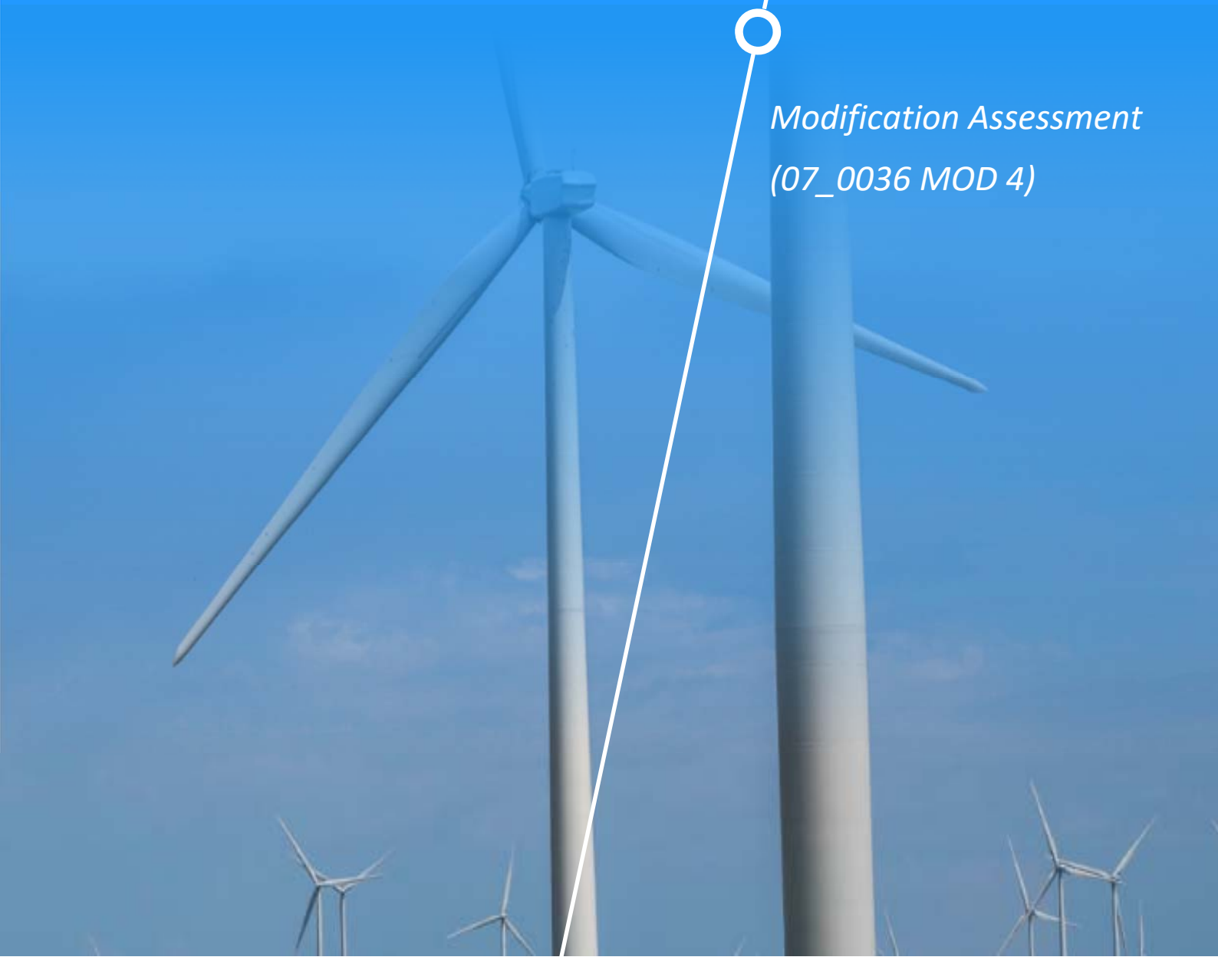
Glen Innes Wind Farm

Modification Assessment

(07_0036 MOD 4)



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Executive Summary

Glen Innes Windpower Pty Ltd, a fully owned subsidiary of Nexif Energy (Nexif), is proposing to modify its approval for the Glen Innes Wind Farm (the project), an approved wind farm located near Glen Innes in the New England region of NSW.

Project Background

The project was approved by the Land and Environment Court in 2010 and has since undergone three modifications, including approval to increase its turbine dimensions. As currently approved, the project includes the construction and operation of up to 25 wind turbines up to 150 m in height, and associated infrastructure.

Proposed Modification

Nexif is proposing to further increase the maximum dimensions of the turbines including the blade tip height (from 150 to 180 metres) and rotor diameter (from 122 m to 140 m) and other minor turbine and ancillary infrastructure design refinements. The modification does not involve any changes to the locations of turbines (subject to micro-siting limits) or number of turbines.

Nexif's primary justification for the proposed modification is that the proposed changes reflect improvements in turbine technology, in which larger turbines with longer turbine blades achieve increased generation capacity with lower production costs.

Strategic Context

In assessing the impacts of the proposed modification, it is important to consider key performance objectives identified in the *Visual Assessment Bulletin* (the Bulletin), which was released in December 2016 as part of the *NSW Wind Energy Framework* (the Framework). The Bulletin outlines several performance objectives that are relevant for the assessment of Nexif's proposal, including visual magnitude, cumulative impacts, aviation hazard lighting and shadow flicker.

While neither the Framework nor the Bulletin were in effect at the time of the approval of the project or the subsequent modifications, the current modification must be assessed against both the Framework and the Bulletin.

Engagement

The Department publicly exhibited the application and its Environmental Assessment from 8 August 2017 until 31 August 2017. The Department received 53 submissions during exhibition, including advice from 10 Government agencies, 5 submissions from special interest groups, and 38 submissions from members of the public. All the public submissions and 4 of the 5 special interest group submissions objected to the proposed modification.

Approximately one third of the objections were from landowners or special interest groups located within 5 km of the project site, and the overwhelming concern raised was visual impacts.

During the assessment process, the Department visited the site and surrounds on several occasions, held a community information session, and consulted with local residents, community groups, Glen Innes Severn Council and other Government agencies.

Following the end of the public exhibition period, subsequent site visits and preliminary advice from its independent visual expert, the Department advised Nexif it had significant concerns about visual impacts associated with the larger turbines, and that visual impact mitigation was required for affected residences.

Due to the existing topography and constrained layout of the project, the most appropriate mitigation measure available to Nexif involves securing landowner agreements with affected residences.

While Nexif submitted its Response to Submissions to the Department in June 2018, approximately 10 months after the end of the exhibition period, no agreements with affected residences have been reached.

Assessment

In assessing the merits of the modification application, and particularly the potential impacts on the local community, the Department carefully considered the potential visual impacts of the proposal. The Department's assessment is focused on the incremental change between the approved and modified turbines, and does not include a re-assessment of the impacts that have previously been assessed and approved by the Department, and the potential impacts on non-associated residences with views of the modified turbines.

Following consideration of the advice provided by the Department's independent visual expert and a detailed assessment in accordance with the Bulletin, the Department has concluded that the proposed changes to the project would materially increase the visual magnitude impacts and further exacerbate cumulative impacts on a large number of non-associated residences.

Furthermore, the Department considers that the aviation hazard lighting required for the higher turbines has the potential to further contribute to the significant visual impacts experienced at surrounding residences.

Consequently, in the absence of landowner agreements with any of the highly impacted residences, the Department considers that the modification would fail to meet a number of the Bulletin's key visual performance objectives, resulting in unacceptable levels of visual impact.

