

ALTIS

PROPERTY PARTNERS

Altis Property:

West Wilton Project – Mine Subsidence Assessment

Review of concept designs

DOCUMENT REGISTER

Revision	Description	Author	Date
A	Draft	DJK	Aug-22
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Report produced to:- Provide mine subsidence advice to inform planning proposals

Background reports available at www.minesubsidence.com:-

Introduction to Longwall Mining and Subsidence (Revision A)

General Discussion of Mine Subsidence Ground Movements (Revision A)

Mine Subsidence Damage to Building Structures (Revision A)

EXECUTIVE SUMMARY

Altis Property is currently preparing a proposal to develop a property near the intersections of Wilton Park Road, Berwick Park Road and Picton Road (West Wilton Project). The proposed development generally consists of warehouses, office buildings and hardstand areas.

Mine Subsidence Engineering Consultants (MSEC) has been engaged to provide advice on potential future underground coal mining effects in relation to the proposed West Wilton Project.

The proposed development is spread over 8 lots. The location of the proposed development is shown in Drawing No. MSEC1291-01 and a general layout is shown in Drawing No. MSEC1291-02.

The layout of structures on the property is yet to be determined at the time of preparing this report, but Altis Property has provided a rezoning boundary outline that describes the limit of the potential development, which is shown in Drawing No. MSEC1291-02.

The property lies in the Southern Coalfield of NSW and is wholly located within the Wilton Mine Subsidence District, which is shown in Drawing No. MSEC1291-01.

This report describes the location of current mining operations in the vicinity of the West Wilton Project and provides advice on the potential for future mining operations. Mining Lease CCL767 is held by Endeavour Coal Pty Limited, which is a subsidiary of South32. The majority of the property boundary lies just outside the current mining lease boundary to the south. A very small portion in the north-west corner of the property is located just inside the current mining lease boundary.

There are currently no mining operations approved or proposed to occur directly beneath the property, with the exception of possible future underground roadways in the north-west corner of the property. There are currently no longwalls approved or proposed to be extracted directly beneath the property.

While mining may occur in West Wilton in the future, a large portion of the West Wilton Project is unlikely to experience mine subsidence movements as part of the mining lease has been relinquished by South32 in an agreement with developers for the West Wilton Project. This includes the Wilton Town Centre Precinct, which has been rezoned with a commencement date of 30 June 2023 by the NSW Government.

Mining is also extremely unlikely to be permitted directly beneath or adjacent to the Nepean River, Pheasants Nest Bridge and the Picton Road Interchange. These features are located immediately adjacent to the property.

Given the identified hard constraints surrounding the West Wilton Project, it appears extremely unlikely that future mining operations would be permitted to extract coal beneath the property, particularly via longwall mining techniques. While it might be technically possible to conduct minor mining operations beneath the central portions of the site, the operations would be severely restricted from causing substantial subsidence movements.

It is, therefore, extremely unlikely that future mining operations will be permitted directly beneath the site or adjacent to the site.

It is recommended that Altis Property consult with the Department of Planning and Environment and Subsidence Advisory NSW regarding the potential for future mining to occur in this area. It may be reasonable for Altis Property to design infrastructure in this area without accommodating for future mine subsidence movements.

SA NSW may decide to annex the area from the Wilton Mine Subsidence District when it reviews the District boundaries in the future, which usually occurs approximately every 5 years.

Subsidence predictions have, however, been provided if SA NSW requires the development to be designed to accommodate the full range of mine subsidence movements from potential future longwall mining.

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1.1. Background

Altis Property is currently preparing a proposal to develop a property near the intersections of Wilton Park Road, Berwick Park Road and Picton Road (West Wilton Project). The proposed development generally consists of warehouses, office buildings and hardstand areas.

Mine Subsidence Engineering Consultants (MSEC) has been engaged to provide advice on potential future underground coal mining effects in relation to the proposed West Wilton Project.

The proposed development is spread over 9 lots. The location of the proposed development is shown in Drawing No. MSEC1291-01 and a general layout is shown in Drawing No. MSEC1291-02.

The location of the West Wilton Project is bounded to the north by Wilton Park Road, Berwick Park Road and Picton Road, to the south by the Nepean River, to the east by the M31 Hume Motorway and to west by neighbouring private properties.

