SAMSA CONSULTING
TRANSPORT PLANNING & TRAFFIC ENGINEERING

18th January 2016

CWP Renewables Pty Ltd
Floor 6, 45 Hunter Street
NEWCASTLE NSW 2300

Our Ref: *Sapphire WF modification*
Direct line: 0414 971 956

SAPPHIRE WIND FARM PROJECT MODIFICATION
Update of Traffic & Transport Study

Background

The proposed Sapphire Wind Farm (SWF) is to be located in Northern NSW approximately mid-way between the Glen Innes and Inverell townships and some 100 km north of Armidale. In June 2013, NSW State planning consent was achieved for 159 wind turbines with a capacity of 319 MW.

Subsequent to this project consent, modifications are proposed to the Project as follows:

- Overall reduction in wind turbine numbers from 159 to approximately 109 wind turbines.
- Increase to the maximum tip height from 157 m to 200 m with a rotor diameter increase from 126 m to 140 m.
- Consolidation of two project layouts into one.

CWP Renewables are proposing to amend the SWF Project through submission of a modification to the NSW Department of Planning and Environment (DPE). This modification assessment has been prepared by *Samsa Consulting Pty Ltd*, Transport Planning & Traffic Engineering Consultants, and aims to update the previously prepared traffic and transport study prepared by Bega Duo Designs (BDD Study)[1] for the SWP Project.

Previous Assessment

The previous BDD Study assessment concluded that the impacts during the operational phase of the SWF Project would be minimal provided that all recommended management strategies (outlined in the BDD Study report) to address the traffic impacts of the proposal are adopted. The pertinent transport-related management strategies included:

- Road and bridge improvements to allow for the passage of Project haulage vehicles.
- Upgrades to intersections to permit the turning of steerable trailers.
- Sufficient width of road pavement and trafficable shoulder to remain at most locations to permit an opposing vehicle to park off the road travel lanes.
- Road surfaces to be improved to permit safe passage in all weather conditions.
- Road signposting and guideposts to be upgraded to provide increased guidance for all road users.
- Implementation of a Construction Traffic Management Plan (CTMP) with flexibility to adapt to changing conditions.

1 Bega Duo Designs "*Traffic and Transport Study: Proposed Sapphire Wind Farm*", February 2011

- Regular monitoring of the traffic volumes, travel speeds and accidents.
- Commitment to carry out road repair works at short notice to ensure the continued safety of the access routes during the construction phase.

All of the above transport-related management strategies are still relevant and are proposed to be maintained as part of this modification. There is no intention to seek amendments to any of the previously approved Conditions of Consent, Statement of Commitments and other protocols related to traffic and transport management in the planning modification.

Proposed Modifications

Reduction in Wind Turbines

The modification proposes a significant reduction of wind turbines from 159 to approximately 109 wind turbines. The reduction in wind turbine numbers will result in a considerable decrease in traffic movements. This decrease would be a total decrease over the course of the construction period. Peak traffic movements during peak activity periods and daily traffic generation would remain the same as (or less than) the original proposal.

Increase in Wind Turbine Dimensions

A minor increase in wind turbine component dimensions will mean (potentially) additional tower sections per wind turbine (up to five) and an increased truck-trailer length to accommodate blades up to 68.5 m in length[2]. The previous traffic management strategy to adjust intersections to permit the turning of a steerable trailer carrying blades 63 m long would therefore need to accommodate vehicles carrying blades up to 68.5 m long.

For the original assessment, the transport of tower sections required a total of approximately 650 oversize vehicle loads (four sections per turbine). Even with a potential additional tower section per wind turbine (total of five sections per tower) for the modification, the oversize vehicle delivery would reduce by approximately 100 loads over the course of the construction period due to the decrease in wind turbine numbers.

Project Layout & Access Routes

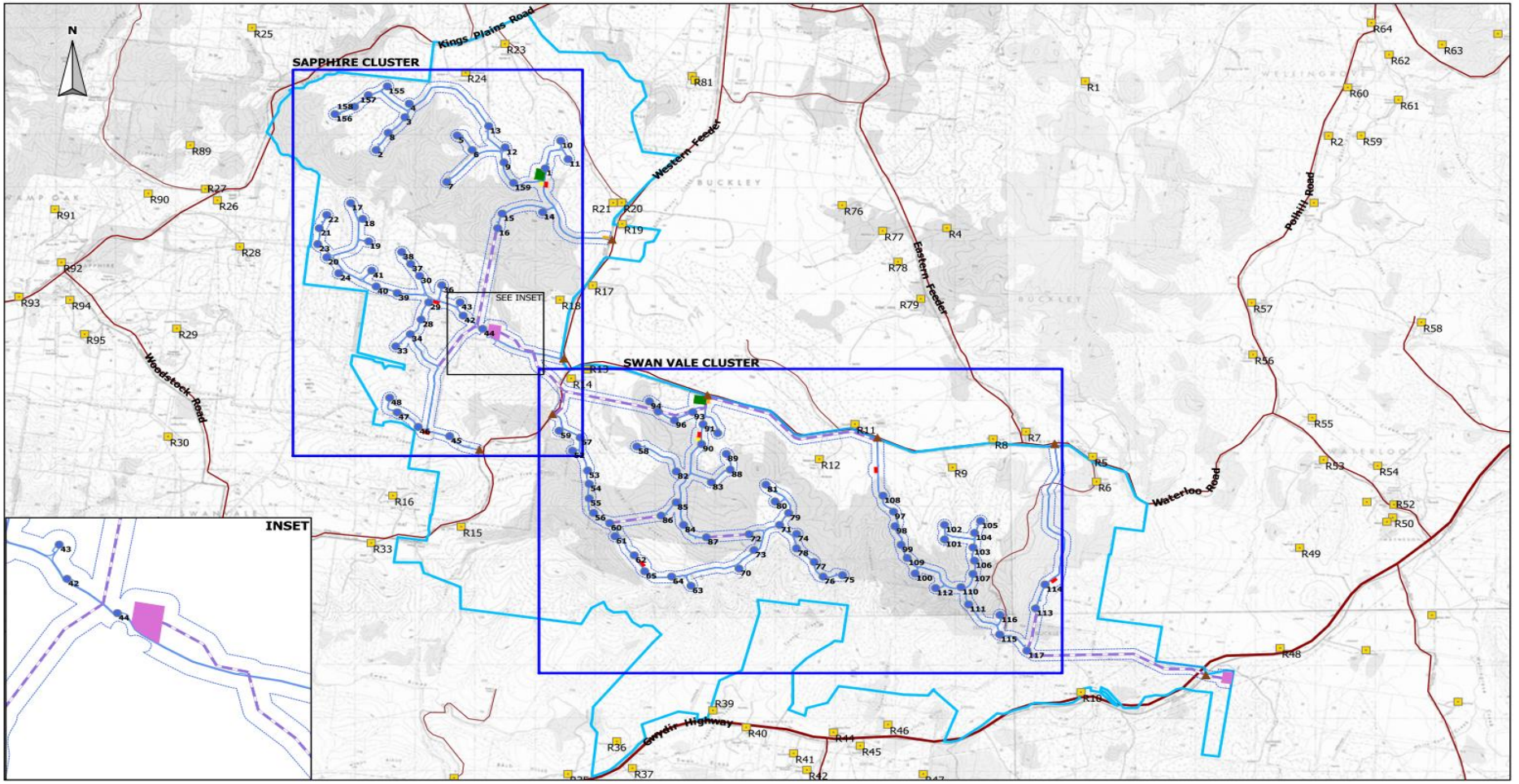
The modified Project layout would likely result in reduced access impacts due to the consolidation of the turbine locations into two clusters as follows (refer to the modified layout figure below):