Evaluation

The Department notes that since its original approval, the project has already received approval for a turbine dimension increase and over 9 years to commence construction. In this time, the community has experienced significant uncertainty and angst.

While the proposed modification would allow additional renewable energy generation of 22.5 MW, the Department does not consider that this benefit justifies the significant increase in visual impacts on the local community.

Nexif has stated the modification is essential to the viability of the project. However, the Department notes the generation capacity and turbine dimensions of the approved project are comparable to a number of approved wind farms already constructed or currently under construction across NSW, including Stage 1 of the neighbouring White Rock Wind Farm.

The Department considers that while the NSW Government remains strongly in favour of the development of renewable energy projects in NSW, these projects should be subject to detailed assessment in accordance with the current policy framework and be designed to avoid or minimise significant adverse impacts on the surrounding community.

In this case, the Department considers that the larger turbines would result in unacceptable visual impacts on the landscape and residences in the local area, and that the environmental impacts of the proposed modification outweigh the relatively modest additional benefits (when compared to the project as approved).

Consequently, the Department considers that on balance the proposed modification is not in the public interest, and should not be approved.

Contents

1. Introduction

Glen Innes Windpower Pty Ltd, a wholly owned subsidiary of Nexif Energy (Nexif), has approval to construct and operate the Glen Innes wind farm (the project). The project is located approximately 12 kilometres (km) west of Glen Innes, within the Glen Innes Severn local government area (see **Figure 1**).

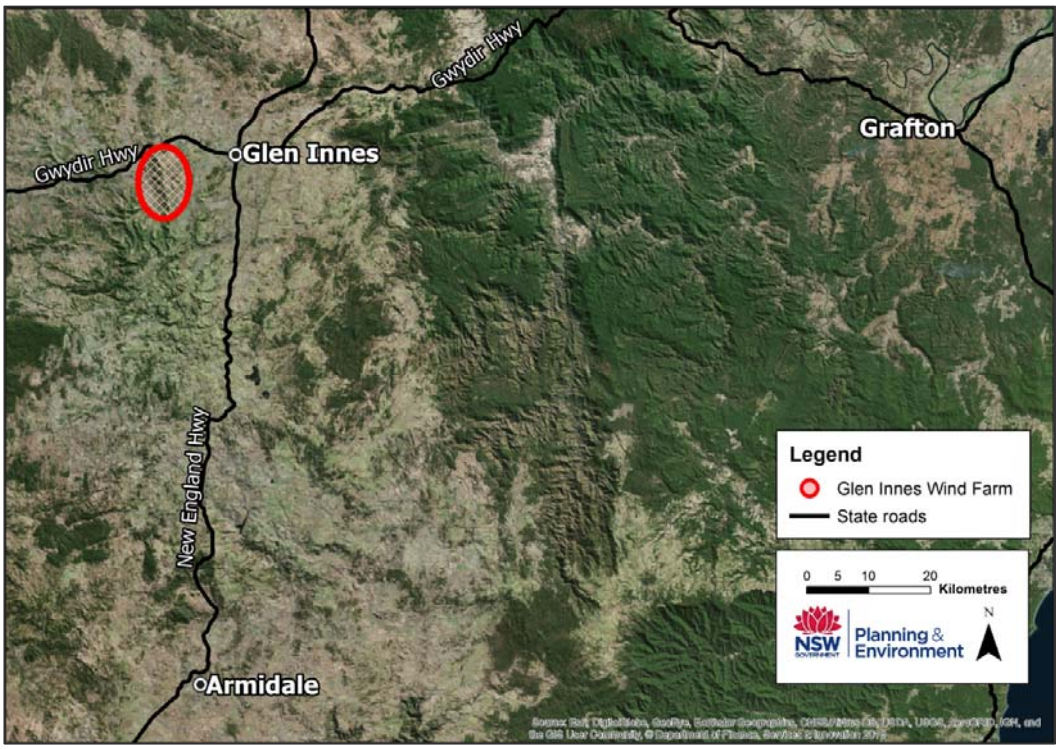

Figure 1 | Regional Context Map

The project was originally approved by the Minister of Planning on 2 October 2009. The Minister's determination was later challenged in the NSW Land and Environment Court but approval was ultimately granted by the Court on 18 August 2010, subject to revised conditions, including the removal of one turbine.

The project has since undergone three modifications. The first modification (Modification 1) was approved in 2013 and involved an extension to the project lapse date. Modification 2 involved an increase in the maximum blade tip height from 130 m to 150 m. Modification 3 involved a further 12-month extension to the project lapse date. Modification 2 and 3 were assessed together and were approved in 2016.

The project as currently approved allows for construction and operation of up to 25 turbines (with a maximum tip height of 150 m and blade length of 60 m) and ancillary infrastructure including project substation, internal access tracks and transmission cabling.

Nexif has advised that it had physically commenced the project by undertaking geotechnical works on the site, prior to the 31 January 2017 lapse date.

2. Proposed Modification

The proposed modification for the Glen Innes Wind Farm includes:

- increasing the approved turbine dimensions, including:
  - increased tip height (from 150 m to 180 m);
  - increased hub height (from 89 m to 110 m);
  - increased blade length (from 60 m to 68.5 m); and
  - increased rotor diameter (from 122 m to 140 m);
- minor relocation of turbines and ancillary infrastructure; and
- increasing the width of internal access tracks from 8 m to 12 m, resulting in a 4.9 ha increase in the project's disturbance footprint.

A comparison of the approved project (original project and Modification 2) and proposed turbine dimensions is provided in **Table 1** below.

Table 1 | Approved and proposed turbine specifications

Component	Originally approved turbines	Currently approved turbines (Modification 2)	Modified turbines	Change from current approval
Number of turbines	25	25	25	No change
Maximum blade tip height	130 m	150 m	180 m	20%
Minimum blade tip height	30 m	28 m	41.5 m	43%
Hub height	80 m	89 m	110 m	24%
Rotor diameter	100 m	122 m	140 m	15%
Blade length	50 m	60 m	68.5 m	14%
Swept area per turbine	7,854 m^2	11,690 m^2	15,394 m^2	32%
Max tip speed	94 m/s	78 m/s	70 m/s	-10%
Nominal power per turbine	up to 3 MW	2.7 MW	3.6 MW	33%
Total generation capacity	up to 75 MW	67.5 MW	90 MW	33%

The modification is described in detail in the Environmental Assessment (EA) that was submitted in support of the modification application (see **Appendix B**).

Nexif's primary justification for the modification is the opportunity for the project to adopt contemporary advancements in turbine technology, which would achieve a 33% increase in generation capacity and lower production costs. Other changes proposed, including turbine and ancillary infrastructure relocation, and increasing the width of internal access tracks, are largely a consequence of detailed project design and to accommodate the larger turbine dimensions proposed.

3. Strategic Context

3.1 Energy Context

A number of recent State and Commonwealth Government initiatives, including the *Renewable Energy Target*, *NSW Climate Change Policy Framework* and *Renewable Energy Action Plan* set targets and objectives for reducing greenhouse gas emissions and promoting the development of renewable energy. Consequently, the development of renewable energy sources, like wind and solar farms, is experiencing rapid growth throughout NSW.

The project is located within the New England Energy Zone in the Northern Tablelands region of northern NSW. This zone currently comprises a number of large-scale renewable energy projects, including wind and solar farms (see **Figure 2** below).

The White Rock Wind Farm and Sapphire Wind Farm are both located in close proximity to the project (5 km and 10 km respectively) and are important considerations when assessing the cumulative impacts for the proposed modification.

