APPENDIX I

Traffic Impact Assessment Study

(ARCCOS Consulting, 2025)

ARCCOS CONSULTING PTY LTD

CORE LITHIUM ACCESS

TRAFFIC IMPACT ASSESSMENT

Project Number	2024084
Client	CORE LITHIUM

Revision Status

Revision	Date	Author	Review	Approved
DRAFT	19/06/2025	AT	BAS	BAS
For Approval	25/06/2025	AT	BAS	BAS

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1 Introduction

1.1 Purpose of Report and Study Objectives

Core Lithium have requested a Traffic Impact Assessment (TIA) to be developed for facilitating relevant approvals from the NT Government to recommence extraction, mining operations and exploration of Core Lithium mine sites on the Cox Peninsula, NT.

It is understood that there was a previously approved TIA for the site, however, NTG have requested an updated TIA now that numbers of vehicles including haul vehicles, delivery vehicles, buses and trade vehicles are known in greater detail.

This assessment has been undertaken in line with the guidance provided within the NTG Subdivisional Development Guidelines and the Austroads Guide to Traffic Management Part 12: Integrated Transport Assessments for Developments (2020).

1.2 Site Location and Study Area

The site is located on the Cox Peninsula Road. The accesses for the subject mine sites have been provided from Cox Peninsula Road as shown below.

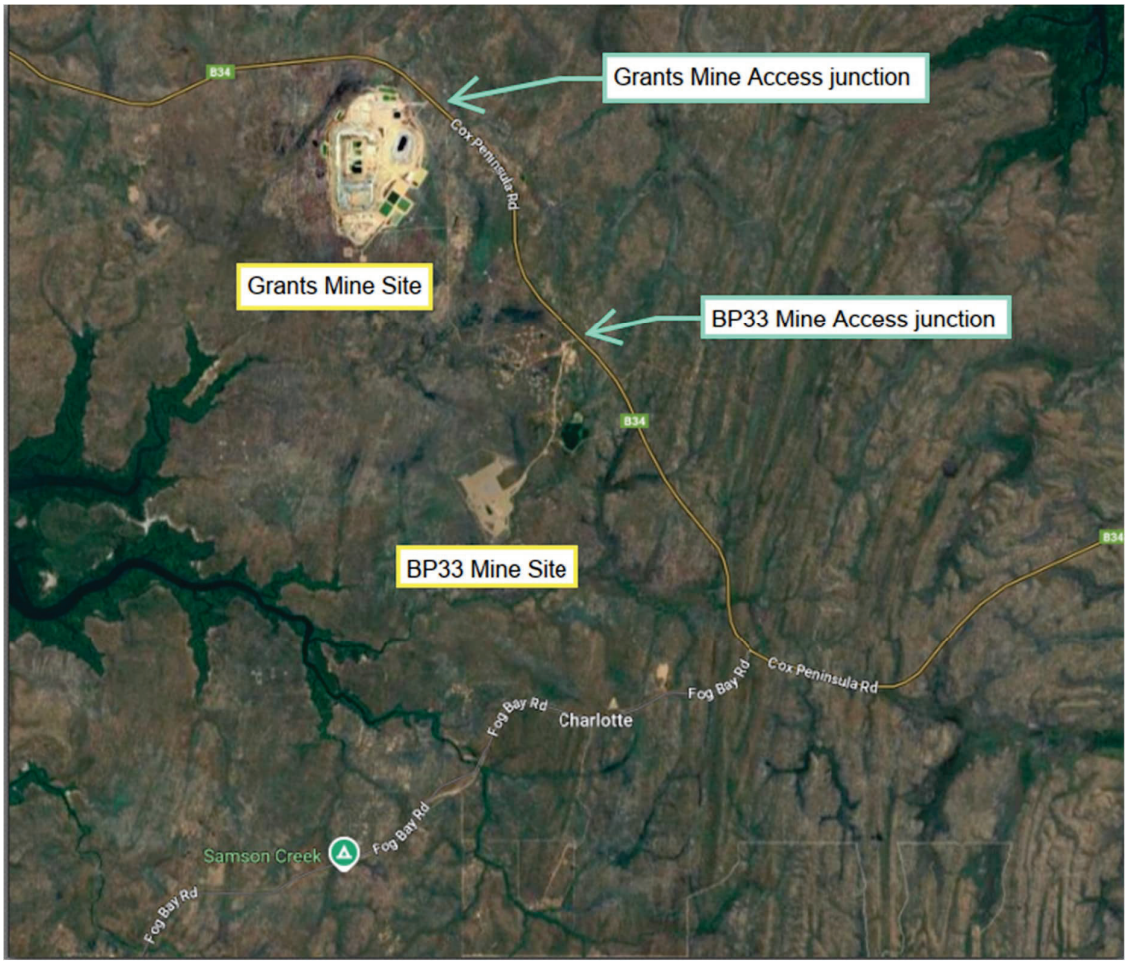

Figure 1 Site Location

2 Proposed Development (Site and Nearby)

2.1 Off-Site (or Background) Development

There is no specific known background development likely to occur within the area. The Darwin Regional Land Use Plan (2015) identifies that the existing land uses are primarily fishing and recreational activities along with the Wagait Beach residential area and the Belyuen community. The successful Kenbi Land Claim may result in additional development on the aboriginal land, however the scale and type of development are not yet known.