- Sapphire Cluster consisting of 47 wind turbines.
- Swan Vale Cluster consisting of 62 wind turbines.

The previously assessed access points to the Project site were via Waterloo Road, Western Feeder Road and Polhill Road, making use of the connecting Council and State roads in the vicinity. There is proposed to be minimal change in this regard, although the proposed entry point to the site from Polhill Road will no longer be required. Therefore, the modified Project layout would also consolidate access points off the public road network thus reducing transport-related impacts during the construction period. The consolidated access points are proposed as follows (refer to the modified layout figure below):

- Three (3) off the southern side of Waterloo Road, at its western end.
- Four (4) off the western side of Western Feeder Road, in the vicinity of Waterloo Road.
- One (1) additional access point off the southern side of Gwydir Highway for access to a potential 132 kV substation (if required).

2 Length of individual blade associated with a 140 m rotor diameter wind turbine.

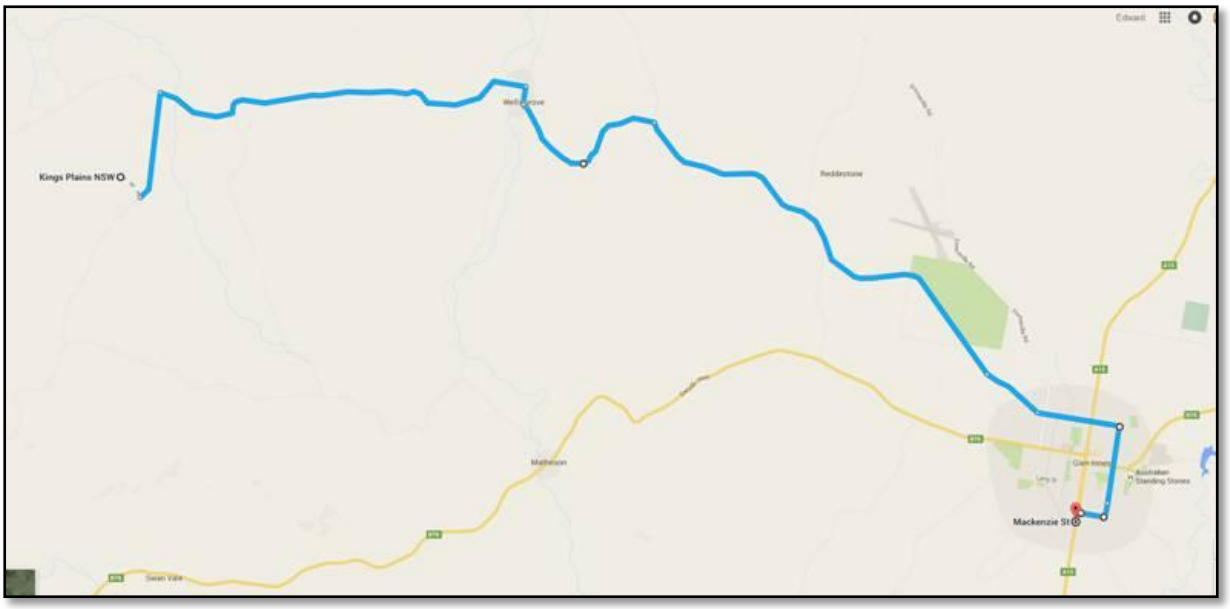


LEGEND							
Turbine (109) Access Tracks Project Access Points Easement Options	**Ancillary Infrastructure Options** Substation Concrete Batching Construction Compound Rock Crusher Site Office	Development Corridor Project Site Building	COMPANY: SAPPHIRE WIND FARM PTY LTD				
SCALE BAR: 0 — 5 km			TITLE: OVERVIEW MAP				
			DATE: 16 DEC 2015	SCALE: 1:64000	DWG NO: SAP-084	REV: A	VER: 1
			DRAWN BY: S ISHERWOOD	CHECKED BY: E MOUNSEY	SHEET: 1 OF 1	JOB NO: 080602	SIZE: A3

