



**Tahmoor Colliery**

**MANAGEMENT PLAN**

**for**

**POTENTIAL IMPACTS TO**

**NO. 55-59 REMEMBRANCE DRIVE,**

**TAHMOOR**

**DUE TO THE MINING OF**

**Longwalls 26 to 28**

**REVISION B**



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## GENERAL

### REVIEW

| Date   | Rev | Comments         |
|--------|-----|------------------|
| Dec-10 | A   | Draft for review |
| Feb-11 | B   | Final plan       |
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- MSEC, (2009). *Tahmoor Colliery Longwalls 27 to 30 - The Prediction of Subsidence Parameters and the Assessment of Mine Subsidence Impacts on Natural Features and Items of Surface Infrastructure due to mining Longwalls 27 to 30 at Tahmoor Colliery in support of the SMP Application*. Mine Subsidence Engineering Consultants, Report No. MSEC355, Revision B, July 2009.

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## CHAPTER 1. STRUCTURES

### 1.1. Introduction

Tahmoor Colliery is located approximately 80 kilometres south west of Sydney in the township of Tahmoor NSW. It is managed and operated by Xstrata Coal. Tahmoor Colliery has previously mined 24 longwalls to the north and west of the mine's current location and is currently mining Longwall 25.

Longwalls 26 to 28 are a continuation of a series of longwalls that extend into the Tahmoor North Lease area, which began with Longwall 22. The longwall panels are located between the Bargo River in the south-east, the township of Thirlmere in the west and Picton in the north. A portion of each longwall is located beneath the urban area of Tahmoor.

No. 55 to 59 Remembrance Drive is located directly above Longwall 26. The location of the structure in relation to the proposed Longwall 26 is shown in Fig. 1.2. No impacts were reported during the mining of Longwall 25.

This structure is considered an item of heritage significance and consists of a single-storey weatherboard house with an adjacent stone building. A photograph of the structure is shown in Fig. 1.1.

The property was inspected by heritage consultants, Biosis Research on 4 March 2009. The landowner has not consented access to this property for the purposes of undertaking detailed inspections by a structural engineer or further inspections by the heritage consultant. The reason for the refusal is for personal reasons and Tahmoor Colliery respects the landowner's decision.

This Management Plan provides detailed information about how the risks associated with the mining beneath this property will be managed by Tahmoor Colliery in coordination with the Mine Subsidence Board.

The Management Plan is a live document that can be amended at any stage of mining.



**Fig. 1.1 No. 55-59 Remembrance Drive, Tahmoor**



**Fig. 1.2 Location of No. 55-59 Remembrance Drive, Tahmoor in relation to Tahmoor Longwall 26**

## **1.2. Objectives**

The objectives of this Management Plan are to establish procedures to measure, control, mitigate and repair potential impacts that might occur to No. 55 to 59 Remembrance Drive, Tahmoor.

The objectives of the Management Plan have been developed to:-

- Ensure the safety and serviceability of all structures. Public safety is paramount. Disruption and inconvenience should be kept to minimal levels.
- Maintain the heritage value of the structure
- Monitor ground movements and the condition of structures during mining.
- Initiate or coordinate action with the Mine Subsidence Board to mitigate or remedy potential significant impacts that are expected to occur to structures.
- Provide a plan of action in the event that the impacts of mine subsidence are greater than those that are predicted.
- Provide a forum to report, discuss and record impacts to the surface. This will involve Tahmoor Colliery, Mine Subsidence Board, Department of Primary Industries, and consultants as required.
- Establish lines of communication and emergency contacts.

### 1.3. Scope

The Management Plan is to be used to protect and monitor the condition of the items of infrastructure identified to be at risk due to mine subsidence. The major items at risk are:-

- Residential Establishments
- Heritage significance of the structure

The management plan does not include other property which lies outside the boundary of No. 55 to 59 Remembrance Drive, Tahmoor.

### 1.4. Proposed Mining Schedule

It is planned that each longwall will extract coal working northwest from the southeastern ends. This Management Plan covers longwall mining until completion of mining in Longwall 28 and for sufficient time thereafter to allow for completion of subsidence effects.

The current schedule of mining is shown in Table 1.1.

