

Appendix G – Traffic impact assessment



Renew Estate Pty Ltd
Bomen solar farm EIS
Traffic impact assessment

20 February 2018

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1. Introduction

1.1 Background

Renew Estate requires an Environmental Impact Statement (EIS) and specialist studies to be submitted as part of a development application for a proposed 120 megawatt (MW) solar farm at Bomen, NSW (the proposal).

The primary components of the proposal include:

- Approximately 400,000 photovoltaic solar modules (modules).
- Approximately 4,500 trackers comprising single-axis tracking framing systems mounted on steel piles (structures).
- Up to 44 containerised power conversion stations containing electrical switchgear, inverters (SMA 2.75 MVA – 2750 CE) and medium voltage transformers (power stations).
- New onsite electrical switchyard and substation (substation).
- Connection into the National Electricity Market (NEM) via about 3.5 kilometres of 132 kV transmission line between the proposed on-site substation and the existing TransGrid Wagga North Substation. The transmission line may be overhead or underground, or a combination of both, subject to detailed design.
- Battery storage system.
- Control building including office, SCADA systems, operation and maintenance facilities, spare parts and staff amenities serviced by septic systems and rainwater tanks.
- A car park with approximately 10 spaces.
- Internal DC and AC cabling in trenches for electrical reticulation.
- Minor upgrade of the unsealed section of Trahairs Road, east of Byrnes Road, for site access (to be maintained as a single lane unsealed road) (as recommended in this report).
- Internal all-weather access tracks.
- Internal fire trail and bushfire asset protection zones.
- Security fencing around the solar farm.
- Vegetation screening – plantings along the site boundaries where required.
- Meteorological stations.
- Subdivision of the following lots to allow the purchase of the required land for the proposal site, as shown in the plan of proposed subdivision:
 - Lot 11 DP1130519
 - Lot 2 DP590756
 - Lot 174 DP751405
 - Lot 108 DP751405.

1.2 Site Location

The proposal site is located on Trahairs Road, approximately 7 km to the north-east of the Wagga Wagga central business district. The proposal site is located within the Wagga Wagga Local Government Area and is accessed via the intersection of Byrnes Road and Trahairs Road.

The proposal site is on land zoned IN1 General Industrial, RE1 Public Recreation and RU1 Primary Production under the Wagga Wagga Local Environmental Plan (LEP).

The location of the proposal site is displayed in Figure 1.1. An overview of the proposal is shown in Figure 1.2.