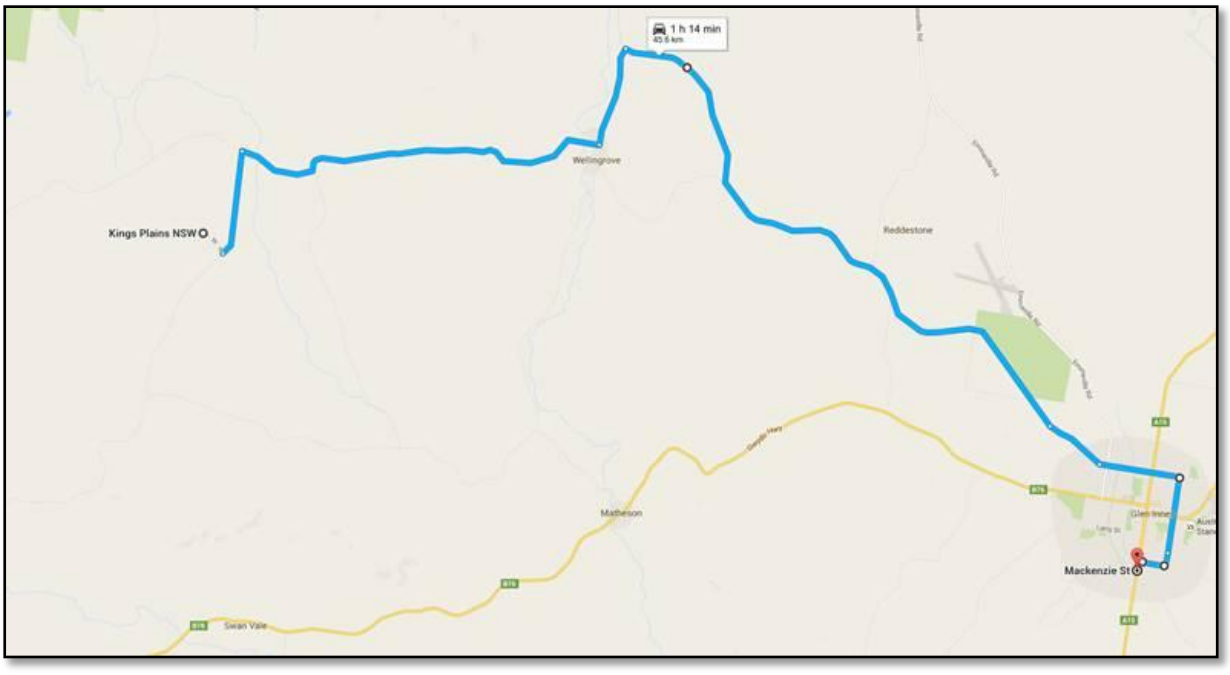
It is likely that the seaport of entry will be Newcastle and therefore, major components and other equipment will travel to Glen Innes via New England Highway. In relation to transport for the White Rock wind farm project (located immediately south of SWF), haulage contractors Rex Andrews have advised a preferred bypass route of the Glen Innes urban centre is via Heron, Hunter, Grafton and Martin Streets. Therefore, the access route from Newcastle to the north-western side of Glen Innes is proposed via Selwyn Street, George Street, Industrial Drive, Maitland Road, New England Highway, John Renshaw Drive, Hunter Expressway, New England Highway, Heron Street, Hunter Street, Grafton Street and Martin Street.

From Martin Street, there are two (2) route options to the Project access points off Western Feeder Road; either via Strathbogie Road, Wellingrove Road, Polhill Road and Kings Plains Road (refer to *Route Option 1* below) or via Strathbogie Road, Polhill Road and Kings Plains Road (refer to *Route Option 2* below).

Route Option 1

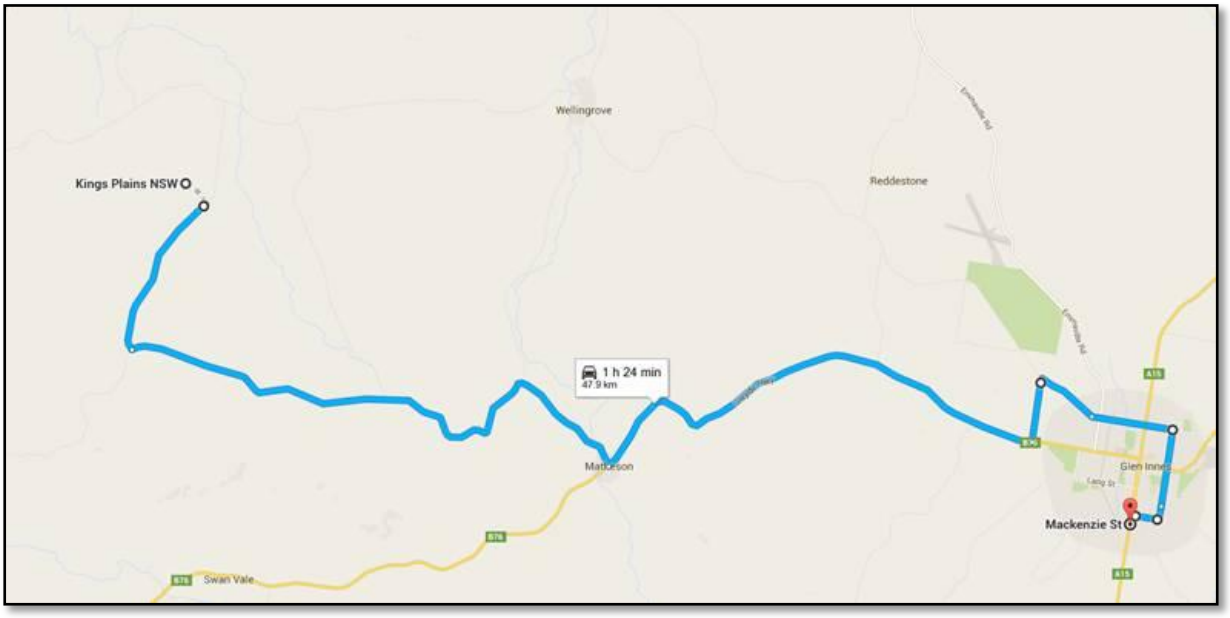


Route Option 2



For access from Martin Street to Waterloo Road and Gwydir Highway, the route proposed would travel via Tuttles Lane to Gwydir Highway and continue west (refer to *Route Option 3* below).

