundwater Impact Assessment (OGIA) groundwater modelling report; and
- Updated DNRM bore database.

This additional information has now been incorporated into the 'Class 2' numerical model which has increased the confidence in the results generated by the 'Class 2' numerical model. The objective of the additional modelling was to update the revised Project's 'Class 2' numerical model with the latest data available (listed above) and in doing so, conduct a 'sensitivity and uncertainty' analysis, as required for the Commonwealth Water Trigger review. The purpose of the 'sensitivity and uncertainty' analysis was to further assist in the quantification of the potential impacts of the revised Project on the groundwater regime, and to further clarify mitigation and contingency measures, where applicable. Specific updates of the model included:

- Re-interpretation of the surface geology based on LiDAR and other published geological information; specifically the occurrence of alluvium and basalt throughout the model domain and the region of outcrop of the Walloon Coal Measures. It was found during the model update process that a number of DNRM-registered bores with stratigraphic information reported intersecting coal seams of the Walloon Coal Measures in areas where the DNRM-sourced surface geological mapping used in the previous iteration of the model showed Marburg Sandstone to be outcropping. It was therefore deemed warranted to investigate other sources of surface geological mapping and this investigation showed that the surface mapping presented by SRK Consulting (2006) in the *Bowen & Surat Basin Structural Framework Study* most accurately corresponded to the Jurassic-aged sequences identified in DNRM-registered bore stratigraphic logs within the model domain. The Jurassic-aged surface geology in the model was therefore updated to reflect the mapping provided by SRK Consulting (2006).
- Update of modelling layering including an update of layer thicknesses based on re-assessment of drilling logs.

- Refinement of model lateral boundary conditions.
- Modelling of all natural surface water drainage features in the model as River cells.
- Restriction of hydraulic parameter ranges to those published in other relevant regional studies (eg. the Qld Government Office of Groundwater Impact Assessment's Underground Water Impact Report).
- The inclusion of time-variant hydrogeological parameters to better simulate mine pit voids and backfill areas.
- All post-mining drawdown impacts are a reflection of the balance between ET rates and recharge to the voids. Evapotranspiration (ET) is expected to be an active form of groundwater discharge in the model domain and has been simulated using the EVT package of MODFLOW.
- Maximum ET Potential was initially estimated for the EIS model to be between 1400-1500 mm/yr from local meteorological data (BoM, 2011). However the latest update for the AEIS uses the Australian Bureau of Meteorology estimate for Aerial Actual Evapotranspiration (AAE), estimated to be between 600 to 700 mm/yr (BoM, 2011), which is assumed to be better reflection of actual ET for areas where water is not ponded at surface. For modelling purposes, maximum ET was set to 650 mm/yr for all non-void areas. The maximum ET potential rate of 1450 mm/yr was assigned for all areas of voids, where water has the potential to be ponded at surface, because it is based upon measured potential ET rates of water exposed at surface.

  The EVT package of MODFLOW requires that an extinction depth be provided, which indicates at what depth ET no longer occurs (i.e. ET rate =0). The ET rate is then linearly decreased from the maximum rate when the water level is estimated to be at the ground surface to 0 mm/year when the water level is estimated to be at the extinction depth. The extinction depth is allowed to vary during the calibration process.

  For further information, refer to **Section 4.2** of **Appendix F**.
- Application of transient recharge over the mining area to better simulate the effect of rainfall recharge over the mine pits and backfill areas.
- Revised modelling of recharge to the mine voids in the post-mining period, to take into account the effect of local surface runoff from the void catchment areas in addition to direct rainfall into the voids.
- An increased number of calibration targets:
    - NAC monitoring bores (36).
    - DNRM bores (129).
    - Private bores visited as part of the revised Project's Landholder Bore Survey (8).
    - Observed mine pit inflows over the period 2011-2012.
- Revision of the calibration target weighting based on an assessment of calibration target data reliability.
- Sensitivity testing of the occurrence of barrier faults in the Marburg Sandstone.
- Inclusion of a stochastic calibration methodology for both a steady-state (pre-2002, the commencement of mining) and transient (2002-2013) calibration.
- Stochastic predictive simulations allowing model sensitivity and uncertainty to be addressed.

In the updated model calibration process, the following model parameters were stochastically varied within defined ranges in order to achieve best data fits to the calibration targets:

- Horizontal hydraulic conductivity (all layers/hydrostratigraphic units);
- Vertical hydraulic conductivity (all layers/hydrostratigraphic units);
- Specific yield (all layers/hydrostratigraphic units);
- River conductance (Myall and Oakey Creeks);
- ET extinction depth (entire model domain); and
- Recharge (all outcropping hydrostratigraphic units).

Investigations undertaken as part of the existing Mine operations, including field investigations (e.g. WSA, 2013), have sought to identify the role that faulting within the Walloon Coal Measures plays in control on groundwater flow and aquifer compartmentalisation. These investigations have shown that these faults may play a significant role in providing barriers to groundwater flow in the Walloon Coal Measures. During the original model development as part of the draft EIS, the calibration procedure involved simulating the existing Mine operation with and without the inclusion of barrier faults in the model. The results of this procedure indicated that in order to best represent the compartmentalisation of the Walloon Coal Measures and the resulting monitoring bore responses, the faults which have been previously mapped by NAC's geologists based on drilling results and observations of the existing Mine's open cut pits are best simulated as barrier 'Walls' in the model. For the updated modelling, this approach has again been adopted without specifically undertaking calibration trials without the inclusion of these Walls in the Walloon Coal Measures.

Model calibration runs were undertaken with and without barrier Wall faults applied to the Marburg Sandstone. The results of this sensitivity analysis showed that the model is relatively unsensitive to the inclusion of these faults. Given that the Marburg Sandstone is conceptualised as a relatively thick, permeable and homogenous unit compared to the upper Walloon Coal Measures, it was considered that compartmentalisation of the unit is much less likely to occur than in the Walloon Coal Measures, and therefore it was decided to not apply faults to the Marburg Sandstone for the model predictions. This approach is considered conservative as it will result in further lateral propagation of drawdown away from the revised Project site in the Marburg Sandstone than would be the case with barrier faults applied.

The updated model calibration simulations resulted in 1667 realisations (out of 2980 total possible realisations), or sets of model parameters, that simulated groundwater levels within the target calibration criteria of 5% SRMS (the first calibration target). Of these, 18 also simulated pit inflows within the range of inflow estimates used for calibration (the second calibration target). Therefore, these 18 realisations are considered the calibrated datasets available for an assessment of calibration sensitivity\uncertainty, as well as forming the input parameters for the predictive simulations and associated sensitivity\uncertainty assessments.

The results of the updated model calibration sensitivity analysis show that the model calibration is highly sensitive to the horizontal and vertical hydraulic conductivities used for the Upper Walloon Coal Measures, and relatively sensitive to the horizontal and vertical hydraulic conductivities used for the Lower Walloon Coal Measures and the horizontal and horizontal hydraulic conductivities of the

alluvium and basalt. The calibration shows some sensitivity to the specific yield of the Upper Walloon Coal Measures and basalt. The model is shown to be relatively insensitive to the other model parameter variables, including recharge and ET. Full results of the updated model calibration sensitivity analysis are presented in full in the groundwater modelling technical addendum presented as **Appendix F** of the AEIS.

The updated numerical model calibration and sensitivity analysis has resulted in the need to update the predictive simulations to take into account the model revisions. The updated predictive simulations have been run using the 18 calibrated datasets described above; that is, a total of 18 different predictive simulations have been run using the calibrated datasets, allowing an assessment of predictive uncertainty.

The updated predicted groundwater inflows to the revised Project's mining pits are shown in **Figure Figure 5.2-V**. Inflows gradually increase during mining before peaking immediately prior to the completion of the mining phase (2030) at approximately 3.5 ML/day (median case), which will be spread variably across the three operational pits. The general increase in groundwater inflows to the revised Project's mining pits during mining is a result of mining depths generally becoming greater as the revised Project progresses, especially in the Willeroo Pit. The peak in the predicted inflow curve in the latter stages of mining is a result of an increased mining area being simulated. The increase in mining area is associated with the mine plans going from 2 year increments to a 3 year block at the end of mining. It is expected that actual inflows would be less than modelled, with a smooth inflow curve consistent with the progressive nature of mining. The updated model predictions result in peak median predicted inflows to the revised Project's pits of around 3.5 ML/day close to the end of mining, compared to 3.8 ML/day in the previous model as reported in the draft EIS. Overall, this change is not considered significant.

The uncertainty of inflow predictions, as indicated by the upper and lower bounds (16^{th} and 84^{th} percentiles, equivalent to one standard deviation), is relatively small (< +/- 20% the median). The inflows account for evaporation at the time of seepage from the groundwater system but do not account for any evaporation while in the water management system (ponds, sumps etc.).

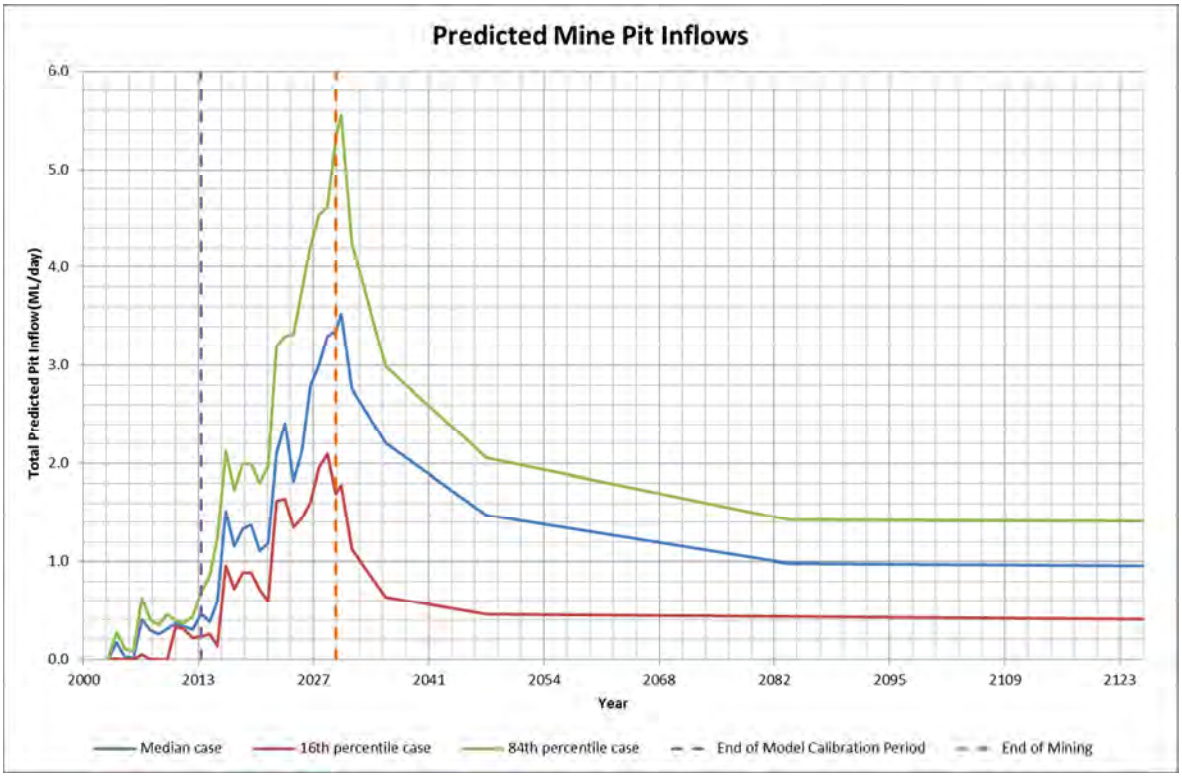

Figure 5.2-V Predicted Mine Pit Inflows (median value plus one standard deviation either side)

Updated predictions for groundwater level drawdown, arising from predicted revised Project pit inflows, are presented for selected years in **Figure 5.1.5-A** through **Figure 5.1.5-D** (**Section 5.1.5** of the AEIS). The drawdown presented is the most likely (i.e. median) drawdown based upon the 18 predictive simulations undertaken in the updated modelling.

For the Tertiary Basalt aquifer, groundwater drawdown exceeding 5 m is mostly limited to the area immediately northwest of the revised Project site. Drawdown of up to 12 m in the Basalt is limited to a small area within the revised Project site. Drawdowns of between 1 and less than 5 m extend westwards from the boundary of the revised Project site. Drawdown exceeding greater than 5 m does not occur outside of the revised Project site, with the 1 m drawdown contour reaching a maximum extent of around 8 km west of the revised Project site. The uncertainty analysis indicates that the occurrence of the 5 m drawdown contour in the basalt may extend outwards in the northwest over a lateral distance of up to 1 km in the worst case, and be non-existent in the best case. Compared to the draft EIS (refer to **Figure 6-29** of the draft EIS), the revised groundwater modelling indicates similar magnitude and extent of drawdown in the Tertiary Basalt, however direct comparison is difficult due to the significantly different and improved modelling methods now applied to that particular aquifer (refer to **Appendix F** of the AEIS for further details).

The modelling results indicate that groundwater drawdowns in the Walloon Coal Measures of greater than 10 m are not expected to extend more than around 3.5 km from the boundary of the revised Project site, with the 1 m drawdown contour extending up to 9 km west of the revised Project site. The uncertainty analysis indicates that the occurrence of the 5m drawdown contour may vary over a lateral distance of up to around 2 km to the west of the revised Project site, with less variance elsewhere.

Southwards drawdown propagation in the Walloon Coal Measures is somewhat controlled by the occurrence of faulting that restricts this propagation. The greatest drawdown is expected to occur at the end of mining (2030) in association with the Manning Vale West Pit reaching its greatest depth. Compared to the draft EIS, the revised groundwater modelling indicates a broader overall extent of drawdown in the Walloon Coal Measures, with the 1 m drawdown contour extending outwards a further 1 km to 2 km. Additionally, maximum drawdowns of around 47 m are expected within the revised Project site in close proximity to the mine pits, compared to around 30 m in the draft EIS .