Figure 1.1 – Proposal Site Location

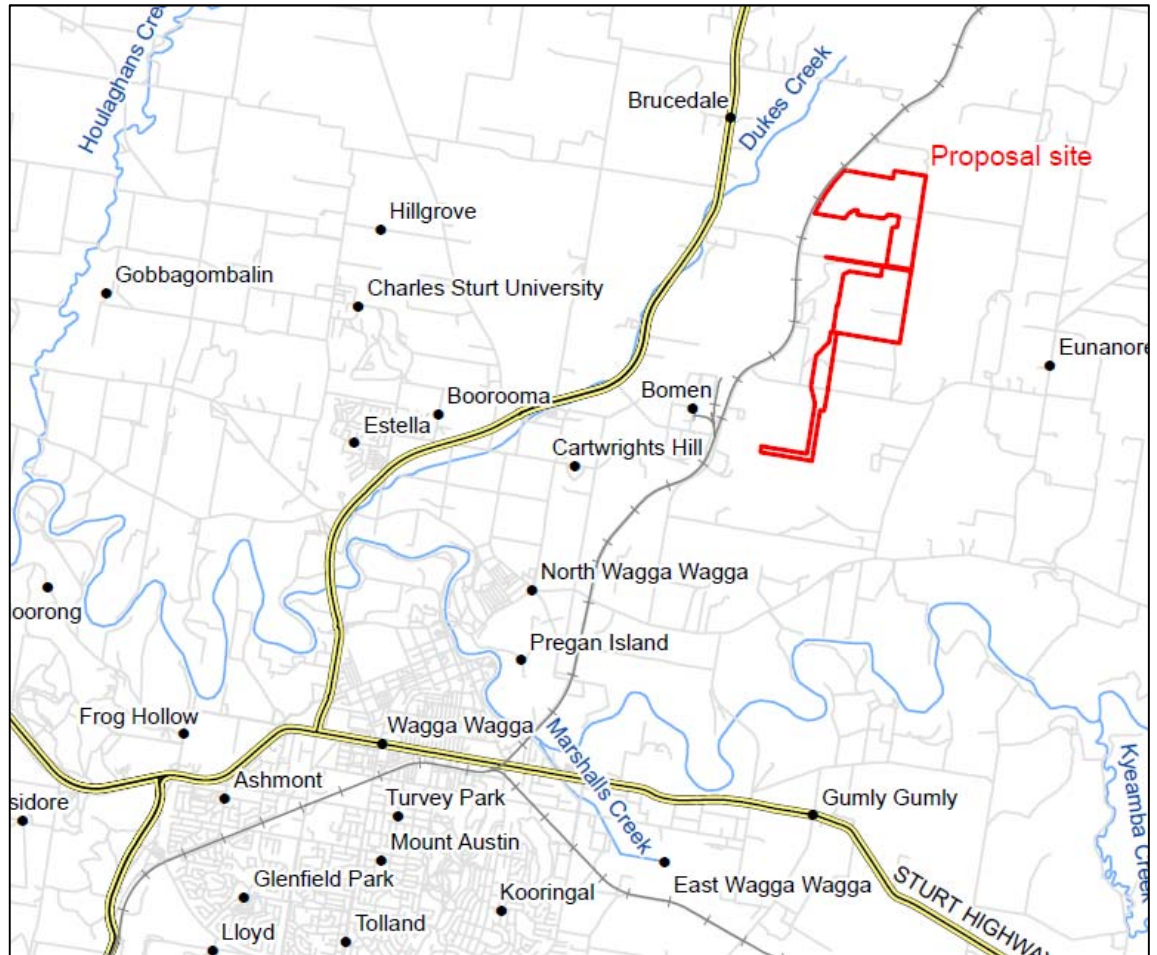
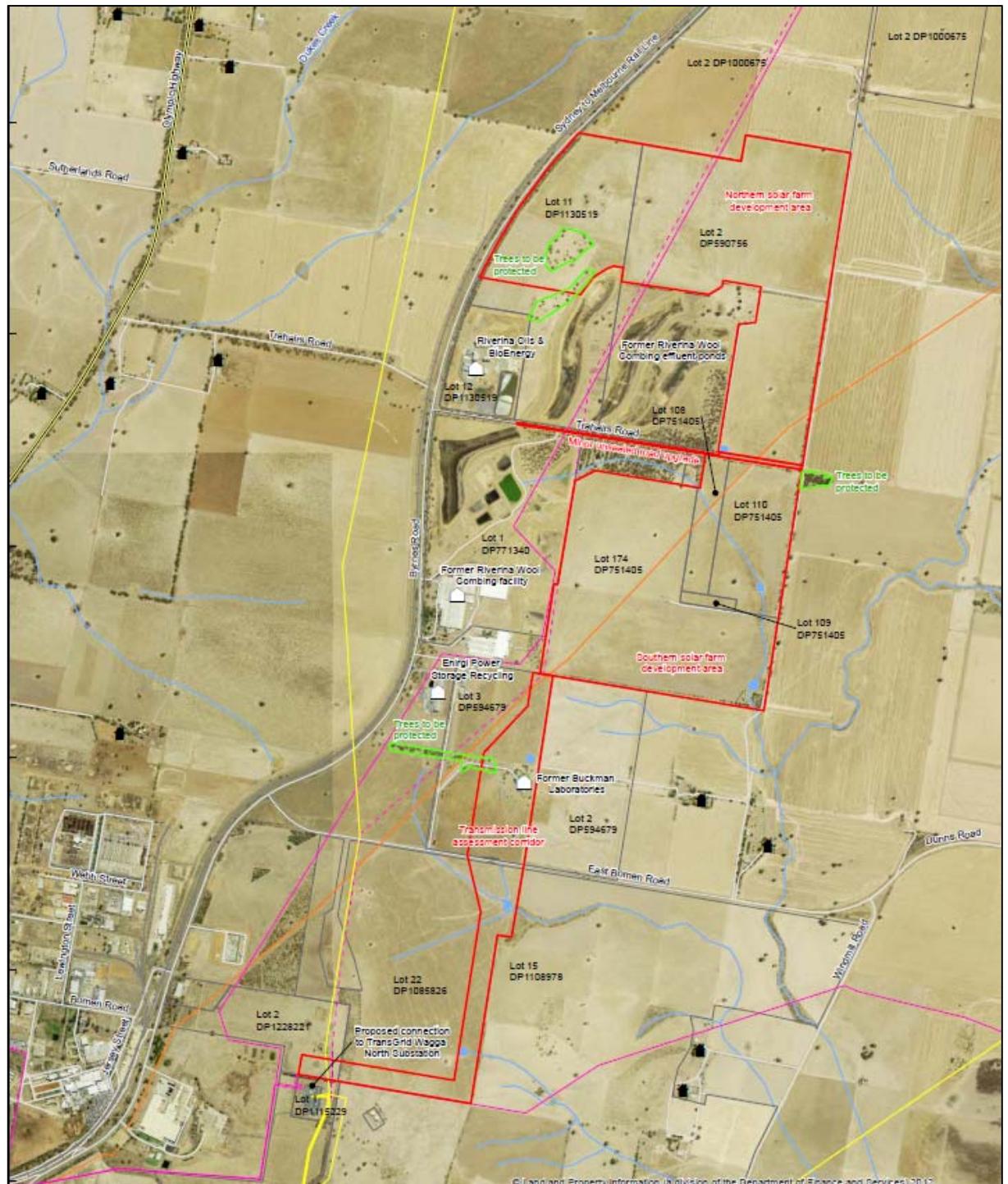


Figure 1.2 - The Proposal



LEGEND

	Industrial facility		Existing gas pipeline		Proposal site
	Residence		Highway		Lot boundary
	Existing transmission line		Road		Trees to be protected
	Subtransmission line under construction		Rail line		Dam
	Existing subtransmission line		Drainage line/stream		

1.3 Secretary's Environmental Assessment Requirements

The proposed solar farm is a State Significant Development.

The EIS scope is based on the content of the Secretary's Environmental Assessment Requirements (SEARs). As part of SEARS requirements, a Traffic Impact Assessment (TIA) is required for the proposed solar farm:

Transport – including an assessment of the site access route, site access point and likely transport impacts (including peak and average traffic generation) of the development on the capacity and condition of roads, a description of the measures that would be implemented to mitigate any impacts during construction and a description of the proposed road upgrade developed in consultation with the relevant road and rail authorities (if required).

The TIA shall detail the potential impacts associated with the phases of the development, the measures to be implemented to maintain the standard and safety of the road network, and procedures to monitor and ensure compliance. Where road safety concerns are identified at a specific location along the haulage route/s, the TIA may be supported by a targeted Road Safety Audit undertaken by suitably qualified persons.

For guidance in the preparation of the TIA the applicant is referred to section 2 of the "Guide to Traffic Generating Developments" prepared by the RTA and the Austroads publications, particularly the Austroads Guide to Traffic Management Part 12: Traffic Impacts of Development. The TIA should contain information such as the expected traffic generation, vehicle numbers and types of vehicles, and travel routes for vehicles accessing the development site.

1.4 Purpose of this report

GHD has been commissioned to undertake a traffic assessment in support of the EIS for the project. The purpose of this report is to assess the operational and construction traffic impacts of the proposed Bomen Solar Farm, including the provision of site access from Trahairs Road.