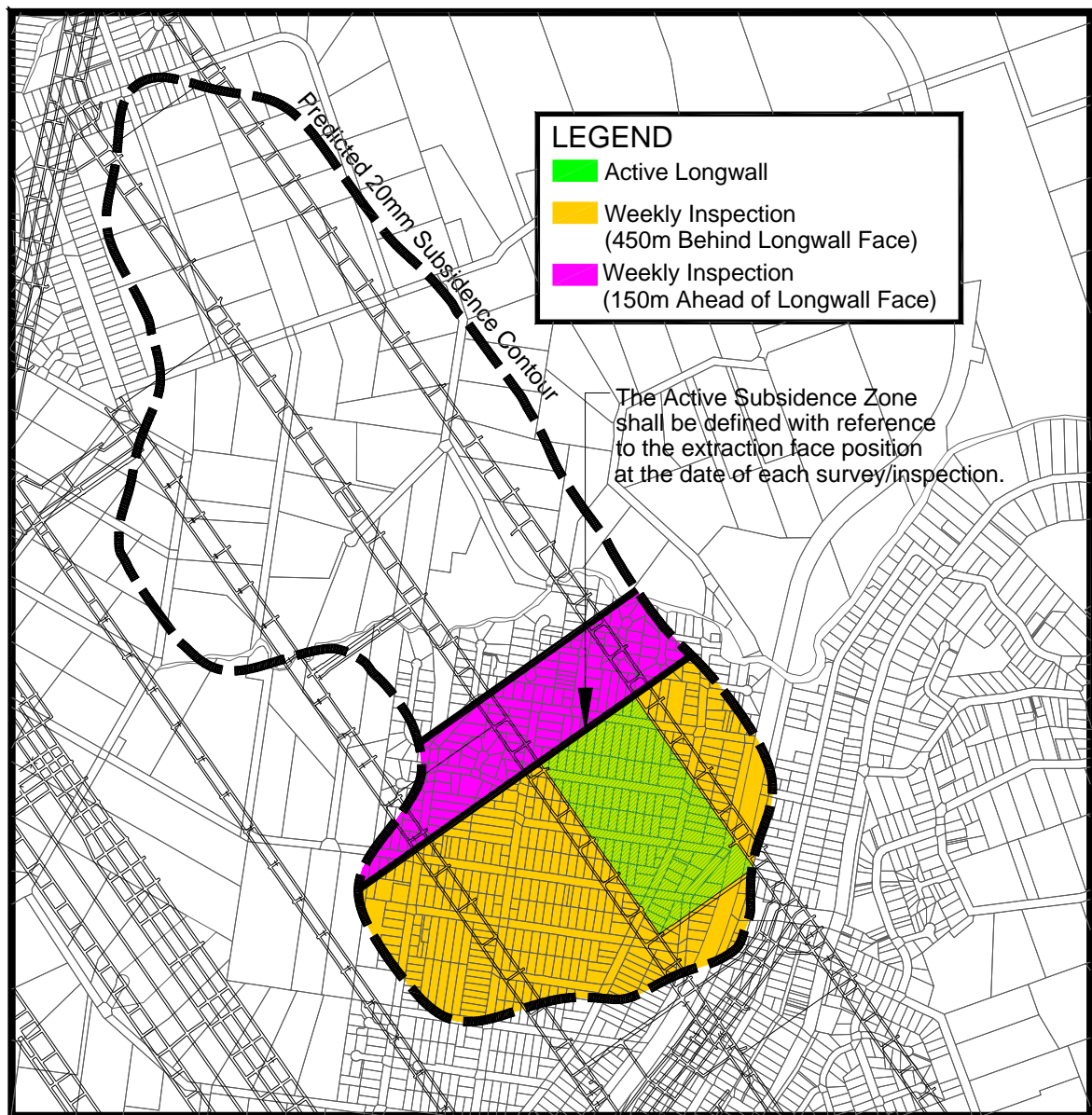
**Table 1.1 Schedule of Mining**

| <b>Longwall</b> | <b>Start Date</b> | <b>Completion Date</b> |
|-----------------|-------------------|------------------------|
| Longwall 26     | March 2011        | July 2012              |
| Longwall 27     | August 2012       | August 2013            |
| Longwall 28     | September 2013    | July 2014              |
| Longwall 29     | August 2014       | February 2015          |
| Longwall 30     | March 2015        | October 2016           |

### 1.5. Definition of Active Subsidence Zone

As a longwall progresses, subsidence begins to develop at a point in front of the longwall face and continues to develop after the longwall passes. The majority of subsidence movement typically occurs within an area 150 metres in front of the longwall face to an area 450 metres behind the longwall face.

This is termed the “active subsidence zone” for the purposes of this Management Plan, where surface monitoring is generally conducted. The active subsidence zone for each longwall is defined by the area bounded by the predicted 20 mm subsidence contour for the active longwall and a distance of 150 metres in front and 450 metres behind the active longwall face, as shown by Fig. 1.3.



**Fig. 1.3 Diagrammatic Representation of Active Subsidence Zone**

## CHAPTER 2. RISK ASSESSMENT

### 2.1. Description of No. 55 to 59 Remembrance Drive, Tahmoor

#### 2.1.1. Building structures

No. 55-59 Remembrance Drive includes a single-storey weatherboard house with a small stone building. These structures are considered to be of heritage significance. There is also a garage on the property.

The timber-framed single storey weatherboard house is on sandstone footings with painted masonry chimneys above a hipped corrugated iron roof and includes an enclosed verandah (Biosis, 2010). The plan dimensions of the structure are approximately 17 metres x 13 metres.

To the south of the main building is a small sandstone structure, with a hipped corrugated iron roof. The structure has a chimney, of which the base is stone and the top brick (Biosis, 2010). The plan dimensions of the structure are approximately 5 x 5 metres.

Given that the landowner has not consented to a pre-mining structural inspection, it is not possible to ascertain whether or not there are currently any structural issues. When viewed from the outside, both the main building and small sandstone building appear to be in sound condition.

The property is located on relatively flat terrain, with minor slopes.

#### 2.1.2. Heritage Significance

A heritage assessment has been conducted by Biosis Research (2010). Background research indicates that the building was constructed in the late 1880's.

Biosis (2010) advises that the property is listed in the Draft Wollondilly Local Environmental Plan 2009 Schedule 6 and the Wollondilly Heritage Study 1993.

Biosis (2010) advises that the property is not listed in the State Heritage Register, State Heritage Inventory, Government Authority s.170 Register, Schedule 1 of the Wollondilly Local Environmental Plan 1991, Sydney Regional Environmental Plan No. 20, and it has not been classified by the National Trust.

Biosis Research (2010) has provided the following statement of significance:

*“55 to 59 Remembrance Drive is of local heritage significance, again largely due to the early period of its construction, settlement being relatively sparse in the area in the late nineteenth century. The house is also associated with at least one figure of importance locally; Struan Robertson. The significance of the property is represented in the extant house and associated plantings, and may also be represented in archaeological relics.”*

### 2.2. Predicted Subsidence Movements

The subsidence predictions for this structure were provided in Report No. MSEC355 (2009, Rev. B), which was provided in support of Tahmoor Colliery's SMP application for Longwalls 27 to 30. The main structure was referenced Y108a and the small sandstone structure was referenced Y108b in this report.

Predictions of systematic subsidence, tilt and curvature for the main house is provided in Table 2.1.

**Table 2.1 Subsidence Predictions for 55-59 Remembrance Drive, Tahmoor**

| Stage of Mining | Maximum Predicted Subsidence (mm) | Maximum Predicted Tilt (mm/m) | Maximum Predicted Hogging Curvature (1/km) | Maximum Predicted Sagging Curvature (1/km) |
|-----------------|-----------------------------------|-------------------------------|--|--|
| After LW 26     | 835                               | 5.8                           | 0.03                                       | 0.08                                       |
| After LW 27     | 1145                              | 4.6                           | 0.03                                       | 0.13                                       |
| After LW 28     | 1180                              | 4.5                           | 0.03                                       | 0.13                                       |
| After LW 29     | 1190                              | 4.5                           | 0.03                                       | 0.13                                       |
| After LW 30     | 1190                              | 4.5                           | 0.03                                       | 0.13                                       |

As noted in Report No. MSEC355, increased subsidence was observed during the mining of Longwalls 24A and 25 at the commencing (southeastern) ends of the longwalls. Subsidence was observed to return to normal levels in the central and northwest ends of the longwalls. Subsidence was observed to



transition gradually between zones of maximum increased subsidence and normal subsidence. This transition zone has been observed to lie between Remembrance Drive and the southeastern edge of the urban area of Tahmoor.