At all times the drawdown in the Marburg Sandstone is predicted as being less than 5 m outside of the revised Project site, and does not exceed 12 m within the revised Project site. **Figure 5.1.5-E** (**Section 5.1.5** of the AEIS) illustrates the predicted drawdown in the Marburg Sandstone at 2030, and shows that drawdown greater than 10 m is restricted to the revised Project lease area, with the 1 m predicted drawdown contour extending up to around 10 km from the site boundary to the west and 5 km to the east. The uncertainty analysis indicates that the occurrence of the 5m drawdown contour may extend outwards over a lateral distance of up to 2 km in the worst case, and be non-existent in the best case. Compared to the draft EIS (refer to **Figure 6-30** of the draft EIS), the revised groundwater modelling indicates a broader overall extent of drawdown in the Marburg Sandstone, with the 1 m drawdown contour extending outwards a further 1 km to 2 km. Additionally, maximum drawdowns of around 12 m are expected within the revised Project site in close proximity to the mine pits, compared to around 2.5 m in the draft EIS.

As shown in **Figure 5.1.5-A** (**Section 5.1.5** of the AEIS), a small amount of drawdown within the alluvium, up to around 2 m, is predicted in the vicinity of Lagoon Creek adjacent the southwest of the revised Project site. As detailed in the draft EIS, previous groundwater investigations and a general lack of DNRM-registered bores in this area suggest that the alluvium associated with Lagoon Creek is dry; it is therefore likely that the predictions of drawdown in this area are a modelling artefact related to layering and model setup. The impact of predicted groundwater drawdown associated with the revised Project mining activities on the alluvium of Oakey and Myall Creeks (including their tributaries of Doctors, Lagoon and Spring Creeks) is also represented by the predicted change in flows in the Oakey and Myall Creeks. This is best represented by the change in the modelled mass balance associated with the 'River' cells representing these features in the model. These mass balance results indicate that no additional losses to baseflow as a result of the revised Project are expected to occur above any historic or current impacts consistent with the modelling presented in the draft EIS (refer to **Figure 6-32** of the draft EIS).

In the long term post-mining (modelled as 300 years post-mining), the updated model predictions indicate groundwater levels in the Walloon Coal Measures will gradually recover so that for the most part there is less than 10 m residual drawdown outside the revised Project's boundary as depicted in **Figure 5.1.5-F** (**Section 5.1.5** of the AEIS). Recovery to pre-mining conditions throughout the revised Project site is limited by evapotranspirative losses from the depressed landforms (rehabilitated final voids). Drawdown adjacent the last areas to be mined is predicted to remain relatively minor (approximately 10 m drawdown), and less than the 20m predicted in the draft EIS, due to the ongoing evapotranspiration-driven groundwater discharge into the depressed landforms (rehabilitated final voids). The 1 m drawdown extent in the Walloon Coal Measures is predicted to remain at approximately 6 km from the revised Project boundary at its greatest (western) extent, which is around 1 km less than presented in the draft EIS. Predicted drawdowns in both the Tertiary Basalt and the

Marburg Sandstone (refer to **Appendix F** of the AEIS) in the long term are significantly less than the final year of mining, with recovery of groundwater levels occurring such that residual drawdown does not exceed 5 m for either aquifer at any location. In particular, the Marburg Sandstone is predicted to recover such that drawdown does not exceed 2 m in the long term. Overall, the revised groundwater modeling indicates that post-mining impacts are predicted to be less than those presented in the draft EIS.

Although recovery to pre-mining groundwater levels does not occur post-mining, the groundwater system recovers to a new steady-state equilibrium such that there are no additional groundwater impacts other than those that have already occurred during operation of the revised Project.

Due to the high evapotranspiration rate in the Project area, groundwater discharge to the depressed landforms (rehabilitated final voids) is predicted to continue at a combined rate of around 1 ML/day in the long term (median modelled case, refer **Figure 5.2-V**), compared to a significantly greater 3.5 ML/day in the draft EIS due to significant revisions in the post-mining model methodology (refer to **Appendix F** of the AEIS), driven by evaporation from permanent pit lakes. Permanent lakes are predicted to form in all three depressed landforms (rehabilitated final voids) as shown in **Figure 5.2-W**. Recovery of groundwater levels in the depressed landforms is relatively rapid for the first few years post-mining, and stabilizes at between 2 m and 6 m residual drawdown from pre-mining conditions due to ongoing evaporative discharge, compared to 30 m to 40 m in the draft EIS due to significant revisions in the post-mining model methodology (refer to **Appendix F** of the AEIS). The maximum depths of the lakes that are predicted to form are around 33 m in the Manningvale West depressed landform, 18 m in the Manningvale East depressed landform, and 22 m in the Willeroo depressed landform. These pit lakes are around 20 m deeper (that is, the lake levels recover to a higher level) than presented in **Chapter 6** of the draft EIS due to significant revisions in the post mining model methodology (refer to **Appendix F** of the AEIS). The pit lakes are not expected to become salinized, due the effect of incident rainfall and local runoff. At no time are the lake water levels predicted to rise above the base elevation of the basalt aquifer, and the pits will therefore not cause recharge of pit water to the basalt aquifer.

Given the relatively minor long-term drawdown in the depressed landforms, it is possible that episodic large rainfall events could result in enough overland flow to the voids such that this long-term drawdown is overcome on a temporary basis, and the pits may therefore on occasion recharge the groundwater system. However, analytical salt balance modelling (refer to **Section 5.2.9.13** of the AEIS) suggests that the depressed landform lakes are not expected to become salinized due to the effect of long term incidental rainfall and runoff, and in the long term the lakes will have salinities significantly less than native groundwater in the Walloon Coal Measures. Therefore, any groundwater recharge from the lakes will be less saline than native groundwater. In addition, NAC is committed to dedicated void lake studies as part of mine closure planning in the future, and the management strategies for the lakes will be developed in conjunction with the relevant regulators to ensure no long term water quality impacts on the groundwater system.

The revised Project's GMIMP has been updated in accordance with the draft EIS submission provided by DNRM and in light of the updated modelling results. The updated GMIMP is provided as **Appendix H** of the AEIS. The locations of proposed new monitoring bores are based on:

- predictions of groundwater drawdown in the modelling (i.e. bores have been located in areas where drawdown is predicted);
- the proximity of receptors of interest in relation to those predicted drawdowns (i.e. bores have been located in areas where groundwater users have been identified); and
- achieving a good geographic spread of monitoring for each aquifer within and surrounding the revised Project site (i.e. bores have been located so that each potentially affected aquifer has a suitable number and spatial arrangement of monitoring bores, considering the distribution of existing New Acland Mine monitoring bores).

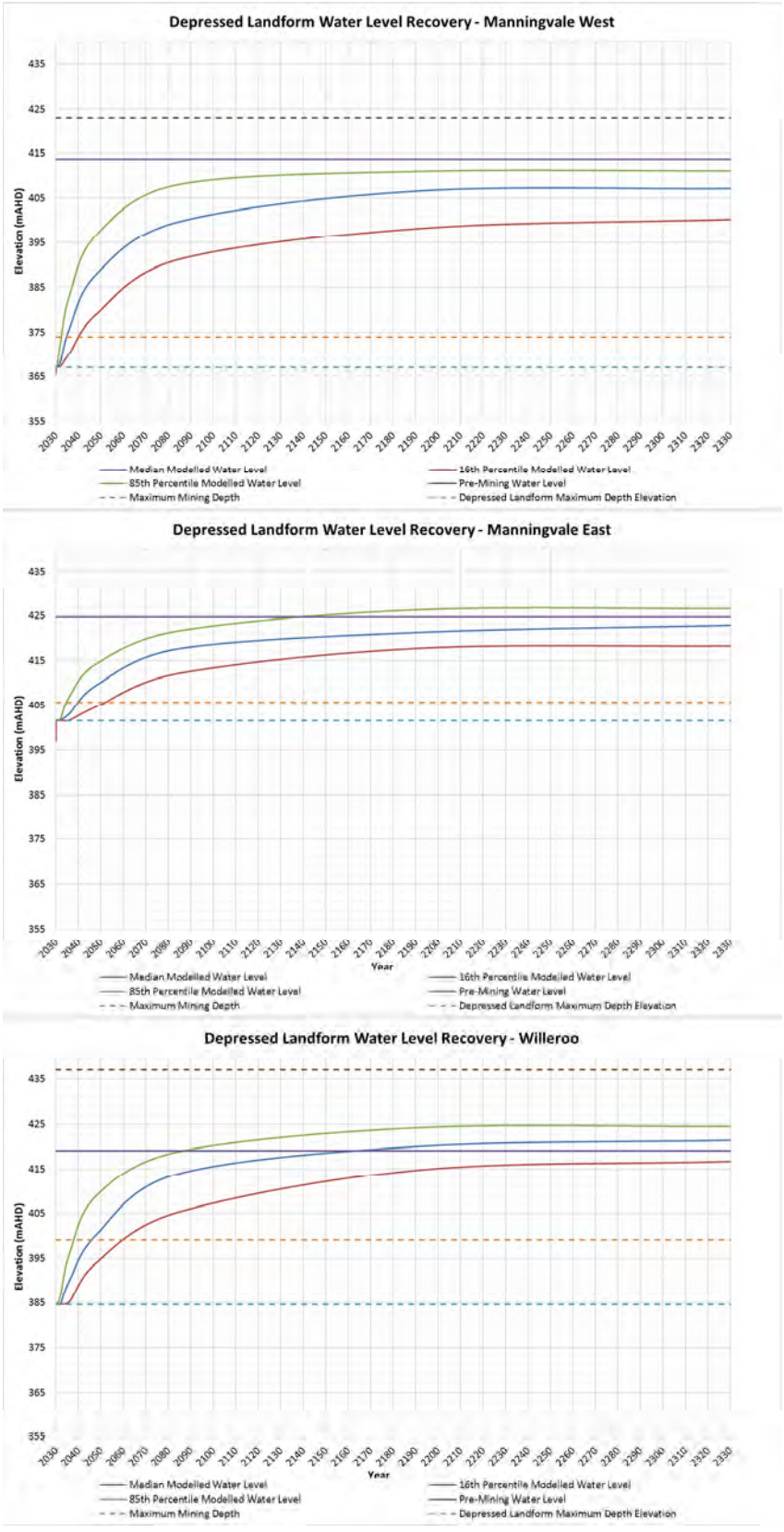

Figure 5.2-W Depressed Landform Lake Evolution

5.2.9.24 Issue 24

Table 5.2-S and **Table 5.2-T** present predicted drawdown at all potentially affected DNRM-registered groundwater bores, where the source aquifer is known in the DNRM database. The tables exclude bores owned by the NHG through its APC, and use a lower cut-off of 1m as this is the drawdown level at which there is sufficient confidence in the reliability of model predictions. Similarly, the provision of two tables (potentially affected bores; **Table 5.2-S**, and likely affected bores; **Table 5.2-T**) is based on the assessment of confidence in the reliability of model predictions. **Table 5.2-U** presents a summary of the predictions of bore impacts by aquifer.

Table 5.2-S Potentially affected private bores with known source aquifer (median predicted drawdown between 1 and 2 m)

Bore RN	Aquifer	Predicted Drawdown (m)		
		Median (50th percentile)	Min (16th percentile)	Max (84th percentile)
94343	Tertiary Basalt	1.5	0.1	3.4
94730	Tertiary Basalt	1.2	0.5	1.9
38704	Tertiary Basalt	1.1	0.5	2.0
48114	Tertiary Basalt	1.1	0.2	2.6
42231619	Tertiary Basalt	1.0	0.0	4.4
86634	Walloon Coal Measures	1.9	1.3	3.7
16464	Walloon Coal Measures	1.9	0.7	3.2
107795	Walloon Coal Measures	1.9	1.3	3.1
17179	Walloon Coal Measures	1.9	1.3	3.4
107083	Walloon Coal Measures	1.7	0.0	4.3
147260	Walloon Coal Measures	1.6	1.0	3.0
147262	Walloon Coal Measures	1.6	1.1	3.1
147259	Walloon Coal Measures	1.6	1.0	3.0
48110	Walloon Coal Measures	1.6	1.0	2.9
37159	Walloon Coal Measures	1.5	0.7	3.2
107378	Walloon Coal Measures	1.5	0.8	2.5
71436	Walloon Coal Measures	1.5	0.5	3.2
31016	Walloon Coal Measures	1.5	0.7	2.5
36991	Walloon Coal Measures	1.5	0.8	2.3
87765	Walloon Coal Measures	1.4	1.0	2.6
94627	Walloon Coal Measures	1.4	0.8	2.8
107883	Walloon Coal Measures	1.3	0.7	2.5
31898	Walloon Coal Measures	1.2	0.6	2.7
32979	Walloon Coal Measures	1.2	0.5	2.2
94924	Walloon Coal Measures	1.2	0.5	2.1
71409	Walloon Coal Measures	1.1	0.8	2.3
42231524	Walloon Coal Measures	1.0	0.5	2.4
38843	Marburg Sandstone	1.5	0.5	2.1
17389	Marburg Sandstone	1.2	0.3	2.4
55155	Marburg Sandstone	1.2	0.4	1.7
119138	Marburg Sandstone	1.1	0.4	1.9
147604	Marburg Sandstone	1.1	0.4	1.7
42231590	Marburg Sandstone	1.1	0.4	1.6

Bore RN	Aquifer	Predicted Drawdown (m)		
		Median (50th percentile)	Min (16th percentile)	Max (84th percentile)
32885	Marburg Sandstone	1.1	0.4	1.8
48270	Marburg Sandstone	1.1	0.4	1.8
61183	Marburg Sandstone	1.0	0.3	2.1
71462	Marburg Sandstone	1.0	0.4	1.6

