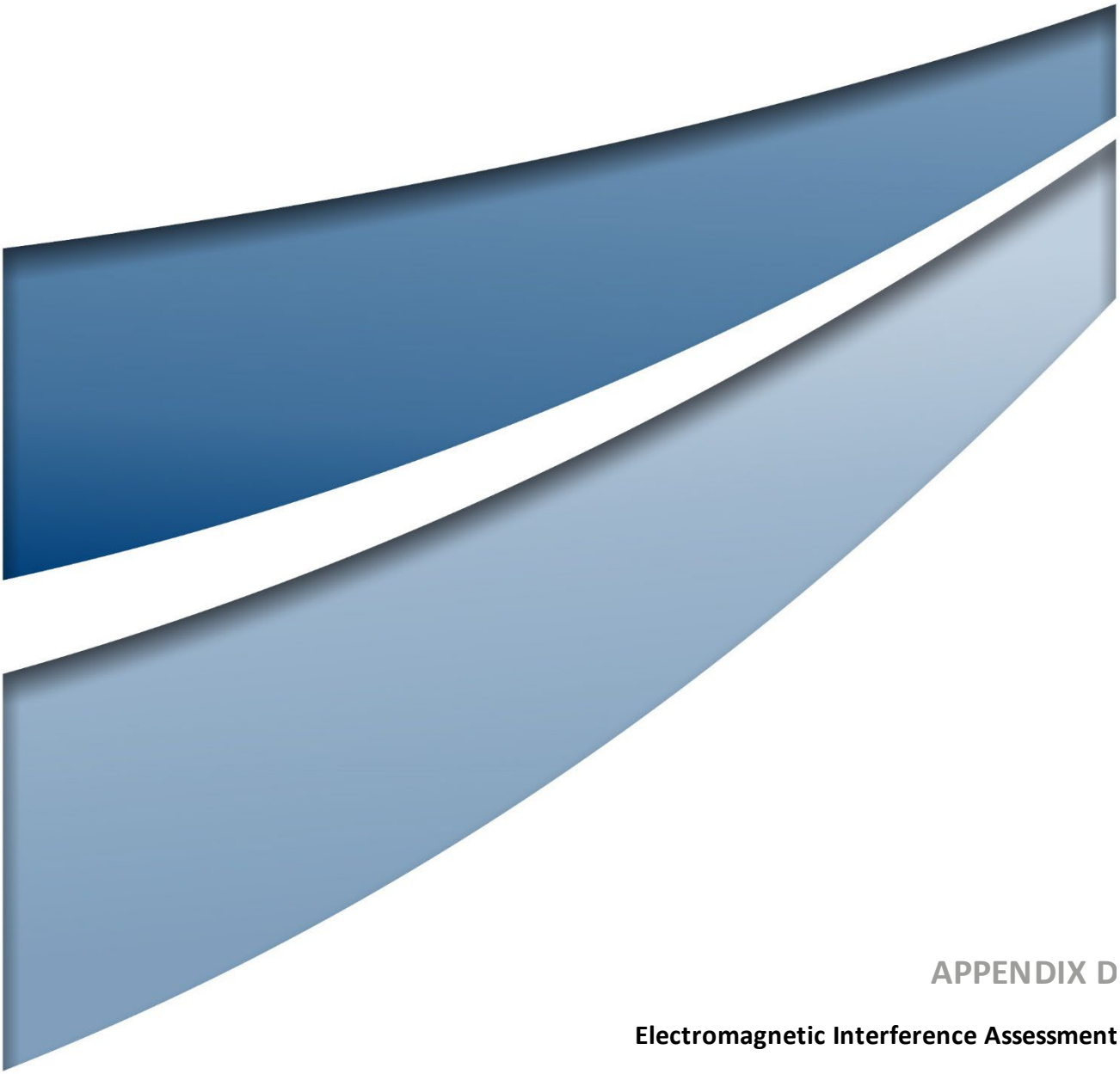

APPENDIX D

Electromagnetic Interference Assessment

NEOEN AUSTRALIA PTY LTD

MT HOPEFUL WIND FARM

ELECTROMAGNETIC INTERFERENCE STUDY

FEBRUARY 2023

CONFIDENTIAL

Question today
Imagine tomorrow
Create for the future

Mt Hopeful Wind Farm
Electromagnetic Interference Study

Neoen Australia Pty Ltd

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REV	DATE	DETAILS
A	3/03/2021	Initial Release
B	23/04/2021	Updated project boundary and WTG layout
C	09/06/2021	Added consultation responses
D	18/06/2021	Minor amendments after Client's feedback
E	25/06/2021	Further minor amendments after Client feedback
F	17/02/2023	Updated project boundary and WTG layout
G	9/03/2023	Minor amendments after Client feedback

	NAME	DATE
Prepared by:		9/03/2023
Reviewed/Approved by:		9/03/2023

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GLOSSARY

ACMA	Australian Communications and Media Authority
AM	Amplitude Modulation
BoM	Bureau of Meteorology
EMI	Electromagnetic Interference
FM	Frequency Modulation
GIS	Geographic Information System
ISP	Internet Service Provider
MHWF	Mount Hopeful Wind Farm
P2MP	Point-to-Multipoint
P2P	Point-to-Point
RADCOM	Register of radio licences, radio communication towers and radio services
RFNSA	Radio Frequency National Site Archive
TV	Television
UHF	Ultra-High Frequency
WSP	WSP Australia Pty Limited
WTG	Wind Turbine Generator

EXECUTIVE SUMMARY

Neoen Australia Pty Limited (Neoen) has requested WSP Australia Pty Limited (WSP) to undertake an updated assessment of the potential electromagnetic interference (EMI) impacts arising from the development and operation of the proposed Mount Hopeful Wind Farm (MHWF) project. The MHWF project is located approximately 45 km south of Rockhampton, in Central Queensland (QLD).

WSP previously conducted an EMI assessment of MHWF in June 2021 [1] including consultation with relevant identified licensees from February to May 2021. This updated assessment considers an updated layout consisting of 63 WTGs with a maximum blade tip height of 260 m above ground level (AGL), and an updated site boundary provided by Neoen [2]. As part of this study, WSP has considered potential impacts of the MHWF project on registered point-to-point, point-to-multipoint, point-to-area and broadcast services in the vicinity of the wind farm.

The previous consultation process considered registered licensees within 10 km of MHWF. WSP commenced consultation with identified licensees on 19 February 2021, based on the information accessed via the ACMA database on 30 November 2020 [3]. The responses received from the licensees have been detailed throughout the report where applicable. A summary of contacted licensees and responses can be found in Appendix A. It should be noted that WSP has updated the ACMA database on the 25 January 2023. At this time, no further consultation has been conducted with regards to the updated WTG locations and the updated ACMA database.

For this updated investigation, WSP identified existing radio communication services registered within the ACMA register of radio licences, radio communication towers and radio services (RADCOM). This database was reviewed and sites within 70 km of the MHWF project boundary were identified. 746 radio communication sites were found within 70 km of the provided site boundary, and 66 towers within 30 km of the site boundary. Sites were mapped against the wind farm layout provided by Neoen [4]. Communication towers and point-to-point links identified in the vicinity of the project area were selected for further investigation.

It should be noted in the previous assessments, distances were calculated from a set point within the site (-23.86°, 150.6°), which was understood to be representative of the centre of the location. In this revision the methodology has been updated, with the distance calculated from the site boundary. The previous assessment identified 513 communication towers within 75 km of the project and 25 towers within 30 km of the site. As a result of the updated methodology, significantly more towers were identified in this assessment. Within 30 km of the site boundary, an additional 41 towers were identified in this update.

COMMUNICATION TOWERS

A refined search was undertaken to identify any communication towers located within 2 km of the proposed wind farm and assessed for potential near-field impacts. Eight (8) towers were identified within 2 km of the project boundary, with no towers located within 500 m of any proposed WTGs. The licensees registered were contacted as part of WSP's consultation process in the previous assessment [1]. Please refer to Section 3.1.1 for additional information regarding the communication towers identified in the vicinity of the MHWF project.

POINT-TO-POINT LICENCES

17 fixed point-to-point links were identified to intersect with the provided site boundary of MHWF [2]. The 2nd Fresnel zones were calculated for each link and it was observed that there are no WTG locations within one (1) blade length of the 2nd Fresnel zones for any of the 17 links. Additional information regarding the point-to-point links identified in the vicinity of MHWF can be found in Section 3.2. In the previous assessment, WSP contacted all the relevant licensees within 10 km of MHWF. Details of the licensees contacted can be found in Appendix A.

POINT-TO-MULTIPOINT, POINT-TO-AREA AND BROADCASTING LICENCES

Point-to-multipoint licences, point-to-area licences and broadcast services were assessed in the vicinity of MHWF. In the previous assessment WSP contacted all the relevant licensees within 10 km of MHWF. Details of the licensees contacted can be found in Appendix A.

Residences close to MHWF may experience some interference to their television (TV) services if they are located in a region of existing marginal coverage. Due to the limited TV coverage identified during this study, WSP recommends that a ground survey of TV signal strength is undertaken amongst the residences surrounding the site prior to the construction of the wind farm. Should some residences experience TV interference, a number of mitigation options are available as discussed in Section 4 .

1 INTRODUCTION

WSP Australia Pty Limited (WSP) has been engaged by Neoen Australia Pty Limited to conduct an updated assessment of the potential Electromagnetic Interference (EMI) impacts of the Mount Hopeful Wind Farm (MHWF).

The EMI assessment conducted by WSP includes but is not limited to the analysis of

- Fixed point to point radio communication links in the vicinity of the proposed WTG locations
- Fixed point to multipoint licenses within 30 km of the site
- Radar operations within 250 nautical miles of the site
- Television and radio broadcasting services in operation around MHWF
- Mobile phone services
- Internet services, and
- Licences operated by emergency services in proximity to the development.

This report details the methodology adopted to assess the potential EMI impact resulting from the development and operation of MHWF. It also describes potential mitigation options to manage and minimise the likely EMI impacts arising from MHWF development and operations. It should be noted that further consultation was not included within the scope of this updated assessment as no new licences were identified within 10 km of the site boundary, and as per WSP's agreement with the Client.

1.1 PROJECT UNDERSTANDING

MHWF is located approximately 45 km south of Rockhampton as shown in Figure 1.1. As the project is in the early development phase, a preferred WTG model has not been selected. To assess a worst-case impact scenario, this EMI assessment assumes a maximum blade tip height of up to 260 m AGL and a rotor diameter of up to 180 m. The site is proposed to consist of 63 WTGs, as summarised in Table 1.1.

Table 1.1 Proposed WTG dimensions for MHWF

HUB HEIGHT	ROTOR DIAMETER [M]	TIP HEIGHT [M]	BLADE LENGTH [M]	NO. OF WTGS
170	180	260	90	63

In the previous assessment, WSP noted that Neoen have also proposed a 400 MW/800 MWh battery facility in the eastern section of the project. The assessment of the potential EMI impacts arising from the battery is considered outside of the scope of the current assessment.

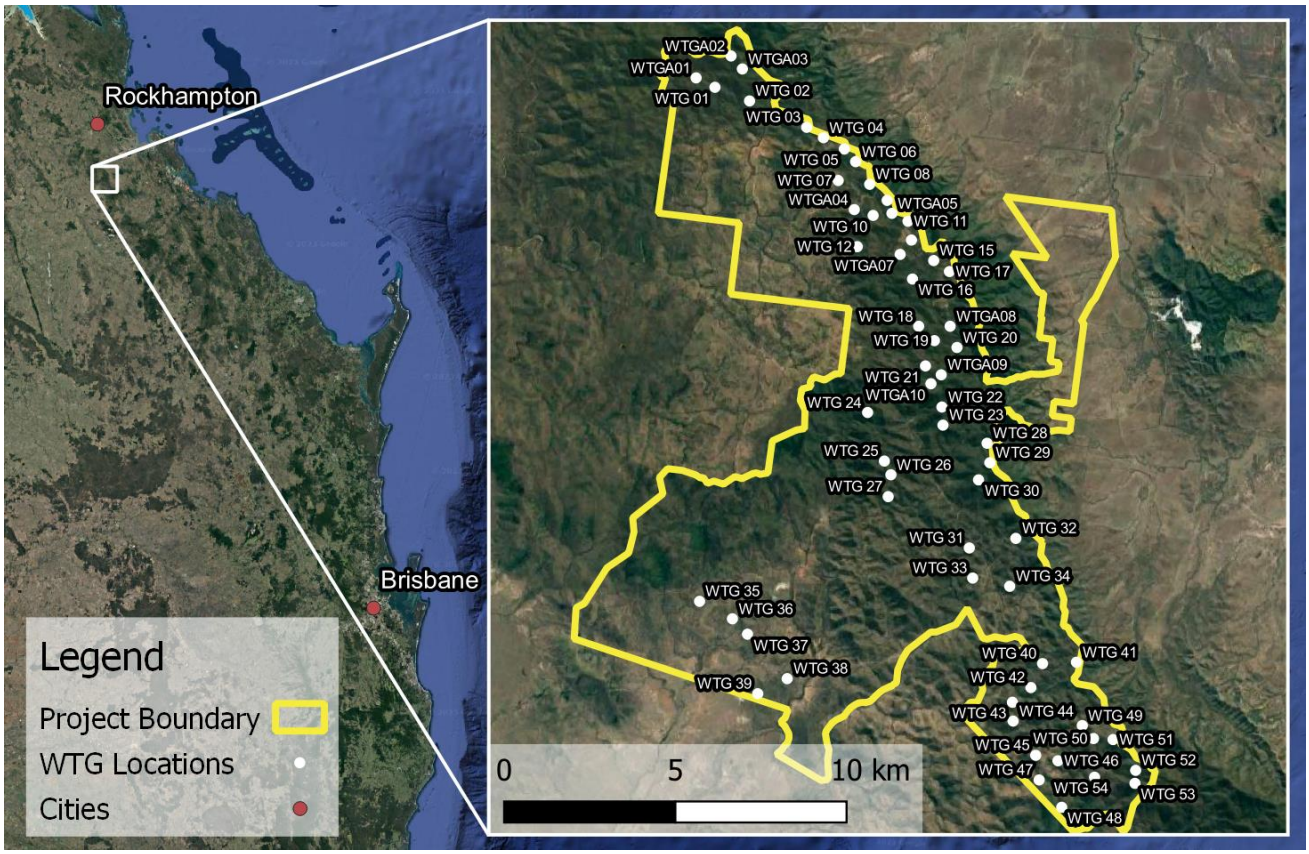

Figure 1.1 Location of MHWF, with site area and WTG locations shown

1.2 APPLICABLE GUIDELINES

The following industry standard guidelines and references have been used in this EMI assessment:

- Draft National Wind Farm Development Guidelines [5]
- Fixed link WTG exclusion zone method [6]
- Queensland State code 23: Wind farm development [7]
- Guidelines for Minimizing the Impact of Wind Farms on the SAGRN (Doc: TR049-SA) [8]

1.3 LIMITATIONS OF THE REPORT

This Report is provided by WSP Australia Pty Limited (WSP) for Neoen Australia Pty Limited (Client) in response to specific instructions from the Client and in accordance with WSP's proposal dated 16 October 2020 and agreement with the Client dated 26 October 2020 (Agreement), under variation *Work Order Proforma Mount Hopeful Wind Farm - VAR20 – RevA* dated 16 January 2023.

1.3.1 PERMITTED PURPOSE

This Report is provided by WSP for the purpose described in the Agreement and no responsibility is accepted by WSP for the use of the Report in whole or in part, for any other purpose (Permitted Purpose).

1.3.2 QUALIFICATIONS AND ASSUMPTIONS

The services undertaken by WSP in preparing this Report were limited to those specifically detailed in the Report and are subject to the scope, qualifications, assumptions and limitations set out in the Report or otherwise communicated to the Client.

Except as otherwise stated in the Report and to the extent that statements, opinions, facts, conclusion and / or recommendations in the Report (Conclusions) are based in whole or in part on information provided by the Client and other parties identified in the report (Information), those Conclusions are based on assumptions by WSP of the reliability, adequacy, accuracy and completeness of the Information and have not been verified. WSP accepts no responsibility for the Information.

WSP has prepared the Report without regard to any special interest of any person other than the Client when undertaking the services described in the Agreement or in preparing the Report.

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1.3.4 DISCLAIMER

No warranty, undertaking or guarantee whether expressed or implied, is made with respect to the data reported or the Conclusions drawn. To the fullest extent permitted at law, WSP, its related bodies corporate and its officers, employees and agents assumes no responsibility and will not be liable to any third party for, or in relation to any losses, damages or expenses (including any indirect, consequential or punitive losses or damages or any amounts for loss of profit, loss of revenue, loss of opportunity to earn profit, loss of production, loss of contract, increased operational costs, loss of business opportunity, site depredation costs, business interruption or economic loss) of any kind whatsoever, suffered on incurred by a third party.

2 METHODOLOGY

2.1 WIND FARMS AND ELECTROMAGNETIC INTERFERENCE

Communication systems using radio waves are heavily utilised in Australia. Mobile phones, television (TV), commercial radio, land mobile radio and emergency radio are common examples of systems that rely on radio and telecommunication. These systems generally use radio towers to transmit and receive signals across a wide area. In the context of wind farm development and operation, electromagnetic interference (EMI) is the impact of WTGs on surrounding communication services resulting in an unacceptably detrimental effect to the communication service. Radar services (such as aviation and weather) can potentially be impacted by wind farms also. This is discussed further in this report.

2.1.1 TYPES OF IMPACTS AND EXCLUSION ZONES

The different effects WTGs can have on communication services are summarised below.

- *Near field impact:* A property of a transmitting and/or receiving antenna is a "near field" zone that is present around the antenna. Any object that can conduct or absorb radio waves, placed within the near field zone, can alter the behaviour of the antenna.
- *Obstruction impact*: If a conductive object is placed in the path of an advancing radio wavefront, wave energy can be absorbed, detrimentally affecting the signal detected at the receiver.
- *Reflection and scattering impacts*: If an object reflective to radio waves is placed in the path of an advancing radio wavefront, it may reflect energy away. The reflected signal may be reflected from the transmitting or receiving antenna which can interfere with the desired signal.
- *Electromagnetic fields / Radio frequency interference:* The operation of a WTG and the associated electrical transmission infrastructure creates an electromagnetic emission that can, theoretically, interact with radio communications.

In many cases, impacts can be sufficiently characterised and mitigated using calculated "exclusion zones" and ensuring these zones are free from WTGs. In other cases, such as when exclusion zones are not feasible to calculate or not appropriate for the communication service, mitigation options are available, as discussed in Section 4. Details of the calculated exclusion zones are given below [6].

- *Near field impact:* The recommended methodology for determining exclusion zones to mitigate near field impacts as discussed above are given by the 'Fixed-link wind-turbine exclusion zone method' [6] and exclusion zones for the MHWF project can be calculated using this approach. Communication towers in proximity to the site were reviewed and are discussed in Section 3.1. In many cases, the required exclusion zones can be very small. However, WSP recommends a minimum standard 1 km radio tower exclusion zone from WTGs as a precautionary measure for any reflection and scattering impacts that may be produced. Consultation with identified licensees is still required and has been undertaken for all communication towers within 2 km of a proposed WTG location.
- *Obstruction impact:* Recommendations for determining exclusion zones to mitigate obstruction are given by 'Fixed-link wind-turbine exclusion zone method' [6]. Exclusion zones have been calculated at MHWF using this method (2^{nd} Fresnel zone method) and are discussed in Section 3.2.
- *Reflection and scattering:* The accepted methods for calculating these impacts generally require information on signal performance requirements specific to each service and client. Additionally, impact calculations from this effect require complex modelling to determine. The scope of this assessment does not include the calculation of reflection/scattering impacts. WSP has undertaken a qualitative assessment to determine potentially affected

licensees within the vicinity of MHWF. Further, all licensees identified within 10 km of MHWF were previously contacted as part of the consultation process to provide further feedback on any potential EMI impacts. All feedback received was forwarded to Neoen. Note that this updated assessment does not include any further consultations.

2.1.2 RELEVANT CATEGORIES

In assessing EMI impacts resulting from wind farm development and operation, radio systems are commonly broken into several different categories based on type. For the purposes of the current investigation, the following categories of services are considered.

- *Fixed point-to-point:* Radio links that transmit and receive between two (2) fixed points fall under this category. For example, network backhaul (such as a dedicated transport core network) commonly utilises point-to-point communication.
- *Fixed point-to-multipoint:* A central location transmits to, and sometimes receives from, several independent locations, such as remote control or base stations for utility and power providers. Some land mobile systems fall under this category.
- *Other/Point-to-area*: TV and radio broadcasting and reception, mobile phones (to the cell site mast) and land mobile systems fall under this category.
- *Radar:* Radar transmits a signal which is reflected back to the transmitting station (some systems involve communication between a radar station and a transponder). Services that utilise radar technology include aircraft detection and weather services.