While turbine dimensions, topography and number of residences surrounding these projects could be considered comparable to the Glen Innes Wind Farm as proposed, the Department notes the fundamental difference is that both projects have avoided and/or mitigated visual impacts through strategic turbine layout and securing landowner agreements with affected residences.

3.2 NSW Wind Energy Framework

In December 2016, the Department released the new *NSW Wind Energy Framework* (the Framework).

The Framework replaces the draft wind farm planning guidelines, which were exhibited in 2011, and seeks to provide greater clarity, consistency and transparency for industry and the community regarding both assessment and decision-making on wind energy projects.

The Framework provides a merit-based approach to the assessment of wind energy projects, which is focused on the issues unique to wind energy, particularly noise and visual impacts. The key documents comprising the Framework include the *Wind Energy Guideline*, *Visual Assessment Bulletin*, *Noise Assessment Bulletin* and *Standard Secretary's Environmental Assessment Requirements*.

The *Visual Assessment Bulletin* (the Bulletin) identifies a number of visual performance objectives that can be used to assess potential visual impacts associated with wind energy development. With regard to the proposed modification, the performance objective for visual magnitude identifies that 180 m turbines have the potential to result in significant visual magnitude impacts on residences within 3.6 km of a turbine.

Other key visual performance objectives identified within the Bulletin that are relevant to the proposed modification are cumulative impacts, aviation hazard lighting and shadow flicker. The Department's visual assessment and consideration of these performance objectives is discussed further in **Section 6**.

While applicable to the proposed modification, the Department notes the Framework was developed after the project's previous modification to increase turbine dimensions (Modification 2) was assessed and approved.

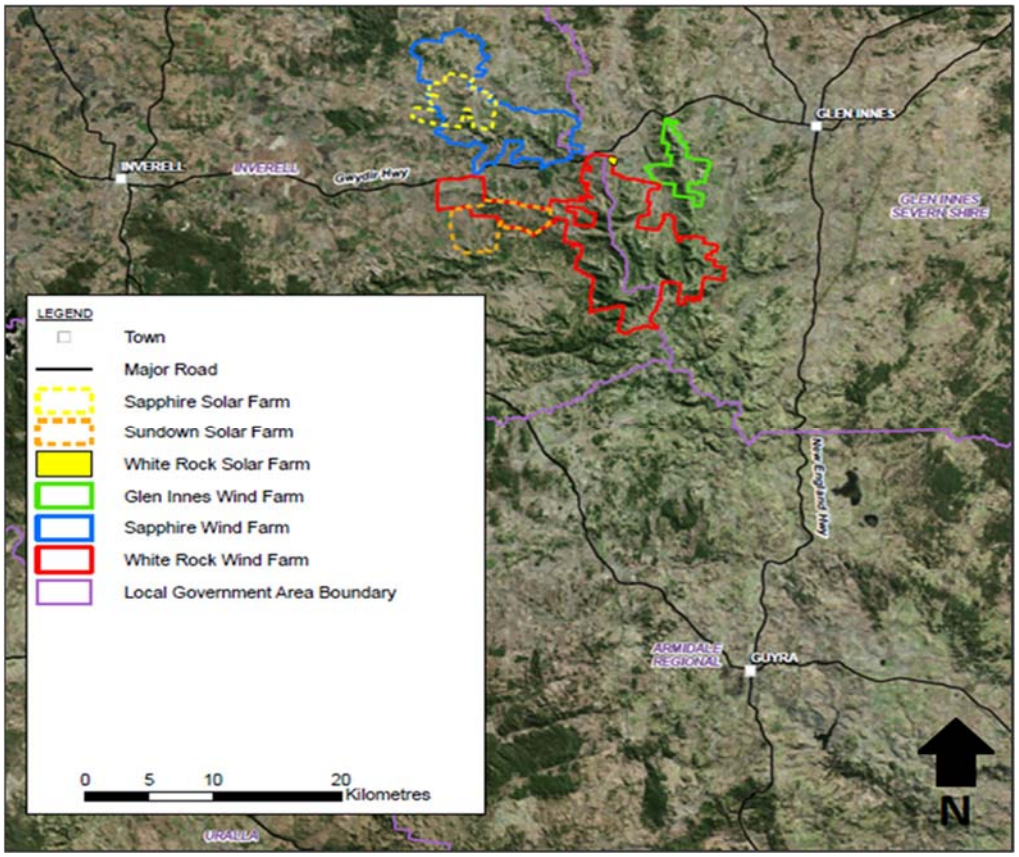

Figure 2 | Renewable energy projects in the locality

3.3 Site and Surrounds

The project site is positioned along the Waterloo Range, which comprises elevations up to 1,200 m above sea level and is a prominent landform within the local landscape. The project's development footprint extends for about 8.5 km, covering approximately 2,550 hectares (ha). The project site has been mostly cleared for grazing, however, areas of remnant woodland occur in close proximity to project infrastructure.

The surrounding landscape comprises a pastoral/wind energy character that includes both areas of elevation and low-lying valleys. Of these, the Department has identified the Ilparran valley as a key landscape feature in the area when considering visual impacts associated with the Glen Innes Wind Farm.

The Ilparran valley is a large valley located to the west of the project site stretching the length of the Ilparran Road (approximately 8 km) and is positioned in between the project site and White Rock Wind Farm. While residences surround the project site in all directions, over 40% of non-associated residences are located within the Ilparran valley to the west of the site.

The Department notes the potential for significant visual impacts on residences in this valley are high due to the relative proximity of the two wind farms, and the fact that both wind farms are located on ridgelines either side of the valley, effectively surrounding and enclosing the valley and residences.

The project has five host or 'associated' landowners, who own land and residences both on and adjoining the project site (including Rose Hill A, Rose Hill B, Hillside and Glengyle) (see **Figure 3**). These landowners provided landowner's consent for the development application and entered into commercial agreements with Nexif to facilitate the development of the project, including accepting the impacts of the project. As such, these residences are considered to be associated with the project for the purposes of the Department's assessment.