1.5 Study Limitations and Assumptions

The study limitations and key assumptions applicable to this study include:

- No intersection traffic modelling has been undertaken as part of this assessment.
- The expected construction and operational traffic volumes of the proposal have been provided by Renew Estate.
- The background traffic volumes on Byrnes Road have been sourced from survey data provided by Wagga Wagga City Council.

1.6 Report Structure

This report is structured as follows:

- Section 1, Introduction.
- Section 2, Existing Conditions: provides a review of the traffic and transport facilities and operation in the vicinity of the proposed Bomen Solar Farm.
- Section 3, Proposed Development: provides a summary of the operational and construction activities associated with the proposal.
- Section 4, Impact Assessment: quantifies the likely traffic impacts of the proposal.
- Section 5, Summary and Conclusions.

2. Existing Conditions

2.1 Existing Road Network Characteristics

2.1.1 Road Hierarchy

Roads within NSW are categorised in the following two ways:

- By Classification (ownership)
- By the function that they perform.

Road Classification

Roads are classified (as defined by the *Roads Act 1993*) based on their importance to the movement of people and goods within NSW (as a primary means of communication).

The classification of a road allows Roads and Maritime Services (Roads and Maritime) to exercise authority of all or part of the road. Classified roads include Main Roads, State Highways, Tourist Roads, Secondary Roads, Tollways, Freeways and Transitways.

For management purposes, Roads and Maritime has three administrative classes of roads. These are:

- **State Roads** – Major arterial links through NSW and within major urban areas. They are the principle traffic carrying roads and fully controlled by Roads and Maritime with maintenance fully funded by Roads and Maritime. State Roads include all Tollways, Freeways and Transitways; and all or part of a Main Road, Tourist Road or State Highway.
- **Regional Roads** – Roads of secondary importance between State Roads and Local Roads which, with State Roads provide the main connections to and between smaller towns and perform a sub-arterial function in major urban areas. Regional roads are the responsibility of councils for maintenance funding, though Roads and Maritime funds some maintenance based on traffic and infrastructure. Traffic management on Regional Roads is controlled under the delegations to local government from Roads and Maritime. Regional Roads may or all part of all or part of a Main Road, Secondary Road, Tourist Road or State Highway; or other roads as determined by Roads and Maritime.
- **Local Roads** – The remainder of the council controlled roads. Local Roads are the responsibility of councils for maintenance funding. Roads and Maritime may fund some maintenance and improvements based on specific programs (e.g. urban bus routes, road safety programs). Traffic management on Local Roads is controlled under the delegations to local government from Roads and Maritime.

Functional Hierarchy

Functional road classification involves the relative balance of the mobility and access functions. Roads and Maritime define four levels in a typical functional road hierarchy, ranking from high mobility and low accessibility, to high accessibility and low mobility. These road classes are:

- **Arterial Roads** – generally controlled by Roads and Maritime, typically no limit in flow and designed to carry vehicles long distance between regional centres.
- **Sub-Arterial Roads** – can be managed by either Roads and Maritime or local council. Typically, their operating capacity ranges between 10,000 and 20,000 vehicles per day, and their aim is to carry through traffic between specific areas in a sub region, or provide connectivity from arterial road routes (regional links).

- **Collector Roads** – provide connectivity between local roads and the arterial road network and typically carry between 2,000 and 10,000 vehicles per day.
- **Local Roads** – provide direct access to properties and the collector road system and typically carry between 500 and 4,000 vehicles per day.

A summary of the key roads in proximity to the proposal site is provided below.

2.1.2 Byrnes Road

Despite carrying low traffic volumes, Byrnes Road functions as a sub-arterial road which provides an alternative north-south route to the Olympic Highway (A41), between Wagga Wagga and Junee. Byrnes Road has the following road characteristics:

- It is a two lane two way carriageway.
- It has a sealed carriageway, approximately seven metres in width with half metre sealed shoulders provided on each side of the road.
- It has centre line road marking.
- The signposted speed limit is 100 km/h.

At its intersection with Trahairs Road, Byrnes Road provides a rural auxiliary left turn lane (AUL) and right turn lane (AUR).¹



Figure 2.1 – Byrnes Road looking south towards Trahairs Road

¹ GHD previously completed the design of the Byrnes Road / Trahairs Road intersection.

2.1.3 Trahairs Road (east of Byrnes Road)

Trahairs Road functions as a local road and is located approximately 3 km to the north of Bomen. The section east of Byrnes Road provides access to the Riverina Oils and Bio Energy Facility and other properties.

The 400 metre section of Trahairs Road east of Byrnes Road has the following road characteristics:

- It is a two lane two way carriageway.
- It has sealed carriageway approximately nine metres in width.
- No road marking is provided.

West of the 400 metre sealed section of Trahairs Road, it is unsealed with a width of approximately five metres.

Trahairs Road intersects Byrnes Road at a priority controlled (give way) intersection.