Point-to-point, point-to-multipoint and radar impacts are considered separately in this assessment. WSP has also considered the impact of the wind farm development on nearby mobile phone networks, internet services, TV broadcasting services and other types of point-to-area licences.

In order to assess the potential EMI impacts arising from the MHWF project development and operation, WSP has adopted the following methodology in line with the Draft National Wind Farm Development Guidelines [5] (or the "Guidleine") as well as State Code 23: Wind farm development [7] (or "State Code 23"), noting substantial overlap between the Guideline and State Code 23:

1. Using the Australian Communications and Media Authority (ACMA) radio communication towers and radio services (RADCOM) database, all licences currently registered within 70 km of MHWF have been identified.
2. All communication towers within 2 km of the MHWF project were investigated and assessed for potential near-field and obstruction effects.
3. All registered fixed point-to-point licences passing through or near the proposed WTG locations were identified and assessed for potential EMI impacts.
4. All fixed point-to-multipoint licences within 30 km of MHWF were identified and assessed for potential EMI impacts.
5. All other remaining registered licences were assessed for potential impacts within 30 km of MHWF.
6. Operators of radar services, including the Bureau of Meteorology (BoM) and aviation services, were identified within 250 nautical miles of MHWF.
7. Network coverage of mobile phone services, internet services and TV broadcast services were assessed in the vicinity of MHWF.
8. Emergency services operating licences within 30 km of MHWF were also identified.
9. A consultation process with identified licensees within 10 km of MHWF. As part of the previous consultation, feedback was requested on any potential impacts that licensees envisage on their respective services from the development and operation of MHWF. Note that no consultation was conducted as part of this updated assessment.

2.2 AUSTRALIAN COMMUNICATIONS AND MEDIA AUTHORITY

ACMA is the Australian Government body that regulates the use of Australia's radio spectrum. ACMA maintains a register of radio licences, radio communication towers and radio services (RADCOM). The RADCOM database contains a register of all radio apparatus, each having a unique radio assignment number. WSP initially accessed the ACMA RADCOM database in November 2020 to conduct the preliminary EMI assessment and the results are detailed in 'PS122878-WIN-MEM-001 RevA' [9]. Revisions of the report up to and including Revision E were produced without re-accessing the database. For the purposes of this report, the RADCOM database was accessed on the 25th January 2023 [3].

The RADCOM database has been known to potentially contain inaccurate information. Additionally, the precision of some tower location coordinates can be considered low for the purposes of this assessment. As part of the previous consultation process, WSP had requested feedback from identified licensees to confirm the accuracy of the information sourced from the RADCOM database. WSP has included responses where feedback was supplied by the licensees.

2.3 ASSESSMENT INPUTS

Table 2.1 outlines the inputs which were considered in this assessment.

Table 2.1 Inputs to the EMI assessment

INPUT	DESCRIPTION	REFERENCE
WTG Layout/Model	WTG layout and model at MHWF, corresponding to a maximum tip height of 260 m and a blade length of 90 m.	[4]
RADCOM Database	Details of licences in operation in Australia, publicly available in the RADCOM database	[3]
BoM data	Locations of nearby weather radars and stations as per the Bureau of Meteorology (BoM) website	[10]
Broadcasting data	Location of nearby TV and radio broadcast towers	[11]
Mobile phone coverage	Mobile phone coverage areas as provided by Telstra, Optus and Vodafone	[12] [13] [14]

2.4 CONSULTATION PROCESS

The Draft National Wind Farm Guidelines [5] recommend that organisations operating within 5 km of a prospective site are consulted regarding the potential EMI impacts of the wind farm on their operations and services. In the previous EMI assessment, WSP considered organisations within 10 km of MHWF.

WSP contacted identified licensees on 19 February 2021, based on the information downloaded from the ACMA database [15]. The responses from licensees where WSP received feedback have been included in the relevant sections in future revisions of this report. The consultation process was concluded in May 2021. A summary of contacted licensees and any associated responses can be found in Appendix A.

2.5 EXCLUSIONS

As mentioned previously, this assessment does not include the calculation of reflection/scattering impacts. WSP has undertaken a qualitative assessment to determine potential affected licensees within the vicinity of MHWF (up to 10 km). Further, all licensees identified within 10 km of MHWF were contacted as part of the previous consultation process conducted in 2021 to provide further feedback on any potential EMI impacts. Of the received consultation responses so far, no licensees flagged potential reflection and/or scattering impacts.

This EMI study only qualitatively assesses the potential impact caused from WTGs, and it does not consider the EMI impact of other wind farm infrastructure such as overhead powerlines, substations, or met masts etc. Further, this Report does not include an Electromagnetic Radiation (EMR) assessment.

3 POTENTIAL IMPACTS

Following the methodology and inputs described in Section 2, WSP has undertaken an independent analysis of the potential EMI impacts arising from the development and operation of the MHWF project.

The RADCOM database [3] was accessed in January 2023 and was used to identify all licences in operation within 70 km of the project.

3.1 RADCOM DATABASE

The ACMA RADCOM database [3] was used to identify all licences within 70 km of the MHWF project boundary. The Draft National Wind Farm Guidelines recommend that all licences within 50-60 km of a project are identified and assessed. It is noted that it is possible that point-to-point licences span over greater distances and as such, WSP has considered 70 km as a first-pass analysis.

746 communication towers were identified within 70 km of the MHWF project boundary, with approximately 66 towers within 30 km of the site boundary.

3.1.1 NEAR FIELD EXCLUSION

A refined search was undertaken to identify any towers located within 2 km of the site boundary and further assessed for potential WTG near-field and scattering effects. Eight (8) communication towers were identified, as shown in Table 3.1.

Table 3.1 Communication towers within a 2 km vicinity of the MHWF boundary

SITE ID	LATITUDE [°]	LONGITUDE [°]	SITE NAME
17392	-23.910	150.566	Telstra Customer GLENGOWAN
17465	-23.875	150.542	Telstra Customer POMEGRANATE
17134	-23.726	150.531	TMR RoadTek Site MT HOPEFUL
17138	-23.730	150.536	BA Site Mount Hopeful 1046 Mount Hopeful Rd BAJOOL
17136	-23.730	150.534	Ergon Site 38 km S of Rockhampton MT HOPEFUL
17135	-23.730	150.534	Nixons Site 38 km S of Rockhampton MT HOPEFUL
17442	-23.730	150.536	Broadcast Australia Site 1046 Mt Hopeful Rd MOUNT HOPEFUL
151579	-23.730	150.532	Broadcast Site 38 km S of Rockhampton MT HOPEFUL

Towers with Site ID 17465 and 17392 to the southern section of the site boundary are located further than 2 km from the nearest proposed WTG locations as shown in Figure 3.1. Both towers are operated by Telstra Corporation Limited. In the previous assessment, WSP contacted the relevant licensees but did not receive a response by the end of the consultation period. See Section 3.2 for the point-to-point impact assessment of these towers.

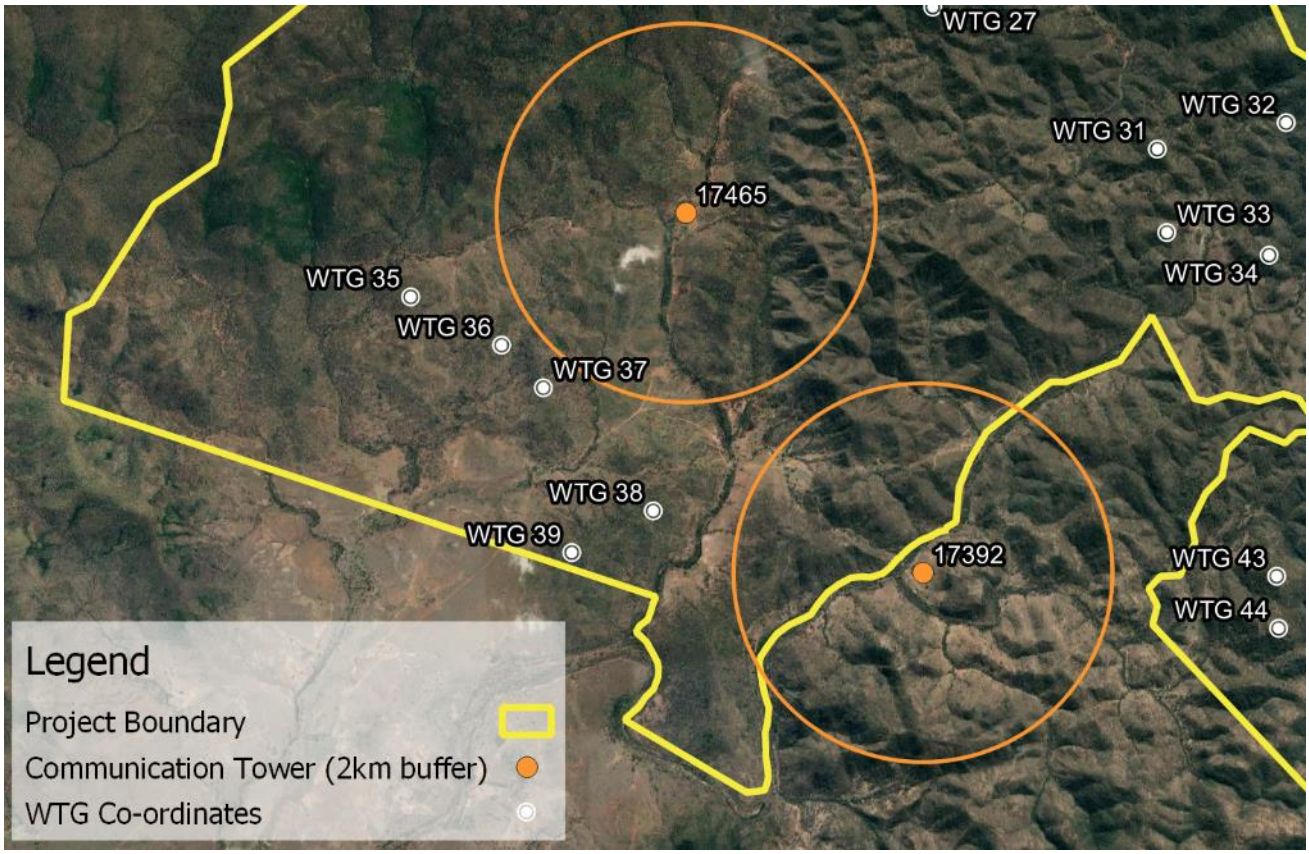

Figure 3.1 Communication towers 17465 and 17392

To the north of the project boundary, there are six communications towers (Site ID's 17134, 17135, 17136, 17138, 17442, 151579). As a conservative approach, WSP generally recommends a 2 km exclusion zone to mitigate near field effects, and to avoid reflection and/or scattering of the radio signals. According to State Code 23 [7], it is recommended that communications towers within 1 km of the WTG locations are considered in relation to near-field effects.

WSP notes that the proposed locations of WTGA02 and WTGA03 lie within a 2 km radius of these towers, but outside a 1 km radius. This is shown in Figure 3.2 below and the point-to-point impact assessment of these towers is assessed in Section 3.2.

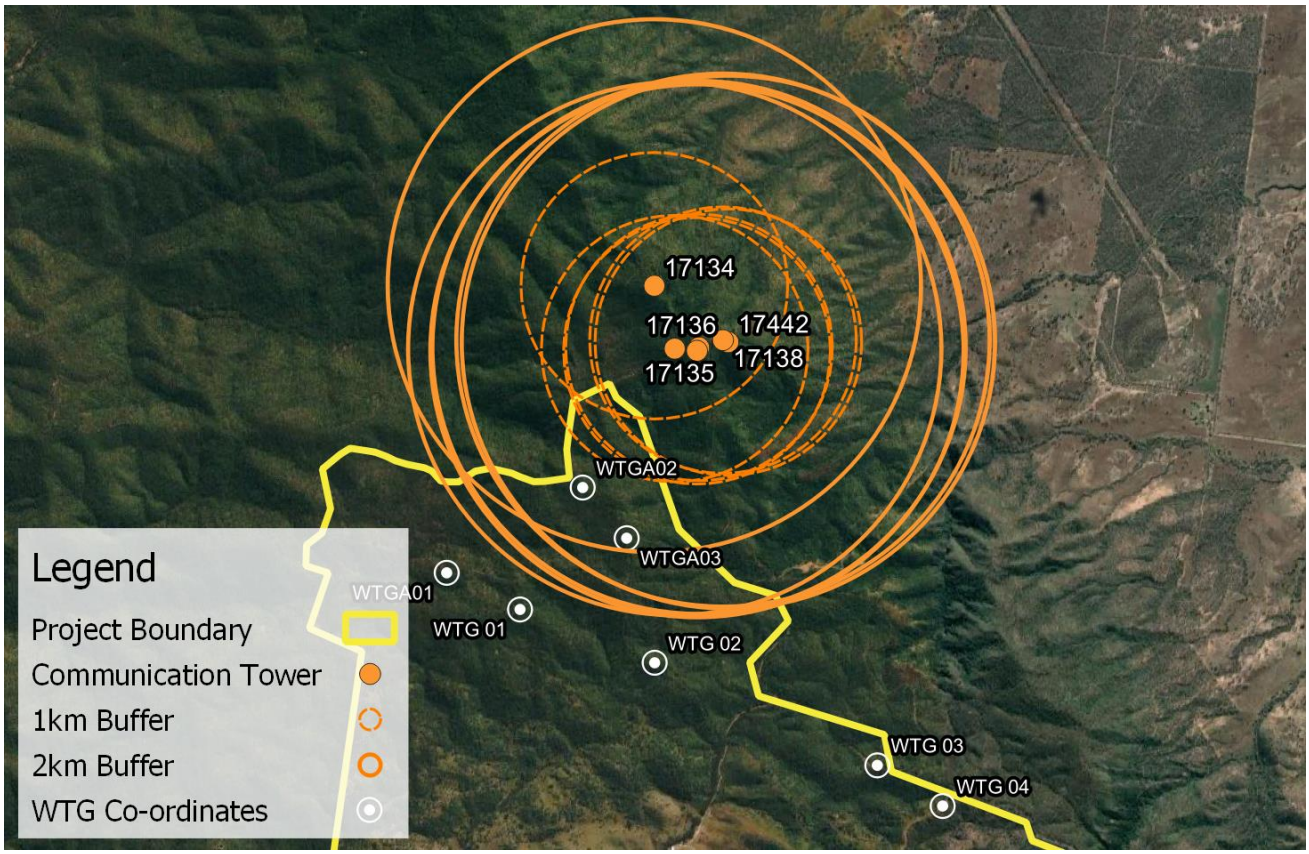

Figure 3.2 Communication towers to the north of the project boundary

3.2 POINT-TO-POINT LICENCES

All registered fixed point-to-point links within 70 km of MHWF have been identified and further analysed for potential intersection with the WTGs within the MHWF site. 17 point-to-point links were identified to intersect or come within 500m of the site boundary. The details of the links are shown in Table 3.2 and Figure 3.3.

Table 3.2 Registered point-to-point links in vicinity to MHWF

LINK NUMBER	SITE 1 ID [LAT, LONG]	SITE 2 ID [LAT, LONG]	LICENCEES	MINIMUM FREQUENCY
1	17134 [-23.725746°, 150.530646°]	17739 [-24.448326°, 150.315667°]	Department of Transport and Main Roads	450.575 MHz
2	17136 [-23.729977°, 150.533851°]	460744 [-24.448554°, 150.31581°]	Queensland Police Services	404.275 MHz
3	17500 [-24.070876°, 150.40958°]	17465 [-23.875481°, 150.542044°]	Telstra Corporation Limited	149.550 MHz
4	17500 [-24.070876°, 150.40958°]	17392 [-23.910163°, 150.565935°]	Telstra Corporation Limited	150.0875 MHz
5	17135 [-23.7302°, 150.533699°]	17740 [-24.448332°, 150.316012°]	Nixon Communications Pty Ltd	404.625 MHz
6	17514 -23.729651, 150.536014	17136 [-23.729977°, 150.533851°]	Ergon Energy Corporation Limited	6.500 GHz
7	17442 [-23.729651°, 150.536014°]	9000353 [-23.922387°, 150.086236°]	Optus Mobile Pty Limited	6.019 GHz
8	17136 [-23.729977°, 150.533851°]	55466 [-23.922296°, 150.076255°]	Queensland Fire and Emergency Services	404.600 MHz
9	17135 [-23.7302°, 150.533699°]	17533 [-23.751029°, 149.051231°]	Nixon Communications Pty Ltd	404.625 MHz
10	17136 [-23.729977°, 150.533851°]	17537 [-23.773166°, 149.116817°]	Queensland Police Service	404.975 MHz
11	17136 [-23.729977°, 150.533851°]	17533 [-23.751029°, 149.051231°]	Department of Health (Queensland Ambulance Service)	450.700 MHz
12	17442 [-23.729651°, 150.536014°]	404292 [-23.749794°, 149.979364°]	Optus Mobile Pty Limited	5.945 GHz
13	9021588 [-23.959662, 150.804856]	17138 [-23.729509, 150.535625]	Airservices Australia	7.435 GHz
14	17568 [-23.908641, 150.762348]	17138 [-23.729509, 150.535625]	Telstra Corporation Limited	404.325 MHz
15	10002893 [-23.810400, 150.647777]	17442 [-23.729651, 150.536014]	Vertical Telecoms Pty Ltd	11.095 GHz
16	17134 [-23.725746, 150.530646]	16905 [-24.311781, 151.624440]	Department of Transport and Main Roads	450.575 MHz
17	151579 [-23.73003, 150.532065]	404292 [-23.749794, 149.979364]	Digital Distribution Australia Pty Ltd	6.720 GHz

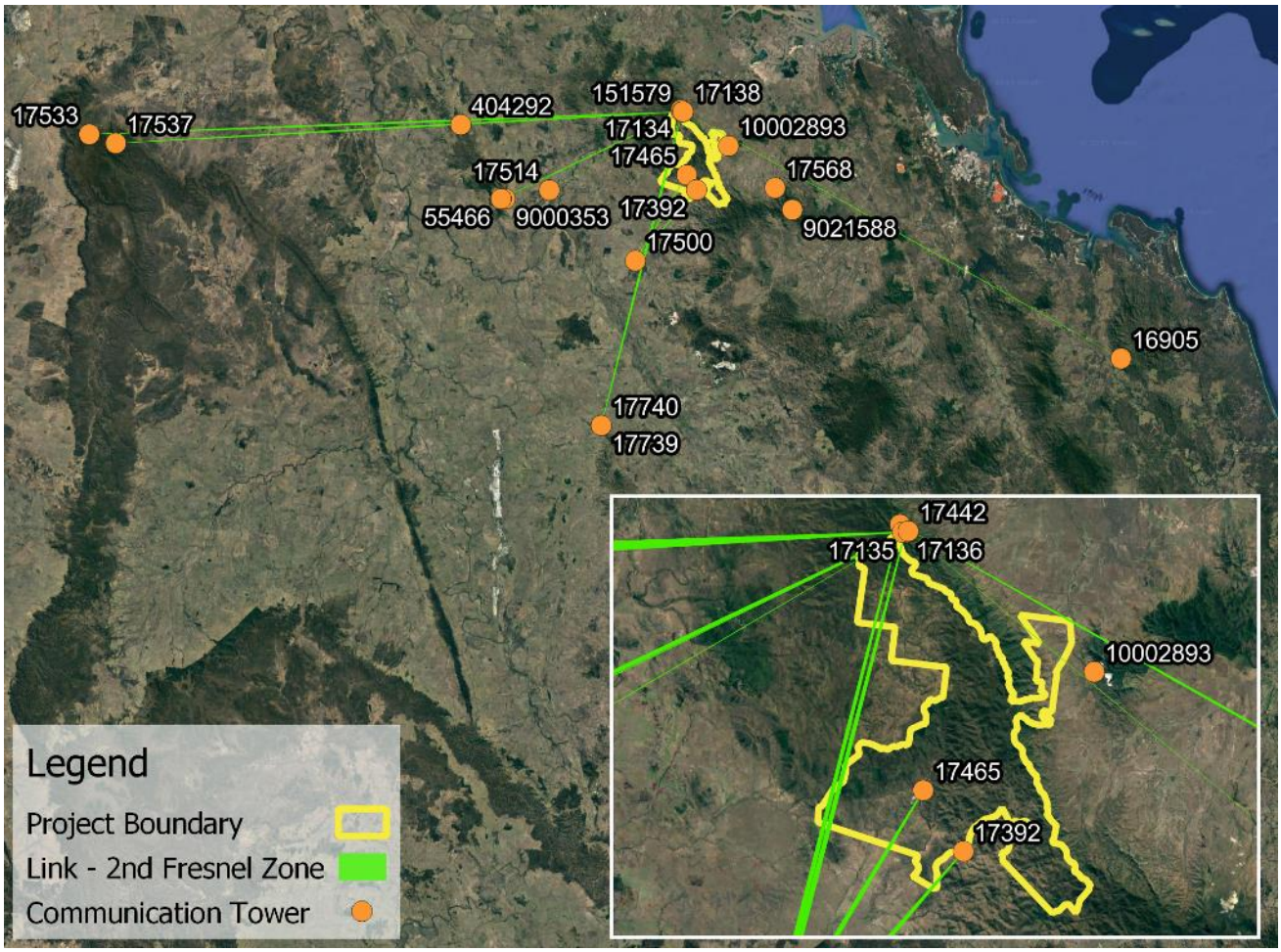

Figure 3.3 Point-to-point links identified in vicinity of MHWF

To assess the likely impact of the MHWF project development and operation on the nearby point to point links, WSP has assessed the 2nd Fresnel exclusion zones for each identified link. As a conservative approach, the lowest frequency associated with each link has been used to develop the 2nd Fresnel zones as this results in the largest Fresnel zone radius. Furthermore, it is noted that the Fresnel zone analysis does not consider the vertical position (elevation above ground level) of the point-to-point link. As such, the exclusion zones reflect a worst case, 2D impact scenario.