The area is located approximately 1.5 hours drive from Darwin. Development is limited by the single access road (Cox Peninsula Road).

2.2 Description of On-Site Development

The Core Lithium mining project is located on the Cox Peninsula Road, and encompasses the extraction of lithium ore though mining as well as operation of a crushing and screening plant and necessary mine facilities.

2.2.1 Land Use and Intensity

The site primarily caters for mining purposes.

There are existing access junctions providing connections from the subject mine sites to the Cox Peninsula Road, ensuring efficient processing and transportation of mined and processed materials. In this TIA, analysis has been undertaken to review the movements between the Grants Mine and BP33 Mine and, the haulage of the processed materials from the Grants Mine at Cox Peninsula to Darwin Port at Berrimah.

2.2.2 Site Plan

The size of the site is adequate to provide parking that complies with the NT Planning Scheme and AS/NZS2890.1. The site will also have enough space to accommodate the turning movements of all proposed vehicles, which will ensure that all loading is performed entirely within the site and that all vehicles can enter and exit while in a forward gear.

2.2.3 Zoning

The area is currently zoned as rural.

It is noted that as the parcel of land that the mining is occurring on in Crown land, there is no road reserve provided for the Cox Peninsula Road past the site.

2.2.4 Phasing and Timing

It is understood that it is planned for mining to recommence at the site in late 2026.

The mining operations and the logistics of the materials have been proposed to be completed over a 2-year period where the operation will be undertaken for 12 hours a day / 7 days a week.

It is understood that as further exploration is undertaken, there may be additional ore bodies which will require processing. The traffic movements from any new sites would require a separate TIA.

3 Existing Area Conditions

3.1 Study Area

3.1.1 Area Of Influence

It is anticipated that the main area of influence of the project will be limited to the junctions of Cox Peninsula Road with the two site accesses (Grants Mine access and BP33 mine access), along with the junction of Fog Bay Road and Cox Peninsula Road.