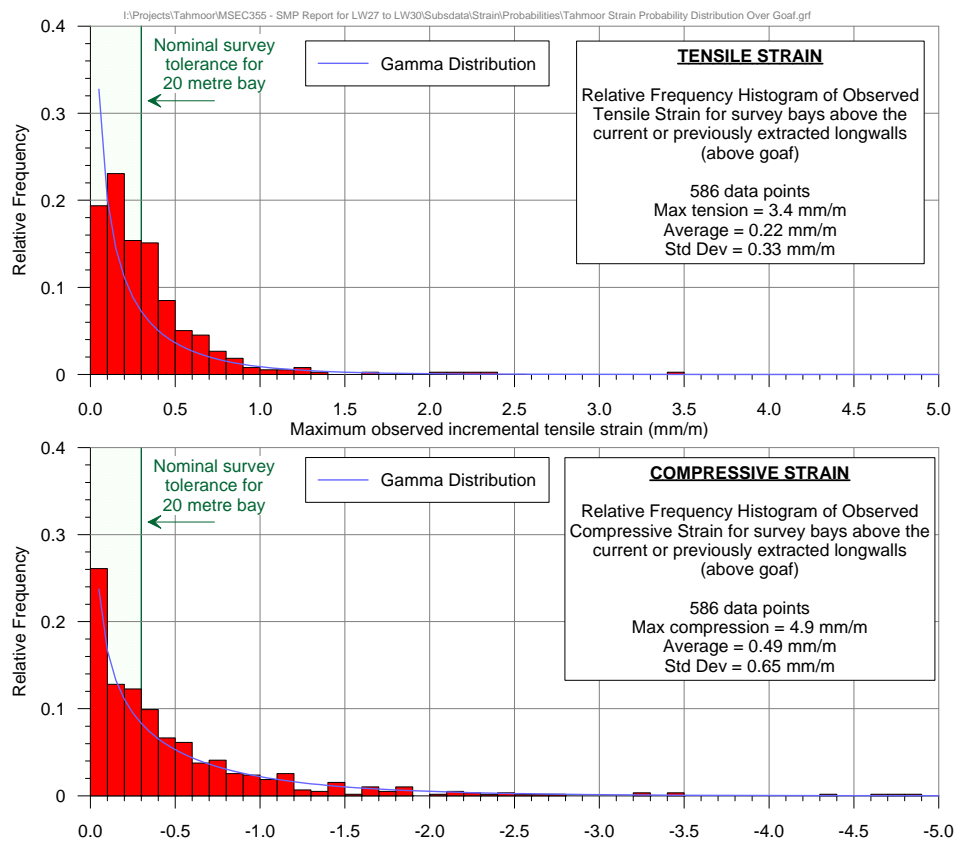
In the case of No. 55-59 Remembrance Drive, the structure is located on the projected interface between the normal subsidence zone and the transition zone above Longwall 26. This means that the structure is expected to experience subsidence at the levels shown above. It is recognised, however, that there is uncertainty in relation to where the actual interface between normal subsidence and the transition zone will occur and it is possible that the structure will experience more subsidence than predicted.

### 2.3. Predicted Strain

The prediction of strain is more difficult than the predictions of subsidence, tilt and curvature. The reasons for this are that strain is affected by many factors, including ground curvature and horizontal movement, as well as local variations in the near surface geology, the locations of joints at bedrock, the depth of bedrock. The measurements are also affected by survey tolerance. The profiles of observed strain can, therefore, be irregular even when the profiles of observed subsidence, tilt and curvature are relatively smooth.

The survey database has been analysed to extract maximum tensile and compressive strains that have been measured at any time during the mining of Longwalls 22 to 25 as at May 2009, for pegs that were located directly above goaf or the chain pillars that are located between the extracted longwalls.

The frequency distribution of maximum observed tensile strains and compressive strains above goaf is provided in Fig. 2.1.



**Fig. 2.1 Distributions of Measured Maximum Tensile and Compressive Strains at any time during the mining of Longwalls 22 to 25 as at May 2009 for pegs located Above Goaf.**

## 2.4. Potential Impacts during the mining of Longwalls 26 to 28

No impacts were reported at the property during the mining of Longwall 25. This is expected as the property is located to the side of this longwall. Approximately 50 mm of subsidence had developed at the property.

A method of assessment has been provided in Report No. MSEC355. The assessed probability of impact for the main house, based on its type of construction and predicted systematic curvature is provided in Table 2.2.

**Table 2.2 Assessed Probability of Impacts for 55-59 Remembrance Drive, Tahmoor**

| Structure | Repair Category |          |          |                |
|-----------|-----------------|----------|----------|----------------|
|           | No Claim or R0  | R1 or R2 | R3 or R4 | R5             |
| Y108a     | 83%             | 13%      | 4%       | Not applicable |

The repair categories have been defined as shown in Table 2.3. The Repair Category R5 is reserved for instances where the Mine Subsidence Board has agreed with the owner to rebuild the structure as the cost of repair exceeds the cost of replacement. In the case of items of heritage significance like No. 55-59 Remembrance Drive, such a commercial decision would not apply and all attempts would be undertaken to minimise subsidence induced impacts to the structure progressively during active subsidence. This is the focus of this Management Plan.

The probability of impacts to the small stone building is greater than the main house as the method of assessment does not take the size of the structure into account. The stone building has a maximum plan dimension of 5 metres and experience during the mining of Longwalls 22 to 25 indicates there is a reduced frequency of impact for smaller buildings. If impacts occur to the stone building, they will most likely occur at the junction with the main house, as they are constructed with different foundations. Structural engineer John Matheson concurs with this opinion (JMA, 2010).

As shown in Table 2.1, the majority of subsidence movements will occur during the mining of Longwall 26. It is expected that the mining of Longwalls 27 to 30 will reduce mining-induced tilts that occurred during the mining of Longwall 26.

Given that the landowner has not consented to a structural inspection, it is possible that there may be existing structural issues within the buildings that are not known to the colliery. If such an issue exists, there is a remote possibility that the comparatively small additional contribution of mine subsidence movements could be sufficient to result in failure of structures that do not meet Australian Standards or are unsafe. While the warnings appear dire, it should be noted that the likelihood of structural failure is still considered to be remote as no structures have collapsed as a result of mine subsidence movements in the Southern Coalfield.

The experience from the mining of over 1300 structures affected by Longwalls 22 to 25 at Tahmoor Colliery shows that residents have not been exposed to immediate and sudden safety hazards as a result of impacts that occur due to mine subsidence movements. In rare cases, some structures have experienced severe impacts, but the impacts did not present an immediate risk to public safety as they developed gradually with ample time to relocate residents, or introduce measures to provide additional support to the house.