Route Option 3



Modification Assessment

Reduction in Wind Turbines

The proposed reduction in wind turbine numbers will result in a considerable decrease in traffic movements over the course of the construction period. Peak traffic movements during peak activity periods and daily traffic generation would remain the same as (or less than) the original proposal.

Increase in Wind Turbine Dimensions

An increased truck-trailer length carrying loads of up to 68.5 m long would be required to accommodate the proposed longer blades. The previous traffic management strategy to adjust intersections to permit the turning of a steerable trailer carrying blades 63 m long needs to accommodate vehicles carrying blades up to 68.5 m long.

Mitigation measures proposed in the previous (original) assessment (refer to *Section 5.5* of the BDD Study report) would be applicable and a preliminary desktop review indicates that the routes described above are feasible and that significant constraints should not be encountered.

Road furniture relocation and other required intersection amendments have already been approved at a number of locations and these would need to be confirmed and/or amended in detail by the designated haulage contractor, in addition to any other locations along the approved transport route. Component weights (loads) will remain essentially the same as per the existing approval and thus, any load issues on existing bridges and other structures would remain similar.

For the transport of tower sections, oversize vehicle delivery would reduce by approximately 100 loads over the course of the construction period due to the decrease in wind turbine numbers, even though there may potentially be an additional tower section per wind turbine (total of five sections per tower) for the modification. This would reduce traffic movement impacts over the course of the construction period.

Transport Access Routes

The modified Project layout would consolidate access points off the public road network by removing the need for an entry point to the site from Polhill Road, thus reducing transport-related impacts during the construction period. The previously assessed access points to the Project site via Waterloo Road and Western Feeder Road make use of the connecting Council and State roads in the vicinity.

Consultation with Councils

Prior to consolidating the SWF Project modification, the Proponent both met with and wrote to Glen Innes Severn Council and Inverell Shire Council in the period from November 2015 to January 2016 to advise of the Project modifications. Both Councils were advised that there would be no intention to seek amendments to the current Conditions of Consent or Statement of Commitments with respect to traffic and transport related controls in the modification. No concerns were raised by the Councils, and in-principle support was provided in regard to the road route clarifications.

Conclusions

With respect to potential amended traffic and transport impacts for the proposed modified Project, it is noted that there is significant spare capacity on the major and minor road networks that would serve the Project during construction and operation. Therefore, there would not be a capacity issue with respect to material deliveries, staff travel and transportation of wind turbine components. Indeed, with the reduced number of turbines proposed, the impacts on traffic operations and road safety would generally reduce in line with the reduction of wind turbine numbers.

For the transportation of the over-length blade components, there would need to be confirmation by the designated haulage contractor of the road network adequacy for slightly wider swept paths, due to the proposed longer blades. It is considered that the proposed transport access routes are feasible and that significant constraints should not be encountered.

The transport-related management strategies proposed in the previous (original) assessment (refer to BDD Study report) are relevant and are proposed to be maintained as part of this modification. There is no intention to seek amendments to any of the previously approved Conditions of Consent, Statement of Commitments and other protocols related to traffic and transport management in this planning modification.

It is considered that traffic and transport impacts would not be any greater than the previous (original) Project assessment and that over-size component and equipment transportation is considered to be feasible and relatively straight-forward.

If you have any queries with respect to the above, please do not hesitate to contact the undersigned.

Yours faithfully,

ALAN SAMSA
Member Institute of Engineers Australia (MIEAust)
Chartered Professional Engineer (IEAust): NPER (1151361)
RMS Accredited Road Safety Auditor: Level 3 Lead Auditor (Auditor ID: RSA-02-0056)
Fellow, Australian Institute of Traffic Planning & Management (FAITPM)
Certified Transport Planner (CTP)
Member Institute of Transportation Engineers (ITE)