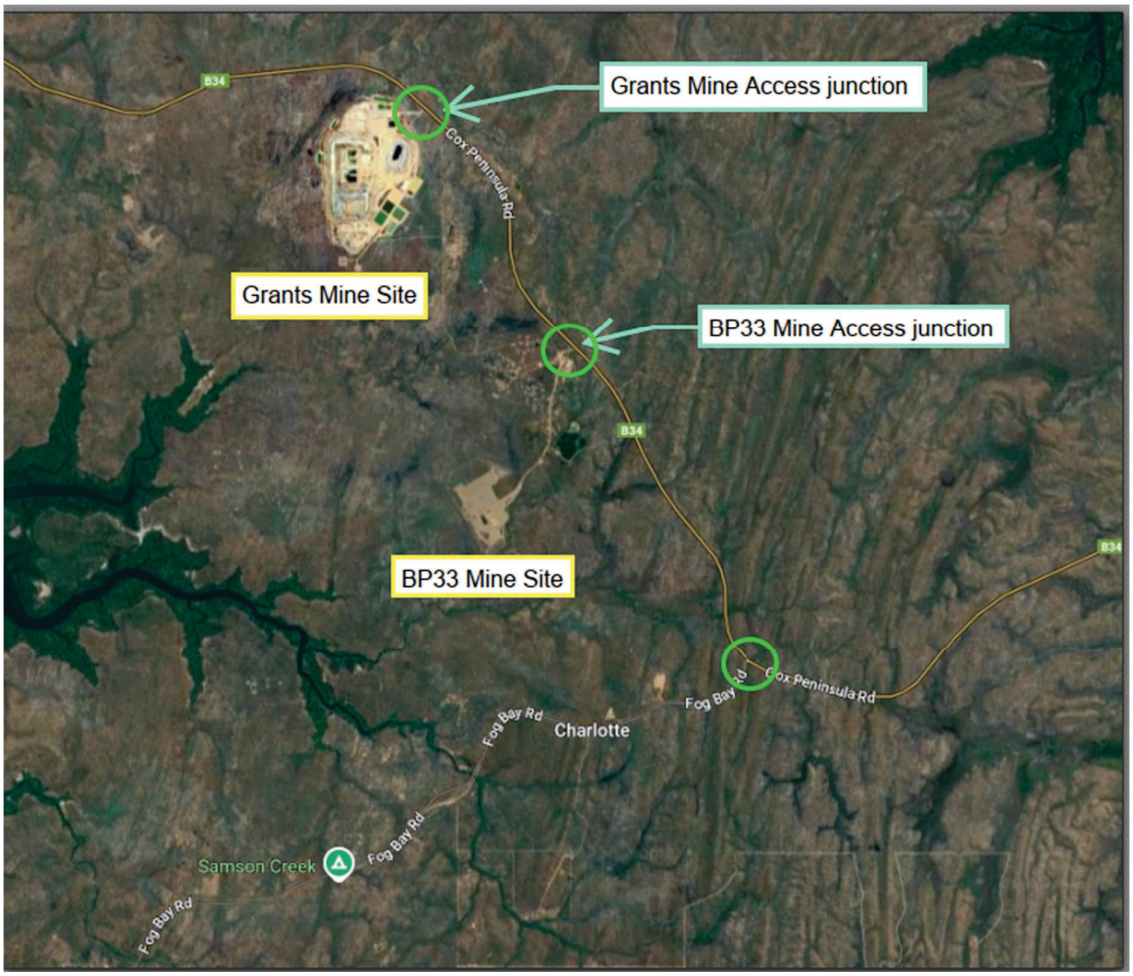

Figure 2 Area of Influence (Green circles)

3.2 Study Area Land Use

3.2.1 Existing Zoning

The existing land use zones within the area around the subject site is undeveloped rural land with Cox Peninsula Road categorised as a main road.

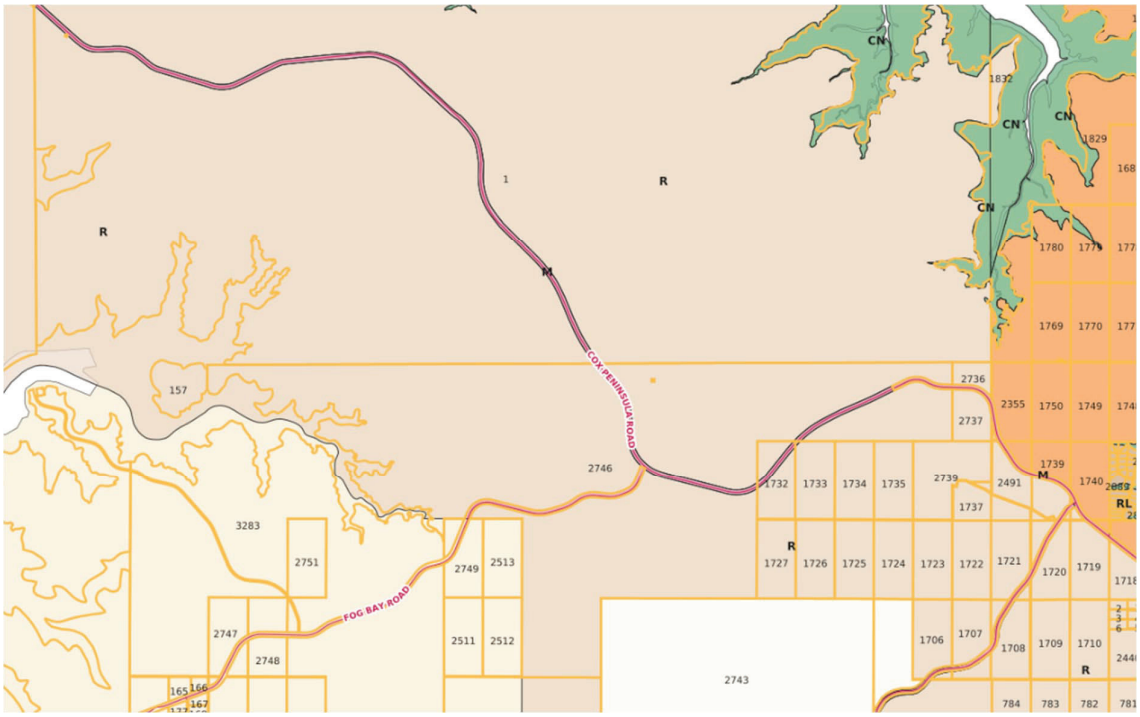

Figure 3 Existing Land Use Zones

3.3 Site Accessibility

3.3.1 Area Roadway System:

3.3.1.1 Existing

The posted speed limit near the vicinity of project site on Cox Peninsula Road is 110km/h.

Cox Peninsula Road is a rural arterial road extending from the Stuart Highway along the Cox Peninsula to Wagait Beach. This road has single lane in each direction separated by a centreline.

3.3.1.2 Future

There are no known upgrades to the road network planned within the short term.

3.4 Traffic Volumes and Conditions

The closest primary count station along the Cox Peninsula Road from the site is RDVDP010 which is located at 300m west of Pioneer Creek Bridge.

`The traffic volume at the count site have been consistent over the past 10 years with an increase of approximately 5% per year being observed. It is noted that the site traffic would have been part of the identified traffic increases for the years 2020-2023.