**Table 2.3 Classification based on the Extent of Repairs**

| <b>Repair Category</b>           | <b>Extent of Repairs</b>  |
|----------------------------------|---|
| <b>Nil</b>                       | No repairs required   |
| <b>R0<br/>Adjustment</b>         | One or more of the following, where the damage does not require the removal or replacement of any external or internal claddings or linings:- <ul style="list-style-type: none"> <li>- <b>Door</b> or <b>window</b> jams or swings, or</li> <li>- Movement of <b>cornices</b>, or</li> <li>- Movement at external or internal <b>expansion joints</b>.</li> </ul>   |
| <b>R1<br/>Very Minor Repair</b>  | One or more of the following, where the damage can be repaired by filling, patching or painting without the removal or replacement of any external or internal brickwork, claddings or linings:- <ul style="list-style-type: none"> <li>- Cracks in <b>brick mortar</b> only, or isolated cracked, broken, or loose <b>bricks</b> in the external façade, or</li> <li>- Cracks or movement &lt; 5 mm in width in any external or internal wall <b>claddings, linings, or finish</b>, or</li> <li>- Isolated cracked, loose, or drummy floor or wall <b>tiles</b>, or</li> <li>- Minor repairs to any <b>services</b> or <b>gutters</b>.</li> </ul>  |
| <b>R2<br/>Minor Repair</b>       | One or more of the following, where the damage affects a small proportion of external or internal claddings or linings, but does not affect the integrity of external brickwork or structural elements:- <ul style="list-style-type: none"> <li>- Continuous cracking in <b>bricks</b> &lt; 5 mm in width in one or more locations in the total external façade, or</li> <li>- Slippage along the <b>damp proof course</b> of 2 to 5 mm anywhere in the total external façade, or</li> <li>- Cracks or movement ≥ 5 mm in width in any external or internal wall <b>claddings, linings, finish</b>, or</li> <li>- Several cracked, loose or drummy floor or wall <b>tiles</b>, or</li> <li>- Replacement of any <b>services</b>.</li> </ul> |
| <b>R3<br/>Substantial Repair</b> | One or more of the following, where the damage requires the removal or replacement of a large proportion of external brickwork, or affects the stability of isolated structural elements:- <ul style="list-style-type: none"> <li>- Continuous cracking in <b>bricks</b> of 5 to 15 mm in width in one or more locations in the total external façade, or</li> <li>- Slippage along the <b>damp proof course</b> of 5 to 15 mm anywhere in the total external façade, or</li> <li>- Loss of bearing to isolated walls, piers, columns, or other load-bearing elements, or</li> <li>- Loss of stability of isolated structural elements.</li> </ul>  |
| <b>R4<br/>Extensive Repair</b>   | One or more of the following, where the damage requires the removal or replacement of a large proportion of external brickwork, or the replacement or repair of several structural elements:- <ul style="list-style-type: none"> <li>- Continuous cracking in <b>bricks</b> &gt; 15 mm in width in one or more locations in the total external façade, or</li> <li>- Slippage along the damp proof course of 15 mm or greater anywhere in the total external façade, or</li> <li>- Relevelling of building, or</li> <li>- Loss of stability of several structural elements.</li> </ul>  |
| <b>R5<br/>Re-build</b>           | Extensive damage to house where the MSB and the owner have agreed to rebuild as the cost of repair is greater than the cost of replacement.   |

## **2.5. Potential Impacts on Heritage Significance of the Structures during the mining of Longwalls 26 to 28**

The heritage assessment stated that *“The significance of the property is represented in the extant house and associated plantings-and may also be represented in archaeological relics.”*

### **Main House**

The finish of the external walls is painted weatherboard. While there is potential for the weatherboard walls to develop cracks or gaps during mining, these impacts can be repaired in a sensitive manner without impacting on the heritage significance of the house.

Subsidence impacts on roofs are historically very rare and impacts to the hipped corrugated iron roof can be repaired in a sensitive manner without impacting on the heritage significance of the house.

The most significant potential impact of subsidence on the heritage significance of the house would be if severe differential vertical or horizontal movements occurred. This may result in noticeable distortion to the structural floor and building frame. In this case, the floor appears to be suspended and it will be possible to relevel the floor and building frame by jacking the floor and inserting packers between the footings and the floor beam supports. The releveling work would also allow the foundations to move horizontally relative to the floor beam supports.

Experience from extensive ground survey monitoring in the Southern Coalfield shows that subsidence develops gradually. If severe differential movements develop, they can be detected either by ground surveys or visual inspections at an early stage before they become severe. This allows time for measures such as jacking to be introduced before the structure experiences significant deformation.

### **Small Sandstone Building**

Exposed, untreated sandstone walls can be difficult to restore to their original condition in the event of cracks forming. While repairs can be carefully undertaken, there is a potential that impacts to the sandstone walls may not completely restore the appearance of the wall to its pre-mining condition.

The potential impacts to the building are limited by virtue of its very small footprint. In the very rare event that substantial differential subsidence movements occur at this structure, it may be possible to partially protect it from impacts by excavating a trench around the perimeter of the structure to reduce the transfer of ground strain into the foundations and walls. This requires landowner approval.

As discussed in the previous section, the interface between the small sandstone building and main weatherboard house is a likely location for impacts. This has been observed previously during mining beneath houses with extensions at Tahmoor. Impacts on the building interface can be restored in a sensitive manner without affecting the historical significance of the building.

### **Plantings**

There is a long history of mining beneath vegetation and based on this experience, the potential for impacts on planting is extremely low and not considered a credible risk.

## 2.6. Risk Assessment

The following risk analysis matrix has been used by Tahmoor Colliery to assess the risks to No. 55 to 59 Remembrance Drive.

**Table 2.4 Qualitative Risk Analysis Matrix**

| LIKELIHOOD            | CONSEQUENCES |          |          |           |             |
|-----------------------|--------------|----------|----------|-----------|-------------|
|                       | Very Slight  | Slight   | Moderate | Severe    | Very Severe |
| <b>Almost Certain</b> | Low          | Moderate | High     | Extreme   | Extreme     |
| <b>Likely</b>         | Low          | Moderate | High     | Very High | Extreme     |
| <b>Moderate</b>       | Low          | Low      | Moderate | High      | Very High   |
| <b>Unlikely</b>       | Very Low     | Low      | Moderate | High      | High        |
| <b>Rare</b>           | Very Low     | Very Low | Low      | Moderate  | High        |
| <b>Very Rare</b>      | Very Low     | Very Low | Low      | Moderate  | Moderate    |

The following risks have been identified and assessed by Tahmoor Colliery.

**Table 2.5 Risk Analysis for No. 55 to 59 Remembrance Drive, Tahmoor**

| <b>Risk</b>   | <b>Planned Controls</b>   | <b>Consequence</b> | <b>Likelihood</b>   | <b>Risk Analysis</b> |
|---|---|--------------------|---|----------------------|
| Impacts to structure  | Ground survey<br>Kerbside visual inspections<br>Landowner consultation<br>Repairs to structure if req'd<br>Structural inspection if req'd   | Very Slight        | Likely (83%)  | Low                  |
|   |   | Slight             | Unlikely (13%)  | Low                  |
|   |   | Severe             | Rare (4%)   | Moderate             |
|   |   | Very Severe        | Very Rare   | Moderate             |
| Impact to heritage significance of weatherboard walls   | Ground survey<br>Kerbside visual inspections<br>Landowner consultation<br>Repair, repaint as per advice from Heritage Consultant if req'd<br>Structural inspection if req'd   | Moderate           | Very Rare<br>(on account of being relatively easy to repair without affecting heritage significance)  | Low                  |
| Severe impacts to building structure, affecting overall heritage significance of house                    | Ground survey<br>Kerbside visual inspections<br>Landowner consultation<br>Re-level and adjust floor if required<br>Repair, repaint as per advice from Heritage Consultant if req'd<br>Structural inspection if req'd                | Severe             | Very Rare<br>(on account of likelihood of substantial differential movements developing at house and ability to relevel / adjust structure without affecting heritage significance) | Moderate             |
| Impacts to exposed sandstone blockwork of small building affecting overall heritage significance of house | Ground survey<br>Kerbside visual inspections<br>Landowner consultation<br>Excavate trench around structure if req'd<br>Repair, re-point sandstone as per advice from Heritage Consultant if req'd<br>Structural inspection if req'd | Moderate           | Rare<br>(on account of small building footprint)  | Low                  |
| Impacts to interface between small sandstone building and main weatherboard building                      | Ground survey<br>Kerbside visual inspections<br>Landowner consultation<br>Repair as per advice from Heritage Consultant if req'd<br>Structural inspection if req'd  | Slight             | Very Rare<br>(on account of being relatively easy to repair without affecting heritage significance)  | Low                  |

## **CHAPTER 3. RISK CONTROL PROCEDURES**

### **3.1. Structures Response Group (SMG)**

The SMG is responsible for taking the necessary actions required to manage the risks that are identified from monitoring of structures. The SMG's key members are:

- Tahmoor Colliery
- John Matheson and Associates (Structural Engineer)
- Biosis Research (Heritage Consultants)
- Mine Subsidence Engineering Consultants
- Mine Subsidence Board
- Sunrise Building and Property Services

The SMG may invite other specialist consultants from time to time.