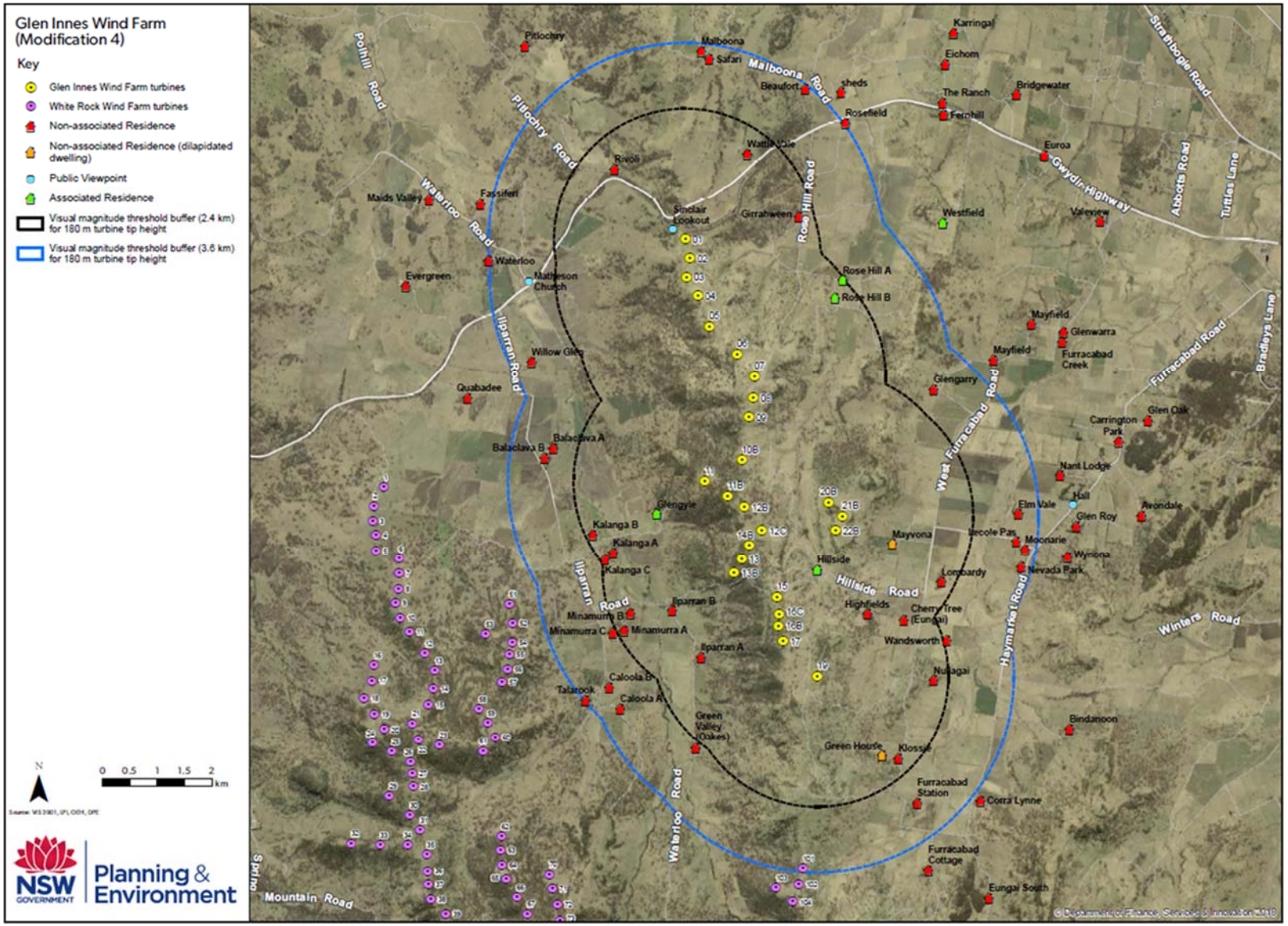

Figure 3 | The proposed layout of Glen Innes Wind Farm and surrounding residences

4. Statutory Context

4.1 Scope of Modification

The project was approved under Part 3A of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The project is a transitional Part 3A project under Schedule 2 to the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*.

While the power to modify transitional Part 3A projects under Section 75W of the EP&A Act is being wound up, the request for this modification was made before the cut-off date of 1 March 2018 and the provisions of Schedule 2 (clause 3) continue to apply. Consequently, this modification application has been assessed under Section 75W of the EP&A Act. The Department is satisfied the proposed modification is within the scope of Section 75W as:

- no new turbines are proposed as part of the modification; and
- the modified layout, including proposed turbine and ancillary infrastructure relocations, is generally in accordance with the project layout as approved.

4.2 Approval Authority

The Minister for Planning and Public Spaces is the approval authority for this modification application. However, under the Minister's delegation of 9 March 2020, the Executive Director, Energy, Resources and Compliance may determine the application as Council did not object, there were 43 public submissions by way of objection during the exhibition of the application, and Nexif has not made any reportable political donations.

4.3 Environmental Planning Instruments

Under the *Glen Innes Severn Local Environment Plan 2012*, the proposed modification is located on land zoned RU1 Primary Production. Electricity generating works is permitted with consent in this zone. There are no other environmental planning instruments that substantially govern the proposed modification.

4.4 Other Approvals

Nexif is required to obtain a number of further approvals, including (but not limited to) approvals under the *Protection of the Environment Operations Act 1997* and *Roads Act 1993*. Nexif would be required to consult further with the relevant Government agencies regarding the necessary approvals, prior to commencing construction of the project.

5. Engagement

5.1 Department's Engagement

The Department publicly exhibited the modification application and EA from Tuesday 8 August 2017 until Thursday 31 August 2017 (23 days). The Department also notified Glen Innes Severn Council (Council), relevant Government agencies and landowners adjoining the project boundary.

During the assessment process, the Department visited the site and surrounds on two separate occasions and consulted with local residents, community groups, Council, key Government agencies and Nexif.

In total, the Department and its independent visual expert Terry O'Hanlon visited 18 properties around the site to get a better appreciation of the potential impacts associated with the modification and to further understand the concerns of individual landowners.

In addition, the Department hosted a community information session at the Glen Innes town hall on 27 September 2017. Direct invitations were sent to neighbouring residents and those who made submissions on the modification application, and the event was open to anyone with concerns over the proposal.

The Department used this opportunity to inform the 22 attendees about the planning assessment process and to listen to the community's concerns about the proposal. The majority of attendees were landowners residing within 5 km of the project site.

5.2 Summary of Submissions

In response to the exhibition, the Department received 53 submissions, including:

- advice from 10 Government agencies;
- 38 submissions from the general public; and
- 5 submissions from special interest groups.

A summary of submissions is provided in **Table 2**, and a full copy of the submissions is attached in **Appendix D**.

Table 2 | Summary of Submissions

Submitters	Number	Position
Government Agency	***10***	
• Glen Innes Severn Council • DPIE Water (formerly Department of Primary Industries – Land & Water) • Biodiversity Conservation Division (formerly Office of the Environment and Heritage) • Environment Protection Authority		Comment

Submitters	Number	Position
• Mining, Exploration and Geosciences (formerly Division of Resources and Geoscience) • Transport for NSW (formerly Roads and Maritime Services) • Civil Aviation Safety Authority • Airservices Australia • NSW Rural Fire Service • NSW Health - Hunter New England Local Health District		
Special Interest Group	***5***	
• Romski Pty Ltd as trustee for the Wiled Trust • Romski Pty Ltd as trustee for the Wilmar Trust • Waterloo Station Pastoral Company Pty. Ltd. as trustee for The Waterloo Pastoral Trust • Glen Innes Landscape Guardians		Object
• Glen Innes Regional Airport		Comment
Community	***38***	
• < 5 km	12	Object
• 5 – 15 km	4	Object
• > 50 km	22	Object
TOTAL	***53***	

5.3 Key Issues – Government Agencies

While none of the agencies objected to the proposed modification, several agencies made comments on aspects of the proposal and approved project, relevant to their regulatory responsibilities.

In addition, most agencies recommended that if the modification application were to be considered for approval, Nexif should update the relevant management plans to reflect any changes proposed and contemporary requirements. The key matters raised in agency submissions related to aviation, waste management and noise, and are summarised below. Full copies of Government agency submissions are available in **Appendix D**.

Airservices Australia (Airservices), ***Civil Aviation Safety Authority (CASA)*** and ***Glen Innes Severn Council (Council)*** raised concerns about the proposed 180 m turbines infringing the navigable airspace and affecting procedures at nearby Glen Innes Regional Airport (the airport).

However, Airservices subsequently advised its departure and approach procedures for the airport would be updated, effective from May 2018, and that the larger turbines would no longer affect its procedures at the airport.

In addition, CASA and Council recommended that the 180 m turbines be lit with steady red medium intensity hazard lighting at night in accordance with contemporary requirements. To minimise the visual impacts at night, CASA recommended the installation of an aircraft detection lighting system that would be activated only when an aircraft is detected in the area.

Glen Innes Severn Council (Council) raised concerns over waste generation and off-site management and the potential operational noise impacts associated with the larger turbines. The Department also acknowledges the concerns about operational noise impacts that were raised by Council and the local community following the recent commissioning of the White Rock wind farm.