Figure 2.2 – Sealed section of Trahairs Road looking towards Byrnes Road



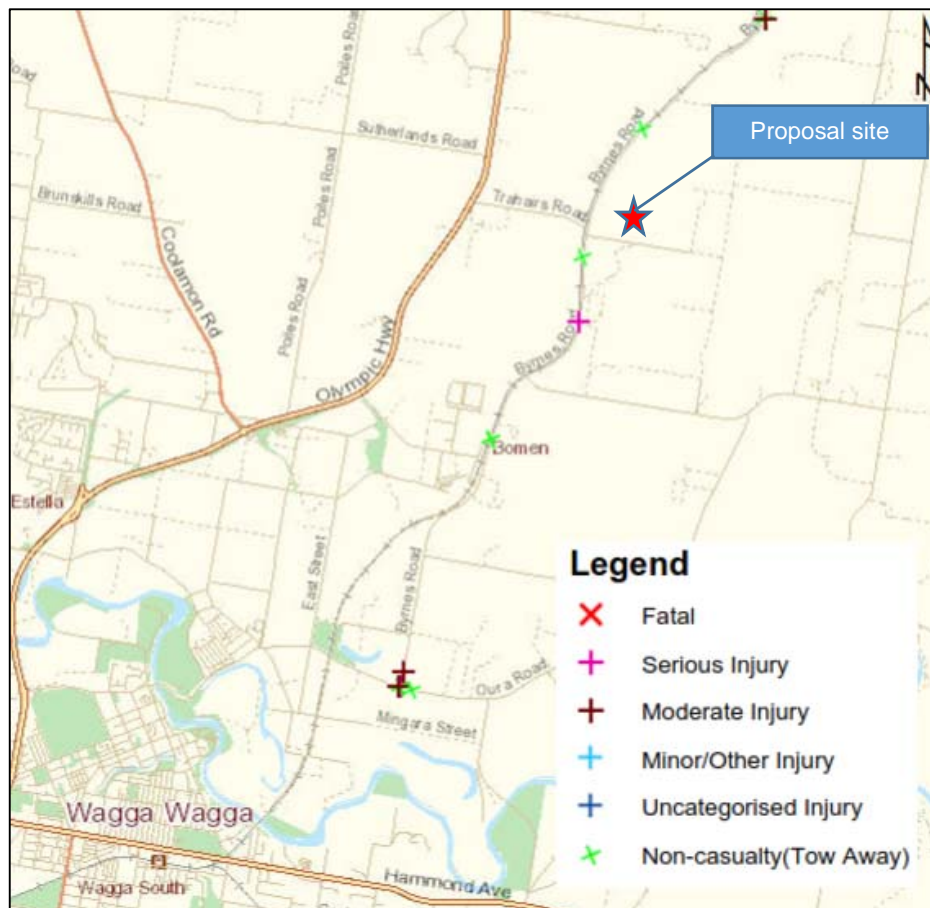
Figure 2.3 – Unsealed section of Trahairs Road

2.2 Crashes

Crash data for a five year period (from 2012 to 2016) was collected on Byrnes Road using data from the Transport for NSW Centre for Road Safety website. A total of 21 crashes have been recorded during this period, including:

- The majority of crashes (nine) were caused by vehicles leaving the carriageway on a bend.
- Four crashes involved vehicles driving off the road and four involved collisions between vehicles at intersections.
- Nine crashes caused injury, two of which were serious.
- Six crashes occurred at the intersection of Byrnes Road / Oura Road (south of Bomen), with the majority of these resulting in injuries.

The locations of the crashes recorded along Byrnes Road are shown in Figure 2.4 with crashes by type summarised in Figure 2.5.



Source: Roads and Maritime Services

Figure 2.4 – Crash Location Map

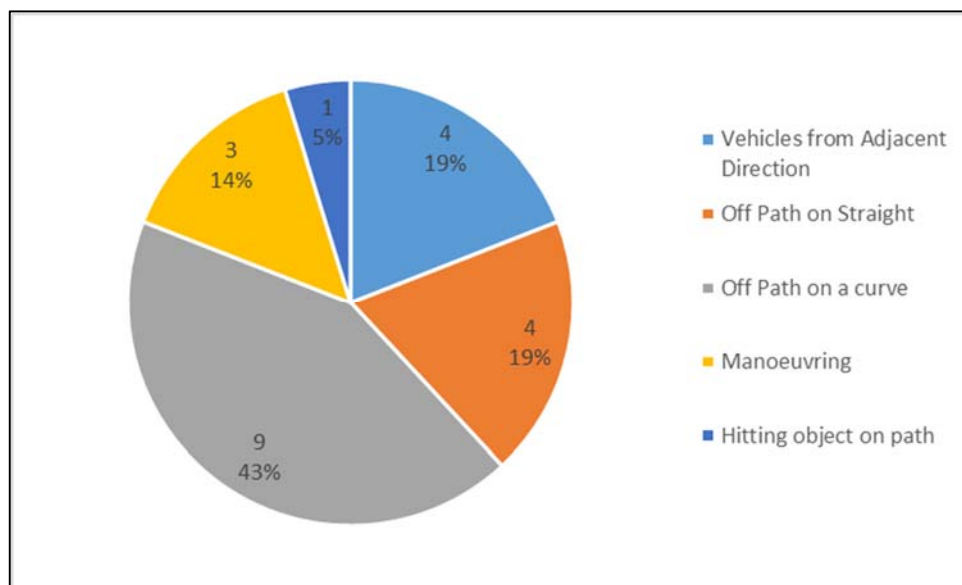


Figure 2.5 – Crashes by Type

2.2.1 Freight Routes

The Roads and Maritime Restricted Access Vehicle Map identifies Byrnes Road as being approved to accommodate vehicles up to the size of a 26 m B-Double.

2.2.2 Active Transport and Public Transport

There are no formal pedestrian or bicycle facilities provided in the vicinity of the proposal site, which reflects the rural location of the site.

In addition, there are no public bus services operating along Byrnes Road near the site.

2.3 Byrnes Road Traffic Volumes

Wagga Wagga City Council has provided traffic data from week long tube counts that were undertaken on Byrnes Road between 14th April 2015 and 21st April 2015. The observed average weekday traffic volumes are displayed below in Figure 2.6.