### **3.2. Mitigation Measures**

Tahmoor Colliery or its representatives are currently not permitted to inspect the property.

Mitigation measures are currently not planned to be undertaken at the house. If access to the house is permitted in the future, the SMG will consider the implementation of mitigation measures. These may include:

- Strengthening of any structural elements identified by a structural engineer during inspection
- Preparation of footings and floor supports for future jacking if required

If a decision to excavate is made by the landowner and Tahmoor Colliery, Tahmoor Colliery will contact a Heritage Consultant immediately for advice as it is possible that the excavation may uncover relics.

### **3.3. Monitoring Measures**

Tahmoor Colliery or its representatives are currently not permitted to inspect the property.

The following monitoring measures will be undertaken during active subsidence:

- Ground surveys along Remembrance Drive in front of the property, and along York Street behind the property.
- Visual inspections from the street

Tahmoor Colliery will inform the landowner of the progress of mining and request the owner to contact either Colliery or the Mine Subsidence Board if impacts are observed.

If access to the house is permitted in the future, the SMG will consider the implementation of additional monitoring measures. These may include:

- Visual inspections during active subsidence
- Structural inspections, if required, during active subsidence
- Relative 3D ground surveys around the perimeter of the building
- Monitoring of existing cracks if requested by the structural engineer

### **3.4. Triggers and Responses**

Tahmoor Colliery or its representatives are currently not permitted to inspect the property.

Triggers in this Management Plan are described in Section 3.5 and are based on ground survey and visual inspections near the property.

If access to the house is permitted in the future, the SMG may consider the responses, if required. These may include:

- Additional inspections and/or surveys during active subsidence
- Releveling of the main house structure
- Excavation of trench around the perimeter of the small sandstone building

There may also be a number of other measures that might be considered, depending on actual observations.

If a decision to excavate is made by the landowner and Tahmoor Colliery, Tahmoor Colliery will contact a Heritage Consultant immediately for advice as it is possible that the excavation may uncover relics.

### **3.5. Risk Control Procedures for Longwalls 26 to 28**

The risk control procedures for the management of potential impacts to No. 55 to 59 Remembrance Drive are provided in Table 3.1.



**Table 3.1 Risk Control Procedures for No. 55 to 59 Remembrance Drive for Longwalls 26 to 28**

| Infrastructure                 | Hazard / Impact  | Risk            | Trigger   | Control Procedure/s   | Timing and Frequency  | By Whom?                               |
|--------------------------------|--|-----------------|---|---|---|--|
| No. 55 to 59 Remembrance Drive | Impacts occur to structures or heritage significance of property | Low to Moderate | Baseline monitoring for SMP   | Kerbside inspection to identify any potentially unstable structures   | Complete  | Tahmoor Colliery (MSEC)                |
|                                |  |                 |   | Baseline heritage assessment  | Complete  | Tahmoor Colliery (Biosis)              |
|                                |  |                 |   | Baseline structural assessment  | Complete (as far as possible without access to property)  | Tahmoor Colliery (JMA)                 |
|                                |  |                 | Prior to mining   | Contact landowner to inform of commencement of mine subsidence. Request landowner for information on any potential issues with existing structures. [Note: landowner currently refuses inspections] | Prior to subsidence occurring   | Tahmoor Colliery                       |
|                                |  |                 |   | Inform Wollondilly Council of commencement of mine subsidence.  | Prior to subsidence occurring   | Tahmoor Colliery                       |
|                                |  |                 |   | If consented by landowner, conduct pre-mining structural inspection and heritage re-inspection.   | Prior to subsidence occurring   | Tahmoor Colliery (JMA / Biosis)        |
|                                |  |                 |   | If consented by landowner, consider mitigation measures   | Prior to subsidence occurring   | Tahmoor Colliery (JMA / Biosis / MSEC) |
|                                |  |                 | During mining of Longwalls 26 and 27  | Conduct ground surveys of Remembrance Drive and York Street   | Weekly when streets are within the active subsidence zone (150m in front and 450m behind LW face) | Tahmoor Colliery (L&H)                 |
|                                |  |                 |   | Conduct kerbside visual inspection  | Weekly when house is within the active subsidence zone (150m in front and 450m behind LW face)    | Tahmoor Colliery (SBPS)                |
|                                |  |                 |   | Confirm arrangements through MSB for building contractors to remain on standby for immediate call out and service in the event of impacts affecting safety or serviceability.                       | Prior to subsidence occurring   | Tahmoor Colliery                       |
|                                |  |                 |   | Contact landowner to advise of LW progress and check for impacts to property  | Monthly when house is within the active subsidence zone (150m in front and 450m behind LW face)   | Tahmoor Colliery                       |
|                                |  |                 | For survey pegs outside property on Remembrance Drive:<br>Tilt exceeds 7 mm/m or Significant non-systematic movement occurs or Impacts observed to surface outside property | Contact and inform landowner. Request inspection by structural engineer and heritage consultant   | Within two days and then as recommended by structural engineer                                    | Tahmoor Colliery                       |
|                                |  |                 |   | If consented by landowner, conduct pre-mining structural inspection and re-inspection by heritage consultant  | Within two days and then as recommended by structural engineer                                    | Tahmoor Colliery (JMA / Biosis)        |
|                                |  |                 |   | If consented by landowner, consider additional monitoring and/or mitigation/strengthening measures or any other management measures.  | Immediately after structural re-inspection.   | Tahmoor Colliery (JMA / Biosis / MSEC) |