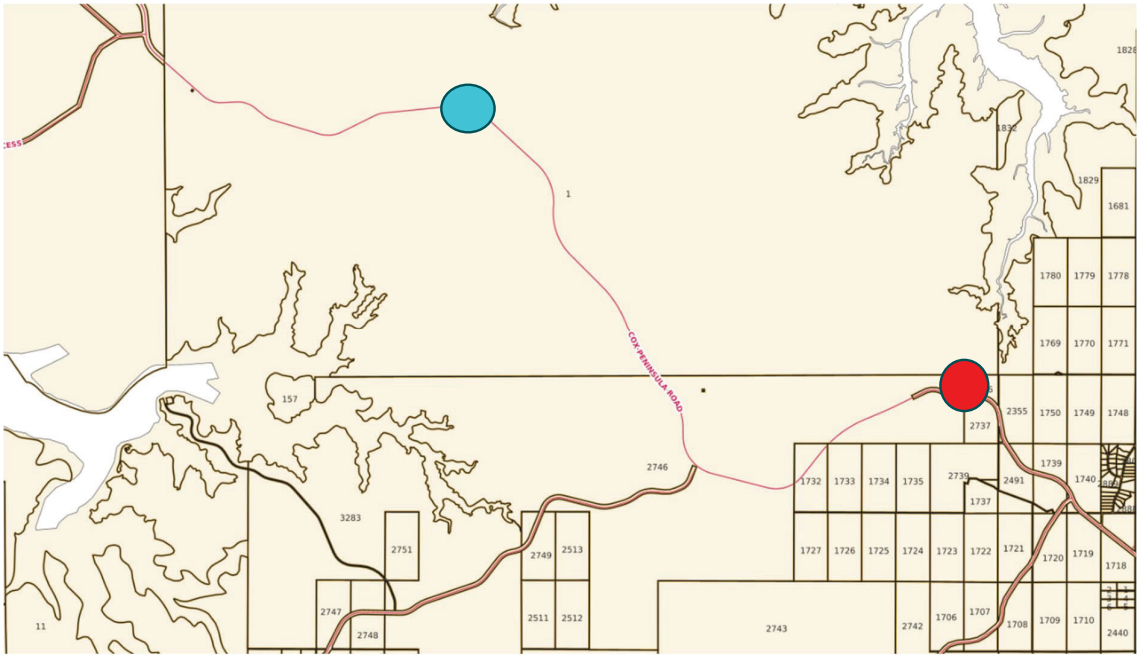

Figure 4 Mine Site (Blue) with Approximate Count Station Site (Red)

Table 1 NTG Traffic Count (from 2023 Annual Traffic Report)

Rural Primary Count Stations **Year: 2023**

Table: 2.1 AADT For Primary Stations - 10 Year Period **Region: Darwin**

Road Name / Location	ADT Station	Direction	Units	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Cox Peninsula Road	RDVDP010	Inbound	Veh	263	284	318	311	302	302	346	376	441	505
300m west of Pioneer Creek Bridge		Outbound	Veh	268	288	322	315	306	305	350	380	445	521
		Both	Veh	531	572	640	626	608	607	696	756	886	1026

Figure 5 Count stations with the latest count volumes along Cox Peninsula Road (from NTG 2023 Annual Traffic Count Report)

4 Projected Traffic

4.1 Site Traffic (Each Horizon Year)

Site traffic has been reviewed at full operation and at a 10-year design horizon.

4.1.1 Trip Generation

Trip generation has been based on the RMS Guide to Traffic Generating Developments (2024). Analysis has been undertaken by categorising the movements for two different usages as follows.

- Local Movements: Extraction and haulages of raw ores from BP33 mine to Grants Mine processing plant.
- Widespread Movements: Logistics of processed ore concentrate from Grants Mine to Darwin Port in Berrimah.

Haulage movements and worker movements have been identified by the Core Lithium and the traffic analysis has been conducted based on the provided data as below.

Ore Haulage (Raw)

- Ore haulage: 12,635 movements each way per year at 95t per vehicle.
- Tailings material hauling back to mine site at 95t per vehicle.
- Outbound: 12,635 trips * 95 Tonnes = 1,200,000 Tonnes (Approximately).
- Inbound: 12,635 trips * 64 Tonnes =800,000 Tonnes (Approximately – noting not all trucks will be laden on their return journey).
- Total movements: 25,270 trips each direction.
- Total weight: 2.0 million Tonnes.

Ore Concentrate (Processed)

- 3,170 movements each way per year at 100t per vehicle.
- Outbound: 3170 trips * 95 Tonnes = 301,150 Tonnes.
- Inbound: 2,400 trips * 0 Tonnes = 0 Tonnes (No inbound Tonnes).
- Total movements: 6,340 trips per year.
- Total weight: 301,150 Tonnes.

It is noted that in order to minimize impacts on other road users, the following time restrictions have been considered: The proponent should restrict road train haulage past the Berry Springs Primary School to outside of the hours of 07:45am to 08:45am and 2:30pm to 3:30pm on school days unless otherwise approved in writing by the Department of Logistics and Infrastructure in consultation with Berry Springs Primary School.