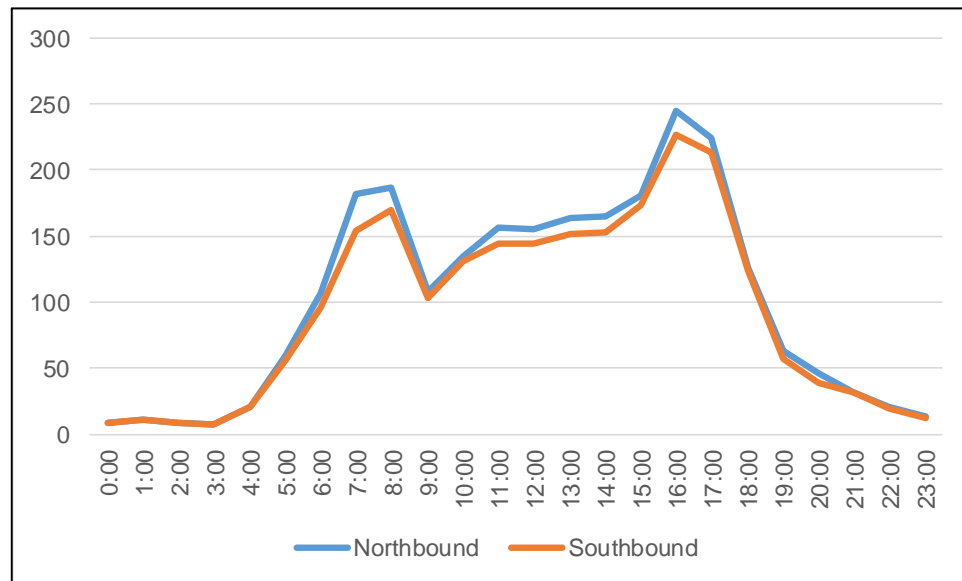


Figure 2.6 – Byrnes Road – Average Weekday Traffic Volumes

The traffic count profile shown in Figure 2.6 indicates the following:

- Morning and evening peak periods of road network activity occur between 8:00 am – 9:00 am and 4:00 pm – 5:00 pm respectively.
- During morning periods the vehicle activity on Byrnes Road is approximately 356 (bidirectional) vehicles per hour.
- During afternoon periods the vehicle activity on Byrnes Road is approximately 472 (bidirectional) vehicles per hour.
- During the morning peak, heavy vehicles constitute approximately 18 percent of the traffic volumes.
- During the afternoon peak, heavy vehicles constitute approximately 12 percent of the traffic volumes.

2.4 Current Network Operation

The Roads and Maritime *Guide to Traffic Generating Developments* (2002) specifies that for rural roads with a speed limit of 100 km/h, a single travel lane in each direction, level terrain and 15 percent heavy vehicles, have a mid-capacity (to a Level of Service D) of 1,410 vehicles (bi-directional traffic).

The traffic volumes displayed in Figure 2.6 indicates that Byrnes Road is operating well within the acceptable limits of its mid-block capacity.

3. Proposed Development

3.1 Bomen Solar Farm

The primary components of the proposal include:

- Approximately 400,000 photovoltaic solar modules (modules).
- Approximately 4,500 trackers comprising single-axis tracking framing systems mounted on steel piles (structures).
- Up to 44 containerised power conversion stations containing electrical switchgear, inverters and medium voltage transformers
- New onsite electrical switchyard and substation (substation).
- Connection into the National Electricity Market (NEM) via about 3.5 kilometres of 132 kV transmission line between the proposed on-site substation and the existing TransGrid Wagga North Substation. The transmission line may be overhead or underground, or a combination of both, subject to detailed design.
- Battery storage system.
- Control building including office, SCADA systems, operation and maintenance facilities, spare parts and staff amenities serviced by septic systems and rainwater tanks.
- A car park with approximately 10 spaces.
- Internal DC and AC cabling for electrical reticulation
- Minor upgrade of the unsealed section of Trahairs Road, east of Byrnes Road, for site access (to be maintained as a single lane unsealed road as recommended in this report).
- Internal all-weather access tracks.
- Internal fire trail and bushfire asset protection zones.
- Security fencing around the solar farm.
- Vegetation screening – plantings along the site boundaries where required
- Meteorological stations.
- Subdivision of the following lots to allow the purchase of the required land for the proposal site, as shown in the plan of proposed subdivision:
 - Lot 11 DP1130519
 - Lot 2 DP590756
 - Lot 174 DP751405
 - Lot 108 DP751405.

The operational lifetime of the solar farm is 30 years, at which time the proposal would either be decommissioned would or continue to operate subject to further approvals.

3.2 Traffic Generation

3.2.1 Operational Traffic

Information provided by Renew Estate indicates that:

- The solar farm will be staffed between 7:00 am – 5:00 pm, seven days per week.

- The solar farm will have up to approximately ten staff members during the defect liability period (DLP).²
- Subsequent to the DLP approximately five staff members will be employed at the solar farm.
- It is anticipated that staff movements will be inbound in AM peak periods and outbound in PM peak periods.
- There will be occasional heavy vehicle movements to and from the site, associated with the delivery of spare parts, waste removal and civil maintenance.
- During the DLP the proposal is expected to generate up to 20 light vehicle peak hour movements per day, with 10 inbound movements in the AM peak and 10 outbound movements in the PM peak.
- Post DLP the proposal is expected to generate up to 10 light vehicle peak hour movements per day including 5 inbound movements in the AM peak and 5 outbound movements in the PM peak.

3.2.2 Construction and Decommissioning Traffic

With respect to construction traffic volumes, information provided by Renew Estate indicates that:

- Subject to planning and environmental approvals, the construction period is expected to be nine to 12 months from site establishment to commissioning, commencing in the third quarter of 2018.
- During peak construction it is expected that there will be up to 200 construction personnel onsite, with about 170 inbound light vehicle movements in the morning peak period and 170 outbound light vehicle movements in the evening peak period, with some personnel carpooling.
- During peak construction periods, there would be up to 30 heavy vehicle movements per day, including both inbound and outbound movements.

It has been assumed that the heavy vehicle activity will occur over the course of the day. For the purposes of this assessment, it has been assumed that up to five heavy vehicles will be on site at any one time.

The majority of the traffic impacts of the proposal will occur during the construction phase. For the purposes of this assessment, the highest peak hour traffic generation for the proposal under the peak construction scenario has been assumed to be 180 vehicle movements in total, which would consist of the following:

- AM peak hour:
 - Five inbound heavy vehicle movements
 - Five outbound heavy vehicle movements
 - 170 inbound worker movements (light vehicles).
- PM peak hour:
 - Five inbound heavy vehicle movements
 - Five outbound heavy vehicle movements
 - 170 outbound worker movements (light vehicles).