Table 5.2-T Likely affected private bores with known source aquifer (median predicted drawdown > 2 m)

Bore RN	Aquifer	Predicted Drawdown (m)		
		Median (50th percentile)	Min (16th percentile)	Max (84th percentile)
94285	Tertiary Basalt	10.4	1.3	13.9
94801	Tertiary Basalt	8.1	0.7	10.6
71247	Tertiary Basalt	5.4	1.5	7.3
94722	Tertiary Basalt	3.5	0.7	5.8
42231620	Tertiary Basalt	3.2	0.2	8.1
83426	Tertiary Basalt	3.1	0.6	5.3
48209	Tertiary Basalt	2.5	0.2	5.3
119022	Tertiary Basalt	2.5	0.7	4.3
42231618	Tertiary Basalt	2.4	0.0	6.0
83287	Tertiary Basalt	2.3	0.2	4.6
42231617	Tertiary Basalt	2.2	0.1	5.7
147526	Tertiary Basalt	2.1	0.2	4.6
17490	Walloon Coal Measures	21.0	19.0	25.1
17125	Walloon Coal Measures	16.5	11.8	19.4
87958	Walloon Coal Measures	9.8	7.8	12.0
87948	Walloon Coal Measures	9.3	7.3	11.4
87927	Walloon Coal Measures	5.8	3.8	8.1
55224	Walloon Coal Measures	5.8	4.4	7.6
9583	Walloon Coal Measures	3.9	3.0	5.6
87741	Walloon Coal Measures	3.7	2.0	5.2
48164	Walloon Coal Measures	3.4	2.6	4.8
42231622	Walloon Coal Measures	2.9	1.8	4.4
107882	Walloon Coal Measures	2.8	1.7	4.6
83742	Walloon Coal Measures	2.7	1.8	4.2
119581	Walloon Coal Measures	2.7	1.7	4.0
83238	Walloon Coal Measures	2.6	0.9	4.1
61545	Walloon Coal Measures	2.5	2.0	3.4
55126	Walloon Coal Measures	2.4	0.9	3.6
87646	Walloon Coal Measures	2.3	1.5	3.7
64254	Walloon Coal Measures	2.2	1.4	3.6
87379	Walloon Coal Measures	2.0	1.4	3.5
87941	Marburg Sandstone	5.2	1.0	7.2
64280	Marburg Sandstone	5.0	0.8	7.5
66782	Marburg Sandstone	4.1	0.7	6.0
9564	Marburg Sandstone	3.8	0.9	5.3
17180	Marburg Sandstone	3.3	0.7	4.5
64185	Marburg Sandstone	3.3	0.6	5.6
94997	Marburg Sandstone	2.3	0.7	3.5
52872	Marburg Sandstone	2.2	0.7	2.8
107386	Marburg Sandstone	2.1	0.6	3.0

Table 5.2-U Summary of potentially and likely affected private bores with known source aquifer (median predicted drawdown)

Aquifer	Number of Bores Likely Affected (>2 m drawdown, median case)	Number of Bores Potentially Affected (1-2 m drawdown, median case)
Tertiary Basalt	12	5
Walloon Coal Measures	19	22
Marburg Sandstone	9	10

Within the potentially impacted groundwater drawdown zone (i.e. > 1 m median predicted drawdown for any aquifer) there are 77 DNRM registered bores with known source aquifer and 109 DNRM registered bores with no aquifer information. These bores are located on properties owned by approximately 50 landholders. The majority of the 109 bores with no aquifer information were drilled between 1910 and 2000 resulting in limited information being collected by the administering authority. Landholder bores targeted for monitoring were proposed to be selected based on a thorough review of bores within the predicted drawdown impact zone. This will include consideration of impacted bores not included in the DNRM database that do not have a defined source aquifer. These bores will be assessed through future baseline assessment work and additional monitoring may be employed to adequately address potential impact.

Within the draft EIS, commitments were made to undertake groundwater monitoring at selected landholder bores surrounding the revised Project site, following consultation with relevant landholders and the development of legally binding Landholder Agreements. Landholder bores targeted for monitoring were proposed to be selected based on a thorough review of bores within the predicted drawdown impact zone. Following the baseline assessment process, NAC remains committed to selecting appropriate and suitable private bores in conjunction with landholders for ongoing monitoring prior to any real or perceived impact occurring. Bores selected for ongoing monitoring on the basis of suitability will be added to NAC's routine groundwater monitoring program, with monitoring of water levels undertaken monthly and monitoring of water quality undertaken every 6 months. The data collected will be provided to the landholder following collection.

NAC will undertake investigations and bore assessments if private bore complaints are received, as outlined in the revised Project's updated GMIMP (**Appendix H** of the AEIS) and in accordance with the Water Act, and will reach Make Good agreements with affected landholders as necessary and in accordance with the Water Act.. Additionally, and separate from any complaints process, NAC remains committed to undertaking baseline groundwater bore assessments in its area of potential impact, and selecting appropriate and suitable private bores in conjunction with landholders for ongoing monitoring prior to any real or perceived impact occurring. In the time since the draft EIS release, NAC has undertaken additional landholder bore surveys in the area surrounding the revised Project site. The results of these additional surveys are presented in **Appendix G** of the AEIS. NAC remains committed to reaching Make Good agreements with potentially affected landholders (as shown by the AEIS groundwater modelling) prior to the operation of the revised Project.

The updated groundwater modelling as presented in **Appendix F** of the AEIS has not resulted in a change to the GMIMP groundwater monitoring network, except for the addition of a single new Marburg Sandstone monitoring bore (refer to **Appendix H** of the AEIS) to comply with the IESC's recommendations (refer to **Appendix N** of the AEIS).

5.2.9.25 Issue 25

NAC take note that regional vegetation management codes are now superseded and that the relevant provisions are contained within Module 8 of the State Development Assessment Provisions (SDAP), rather than the regional vegetation management code. The applicable exemption for vegetation clearing is *Sustainable Planning Regulations 2009* Schedule 24, Part 1, Item 6 for a resource activity.

5.2.9.26 Issue 26

The SCL Act has been repealed under Section 96 of the RPI Act which commenced on 13 June 2014.

5.2.9.27 Issue 27

NAC will carry out all relevant activities such as haul roads, conveyer belts, outlet works or anything else that may result in activities such as excavating or placing fill that would interfere with the flow in Lagoon Creek in accordance with DNRM's Riverine Protection Permit (RPP) Exemption Requirements.

5.2.9.28 Issue 28

Refer to **Section 5.2.9.25**.

5.2.9.29 Issue 29

Refer to **Section 5.2.9.3**

5.2.9.30 Issue 30

Refer to **Section 5.2.9.21.**

5.2.9.31 Issue 31

NAC acknowledges that DNRM is responsible for administering roads under the *Land Act 1994* and that any proposal in relation to road closures/alterations must be referred to DNRM for consideration in consultation with the relevant road manager. In the event that a decision is made to support a proposed permanent road closure, the resulting land is required to be included into the adjoining land parcel/s. NAC will consult with DNRM at the appropriate time and apply for road closures prior to any mining activities. NAC has a fully executed Compensation Agreement as per the requirements of Section 279 of the MR Act dated 30 May 2011 for the roads proposed to be closed as part of the Project.

5.2.9.32 Issue 32

NAC understands that approval will be required from the DNRM for any clearing of remnant vegetation conducted off tenure that is not an exempt activity as per Schedule 24 of the *Sustainable Planning Regulation 2009*.

5.2.9.33 Issue 33

NAC notes that RPPs no longer regulate the clearing of vegetation. It is understood that RPPs are required to excavate or place fill in a watercourse, lake or spring, although exemptions apply in certain circumstances and relevantly where the clearing is undertaken in accordance with the DNRM *Riverine protection permit exemption requirements*.

5.2.9.34 Issue 34

NAC understands that activities not associated with an EA, a water licence would be required if the revised Project will take water or interfere with the flow of water on, under or adjoining any of the land, subject of the ML. NAC also acknowledges that the granting of the licence must be consistent with relevant Water Resource Plan (WRP) and Resource Operations Plan (ROP) and any relevant moratorium notices.

5.2.9.35 Issue 35

Refer to **Section 5.2.9.33**.

5.2.9.36 Issue 36

Refer to **Section 5.2.9.33**.

5.2.9.37 Issue 37

Refer to **Chapter 4** of the AEIS.

5.2.9.38 Issue 38

NAC understands that the code for self-assessable development of operational works that interfere with water in a watercourse, lake or spring does not apply to the *Condamine and Balonne Resource Operations Plan* area.

5.2.9.39 Issue 49

Refer to **Section 5.2.9.31**.

5.2.9.40 Issue 40

Refer to **Chapter 6** of the AEIS.

5.2.9.41 Issue 41

Refer to **Section 5.2.9.26.**

5.2.9.42 Issue 42

Refer to **Section 5.2.9.9.**

5.2.9.43 Issue 43

Refer to **Section 5.2.9.26.**

5.2.9.44 Issue 44

NAC has made a commitment to undertake soil surveys to enable the refinement of the TMP prior to the commencement of topsoil stripping. Further information on this commitment is provided in **Section 5.2.9.11** of the AEIS. The additional soil surveys and TMP will be used to further refine the FLURP.

5.2.9.45 Issue 45

Grazing trials and rehabilitation monitoring undertaken for the Stage 2 Mine by APC demonstrate that land can be successfully returned to quality grazing land. Rehabilitation undertaken to date at the Stage 2 Mine has been successful without the need for irrigation, even during dry seasons. Similar strategies (to those effectively and successfully implemented for the Stage 2 Mine), such as maximising the use of summer dominant rainfalls, or other available water supplies, will be documented and referred to for the revised Project to ensure an adequate vegetal cover is established to minimise erosion risks if drought conditions prevail. In addition, the outcomes of the grazing trials and rehabilitation monitoring for the Stage 2 Mine will inform the FLURP for the revised Project.

5.2.9.46 Issue 46

Refer to **Section 5.2.9.3**

5.2.9.47 Issue 47

Refer to **Section 5.2.9.26.**

5.2.9.48 Issue 48

Refer to **Section 5.2.9.31**.

5.2.9.49 Issue 49

The proposed post-mining land use is grazing. Post-mining land suitability is expected to range from Class 2 to Class 5. Further information on the expected post-mining land suitability is provided in **Section 5.2.9.9** and **Section 5.2.9.12** of the AEIS.

5.2.9.50 Issue 50

Refer to **Section 5.2.9.3**

5.2.9.51 Issue 51

Refer to **Section 5.2.9.31**.

5.2.9.52 Issue 52

Refer to **Section 5.2.9.26.**

5.2.10 Toowoomba Regional Council (submitter 466)

5.2.10.1 Issue 1

A comprehensive community and stakeholder engagement program has been an integral component of the planning and approval process for the revised Project. **Chapter 19** of the draft EIS provides an overview of the consultation program implemented by NAC, which reflects both the formal consultation activities carried out specifically for the revised Project and the existing community and stakeholder engagement activities undertaken as part of NAC's on-going community consultation program for the Mine.

There has been a major increase in consultation undertaken for the revised Project for all stakeholders, commensurate with the requirement for the ToR. NAC will continue consultation with relevant stakeholders throughout the course of the Project Approvals and beyond into construction and operation. This is evidenced by clear consultation strategy and program in the Stakeholder Engagement Plan **(Appendix K.1** of the draft EIS**)**.

Section 5.1.10 of the AEIS details the engagement activities and mitigation strategies proposed to resolve issues raised by landholders. This includes detail about how the most affected community members will be engaged and impacts mitigated and managed during the life of the revised Project.

5.2.10.2 Issue 2

NAC considers the existing site values, the extent of potential impacts and evidence to support confidence in the success of mitigation measures are adequately presented in the draft EIS, and further detailed in the AEIS.

Section 5.1.10 of the AEIS provides targeted mitigation measures to address impacts on koalas across the revised Project area. A KSMP is provided in **Appendix B** of the AEIS.

The revised Project approvals are provided in **Chapter 4** and **Appendix A** of the AEIS.

5.2.10.3 Issue 3

A comprehensive list of the relevant legislation and regulatory approvals plan for the revised Project is provided in **Appendix C** of the draft EIS. A revised Regulatory Approvals Plan is provided in **Appendix A** of the AEIS.

5.2.10.4 Issue 4

Refer to the revised Regulatory Approvals Plan, provided in **Appendix A** of the AEIS.

5.2.10.5 Issue 5

Refer to the revised Regulatory Approvals Plan, provided in **Appendix A** of the AEIS.

5.2.10.6 Issue 6

Refer to **Section 5.2.4.16**.

Refer to the revised Regulatory Approvals Plan, provided in **Appendix A** of the AEIS.

5.2.10.7 Issue 7

Refer to **Section 5.2.4.16**.

Refer to the revised Regulatory Approvals Plan, provided in **Appendix A** of the AEIS.

5.2.10.8 Issue 8

Reserve 14096 (described as Lot 62 on plan AG2962) is dedicated for Sanitary Depot purposes and Reserve 16087 (described as Lot 87 on plan AG3429) is dedicated for park purposes. The APC has acquired both reserves from the State of Queensland and received confirmation that Council agree to relinquish trusteeship of Lot 62 in AG2962 and Lot 87 in AG3429 on 18 October 2010. A Compensation Agreement with the State Government was executed on 11 October 2010. Queensland Government Reference Number 2009/005895 and 2009/005896.

5.2.10.9 Issue 9

Rainfall events generating runoff from the Study area is to be management with the mine water management system. The mine water management system has been designed to minimise the potential for harm to environment. Structures will be constructed to capture and remove sediment from runoff. These structures will be designed in accordance with guidelines from DEHP and industry standard guidelines.

A large proportion of runoff from frequent to extreme rainfall events will captured in the mining pits and prevented from entering Lagoon Creek reducing sediment transport to the creek.