GLEN INNES SEVERN COUNCIL

Our Ref: MBD
Contact: Mr Malcolm Donnelly

20 January 2016

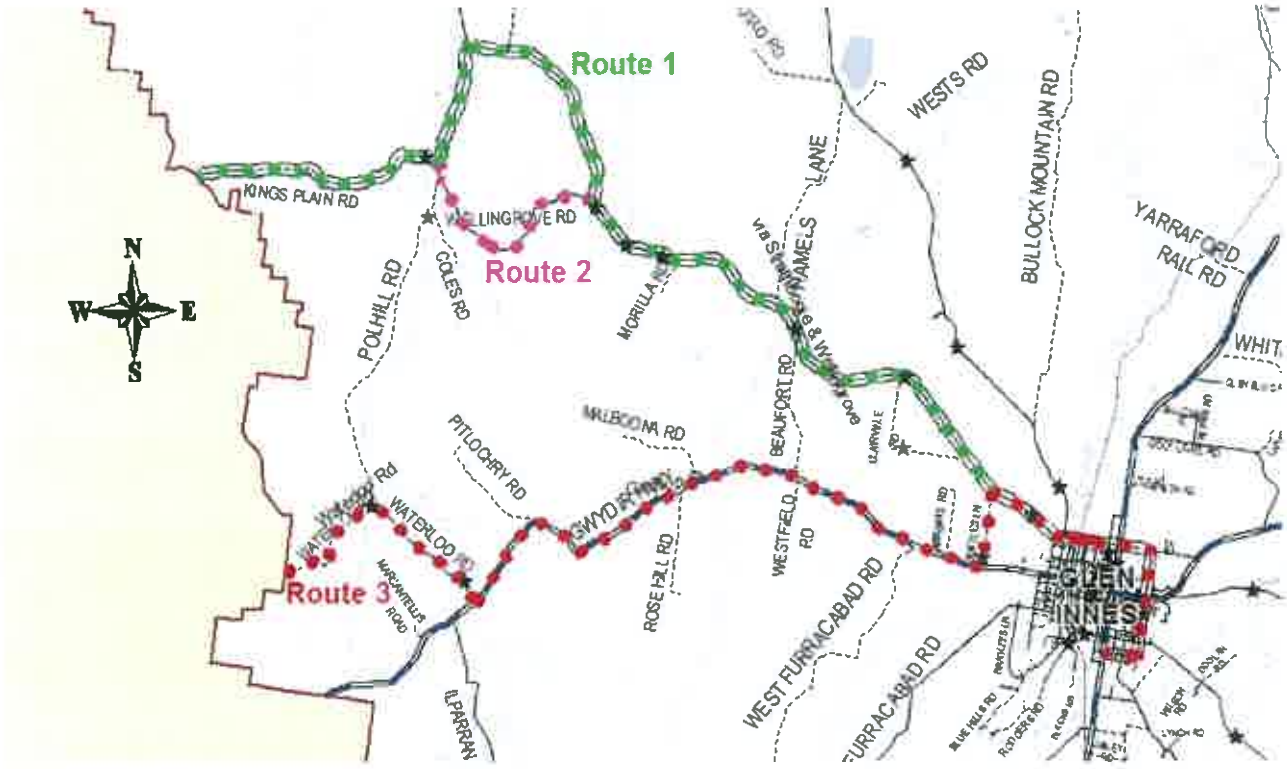
Mr Edward Mounsey
Chief Operating Officer
CWP Renewables Pty Ltd
PO Box 1708
NEWCASTLE NSW 2300

Dear Edward,

Re: PROPOSED PLANNING MODIFICATION, SAPPHIRE WIND FARM

Council understand that CWP Renewables are seeking to modify the Sapphire Wind Farm development approval, to decrease the number and increase the size of wind turbine components, resulting in reduced construction traffic movements and an increase in the truck-trailer length from 63 metres up to 70 metres.

Council note that three proposed routes would be considered within the Glen Innes Severn local government area to access the site as shown in the diagram below:



Kindly address all correspondence to: The General Manager PO Box 61 Glen Innes NSW 2370
Town Hall Office - 265 Grey St Glen Innes NSW 2370
Phone: (02) 6730 2300 Fax: (02) 6732 3764
Email: council@gisc.nsw.gov.au
Website: www.gisc.nsw.gov.au
ABN: 81 365 002 718

GLEN INNES

Council offer in-principle approval for over-mass and over-dimension travel on local roads for any one of the three identified routes. It is important to note however that there are likely to be geometric and structural constraints requiring localised upgrades to permit the haulage operation, and conditions may be placed on any over-mass or over-dimensional travel. A detailed route assessment would be required to select and scope any necessary upgrades to the preferred transport route.

Constraints which may impact all routes include the vertical and horizontal road alignments, school bus traffic, intersection geometry, cross-falls, traction, gradient and clearances to roadside furniture and trees. Additional constraints along the identified routes may include:

Route	Possible Constraints
1 & 2 (via Strathbogie Road)	Seven (7) concrete/steel bridges, with the narrowest having a kerb to kerb width of 5.0 metres.
3 (via Tuttles Lane and Waterloo Road)	Three (3) concrete/steel bridges, and one (1) timber bridge, with the narrowest having a kerb to kerb width of 3.7 metres.

Council are satisfied that existing consent conditions and commitments, including those detailed below, will address the impacts associated with the modification.

- condition E17 requiring a Road Dilapidation Report and restoration of any damage;
- condition E22 requiring a Construction Traffic and Access Management Plan;
- commitment 030, engaging a suitably licensed and experienced haulage contractor;
- commitment 031, development of a Traffic Management Plan;
- commitment 032, implementation of the Traffic Management Plan;
- commitment 033, preparing road dilapidation reports and arranging repairs or other agreed compensation;
- commitment 034, consider establishing a transport pool to minimise traffic volumes;
- commitment 036, prepare a Traffic Management Plan at time of decommissioning;
- commitment 110, quarterly inspection of public roads and reporting deterioration.

Kindly direct any further enquiry about this matter to the under-signed on direct phone 02 6730 2362.

Yours sincerely

Malcolm Donnelly
Manager of Technical Services

Ed Mounsey

From: Christopher J. Faley [Christopher.Faley@inverell.nsw.gov.au]
Sent: Tuesday, 15 December 2015 2:12 PM
To: Ed Mounsey
Subject: FW: SWF / Transport routes

Hi Ed

Refer comments below from Council's Manager Civil Engineering Justin Pay.

Regards

Chris Faley
Development Planner I **Civil and Environmental Services**

Inverell Shire Council PO Box 138 Inverell NSW 2360
Tel 02 6728 8251 | Fax 02 6728 8277 I **chris.faley@inverell.nsw.gov.au**

From: Justin T. Pay
Sent: Tuesday, 15 December 2015 8:46 AM
To: Christopher J. Faley
Subject: RE: SWF / Transport routes

Hi Chris,

I have no object to in-principle support provided that the below conditions of consent are applied . A considerable amount of our road network will be impacted and each road would need to be assessed to determine if the proposed 63m-70m truck lengths are acceptable. I do not have resources to undertake this assessment and feel that it should be the responsibility of the proponent.