² The DLP is the period a contractor is responsible for repairing defects in new developments .A two year DLP period is specified for the Bomen Solar Farm.

The majority of deliveries during construction will be by semi-trailer.

Similar volumes of construction vehicles will be required for decommissioning.

3.3 Trip Distribution

It is anticipated that the majority of the construction labour force will reside in Wagga Wagga and therefore travel northbound on Byrnes Road in the morning peak period and southbound in the evening peak period.

Heavy vehicle access routes during construction are not currently known. However, it is expected that the majority of heavy vehicles will access / egress the proposal to / from the Sturt Highway to the south and possibly the Olympic Highway to the east.

Existing auxiliary lanes are provided on Byrnes Road to accommodate vehicles turning into Trahairs Road.

3.4 Site Access

Site access for the operational and construction traffic volumes will be via Trahairs Road.

GHD has reviewed the Trahairs Road access with respect to the expected construction vehicle activity (see Annexure A) and has made the following conclusions / recommendations:

- For the purpose of providing access for construction vehicles accessing the site, a single unsealed lane width of four metres for the length of Trahairs Road would provide sufficient access for semi-trailers, with no requirement for vegetation removal.
- Minor grading work along the unsealed section of Trahairs Road work to a width of four metres is required to make the unsealed section of the road suitable for use during construction.
- To ensure that inbound and outbound vehicles do not need to travel on the single lane unsealed road simultaneously, a radio protocol would be implemented for vehicles to give way to oncoming vehicles already on the road. Appropriate warning signage detailing the radio protocol would also be erected at either end of the unsealed section of road.
- A condition assessment of Trahairs Road should be conducted before and after construction.

3.5 Car Parking

It is proposed to provide permanent parking facilities for up to 10 light vehicles at the control building.

The layout of the proposed parking area is not currently available for this assessment. However, the car park will be designed and constructed in accordance with Australian Standards.

4. Traffic Impacts

4.1 Construction

As detailed in Section 2.4, Byrnes Road is currently operating well within its functional mid-block capacity, with bi-directional traffic flows of up to 472 vehicles per hour and a capacity of approximately 1,410 vehicles per hour.

Due to lack of data availability, intersection analysis has not been undertaken. However, at its intersection with Trahairs Road, Byrnes Road provides a rural auxiliary left turn lane (AUL) and right turn lane (AUR) to allow through vehicles to pass vehicles turning into Trahairs Road.

It is therefore anticipated that Byrnes Road and Trahairs Road can accommodate the construction vehicle activity associated with the proposal.

It is also anticipated that the construction traffic volumes will have a negligible impact on road safety.

4.2 Operational

Upon completion of the construction phase, the solar farm is expected to generate up to 20 light vehicle peak hour movements per day. This additional traffic will constitute approximately three percent of the existing peak hour traffic volumes on Byrnes Road. This small variation in traffic movement within the road network would be unlikely to have an adverse impact on the road system and/or intersection operation, and would be within the typical daily fluctuations in traffic.

It is therefore anticipated that the road network will perform as per the existing conditions.

It is also anticipated that the operational traffic volumes will have a negligible impact on road safety.

4.3 Mitigation Measures

The following mitigation measures should be undertaken to minimise traffic and access impacts:

- A detailed Construction Traffic Management Plan (CTMP) be prepared and approved by Wagga Wagga City Council prior to construction commencing. The CTMP would include appropriate Traffic Control Plans and include detail in relation to:
 - Traffic control measures in works areas.
 - Appropriate entry/exit points for the proposed compound areas.
 - Advising motorists of the change in traffic conditions associated with the work.
- Appropriate exclusion barriers, signage and site supervision are to be employed at all times to ensure that the works area is controlled and that unauthorised vehicles and pedestrians are excluded from the works area.
- All traffic control devices are to be in accordance with AS 1742.3-2009 – Manual of uniform traffic control Devices: Traffic control for works on roads and Roads and Maritime Services Traffic control at worksites manual.
- A condition assessment of Trahairs Road will be conducted before and after construction.

4.4 Oversize Vehicles

Any movement of oversize vehicles will be strictly undertaken with Roads and Maritime and the National Heavy Vehicle Regulator Guidelines. This will include the preparation and approval of a NSW Load Declaration Form.

4.5 Cumulative Impacts

A summary of other potential developments in proximity to Wagga Wagga are detailed below in Table 4-1.

Table 4-1 – Other Potential Developments

Entity / project	Location	Status
Essential Energy Construction of new subtransmission line	On the proposal site	Construction in progress – poles constructed
Renewed Metals Technology – Bomen (Enirgi) Expansion of Battery Resource Recovery Facility	240 m west of the proposal site	Major project, SEARs issued, EIS in progress
Potential waste management facility at the site of the decommissioned Riverina Wool Combing effluent ponds	On the western side of the proposal site	Early planning stages
Teys Australia Wagga Wagga Relocation of Retail Ready Meat Products Facility	About 4 km west of the proposal site	Major project, SEARs issued
Gregadoo Solar Development of a 45 MW solar farm and associated infrastructure at Gregadoo	About 16 km south of the proposal site	Major project, SEARs issued
Terrain Solar Wagga Wagga Solar Farm	Immediately east of the southern end of the proposed transmission line	Development Application, being assessed

The expected timing of these developments (pending their approval) is not currently known.

However, it is anticipated that the primary traffic impacts of these projects will occur during their construction rather than their operational phases and will be short term in nature.

A number of the developments are located a substantial distance from the proposal site.

Taking into account the spare capacity of Byrnes Road, and the provision of turning lanes at the intersection with Trahairs Road, it is assessed that the proposal and developments detailed in Table 4-1 would have minor cumulative impacts on the road network.

5. Summary and Conclusions

Renew Estate requires an Environmental Impact Statement (EIS) and specialist studies to be submitted as part of a development application for a proposed 120 megawatt (MW) solar farm at Bomen, NSW.