The layout of structures on the property is yet to be determined at the time of preparing this report, but Altis Property has provided a rezoning boundary outline that describes the limit of the potential development, which is shown in Drawing No. MSEC1291-02.

The property lies in the Southern Coalfield of NSW and is wholly located within the Wilton Mine Subsidence District, which is shown in Drawing No. MSEC1291-01.

Altis Property has requested advice regarding the potential future impacts of mine subsidence on the proposed development of the West Wilton Project.

2.1. Illawarra Coal

South 32's Illawarra Metallurgical Coal has received development consent to extract coal using longwall mining methods from the Bulli Seam in this area. The Project Approval was received on 22 December 2011 (Application Number 08_0150). A map showing the approved Extent of Longwall Mining Area, as attached in Appendix 3 of the Project Approval, is shown in Fig. 2.1.

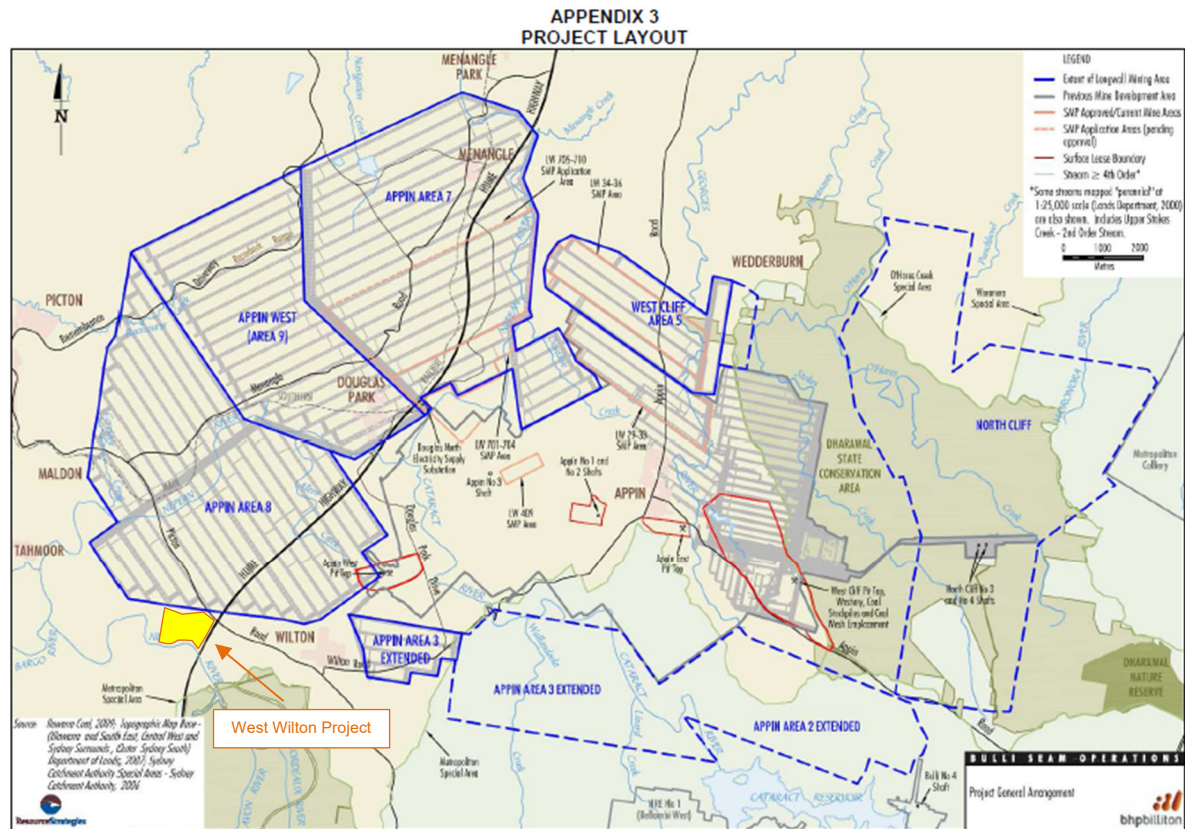


Fig. 2.1 Illawarra Coal Approved Extent of Longwall Mining Area (blue polygons) as at December 2011

The blue polygons describe the boundary of Illawarra Coal's approved mining area under the original development consent, which is called the "Extent of Longwall Mining Area".