5.4 Key Issues – Community

All 38 of the public submissions received objected to the proposed modification. Sixteen submissions (42%) were received from the landowners residing within 15 km of the project site. The remaining 22 submissions were received from community members residing outside of the local region, including 4 from NSW (more than 50 km), 15 from QLD, and 3 from overseas.

The key issues raised in community submissions related to visual impacts, noise impacts, cumulative impacts, community consultation, Nexif's assessment methodology, lapsing of the approval, financial viability and/or need for the project, biodiversity impacts, and community uncertainty relating to the length of time that has lapsed since the project was originally approved. Of the issues raised, the Department notes the overwhelming concern raised in submissions (74%) was in relation to the visual impacts associated with the larger turbines.

A number of submissions raised concerns about the broader impacts of the project as approved. While the Department acknowledges the concerns of the community about the project, many of these issues were considered during the assessment of the original project or subsequent modifications, and are not directly relevant to the assessment of the current modification.

5.5 Key Issues – Special Interest Groups

Of the 5 special interest groups that made a submission on the modification, 4 objected and 1 provided comments. The Department has summarised the matters raised by special interest groups below.

Three special interest groups objected to the proposal, including ***Romski Pty Ltd as trustee for the Wiled Trust***, ***Romski Pty Ltd as trustee for the Wilmar Trust*** and the ***Glen Innes Landscape Guardians***. Each submission used the same form letter and raised concerns over potential amenity impacts, the adequacy of Nexif's community consultation, lapsing of the approval, and the lack of community support for the modification and the project in general.

Waterloo Station Pastoral Company Pty Ltd as trustee for The Waterloo Pastoral Trust also objected to the proposal and raised concerns over the need for project. The submission also raised concerns about the potential amenity impacts of the proposal (namely visual and noise) and effects on the heritage values of Waterloo Station, located approximately 3.5 km from the project site. The Department has considered Waterloo Station in its assessment of visual impacts in **Section 6**.

The ***Glen Innes Regional Airport*** submission included a report completed by an aviation specialist, recommending that obstacle lighting be installed, and that Nexif should consult with relevant stakeholders regarding the potential risks to aviation. The Glen Innes Regional Airport also raised concerns over the potential impacts of the larger turbine heights on a flight academy that was proposed for the local area. However, the

Department understands that development plans for the proposed flight academy have since been abandoned, and the Department has not received any further comment from the airport on this matter.

5.6 Response to Submissions

Agency advice and submissions received from members of the public and special interest groups are summarised in **Sections 5.4**, **5.5** and **5.6** below.

Approximately 10 months after the public exhibition period, Nexif provided its response to the issues raised in submissions (see **Appendix B**). Although the Department has considered this response in its assessment of the merits of the proposed modification, it notes the response does not propose any additional measures to mitigate the visual impacts of the proposed modification. In addition, the Department notes Nexif's response relies on the existing conditions of approval and updating management plans to manage other risks associated with the proposal.

6. Assessment

In assessing the merits of the modification application, the Department has considered the:

- existing conditions of approval;
- the environmental assessments (EAs) for previous modifications;
- the EA, submissions, RTS and additional information for the proposed modification;
- advice from the independent visual expert commissioned by the Department;
- community views obtained during the Department's consultation activities;
- relevant environmental planning instruments, policies and guidelines; and
- relevant provisions of the EP&A Act, including the objects of the Act.

6.1 Visual

Introduction

Visual impacts were the key concern raised by surrounding residences and the local community during the Department's engagement activities and in submissions.

Nexif commissioned a visual impact assessment (VIA) to assess the visual impacts to residences surrounding the project, which was prepared by Green Bean Design in July 2017.

The Department commissioned an independent visual expert, Mr Terry O'Hanlon of O'Hanlon Design to complete an independent VIA (see **Appendix C**).

Nexif's Visual Impact Assessment

Nexif's VIA involved a desktop assessment of non-associated residences located within 3.6 km of a turbine in the modified project layout.

However, it is based on a comparison against the visual impact ratings identified in the Modification 2 VIA, and therefore does not assign visual impact ratings for a number of additional residences that would be affected by the proposed increase in turbine height (e.g. those residences located between 3 and 3.6 km away). Furthermore, the Department notes Nexif's VIA did not re-assess impact ratings already approved for Modification 2 using the current policy framework (the Framework and Bulletin). Nor did it provide a consideration of community values (which informs scenic quality and Visual Influence Zone), an assessment of the cumulative impacts or night lighting impacts associated with the proposed modification.

Overall, the Nexif VIA found that the proposed modification would not change the visual impact ratings from Modification 2. It concluded that the overall change in visual impacts from the proposed modification would be low to negligible.

Independent Review

The Department's independent visual expert prepared his VIA based on both a desktop analysis and a visit to the site and surrounds, which included inspections of potentially affected residences.

The independent VIA report assigns visual impact ratings for all residences that would be affected by the proposed turbine height increases, in accordance with the current *NSW Wind Energy Framework* and V*isual Impact Assessment Bulletin* (i.e. up to 3.6 km away).

The independent expert focused on the incremental change between the approved and proposed turbine dimensions, and found that the larger turbines would result in significant visual magnitude impacts, cumulative impacts and landscape dominance for the majority of residences located within 3.6 km of the project site.

Assessment of Visual Impacts

It is important to note that while neither the *NSW Wind Energy Framework* nor the *Visual Assessment Bulletin* were in effect at the time of the original project approval or subsequent modifications, the current modification application must be assessed against both the Framework and the Bulletin.

Consequently, the Department's assessment is solely focused on the incremental change between the approved and proposed turbines. In assessing the proposed modification, the Department is not in a position to recommend deletion, or relocation, of approved turbines.

The Department has assessed the visual impacts of the proposed modification against the relevant visual performance objectives identified within the Bulletin. This assessment is summarised below.

Visual Magnitude

In accordance with the Bulletin's threshold distance for visual magnitude, the Department identified 36 non-associated residences located within 3.6 km of a project turbine, and 17 non-associated residences located within 2.4 km of a project turbine (which is the distance within which significant visual impacts can occur and which requires further detailed consideration under the Bulletin).

The Department has assigned the 36 non-associated residences into 4 separate residential clusters (see **Figure 4** below). Residences within each cluster are broadly grouped to reflect comparable geographical positioning and locational characteristics which result in potentially similar visual impacts from project turbines.

The Department assessment identified that high and moderate/high ratings represent over 58% of the residences assessed within 3.6 km of project turbines. Importantly, of the 21 non-associated residences that were provided a moderate/high or high visual rating, 15 are located within 2.4 km of a project turbine and require detailed consideration under the Bulletin (see **Figure 4**).

The Department's visual impact ratings for non-associated residences (and one public viewpoint) within 3.6 km affected by the modification are summarised in **Table 3** below. This summary also includes ratings provided in Nexif's VIA and the Modification 2 visual assessment.

In assessing the visual magnitude impacts of the larger 180 m turbines, important considerations highlighted in Table 3 include:

- increased number of turbine hubs/tips visible;
- increase in visual impact ratings from those provided for Modification 2;
- number of non-associated residences within 3.6 km that have not previously been assessed or allocated visual impact ratings; and
- interpretation of impacts to residences with unchanged "high" visual impact ratings from Modification 2.

As evident in Table 3, total of 22 of the 36 non-associated residences assessed would see more turbine hubs and/or tips. This increase is most severe for residences located in the western cluster (Ilparran valley). The larger turbines would result in views of an additional 17 hubs and 7 tips from 10 of the 15 residences within this cluster.