GHD has been commissioned to undertake a traffic assessment to inform the EIS. This assessment addresses the relevant SEARs and also assesses the need for upgrade works on Trahairs Road for the provision of site access.

5.1 Key Findings

5.1.1 Active and Public Transport

There are no formal pedestrian or bicycle facilities provided in the vicinity of the proposal site, which reflects the rural location of the site.

5.1.2 Site Access from Trahairs Road

The site is proposed to be accessed from Trahairs Road during construction and operation. GHD has reviewed the Trahairs Road access with respect to the expected construction vehicle activity (see Annexure A) and has made the following conclusions / recommendations:

- For the purpose of construction traffic to access the solar farm site, a single unsealed lane width of four metres for the length of Trahairs Road would provide sufficient access for semi-trailers, with no requirement for vegetation removal.
- Minor grading work along the unsealed section of Trahairs Road work to a width of four metres is required to make the unsealed section of the road suitable for use during construction.
- To ensure that inbound and outbound vehicles do not need to travel on the single lane unsealed road simultaneously, a radio protocol would be implemented for vehicles to give way to oncoming vehicles already on the road. Appropriate warning signage detailing the radio protocol would also be erected at either end of the unsealed section of road.
- A condition assessment of Trahairs Road should be conducted before and after construction.

5.1.3 Traffic Generation

Operational Traffic

The proposal will employ up to 10 staff members during the first two years of operation during the DLP.

During operation, the proposal is expected to generate up to 20 peak hour movements per day, with 10 inbound movements in the AM peak and 10 outbound movements in the PM peak.

Following the DLP, the proposal will employ up to around 5 staff members. This is expected to generate up to 10 peak hour movements per day including 5 inbound movements in the AM peak and 5 outbound movements in the PM peak.

Construction and Decommissioning Traffic

The highest peak hour traffic generation for the proposal under the peak construction scenario has assumed to be 180 vehicle movements in total, which would consist of the following:

- Five inbound heavy vehicle movements
- Five outbound heavy vehicle movements
- 170 inbound worker movements (light vehicles).

It is assumed that similar volumes of construction vehicles will be required for decommissioning.

5.1.4 Traffic Impacts

As detailed in Section 2.4, Byrnes Road currently operates well within its mid-block capacity. It is therefore expected that Byrnes Road would be able to accommodate the additional traffic associated with the proposed construction activities.

During operation the solar farm is expected to generate up to 20 light vehicle peak hour movements per day (10 inbound in the AM peak and 10 outbound in the PM peak). This additional traffic will constitute approximately three percent of the peak hour traffic volumes on Byrnes Road.

It is considered that this small variation in traffic movement within the road network would have no adverse impact on the road system and/or intersection operation and would be within the typical daily fluctuations in traffic.

5.2 Conclusion

The operational traffic is expected to have a negligible impact on the operation and safety of the adjoining road network.

Based upon a mid-block capacity assessment, it is anticipated that the road network can accommodate the construction vehicle activity (including decommissioning activity) associated with the proposal.

A detailed construction traffic management plan will need to be prepared and approved by Wagga Wagga City Council prior to construction commencing.

Annexes

Annexure A –Trahairs Road Assessment



Memorandum

01 December 2017

To Renew Estate Pty Ltd

Copy to

From Nathan Szymanski

Tel (02) 6923 7432

Subject Trahairs Road Assessment

Job no. 2316243

1 Introduction

1.1 General Background

Renew Estate's commitment to embedding sustainable energy into rural and urban lifestyles has led to the proposed development of a 120 MW solar farm in Bomen, NSW. The proposed solar farm lies east of the Sydney to Melbourne Rail Line, encompassing land parcels north and south of Trahairs Road for a total of 250 hectares in size. The proposed works will require access to Lot 2 DP590756 and Lot 110 DP751405 utilising Trahairs Road for the delivery of construction materials and plant and for future maintenance.

Renew Estate requires an assessment of the capacity of Trahairs Road to safely accommodate expected traffic volumes and manoeuvrability requirements. GHD understands the traffic expectations to be as follows:

- 2,00 semi-trailer vehicle movements delivering 40 ft containers.
- 100 heavy vehicle movements for the delivery/ removal of construction and plant.
- Delivery of an approximately 130 tonne transformer requiring B-Double transportation.
- During peak delivery periods of approximately 30 heavy vehicle movements expected per day, with approximately 4 heavy vehicle movements expected per day during non-peak periods

1.2 Site Inspection

GHD undertook a site visit to Trahairs Road on the 30th Nov 2017. The following issues were identified:

- Multiple trees with low lying branches located in close proximity to the existing edge of road formation, on both the northern and southern sides of Trahairs Road
- Existing width of unsealed section limits vehicles safely passing
- Existing culvert located at access entrance to Lot 11 DP1130549
- Existing table drain running along the entirety of Trahairs Road. A more formal table drain is located on the eastern side of the culvert located at the access entrance to Lot 11 DP1130549 draining to a shallow, informal table drain running west of the culvert



Memorandum

- APA assets have been identified approximately 200 m from the western end of Trahairs Road
- Overhead powerlines identified approximately 250 m from the western end of Trahairs Road
- Existing dam located in Lot 2 DP590756 approximately 300 m from the western end of Trahairs Road
- Vacant power poles for Essential Energy power easement running north to south across Trahairs Road, approximately 1 km from eastern end of Trahairs Road
- Signs of pavement failure on sealed section of Trahairs Road west of the western ROBE carpark entrance

The issues stated above have been highlighted in Figures 003 – 005 in Attachment A to this memorandum.