5.2.10.10 Issue 10

The revised Project will be assessed under the requirements of the RPI Act, subordinate legislation and the *Darling Downs Regional Plan*. NAC will be required to comply with the necessary approvals under the RPI Act. Further information on the implications of the RPI Act to the revised Project is provided in **Section 4** of the AEIS. The revised regulatory Approvals Plan in provided in **Appendix A** of the AEIS.

5.2.10.11 Issue 11

The SCL Act has been repealed on 13 June 2014. The revised Project will be assessed under the requirements of the RPI Act (refer to **Section 5.2.9.9** of the AEIS).

NAC has made a commitment to undertake soil surveys to enable the refinement of the TMP prior to the commencement of topsoil stripping. Further information on this commitment is provided in **Section 5.2.9.11** of the AEIS. The additional soil surveys and TMP will be used to further refine the FLURP.

5.2.10.12 Issue 12

Section 4.5.3 of the draft EIS provided an assessment of Good Quality Agricultural Land (GQAL) with consideration to SPP 1/92 (now expired) and *The Planning Guidelines: The Identification of GQAL* (DLGP and DPI, 1993). **Section 4.5.3** of the draft EIS defines Class A Crop Land as land suitable for current and potential crops with limitations to production which range from non to moderate levels, which is consistent with the definition in *The Planning Guidelines: The Identification of GQAL*. An assessment of post-mine land suitability was provided in **Section 4.5.4** of the draft EIS and in **Section 5.2.9.12** of the AEIS.

5.2.10.13 Issue 13

The stripping and management of topsoil resources including seed banks was presented in the TMP (**Appendix J.3** of the draft EIS) and FLURP (**Appendix J.2** of the draft EIS). NAC has made a commitment to undertake soil surveys to enable the refinement of the TMP prior to the commencement of topsoil stripping. Further information on this commitment is provided in **Section 5.2.9.11.** The additional soil surveys will be used to further refine the TMP and FLURP.

5.2.10.14 Issue 14

Refer to **Section 5.2.9.3** of the AEIS.

5.2.10.15 Issue 15

The SCL Act has been repealed on 13 June 2014. The revised Project will be assessed under the requirements of the RPI Act (refer to **Section 5.2.9.9** of the AEIS).

5.2.10.16 Issue 16

The SCL Act has beenrepealed on13 June2014. The revised Project will be assessed under the requirements of the RPI Act (refer to **Section 5.2.9.9** of the AEIS).

5.2.10.17 Issue 17

Refer to **Section 5.2.10.12** of the AEIS.

5.2.10.18 Issue 18

Refer to **Section 5.2.10.13** of the AEIS.

5.2.10.19 Issue 19

Chapter 4 of the draft EIS presented baseline information for soils and mine waste (overburden) which informed the preparation of the TMP (**Appendix J.3** of the draft EIS) and FLURP (**Appendix J.2** of the draft EIS). NAC has made a commitment to undertake soil surveys to enable the refinement of the TMP prior to the commencement of topsoil stripping. Further information on this commitment is provided in **Section 5.2.9.11** of the AEIS.

5.2.10.20 Issue 20

Refer to **Section 5.2.9.12** of the AEIS in regard to post-mine land suitability, and **Chapter 7** of the draft EIS for potential impact and mitigation of terrestrial ecological values. Further consideration to vegetation offset strategies is provided in **Section 5.2.9.16** of the AEIS.

5.2.10.21 Issue 21

Rehabilitation monitoring undertaken for the Mine by NAC demonstrates that land can be successfully rehabilitated using the methods outlined in the TMP (**Appendix J.3** of the draft EIS) and FLURP (**Appendix J.2** of the draft EIS). Further information on rehabilitation and grazing trials is provided in **Section 5.1.2** of the AEIS.

Further information on the expected post-mining land suitability is provided in **Section 5.2.9.12** of the AEIS.

Refer to **Chapter 7** of the draft EIS for potential impact and mitigation of terrestrial ecological values. Further consideration to vegetation offset strategies is provided in **Section 5.2.9.16** of the AEIS.

5.2.10.22 Issue 22

Most coal mines in Queensland do not typically produce drainage that has elevated concentrations of acid, metals or salts, and this is due to the way in which the coal deposits were formed. The environmental impacts from coal mines can however include drainage that has neutral pH, and that may have low to moderate concentrations of salts such as sodium, chloride and sulphate.

Geochemical characterisation (refer to **Section 4.7** of the draft EIS) indicates that mine waste associated with the revised Project is generally geochemically benign with negligible acid generation potential, and are not expected to adversely affect water quality post-closure. Mineralisation was found to be low and combined with negligible acid generation potential the risk of minerals leaching is considered negligible.

5.2.10.23 Issue 23

Rehabilitation monitoring undertaken for the Mine by NAC demonstrates that land can be successfully rehabilitated using methods outlined in the TMP (**Appendix J.3** of the draft EIS) and FLURP (**Appendix J.2** of the draft EIS). Further information on rehabilitation and grazing trials is provided in **Section 5.1.2** of the AEIS. NAC has made a commitment to undertake soil surveys to enable the refinement of the TMP prior to the commencement of topsoil stripping. Further information on this commitment is provided in **Section 5.2.9.11** of the AEIS. The additional soil surveys and TMP will be used to further refine the FLURP.

Section 4.7 of the draft EIS provided an assessment of mine waste characterisation and management. The assessment of mine waste associated with the revised Project concluded that mine waste comprising weathered and fresh overburden is generally chemically benign.

5.2.10.24 Issue 24

The rehabilitation actions to be undertaken along Lagoon Creek are detailed in the CZMP (**Appendix J.6** of the draft EIS). These actions concentrate on the rehabilitation and restoration of vegetation and habitat along the creek.

5.2.10.25 Issue 25

As stated in the Bluegrass Offset Management Plan (BOMP) (**Appendix J.8** of the draft EIS), three potential offset areas for the bluegrass community have been identified on land owned by NAC to the south of the revised Project site. All three potential offset areas possessed evidence of an existing Bluegrass ecological community and *Dichanthium sericeum* regeneration potential. The three bluegrass offset areas are to be managed for the conservation of the bluegrass community. As described in the BOMP, management actions will involve natural regeneration of the community, translocation of grassland species, planting and seeding of grassland species within the offset areas.

As stated in the Bluegrass Recovery Plan (**Appendix C** of the BOMP), grazing is not incompatible with environmental values on remnant grasslands provided grazing is managed to maintain palatable perennial species and legumes and to prevent erosion. The Bluegrass Recovery Plan also states that low intensity or intermittent grazing can increase the availability of suitable sites for seed germination. NAC intends to use grazing in a very limited and selective manner, to manage the build up of fuel and help with the management of weeds within the offset area. NAC will limit grazing to short durations and will monitor species health to avoid the suppression of plants that insensitive to grazing, to maintain species diversity in the community. The bluegrass offset sites are not intended to be used for permanent or full time grazing.

The revised Project will have an unavoidable impact on terrestrial ecology values of the site. The placement of the mine pits is based on the location of the coal resource. NAC has made effort to limit the extent of the pits, however the loss of vegetation within the revised Project disturbance area is unavoidable. NAC has been able to avoid impact to some areas of vegetation. The placement of the rail loop in the south-western corner of the MLA has avoided impact to areas of brigalow and poplar box community. Similarly, Lagoon Creek will not be disturbed by the revised Project, and this allows NAC the ability to undertake restoration and rehabilitation of the vegetation and habitat along the creek. This work is detailed in the CZMP (**Appendix J.6** of the draft EIS). The location of the conservation zone of the revised Project includes areas where impact has been avoided. These areas are Lagoon Creek and the adjacent Bottle Tree Hill.

The TSTP (**Appendix J.7** of the draft EIS), the CZMP (**Appendix J.6** of the draft EIS), the BOMP (**Appendix J.8** of the draft EIS) and the Biodiversity Offset Strategy (**Appendix I** of the draft EIS) have all been prepared on the basis that impacts have been minimised by avoiding and mitigating impacts.

5.2.10.26 Issue 26

Refer to **Section 5.2.10.26** of the draft EIS. Geochemical characterisation (refer to **Section 4.7** of the draft EIS) indicates that mine waste associated with the revised Project is generally geochemically benign. Mineralisation was found to be low and accordingly is not considered to be a criteria requiring monitoring in the FLURP.

5.2.10.27 Issue 27

The release of mine affected water to Lagoon Creek would be in accordance with the EA developed for the revised project. The release parameters will be determined in negotiation with the DEHP and with consideration for the protection of environmental values and water quality standards.

5.2.10.28 Issue 28

The tailings management system for the revised Project includes the disposal of tailings in previously mined pits. The revised Project does not include the development of any new tailings dams. Runoff to the inpit tailings areas will be managed to reduce the risk of overtopping in large rainfall events. Management measures may include the reuse of water recovered from tailings in the mining process, drainage and bunding to minimise runoff into the inpit tailings areas as required and the implementation of an operating and warning levels for the inpit tailings storage.

5.2.10.29 Issue 29

The release of mine affected water to Lagoon Creek will be in accordance with the EA developed for the revised project. The release parameters will be determined in negotiation with the DEHP and with consideration for the protection of environmental values and water quality standards.

5.2.10.30 Issue 30

There will be no unregulated discharge of dewatered groundwater into Lagoon Creek. Any dewatered groundwater will be stored in water management infrastructure (dams), with any subsequent

discharge to Lagoon Creek regulated by EA conditions. The potential environmental impacts of discharges to Lagoon Creek have been described in the draft EIS for the revised Project.

5.2.10.31 Issue 31

Groundwater inflows into the pit (as predicted by the groundwater model) have been included in the surface water balance model. The management of this water is detailed in **Section 5.13** of the draft EIS. **Table 5-16** of the draft EIS indicates the groundwater inflow to the pits. The updated groundwater modelling undertaken for the AEIS predicts pit inflows that are marginally less than those predicted in the EIS modelling. Therefore, the updated groundwater inflows will not result in any material changes to the surface water balance modelling nor on the results or operation of the mine water management system. A controlled release strategy is proposed as part of the revised Project's site water management to support proactive management of water during periods of extended rainfall. The controlled release strategy is based on stringent water quality and quantity targets and has been developed to minimise the potential for impacts on water quality, aquatic ecology and existing users downstream. The strategy seeks to optimise the potential for the controlled release of good quality water, so that it does not become saline as a result of prolonged storage. The strategy has benefits for downstream users and the environment, by releasing good quality water from large rainfall events, the impacts of the mine on the overland flow regime are further minimised.

5.2.10.32 Issue 32

Refer to **Section 5.2.9.24** of the AEIS**.**

5.2.10.33 Issue 33

Mitigation measures for terrestrial ecology matters are included in the EM Plan (**Appendix J.19** of the draft EIS), as well as the TSTP (**Appendix J.7** of the draft EIS), the CZMP (**Appendix J.6** of the draft EIS), the BOMP (**Appendix J.8** of the draft EIS) and the Biodiversity Offset Strategy (**Appendix I** of the draft EIS). Specific conservation management actions will also be incorporated into the EM Plan. These actions will include:

- staff induction to include description of species of conservation significance that could be encountered at the revised Project site;
- the use of fauna spotters during clearing of vegetation;
- relocation of fauna captured during pre-clearing operations;
- incorporate of koala feed trees into rehabilitation along Lagoon Creek; and
- monitor fauna vehicle collision rates to identify high mortality areas with a view to incorporating additional protective measures where appropriate.

As described in **Section 5.2.10.26** of the AEIS, the revised Project will have an unavoidable impact on terrestrial ecology values of the site. The placement of the mine pits is based on the location of the coal resource. NAC has made effort to limit the extent of the pits, however the loss of vegetation within the revised Project disturbance area is unavoidable. NAC has been able to avoid impact to some areas of vegetation. The placement of the rail loop in the south-western corner of the MLA has

avoided impact to areas of brigalow and poplar box community. Similarly, Lagoon Creek will not be disturbed by the revised Project, and this allows NAC the ability to undertake restoration and rehabilitation of the vegetation and habitat along the creek. This work is detailed in the CZMP (**Appendix J.6** of the draft EIS). The location of the conservation zone of the revised Project includes areas where impact has been avoided. These areas are Lagoon Creek and the adjacent Bottle Tree Hill.

The TSTP (**Appendix J.7** of the draft EIS), the CZMP (**Appendix J.6** of the draft EIS), the BOMP (**Appendix J.8** of the draft EIS) and the Biodiversity Offset Strategy (**Appendix I** of the draft EIS) have all been prepared on the basis that impacts have been minimised by avoiding and mitigating impacts.

5.2.10.34 Issue 34

Mapping of vegetation of the revised Project site has been undertaken by NAC to confirm the actual regional ecosystems that are found at the site. Regional Ecosystem mapping prepared by the DEHP is completed at a scale of 1:100,000. At this scale of mapping, it is common for some areas of vegetation to be mapped showing two or more regional ecosystems within one patch of vegetation.

To enable a correct assessment of impacts that arise from a project, it is necessary to map vegetation at a scale that allows regional ecosystems to be mapped individually. Mapping individual regional ecosystems allows for the calculation of impacts to specific vegetation communities, which is a requirement of the ToR for the EIS.

Mapping of the vegetation for the revised Project used the Methodology for Survey and Mapping of Regional Ecosystems and Vegetation Communities in Queensland (Neldner 2012).

Vegetation mapping shown in the revised Project EIS concentrated on the areas within the MLA and the disturbance footprint of the revised Project.

5.2.10.35 Issue 35

The survey results and methods used for the ecology surveys are described in **Section 7.4.2** and **Section 7.5** of the draft EIS, and **Section 3** of the MNES Report (**Appendix H.1** of the draft EIS). **Appendix G.5.2** of the draft EIS lists all the surveys completed by NAC at the Mine.