Regards,

Justin Pay

Manager Civil Engineering I **Civil and Environmental Services**

Inverell Shire Council PO Box 138 Inverell NSW 2360
Tel 02 6728 8205 | Fax 02 6728 8277 I **Justin.Pay@inverell.nsw.gov.au**

From: Christopher J. Faley
Sent: Wednesday, 9 December 2015 1:48 PM
To: Justin T. Pay
Subject: FW: SWF / Transport routes

Chris Faley
Development Planner I **Civil and Environmental Services**

Inverell Shire Council PO Box 138 Inverell NSW 2360
Tel 02 6728 8251 | Fax 02 6728 8277 I **chris.faley@inverell.nsw.gov.au**

From: Anthony C. Alliston
Sent: Wednesday, 9 December 2015 1:46 PM
To: Christopher J. Faley
Subject: FW: SWF / Transport routes

Anthony Alliston
Manager Development Services I **Civil and Environmental Services**

Inverell Shire Council PO Box 138 Inverell NSW 2360
Tel 02 6728 8200 | Mob 0425 271 633 I **anthony.alliston@inverell.nsw.gov.au**

From: Ed Mounsey [mailto:ed.mounsey@cwprenewables.com.au]
Sent: Wednesday, 9 December 2015 12:15 PM
To: mdonnelly@gisc.nsw.gov.au; Anthony C. Alliston
Cc: Alan Samsa
Subject: RE: SWF / Transport routes

Hi Anthony and Malcolm,

To assist with our request I have included below conditions of consent and Statement of Commitments which relate to Traffic and Transport management. There is no intention to seek amendments to these conditions and protocols in the planning modification.

CONDITIONS OF CONSENT
Road Dilapidation
E17 Unless otherwise agreed by the Director-General, the Proponent shall commission an independent, qualified person or team to undertake the following in consultation with the relevant road authority:

(a) prior to the commencement of construction, review the proposed route and existing access provisions to the Wind Farm Site to determine whether the route and existing provisions allow for safe access of construction and operational vehicles associated with the project (including appropriate site distances and provisions for over-mass or over-dimensional transport and safety with other road users). Where improvements, temporary upgrades or changes to the proposed route are required as a result of the project, the Proponent shall implement these in consultation with the relevant road authority, prior to the commencement of construction and at the full expense of the Proponent; and

(b) assess all roads proposed to be used for over-mass and/ or over-dimensional transport (including intersections, bridges, culverts and other road features) prior to the commencement of construction to determine whether the existing road condition can accommodate the proposed over-mass and/ or over-dimensional haulage. Where improvements or temporary upgrades are required as a result of the project, the Proponent shall implement these in consultation with the relevant road authority, prior to the commencement of construction and at the full expense of the Proponent.

Upon determining the haulage route(s) for construction vehicles associated with the project, and prior to construction, an independent and qualified person or team shall undertake a Road Dilapidation Report. The report shall assess the current condition of the road(s) and describe mechanisms to restore any damage that may result due to traffic and transport related to the construction of the project. The Report shall be submitted to the relevant road authority for review prior to the commencement of haulage.

Following completion of construction, a subsequent report shall be prepared to assess any damage that may have resulted from the construction of the project.

Measures undertaken to restore or reinstate roads damaged by the project shall be undertaken in a timely manner, in accordance with the reasonable requirements of the relevant road authority, and at the full expense of the Proponent.

Construction Traffic and Access Management Plan

E22

(c) a **Construction Traffic and Access Management Plan** to manage construction traffic and access impacts of the project. The plan shall be developed in consultation with the relevant road authority and shall include, but not necessarily be limited:

(i) identification of construction traffic routes and construction traffic volumes (including heavy vehicle/ spoil haulage) on these routes;

(ii) details of vehicle movements for construction sites and site compounds including parking, dedicated vehicle turning areas, and ingress and egress points;

(iii) identification of construction impacts that could result in disruption of traffic, public transport, pedestrian and cycle access, property access, including details of oversize load movements;

(iv) details of management measures to minimise traffic impacts, including temporary road work traffic control measures, onsite vehicle queuing and parking areas and management measures to minimise peak time congestion and measures to ensure safe pedestrian and cycle access;

(v) a response plan which sets out a proposed response to any traffic, construction or other incident; and

(vi) mechanisms for the monitoring, review and amendment of this plan.

STATEMENT OF COMMITMENTS

Traffic and Transport				
030	Safety and asset protection	Minimise risk	Contract a licensed haulage contractor with experience in transporting heavy and over-size loads, to be responsible for obtaining all required approvals and permits from the RTA and Councils and for complying with any conditions specified in the aforementioned approvals.	Proponent consultatio RTA and co
031	Safety and asset protection	Minimise risk	Development of a **Traffic Management Plan**, to include, but not be limited to: • Scheduling of deliveries, timing of transport, limiting the number of trips per day; • Undertaking community consultation before and during all haulage activities and providing a dedicated telephone contacts list to enable any issues to be rapidly identified and addressed; • Managing the haulage process, including the erection of warning signs and/or advisory speed signs posting in advance of isolated curves, crests, narrow bridges and changes of road conditions; • Placing of speed limits on all roads that would be used primarily by construction traffic to reduce the likelihood of any accidents and reduce maintenance costs; • Designing and implementing temporary modifications to intersections and roadside furniture as appropriate; • Producing a Transport Code of Conduct which would be made available to all contractors and staff detailing traffic routes, behavioural requirements and speed limits; • Establishing procedures to monitor traffic impacts on public and internal access tracks during construction, including noise, dust nuisance and travel times, and to implement modified work methods to reduce such impacts where possible; • Reinstating pre-existing conditions after temporary modifications to the roads and pavements along the route, where applicable, in consultation with relevant authorities; and	Proponent consultatio licensed contractor road autho