| Infrastructure                 | Hazard / Impact  | Risk            | Trigger  | Control Procedure/s   | Timing and Frequency  | By Whom?                               |
|--------------------------------|--|-----------------|--|---|---|--|
| No. 55 to 59 Remembrance Drive | Impacts occur to structures or heritage significance of property | Low to Moderate | Any impact occurs to structure                         | Notify Mine Subsidence Board, Industry and Investment, Wollondilly Council  | Within 24 hours   | Tahmoor Colliery                       |
|                                |  |                 |  | Inspect impact of subsidence on building  | As soon as possible   | MSB / Tahmoor Colliery                 |
|                                |  |                 |  | If landowner consents, inspect condition of building  | Once a week with active subsidence area or as agreed with landowner | Tahmoor Colliery (SBPS)                |
|                                |  |                 |  | Rectify any adverse impacts that impair upon:<br>- the safety, access and mobility, security or fire egress<br>- any essential services   | As soon as possible at any stage during mining                      | Tahmoor Colliery and/or MSB            |
|                                |  |                 |  | If consented by landowner, conduct pre-mining structural inspection and re-inspection by heritage consultant  | Within two days and then as recommended by structural engineer      | Tahmoor Colliery (JMA / Biosis)        |
|                                |  |                 |  | Assess available monitoring information and forecast potential impacts to structure and impacts on heritage significance  | Within two days   | Tahmoor Colliery (JMA / Biosis / MSEC) |
|                                |  |                 |  | If consented by landowner, consider additional monitoring and/or mitigation/strengthening measures , including jacking of floor and excavation of trench around building or any other management measures | Within two days   | Tahmoor Colliery (JMA / Biosis / MSEC) |
|                                |  |                 |  | Repair damage to structure, with input from heritage consultant if impacts are related to heritage significance of property   | When subsidence movements cease                                     | MSB                                    |
|                                |  |                 | Property is likely to be safe during and after mining  | Monitor impacts on building (e.g. extent of cracking, level of tilt)  | As advised by subsidence engineer and structural engineer           | Tahmoor Colliery (MSEC)                |
|                                |  |                 |  | Re-inspect condition of building  | Weekly within active subsidence area                                | Tahmoor (SBPS)                         |
|                                |  |                 | Property is likely to be unsafe during or after mining | Coordinate with MSB and provide temporary accommodation for residents.  | Immediately   | MSB & Tahmoor Colliery                 |
|                                |  |                 |  | Utilise acquisition and compensation procedure from DA67/98-1999 Development Consent Conditions 18-26 and MSB procedures  | Immediately   | MSB & Tahmoor Colliery                 |
|                                |  |                 | Property owner does not accept acquisition             | Temporarily relocate residents until building is repaired   | Immediately   | MSB & Tahmoor Colliery                 |

## **CHAPTER 4. SMG REVIEW MEETINGS**

SMG meetings will be held between Tahmoor Colliery, the Mine Subsidence Board and / or Industry and Investment, NSW for discussion and resolution of issues raised in the operation of the Management Plan. The frequency of the Plan Review Meetings will be as requested by any party.

SMG meetings will discuss any incidents reported in relation to the relevant surface feature, the progress of mining, the degree of mine subsidence that has occurred, and comparisons between observed and predicted ground movements.

It will be the responsibility of the meeting representatives to determine whether the incidents reported are due to the impacts of mine subsidence, and what action will be taken in response.

In the event that a significant risk is identified for a particular surface feature, any member of the SMG may call an emergency SMG Meeting, with one day's notice, to discuss proposed actions and to keep other parties informed of developments in the monitoring of the surface feature.

## **CHAPTER 5. AUDIT AND REVIEW**

All Management Plans within this document have been agreed between parties. The Management Plan will be reviewed following extraction of each longwall.

Should an audit of the Management Plan be required during that period, an auditor shall be appointed by the Tahmoor Colliery to review the operation of the Management Plan and report at the next scheduled Plan Review Meeting.

Other factors that may require a review of the Management Plan are:-

- Observation of greater impacts on surface features due to mine subsidence than was previously expected.
- Observation of fewer impacts or no impacts on surface features due to mine subsidence than was previously expected.
- Observation of significant variation between observed and predicted subsidence.

## **CHAPTER 6. RECORD KEEPING**

Tahmoor Colliery will keep and distribute minutes of any SMG Meeting.

## CHAPTER 7. CONTACT LIST

| <b>Organisation</b>   | <b>Contact (* SMG Member)</b>                           | <b>Phone</b>                   | <b>Email / Mail</b>   | <b>Fax</b>     |
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| Xstrata Coal Tahmoor Colliery – Environment and Community Manager | Ian Sheppard*   | (02) 4640 0156<br>0408 444 257 | isheppard@xstratacoal.com.au  | (02) 4640 0140 |
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# Tahmoor Colliery Longwall 26

## Assessment of 55 to 59 Remembrance Driveway Tahmoor

FINAL Report for Xstrata Coal –  
Tahmoor Colliery

February 2011

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## EXECUTIVE SUMMARY

### Background

Biosis Research Pty. Ltd. was commissioned by Xstrata Coal – Tahmoor Colliery to undertake an assessment of the subject property at 55 to 59 Remembrance Driveway, Tahmoor. The property is comprised of an occupied house and other standing structures, cultural plantings and a potential archaeological site. The property is within an area that will potentially be affected by the proposed Longwall 26 for the Tahmoor Colliery, NSW.

The aim of this report is to distil information presented in an earlier report by Biosis Research in 2009, that looked at a wider study area and assessed a number of Aboriginal and historical heritage items. Additional research was also conducted to supplement the information in the 2009 report; however a site visit was not undertaken thus the condition of the standing structure was not assessed, nor was the possible archaeological site investigated. The subject property was visited in 2009, the results of which are included in this report. It has been assumed that the condition of the structures on the property remains unchanged.

The subject property has been identified as an item of heritage value in the *Draft Wollondilly LEP 2009* but is not included in the heritage schedule of the LEP currently in force (1991). Relics on the site, should they exist, are protected by provisions of the *Heritage Act 1977* (NSW).

### Impact Assessment

Based on the subsidence predictions and recommendations provided by MSEC, the subject property at 55 - 59 Remembrance Driveway is within an area where some risk from the mining operations may exist. The recommendations below have been formulated to assist in identifying potential impacts of the proposed mining operations and removing or minimising them before they occur.

## Recommendations

### Statutory Requirements

The subject property at 55-59 Remembrance Driveway Tahmoor, is not listed on the LEP currently in force. It is, however listed on the *Draft Wollondilly LEP 2009*, and should the LEP be adopted as is, the property including the existing buildings and the potential archaeological site would be protected under Clause 5.10 of that instrument.

Archaeological relics, as defined in the *Heritage Act 1977*, are protected by that Act. Disturbance to any such relics requires an Excavation Permit or Exception Notification, issued by the Heritage Branch of the Department of Planning.

## Recommendations

Based on the subsidence predictions provided by MSEC (2009), and the nature of the subject property, there is some potential for impacts to occur resulting from the proposed longwall mining. The following recommendations are intended to address the statutory requirements with regard to the potential impact on heritage items, and minimise or manage this potential impact.

### Recommendation 1 – Consultation with Wollondilly Shire Council

Wollondilly Shire Council should be consulted, prior to the commencement of the mining of Longwalls 26, with regard to the subject property, which has been identified as a heritage item on the *Draft Wollondilly LEP 2000* and includes a potential archaeological site.

### Recommendation 2 – Develop plan of management with mitigation measures & ameliorative actions

In response to the conditions of approval (DA 67-98) prepare a plan of management for subject property, or include it in an existing plan. A plan of management would be endorsed by Council and be used to identify potential impacts and provide practical ameliorative actions should they be required. Refer to section 7 for guidance with the plan's structure. The proposed plan of management should include provision of an archaeological program for any excavation works (refer Recommendation 3).