To avoid all potential EMI impacts on the links, WSP recommends that no WTG (including blade tip) encroach the 2nd Fresnel zones of the identified links and had previously adopted this approach as part of the layout development process. A set-back distance of one blade length (90 m) has also been considered from the 2nd Fresnel zones to avoid blade overhang.

In the previous revision of this report, WSP contacted the operators of the identified point-to-point links. Any feedback received is discussed further in the following subsections. It is important to note that Link 17 was not identified in the previous revision and the licensee has not been contacted yet. The WTG layout has also changed significantly since the previous revision. WSP recommends a consultation process is to be conducted to ensure the proposed WF is to not adversely impact the signal strength of Link 17. Further details for Link 17 can be found in Section 3.2.17.

3.2.1 LINK 1 DETAILS

Table 3.3 lists the details for Link 1, between the communication towers 17134 and 17739, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.3 Point-to-point assignments between 17134 and 17739

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Department of Transport and Main Roads	17134 [TMR RoadTek Site MT HOPEFUL]	17739 [QR Site BANANA RANGE]	710552-710553	460.075 MHz
			710555-710554	**450.575 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 450.575 MHz, shown in Figure 3.4.

Figure 3.4 Point-to-point Link 1, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 1, with the closest WTG being WTGA02. The blade tip of WTGA02 (assuming a 180 m rotor diameter) is approximately 13 m to the west of the 2nd Fresnel zone, but remains outside the 2nd Fresnel zone based on a rotor diameter of 180 m.

In the previous assessment, WSP contacted the relevant licensees and did not receive any feedback by the end of the 4-month consultation period (May 2021).

It should be noted that the updated WTG layout has resulted in a shorter distance between the 2nd Fresnel zone and the nearest WTG.

3.2.2 LINK 2 DETAILS

Table 3.4 lists the details for Link 2, between the communication towers 17136 and 460744, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.4 Point-to-point assignments between 17136 and 460744

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Queensland Police Service	17136 [Ergon Site 38 km S of Rockhampton MT HOPEFUL]	460744 [Emergency Services Site BANANA RANGE]	1338270-1338271	460.725 MHz
			1338273-1338272	451.225 MHz
			1453023-1453022	414.050 MHz
			1453024-1453025	404.600 MHz
			709158-709157	413.725 MHz
			709159-709160	**404.275 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 404.275 MHz, shown in Figure 3.5.

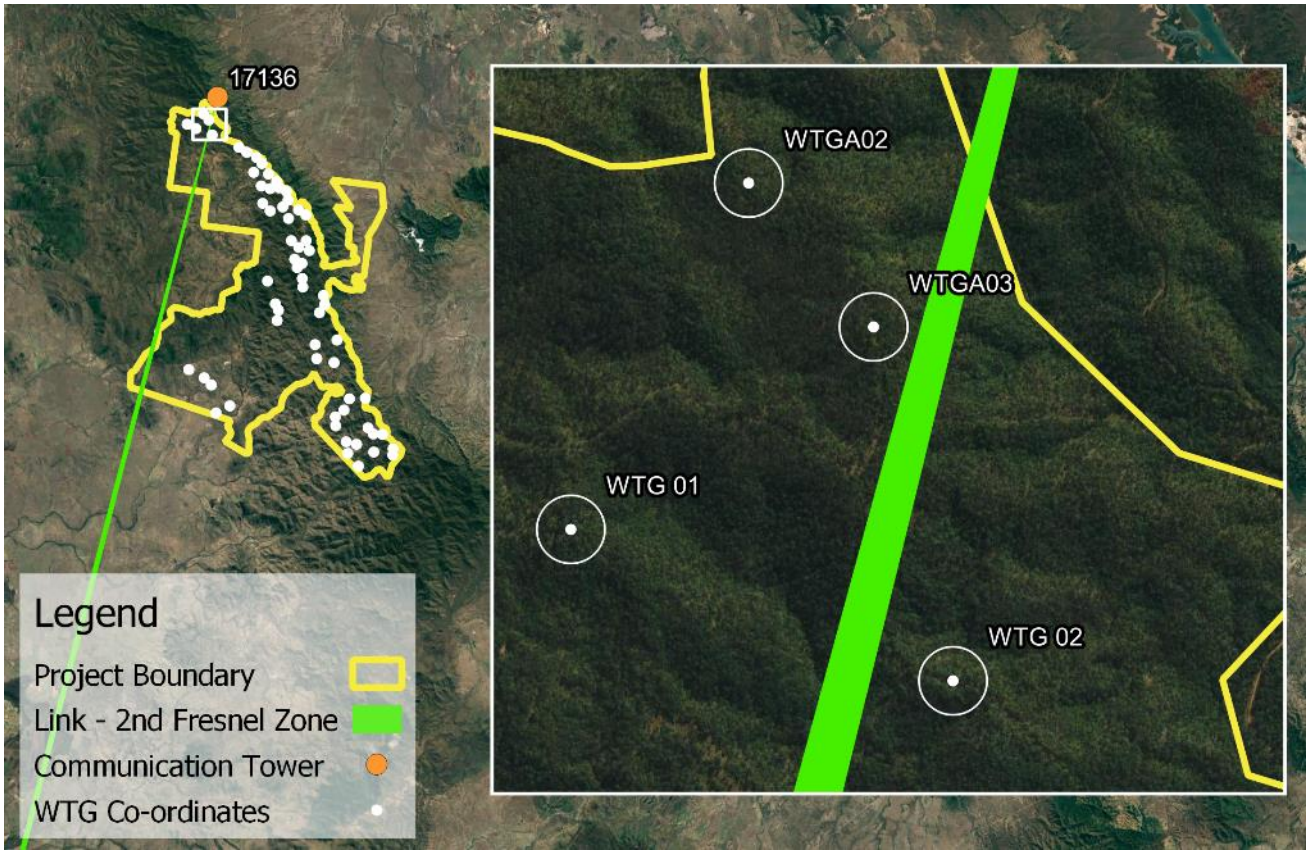

Figure 3.5 Point-to-point Link 2, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 2, with the closest WTG being WTGA03. The blade tip of WTGA03 is approximately 30 m west of the 2nd Fresnel zone.

In the previous assessment, WSP contacted the Queensland Ambulance Service (QAS) seeking feedback on the potential EMI impact of MHWF on their operations and services. QAS stated that *"the link paths and radio sites at Banana Range and My Spencer are not obstructed and the wind farm location should not have any impact on nearby PSA radio communication facility services."* [16] [17]

It should be noted that since the previous assessment, the licencee for this link has changed from the QAS to Queensland Police. The updated WTG layout has also resulted in a shorter distance between the 2nd Fresnel zone and the nearest WTG.

3.2.3 LINK 3 DETAILS

Table 3.5 lists the details for Link 3, between the communication towers 17500 and 17465, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.5 Point-to-point assignments between 17500 and 17465

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Telstra Corporation Limited	17500 [Telstra Radio Terminal TOMLIN]	17465 [Telstra Customer POMEGRANATE]	688248-688249	154.75 MHz
			688251-688250	**149.55 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 149.55 MHz, shown in Figure 3.6.

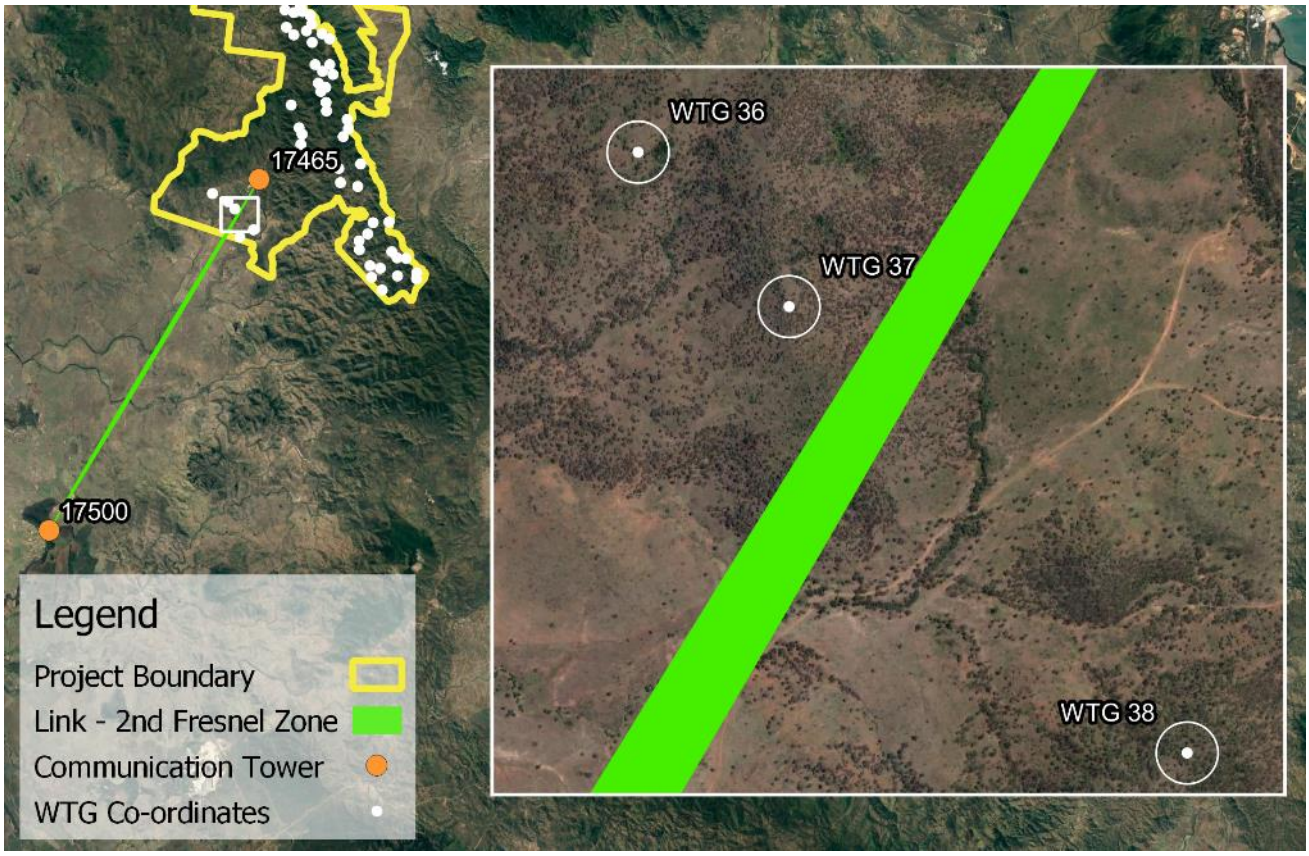

Figure 3.6 Point-to-point Link 3, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 3, with the closest WTG being WTG37. The blade tip of WTG37 is approximately 160 m west of the 2nd Fresnel zone.

In the previous assessment, WSP contacted the relevant licensees and did not receive any feedback by the end of the 4-month consultation period (May 2021).

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.4 LINK 4 DETAILS

Table 3.6Table 3.20 lists the details for Link 4, between the communication towers 17500 and 17392, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.6 Point-to-point assignments between 17500 and 17392

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Telstra Corporation Limited	17500 [Telstra Radio Terminal TOMLIN]	17392 [Telstra Customer GLENGOWAN]	688244-688245	154.6875 MHz
			688247-688246	**150.0875 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 150.0875 MHz, shown in Figure 3.7.

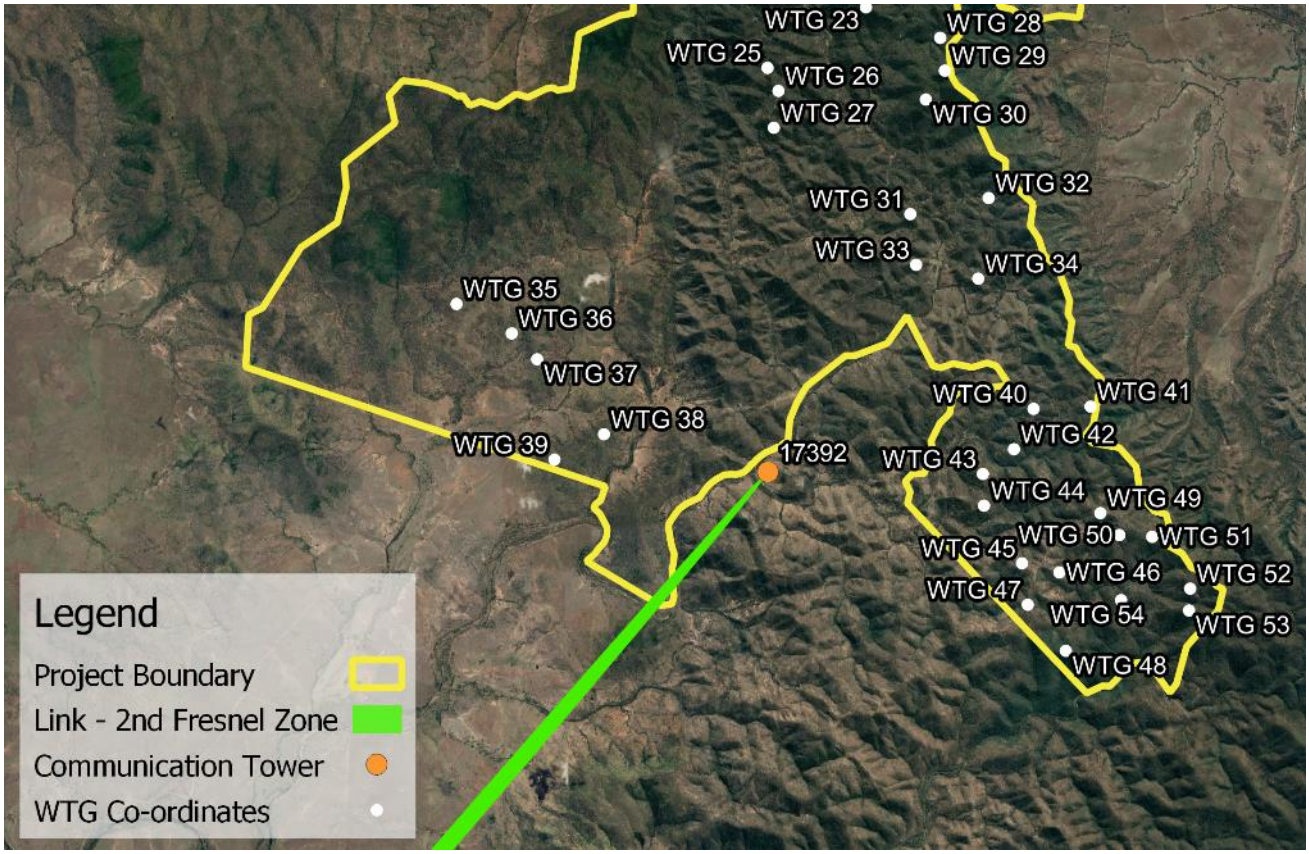

Figure 3.7 Point-to-point Link 4, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 4. The closest WTG is over 2km distance from the 2nd Fresnel zone.

In the previous assessment WSP contacted the relevant licensees and did not receive any feedback by the end of the 4-month consultation period (May 2021).

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.5 LINK 5 DETAILS

Table 3.7 lists the details for Link 5, between the communication towers 17135 and 17740, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.7 Point-to-point assignments between 17135 and 17740

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Nixon Communications Pty Ltd	17135 [Nixons Site 38 km S of Rockhampton MT HOPEFUL]	17740 [Council Site BANANA RANGE]	821276-821275	414.075 MHz
			821277-821278	**404.625 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 404.625 MHz, shown in Figure 3.8.

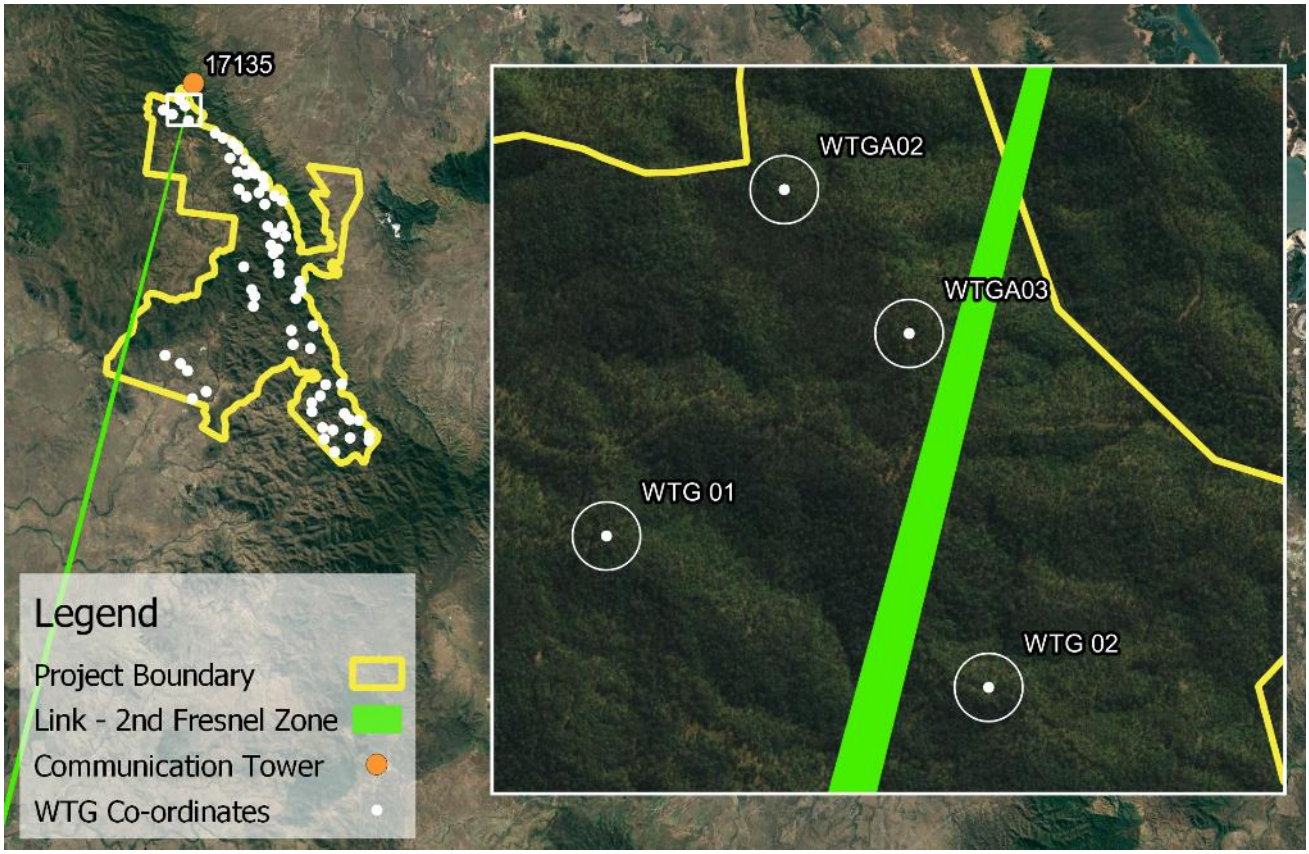

Figure 3.8 Point-to-point Link 5, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 5, with the closest WTG being WTGA03. The blade tip of WTGA03 is approximately 20 m east of the 2nd Fresnel zone, and remains outside of the 2nd Fresnel zone based on the proposed rotor diameter of 180 m.