			• Where reconstruction or provision of a temporary crossing is required over a creek or drainage structure, the design of this structure will be discussed with the relevant authority.	
032	Safety and asset protection	Minimise risk	Implement all aspects of the **Traffic Management Plan** in co-ordination with the Councils, RTA and property managers.	Proponent consultatio licensed contractor road autho
033	Safety and asset protection	Minimise risk	Prepare road dilapidation reports covering pavement and drainage structures, in consultation with the Councils, for all of the routes before and after construction. Any damage resulting from construction traffic, except that resulting from normal wear and tear, would be repaired at the Proponent's cost. Alternatively, the Proponent may negotiate other forms of compensation for road damage with the relevant roads authorities as appropriate.	Proponent consultatio council an authorities
034	Safety and asset protection	Minimise risk	Consideration for establishing a transport pool for employees from nearby towns to minimise traffic volumes.	Proponent
035	Safety and asset protection	Minimise risk	Establish a procedure to ensure the ongoing maintenance of the Project site internal access roads during the operation phase. This maintenance would include sedimentation and erosion control structures, where necessary.	Proponent
036	Safety and asset protection	Minimise risk	Prepare and implement a revised **Traffic Management Plan** reflecting change in traffic volumes, during time of decommissioning.	Proponent consultatio council an authorities
110	Safety and asset protection	Minimise risk	The Proponent is prepared to commit to quarterly inspections of public roads during the construction period, together with a process of reporting by construction workers of any areas of deterioration within each quarterly window.	Proponent consultatio council

Ed

From: Ed Mounsey
Sent: Wednesday, 2 December 2015 10:46 PM
To: 'mdonnelly@gisc.nsw.gov.au'; 'Anthony C. Alliston'
Cc: 'Alan Samsa'
Subject: SWF / Transport routes

Hi Malcolm and Anthony,

CWP Renewables are looking to modify the Sapphire WF approval through the Department of Planning and Environment (DPE). The modification will generally deal with a reduction in wind turbines and an increase in dimensions of wind turbine components. The reduction in number will result in a considerable decrease in traffic movement during construction however the increase in dimensions will mean (potentially) additional tower sections per wind turbine (up to five) and an increased truck-trailer length from 63m up to 70m.

Having worked with the DPE closely on other projects recently, they are keen to ensure Council is appraised of the proposed amendments and if required capture a schedule of likely upgrade works that may be needed along the proposed haulage routes through each of your respective Council regions.

At this stage it is likely that the Port of Entry will be Newcastle, and therefore equipment will travel to Glen Innes via the New England Hwy and onto the project.

Current entry points to the project are via the Waterloo, Western Feeder and Polhill roads, making use of the connecting Council and State roads in the vicinity. Little will change in this regard however the proposed entry to the site from Polhill Road will no longer be required.

Haulage contractors Rex Andrews have advised (in relation to their dealing with Goldwind re: the White Rock WF project) they would look to navigate through Glen Innes via Heron, Hunter, Grafton and Martin streets. SWF would look to utilise the same route, with options to progress to the site either via Wellingrove along Strathbogie Road and/or Wellingrove Road and Polhill Road, or via Tuttles Lane, Gwydir Hwy and Waterloo Road. From Wellingrove, the route would continue west along Kings Plains Road to the Eastern or Western Feeder Roads and on to the Waterloo Road (example route images below).

To assist our dealings with the DPE, it would be welcomed if Council could provide correspondence to indicate in-principle approval of the preliminary routes described above.

Many thanks in advance, and please call me should you require further information at this stage.

Kind regards,

Ed Mounsey
CWP Renewables
02 4013 4640 | 0428 998 311
45 Hunter St. Newcastle NSW

Image 1 – Route from New England Hwy, Heron Street, Hunter Street, Grafton Street, Martin Street, Strathbogie Road, Wellingrove Road, Polhill Road, Kings Plains Road to Western Feeder
Road.