Table 2 Two-way Local Movements Between Mine Sites

Two-way Local Movements

Traffic in between Grants and BP33 Mines		
Category	**Trips per year**	**Trips per day**
Haulage movements	25,270	75
Staff movements	N/A	55

Table 3 Two-way Widespread Movements affecting larger area

Two-way Widespread Movements

Traffic movements affecting larger area		
Category	**Trips per year**	**Trips per day**
Haulage movements	6,340	20
Staff movements	N/A	190

Assumptions: Working days = 340 days per year excluding annual public holidays and non-operational days.

Table 4 Staff Movements

Category	Total
Buses	21
Light Vehicles	30
Personal Vehicles	30
Travel between Grants and BP33	26
Contractors / Couriers / Freight	12

4.1.2 Trip Distribution

All vehicles will access and egress the mine sites using the existing accesses for both sites on Cox Peninsula Road.

The operation hours of the mines have been provided as 12 hours/day, 7 days/week, the directional split has been assumed as:

- AM Peak 50% entering, 50% exiting
- PM Peak 50% entering, 50% exiting

4.1.3 Modal Split

Different types of movements have been categorised based on the size and the usage of the vehicles. This data was provided by Core Lithium in accordance with the estimated number of staffs and operational workers.

Based on the provided data, a modal split has been created in the table as below.

Table 5 Modal Split

Modal Split

Modes	Percentage
Haulage Trains	26%
Buses	7%
Light Vehicles	27%
Freight/Couriers	4%

4.1.4 Trip Assignment

Based on the previous TIA completed by Flanagan Consulting (Reference no.: R-RB1056 dated on 5 October 2018), different haulage routes were identified and examined concluding Route 1: Stuart Highway – Berrimah Road (88.31km) as the best and most preferred route for the operations.

This route is still valid and should be adopted for the haulage operations.

> Preferred Haulage Route:
>
> Grants Mine site -> Cox Peninsula Road -> Stuart Highway -> Tiger Brennan Drive -> Berrimah Road -> Darwin Port

Acknowledging the upgrade of Berrimah Road/Tiger Brennan Drive intersection into a grade-separated intersection, the traffic safety at this intersection has been strengthened to minimise the potential conflict points and other hazards.

The following trip assignments for the haulage movements between the mine sites and the movements from the mine to the port have been displayed in the figures as following.