NAC also completed surveys for EPBC listed species in October and November 2013, following consultation with DotE. The results of these surveys are provided in both **Section 7** and **Appendix H.1** of the draft EIS.

5.2.10.36 Issue 36

Koalas are known to occur in the Acland area and have been found within the revised Project site. The greatest occurrence of koalas has been found in the Manning Vale West pit area. Impacts to koalas from the revised Project will be clearing of habitat, particularly in the Manning Vale West pit.

Mining is already undertaken by NAC at the New Acland Coal Mine and koalas are observed across the mine site. The expansion of mining will have an avoidable impact on koalas, however areas of

habitat and bushland will be retained. The placement of the rail loop has avoided areas of brigalow and poplar box vegetation. Habitat adjacent to Lagoon Creek will also be retained and rehabilitated, to strengthen the habitat corridor along Lagoon Creek.

During site inductions, NAC will inform staff and contractors that koalas are found in the Acland area and could be encountered within the revised Project site. The induction will provide direct to staff to not interfere with koalas, to drive with caution on roads and across the mine site to reduce the chance of colliding with koalas and actions to report koala observations to site environmental staff.

NAC will incorporate koala food trees within the rehabilitation and restoration works to be undertaken along Lagoon Creek.

Further detail is provided in **Section 5.1.1**, and a KSMP is provided in **Appendix B** of the AEIS.

5.2.10.37 Issue 37

The impact of the revised Project on fauna species is described in **Section 7.7**, **Section 7.8** and **Section 4** of the MNES Report (**Appendix H.1**)of the of the draft EIS.

5.2.10.38 Issue 38

Results of the aquatic ecology risk assessment were presented in **Table 8-13** of the draft EIS. All of the residual risks, following the implementation of mitigation measures, were assessed to be 'low'. The descriptive term 'very minimal' was used once in the chapter to provide a qualitative description of anticipated flow changes within Lagoon Creek, rather than an assessment of environmental risk. The terms 'relatively minor' and 'limited' were each used once in the chapter to describe impacts on aquatic values and riparian vegetation arising from construction and operation of the rail spur and road crossings. Such descriptions are consistent with an assessment of low residual risk, as outlined in **Table 8-13** of the draft EIS. The term 'negligible' was applied only in describing effects on flows within Lagoon Creek, rather than environmental risk. 'Negligible' also forms part of the description of low consequence in **Table 8-4**.

5.2.10.39 Issue 39

Baseline water quality and aquatic ecology conditions were described in the draft EIS in sufficient detail to satisfy the TOR and assist in making a decision on the revised Project. NHG commits to conducting more detailed characterisation of baseline water quality conditions prior to the revised Project construction, as these additional data will be required for the purposes of monitoring compliance with EA conditions. However, additional baseline data are not required at this time for the purpose of impact assessment. The ephemeral flow conditions of waterways within the revised Project site requires regular monitoring involving rapid responses to rain events in order to comprehensively describe water quality conditions.

NHG commits to develop and implement a REMP in consultation with the DEHP, to achieve a more detailed characterisation of baseline conditions. The REMP will describe the objectives of water quality monitoring, show the location of all monitoring sites, and describe the methods that will be implemented to determine water quality at upstream reference sites, within mine storages and

downstream of mining activities. The REMP will be developed in accordance with the ANZECC/ARMCANZ (2000) water quality guidelines and the Queensland Water Quality Guidelines.

5.2.10.40 Issue 40

Appendix J.19 of the draft EIS provided details of how mitigation measures would be implemented through an the EM Plan. In particular, **Section 3.7.1** provides a description of a no mining buffer zone to promote re-establishment of the creek's riparian vegetation. A detailed CZMP was also provided in the draft EIS as **Appendix J.6**. This document provides a description of the approach to vegetation management within the riparian zone.

5.2.10.41 Issue 41

The modelling methodology for the air quality assessment is consistent with the methodology accepted by the DEHP.

- Dust emissions were derived from industry-standard emission factors that have been collated by the National Pollutant Inventory (NPI) and United States Environmental Protection Agency (USEPA) AP-42 emissions estimation methodology.
- The CALPUFF modelling system is air dispersion model approved by the US EPA and is accepted by the DEHP for the assessment of air quality impacts from mining operations in Queensland.

A discussion on accuracy of modelling was presented in **Section 9.4.5** of the draft EIS. The predicted air quality impacts for current operations were compared to air quality monitoring data recorded at monitoring locations Acland and Balgowan in **Appendix G.6.6** of the draft EIS. The modelled 24 hour average PM_{10} concentrations for current operations were generally higher than air quality monitoring data.

Measures to avoid air quality impacts on local communities around the mine were presented in **Section 9.5** of the draft EIS. The proposed air quality monitoring program for mining operations was presented in **Section 9.5.4** of the draft EIS with locations presented in **Figure 9.37** of the draft EIS. The proposed monitoring sites are considered to have the highest potential for air quality impacts based on the air quality modelling assessment.

NAC is not responsible for the transportation of coal along the rail network. The transportation of coal by rail is undertaken by freight service operator Aurizon on the rail network maintained by QR. Road and rail operators are responsible for the management of their operations to meet environmental legislative requirements and avoid potential for nuisance impacts.

The draft EIS examined the air quality impacts associated with coal dust from transport in **Sections 9.4.5** and **20.7**. DSITIA (2013) undertook air quality monitoring was conducted at six locations along the Western and Metropolitan rail systems used to transport coal to the Port of Brisbane. The Queensland Department of Health has concluded that, for people living along the rail corridor, the dust concentrations, resulting from all particle sources, measured during the investigation are unlikely to result in any additional adverse health effects (DSITIA, 2013).

NAC propose to minimise potential for air quality impacts along the rail corridor through the implementation of the South West System Coal Dust Management Plan (CDMP) (SWS User Group 2013). This plan has been prepared to assist in mitigation and management of coal dust on the South West System rail corridor. The measures being undertaken to minimise and manage coal dust emissions include:

- Moisture content management;
- Improved loading practices;
- Load profiling of coal surface;
- Veneering; and
- Ongoing dust monitoring.

The Office of the Coordinator-General will convey community concerns raised in the submissions on the draft EIS regarding dust impacts associated with coal transportation on the West Moreton rail line to Aurizon and QR.

5.2.10.42 Issue 42

The JRLF is a coal loading facility located on the Warrego Highway approximately 1 km east-southeast of Jondaryan. NAC is aware of community concerns regarding air quality impacts from the operation of the JRLF. NAC have implemented mitigation measures for key dust sources and an ongoing air quality monitoring program to comply with the conditions of the JRLF's EA. The air quality objectives for the JRLF are presented in **Table 5.2-V**.

Table 5.2-V : Air Quality Objectives for the JRLF

Objective	Air Quality Indicator	Air Quality Limit	Averaging Period	No. of Allowable Exceedances
Human health protection	PM_{10} concentration	50 µg/m^3	24 hours	5 days/year
	TSP concentration	90 µg/m^3	1 year	-
Nuisance abatement	TSP concentration	80 µg/m^3	24 hours	-
	Dust deposition	120 mg/m^2/day	1 month	-

The following dust mitigation measures are implemented at the JRLF to reduce the potential risk of air quality impacts:

- High volume roadways, which convey 75% of site traffic, have been sealed;
- All trucks leaving the facility are covered and must exit over a 'rattle grid';
- Speed restrictions apply to vehicle movements on site;
- A larger water truck has been commissioned for use on site to improve the watering regime;
- Unsealed road surfaces are graded regularly to reduce silt content of the surface;
- Side tipper trucks are used because they possess lower emissions than other types of trucks;
- Sealed roads are swept as required to reduce soiling due to track-out; and

- Additional dust management measures (e.g. water truck to spray site roads, dust sweeper on sealed roads) are implemented when air quality monitoring records exceed the dust trigger level.

NAC undertakes air quality monitoring to determine if the JRLF is generating potential air quality impacts on sensitive receptors. The air quality monitoring locations for the JRLF are presented in **Figure 5.2-X**. The air quality monitoring program for the JRLF includes:

- Two real-time TSP monitoring stations – one at the JRLF and one within Jondaryan;
- Quarterly PM_{10} monitoring at the corner of Lagoon and Earl Streets in Jondaryan; and
- Dust deposition gauges at 5 locations in Jondaryan and near the JRLF.

Historical environmental monitoring results for dust deposition show that JRLF identified no elevated results in the period January 2012 to December 2013 as a result of the JRLF activities. Considering field observations, surrounding land use, laboratory compositional analysis, and meteorological observations, JRLF was not considered the major contributing factor in any of the results.

Historical environmental monitoring results for TSP show that JRLF identified one event of an elevated result in the period January 2012 to December 2013. The elevated result was due to unregulated temperature in the TEOM unit and is not considered accurate.

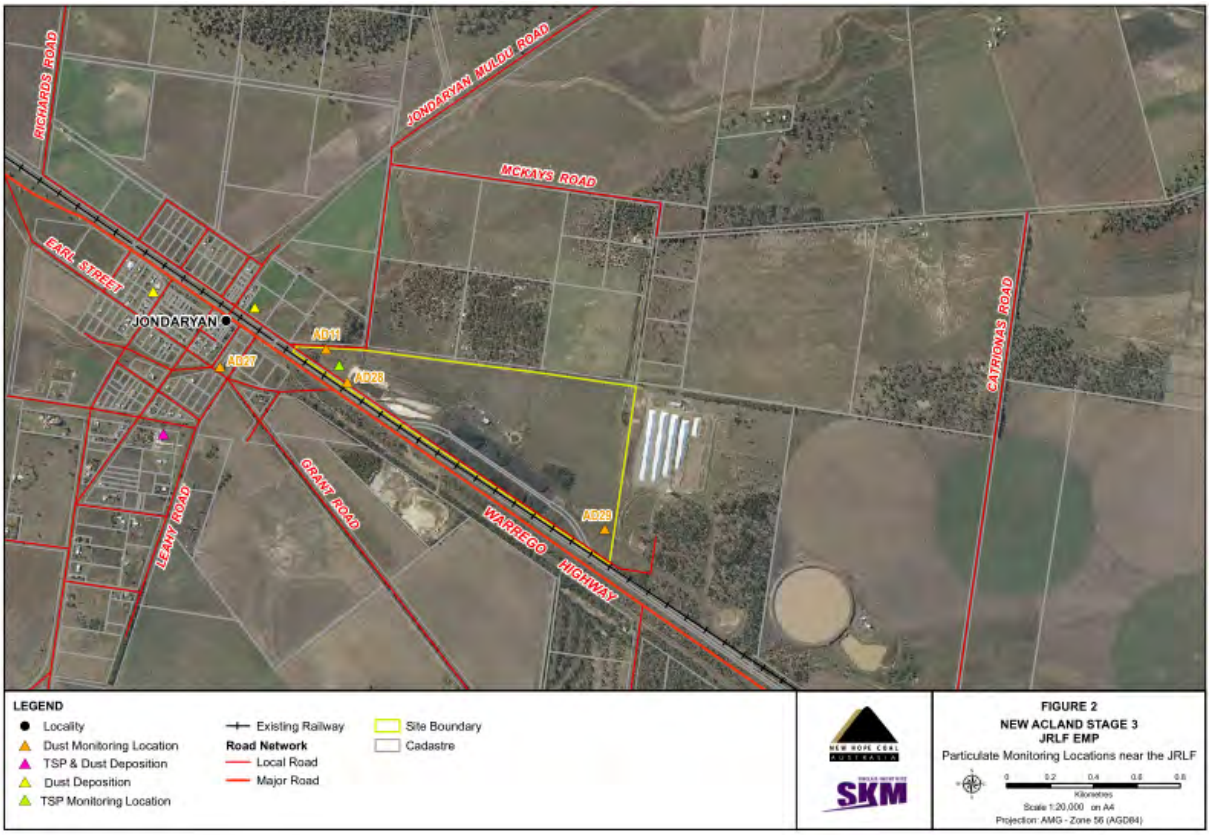

Figure 5.2-X Air Quality Monitoring Locations for the JRLF

NAC propose to decommission the JRLF with the revised Project. Subject to all statutory approvals being received in 2015, the new rail spur and balloon loop, TLF and MHF will be constructed over an estimated two year period with completion in approximately 2017. The decommissioning of the JRLF will commence in 2018 and is expected to be completed in 2019. Based on the current schedule of works it is not expected that the TLF and the JRLF will be in joint operation. The existing JRLF site will be returned to its original land use of grazing.

5.2.10.43 Issue 43

The air quality management actions to reduce emissions from the revised Project were presented in **Section 9.5.1** of the draft EIS and the **Table 3-1** in the Air Quality Management Plan (**Appendix J.10** of the EIS). The management approaches for dust sources from the revised Project are generally in line with best practice dust management practices defined in:

- Environmental compliance and performance report: Management of dust from coal mines (DECCW, 2010); and
- NSW Coal Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining (Katestone Environmental, 2010).

Planting of trees to create a vegetative wind breaks has the potential to reduce emissions of particulate matter from mining operations. Vegetative wind breaks can reduce dust emissions through deposition on vegetation and enhanced gravitational settling through reduction in a wind velocity. The effectiveness of trees as wind breaks is increased through having high density foliage and reducing the distance from the wind break to the dust emissions source. Establishing a dense vegetative wind break will be difficult due to the low rainfall experienced near the Study area. Tree planting is not considered to be an effective means to minimise dust emissions from the revised Project.

The revised Project is expected to comply with the ambient air quality objectives in the EPP (Air) provided NAC successfully implement a comprehensive air quality management strategy including a dust forecasting system, real time air quality monitoring and adaptive air quality management through the suspension or modification of mining activities to reduce dust emissions.