### Recommendation 3 – Archaeological monitoring in certain cases

A minor possibility exists that excavations around the house will be required to protect the structure from potential subsidence impacts. Should excavations around the existing foundations, trenching, or any other ground disturbance, be required with regard to the current proposal it would be prudent to conduct an archaeological test excavation or archaeological monitoring program during any excavation works.

Include the requirement for an archaeological program and the methodology in the recommended plan of management (refer Recommendation 2). A permit or exception notification will be required to undertake the work, therefore it is strongly advised that this issue is addressed with the Heritage Branch as soon as possible; an exception notification for potential trenching should be sought at the earliest stages to avoid delays that would be experienced through permit/exception processing times.

All archaeological relics are protected under the NSW *Heritage Act 1977*. The impact predictions developed and used by MSEC are designed principally for standing structures. Relics have not been discovered on the subject site, however the possibility remains that archaeological resources related to the existing building may occur on site.



## Acknowledgments

Biosis Research acknowledges the contribution of the following people and organisations in preparing this report:

- Martin Cooper, Wollondilly Shire Council
- Belinda Clayton, Xstrata Tahmoor
- Daryl Kay, Mine Subsidence Engineering Consultants

## Abbreviations

|         |   |
|---------|---|
| AHC     | Australian Heritage Council   |
| AHIMS   | Aboriginal Heritage Information Management System                             |
| ARTC    | Australian Rail Track Corporation   |
| ATSIC   | Aboriginal and Torres Strait Islander Commission                              |
| BDM     | NSW Registry of Births, Deaths and Marriages                                  |
| CBNTCAC | Cubbitch Barta Native Title Claimants Aboriginal Corporation                  |
| CHL     | Commonwealth Heritage List  |
| CMP     | Conservation Management Plan  |
| DEC     | Department of Environment and Conservation (now DECC)                         |
| DECC    | Department of Environment and Climate Change                                  |
| DEH     | Department of Environment and Heritage  |
| DPI     | Department of Primary Industries  |
| EP&A    | Environmental Protection and Assessment                                       |
| EPBC    | Environment Protection and Biodiversity Conservation                          |
| GSV     | Ground surface visibility   |
| ICOMOS  | International Council on Monuments and Sites                                  |
| LEP     | Local Environmental Plan  |
| LGA     | Local Government Area   |
| LTO     | Land Titles Office  |
| MGA     | Map Grid of Australia – unless otherwise specified all coordinates are in MGA |
| MSEC    | Mine Subsidence Engineering Consultants                                       |
| NHL     | National Heritage List  |
| NNTT    | National Native Title Tribunal  |
| NPWS    | National Parks and Wildlife Service (now part of DECC)                        |
| REP     | Regional Environment Plan   |
| RNE     | Register of the National Estate   |
| RTA     | Roads and Traffic Authority   |
| SEMP    | Subsidence Environmental Management Plan                                      |
| SHI     | State Heritage Inventory  |
| SHR     | State Heritage Register   |
| SMP     | Subsidence Management Plan  |

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## 1.0 INTRODUCTION

### 1.1 Project background

Xstrata Coal – Tahmoor Colliery commissioned Biosis Research Pty. Ltd. to complete additional historical research and Statement of Heritage Impact for the property at 55-59 Remembrance Driveway Tahmoor. The site lies within the SMP area of Longwall 26, located to the south west of Picton and include part of the Tahmoor township on the southern boundary.

The Study Area includes the subject property at 55 to 59 Remembrance Driveway, Tahmoor. The property comprises of two lots, one of which contains the majority of the built structures, including the cottage (Lot 142 DP 864238); the other being a garden (Lot 141 DP 864238).

This report has been prepared using existing information from an earlier report prepared by Biosis Research to address potential subsidence issues related to Aboriginal and historical items within the Tahmoor area (Biosis Research 2009). Additional property research was also conducted at Land and Property Management Information (formerly Department of Lands).

The results of this investigation will inform the management recommendations proposed for the protection of the item. The recommendations have been designed to minimise impacts to cultural heritage places and have been formulated according to legislative constraints and ‘best practice’ heritage management.

### 1.2 Planning approvals

Development consent has been granted for the mining of Longwalls 24-26. The relevant consent is DA 67-98, issued by the Minister for Urban Affairs and Planning in 1999, as modified by the Minister for Planning in 2006. Conditions relating specifically to cultural heritage are the following:

16. If determined necessary by DPI (MR), the Applicant shall cause a pre-mining structural inspection to be carried out on substantial improvements on land identified by the DPI (MR) at least one month prior to commencement of second workings taking place that may cause subsidence impacts on the relevant property.

These inspections shall:

- be conducted with the consent of the landowner/occupier and in consultation with MSB;
- include a report prepared on the structural integrity of all buildings in their entirety (including roofs, ceilings, openings, foundations and household sewage treatment and disposal systems);
- be conducted by an independent and technically qualified person;

- include permanent reference marks on each corner of all substantial improvements with level tied to Australian Height Datum to a stable point in the area; and include soil sampling for moisture content and soil type as appropriate.

A copy of the inspection report shall be provided to the landowner/occupier upon completion.

17. Where a pre-mining structural inspection under Condition 16 involves a building identified in the Wollondilly Heritage Study the report shall be prepared with the assistance of a qualified heritage expert. The Director General may also require such a report on a building which is not identified in the Wollondilly Heritage Study be prepared with the assistance of a qualified heritage expert if the Director-General is satisfied, on the basis of available information, that the building may be older than 50 years and have heritage significance. Prior notice of such inspections shall be provided to the Director - General by the Applicant to enable a decision to be made.
27. The Applicant shall not cause damage to any building or structure which is a Heritage Item without the prior approval of Council. The application for such approval shall include a detailed report assessing:
  - likely subsidence and the potential damage to the item arising from subsidence;
  - impacts of expected damage on the historical significance of the Item (prepared by a qualified heritage expert endorsed by Council); and
  - appropriate mitigation, management or restoration measures.

*Note: In this condition, "Heritage Item" means an item either listed in Schedule 1 of the Wollondilly Local Environmental Plan 1991 or identified in the Wollondilly Heritage Study 1993. The power for Council to issue an "approval" is established under this condition, and should not be read as establishing any requirement for the application for and grant of development consent under the Act.*

28. When applying for the approval of Council under condition 27, the Applicant shall provide a copy of the application and detailed report to the owner or owners of affected buildings or structures and to the Community Consultative Committee.
29. Prior to commencement of mining the Applicant shall comply with the statutory requirements of NPWS in relation to works affecting Aboriginal sites.
30. If the Applicant becomes aware of any heritage or archaeological material that may be affected by mining or subsidence, all work likely to affect the material shall cease immediately and the relevant authorities consulted about an appropriate course of action prior to recommencement of work. The relevant authorities may include NPWS, the Heritage Office, and the Local Aboriginal Land Council. Any necessary permits or consents shall be obtained and complied with prior to recommencement of work.

Prior to the commencement of longwall mining, a Subsidence Management Plan (SMP) must be submitted for approval to the Department of Primary Industries, as outlined in the *Guideline for Application for Subsidence Management Approvals* (Department of Mineral Resources Dec 2003). The

present report has been prepared to meet the cultural heritage requirements of the SMP, through the identification of the Aboriginal and historic cultural values of the Study Area and the provision of recommendations in accordance with the:

- *National Parks and Wildlife Act 1974* (NSW); and
- *Heritage Act 1977* (NSW).