In the previous assessment, WSP contacted Nixon Communications seeking feedback on the potential EMI impact of MHWF on their operations and services. Nixon Communications stated *"We assumed no impact due to the frequencies we use at Mt Hopeful and have noted no impact to date."* [18]

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.6 LINK 6 DETAILS

Table 3.8 lists the details for Link 6, between the communication towers 17514 and 17136, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.8 Point-to-point assignments between 17514 and 17136

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Ergon Energy Corporation Limited	17514 [Sub Station Railway Ave WOWAN]	17136 [Ergon Site 38 km S of Rockhampton MT HOPEFUL]	898793-898794	6.84 GHz
			898796-898795	**6.50 GHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 6.50 GHz, shown in Figure 3.9.

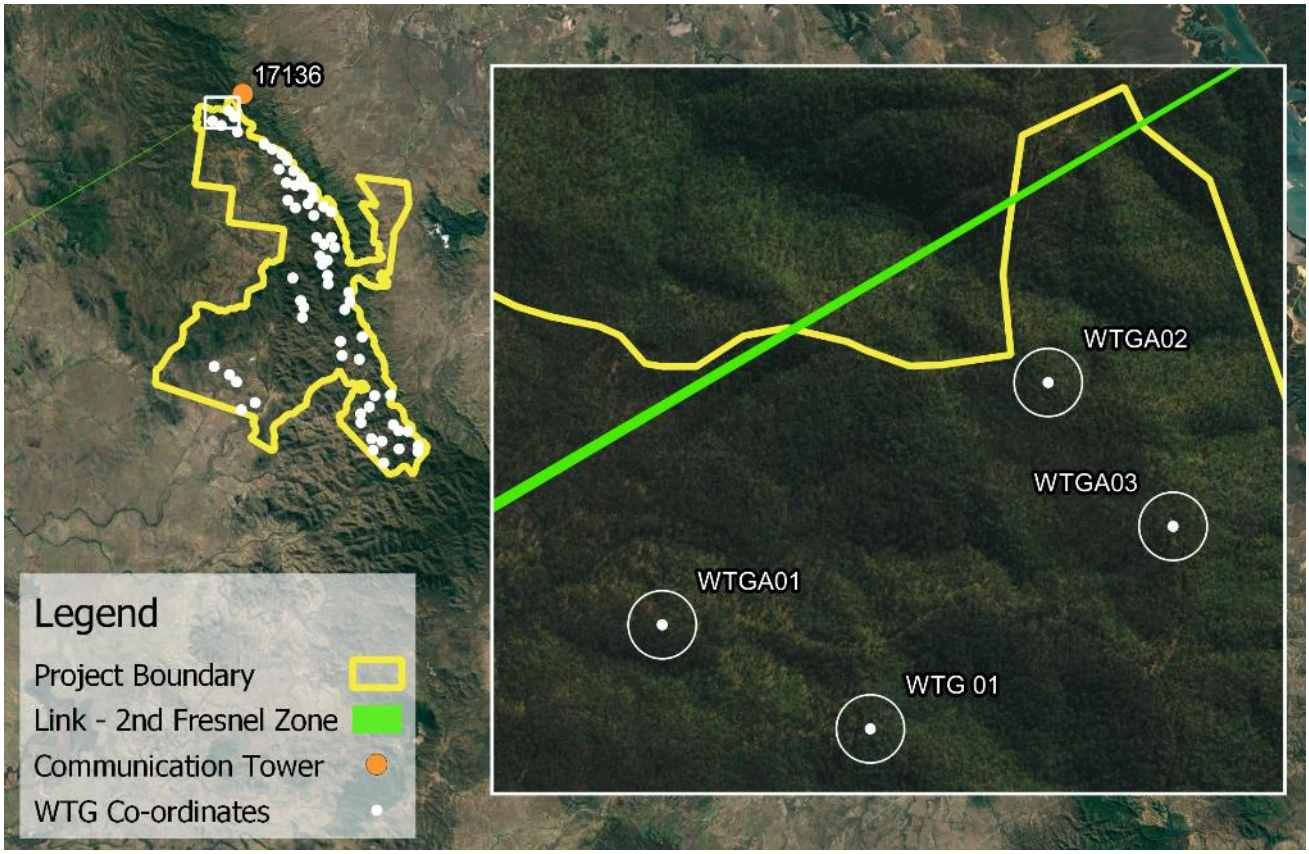

Figure 3.9 Point-to-point Link 6, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 6, with the closest WTG being WTGA02. The blade tip of WTGA02 is approximately 360 m south-east of the 2nd Fresnel zone.

In the previous assessment, WSP contacted Ergon Energy Corporation Limited seeking feedback on the potential EMI impact of MHWF on their operations and services. Ergon Energy stated that; *"No Impact identified with the currently proposed turbine locations."* [19]

It should be noted that the updated WTG layout results in a shorter distance between the 2nd Fresnel zone and the nearest WTG.

3.2.7 LINK 7 DETAILS

Table 3.9 lists the details for Link 7, between the communication towers 17442 and 9000353, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.9 Point-to-point assignments between 17442 and 9000353

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Optus Mobile Pty Limited	17442 [Broadcast Australia Site 1046 Mt Hopeful Rd MOUNT HOPEFUL]	9000353 [Optus Tower Lot 106 RN231 WOWAN]	6641011-6641010	6.271365 GHz
			6641012-6641013	**6.019325 GHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 6.019325 GHz, shown in Figure 3.10.

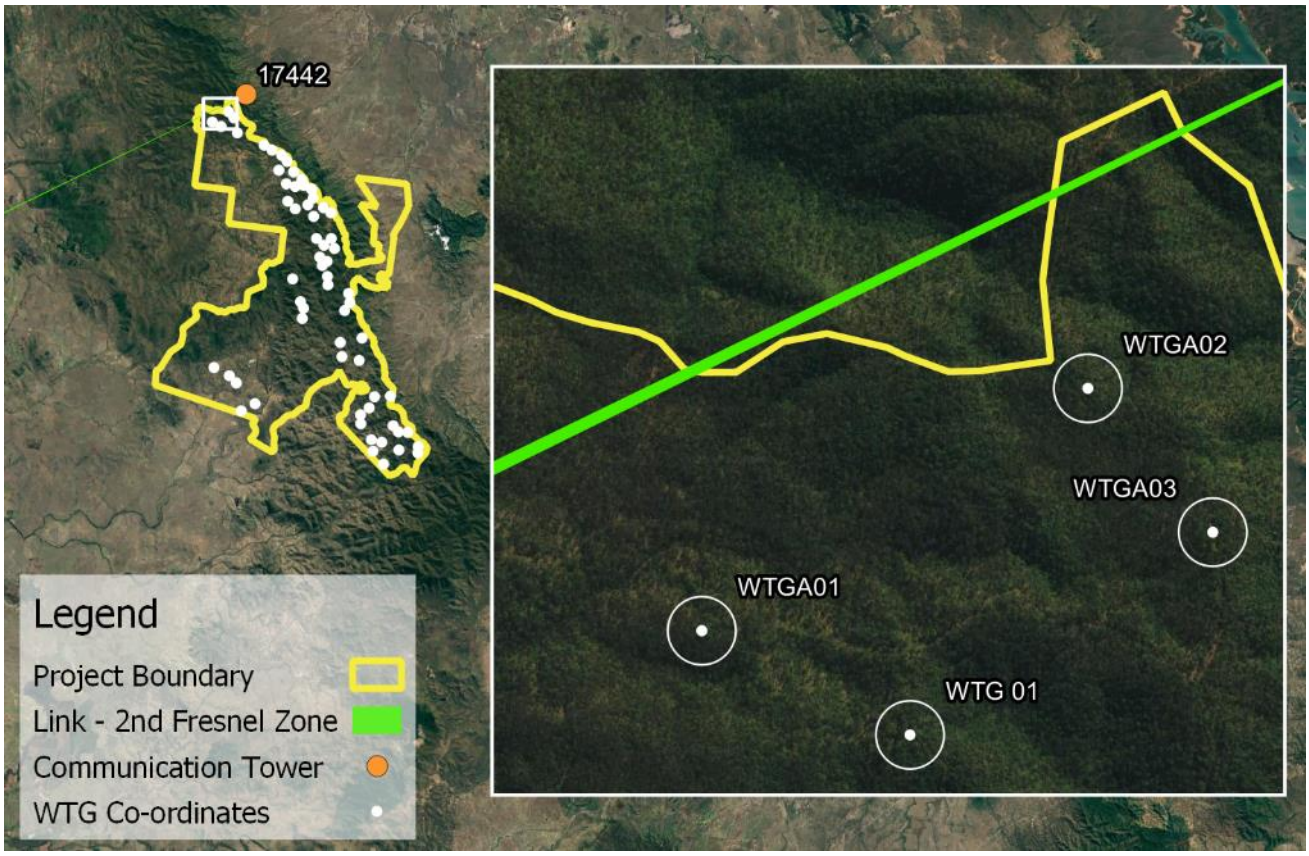

Figure 3.10 Point-to-point Link 7, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 7, with the closest WTG being WTGA02. The blade tip of WTGA02 is approximately 400m south-east of the 2nd Fresnel zone.

In the previous assessment, WSP contacted Optus Mobile Pty Limited (Optus) seeking feedback on the potential EMI impact of MHWF on their operations and services. Optus stated that; *"while there may be some impacts on Optus network and services in the area, the impacts is not expected to be unacceptable. Hence, Optus does not have any objection to the proposed Mt Hopeful Wind Farm located near Rockhampton, QLD."* [20]

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.8 LINK 8 DETAILS

Table 3.10 lists the details for Link 8, between the communication towers 17136 and 55466, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.10 Point-to-point assignments between 17136 and 55466

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Queensland Fire and Emergency Services	17136 [Ergon Site 38 km S of Rockhampton MT HOPEFUL]	55466 [Police Site MT SPENCER]	1453119-1453118	414.05 MHz
			1453120-1453121	**404.60 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 404.60 MHz, shown in Figure 3.11.

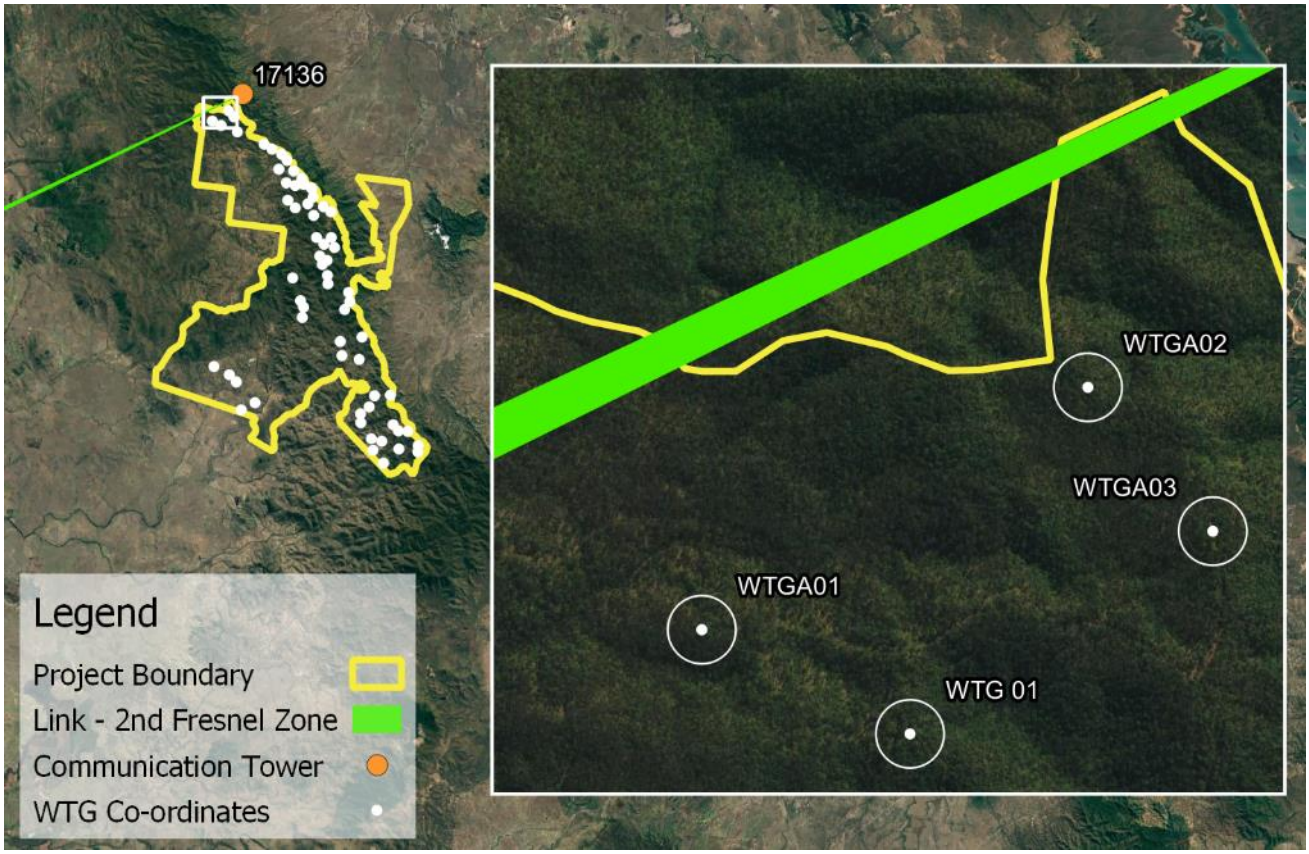

Figure 3.11 Point-to-point Link 8, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 8, with the closest WTG being WTGA02. The blade tip of WTGA02 is approximately 435 m south-east of the 2nd Fresnel zone.

In the previous assessment, WSP contacted the Queensland Fire and Emergency Services (QFES) seeking feedback on the potential EMI impact of MHWF on their operations and services. QFES stated that *"the link paths and radio sites at Banana Range and My Spencer are not obstructed and the wind farm location should not have any impact on nearby PSA radio communication facility services."* [16] [17]

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.9 LINK 9 DETAILS

Table 3.11 lists the details for Link 9, between the communication towers 17135 and 17533, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.11 Point-to-point assignments between 17135 and 17533

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Nixon Communications Pty Ltd	17135 [Nixons Site 38 km S of Rockhampton MT HOPEFUL]	17533 [QAS Site BLACKDOWN TABLELAND]	820269-820267	414.075 MHz
			820271-820272	**404.625 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 404.625 MHz, shown in Figure 3.12.

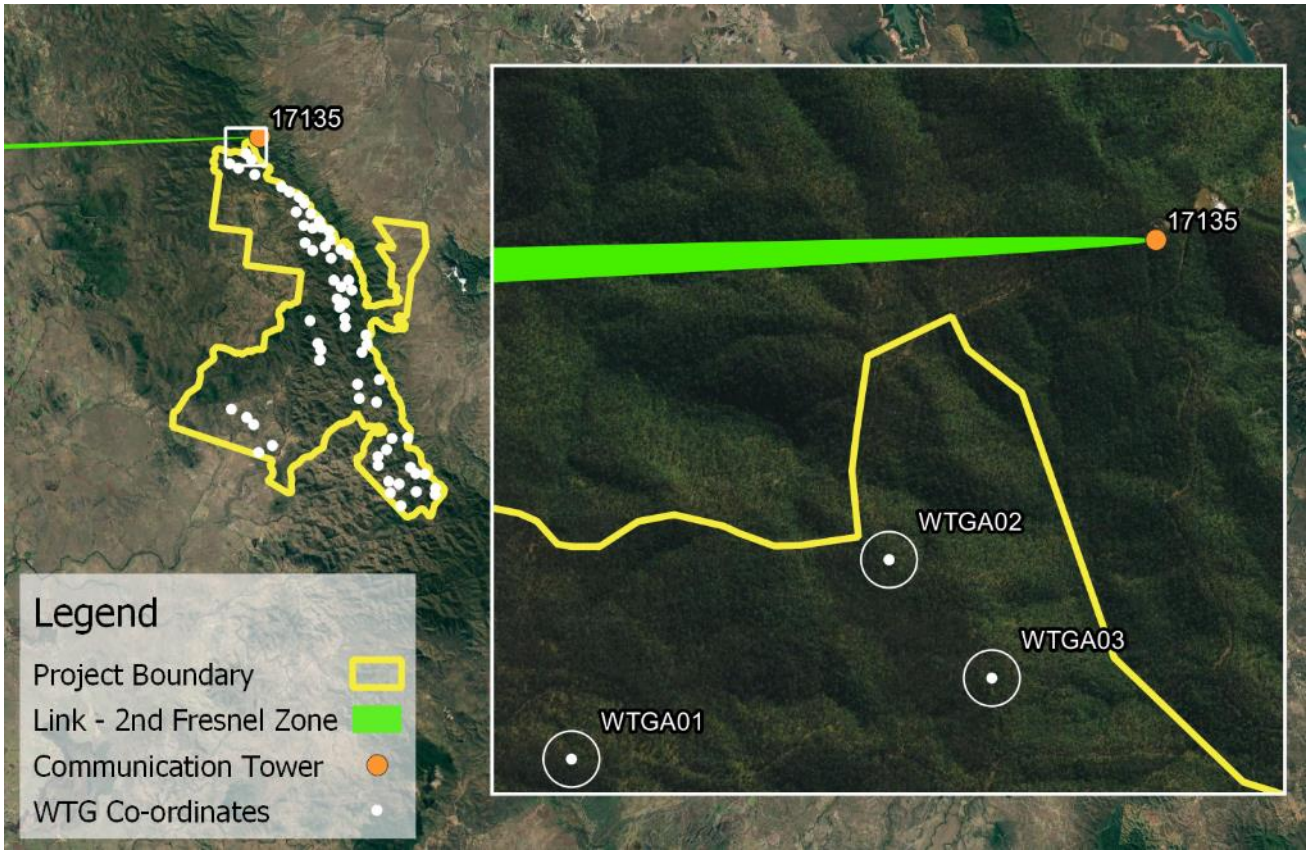

Figure 3.12 Point-to-point Link 9, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 9, with the closest WTG being WTGA02. The blade tip of WTGA02 is approximately 860 m south of the 2nd Fresnel zone.

As noted in the previous assessment WSP contacted Nixon Communications seeking feedback on the potential EMI impact of MHWF on their operations and services. Nixon Communications stated *"We assumed no impact due to the frequencies we use at Mt Hopeful and have noted no impact to date."* [18]

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.10 LINK 10 DETAILS

Table 3.12 lists the details for Link 10, between the communication towers 17136 and 17537, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.12 Point-to-point assignments between 17136 and 17537

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Queensland Police Service	17136 [Ergon Site 38 km S of Rockhampton MT HOPEFUL]	17537 [TMR RoadTek Site BLACKDOWN TABLELAND]	709074-709073	414.425 MHz
			709075-709076	**404.975 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 404.975 MHz, shown in Figure 3.13.