5.2.10.44 Issue 44

The potential for cumulative noise impacts from the revised Project was considered in the noise impact assessment in **Section 11.7** of the draft EIS. Mine layouts for the existing Mine and the revised Project are presented in **Section 3.6.2** of the draft EIS. **Figure 3-11** of the draft EIS identifies the locations of mine pits and working areas in 2019. Some operations for the revised Project will occur on ML 50170 and ML 50216 including CHPP operations and the transport of RoM coal to the CHPP. The operations on ML 50170 and ML 50216 have been included in the noise model for the noise impact assessment. Activities that relate to the Mine operations are rehabilitation activities including dozer operations on mined areas.

The cumulative noise impacts from both the revised Project and the Mine have been modelled in the 2019 scenario. The expected mining fleet (including equipment operating in the existing Mine) for the

2019 scenario was presented in **Table 11-12** of the draft EIS. The noise modelling methodology was presented in **Section 11.7.1** of the draft EIS.

The cumulative noise modelling results for the 2019 scenario were presented in **Table 11-14** of the draft EIS. The predicted noise levels for the 2019 scenario complies with the EPP (Noise) criteria.

The noise impacts from construction were assessed in **Section 11.6** of the draft EIS. Construction is expected to last up to 26 months, with the majority of construction work expected to occur between 2015 and 2017. Construction of the associated infrastructure is proposed to be conducted between 6 am to 6 pm, Monday to Saturday with Sunday available for overtime on specialist tasks. There are currently no construction noise criteria under Queensland legislation.

5.2.10.45 Issue 45

The methodology for the noise modelling for the noise impact assessment of the revised Project involved:

- Developing a three dimensional noise model was developed using SoundPLAN 7.2 software using terrain information supplied by NAC;
- Using the CONCAWE noise propagation algorithms and methodology for noise predictions; and
- Using equipment sound power level data was derived from various sources including manufacturer supplied data and previous field measurements.

The noise modelling methodology is consistent with other noise impact assessments of mining projects in Queensland. The accuracy of the noise model was discussed in **Section 11.7.1** of the draft EIS.

A range of measures to avoid noise impacts on local communities around the mine was presented in **Section 11.8** of the draft EIS. Noise monitoring requirements for mining operations were identified in **Appendix J.11** of the draft EIS:

- A permanent real-time noise monitor will be established in Acland;
- A mobile real-time noise monitor to be placed depending on potential for noise impacts based on considering of meteorological conditions and mining activities;
- Current monthly noise monitoring program will continue in an expanded form to cover the broader revised Project area; and
- Monitoring of blasts will continue at the nearest sensitive receivers around the revised Project based on climatic conditions (e.g. wind conditions).

All complaints received in relation to the revised Project's mining operations will be managed as outlined in the LSMP. Additional complaint and dispute management is described as per **Section 5.1.9** of the AEIS.

NAC is not responsible for the transportation of coal on the rail network. The transportation of coal by rail will be undertaken by freight service operator Aurizon on the rail network maintained by QR. The noise impact assessment determined that rail noise impacts have been assessed and are found to

comply with the QR criteria (Section 11.7.9 of the EIS). Rail operators are responsible for the management of their operations to meet environmental legislative requirements and avoid potential for nuisance impacts.

The *Code of Practice for Railway Noise Management* (Queensland Rail, 2007) has been developed to minimise unreasonable noise from railway operations. Potential strategies to reduce railway noise include:

- Track lubrication/greasing on tight radius curves where there is high potential for noise from wheel/rail interaction;
- Construction of noise barriers to shield properties adjacent to the rail corridor from noise;
- Retrofitting existing rollingstock to reduce noise levels – examples of possible controls include wheel damping, friction modifiers, wheel profiling, coupler slack adjustment, and locomotive silencers); and
- Purchase of new rollingstock against strict noise specifications.

Freight service operators (including Aurizon) are required to meet the requirements of the *Code of Practice for Railway Noise Management.*

The Office of the Coordinator-General will convey community concerns raised in the submissions on the EIS regarding noise impacts associated with coal transportation on the West Moreton rail line to Aurizon and QR.

NAC is not responsible for the transportation of coal on the road network. The transportation of coal by road will be undertaken by an independent contractor. The noise impact assessment for road transport determined that the increase in noise levels is unlikely to be perceived by sensitive receptors (**Section 11.7.8** of the draft EIS).

TMR recognise road traffic noise is a concern for many people living adjacent to or near motorways and arterial roads that have high volumes of heavy vehicles. Engine brake noise is a source of community complaint against the heavy vehicle industry. DTMR strategy to deal with engine brake noise involves providing education to the trucking industry and the installation of signs at key locations to limit the use of engine brakes.

5.2.10.46 Issue 46

The draft EIS addresses all provisions contained within Chapter 10 of the MR Act and acknowledges TRC as the relevant local road authority under section 318EN of the Act. NAC further clarify that section 318EM(1) states:

> "This chapter does not apply for a mining lease that is, or is included in, a project declared under the *State Development and Public Works Organisation Act 1971*, section 26, to be a coordinated project."

The revised Project was declared a coordinated project by the Coordinator-General under the SPDWO Act on 18 May 2007.

5.2.10.47 Issue 47

The draft EIS address all provisions contained within Chapter 10 of the MR Act. The RMP and the TMP for the revised Project will be undertaken when the detailed transport routes have been confirmed which would only occur once the detail design has been completed and the project execution contracts have been awarded.

5.2.10.48 Issue 48

Jondaryan-Muldu Road, Jondaryan-Nungil Road, Muldu-Brymaroo Road and Muldu-Plainview Road are local roads with regional significance which serves both the state and local (regional functionality). The traffic generation and distribution estimated for the revised Project will not diminish the regional road function capability. The LoS levels for the peak construction (2016) phase, the operation(2017) phase and the ten year horizon(2027) phase outlined within **Table 13-11** (**Chapter 13** of the draft EIS) indicates that there is no change in level of services from the existing levels.

See **Section 5.2.10.52** of the AEIS for revised LoS level undertaken for the local road within close proximity to the revised Project site.

5.2.10.49 Issue 49

A detailed road safety assessment can only be undertaken upon detail design of the transport routes for the revised Project. NAC will ensure appropriate road safety audits are undertaken during the detailed design stage to ensure the confirmed transport route is road safety risks are adequately dealt.

In the interim, further crash data has been sourced for key local roads within close proximity to the revised Project. This analysis will be undertaken upon receiving the entirety of the data from DTMR and will be prepared during the detailed design stage.

5.2.10.50 Issue 50

TRC does not have any publically available document outlining its scheduled improvements over a 10 year horizon. Based on latest 2013/2014, there are no scheduled road improvement works for key local roads within close proximity to the revised Project. NAC will continue its close consultation with the relevant personnel within TRC to ensure any future improvements works are captured within the RMP and TMP which will be undertaken during the detailed design stage.

5.2.10.51 Issue 51

Section 3.10 of the draft EIS outlines the existing capacity limitations on the Western Railway, and acknowledges that upgrades to the Western Rail Line may be required to facilitate the increase in number of trains associated with the revised Project. Discussions between NAC, QR and Aurizon will continue with regard to infrastructure and logistics associated with any required upgrades.

5.2.10.52 Issue 52

Revised 2012 AADT data have been provided by TRC. Based on the performance criteria adopted within **Chapter 13** of the draft EIS, the existing LoS level for the revised 2012 data are summarised within **Table 5.2-W**.

Table 5.2-W Existing Level of service for local roads within close proximity to revised Project

Name	Counting Site	2012 AADT[3] (vpd)	2012 LoS[2 3]
Jondaryan Sabine Road	Within close proximity to revised project site[1]	720	A
Jondaryan Muldu Road	Within close proximity to revised project site[1]	1260	A
Jondaryan-Nungil Road	At the proximity of Jondaryan township	260	A

[1] As stated within the submission document on the environmental impact statement

[2] 0<LoS A <4,900, 4,900<LoS B<7,800, 7,800<LoS C<11,900, 11,900<LoS D<18,300, 18,300<LoS E<32,000

[3] Rounded to the nearest 10 trips (or a nominal sum of 10)

Based on the criteria outlined in **Section 13.5.1** of the draft EIS and the revised AADT received from TRC, the estimated LoS levels for the peak construction (2016) phase, operation (2017) phase and then year horizon (2027) phase are summarised within **Table 5.2-X** .

The estimated traffic generated by the revised Project was based on **Section 13.7** and **Section 13.8** of the draft EIS.

Table 5.2-X: LoS for local roads during peak construction, operation phase and ten year horizon

Name	AADT[1] (vpd)	2012 LoS[2]	Estimated project Traffic		TOTAL (veh/day)	LoS[2]
			HV	LV		
Peak construction (2016) phase						
Jondaryan Sabine Road	780	A	50	80	910	A
Jondaryan Muldu Road	1270	A	50	80	1400	A
Jondaryan-Nungil Road	280	A	10	10	300	A
Start of operation (2017) phase						
Jondaryan Sabine Road	800	A	30	60	890	A
Jondaryan Muldu Road	1390	A	30	60	1480	A
Jondaryan-Nungil Road	290	A	10	10	310	A

Name	AADT[1] (vpd)	2012 LoS[2]	Estimated project Traffic		TOTAL (veh/day)	LoS[2]
			HV	LV		
10 Year horizon (2027) phase						
Jondaryan Sabine Road	970	A	30	60	1060	A
Jondaryan Muldu Road	1700	A	30	60	1790	A
Jondaryan-Nungil Road	350	A	10	10	370	A

[1]AADTbackground data was based on existing 2012 counts factored up with the agreed cumulative annual traffic growth

[2] 0<LoS A <4,900, 4,900<LoS B<7,800, 7,800<LoS C<11,900, 11,900<LoS D<18,300, 18,300<LoS E<32,000

[3] Rounded to the nearest 10 trips (or a nominal sum of 10)

[4] Calculated as"backgound traffic + peak construction /operation traffic + nominal trips(20)

The additional traffic generated by the revised Project during the peak construction phase, operation phase and ten year horizon does not impact on the existing LoS levels on the surrounding local roads, which are forecasted to operate within the acceptable thresholds for rural roads.

5.2.10.53 Issue 53

Revised performance criteria for the LoS assessment for the specified sections of Warrego Highway will be undertaken for the Road Impact Assessment report during the detailed design stage.

5.2.10.54 Issue 54

The projected traffic growth rates outlined within **Section 13.5.5** of the draft EIS is based on a percentage increase per annum.

5.2.10.55 Issue 55

Existing traffic data and future traffic growth data for the key local roads were sourced from TRC (via email and telephone conversation) on Tuesday, 7 May 2013. TRC's representative provided the available traffic data and advice on future traffic growth for the key local road within close proximity to the revised Project site. The background traffic volumes and estimated traffic growth are in line with the assumptions advised by TRC.

5.2.10.56 Issue 56

Cherrys Road is a former public road within ML 50170 that is closed for public use. The former Cherrys Road alignment is used for internal access purposes and was proposed to be the new light vehicle access to/from Oakey-Cooyar Road. Refer to **Section 3** of the AEIS for more details on the proposed project amendments which includes access to the MIA via a new private road and the realignment of Jondaryan Muldu Road along with its connections to the existing road network.

The proposed Jondaryan-Muldu Road alignment is expected to cater for high heavy vehicle usage. All proposed mine haul roads will follow existing design criteria subject to the requirements of the CMSH

Act, including a design speed of 60 km/hr, at least 30 m wide and two-way lanes. The maximum grade of the haul roads will be 10% with a maximum cross fall of 3%.

Detailed design of the proposed realignment will be outlined within the detailed design stage. The RMP and TMP undertaken during the detailed design will outline the following issues:

- how the existing section of Jondaryan- Muldu Road (within the Manning Vale West resource area) will be controlled subsequent to the implementation of the revised Project;
- the management of existing public utilities within the existing road reserves when the proposed road closures are in place; and
- funding for the proposed new road and upgrades to the existing road (if required).

Refer to **Section 5.1.6.2** and **Section 5.1.6.3** of the AEIS for information in regards to the impacts of the proposed road closures on the existing concerned landholders and business within close proximity to the revised Project site.

5.2.10.57 Issue 57

The TMP and RMP reports will outline the impacts of the potential temporary closure of the Western Railway during emergency events on the surrounding road network and uses.

As discussed in **Section 1.2.3** of the Regulatory Approvals Plan (**Appendix C** of the draft EIS), an application for an Infrastructure ML is proposed for the rail spur and balloon loop. A revised Regulatory Approvals Plan is provided in **Appendix A** of the AEIS.

Refer to **Section 5.1.6.2** and **Section 5.1.6.3** of the AEIS for information in regards to time delays impacts of the proposed road closures on the existing concerned landholders and business within close proximity to the revised Project site. Refer to **Section 5.2.10.52** for impacts on the existing LoS for local road within close proximity to the revised Project.

5.2.10.58 Issue 58

The estimated traffic generation and distribution for oversize /over mass vehicles outlined within **Chapter 13** of the draft EIS is the best possible estimate for a pre-feasibility design level. Travel routes and distribution can only be available once the detail designs have been completed and project execution contracts have been awarded, which is expected to occur in 2015. The RMP and the TMP will capture a better estimate of the construction traffic volume and distribution during the detailed design stage.

5.2.10.59 Issue 59

Refer to **Section 5.2.3.1** of the AEIS, outlining the detailed intersection assessment undertaken for key intersection affected by the revised Project.

5.2.10.60 Issue 60

Table 14-3 of the draft EIS states that tyres will be stored and disposed of in the spoil dumps or transported off-site by a licensed regulated waste transporter to a licensed regulated waste receiver for recycling or disposal.

Likewise, **Section 2.1.2** of the Waste Management Plan (**Appendix J.13** of the draft EIS) states that waste tyres generated by NAC for the revised Project will be stored near the workshop until a volume of tyres is present that necessitates dumping. A suitable area of pit floor as deep as possible but not in the region of an expressing aquifer will be prepared; the tyres will be then dumped, and surveyed as appropriate. These activities are regulated under an Environmental Authority for a resource operation. Alternatively, tyres will be stored and transported off-site by a licenced regulated waste transporter to a licensed regulated waste receiver.