The West Wilton Project has been overlaid over the Project Approval in Drawing No. MSEC1291-01. It can be seen that the majority of the property boundary lies just outside the Extent of Longwall Mining Area to the south. A very small portion in the north-west corner of the property is located just inside the Extent of Longwall Mining Area.

There are currently no mining operations approved or proposed to occur directly beneath the property, with the exception of possible future underground roadways in the north-west corner of the property. There are currently no longwalls approved or proposed to be extracted directly beneath the property.

Appin Colliery is the only active coal mine in this area. It is currently operating in Areas 7 and 9, between the townships of Douglas Park and Menangle, to the north of the West Wilton Project.

In a memorandum to the Australian Stock Exchange in 2015, when South32 was demerged from BHP Billiton, projected coal production for Illawarra Coal indicated that mining would occur in Area 8 in the period 2031 to 2042. The Area 8 referenced in those plans, however, appears to be the longwall series to the north west of the Nepean River and not the longwall series within the southern section of Area 8 near the West Wilton Project.

It is unlikely, therefore, that the properties at the West Wilton Project will experience mine subsidence movements for the next 20 years. It is, however, possible that these plans could change depending on the mining conditions that are encountered within Areas 7 and 9 of the Appin Colliery, where mining is occurring now, and any other plans to extend the mine to the north west into Appin Area 8.

2.1.1. Relinquishment of a portion of Illawarra Coal's Mining Lease

Mining Lease CCL767 is held by Endeavour Coal Pty Limited, which is a subsidiary of South32.

It was reported in August 2017 by the NSW Department of Planning and Environment, in Section 7.12 of a report titled, 'Wilton Priority Growth Area Interim Land Use and Infrastructure Implementation Plan, Background Analysis', that the Landowners (Bradcorp and Governors Hill) of the northern and town centre precincts within the Wilton Priority Growth Area, had reached commercial agreements with the mine operator (South32) that a portion of mining lease CCL767 would be relinquished on rezoning.

The updated boundary of CCL767, following the relinquishment of the lease, is shown in Drawing No. MSEC1291-01. It can be seen that the majority of the property boundary lies just outside the current mining lease boundary to the south. A very small portion in the north-west corner of the property is located just inside the current mining lease boundary.

As shown in the drawing, the effect of the lease relinquishment is to remove a sizeable proportion of the previously planned longwalls in Area 8 north of the West Wilton Project. The mine layout will need to be amended such that future longwalls and underground access roads (headings) are not excavated directly beneath the relinquished portion of the lease.

At this point in time, the relinquished area remains within the declared Wilton Mine Subsidence District. SA NSW may annex the area when it reviews the District boundaries in the future, which usually occurs approximately every 5 years.

2.1.2. Future relinquishment of another portion of Illawarra Coal's Mining Lease

In late October 2021, the NSW government announced that the Wilton Town Centre Precinct would be rezoned on 31 March 2022. The NSW government has recently announced that the Precinct has been rezoned with a commencement date of 30 June 2023. The location of the Wilton Town Centre Precinct is shown in Figure 1 of a report by the NSW Department of Planning, Industry and Environment (DPIE, 2021) and is reproduced in Fig. 2.2.

As confirmed in documentation issued by DPIE (2021), the developer and South32 have reached an agreement to relinquish another part of the mining lease. The relinquishment is supported by the NSW Government.

The boundary of the Wilton Town Centre Precinct is shown in Drawing No. MSEC1291-01. It can be seen that the property boundary lies just outside the boundary to the south.

It is, therefore expected that another portion of mining lease CCL767 will be relinquished very soon, in accordance with the rezoning that has been agreed. MSEC is not aware whether the relinquishment has taken place. If the planned relinquishment occurs, future mining will not occur immediately to the north of the West Wilton Project.

At this point in time, the future relinquished area remains within the declared Wilton Mine Subsidence District and whilst the planned rezoning has been declared, we cannot find publicly available information to confirm that the rezoning has occurred. SA NSW may annex the area when it reviews the District boundaries in the future, which usually occurs every 5 years. It is recommended that Altis Property consult with SA NSW about design requirements in this area.