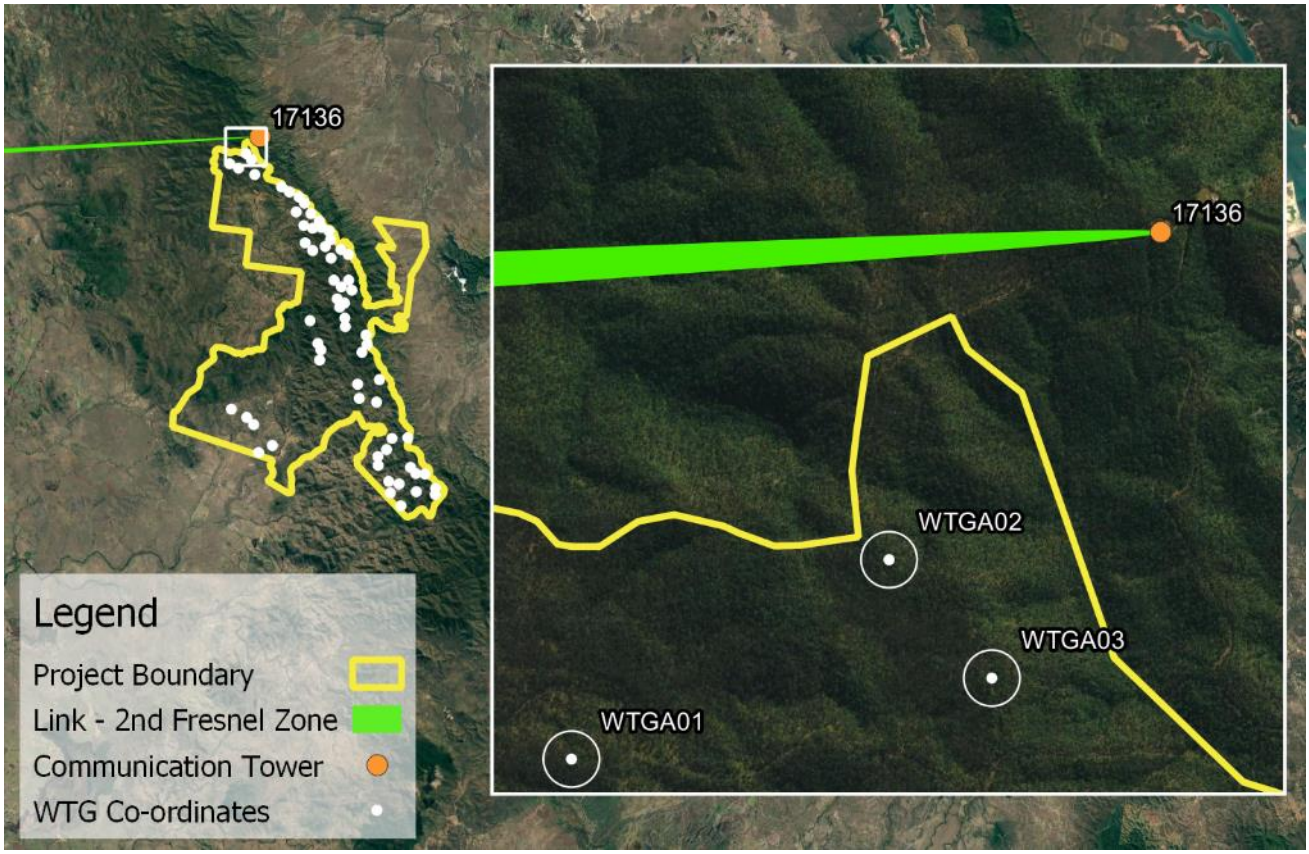

Figure 3.13 Point-to-point Link 10, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 10, with the closest WTG being WTGA02. The blade tip of WTGA02 is approximately 870 m south of the 2nd Fresnel zone.

In the previous assessment, WSP contacted the Queensland Police Service (QPS) seeking feedback on the potential EMI impact of MHWF on their operations and services. QPS stated that *"the link paths and radio sites at Banana Range and My Spencer are not obstructed and the wind farm location should not have any impact on nearby PSA radio communication facility services."* [16] [17]

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.11 LINK 11 DETAILS

Table 3.13 lists the details for Link 11, between the communication towers 17136 and 17533, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.13 Point-to-point assignments between 17136 and 17533

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Department of Health (Queensland Ambulance Service)	17136 [Ergon Site 38 km S of Rockhampton MT HOPEFUL]	17533 [QAS Site BLACKDOWN TABLELAND]	1338298-1338299	460.2 MHz
			1338301-1338300	**450.7 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 450.7 MHz, shown in Figure 3.14.

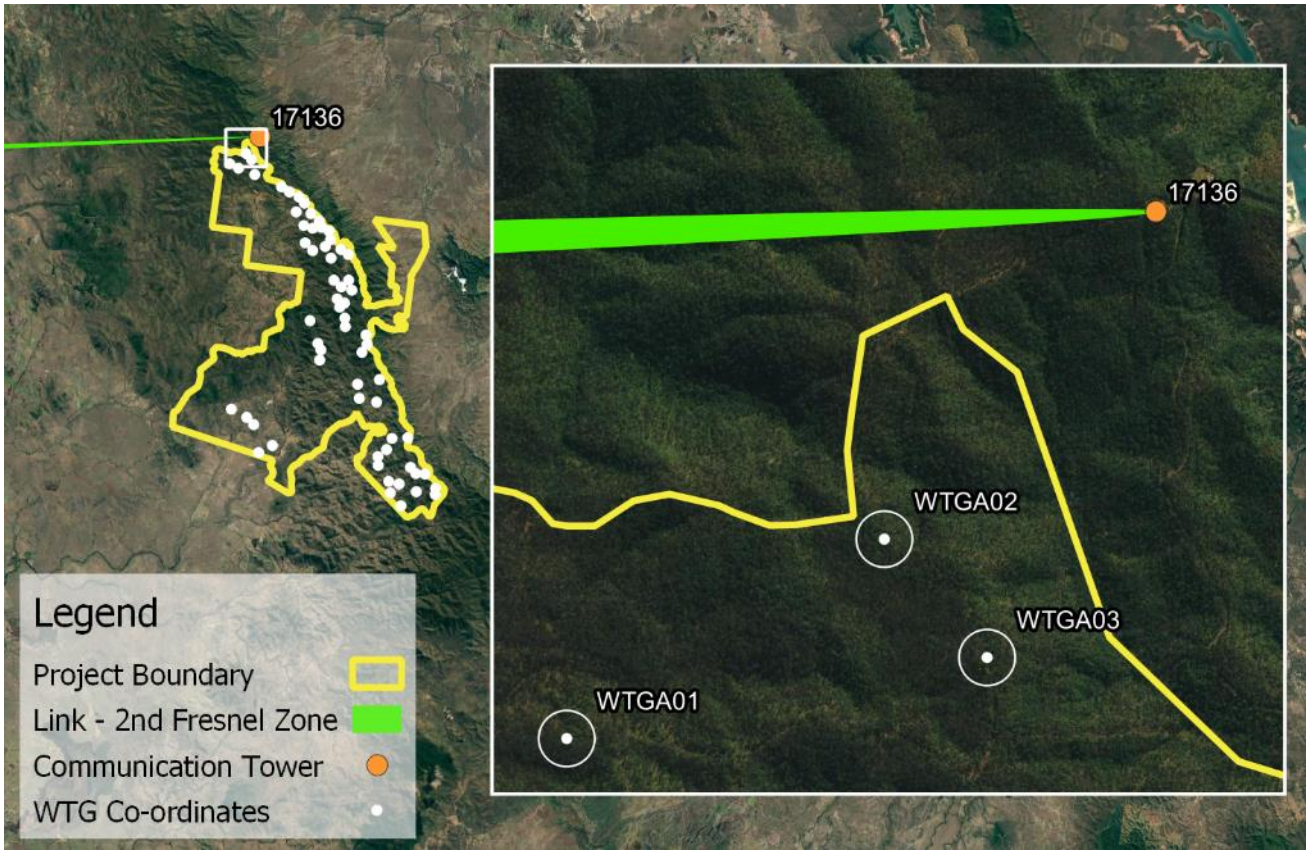

Figure 3.14 Point-to-point Link 11, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 11, with the closest WTG being WTGA02. The blade tip of WTGA02 is approximately 890 m south of the 2nd Fresnel zone.

In the previous assessment, WSP contacted the Queensland Ambulance Service (QAS) seeking feedback on the potential EMI impact of MHWF on their operations and services. QAS stated that *"the link paths and radio sites at Banana Range and My Spencer are not obstructed and the wind farm location should not have any impact on nearby PSA radio communication facility services."* [16] [17]

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.12 LINK 12 DETAILS

Table 3.14 lists the details for Link 12, between the communication towers 17442 and 404292, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.14 Point-to-point assignments between 17442 and 404292

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Optus Mobile Pty Limited	17442 [Broadcast Australia Site 1046 Mt Hopeful Rd MOUNT HOPEFUL]	404292 [Optus Site Grantleigh Rd GOGANGO]	1313232-1313231	6.22689 GHz
			1313233-1313234	5.97485 GHz
			990939-990938	6.19724 GHz
			990940-990941	**5.9452 GHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 5.9452 GHz, shown in Figure 3.15.

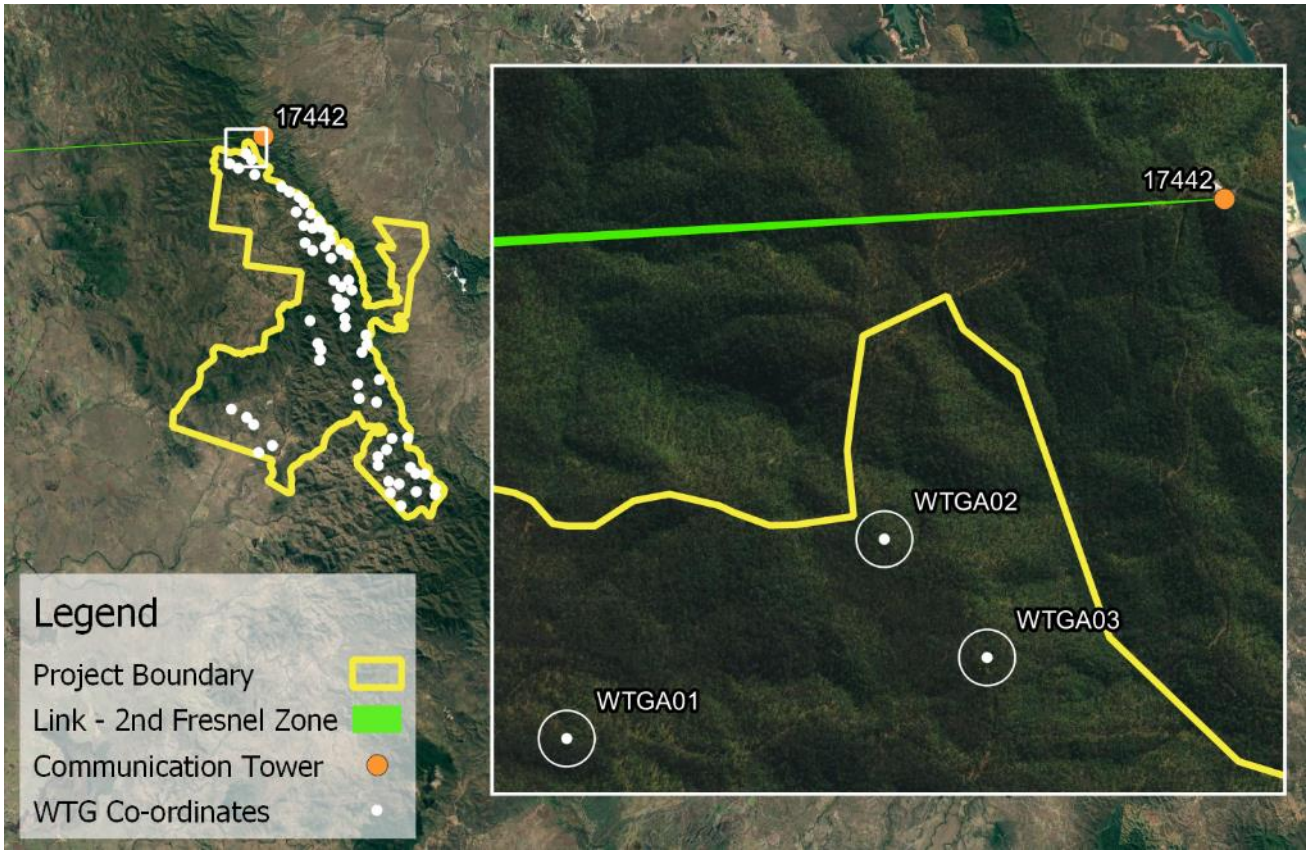

Figure 3.15 Point-to-point Link 12, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 12, with the closest WTG being WTGA02. The blade tip of WTHA02 is approximately 920 m south of the 2nd Fresnel zone.

In the previous assessment, WSP contacted Optus Mobile Pty Limited (Optus) seeking feedback on the potential EMI impact of MHWF on their operations and services. Optus stated that; *"while there may be some impacts on Optus network and services in the area, the impacts is not expected to be unacceptable. Hence, Optus does not have any objection to the proposed Mt Hopeful Wind Farm located near Rockhampton, QLD."* [20]

It should be noted that the updated WTG layout results in a greater distance between the 2nd Fresnel zone and the nearest WTG.

3.2.13 LINK 13 DETAILS

Table 3.15 lists the details for Link 13, between the communication towers 9021588 and 17138, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.15 Point-to-point assignments between 9021588 and 17138

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Airservices Australia	9021588 [Airservices Radar Tower Mt Alma Radar Site MT ALMA]	17138 [BA Site Mount Hopeful 1046 Mount Hopeful Rd BAJOOL]	2340341-2340342	7.596 GHz
			2340344-2340343	**7.435 GHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 7.435 GHz, shown in Figure 3.16.

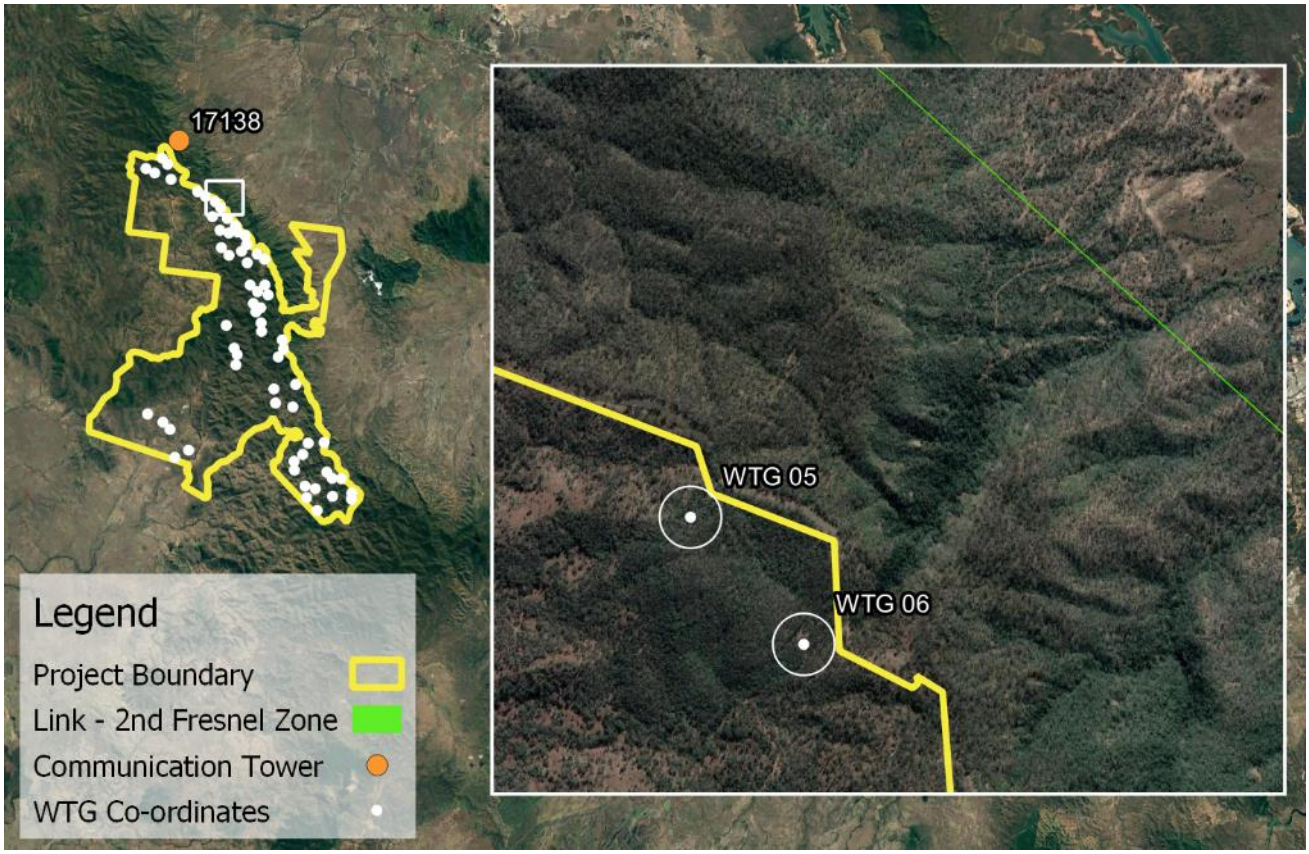

Figure 3.16 Point-to-point Link 13, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 13, with the closest WTG being WTG 05. The blade tip of WTG 05 is approximately 1250 m south-west of the 2nd Fresnel zone.

In the previous assessment, WSP contacted Airservices Australia seeking feedback on the potential EMI impact of MHWF on their operations and services. Airservices Australia stated that *"This proposal will not adversely impact the performance of any Airservices Precision/Non-Precision Nav Aids, Anemometers, HF/VHF/UHF Comms, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links."* [21]

It should be noted that the updated WTG layout results in a roughly similar distance between the 2nd Fresnel zone and the nearest WTG.

3.2.14 LINK 14 DETAILS

Table 3.16 lists the details for Link 14, between the communication towers 17568 and 17138, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.16 Point-to-point assignments between 17568 and 17138

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Telstra Corporation Limited	17568 [Telstra Customer Creed MT BENNET HOMESTEAD]	17138 [BA Site Mount Hopeful 1046 Mount Hopeful Rd BAJOOL]	705297-705298	413.775 MHz
			705300-705299	**404.325 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 404.325 MHz, shown in Figure 3.17.

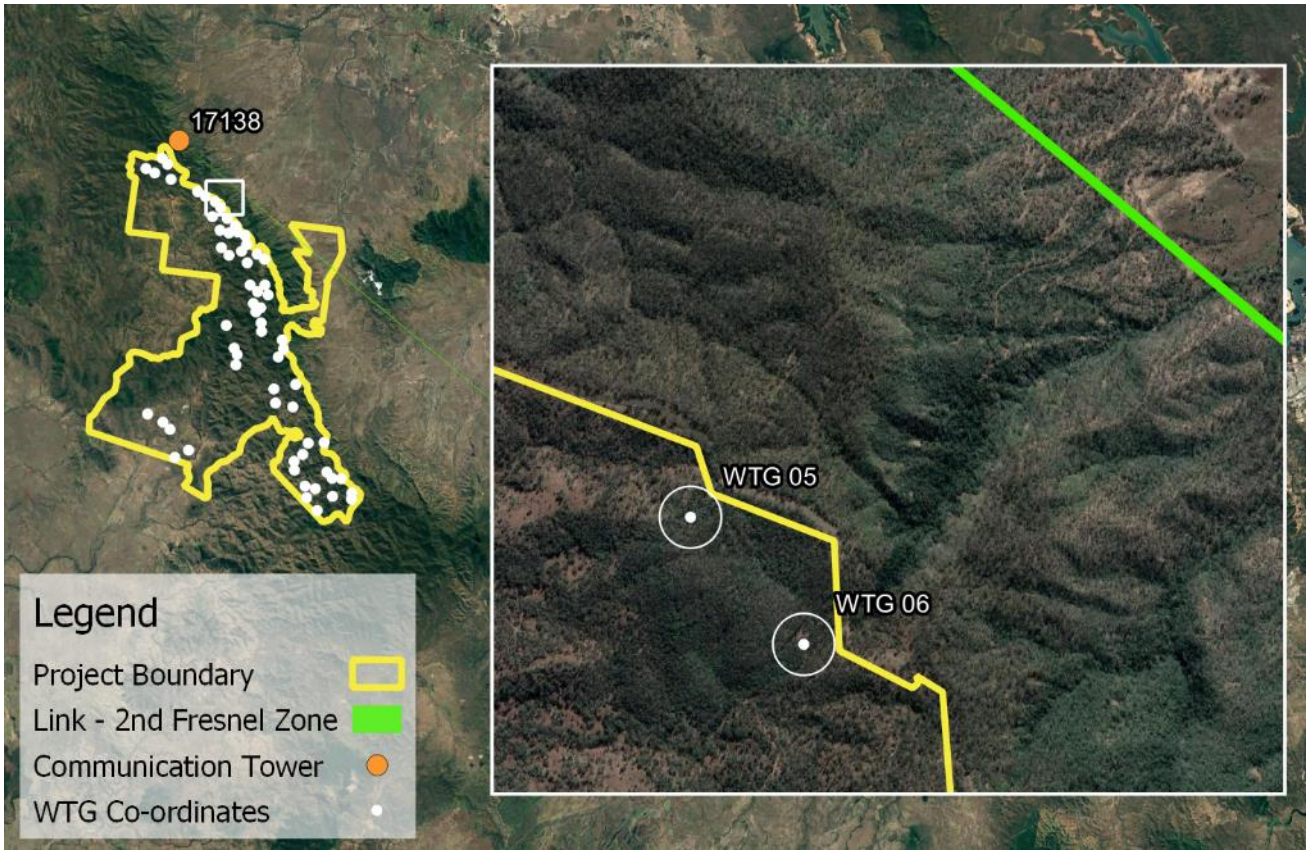

Figure 3.17 Point-to-point Link 14, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 14, with the closest WTG being WTG 05. The blade tip of WTG05 is approximately 1400 m south of the 2nd Fresnel zone.

In the previous assessment, WSP contacted the relevant licensees and did not receive any feedback by the end of the 4-month consultation period (May 2021).