Assessment of construction methods and possible waste generation areas will be undertaken in line with the waste management hierarchy to identify the most appropriate measures to manage all wastes.

The Waste Management Plan will be periodically updated to incorporate aspects of the revised Project and involved the following process:

- Identification and minimisation of waste streams;
- Improve where possible on the waste disposal and management techniques currently adopted;
- All waste generated on-site during the construction and operational phases will be disposed of in accordance with the updated WMP;
- Contracts with construction companies will be negotiated to place responsibility on all contractors to adopt best practice waste minimisation procedures;
- Waste monitoring and auditing will be undertaken; and
- Training will be provided to personnel and contractors in relation to waste management requirements and practices.

5.2.10.61 Issue 61

Since the beginning of 2012 the NHG has worked to enhance its approach to consultation and developed a program focussed on proactive and transparent engagement with stakeholders and the local community. NAC continued community engagement throughout the EIS display period for the revised Project and has a program for ongoing engagement. This is further detailed in **Section 5.1.10** of the AEIS.

The overall approach to consultation is included in the revised Project Stakeholder Engagement Plan (**Appendix K.1** of the draft EIS) however key communication and engagement activities included:

- property owner discussions;
- employee communications;
- fact sheets;
- community newsletters

- key stakeholder briefings;
- community reference group meetings;
- advertising and media releases;
- information through the New Hope Community Information Centre; and
- community contact points including a free call information line and enquiry email address.

Community comments and concerns are detailed in **Section 19.6** of the Consultation Report identifies the concerns raised by the community, while additional consultation is further described in **Section 5.1.10** of the AEIS. Concerns raised during the consultation period have been considered by the project team in the AEIS process. **Section 16.18** of the draft EIS lists the range of potential social impacts and relevant mitigation measures associated with the revised Project. A range of management measures have also been outlined in the SIMP (**Appendix J.14** of the draft EIS) and in the revised SIMP (**Appendix L** of the AEIS) to minimise impacts on the community.

5.2.10.62 Issue 62

In order to comprehensively identify the existing demographic profile and social characteristics of the revised Project's surrounding areas and the potential extent of impacts and opportunities, the SIA assessed a local study area and the broader TRC area. This allowed the SIA to consider the local communities closest to the Mine that may experience changes to the social environment, as well as the communities located further from the Mine that may experience indirect impacts or beneficial outcomes.

Section 16.18 of the draft EIS lists the range of potential social impacts and relevant mitigation measures associated with the revised Project for the local and regional study areas.

5.2.10.63 Issue 63

The TRC Community Plan was a key input to the SIA and is addressed in **Section 16.6.8** of the draft EIS.

5.2.10.64 Issue 64

The revised Project is expected to generate a small increase in traffic movements during the construction and operation phases. No significant impacts are anticipated to the safe operation of local roads and infrastructure, including to school bus services. **Chapter 13** of the draft EIS provides a range of mitigation measures to minimise potential impacts on traffic and transport, including:

- Traffic control measures designed for the safe movement of vehicles, pedestrians and cyclists accessing the residential properties in the vicinity of the revised Project site will be provided.
- Working hour arrangements will be modified and haulage tasks avoided during peak traffic periods and school drop-off and pick-up times.
- Established truck routes and arterial roads will be used for the haulage of construction materials and spoil in order to minimise truck traffic on local roads.
- Construction works will be staged to minimise traffic congestion effects.

- Traffic conditions during the construction period will be monitored in order to identify and address any negative impacts.
- The local community will be adequately notified about proposed changes to local traffic conditions due to construction activities, including the provision of advanced notice, clear signage of changed traffic conditions and as required, traffic control personnel.
- Prior to the commencement of any roadwork, bus operators and the local community will be notified about potential delays or disruptions to school bus services and other travel arrangements.
- Adequate consultation is undertaken with the appropriate regulatory authorities.

5.2.10.65 Issue 65

As the revised Project relates to the expansion of an existing operation, much of the workforce would maintain their employment at the mine and will not experience a change to their housing and accommodation needs. NAC will seek to source local employees for the revised Project wherever possible. The use of local people for employment is not expected to put an additional burden on the region's accommodation resources. It is expected that a small number of new employees are likely to move to the area for employment at the mine, and are likely to reside in Toowoomba, Oakey or other nearby centres. As described in the draft EIS, if Stage 3 proceeds, NAC's current operational workforce of 300 people is expected to increase by 38 to 338 people in 2018, and to a total of 435 people in 2024. The draft EIS assumed 70% of new employees could be found in the Toowoomba region, and 30% would move to either the local area or other parts of the Toowoomba region.

For the start-up of Stage 3 operations in 2018, 38 new employees, including up to 12 non-local workers, would be required. Assuming 60% of those were married and 40 % were single, and if 50% settled in the Jondaryan-Oakey Goombungee district, a maximum of six houses would be required in the local area. In the Toowoomba region as a whole, there would be a requirement for 8-10 houses across the region. Some families and single workers would purchase houses, and others would rent. As such, demand for housing for NAC employees during 2018-2023 is unlikely to impact negatively on housing affordability in the local area or the Toowoomba region, or on access to housing for low income households.

Peak operations would be reached in 2024, when the workforce is expected to increase by a further 97 people to 435 employees. This would see an addition of approximately 30 non-local employees settling across the region, and would induce demand for some 22 dwellings. This is considered a negligible requirement and is not likely to impact on housing affordability in Toowoomba, particularly as Toowoomba has an adequate supply of land for residential growth and will have increased its housing stock by 2024. In all a maximum of approximately 32 dwellings would be required for the revised Project's employees by 2024.

Chapter 5.1.10 of the AEIS provides clarification of the demand for housing during operations.

There are currently a range of housing and accommodation options available in the SIA study area. There were 132 houses, apartments or townhouses for sale in Oakey (7 May 2014, realestate.com.au), at a range of price points from $149,000 to $538,400, and 30 rental properties

available starting from $150 per week. At the same time, there were 897 houses, apartments or townhouses for sale in Toowoomba City and suburbs, priced from $91,000 to $1.1million and over 400 rental properties available, starting from $130 per week (7 May 2014, realestate.com.au). This suggests there is an active real estate market that would be expected to cover the small demand associated with the Project, particularly as any increased demand will be spread across several years.

Furthermore, a range of strategies to minimise any potential for the revised Project to impact on housing affordability and availability are outlined in the **Section 5.2.3** of the SIMP **(Appendix J.14** of the draft EIS). Key strategies aimed at minimising a potential decrease in housing availability and affordability include:

- Maximise local employment opportunities to minimise the number of new workers moving to the area.
- Encourage employees to seek accommodation in areas with housing capacity and ability to support growth.
- Provide employees with information about appropriate housing options, including share housing.
- Continue consultation with local real estate agents, accommodation providers, elected representatives and government agencies to understand local housing availability, monitor potential changes, opportunities or concerns.

In addition, housing availability and affordability will be discussed as part of the CRG meetings if concerns emerge to determine if additional local strategies are needed.

5.2.10.66 Issue 66

The potential air quality impacts from the revised Project were assessed in **Chapter 9** of the draft EIS. NAC has proposed a comprehensive air quality management strategy to manage potential air quality impacts from the revised Project in **Section 9.5** of the draft EIS. Potential air quality impacts will be managed through the implementation of:

- Mitigation measures to minimise dust emissions;
- Blast fume management procedures;
- A dust forecasting system;
- A range of air quality monitoring techniques (real time and contemporary);
- Adaptive air quality management;
- Communication and concern management; and
- An acquisition/relocation/treatment strategy.

The implementation of adaptive air quality management measures will include the suspension or modification of operations in response to potential dust risk predictions from the dust forecasting system, real time air quality monitoring data and visual monitoring.

The revised Project is expected to comply with the ambient air quality objectives in the EPP (Air) provided NAC successfully implement the proposed air quality management strategy.

5.2.10.67 Issue 67

Is it expected that most of the existing workforce will maintain their employment at the Mine and there would be a relatively small increase in the Mine workforce. NAC will seek to source local employees for the revised Project wherever possible. This approach will maximise employment opportunities for the local community as well as minimise potential impacts on accommodation and social infrastructure. However, some local positions may require back-filling if employees decide to obtain employment at the Mine.

Overall, only a very small number of positions may require back-filling. It is expected that local businesses would be able to fill any vacant positions in a short-time due to the areas proximity to Toowoomba and other established townships. Additional employment opportunities at the Mine, or indirect employment opportunities available through back-filling positions, may attract young people to stay in Oakey and surrounding communities after school, and also support underemployed workers in the area to gain more paid work. As such, potential impacts associated with direct and indirect employment opportunities are expected to be beneficial for the local community.

5.2.10.68 Issue 68

As the revised Project relates to the expansion of an existing operation, cumulative impacts are expected to be minimal. The social benefits of the revised Project will include the creation of employment and procurement opportunities for local and regional communities, as well as the increased spending power of employees and the associated boost to the local economy.

There is potential for cumulative impacts from the revised Project and other proposed mining projects on social infrastructure including accommodation and services. A range of management measures are proposed for the revised Project to enhance benefits and minimise impacts on accommodation and services. Ongoing consultation with stakeholders including Queensland Health, TRC and local schools will also continue to assist in identifying and responding to potential changes in the social environment.

Is it expected that most of the existing workforce would maintain their employment at the Mine and there would be a relatively small increase in the Mine workforce. NAC will seek to source local employees for the revised Project wherever possible. The use of local people for employment will minimise impacts on the region's accommodation resources and provide diverse employment opportunities for the local area and TRC area more broadly. These benefits will be enhanced through the implementation of local procurement and recruitment policies, as well as through NAC's direct involvement in local communities.

Overall, the relatively small increase in new workforce and staging of the revised Project over time and the implementation of the SIMP will minimise cumulative impacts on the local area and Toowoomba.

5.2.10.69 Issue 69

NAC considers the assessment of cumulative impacts (**Chapter 20** of the draft EIS) have met the requirements of the ToR.

The EIS for the Surat Gas Project identified three aspects that have potential for cumulative impacts: groundwater, social and traffic.

- The revised Project lies within the eastern most part of the Surat Cumulative Management Area (CMA). The findings of the Underground Water Impact Report (UWIR) (OGIA, 2012) are based on the outputs of a regional groundwater model developed for the UWIR, which is aimed at predicting cumulative impacts from coal seam gas and conventional petroleum / gas extraction. The UWIR (OGIA, 2012) aims to predict cumulative impacts from coal seam gas and conventional petroleum / gas extraction projects. A regional groundwater model developed for the UWIR simulates groundwater extraction associated with all current and proposed CSG projects within the Surat CMA including the Surat Gas Project. The cumulative groundwater impacts do not extend to the Study area or overlap with impacts presented in **Chapter 6** of the draft EIS. The potential for cumulative groundwater impacts from the Surat Gas Project and the revised Project is considered insignificant.
- Social impacts of the Surat Gas Project "…will be most pronounced in areas where several projects use a common service centre or where the hinterlands from which they draw services and labour overlap. Dalby, Chinchilla, Miles and Wandoan are expected to experience the most pressure for these reasons." (Arrow Energy, 2012) The current residential distribution of the NAC workforce is 45% in Oakey, Jondaryan and the surrounding district and 55% in the broader TRC area, particularly in Toowoomba City. The revised Project will not draw on social services from Dalby, Chinchilla, Miles and Wandoan. The potential for cumulative social impacts from the Surat Gas Project and the revised Project is considered insignificant.
- The traffic assessment adopted assumed high growth scenario to estimate traffic level in 2026. It is assumed growth rates adopted for the traffic assessment is sufficient to account for growth generated by committed development in the area. This is in line with advice received from DTMR. The potential for cumulative traffic impacts from the Surat Gas Project and the revised Project has been considered in the traffic assessment (**Chapter 13** of the draft EIS).

A more detailed assessment of the cumulative impacts of the the revised Project is therefore not required.

5.2.10.70 Issue 70

The potential for localised *cumulative impacts* from current operations at the Mine and the revised Project were identified in **Table 20-1** of the draft EIS. The potential for *cumulative impacts* on land resources was considered low following successful rehabilitation at the Mine demonstrating agricultural production will occur post mining.

The potential significance of impacts on land resources (without mitigation) from the revised Project are considered to medium (refer to **Table 2-1** of the draft EIS). NAC have proposed the following mitigation measures to reduce impacts on land resources:

- Implement progressive rehabilitation program throughout the mine life in accordance with requirements of the FLURP (**Appendix J.2** of the draft EIS)
- Implement Final Landform Technical Report (**Appendix G.1.8** of the draft EIS)
- Implement TMP (**Appendix J.3** of the draft EIS)

5.2.10.71 Issue 71

The potential for localised *cumulative impacts* from current operations at the Mine and the revised Project were identified in **Table 20-1** of the EIS. The potential for *cumulative impacts* on terrestrial ecology was considered low because there had not been clearing of endangered vegetation for the Mine. The minor clearing that has occurred for the Mine to-date has been offset by the establishment and management of conservation zones along Lagoon Creek and over Bottle Tree Hill.

The potential significance of impacts on terrestrial ecology (without mitigation) from the revised Project are considered to medium (refer to **Table 2-1** of the draft EIS). NAC have proposed the following mitigation measures to reduce impacts on terrestrial ecology:

- Avoidance of impacts;
- Biodiversity Offset;
- Threatened species relocation; and
- Rehabilitation of disturbed areas

5.2.10.72 Issue 72

The potential for localised cumulative impacts from current operations at the Mine and the revised Project were identified in **Table 20-1** of the draft EIS. The increase in greenhouse gas emissions above current operations of the Mine represents 0.01% of Australia's annual greenhouse gas emissions. The expected increase in greenhouse gas emissions from the revised Project represents a very minor contribution to global emissions and is considered to be insignificant.