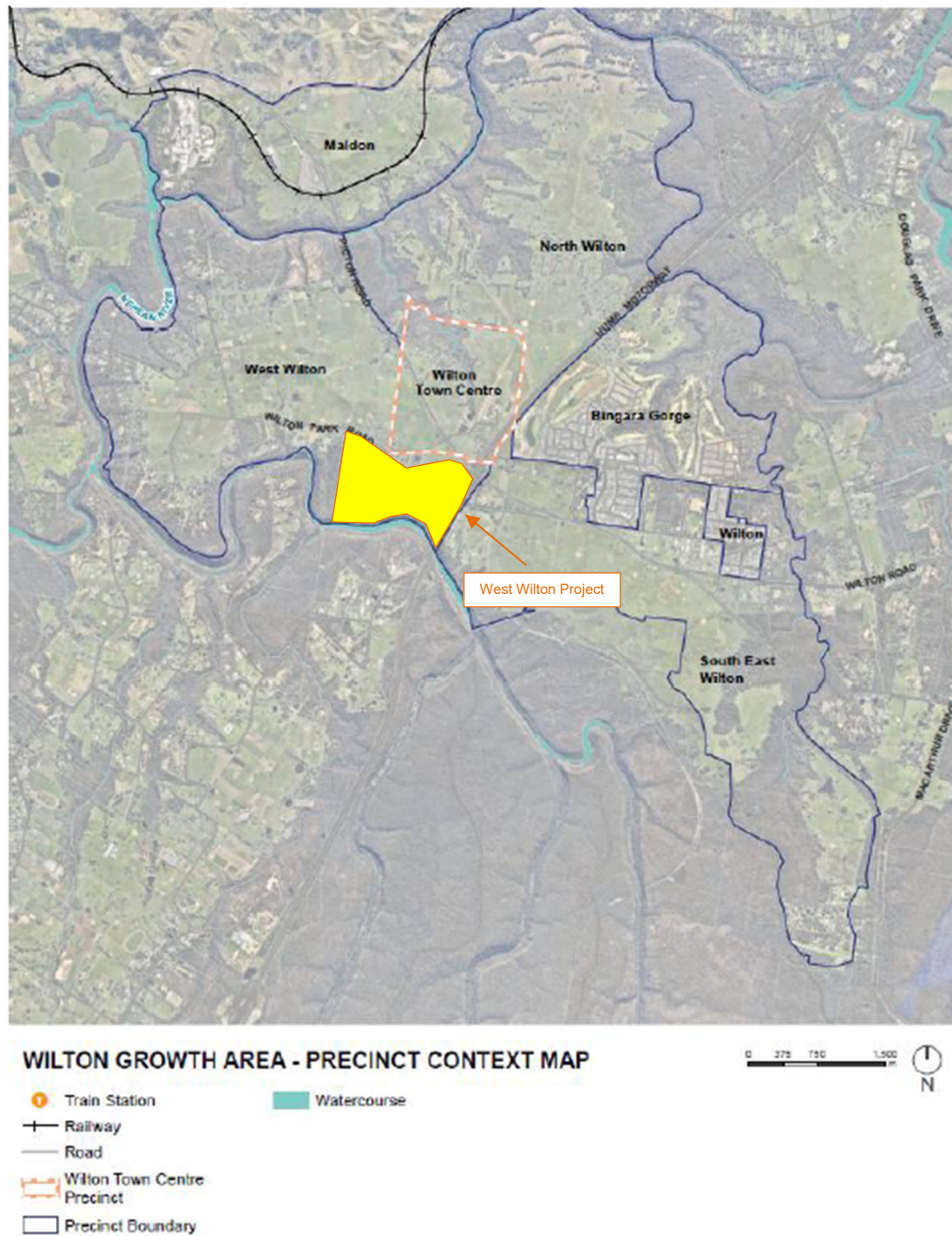


Figure 1 - Wilton Growth Area Precinct Context Map

Fig. 2.2 Location of Wilton Town Centre (DPIE, 2021)

2.2. Potential constraints to future mining operations

The information provided regarding the current mining approvals and lease relinquishments shows that future mining operations are currently not planned to occur immediately to the north of the West Wilton Project.

Valuable coal resources still remain directly beneath the property, which currently remains within a declared Mine Subsidence District. While the likelihood appears to be very low, it remains technically possible for a mining company to apply to extract coal directly beneath the property in the distant future.

From a due diligence point of view, MSEC has considered the potential constraints on future mining operations.

2.2.1. Nepean River

The Nepean River is a major stream in the region, with extensive cliffs lining its banks, including along the southern boundary of the West Wilton Project.