Further, most residences in this cluster would have extensive views of at least 6 turbines, with the tips, majority of hubs and often full rotor diameter visible, resulting in significant visual magnitude impacts. These increases can be directly attributed to the proposed 21 m increase in turbine hub height and 30 m increase in turbine tip height.

In total, the Department's independent visual expert has identified that 16 residences would receive high visual impact ratings and 5 would receive moderate/high ratings.

Five residences were identified as receiving an increased visual rating as a result of the larger turbines. Importantly, all of these would experience an increase in visual rating from moderate to moderate/high or high. The Department notes visual impact ratings remain unchanged for all non-associated residences assessed in Nexif's VIA.

The Department also notes that of the 36 residences within 3.6 km of a turbine, Nexif's VIA only provided visual impact ratings and assessment on the number of hubs/tips visible for 23 residences. Importantly, Nexif's VIA did not assess the visual impacts of the modification on Balaclava B, of which is identified as receiving a high visual impact rating.

Finally, while the Nexif VIA identified 14 residences as having high visual impacts, it concluded the modification is not of a magnitude that would significantly increase the visual impacts associated with the 150 m turbines approved for Modification 2. However, the Department considers Nexif's overall findings in relation to the change in visual magnitude impacts reflect a fundamentally different view of the nature and extent of visual impacts associated with the modification.

In this regard, the independent expert report commented on Nexif's unchanged visual impact ratings for all non-associated residences, noting that the visual impact rating system only allows for three possible rating outcomes (low, moderate and high). The report noted that this limitation made it difficult to reflect increased visual magnitude impacts associated with the proposed modification.

The Department and its independent expert consider that the larger turbine dimensions proposed for Modification 4 would in fact materially increase the visual magnitude impacts received at the majority of residences within 3.6 km of the project turbines. However, as noted, the limitations of the rating system and the large number of non-associated residences rated as having high visual impacts in previous assessments, make it difficult to accurately reflect the impacts associated with Modification 4 through visual ratings alone.

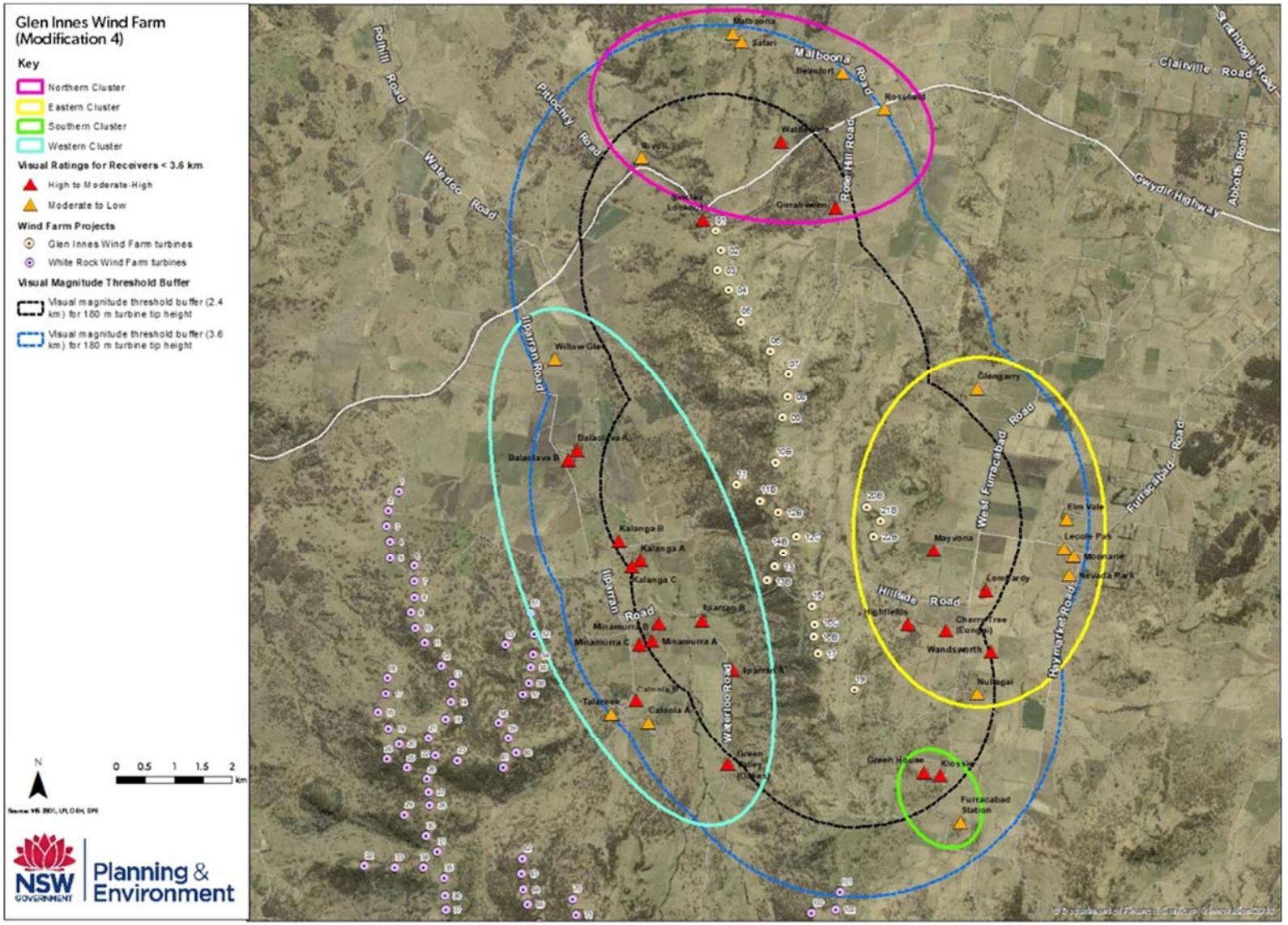

Figure 4 | Residential clusters and visual ratings of non-associated residences within 3.6 km of a project turbine

Table 3 | Visual impact assessment of non-associated residences for the modified project relative to the approved project.

(+#) = Number of additional hubs or tips visible as a result of the proposed modification. NA = No information provided.

Residence	Distance to closest turbine (km)	Closest turbine	Turbine hubs visible	Turbine tips visible	Proponent's assessed impact		Independent visual expert's assessed impact
					Approved project (MOD 2)	Modified project (MOD 4)	
Northern Residence Cluster							
Girrawheen	2.1	01	12	22 (+8)	High	High	High
Rivoli	1.8	01	4 (+1)	5 (+1)	Moderate	Moderate	Moderate
Wattle Vale	1.9	01	18 (+3)	25 (+3)	High	High	High
Rosefield	3.6	01	NA	NA	NA	NA	Low - Moderate
Beaufort	3.5	01	NA	NA	NA	NA	Low
Safari	3.3	01	NA	NA	NA	NA	Low
Malboona	3.4	01	NA	NA	NA	NA	Low
Eastern Residence Cluster							
Nullagai	2.1	19	1	5 (+2)	Moderate	Moderate	Moderate
Wandsworth	2.5	19	15 (+2)	19 (+3)	Moderate	Moderate	Moderate - High
Cherry Tree	1.9	19	14 (+1)	15	High	High	High
Highfields	1.5	19	17 (+3)	17	High	High	High
Lombardy	2.2	22B	13 (+1)	15	High	High	High
Mayvona (dilapidated dwelling)	1.1	22B	8	8	High	High	High
Glengarry	2.8	20B	3 (+1)	4	Moderate	Moderate	Moderate
Elm Vale	3.2	21B	NA	NA	NA	NA	Moderate
Lecole Pas	3.2	21B	NA	NA	NA	NA	Moderate
Moonarie	3.3	21B	NA	NA	NA	NA	Moderate
Nevada Park	3.3	21B	NA	NA	NA	NA	Moderate
Southern Residence Cluster							
Furracabad Station	3	19	7 (+2)	12 (+2)	Moderate	Moderate	Moderate
Klossie	2.1	19	7 (+3)	12 (+2)	Moderate	Moderate	Moderate - High
Green House (dilapidated dwelling)	1.9	19	7 (+2)	8	Moderate	Moderate	Moderate - High