Figure 6 Two-way Local site movements in between mine sites

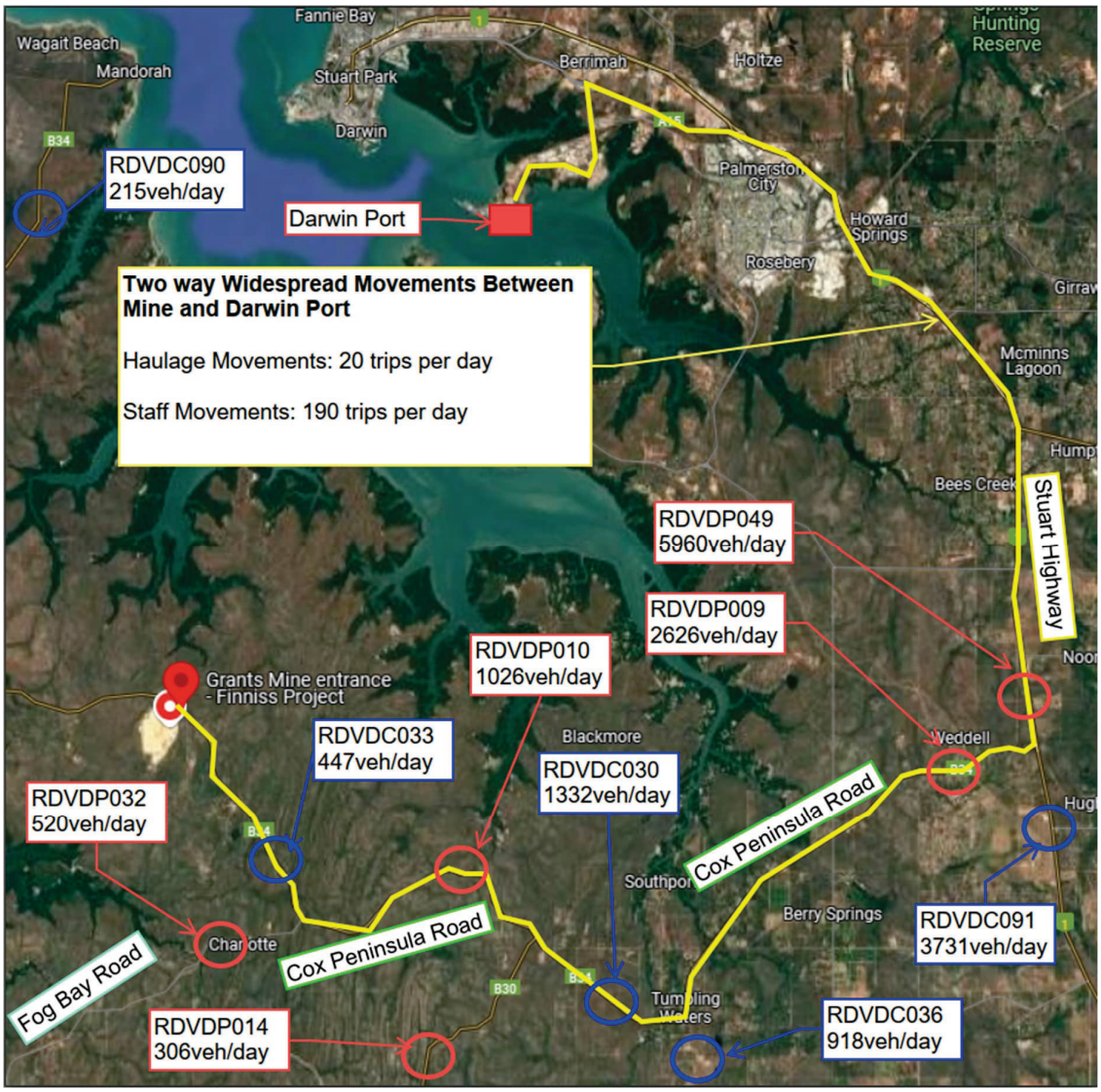

Figure 7 Two-way Widespread site movements between mine and Darwin port including 2023 NTG traffic counts

4.2 Through Traffic

By analysing the previous traffic counts within the area, it can be seen that the growth for through traffic on the primary count stations along Cox Peninsula Road have been observed as given below.

Table 6 Average Growth % for Primary Count Stations along Cox Peninsula Road

Count Station	RDVDP010	RDVDP009	RDVDP032	RDVDP014	RDVDP049
Average Growth %	6%	-2%	3%	9%	-1%

Due to the sealing of the Litchfield Park Road, the traffic volumes on this road were observed to increase around 30% in 2021, the volumes have been stable since then.

From the above table, the average growth along the Cox Peninsula Road was calculated to be 3%. A conservative background growth rate of 5% is taken for the horizon period of 10 years.

For the 10-year design horizon, traffic volumes on Cox Peninsula Road are anticipated to be as shown in the table below.

Table 7 Background Traffic (Veh/day)

Category	Count Station	2023 Counts	2035 Background Traffic
PRIMARY COUNT STATION	RDVDP032	520	934
	RDVDP010	1,026	1,843
	RDVDP014	306	550
	RDVDP009	2,626	4,716
	RDVDP049	5,960	10,704
COVERAGE COUNT STATION	RDVDC090	215	387
	RDVDC033	447	803
	RDVDC030	1,332	2,393
	RDVDC036	918	1,649
	RDVDC091	3,731	6,701

4.3 Total Traffic

Total traffic is the sum of the traffic generated from the site with the background traffic growing over the design horizon. The total traffic that has been predicted along the Cox Peninsula Road is displayed in the table below.

Table 8 Total Traffic (Veh/day)

Category	Count Station	2035 Background Traffic	2035 TOTAL TRAFFIC
PRIMARY COUNT STATION	RDVDP032	934	1,145
	RDVDP010	1,843	2,055
	RDVDP014	550	760
	RDVDP009	4,716	4,956
	RDVDP049	10,704	10,915
COVERAGE COUNT STATION	RDVDC090	387	600
	RDVDC033	803	1,015
	RDVDC030	2,393	2,605
	RDVDC036	1,649	1,860
	RDVDC091	6,701	6,910
Site Traffic		210	

Figure 8 Total Predicted Traffic Movements from Mine to Darwin Port

The local site movements would be undertaken between the mine sites (Grants Mine and BP33 Mine).

Figure 9 Local Site Movements between Grants Mine and BP33 Mine

5 Transportation Analysis

5.1 Site Access

Core Lithium has proposed to use the existing accesses for both Grants Mine and BP33 Mine.

The processing plant is located at Grants mine where the raw materials extracted from BP33 mine are hauled, processed into concentrates and then transported to Darwin Port.

5.1.1 Sight Distance Parameters

The sight distance parameters were examined to verify the minimum requirements for safe traffic flow shown below.

Table 9 Sight Distance Parameters

Item	Minimum Requirement	Grants Mine (Main Access 1)	BP33 Mine (Access 8)
Design Speed	-	120 km/h	120 km/h
Approach Sight Distance	241m	350m	250m
Safe Intersection Sight Distance	341m	350m	150m
Assume Reaction Time = 2.5 sec			

The sight distance for the access of BP33 mine was observed to be restricted due to the presence of crest on the southeastern approach.

It is highly recommended to close the current access to BP33 mine due to this restriction and relocate to the sealed access approximately 450m to the northwest of the current location.