3.2.15 LINK 15 DETAILS

Table 3.17 lists the details for Link 15, between the communication towers 10002893 and 17442, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.17 Point-to-point assignments between 10002893 and 17442

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Vertical Telecoms Pty Ltd	10002893 [1879 South Ulam Road Bajool]	17442 [Broadcast Australia Site 1046 Mt Hopeful Rd MOUNT HOPEFUL]	2338761-2338760	11.585 GHz
			2338762-2338763	**11.095 GHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 11.095 GHz, shown in Figure 3.18.

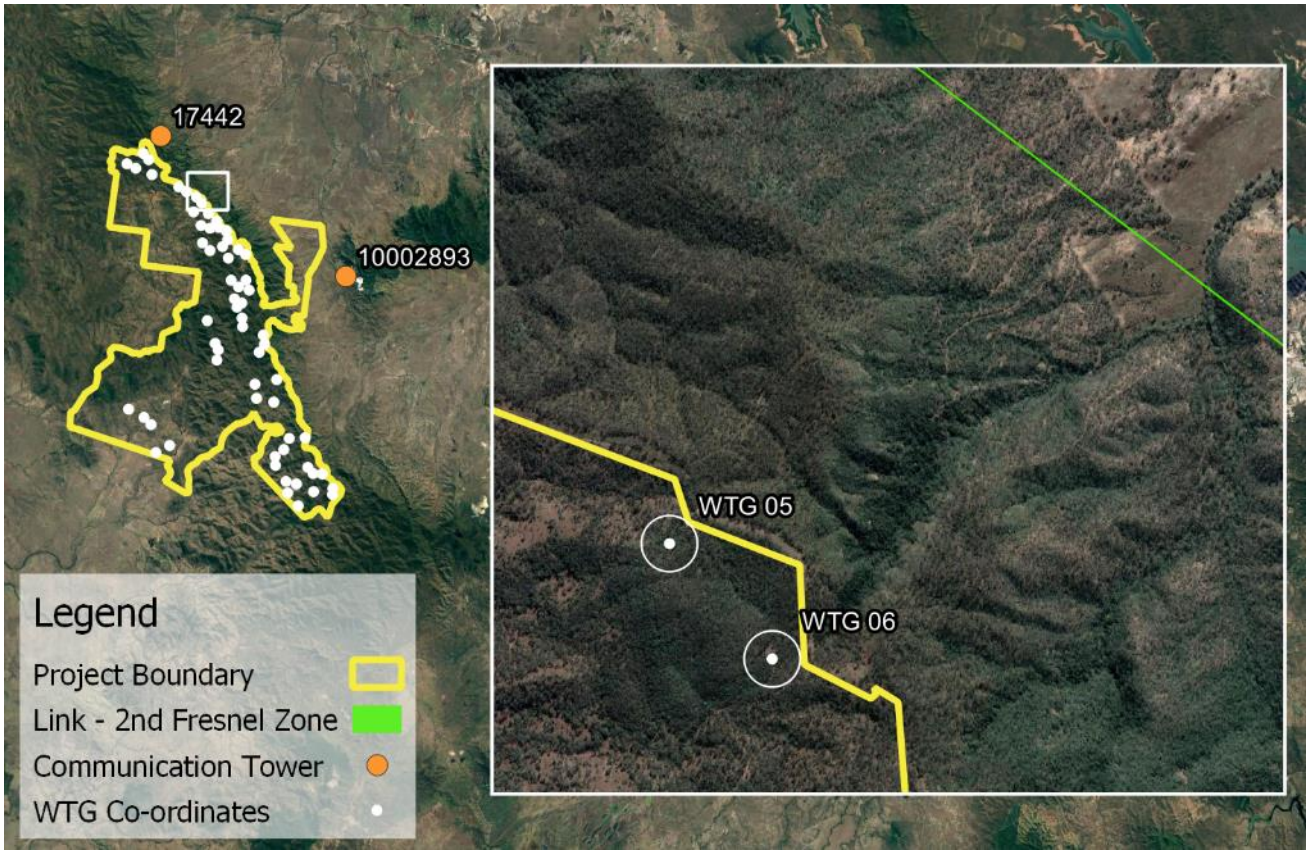

Figure 3.18 Point-to-point Link 15, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 14, with the closest WTG being WTG 05. The blade tip of WTG 05 is approximately 1600 m south of the 2nd Fresnel zone.

In the previous assessment, WSP contacted the relevant licensees and did not receive any feedback by the end of the 4-month consultation period (May 2021).

3.2.16 LINK 16 DETAILS

Table 3.18 lists the details for Link 16, between the communication towers 17134 and 16905, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold**.

Table 3.18 Point-to-point assignments between 17134 and 16905

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Department of Transport and Main Roads	17134 [TMR RoadTek Site MT HOPEFUL]	16905 [Powerlink Site WESTWOOD RANGE]	915246-915247	460.075 MHz
			915249-915248	**450.575 MHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 450.575 Hz, shown in Figure 3.19.

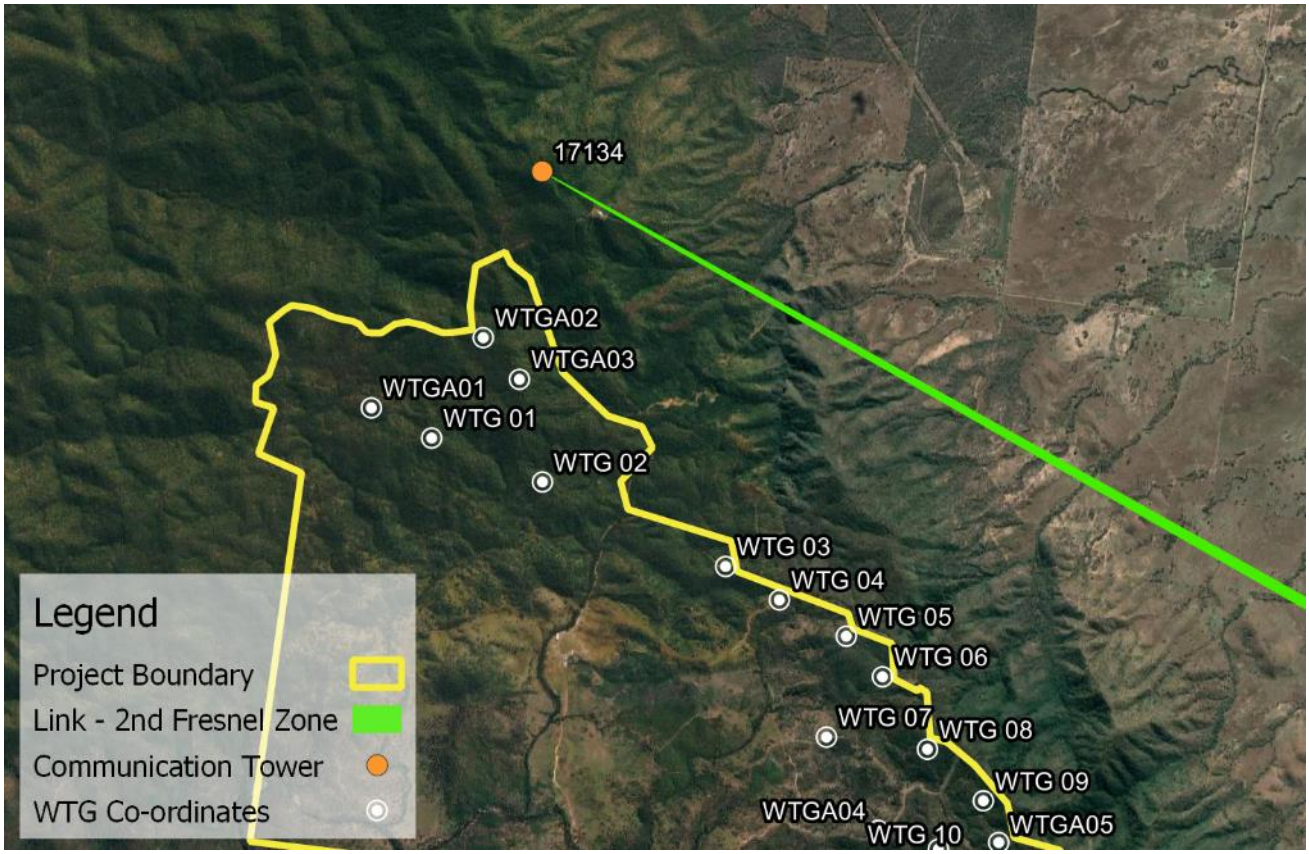

Figure 3.19 Point-to-point Link 16, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 16. The closest WTG is over 2km distance from the 2nd Fresnel zone.

In the previous assessment, WSP contacted the relevant licensees and did not receive any feedback by the end of the 4-month consultation period (May 2021).

3.2.17 LINK 17 DETAILS

Table 3.19 lists the details for Link 17, between the communication towers 151579 and 404292, including the associated Assignment IDs and frequencies. The minimum frequency, used to determine the 2nd Fresnel zone, is highlighted in **bold.**

Table 3.19 Point-to-point assignments between 151579 and 404292

LICENCEE	SITE 1	SITE 2	ASSIGNMENT ID	FREQUENCY
Digital Distribution Australia Pty Ltd	151579 [Broadcast Site 38 km S of Rockhampton MT HOPEFUL]	404292 [Optus Site Grantleigh Rd GOGANGO]	7432482-7432483	7.06 GHz
			7432485-7432484	**6.72 GHz**
			7432486-7432487	7.06 GHz
			7432489-7432488	**6.72GHz**

WSP has calculated the 2nd Fresnel zone for the lowest frequency of 6.72 GHz, shown in Figure 3.20.

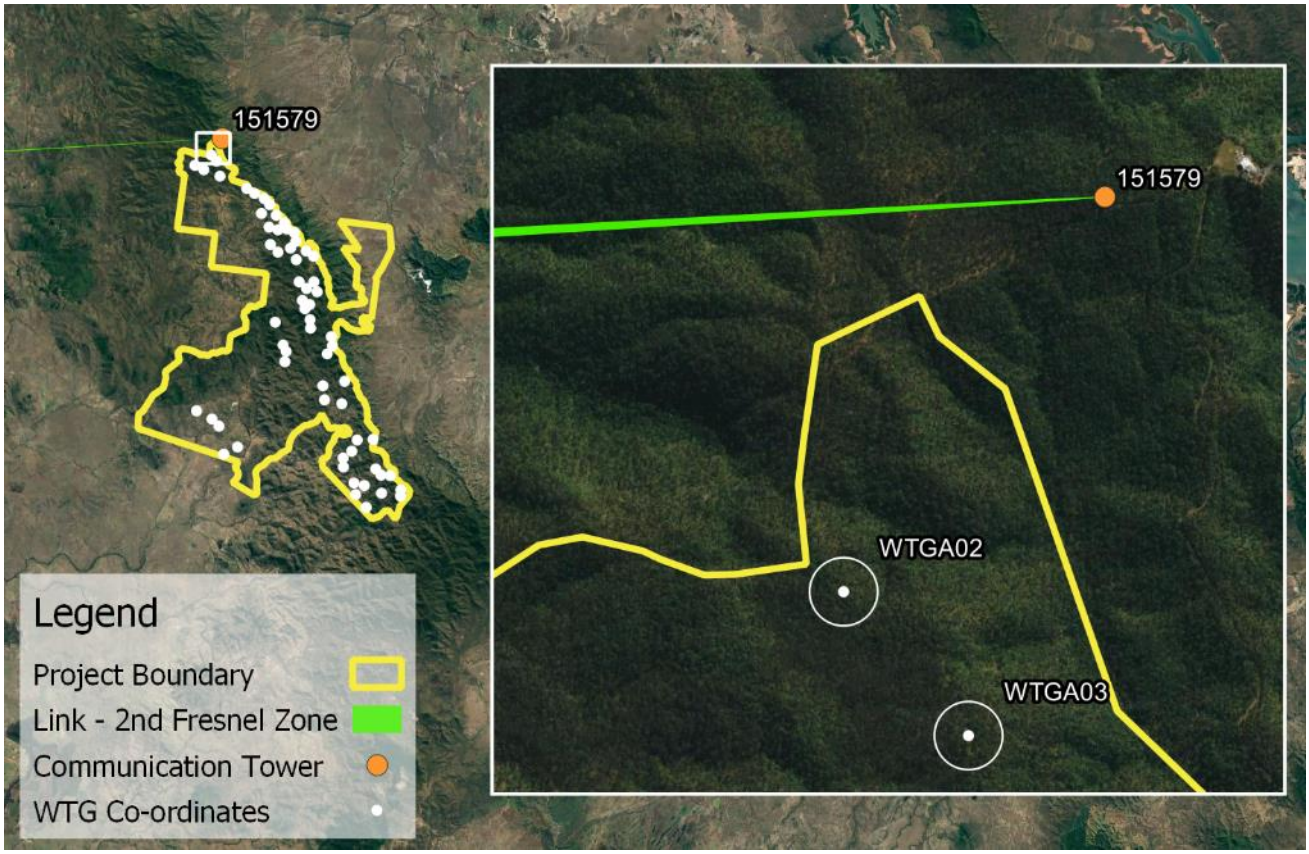

Figure 3.20 Point to point Link 17, calculated 2nd Fresnel zone

It was observed that no WTGs are currently positioned as such to encroach on the 2nd Fresnel zone of Link 17, with the closest WTG being WTGA02. The blade tip of WTGA02 is approximately 890 m south of the 2nd Fresnel zone.

It should be noted that Link 17 was not included in the previous assessment. As such, WSP has not contacted the relevant Licensee yet. However, it is recommended that the licensee is contacted to ensure there are not adverse effects on the communication link.

3.3 POINT-TO-MULTIPOINT LICENCES

Point-to-multipoint links are similarly susceptible to the types of impacts discussed in Sections 3.1.1 and 3.2. There may be point-to-multipoint services with fixed receivers that can be impacted. Any registered services will be present and accounted for in the ACMA database referred to in this assessment [3].

Table 3.20 details the point-to-multipoint services within 30 km of the MHWF project boundary according to the RADCOM database.

Table 3.20 Point-to-multipoint licences within 30 km of the MHWF project

LICENCEE	SITE	SITE ID	FREQUENCY [MHZ]	DISTANCE TO MHWF [km]
Rockhampton Regional Council	Water Treatment Plant Jeannie St MOUNT MORGAN	9010814	472.1250	15.0
Ergon Energy Corporation Limited	QR Site RAGLAN	17127	452.3438, 461.8438	19.4
Aurizon Network Pty Ltd	QR Intermediate Site CALLIOPE RANGE	460377	471.7000	23.4
Telstra Corporation Limited	Telstra Radio Terminal GAYFIELDS	16504	506.7000, 516.7000	24.3

No point-to-multipoint (P2MP) licences were observed to intersect the site boundary. According to the ACMA database [3], the closest P2MP is Site ID 9010814 (Water Treatment Plant Jeannie St) located approximately 15 km away. WSP's previous consultation process only considered organisations within 10 km of the MHWF project. The P2MP links in Table 3.20 were deemed low-risk due to the significant distance from the MHWF site boundary, and therefore these licensees were not further contacted by WSP.

3.4 POINT-TO-AREA AND BROADCASTING LICENCES

Point-to-area services were identified within 30 km of the MHWF project. Table 3.21 lists each licence type and the corresponding number of licences within 30 km of the MHWF project.

Table 3.21 Details of other licences identified within 30 km of the MHWF project

LICENCE TYPE	LICENCE CATEGORY	NUMBER OF LICENCES	MINIMUM DISTANCE TO MHWF [km]
Aeronautical	Aeronautical Assigned System	10	16.8
Amateur	Amateur Repeater	2	19.3
Broadcasting	Commercial Television	3	0.9
	Narrowcasting Service (LPON)	5	13.8
	National Broadcasting	6	0.9
	Retransmission	5	14.9
	Narrowband Area Service stations	1	17.4
Land Mobile	Land Mobile System - > 30MHz	198	0.7
	Land Mobile System 0-30MHz	56	15.5
	Paging System - Exterior	1	14.7
	CBRS Repeater	2	16.8
PTS	PMTS Class B	18	0.9
PTS 900 MHz	PMTS Class B (935-960 MHz)	14	0.9
Radiodetermination	Radiodetermination	10	13.8
Spectrum	1800 MHz Band	20	17.7
	2 GHz	32	17.7
	2.3 GHz Band	560	18.3
	2.5 GHz Band	6	18.4
	3.4 GHz Band	46	17.7
	700 MHz Band	66	0.8
	800 MHz Band	48	0.8
	AWL – FSS Only	15	14.3

In the previous assessment, WSP contacted any organisations with operation licences within 10 km of the MHWF project for comment on potential EMI impacts to their services as a result of the proposed development and operation of the MHWF project. As previously mentioned, WSP have not conducted any further consultation as part of this update, as per the agreement with WSP and the Client. A summary of contacted licensees is shown in Appendix A.

3.4.1 AM AND FM BROADCASTING

The impact on AM and FM radio broadcasting reception is considered to be negligible beyond the boundary of the wind farm. In general, there are no known effects on AM/FM services caused by the wind farm as the wavelengths of these services are relatively large compared to the size of the WTGs.

It is noted that AM signals can propagate around WTGs and as such, WSP does not expect that the MHWF development and operation will adversely impact the AM radio services in the area. FM signals, however, are more susceptible to interference from nearby obstacles, such as WTGs. However, this can only occur when the receiver is in close proximity to the obstacle.

As part of the consultation process in the previous assessment, WSP contacted the Australian Broadcasting Corporation (ABC) seeking feedback regarding any potential EMI impacts on their services arising from the development and operation of MHWF. WSP did not receive a response.

3.4.2 RADIO FREQUENCY NATIONAL SITE ARCHIVE

State code 23 for QLD recommends reviewing the Australian mobile telecommunication association's Radio Frequency National Site Archive (RFNSA) database [22]. WSP notes that there are four (4) Australian Mobile Network base stations in the vicinity of MHWF. Telstra is listed as the contact manager for towers 4714003, 4714005 and 4699003. Tower 4699001 lists Telstra, Optus and Vodafone as contacts.

In the previous assessment, WSP contacted Telstra, Optus and Vodafone. No feedback was received by Telstra or Vodafone but Optus stated that; *"while there may be some impacts on Optus network and services in the area, the impacts is not expected to be unacceptable. Hence, Optus does not have any objection to the proposed Mt Hopeful Wind Farm located near Rockhampton, QLD."* [20]

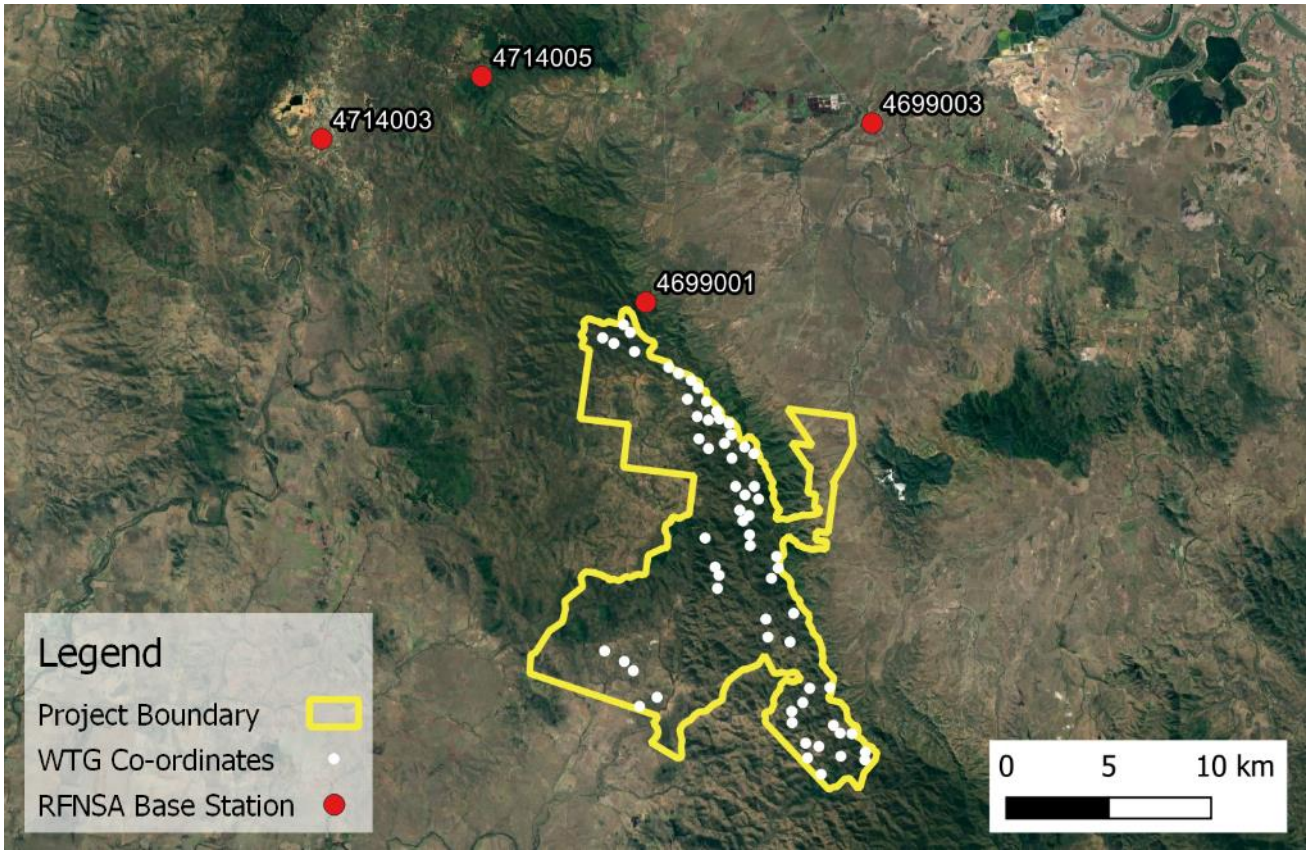

Figure 3.21 Australian Mobile Network base station location with respect to MHWF

3.4.3 DIGITAL RADIO

Based on the Digital Radio Plus's coverage estimator [23], WSP notes that DAB+ digital radio services are currently unavailable in the MHWF area. As such, due to the inexistence of digital radio within the area, MHWF will have negligible impact on digital radio services.