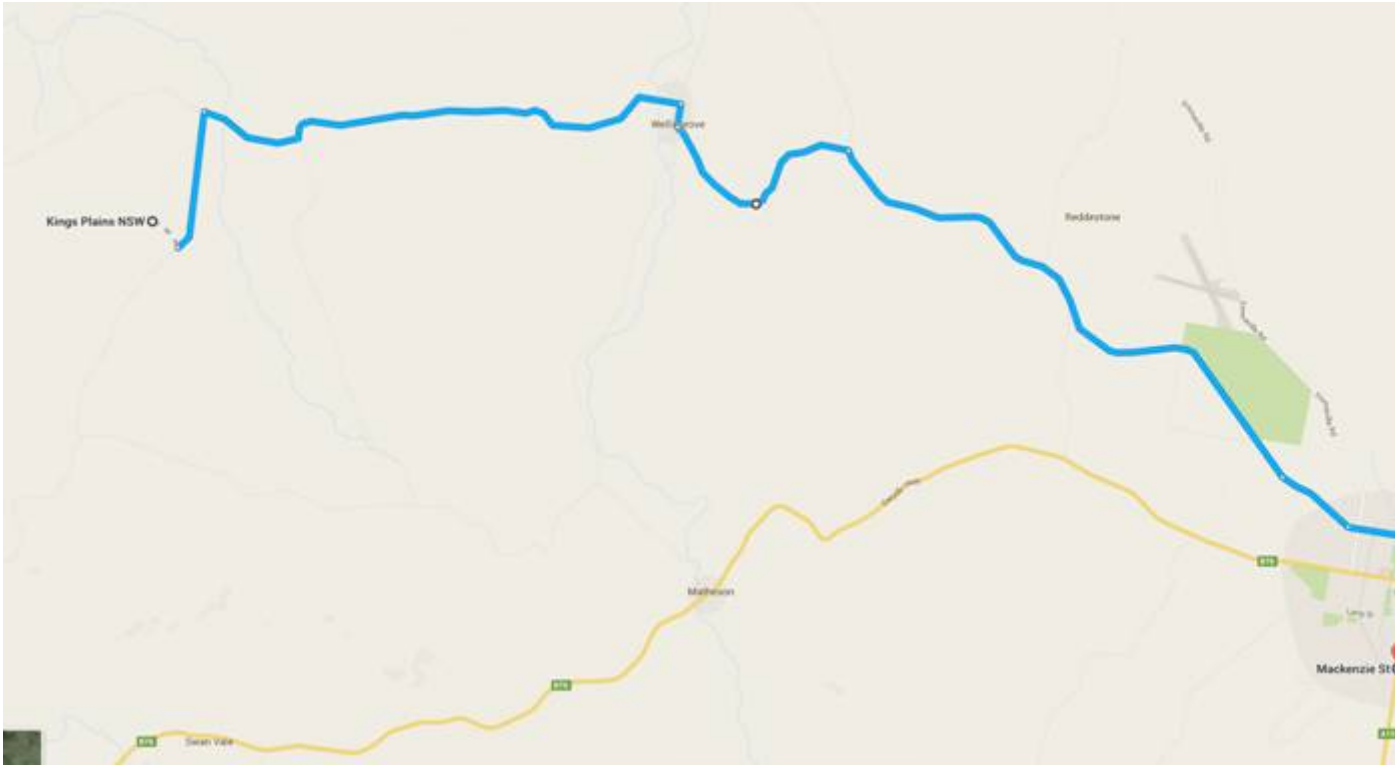


Image 2 – Route from New England Hwy, Heron Street, Hunter Street, Grafton Street, Martin Street, Strathbogie Road, Polhill Road, Kings Plains Road to Western Feeder Road.

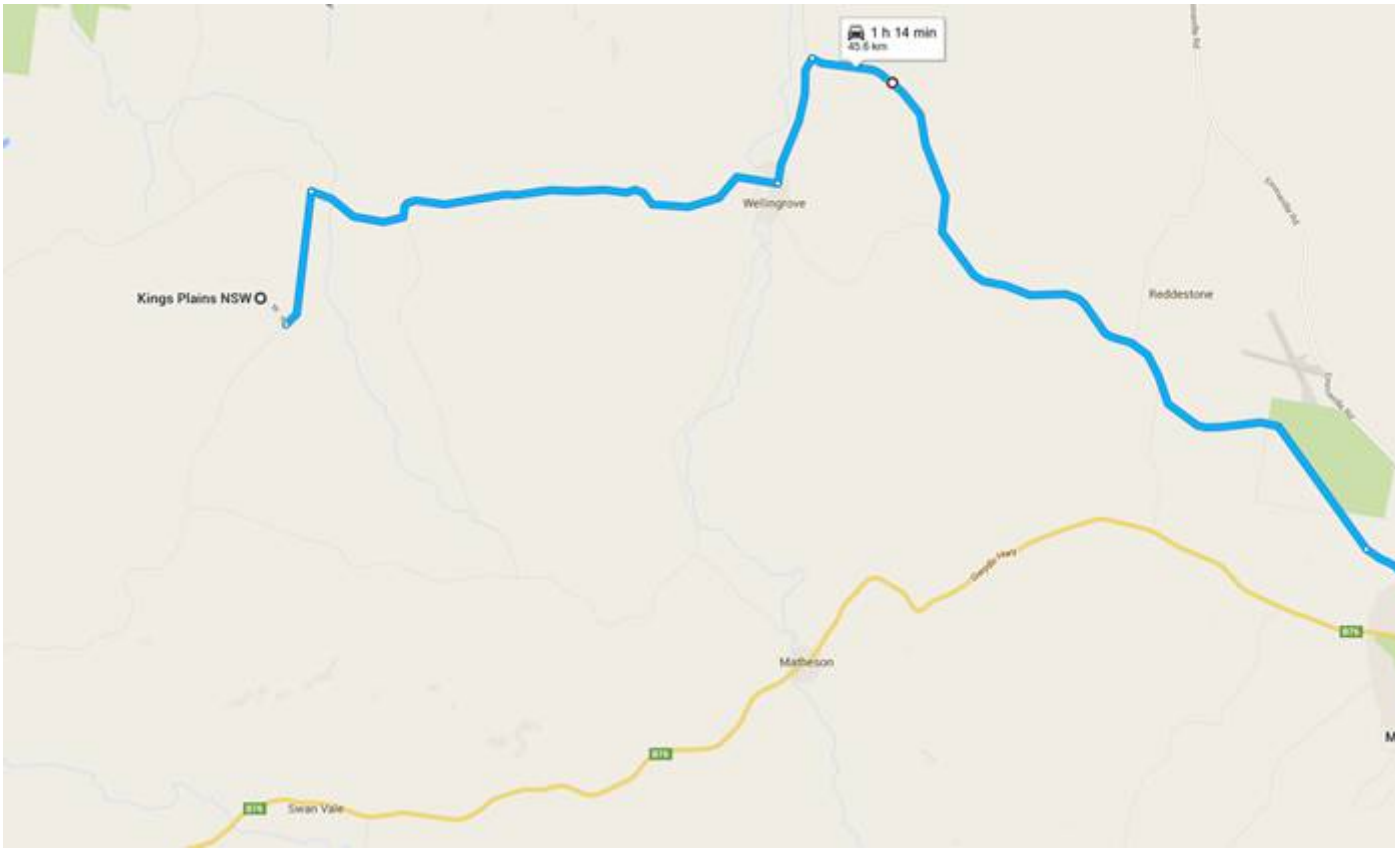


Image 3 – Route from New England Hwy, Heron Street, Hunter Street, Grafton Street, Martin Street, Tuttles Lane, Gwydir Hwy, Waterloo Road to Western Feeder Road.