Mining companies have not been permitted to mine directly beneath the Nepean River for over a decade and it is considered unlikely that approval would be granted in the future.

As shown by Illawarra Coal's approved mine plan in Fig. 2.1, longwall panels have been setback from the Nepean River and other major streams. The setback distances vary depending on the mine layout but 200 metres would represent a reasonable indication of a likely setback distance.

The presence of the Nepean River along the southern boundary of the West Wilton Project, therefore, represents a hard constraint to future mining operations in the area.

2.2.2. Major bridges

The M31 Hume Motorway crosses directly over the Nepean River adjacent to the property via the Pheasants Nest Bridge. A photograph of the Bridge is shown in Fig. 2.3.



Fig. 2.3 Pheasants Nest Bridge on the M31 Hume Motorway

The Pheasants Nest Bridge is a major structure that is sensitive to small differential vertical and horizontal movements. Illawarra Coal and TfNSW have extensive experience of mining longwalls remotely from the Douglas Park Twin Bridges over the Nepean River, where longwalls ceased mining when they were within 600 metres of the Bridges.

As shown in Drawing No. MSEC1191-02, the extent of the Rezoning Boundary within the West Wilton Project is located between 550 metres and 1360 metres from Pheasants Nest Bridge.

The Picton Road Interchange over the M31 Hume Motorway is scheduled to be upgraded to accommodate the anticipated increase in traffic volumes in future. Designs of the upgrade have not been made public at this stage but the Interchange bridge structure or structures are expected to be substantial.

It is considered that the Pheasants Nest Bridge and the Picton Road Interchange will both represent hard constraints to future mining operations in the area.

The offset to Pheasant's Nest Bridge would be at least 600 metres and possibly more.

2.2.3. Wilton Town Centre Precinct and surrounding residential areas

The future Wilton Town Centre Precinct and surrounding residential areas will be constructed above areas where the existing mining lease has been relinquished or will likely be relinquished in the near future.

It is expected that new built infrastructure in the future development will not be designed to accommodate future mine subsidence movements.

While it would be technically possible to mine directly beneath residential structures that have not been designed to accommodate future subsidence, it is expected that future mining operations would be constrained in this area. The Town Centre will consist of substantial building structures that would not accommodate substantial mine subsidence movements.

It is considered that the Wilton Town Centre and surrounding residential areas would represent a hard constraint to future mining operations in the area.

2.2.4. Conclusion

The locations of the identified hard constraints of the Nepean River, Pheasants Nest Bridge and the Wilton Town Centre Precinct are shown relative to the location of the West Wilton Project in Drawing No. MSEC1291-02.

Given the identified hard constraints surrounding the West Wilton Project, it appears extremely unlikely that future mining operations would be permitted to extract coal beneath the property, particularly via longwall mining techniques.

While it might be technically possible to conduct minor mining operations beneath the central portions of the site, the operations would be severely restricted from causing substantial subsidence movements.

Substantial coal reserves are currently available for future extraction in the region.

It is, therefore, extremely unlikely that future mining operations will be permitted directly beneath the site or adjacent to the site.

It is recommended that Altis Property consult with the Department of Planning and Environment and Subsidence Advisory NSW regarding the potential for future mining to occur in this area. It may be reasonable for Altis Property to design infrastructure in this area without accommodating for future mine subsidence movements.

SA NSW may decide to annex the area from the Wilton Mine Subsidence District when it reviews the District boundaries in the future, which usually occurs approximately every 5 years.

2.3. Likely mine subsidence movements if mining occurs beneath the property

Despite the constraints listed above, Subsidence Advisory NSW (SA NSW) may determine that the proposed development be designed to accommodate future mine subsidence movements. It is recommended that Altis Property consult with SA NSW and seek advice.

In the worst case scenario, SA NSW may require the development to be designed to accommodate the full range of mine subsidence movements from potential future longwall mining.

A subsidence model was developed by MSEC in support of Illawarra Coal's development application (MSEC, 2009). The model was based on the mine layout at the time of the application.

The maximum predicted conventional subsidence parameters resulting from the extraction of the planned longwalls in the adjacent Appin Area 8 were provided in the development application.

A summary of the maximum predicted values of maximum total conventional subsidence, tilt and curvature, due to the extraction of longwalls within Appin Area 8, is provided in Table 2.1. The predicted tilts provided in this table are the maxima after the completion of each of the planned longwalls. The predicted curvatures are the maxima at any time during or after the extraction of each of the planned longwalls.