Residence	Distance to closest turbine (km)	Closest turbine	Turbine hubs visible	Turbine tips visible	Proponent's assessed impact		Independent visual expert's assessed impact
					Approved project (MOD 2)	Modified project (MOD 4)	
Western Residence Cluster							
Green Valley	2.5	17	17 (+2)	18	Moderate	Moderate	Moderate - High
Ilparran A	1.5	17	11	16 (+2)	High	High	High
Ilparran B	1.3	13B	10 (+2)	11 (+1)	High	High	High
Minamurra A	2.3	13B	23 (+2)	25 (+2)	High	High	High
Minamurra B	2	13B	21 (+1)	23 (+2)	High	High	High
Minamurra C	2.5	13B	23 (+1)	25	High	High	High
Kalanga A	2.1	11	21 (+2)	25	High	High	High
Kalanga B	2.3	11	24 (+3)	25	High	High	High
Kalanga C	2.3	11	23 (+2)	25	High	High	High
Balaclava A	2.8	11	24 (+2)	25	Moderate	Moderate	High
Balaclava B	3.1	11	NA	NA	NA	NA	High
Talarook	3.6	13B	NA	NA	NA	NA	Moderate
Caloola A	3.2	17	NA	NA	NA	NA	Moderate
Caloola B	3	17	NA	NA	NA	NA	Moderate - High
Waterloo Station	3.5	03	NA	NA	NA	NA	Low - Moderate
Public Viewpoint							
Sinclair Lookout	0.2	01	NA	NA	NA	NA	High

In accordance with the Bulletin's visual performance objectives for visual magnitude, proponents should avoid or provide detailed justification for 180 m turbines located within 3.6 km of residences located within Visual Influence Zone (VIZ) 1. VIZ 1 comprises an area with the highest level of visual significance and is based on a combination of viewer sensitivity, visibility distance and scenic quality class.

Across the four clusters, 8 non-associated residences located within 3.6 km of a project turbine can be identified as falling within VIZ 1. The residences include Wattle Vale, Rivoli, Cherry Tree, Highfields, Mayvona, Green House, Ilparran A and Ilparran B. The Department notes that Nexif has not avoided proposing height increases, nor has it provided detailed justification for turbines affecting any of these non-associated residences, nor have any landowner agreements been reached.

Consequently, the Department considers the proposed modification does not meet the Bulletin's visual performance objectives in relation to visual magnitude impacts.

Cumulative Impacts

In regard to the visual performance objectives for cumulative impacts, the Bulletin states that proponents should avoid or provide detailed justification for views of multiple turbines within 8 km of residences identified as Level 1 or Level 2 viewpoints.

Specifically, the Bulletin identifies the following cumulative impact thresholds for Level 1 or Level 2 viewpoints:

- Level 1 (high sensitivity) viewpoints - turbines visible within the effective horizontal views of 2 or more 60˚ sectors; and
- Level 2 (moderate sensitivity) viewpoints - turbines visible within the effective horizontal views of 3 or more 60˚ sectors (i.e. over 180° views of turbines).

The Bulletin classifies rural dwellings as having a moderate sensitivity level. The Department is satisfied that all residences located within 3.6 km of the project can be considered rural dwellings.

The Department's independent expert has identified that as many as 19 non-associated residences assessed within 3.6 km of the project site are predicted to experience significant cumulative visual impacts with horizontal views of turbines within 3 or more 60˚ sectors. In addition, 12 non-associated residences would experience views of up to 5 sectors, and one residence would experience views across all 6 sectors.

The Department considers that the most significant cumulative impacts would be experienced by residences in the western cluster and Ilparran valley, as views from these residences often involve multiple sectors of turbines from the project and the White Rock Wind Farm.

With the exception of Caloola A, all residences within the western cluster would experience broad and relatively unrestricted views to the south and west of a number of White Rock turbines. Notably, 80% of residences within the western cluster (12 of 15) are predicted to experience views of Glen Innes and White Rock turbines across more than 5 60˚ sectors (i.e. over 300° views of turbines). Talarook would experience views of Glen Innes and White Rock turbines across all 6 of its 60˚ sectors.

While the Department acknowledges that these cumulative impacts would be comparable to impacts associated with the 150 m Modification 2 turbines, it notes the Framework, Bulletin and key performance objectives related to cumulative impacts were not developed at the time of the Modification 2 assessment.

Consequently, as the objectives of Bulletin are applicable to the proposed modification, the Department considers that the larger turbines would fail to meet the Bulletin's visual performance objectives for cumulative impacts.

Aviation Hazard Lighting

Although CASA did not determine that hazard lighting was required for the approved project, its advice on the proposed modification recommended that the wind farm should be lit with steady red medium intensity lighting at night in accordance with contemporary requirements, in order to reduce risk to aviation safety.

Nexif's aviation impact assessment concluded that aviation hazard lighting would be required on the proposed larger turbines.

The Department considers that the addition of aviation hazard lighting has the potential to increase visual impacts at surrounding residences and would further contribute to the visual impacts of the project, particularly as there are limited existing light pollution sources in the vicinity and many residences value the dark night sky as a feature of the area.

The Department's independent visual expert noted that aviation hazard lighting would significantly increase the impact levels identified within its report, and that the lighting would contribute to the overall cumulative impact for most surrounding residences. It also noted the lighting would change the overall landscape character in the area to reflect a wind energy/industrial landscape character.

While the Department acknowledges that aviation hazard lighting is ultimately a matter for CASA, Nexif has not undertaken an assessment of potential visual impacts associated with aviation hazard lighting, stating in its RTS that an assessment may be undertaken, subject to confirmation that aviation hazard lighting is required.

Shadow Flicker

In relation and addition to visual magnitude and dominance impacts, Nexif's shadow flicker assessment identified the theoretical shadow flicker would both increase and exceed the 30 hours per annum limit specified in the Framework, at 3 non-associated residences (Ilparran A, Ilparran B and Mayvona). However, while exceedances were identified the Department notes that Nexif is already required to meet the 30 hours per annum limit under the existing conditions of approval, and should the modification be considered for approval, it would expect Nexif to implement necessary measures to ensure these limits are met.

Avoidance and Mitigation Measures

The Bulletin lists a number of different visual impact mitigation options for consideration, including physical turbine alterations (re-siting, re-sizing and re-colouring), landscaping alterations including vegetation screening, and landowner agreements or voluntary acquisition for significantly affected landowners.

With regard to turbine alteration options, the Department notes that landform and spatial restrictions would limit opportunities to re-site turbines. In addition, the Department notes that the relatively small number of project turbines (i.e. 25) would limit re-sizing or removal options, as these would likely materially reduce the benefits of the modification.

With regard to landscaping options, the Department considers that there are significant limitations for vegetation screening in this case due to the large numbers of non-associated residences with significant impacts (21 with high or moderate/high impacts), the elevated position of many of these residences (particularly on sloping land) or conversely the elevated position of turbines in relation to residences (particularly those within the Ilparran valley), and the extensive horizontal views.