Figure 10 Sight distance restricted by crest at BP33 mine access

Figure 11 Proposed area for relocation of the access for BP33 Mine (To Southeast)

Figure 12 Proposed area for relocation of the access for BP33 Mine (To Northwest)

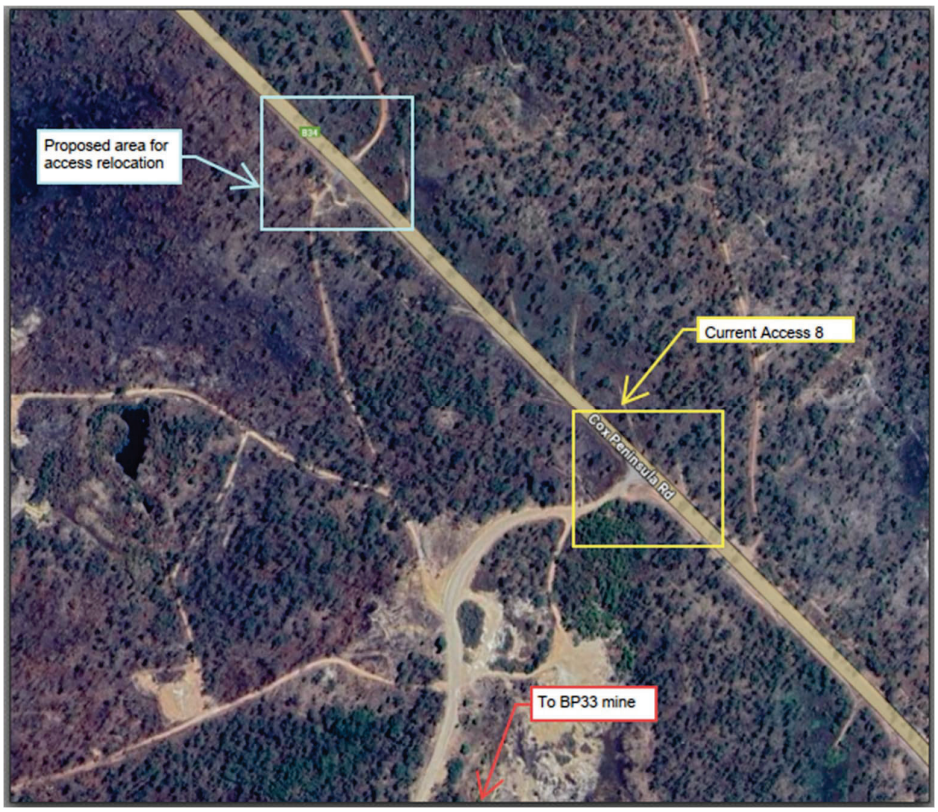

Figure 13 Proposed area for relocation of access to BP33 mine

5.1.2 Turn Lane Provisions – Grants Mine

A channelised left turn lane has been provided for access to Grants mine from Cox Peninsula Road. The traffic volume on Cox Peninsula Road does not warrant the turn treatment, however acknowledging the movements of larger vehicles such as quad road trains (approximate length = 55m), this treatment allows for safer access into the Grants Mine site.

Figure 14 Design Elements for CHL turn lane into Grants Mine

Elements	Minimum Required	Provided
Design Speed	120km/h	-
Rate of deceleration (Comfortable)	2.5m/s2	-
Taper Length	35m	40m
Deceleration Length (includes Taper length)	185m	110m (noting this meets deceleration for 100km/h)

The provided deceleration length is shorter than the requirement. Consideration should be given to increasing the length of this turn lane.

5.1.3 Turn Lanes Provisions – BP33

No additional provisions for vehicles making turn movements into the BP33 Mine from Cox Peninsula Road have been provided.

A review of minimum requirement of turn treatments was undertaken in line with the requirements of the Austroads Guide to Traffic Management Part 6: Intersections, Interchanges and Crossings Management.

The closest primary count station to the subject mine sites is RDVDP010 (300m west of Pioneer Creek Bridge on Cox Peninsula Road). Based on the 2023 NTG Annual Traffic Counts Report, the average annual daily traffic count for 2023 at this count station is approximately 1,030 vehicles per day.

The peak hour traffic has been identified by considering 10 % of the corresponding daily traffic movements.

Q_T = Through traffic volume = 105 vehicles per hour

Q_R = Right turn traffic volume = 34 vehicles per hour

Q_L = Left turn traffic volume = 34 vehicles per hour

Q_M = Major traffic volume = 140 vehicles per hour

Figure 3.25: Warrants for turn treatments on major roads at unsignalised intersections