Table 2.1 Maximum predicted incremental conventional subsidence, tilt and curvature resulting from the extraction of each of the planned longwalls in Appin Area 8

Mining Domain	Maximum predicted total conventional subsidence (mm)	Maximum predicted total conventional tilt (mm/m)	Maximum predicted total conventional hogging curvature (km ⁻¹)	Maximum predicted total conventional sagging curvature (km ⁻¹)
Appin Area 8	1200	6.5	0.08	0.13

Predictions of ground strains are not an exact science, but a reasonably conservative prediction would be 1.2 mm/m tensile and 2.0 mm/m compressive.

If the proposed development was residential, it is likely that Subsidence Advisory NSW would require houses to be constructed to their Surface Development Guideline 5. Given that the proposed development is commercial, Subsidence Advisory NSW may agree to assess the proposed development under its Merit Assessment Policy (Surface Development Guideline 7) rather than apply Surface Development Guideline 5.

A small creek passes through the site and greater curvatures and ground strains may develop in these areas. It is generally recommended to avoid designing building structures over natural creeks.

Further detailed advice would be required to assist in designing the structures to accommodate future mine subsidence movements, which is beyond the scope of this high level report.

3.0 CONCLUSIONS

Altis Property is currently preparing a proposal to develop a property near the intersections of Wilton Park Road, Berwick Park Road and Picton Road (West Wilton Project). The proposed development generally consists of warehouses, office buildings and hardstand areas.

Mine Subsidence Engineering Consultants (MSEC) has been engaged to provide advice on potential future underground coal mining effects in relation to the proposed West Wilton Project.

Mining Lease CCL767 is held by Endeavour Coal Pty Limited, which is a subsidiary of South32. The majority of the property boundary lies just outside the current mining lease boundary to the south. A very small portion in the north-west corner of the property is located just inside the current mining lease boundary.

There are currently no mining operations approved or proposed to occur directly beneath the property, with the exception of possible future underground roadways directly beneath the north-west corner of the property. There are currently no longwalls approved or proposed to be extracted directly beneath the property.

Extensive underground mining has occurred to the north and east of the West Wilton Project by South32. Appin Colliery is the only active coal mine in this area.

While mining may occur in West Wilton in the future, a large portion of the West Wilton Project is unlikely to experience mine subsidence movements as part of the mining lease has been relinquished by South32 in an agreement with developers for the West Wilton Project. This includes the Wilton Town Centre Precinct, which has been rezoned with a commencement date of 30 June 2023 by the NSW Government.

Mining is also extremely unlikely to be permitted directly beneath or adjacent to the Nepean River, Pheasants Nest Bridge and the Picton Road Interchange. These features are located immediately adjacent to the property.

Given the identified hard constraints surrounding the West Wilton Project, it appears extremely unlikely that future mining operations would be permitted to extract coal beneath the property, particularly via longwall mining techniques. While it might be technically possible to conduct minor mining operations beneath the central portions of the site, the operations would be severely restricted from causing substantial subsidence movements.

It is, therefore, extremely unlikely that future mining operations will be permitted directly beneath the site or adjacent to the site.

It is recommended that Altis Property consult with the Department of Planning and Environment and Subsidence Advisory NSW regarding the potential for future mining to occur in this area. It may be reasonable for Altis Property to design infrastructure in this area without accommodating for future mine subsidence movements.

SA NSW may decide to annex the area from the Wilton Mine Subsidence District when it reviews the District boundaries in the future, which usually occurs approximately every 5 years.

Subsidence predictions have, however, been provided if SA NSW requires the development to be designed to accommodate the full range of mine subsidence movements from potential future longwall mining.

APPENDIX A. REFERENCES

References

DPIE, (2021). *Wilton Town Centre Precinct Rezoning*. NSW Department of Planning, Industry and Environment, September 2021.

MSEC (2009). *Bulli Seam Operations Subsidence Assessment, Report on the Prediction of Subsidence Parameters and the Assessment of Mine Subsidence Impacts on Natural Features and Surface Infrastructure Resulting from the Bulli Seam Operations in Support of the Part 3A Application*, Mine Subsidence Engineering Consultants, Report No. MSEC404, Revision D, August 2009.

APPENDIX B. DRAWINGS