5.2.10.73 Issue 73

The closest mining to the revised Project identified in **Table 20-2** of the draft EIS is the Meandu Coal Mine located approximate 60 km north east of the revised Project. The proposed Surat Gas Project is a potential coal seam gas development and is not a mining operation as stated in the submission. The operation of the Meandu Coal Mine will not generate cumulative impacts for water, air and noise.

The proposed Surat Gas Project is a potential coal seam gas development and is not a mining operation as stated in the submission.

The EIS for the Surat Gas Project identified three aspects that have potential for cumulative impacts: groundwater, social and traffic.

- The revised Project lies within the eastern most part of the Surat CMA. The findings of the UWIR (OGIA, 2012) are based on the outputs of a regional groundwater model developed for the UWIR, which is aimed at predicting cumulative impacts from coal seam gas and conventional petroleum /

gas extraction. The UWIR (OGIA, 2012) aims to predict cumulative impacts from coal seam gas and conventional petroleum / gas extraction projects. A regional groundwater model developed for the UWIR simulates groundwater extraction associated with all current and proposed CSG projects within the Surat CMA including the Surat Gas Project. The cumulative groundwater impacts do not extend to the Study area or overlap with impacts presented in **Chapter 6** of the draft EIS. The potential for cumulative groundwater impacts from the Surat Gas Project and the revised Project is considered insignificant.

- Social impacts of the Surat Gas Project "…will be most pronounced in areas where several projects use a common service centre or where the hinterlands from which they draw services and labour overlap. Dalby, Chinchilla, Miles and Wandoan are expected to experience the most pressure for these reasons." (Arrow Energy, 2012) The current residential distribution of the NAC workforce is 45% in Oakey, Jondaryan and the surrounding district and 55% in the broader TRC area, particularly in Toowoomba City. The revised Project will not draw on social services from Dalby, Chinchilla, Miles and Wandoan. The potential for cumulative social impacts from the Surat Gas Project and the revised Project is considered insignificant.
- The traffic assessment adopted assumed high growth scenario to estimate traffic level in 2026. It is assumed growth rates adopted for the traffic assessment is sufficient to account for growth generated by committed development in the area. This is in line with advice received from DTMR. The potential for cumulative traffic impacts from the Surat Gas Project and the revised Project has been considered in the traffic assessment (**Chapter 13** of the draft EIS).

A more detailed assessment of the cumulative impacts of the revised Project is therefore not required.

5.2.10.74 Issue 74

This is further detailed in **Section 5.1.5**.

Refer to **Section 5.2.9.23**.

5.2.10.75 Issue 75

The CZMP (**Appendix J.6** of the draft EIS) describes the actions that NAC will take for the restoration, rehabilitation and management of the Lagoon Creek corridor and adjacent Bottle Tree Hill. The Plan describes the use of natural regeneration, direct seeding and planting. The CZMP also includes the use of weed control, fencing, watering, follow up planting to manage the restoration sites.

As stated in the response to **Section 5.2.4.22**, NAC will include translocation of plants, as a technique to be used in the CZMP.

The use of specific restoration techniques (natural regeneration, direct seeding, translocation or planting) will be determined with consideration of the presence of the target species, condition of the vegetation at the restoration site and the general site conditions (including soil type and conditions, proximity to Lagoon Creek, proximity of existing vegetation).

Section 7 of the CZMP (**Appendix J.6** of the draft EIS) outlines the actions that NAC will take in the event that the natural regeneration and/or revegetation do not meet the rehabilitation criteria. NAC will

investigate the cause of the natural regeneration and/or revegetation not meeting the criteria and will conduct specific maintenance rehabilitation activities to correct or improve the overall performance of the deficient sites. If required, NAC may also adjust its standard revegetation techniques to correct any identified technical or other failings. Maintenance activities may include supplementary plantings of selected species from one or more of the five identified life forms (tree, shrub, grass, forbs and other species) or the implementation of a targeted weed eradication program (herbicide spraying, mechanical removal).

5.2.10.76 Issue 76

The in-stream impoundments of Lagoon Creek have been created by at-grade road crossings of the creek. A consequence of these road crossings is that a low impoundment is created that holds a small volume of water upstream of the road crossing.

NAC does not intend to remove the road crossings that have created these in-stream impoundments. NAC is, however, committed to the restoration of the riparian area adjacent to Lagoon Creek, as described in the CZMP (**Appendix J.6** of the draft EIS).

5.2.10.77 Issue 77

NAC is committed to the protection and enhancement of vegetation and habitat of Lagoon Creek and Bottle Tree Hill. NAC is also committed to the protection and enhancement of vegetation to be established at offset sites created for the revised Project. The CZMP, the TSTP, the BOMP and the Biodiversity Offset Strategy all demonstrate the commitment of NAC to the management and protection of the revised Project site. The OAMP further demonstrates NAC's commitment to the successful delivery of offsets for the revised Project and the management of vegetation for a conservation benefit in the Acland area.

5.2.10.78 Issue 78

As originally stated in **Section 7.2** of the CZMP (**Appendix J.6** of the draft EIS), to efficiently control fire fuel loads following good growing seasons, NAC may undertake targeted grazing within the revised Project's conservation management zone. This specific use of grazing will be very limited in terms of application (timing and extent), will be closely managed and monitored to minimise impacts, and will not be applied to any newly planted areas. NAC's sister company, the APC, will provide advice and manage all targeted grazing undertaken for this purpose within the revised Project's conservation management zone.

Apart from the purpose of efficient fire control, grazing will generally be excluded from the revised Project's conservation management zone. The APC's grazing and other farming activities may require periodic crossing of the revised Project's conservation management zone. The APC will ensure that crossing of the revised Project's conservation management zone is kept to an operational minimum, that no excessive disturbance is caused by crossing events, and that crossing events will avoid sensitive areas (e.g. newly planted areas).

NAC will fence and signpost the revised Project's conservation management zone to increase the level of protection and minimise the risk of accidental disturbance.

5.2.10.79 Issue 79

NAC is committed to providing long term protection to the areas rehabilitated through the CZMP. NAC has had a long standing commitment to the protection and enhancement of Lagoon Creek and Bottle Tree Hill, along with other areas of the Study area. To achieve the objectives of the CZMP, NAC will invest financial, planning and human resources. The delivery of the CZMP will occur over the lengthy period of time and the achievement of the Plan's objectives will be a feature of the revised Project. The areas covered by the CZMP are outside the revised Project's footprint and will not be affected by mining or related activities.

NAC supports the use of covenants to provide long term protection to the areas addressed in the CZMP. NAC will liaise with DEHP to agree on the most appropriate and effective method providing ongoing protection to these areas. As NAC will commence rehabilitation activities early in the life of the revised Project, with the intention that rehabilitation will start before areas are impacted for the development of the revised Project.

NAC will place covenants over the offset sites for the natural blue grassland, brigalow communities and threatened plant translocation sites, as a requirement of the OAMP (**Appendix I** of the draft EIS).

5.2.10.80 Issue 80

In the event that additional threatened plant species are located within the revised Project's disturbance area, NAC will revise the TSTP to include the additional species. Information on the new species, the location and how the impact of the revised Project on the new species is to be managed will be detailed in the TSTP.

Should additional threatened plant species be found within the disturbance footprint, NAC will liaise with DEHP and/or DotE to agree on the approach to manage the new species.

5.2.10.81 Issue 81

The BOMP (**Appendix J.8** of the draft EIS), details the actions that NAC will undertake for the establishment and management of the bluegrass offset areas.

NAC has also committed to the preparation of an OAMP. As described in **Section 5.2.4.15**, NAC will additional details on the measures to manage the offset sites and the achieved the objectives of the OAMP. The OAMP will describe the measures to be taken to achieve the outcomes of the Biodiversity Offset Strategy (**Appendix I** of the draft EIS), including revegetation and restoration actions, seed and plant collection, translocation tasks, maintenance, corrective actions, management of risks and threats and monitoring.

The OAMP will be developed in association with DEHP and the DoTE and will be approved by both Departments.

5.2.10.82 Issue 82

The specific management plan for the bluegrass offset will be included in the OAMP and the BOMP.

NAC has committed to the preparation of an OAMP. As described in **Section 5.2.4.16** of the AEIS, NAC will additional details on the measures to manage the offset sites and the achieved the objectives of the OAMP.

The OAMP will be developed in association with DEHP and the Department of the Environment and will be approved by both Departments.

5.2.10.83 Issue 83

As stated in **Section 5.2.4.16** of the AEIS, NAC will place a covenant over the offset sites to provide long term protection to the offset area. NAC will select one of three options for protecting the offsets, these will be either:

- as a gazettal as a protected area (e.g. a nature refuge) under the NC Act;
- as a voluntary declaration of an area of high nature conservation value under the Queensland *Vegetation Management Act 1999*; or
- a covenant under the Queensland *Land Title Act 1994* or Queensland *Land Act 1994*.

The bluegrass offset sites are not within an area that NAC intends to mine in the future and the placement of a covenant over the offset sites, demonstrates NACs intention not to mine these areas.

5.2.10.84 Issue 84

The suitability of the proposed bluegrass offset sites has been assessed through the application of the Queensland government's BioCondition methodology, to confirm appropriateness of the offset sites. Site assessment data and BioCondition data was provided in **Appendix G** of the draft EIS.

The OAMP to be prepared by NAC will further document suitability of the offset sites.

5.2.10.85 Issue 85

Section 3.3 of the BOMP (**Appendix J.8** of the draft EIS) presents the threshold criteria used to determine the presence of the bluegrass community. The threshold criteria as set out in the community listing advice are to be used to in the evaluation of the effectiveness of the BOMP, by assessing the condition of the community against the threshold criteria.

The criteria will be included in the OAMP that NAC will develop in association with DEHP and the DoTE and will be approved by both Departments.

5.2.10.86 Issue 86

The proposed offset area for the bluegrass community is 90 ha which will be located in an area of up to 247 ha, located on land owned by NAC. The area of bluegrass community that the revised Project will clear is 40.1 ha.

The area of bluegrass offset will result in a net gain for conservation of the bluegrass community, on the basis that twice the area being cleared will be offset. The offset area will be managed to achieve the objectives of the BOMP (**Appendix J.8** of the draft EIS).

5.2.10.87 Issue 87

As stated in **Section 5.2.4.16** of the AEIS, NAC will prepare an OAMP to detail the measures that be taken to deliver the offset program. The OAMP will describe the measures to be taken to achieve the outcomes of the Biodiversity Offset Strategy (**Appendix I** of the draft EIS), including revegetation and restoration actions, seed and plant collection, translocation tasks, maintenance, corrective actions, management of risks and threats and monitoring.

5.2.10.88 Issue 88

The potential for carbon sequestration to reduce greenhouse gas emissions from the revised Project was discussed in **Section 10.5** of the draft EIS. Vegetation planting near the revised Project site is considered to have a relatively low potential to offset greenhouse gas emissions. The reduction in greenhouse gas emissions provided by a carbon sequestration program is not expected to outweigh the costs of implementing the program.

5.2.10.89 Issue 89

Greenhouse gas emissions from the revised Project were presented in **Section 10.4.3** of the draft EIS. Fugitive emissions represent a small proportion (1%) of greenhouse gas emissions from the revised Project. Capturing or combusting coal seam methane is not feasible option for reducing greenhouse gas emissions from the revised Project.

5.2.10.90 Issue 90

NAC has not calculated the exact volume of vegetation waste to be generated for the construction of the revised Project. NAC will consider the harvesting of timber from the vegetation to be cleared. However, the form and size of most of the trees from the areas to be cleared will present handling and logistic difficulties for the effective and efficient use of any timber that able to be harvested.

5.2.10.91 Issue 91

The proposed post-mining land use is grazing. Grazing trials, and rehabilitation monitoring undertaken for the Mine by NAC, demonstrate that land can be successfully returned to quality grazing land. Further information on the grazing trials is provided in **Section 5.1.2** of the AEIS. Rehabilitation completion criteria were presented in **Chapter 4** of the draft EIS and the FLURP (**Appendix J.2** of the draft EIS).

Chapter 7 of the draft EIS included potential impact and mitigation of terrestrial ecological values through the provision of vegetation offsets and specific vegetation management plans. Rehabilitation completion criteria for terrestrial ecological values were presented in the draft EIS and will be developed further through finalisation of vegetation offsets and management plans following approval

of the EIS. Further consideration to vegetation offset strategies is provided in **Section 5.2.4.16** of the AEIS.

5.2.10.92 Issue 92

NAC will deliver offsets for the bluegrass community and undertake restoration of vegetation and habitat of Lagoon Creek and Bottle Tree Hill. NAC will also work to improve the condition of vegetation that is found outside the revised Project disturbance footprint.

The bluegrass offsets are located along a State significant biodiversity corridor that runs in an east-west direction to the south of the revised Project site. The restoration of vegetation and habitat along Lagoon Creek will strengthen the connection of habitat along Lagoon Creek, and increase the opportunities for wildlife to move across the revised Project site.

5.2.10.93 Issue 93

As stated in **Section 5.2.4.16** of the AEIS, NAC will prepare an OAMP to detail the measures that be taken to deliver the offset program. The OAMP will describe the measures to be taken to achieve the outcomes of the Biodiversity Offset Strategy (**Appendix I** of the draft EIS), including revegetation and restoration actions, seed and plant collection, translocation tasks, maintenance, corrective actions, management of risks and threats and monitoring.

The OAMP will be developed in association with DEHP and the DoTE and will be approved by both Departments.

5.2.11 Public Safety Business Agency (submitter 472)

5.2.11.1 Issue 1

NAC acknowledges the contact made on behalf of Public Safety Business Agency QAA and QFRS. NAC will continue consultation with QAS on any potential for increased expectancy of QAS responses or risks that may impact on emergency response.