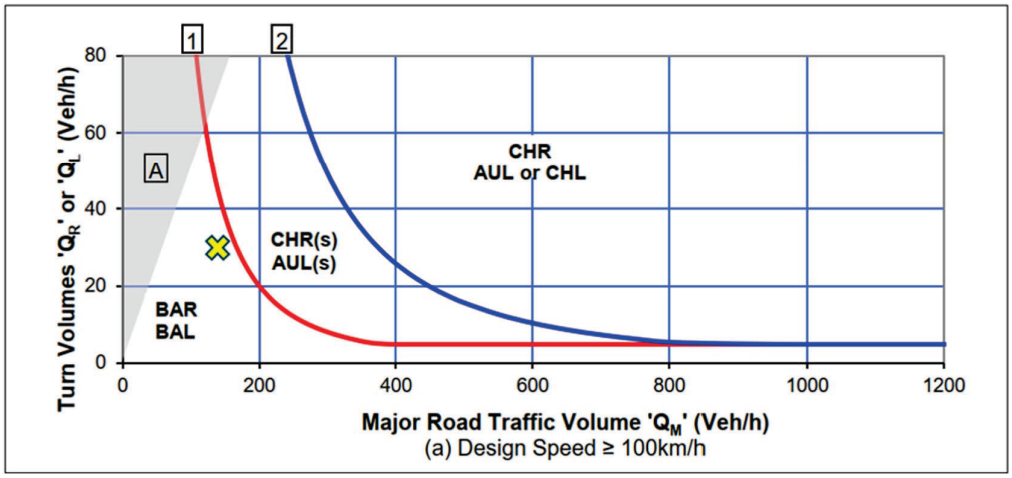

Figure 15 Warrant check for turn treatment (Yellow: Obtained value)

Based on the warrant check as shown above, the intersection does not require a treatment for turn movements.

However, acknowledging the movements of larger vehicles such as quad road trains (approximate length = 55m), it is considered that a CHR treatment should be provided to accommodate and store these vehicles safely when making a right turn into the BP33 Mine site.

Table 10 Design elements for CHR treatment

Design Speed	**120km/h**
Rate of deceleration (Comfortable)	2.5m/s2
Taper Length	35m
Deceleration Length (includes Taper length)	185m

5.2 Capacity and Level of Service

5.2.1 Existing Conditions

The estimated peak traffic volume excluding this development will be relatively low and within the capacity of the Cox Peninsula Road.

5.2.2 Background Conditions (Existing Plus Growth) For Each Horizon Year

When taking background growth into consideration, the Cox Peninsula Road will still be well below capacity.

5.2.3 Total Traffic (Existing, Background and Site)

The total traffic anticipated is up to 2,060 vehicles per day on the RDVDP010 count station (300m west of Pioneer Creek Bridge along Cox Peninsula Road) and that on the count station RDVDP009 (2.8km West of Stuart Highway on Cox Peninsula Road) is 4,930 vehicles per day.

This is well below the capacity of the existing Cox Peninsula Road.

5.3 Transportation Safety

The primary safety concern for the proposed development is expected to be vehicle movements at the junctions where the vehicles need to make turns.

Route 1 which has been identified as the preferred haulage route has two turning movements, one is Cox Peninsula Road/Stuart Highway intersection and the other in Tiger Brennan Drive/Berrimah Road intersection.

Although Cox Peninsula Road/Stuart Highway intersection is an unsignalised intersection, dedicated turn lanes have been provided for left and right turning traffic to allow channelisation and to minimise any potential for congestion at the intersection. The additional traffic contributed to this junction by the site is approximately 4% of the through traffic on Cox Peninsula Road.

The upgrade of Berrimah Road/Tiger Brennan Drive intersection into a grade-separated intersection has increased the safety level of the movements. It is not anticipated that the additional two way traffic volume of up to 20 heavy vehicle movements per day will have any noticeable impact on the operation of the intersection.

Berry Springs Primary School can be considered as the area with major safety concern. It is advised to schedule the heavy haulage movements to be outside of the drop off and pick up timing of the school. It is noted that the DLI have requested that "*The proponent should restrict road train haulage past the Berry Springs Primary School to outside of the hours of 07:45am to 08:45am and 2:30pm to 3:30pm on school days unless otherwise approved in writing by the Department of Logistics and Infrastructure in consultation with Berry Springs Primary School*."

6 Improvement Analysis

6.1 Improvements to Accommodate Existing Traffic

No improvement identified to accommodate existing traffic.

6.2 Improvements to Accommodate Background Traffic

No improvement identified to accommodate background traffic.

6.3 Additional Improvements to Accommodate Site Traffic

It is recommended that the location of the BP33 access is relocated to allow sight distance along Cox Peninsula Road to and from the access to be provided. In addition, consideration should be given to upgrading the relocated junction to include a CHR treatment.

The left turn into the Grants Mine could be extended to accommodate deceleration of vehicles approaching the access on Cox Peninsula Road.

6.4 Alternative Improvements

There may be a potential to provide an internal route between the mine sites without using Cox Peninsula Road. It is understood that this route would need to pass areas of swampy ground so detailed investigations would be required to identify if this is feasible.

7 Findings & Recommendations

7.1 Site Accessibility

Site distance for the access to BP33 mine site is insufficient due to the presence of crest on the southeast approach of the access road/Cox Peninsula Road intersection.

It is recommended to close the existing BP33 access and to relocate the access approximately 450m northwest from the current access.

It is also recommended that the left turn into the Grants Mine site is extended to allow for the desirable deceleration length.

7.2 Transportation Impacts

Due to low site volumes, it is anticipated that there will not be any significant impact on the overall transportation system.

7.3 Compliance With Applicable Local Codes

All the works will be carried out in compliance with the requirements of the NT Subdivision Development Guidelines, NTPS, Austroads and other relevant authorities.

8 Conclusions

Based on the above assessment, the proposed mining operation is supported from a traffic and transport perspective.

Appendix A