The Department considers that landowner agreements (covering visual impacts) would be an option that is available for Nexif to mitigate the visual impacts of the modified project. In this regard, on several occasions

throughout the planning assessment process, the Department advised Nexif on the importance of mitigating visual impacts on affected residences.

The Department acknowledges that Nexif has sought visual impact agreements with affected landowners. However, the current modification was lodged in August 2017, and at the time of completing its assessment, no landowner agreements have been reached.

Finally, the Department acknowledges that in some cases, it has recommended that the landowners of significantly visually impacted residences be afforded voluntary acquisition rights. However, the Department notes that these recommendations have generally only been made where there are a limited number of residences potentially affected, and that the visual impacts are not so significant or widespread to warrant the refusal of the proposal.

Conclusion

The Department has considered the provisions of the *Wind Energy: Visual Assessment Bulletin* in its assessment of visual impacts. Using the Bulletin, the Department considers the proposed 180 m turbines would result in significant visual magnitude impacts and further exacerbate cumulative impacts on the majority of non-associated residences within 3.6 km of a turbine. As noted in **Table 3**, 21 of the 36 non-associated residences within 3.6 km of a turbine would experience high or moderate/high visual impacts.

The Department notes that the number of turbine hubs and/or tips visible would increase for over 60% of the 36 non-associated residences within 3.6 km of a turbine. Furthermore, six residences would receive an increased visual rating as a result of the larger turbines. Importantly, five of these would experience an increase in visual rating from moderate to moderate/high or high.

As evident in **Figure 4**, the visual impacts of the modification are not confined to just one or two areas around the site and that larger turbines are likely to impact the majority of residences surrounding the site.

The Department considers the significant visual magnitude impacts can be directly attributed to the larger turbine dimensions, comprising an increased blade length, hub height and overall tip height.

The Department considers that the nature and extent of the impacts means that vegetation screening as a mitigation measure alone is unlikely to be effective or practical. The Department also notes that due to the surrounding landform, spatial restrictions and small number of project turbines, there are limited opportunities to mitigate the visual impacts of the modification without limiting the heights of the majority turbines, which would materially reduce the benefits of the proposed modification.

Consequently, the Department considers that mitigation of the impacts attributed to the larger turbines could be achieved by Nexif securing landowner agreements with significantly affected residences. However, the Department notes that despite having had almost 3 years from the end of exhibition to secure agreements, Nexif has not reached agreements with any of the significantly impacted non-associated residences located within 3.6 km of a project turbine.

Given that Nexif has had this amount of time to secure agreements with affected landowners, the Department considers that it is unlikely that Nexif will be able to secure a sufficient number of agreements with the most affected residences to adequately mitigate the residual impacts of the larger turbines.

Finally, given that Nexif has not been able to avoid, mitigate or provide detailed justification for the significant visual magnitude, cumulative and landscape integrity impacts of the modification, the Department considers the modification does not meet the Bulletin's visual performance objectives and that the proposed increase in turbine height would result in unacceptable levels of visual impact on surrounding residences.

On this basis, the Department recommends that on the visual impact grounds alone, the proposed modification should not be approved.

6.2 Other Issues

The Department acknowledges that in addition to concerns over visual impacts, community submissions raised concerns related to a range of issues, including biodiversity, noise, decommissioning, telecommunications and bushfire.

The Department considers that any potential impacts related to these issues could be effectively managed through updated conditions of approval that reflect contemporary requirements, in consultation with the Department and the relevant Government agencies. However, given the significant visual impacts of the proposed modification, and the recommended refusal, the Department has not presented its assessment of these issues in this report.

7. Evaluation

The Department has assessed the merits of the modification in accordance with the relevant requirements of the EP&A Act.

The Department acknowledges that the scope of the proposed modification is modest and comparable to other wind farm modifications that have been approved. However, the approved project involves a number of key differences, such as unique site characteristics and landscape features, cumulative impacts, the close proximity of residences to approved turbines, and the absence of any landowner agreements, which means the effects of any further changes to the project in terms of turbine height increases must be carefully considered.

Further, the proposed modification also differs from other historically approved modifications insofar that the *NSW Wind Energy Framework* now applies. Accordingly, the Department has undertaken its assessment of the proposed changes against the key performance objectives set out in the Framework, and specifically the visual performance objectives of the Framework's *Visual Assessment Bulletin*.

In this regard, the Department and the independent visual expert identified 21 non-associated residences located within 3.6 km of the project site that would experience high or moderate/high visual impacts as a result of the modification. Importantly, 15 of these 21 affected residences would be located within 2.4 km of a project turbine.

In the absence of landowner agreements or a detailed justification for the proposed impacts, the Department considers that the modification would result in unacceptable levels of visual impact.

Further, the Department notes the benefits of the project have not been realised since the project was approved in 2009, resulting in considerable uncertainty and angst among the local community. Both the project and the proposed modification have generated significant opposition within the local community, many of whom formally objected to the proposal during the public exhibition period.

While the proposed modification would allow generation an additional renewable energy generation of 22.5 MW, the Department does not consider that this benefit justifies the significant visual impacts on the local community.

Nexif has stated the modification is essential to the viability of the project. However, the Department notes the generation capacity and turbine dimensions of the approved project are comparable to a number of approved wind farms already constructed or currently under construction across NSW, including Stage 1 of the neighbouring White Rock Wind Farm.

Finally, the Department considers that while the NSW Government remains strongly in favour of the development of renewable energy in NSW, over the last 10 years the industry has matured significantly. There are now a large number of wind and solar farms operating, approved or proposed in NSW, and while the development of renewable energy projects remains desirable, they should avoid significant adverse impacts on the surrounding community.

Therefore, in its overall regard to social, environmental and economic considerations, and the broader public interest, the Department does not consider that the benefits of the proposed modification outweigh the significant visual impacts on surrounding residences.

Consequently, the Department considers that the Glen Innes Wind Farm modification application is not in the public interest.

As such, following on from its assessment of the modified project, the Department considers that the proposed modification should not be approved and has prepared a Draft Instrument of Refusal (**Appendix A**).

8. Recommendation

It is recommended that the Executive Director, Energy, Resources and Compliance, as delegate of the Minister for Planning and Public Spaces:

- **considers** the findings and recommendations of this report;
- **determines** that the modification falls within the scope of section 75W of the EP&A Act;
- **accepts and adopts** all of the findings and recommendations in this report as the reasons for making the decision to refuse the application;
- **signs** the attached instrument of refusal (**Appendix A**).

Recommended by:

1 September 2020

Nicole Brewer

Director

Energy Assessments

9. Determination

The recommendation is: **Adopted by:**

2 September 2020

Mike Young

Executive Director

Energy, Resources and Compliance

Appendices

Appendix A – Instrument of Refusal

Appendix B – List of Documents

Glen Innes Wind Farm Modification 4 - Environmental Assessment, Environmental Property Services, 2017.

Glen Innes Wind Farm Modification 4 – Aviation Risk Assessment, The Ambidji Group, 2017.

Glen Innes Wind Farm Modification 4 - Response to Submissions Report, Environmental Property Services, 2018.

Independent Peer Review of Landscape and Visual Impacts (OHD Report), Terry O'Hanlon of O'Hanlon Design, 2018.

Note: all documents are available on the Department's website at:

http://www.majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8648

Appendix C – Independent Peer Review of Landscape and Visual Impacts

Appendix D – Submissions

See the Department's website at:

http://www.majorprojects.planning.nsw.gov.au/index.pl?action=view_job&job_id=8648