1.3 Local Authority Consultation

Consultation with representatives from Wagga Wagga City Council (WWCC) has identified an existing development approval with conditions specifically relating to Trahairs Road. The conditions of consent have been provided by WWCC in the approved Development Application DA 16/0135, and require the following adherence prior to release of the Subdivision Certificate:

- Trahairs Road shall be upgraded from the existing end of seal to a point 5 metres east of the western boundary of the proposed Lot 2 in accordance with the minimum standard under table 3.2 – “*Guidelines for Design of Roads – Part 2*”.
- A section 138 approval shall be obtained from Council prior to the works outlined in this condition being undertaken.
- The applicant shall lodge with Council a works bond to 5% value of road works required under this condition. The bond shall be paid prior to work commencing and shall be returned to the applicant at the expiration of the six (6) months into the maintenance period.
- The applicant shall arrange with Council all required work inspections prior to works commencing.

WWCC have provided an AADT data figure on Trahairs Road of 150 (bidirectional) vehicles collected from the most recent traffic count investigations undertaken.

Subsequent to this, GHD made contact with WWCC Development & Subdivisions Engineer Coordinator to discuss the condition. It has been noted that the majority of the traffic associated with the development would be associated with construction related activities, and therefore the upgrade of the road to meet the standards specified is excessive and does not meet good whole of life objectives. WWCC has agreed in principle and will review the development on this basis.



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2 Desktop Investigation

2.1 Service Location

A Dial Before You Dig (DBYD) investigation of Trahairs Road confirmed the presence of assets owned by the following service authority providers:

- Essential Energy (Electricity)
- WWCC (Water)
- APA Group Networks (Gas)
- Telstra (Communications)
- AAPT/ PowerTel (Communications)

Assessment of the DBYD plans provided concludes the relevant service authorities directly affected by any future works related to the unsealed section of Trahairs Road are; Essential Energy, APA Group Networks and Telstra. The DBYD plans for Trahairs Road have been provided in Attachment B of this memorandum.

2.2 Byrnes Road Intersection

Previous developments by Riverina Oils and BioEnergy Pty Ltd resulted in the engagement of GHD to complete detailed designs for the Byrnes Road / Trahairs Road intersection upgrade. This consisted of a Channelised Intersection. The auxiliary lane located on Byrnes Road allowing for a right-hand turn onto Trahairs Road was designed in accordance with Roads and Traffic Authority (RTA) *Roads Design Guide 1999*. The 105 m auxiliary lane length (incl. taper) exceeds the minimum RTA requirements and will not need further upgrades for stacking due to increased traffic.

Aerial investigation of the Byrnes Road intersection has concluded there will be issues with the proposed 13 axle semi-trailer configuration (transformer) turning right onto Trahairs Road. The current intersection condition will require this vehicle to cross the Byrnes Road centreline and correct turning movement as entry is made to Trahairs Road. The overlay of turning requirements has been provided in Figure 001 of Attachment B of this memorandum.

2.3 Delivery Vehicle Requirements

It is proposed that access to Lot 110 DP751405 be made through an existing gate located at its north-eastern boundary corner. The semi-trailer turning needs are unable to be met by the existing gate, and will require an extension on the gate's eastern end. It is deemed appropriate to utilise the existing gate location as an exit point from the Lot back onto Trahairs Road.

Access to Lot 2 DP590756 is to be made through an existing gate entrance located approximately 350 m from the eastern end of Trahairs Road. The existing gate will meet the semi-trailer vehicle turning requirements and is not in need of upgrade. There is currently an existing access road leading north into Lot 2 DP590756 from the gate entrance that will accommodate semi-trailer vehicles. Investigation has concluded that the existing gate entrance will not need to be extended as it currently meets semi-trailer turning requirements. Exit from Lot 2 DP590756 onto Trahairs Road will require the



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establishment of a gate opening at a location that is east of the existing dam located inside the property fenceline.

Further investigation will be needed to confirm suitability of soil foundations in both Lots to accommodate semi-trailer vehicle movement. Vehicle turning requirements for Lot 2 DP590756 and Lot 110 DP751495 calculated in this desktop investigation have been provided in Figure 002 of Attachment A to this memorandum.

3 Issues and Constraints

3.1 Environmental

It has been identified that an environmental conservation area has been established along Trahairs Road. This includes tree plantings along Trahairs Road (east of Byrnes Road) that were planted to meet consent conditions for the Riverina Wool Combing plant.

In discussions between GHD and Council, Council indicated that there should be no removal of native vegetation along Trahairs Road. The minimum formation width of 8 m specified by WWCC in the DA will impact the existing native vegetation.

3.2 Trahairs Road

As part of the desktop and site investigations, the following constraints were identified for Trahairs Road:

- Limitations of vehicles using Trahairs Road east of the currently sealed section to 1 vehicle. This will require a plan of management be put in place for traffic management.
- It is unclear whether the existing pavement of the sealed section of Trahairs Road has been designed for the design vehicles. A condition assessment of all of Trahairs Road will be required before and after construction
- Widening of the road to cater for vehicles passing will have limitations associated with drainage and the property entrance at the western end of the road, as well as vegetation removal

3.3 Byrnes Road

The primary limitation associated with the Byrnes Road intersection is for right turning vehicles into Trahairs Road carrying the transformers. There is a risk that these vehicles will need to cross the centreline of Byrnes Road before entering Trahairs Road. This may require a management plan be put in place during transportation of these items.

4 Recommendations

Noting the above, GHD proposes the following recommendations:



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- For the purpose of construction access to the solar farm site, a single unsealed lane width of four metres for the length of Trahairs Road would provide sufficient access for semi-trailers, with no requirement for vegetation removal.
- Minor grading work is required to a width of four metres to make the unsealed section of the road suitable for use during construction
- A UHF radio protocol would be implemented for vehicles to give way to oncoming vehicles already on the road. Appropriate warning signage would be erected at either end of the unsealed section of road.
- An extension should be made to the existing gate into Lot 110 DP751405. The new gate should have a minimum width of 5m.
- The establishment of a new gate to be used as an exit point for semi-trailer vehicles from Lot 2 DP590756. The gate should be min. 13.5m in length, at an appropriate location east of the base of the existing dam.
- Condition assessment of Trahairs Road to be conducted before and after construction

Regards

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Revision	Author	Reviewer		Approved for Issue		
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