3.4.4 MOBILE RADIO

Mobile radio may be affected by the shadowing effects of MHWF. However, if this is the case, any problems can usually be rectified through a minor adjustment in the position of the receiver.

3.4.5 MOBILE RECEPTION

Mobile reception can be affected by the development and operation of the MHWF project, depending on the level of coverage surrounding the site. WSP has assessed existing mobile coverage from three (3) common service providers in proximity to the MHWF project, including Telstra, Optus and Vodafone.

3.4.5.1 TELSTRA

The mobile reception coverage map for Telstra in the area surrounding the MHWF project is shown in Figure 3.22 for 4G mobile coverage.

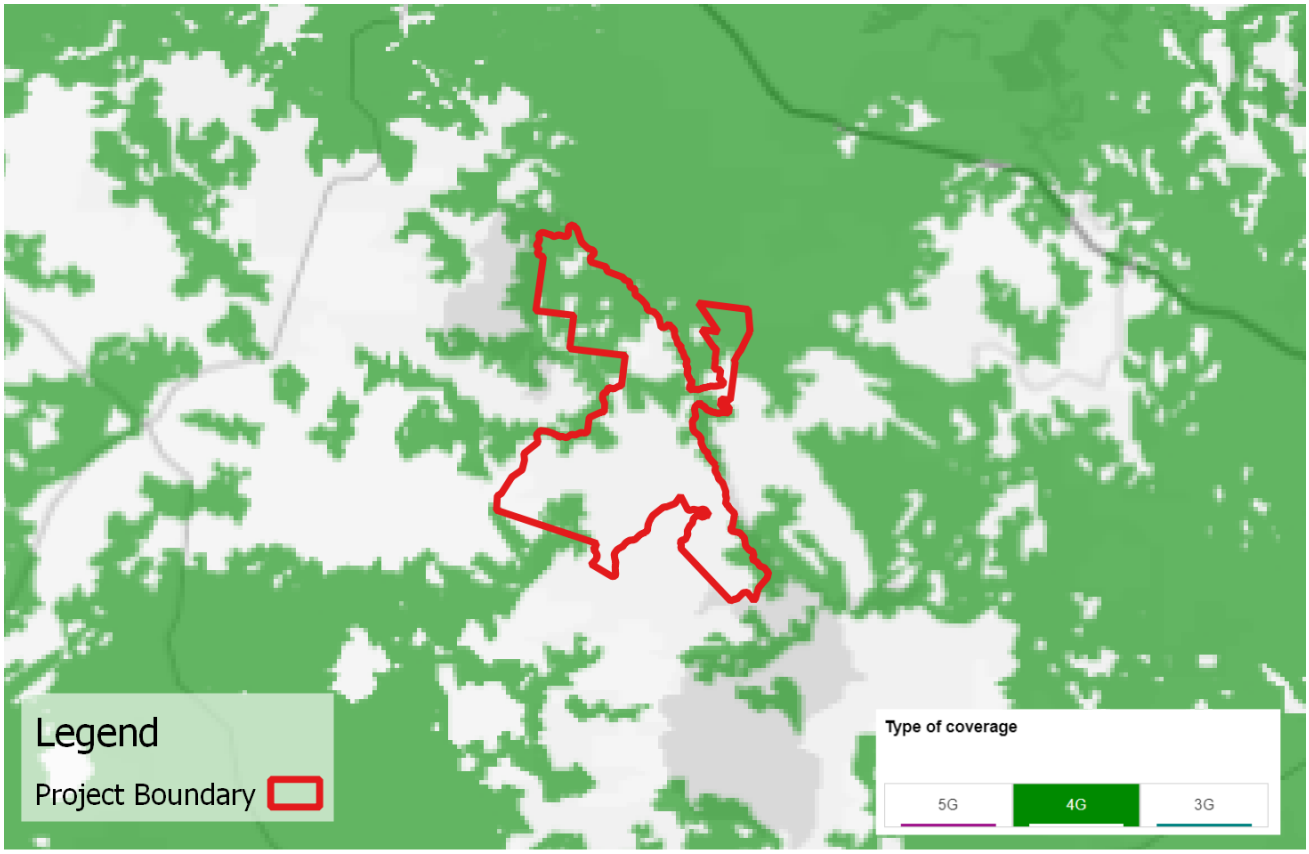

Figure 3.22 Telstra 4G coverage map and the MHWF project site boundary [12]

The strength of Telstra mobile phone reception varies around the MHWF project, with most of the site having little to no coverage. 5G network coverage is currently unavailable for the area. In the previous assessment, WSP contacted the relevant licensees and did not receive any feedback by the end of the consultation period.

3.4.5.2 OPTUS

The mobile reception coverage map for Optus mobile services in the area around the MHWF project is shown in Figure 3.23.

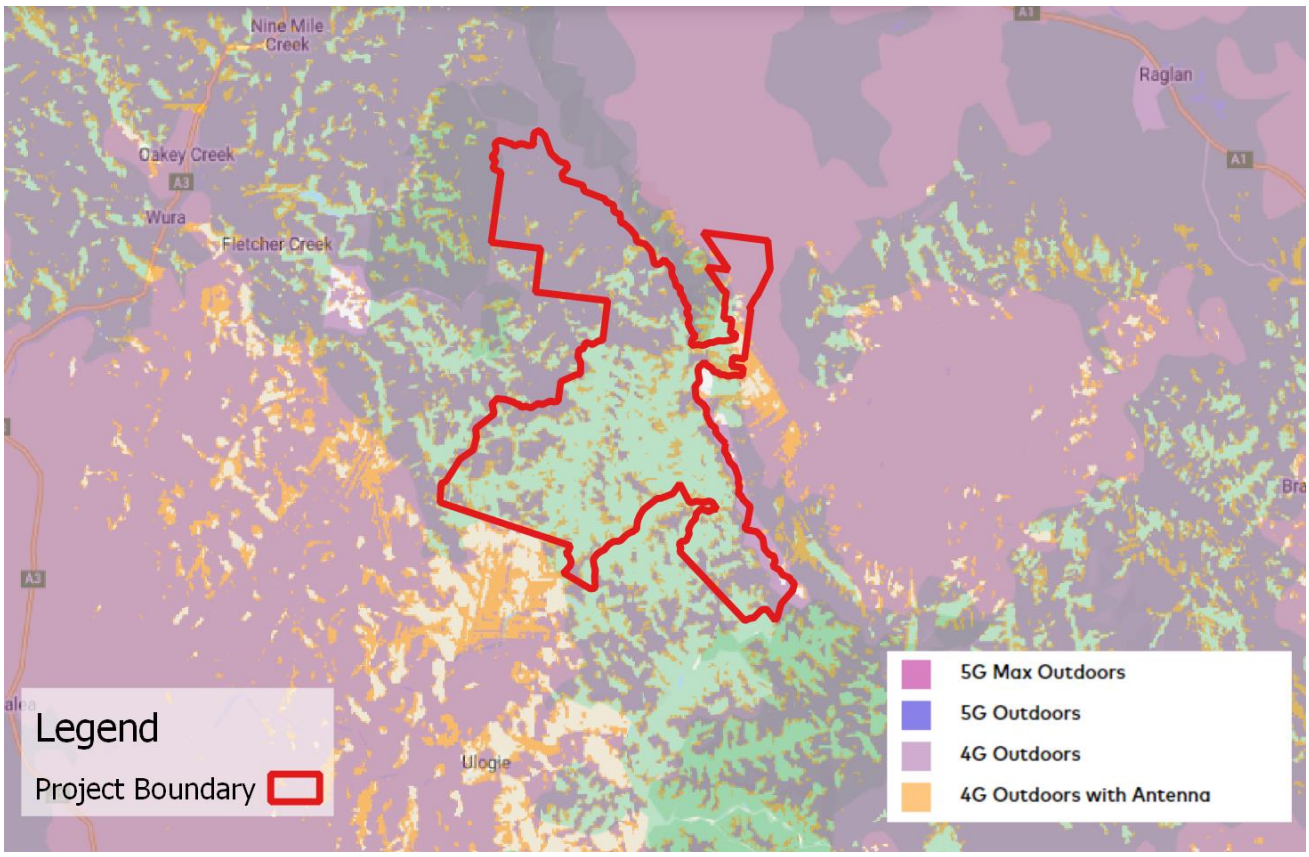

Figure 3.23 Optus network coverage map and the MHWF project site boundary [13]

The strength of Optus mobile phone reception varies around the MHWF project. In areas of currently marginal coverage, it is possible that MHWF will impact the mobile reception for Optus customers. In the previous assessment, WSP has contacted Optus Mobile Pty Limited (Optus) seeking feedback on the potential EMI impact of MHWF on their operations and services. Optus stated that; *"while there may be some impacts on Optus network and services in the area, the impacts is not expected to be unacceptable. Hence, Optus does not have any objection to the proposed Mt Hopeful Wind Farm located near Rockhampton, QLD."* [20]

3.4.5.3 VODAFONE

The mobile reception coverage map for Vodafone in the area around the MHWF project is shown in Figure 3.24.

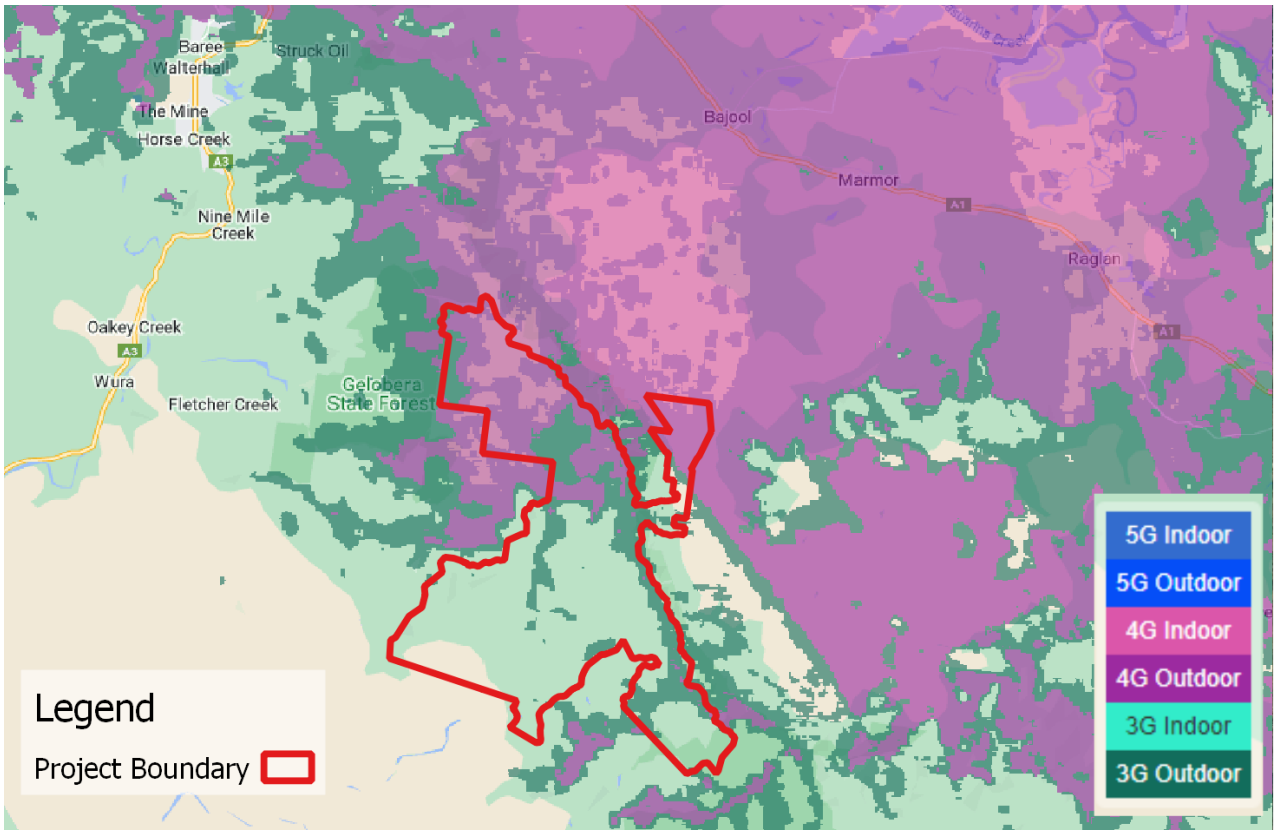

Figure 3.24 Vodafone network coverage map and the MHWF project site boundary [14]

The strength of Vodafone mobile phone reception is limited around the MHWF project, with much of the site not receiving mobile coverage or very limited 3G coverage outdoors. Due to the marginal network coverage from Vodafone in the area, it is unlikely that residents rely on Vodafone for mobile phone services.

WSP has assessed the existing mobile reception in the vicinity of the MHWF project from Vodafone mobile provider. It is observed, based on current coverage, mobile reception is either marginal, or inexistent within and surrounding the MHWF project site. WSP contacted the relevant licensee and did not receive any feedback by the end of the consultation period.

3.4.6 TELEVISION RECEPTION

Analog TV signals are known to be affected by interference from WTGs. Analog TV was gradually phased out in Australia since 2010 and completed nation-wide in 2013. At present, digital TV signals are available across the country and are usually less prone to interference, if the signal is strong enough initially. A search of the digital TV broadcast stations was conducted in proximity of MHWF [11]. Based on the mySwitch website, the coverage within and surrounding the MHWF site, TV reception ranges from good to variable as shown in Figure 3.25.

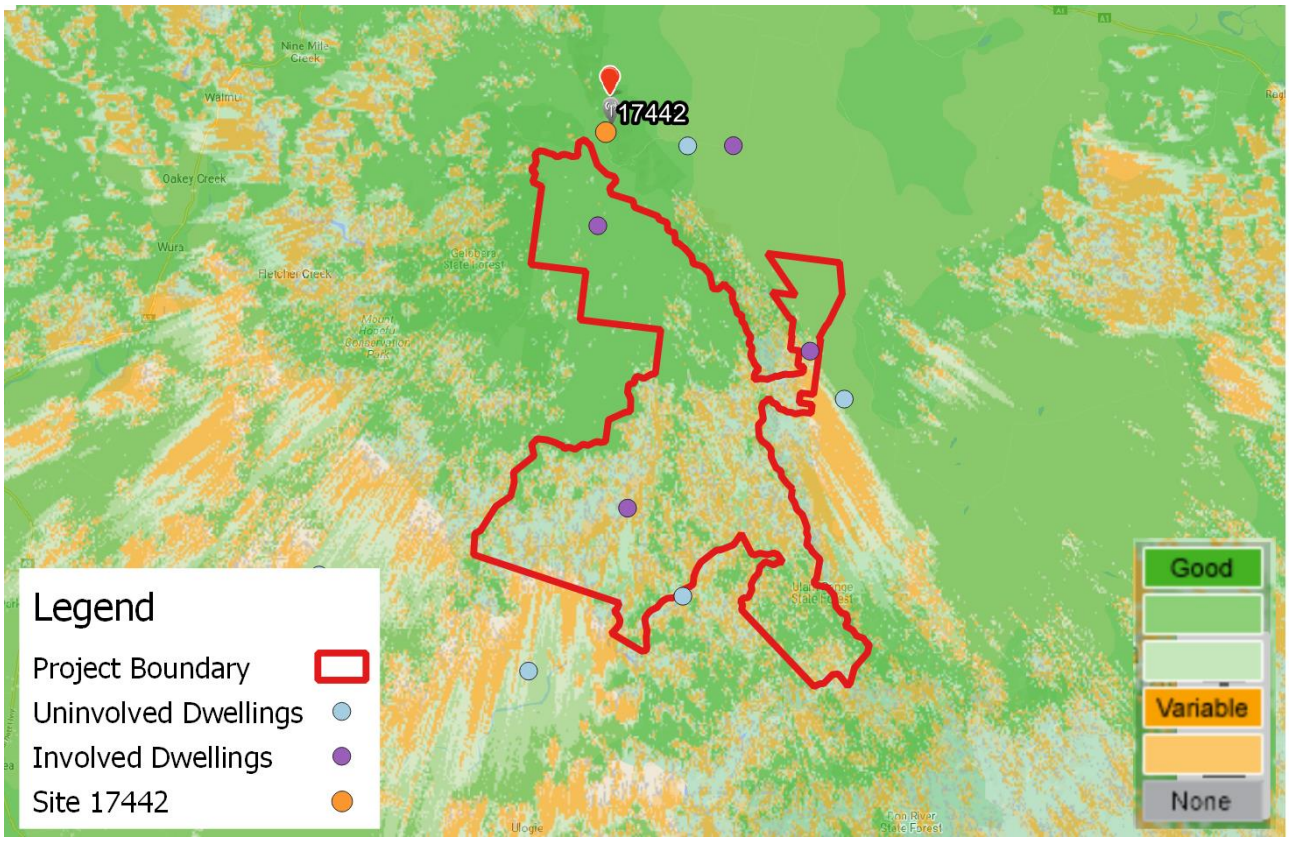

Figure 3.25 Television reception in the proximity of MHWF

There are nine (9) dwellings identified by Neoen in proximity to the MHWF project area [24]. If a WTGs obstructs the line of sight of nearby broadcast stations, residences may experience interference to their existing TV coverage. Residences that are currently experiencing marginal TV coverage, may further experience interference to their TV services due to MHWF.

Should this be the case, there are a number of mitigation measures that can be put in place, as discussed in Section 4.3. According to the mySwitch website [11], the closest broadcasting tower to MHWF is Site 17422, approximately 1 km north east of the site.

As existing TV coverage is considered variable, WSP recommends that a ground survey of TV signal strength is undertaken with the residents surrounding MHWF prior to the construction of the wind farm to confirm the current status of TV signal strength.

In the previous assessment, WSP sought feedback from TV broadcasting licensees identified within 10 km of MHWF as part of the consultation process. Contacted licensees included the Australian Broadcasting Corporation (ABC), the Special Broadcasting Service (SBS), and Prime Television. WSP did not receive any feedback by the end of the consultation period.

3.4.7 INTERNET SERVICES

Organisations operating point-to-area licences within 30 km of the MHWF project were identified in Section 3.4.

Table 3.22 shows the registered Internet Service Providers (ISPs) and telecommunication providers operating within 30 km of the MHWF project.

Table 3.22 Internet service and telecommunications providers holding licences within 30 km of the MHWF project

LICENCEE
Optus Mobile Pty Limited
Telstra Corporation Limited
Vodafone Australia Pty Limited

WSP had previously contacted the licensees in

Table 3.22 that were identified to be within 10 km to comment on any potential impacts to their services as a result of the development and operation of the MHWF project. WSP contacted Telstra, Vodafone and Optus as part of the consultation process and did not receive a response from Telstra and Vodafone but Optus stated that; *"while there may be some impacts on Optus network and services in the area, the impacts is not expected to be unacceptable. Hence, Optus does not have any objection to the proposed Mt Hopeful Wind Farm located near Rockhampton, QLD."* [20]

WSP notes that there are a number of ISPs who are also NBN providers but may not be captured within the ACMA database. WSP recommends that a ground survey is undertaken to identify any other potential ISP providing NBN services at the MHWF project.

3.5 RADAR AND METEOROLOGICAL SERVICES

Radar transmits a signal which is reflected back to the transmitting station (some systems involve communication between a radar station and a transponder). Services that utilise radar technology include aircraft detection and weather services. As per the Draft National Wind Farm Development Guidelines [5], WSP has performed a qualitative assessment to identify radar services within 250 nautical miles of MHWF.

3.5.1 METEOROLOGICAL SERVICES

A search of automatic weather stations (AWS) surrounding the proposed MHWF was conducted using the Australian Bureau of Meteorology (BoM) 'Climate Data Online' database [10]. No weather stations were found within 30 km of the site. The closest AWS was found to be Rockhampton Aero (Station Number 039083) located approximately 39 km from MHWF.

Based on the BoM website [10], five (5) meteorological radars have been identified within 250 nautical miles (approximately 460 km) of MHWF shown in Table 3.23. The closest radar station was observed to be Gladstone located approximately 65 km from MHWF.

Table 3.23 BoM radar stations within 250 nautical miles of MHWF

BOM RADAR SITE	LATITUDE [°]	LONGITUDE [°]	RADAR CATEGORY	APPROXIMATE DISTANCE FROM MHWF [KM]
Gladstone	**-23.86**	**151.26**	**WSR74 S-Band**	**65**
Taroom	-23.70	149.90	Meteor 1700 S-band Doppler	205
Emerald (Central Highlands)	-23.55	148.24	DWSR 8502S 2° S-band	230
Gympie (Mt Kanigan)	-25.96	152.58	DWSR 8502S 2° S-band	300
Mackay (Mt Basset)	-21.12	149.22	TVDR2500C	320

In the previous analysis, WSP contacted the BoM to seek feedback on any potential EMI impacts on their services. The BoM replied and stated that *"Our analysis shows that the proposed wind farm in Mt Hopeful will affect our radar at Gladstone."* The BoM provided several mitigation options to lower the impact of MHWF. As a result WSP understands that Neoen and the BoM are negotiating the exact terms of the operational limits for MHWF to ensure that the Gladstone radar can maintain operational efficiency. [25]

3.5.2 AVIATION

Neoen has informed WSP that an independent Aviation Impact Assessment has been completed for MHWF [26]. Figure 3.26 shows the airports in the vicinity of MHWF.

Figure 3.26 Airports in the vicinity of MHWF

In the previous assessment, WSP contacted both Airservices Australia and the Department of Defence to seek feedback on any impact to their services and operations. WSP received a response from Airservices Australia but not the Department of Defence. Airservies Australia stated *"…the wind farm will affect the 25NM MSA and the RNAV-Z (GNSS) RWY 33 instrument procedures at Rockhampton aerodrome…The wind farm will affect the Rockhampton RTCC" however "this proposal will not adversely impact the performance of any Airservices Precision/Non-Precision Nav Aids, Anemometers, HF/VHF/UHF Comms, A-SMGCS, Radar, PRM, ADS-B, WAM or Satellite/Links."* [21]

3.6 EMERGENCY SERVICES

Using the ACMA RADCOM database, a search was conducted of radiocommunication sites within 30 km of MHWF operated by emergency service providers. Table 3.24 shows the identified emergency service providers.

Table 3.24 Emergency Services operating within 30 km of MHWF

LICENCEE	NO OF ASSIGNMENT IDS
Department of Community Safety (Queensland Fire and Rescue Service)	70
Department of Health (Queensland Ambulance Service)	20
Queensland Fire and Emergency Services	71
Queensland Police Service	32

In the previous assessment, WSP contacted the above licensees seeking feedback on the potential EMI impact of MHWF on their operations and services. The Public Safety Agencies (PSAs) comprising of Queensland Police, Fire and Ambulance responded and stated that *"the link paths and radio sites at Banana Range and My Spencer are not obstructed and the wind farm location should not have any impact on nearby PSA radio communication facility services."* [16] [17]

4 MANAGEMENT AND MITIGATION

Generally, mitigation of radiocommunication impacts involves manipulation of the WTG layout so that impacts are acceptably controlled. However, the wind farm proponent's consideration may make other options feasible (providing there is agreement amongst the relevant parties). The Draft National Wind Farm Development Guidelines [5] provides the following hierarchy of mitigation options (in order of most preferable to least preferable):

1. Re-location / removal of WTGs
2. Replacement of existing radio communications service equipment with another less affected type (e.g. replace UHF link with microwave link)
3. Re-location of radio communications services to another existing radio communications site
4. Re-location of radio communications services to a new telecommunications site
5. Substitute radio communication for underground or overhead optical fibre
6. Enhance radar filters

WSP notes that the Draft National Wind Farm Development Guidelines [5] (as well as State Code 23: Wind farm development [7]) includes designing wind turbines to minimise their Radar Cross Section (RCS) as a mitigation strategy for reflection/scattering. As mentioned previously in Sections 2.1.1 and 2.5 , reflection/scattering impacts were not considered within the scope of this assessment. However as part of the Near Field Impact assessment, as per State Code 23, a recommended minimum distance of 1 km radio tower exclusion zones from WTGs has been used as a precautionary measure for any reflection and scattering impacts, and it is found that no proposed WTGs are within 1 km of a communications tower.

It is recommended that the exclusion distances, which are established and applied to the final layout, be respected during construction, maintenance and decommissioning. These exclusion zones should be agreed upon by the licence holders and the wind farm proponent. Crane booms and the raising and lowering of WTG parts may also cause interference. It is recommended that subsequent lifting management plans for these activities include these considerations.

4.1 RECOMMENDATIONS AND MITIGATION FOR NEAR FIELD INTERFERENCE

For the registered assignments identified within 10 km of the MHWF project, WSP had previously contacted the licensees identified seeking feedback regarding potential EMI impacts on their services and operations. The consultation process had spanned over a 4-month period and no licencee has indicated a potential issue with the proposed the MHWF project layout on near field effects.

However, should licensees deem MHWF to cause potential EMI impacts, the first mitigation technique to be considered should be to microsite or relocate WTGs to locations outside of the near field exclusion zones. The specific requirements of near field zones should be discussed with the affected licensees to minimise disruption to the WTG layout and to avoid radio interference.

In the event that relocation of WTGs is not possible or preferable, it may be possible to modify or upgrade affected services to new apparatus or frequencies with smaller near field zones. If this mitigation technique is not possible, the next option will be to re-locate and/or re-direct services to alternative existing sites.

Further mitigation techniques (including commission of new radio towers and fibre optic cabling) are possible beyond the options discussed; however significant cost may be incurred if these options are undertaken.

4.2 RECOMMENDATIONS AND MITIGATION FOR POINT-TO-POINT LINK INTERFERENCE

For the registered point-to-point links identified in the vicinity of the proposed WTGs, WSP had previously contacted the identified licensees to seek feedback regarding potential EMI impacts on their services and operations arising from the development and operation of MHWF. WSP note that no WTG locations currently encroach the identified links, assuming a rotor diameter of 180 m. If this diameter were to increase, then there is a chance one of the WTGs may encroach on a point-to-point link. A summary of consultation responses can be found in Appendix A.

Assuming that each of the links (and corresponding assignments) are currently active and the locations given by the ACMA and organisations are accurate, the first mitigation technique to be considered is to ensure WTG locations, including their blades and towers, do not intrude on the 2nd Fresnel exclusion zone.

However, in the event that relocation of WTGs is required but not possible or preferable, it may be possible to modify or upgrade affected services to new apparatus or frequencies with narrower 2nd Fresnel exclusion zones. If this mitigation technique cannot be performed, then the next option will be to re-locate and/or re-direct services to alternative existing sites.

Further mitigation techniques (including commissioning of new radio towers and fibre optic cabling) are possible beyond the options discussed, however, significant cost may be incurred if these options are undertaken.

4.3 RECOMMENDATIONS AND MITIGATION FOR BROADCASTING SERVICES

TV broadcast services across Australia are now digital broadcast. Digital TV signals are usually less prone to interference from WTGs. However, in areas where the digital TV signals are considered marginal, it is possible that TV signals can be subject to some interference from nearby obstacles, like WTGs.

For such instances, a number of mitigation options are available, such as:

1. Retuning the antenna to another tower, not within the line of sight of the WTGs
2. The use of a higher gain antenna
3. Moving the existing antenna to a less affected position
4. Installation of satellite TV at the affected residence, such as Viewer Access Satellite Television (VAST) [27].

WSP notes that a large portion of the site is subject to varying levels of TV coverage and as such, recommends that a ground survey of TV signal strength is undertaken with the residences surrounding the MHWF project prior to the construction of the wind farm.

5 ELECTROMAGNETIC COMPATIBILITY OF WTGS

A wind farm typically comprises of complex electrical systems which will emit various levels of electromagnetic emissions while in operation. This section briefly details the main components known to emit electromagnetic emissions and describes a qualitative review undertaken by WSP on expected levels of electromagnetic emissions from wind farms.

5.1 WIND TURBINE GENERATORS

Most electrical components in a WTG are located in the nacelle. The generator, converter and transformer are typically located at the top of the WTG, at approximately 100 m or greater, AGL.

All components associated with the generation and/or distribution of electricity will emit electromagnetic fields (EMFs). The strength of the EMFs is proportional to the voltage of the electrical system. Electromagnetic Compatibility (EMC) relates to the ability of an electrical system to operate in the vicinity of other systems with no impact.

In the case of a WTG, generator windings will typically emit EMFs. The windings are located in close proximity and the EMFs emitted will cancel out each other. Additionally, the windings are enclosed in a metal housing which will provide shielding to the EMFs.

Due to adverse impacts of EMFs, the levels of EMF emitted by a WTG are typically regulated by legislative requirements. The Radiocommunications (Electromagnetic Compatibility) Standard 2017 [28] dictates the EMC criteria required for any device manufactured or imported into Australia. The Standard details the requirements pertaining to interference to radiocommunications and has been developed based on a number of Industry Standards including the Industry Electrotechnical Commission (IEC) and the European Committee for Electrotechnical Standardisation.

WTGs are typically designed to satisfy the requirements of several Standards including the IEC 61400-1 “Electromagnetic Compatibility (EMC) - Part6-1: Generic Standards - Immunity for residential, commercial and light-industrial environments” as well as the EU Electromagnetic Compatibility Legislation [29]. The EU legislation ensures that all electrical components do not adversely impact nearby electrical systems [30].

As such, WSP notes that the levels of EMF emitted by any WTG imported into Australia will most likely be within the allowable limits and pose minimal risk to the general public.

5.2 COLLECTOR SYSTEM AND SUBSTATION

The electrical collector network (reticulation network) of a wind farm typically comprises of underground cables which are used to transport electricity from the WTGs to the wind farm substation. These cables are generally shielded/screened, the individual phases bundled together and typically buried at a depth of 800 mm below ground. Due to this, the EMF levels are negligible. In some instances, the cables can be installed overhead instead of underground. It is expected that these overhead cables are still shielded/screened, and ground clearances are maintained according to Australian Standard requirements. Therefore, EMF levels are still expected to be minimal for overhead cables also. As a mitigation measure however, WSP suggests that any overhead sections are constructed away from metallic fences or underground pipes.

The transformer and reactor (if any) located in the substation are other potential sources of EMF. However, this equipment will be enclosed, shielded and typically located well inside a substation. Also, protective fencing is generally installed, meaning that general public exposure to any potential EMF from a substation is negligible.

In addition to the above commentary, WSP would expect that the design of the wind farm should ensure compliance with the EMF exposure limits/requirements specified in the Energy Network Association (ENA) EMF Management Handbook and AS 2067 (Substations and high voltage installations exceeding 1 kV a.c.).

6 CONCLUSIONS

Following the assessment, WSP makes the following observations, recommendations and conclusions;

1 This report is an update on a previous assessment [1] that was issued in June 2021. The update considers the new WTG layout consisting of 63 turbines [4]. The RADCOM ACMA database has been re-accessed on the 25 January 2023 [3], and the distances of communications towers have now been calculated from the proposed MHWF site boundary (rather than a set point within the boundary).

2 WSP has not engaged in any further consultation since the previous assessment.

3 WSP has used the recommendations in 'Fixed-link wind-turbine exclusion zone method' [6] to determine the exclusion zones associated with fixed point-to-point links in the vicinity of the MHWF project.

4 As a result of this EMI assessment, WSP makes the following conclusions and recommendations

- WTGA02 and WTGA03 were found to be within 2 km of six (6) communication towers to the north of the Project. As a conservative approach WSP generally recommends a 2 km buffer to avoid near-field effects, however State Code 23 recommends a 1 km buffer in respect to near-field effects [7]. None of the proposed WTG locations at MHWF are within 1 km of a communication tower.
- 17 existing point-to-point links are in the vicinity of the MHWF project boundary. No WTGs are observed to encroach links. This is however based on the assumption that the WTG rotor diameters are fixed at 180 m. If the rotor diameter lengths do become larger, it is recommended an update of this assessment is conducted to ensure no WTG blades are encroaching onto the 2nd Fresnel zones.
- According to the ACMA database [3], no point-to-multipoint licences were observed within 10 km of the site boundary. The closest P2MP site was found to be at least 15 km from MHWF.
- Existing mobile reception is observed to be marginal within and surrounding the MHWF project site. In the previous assessment WSP contacted the relevant mobile providers to assess the impact of MHWF on their operations and services. Of the three (3) providers contacted, only Optus Mobile provided a response. No response was received from Telstra nor Vodafone.
- Existing TV coverage is considered marginal. WSP recommends that a ground survey of TV signal strength is undertaken with the residents surrounding MHWF prior to the construction of the wind farm to confirm the current status of TV signal strength.
- Radar and meteorological services include but not limited to aviation, weather and defence services. WSP contacted all relevant parties in the previous consultation process and have received feedback from BoM and Airservices Australia.
- Emergency service providers were contacted as part of the consultation process in the previous assessment and WSP received feedback indicating that MHWF will not affect their services.
- Details of the consultation process undertaken by WSP in the previous assessment can be found in Appendix A.

7 REFERENCES

[1] WSP Australia Pty Ltd, “PS122878-WIN-REP-001 RevE,” WSP Australia Pty Ltd, Melbourne, dated 25 June 2021.

[2] *Project Boundary.shp,* Subject: RE: Mt Hopeful Wind Farm - EMI Report Update, attachment in email from M. Forster (Neoen) to M. Quan (WSP), dated 20 January 2023.

[3] Australian Communications and Media Authority, “Radiocomms licence data,” 25 January 2023. [Online]. Available: https://www.acma.gov.au/radiocomms-licence-data.

[4] Neoen Australia Pty Ltd, “"20221027_Mount Hopeful WTG Coordinates.xlsx",” Neoen Australia Pty Ltd, 2022.

[5] Environmental Protection and Heritage Council, Draft National Wind Farm Development Guidelines, EPHC, 2010.

[6] D. F. Bacon, Fixed link wind turbine exclusion zone method, 2002.

[7] Department of Infrastructure, Local Government and Planning, *state-code-23-wind farm development-planning-guidance.pdf,* February 2022.

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APPENDIX A

CONSULTATION PROCESS

A1 SUMMARY OF LICENCEES

Table A.1 Contacted licensees within 10 km of the MHWF project

LICENCEE	TYPE OF LICENCE	COMMUNICATION	RESPONSE	RESPONSE SUMMARY
Air Services Australia	Radar	Email sent on 01/03/2021 Follow up email on 22/04/2021	Response received 30/03/2021	*"…the wind farm will affect the 25NM MSA and the RNAV-Z (GNSS) RWY 33 instrument procedures at Rockhampton aerodrome…The wind farm will affect the Rockhampton RTCC."*
Australian Broadcasting Corporation	TV and Radio Reception	Email sent on 03/03/2021 Follow up email on 22/04/2021	No response received	-
Aurizon Network Pty Ltd	Point to Multipoint	Email sent on 22/02/2021	Response received 23/03/2021	*"Aurizon Network do not foresee any issues or impacts to our services."*
Bureau of Meteorology (BoM)	Radar	Email sent on 22/02/2021 Follow up email on 22/04/2021	Response received 28/04/2021	*"Our analysis shows that the proposed wind farm in Mt Hopeful will affect our radar at Gladstone."*
Department of Defence	Radar	Email sent on 03/03/2021 Follow up email on 22/04/2021	No response received	-
Department of Health (Queensland Ambulance Service)	Point to Point, Emergency Service	Email sent on 22/02/2021	Response received from the PSBA 25/03/2021	No obstruction or impact to services.
Department of Transport and Main Roads	Point to Point	Email sent on 22/02/2021	No response received	-

LICENCEE	TYPE OF LICENCE	COMMUNICATION	RESPONSE	RESPONSE SUMMARY
Digital Distribution Australia Pty Ltd	Point to Point	Email sent on 22/02/2021 Follow up email on 22/04/2021	Response received 27/04/2021	*"In summary, the proposed windfarm and turbine locations do not appear to have any impacts on the existing DDA infrastructure and point to point links currently in operation."*
Ergon Corporation Limited	Point to Point, Point to Multipoint	Email sent on 22/02/2021	Response received 1/03/2021	No Impact identified with the currently proposed turbine locations.
Nixon Communications Pty Ltd	Point to Point	Email sent on 22/02/2021 Follow up email on 22/04/2021	Response received 23/04/2021	*"We assumed no impact due to the frequencies we use at Mt Hopeful and have noted no impact to date."*
Optus Mobile Pty Limited	Point to Point	Email sent on 22/02/2021	Response received 12/03/2021	*"While there may be some impacts on Optus network and services in the area, the impacts is not expected to be unacceptable. Hence, Optus does not have any objection to the proposed Mt Hopeful Wind Farm located near Rockhampton, QLD."*
Queensland Police Service	Point to Point, Emergency Service	Email sent on 22/02/2021	Response received from the PSBA 25/03/2021	No obstruction or impact to services.
Queensland Fire and Emergency Services	Point to Point, Emergency Service	Email sent on 22/02/2021	Response received from the PSBA 25/03/2021	No obstruction or impact to services.
Special Broadcasting Service Corporation	TV Reception	Email sent on 22/02/2021 Follow up email on 22/04/2021	No response received	-

LICENCEE	TYPE OF LICENCE	COMMUNICATION	RESPONSE	RESPONSE SUMMARY
Telstra Corporation Limited	Point to Point	Email sent on 22/02/2021 Follow up email on 22/04/2021 and 19/05/2021	No response received	-
Vertical Telecoms Pty Ltd	Point to Point	Email sent on 22/04/2021	No response received	
Vodafone Australia Pty Limited	Mobile Coverage	Email sent on 03/03/2021 Follow up email on 22/04/2021	No response received	-
Win Television NSW Pty Limited	TV Reception	Email sent on 22/02/2021 Follow up email on 22/04/2021	No response received	-

APPENDIX B

WIND FARM DETAILS

B1 WTG LOCATIONS

Table B.1 Proposed WTG locations – (UTM South Zone 56, WGS84)

WTG ID	Easting [m]	Northing [m]
WTG 01	247250	7371525
WTG 02	248260	7371125
WTG 03	249930	7370355
WTG 04	250420	7370050
WTG 05	251030	7369720
WTG 06	251360	7369350
WTG 07	250850	7368800
WTG 08	251770	7368690
WTG 09	252280	7368220
WTG 10	251870	7367780
WTG 11	252890	7367610
WTG 12	251408	7366866
WTG 13	251875	7366390
WTG 14	252990	7367060
WTG 15	253640	7366460
WTG 16	253020	7365920
WTG 17	254100	7366140
WTG 18	253200	7364540
WTG 19	253660	7364120
WTG 20	254320	7363920
WTG 21	253400	7363380
WTG 22	253880	7362180
WTG 23	253910	7361650
WTG 24	251710	7362020
WTG 25	252200	7360600
WTG 26	252390	7360200
WTG 27	252310	7359560
WTG 28	255200	7361120
WTG 29	255280	7360550
WTG 30	254950	7360050
WTG 31	254680	7358060
WTG 32	256040	7358340

WTG ID	Easting [m]	Northing [m]
WTG 33	254780	7357180
WTG 34	255860	7356940
WTG 35	246800	7356500
WTG 36	247760	7355990
WTG 37	248200	7355540
WTG 38	249360	7354240
WTG 39	248500	7353800
WTG 40	256820	7354680
WTG 41	257810	7354720
WTG 42	256480	7353980
WTG 43	255940	7353550
WTG 44	255960	7353000
WTG 45	256620	7352000
WTG 46	257270	7351840
WTG 47	256720	7351280
WTG 48	257380	7350480
WTG 49	257980	7352870
WTG 50	258310	7352490
WTG 51	258880	7352460
WTG 52	259540	7351560
WTG 53	259520	7351180
WTG 54	258340	7351360
WTGA01	246700	7371800
WTGA02	247720	7372440
WTGA03	248050	7372060
WTGA04	251320	7367950
WTGA05	252420	7367840
WTGA07	252660	7366640
WTGA08	254120	7364540
WTGA09	253860	7363120
WTGA10	253560	7362860