### 1.3 Aims

The following is a summary of the major objectives.

- Investigate the heritage significance of the subject property
- Formulate management recommendations in response to the property's significance and the potential for damage through subsidence

### 1.4 Constraints

Permission was not given to access the subject property, thus a survey was not conducted. This report is largely based on the report prepared by Biosis Research in 2009. Many sections have been used verbatim as they apply to the current situation.

## 2.0 HERITAGE STATUS AND PLANNING DOCUMENTS

### 2.1 Commonwealth Registers

#### 2.1.1 National Heritage Registers

The *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (EPBC Act) establishes two mechanisms for protection of heritage places of National or Commonwealth significance. The National Heritage List provides protection to places of cultural significance to the nation of Australia. The Commonwealth Heritage List comprises natural, Aboriginal and historical heritage places owned and controlled by the Commonwealth and therefore mostly includes places associated with defence, communications, customs and other government activities.

Nominations to these two lists are assessed by the Australian Heritage Council (AHC), who also compiles the Register of the National Estate (RNE), a list of places identified as having national estate values. There are no management constraints associated with listing on the RNE unless the listed place is owned by a Commonwealth agency.

#### APPLICATION TO THE STUDY AREA – NATIONAL HERITAGE REGISTERS

The subject property is not listed on the NHL, CHL or the RNE

### 2.2 State Registers

#### 2.2.1 Heritage Act Registers

The NSW Heritage Office, part of the Department of Planning, maintains registers of heritage and archaeological items that are of significance to New South Wales.

State Heritage Register: The State Heritage Register (SHR) contains items that have been assessed as being of State Significance to New South Wales. The State Heritage Inventory (SHI) contains items that are listed on Local Environmental Plans and/or on a State Government Agency's Section 170 registers. Items on the SHI have been identified as having heritage significance, but have not been included on the SHR.

If an item or place does not appear on either the SHR or SHI this may not mean that the item or place does not have heritage or archaeological significance; many items have not been assessed to determine their heritage significance. An assessment is required for items that are 50 years or older. Items that appear on either the SHR or SHI have a defined level of statutory protection. This is discussed more fully in Appendix 1.

#### APPLICATION TO THE STUDY AREA – NSW STATE HERITAGE REGISTER LISTINGS

The subject property is not listed on the SHR

**APPLICATION TO THE STUDY AREA – NSW STATE HERITAGE INVENTORY LISTINGS**

The subject building is not listed on the SHI

---

S.170 provisions: In addition, Section 170 of the NSW *Heritage Act 1977* requires that culturally significant items or places managed or owned by Government agencies be listed on departmental Conservation and Heritage Registers. Information in these Registers has been prepared according to NSW Heritage Office guidelines and should correspond with information in the State Heritage Inventory.

The S.170 Heritage and Conservation Registers of the following agencies were searched:

- Roads and Traffic Authority (RTA),
- RailCorp,
- Australian Rail Track Corporation (ARTC),
- Sydney Water.

**APPLICATION TO THE STUDY AREA – GOVERNMENT AUTHORITY S.170 REGISTER**

The subject property is not listed on the s.170 Register

---

Relics Provisions: Approval must be obtained from the NSW Heritage Council when making changes to a heritage place listed on the State Heritage Register (Section 60 Permit), or when excavating any land in NSW where there is a possibility that archaeological relics may be disturbed (Section 140 Permit).

The NSW Heritage Act 1977 currently affords automatic statutory protection to ‘certain relics’ that form part of archaeological deposits. Sections 139–145 of the Act prevent the excavation of a relic, except in accordance with a gazetted exception or an excavation permit issued by the Heritage Council of New South Wales. Consultation and discussion with the NSW Heritage Branch should begin well before lodging an application for a permit to disturb or destroy a historical archaeological site.

**APPLICATION TO THE STUDY AREA – NSW HERITAGE ACT 1977 RELICS PROVISIONS**

One potential archaeological site (relic) has been identified within the subject property.

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## 2.2.2 Environmental Planning and Assessment Act Registers

The *Environmental Planning and Assessment Act 1979* includes provisions for local government authorities to consider environmental impacts in land-use planning and decision making. Such impacts are generally considered in relation to the planning provisions contained in the Local Environment Plan (LEP) or Regional Environment Plan (REP).

Local Environmental Plans: Each Local Government Area (LGA) is required to create and maintain a LEP that includes Aboriginal and historic heritage items. Local Councils identify items that are of significance within their LGA, and these items are listed on heritage schedules in the local LEP and are protected under the *EP&A Act 1979* and *Heritage Act 1977*.

### APPLICATION TO THE STUDY AREA – WOLLONDILLY LEP 1991 SCHEDULE 1

The subject property is not listed on the Wollondilly LEP 1991 Schedule 1

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The draft *Wollondilly Local Environmental Plan 2009* is available to be viewed at the Council offices. This LEP is not yet in force, but was consulted to identify further known heritage items.

### APPLICATION TO THE STUDY AREA – DRAFT WOLLONDILLY LEP 2009 SCHEDULE 5

The subject property is listed on the Draft Wollondilly LEP 2009 Schedule 6

- Cottage, 55-59 Remembrance Driveway, Tahmoor; Lots 141 and 142 DP 864238; Local significance; ID 2690773

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Regional Environmental Plans: Under the *EP&A Act 1979*, broad scale regional plans have also been developed that address cultural heritage resources that may extend beyond the geographic limit of one LGA. *Sydney Regional Environmental Plan No. 20 – Hawkesbury-Nepean River*, and *Sydney Regional Environmental Plan No. 27 – Wollondilly Region Open Space* both apply to the Wollondilly LGA. No items in the Study Area are listed in ‘Schedule 1 – Items of Non-Aboriginal Heritage’ of *SREP No. 20*. *SREP No. 27* does not relate to cultural heritage.

### APPLICATION TO THE STUDY AREA – SREP NO. 20 SCHEDULE 1

No items within the Study Area are listed in the heritage schedule of *SREP No. 20*.

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## 2.3 Non-Statutory Registers

### 2.3.1 The National Trust of Australia (NSW)

The National Trust of Australia (NSW) is a community-based conservation organisation. The Trust maintains a Register of heritage items and places. Although the Register has no legal foundation or statutory power, it is recognised as an authoritative statement on the significance to the community of particular items, and is held in high esteem by the public. The National Trust lists items or places that have heritage or cultural value to the community and, as such, the Trust encourages and promotes the public appreciation, knowledge, and enjoyment of heritage items for future and present generations.

#### *APPLICATION TO THE STUDY AREA – NATIONAL TRUST OF AUSTRALIA (NSW)*

The subject property is not classified by the National Trust

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### 2.3.2 Heritage Studies

#### **Macarthur Region Heritage Study**

**JRC Planning Services (1986)**

The subject property was not identified in the 1986 heritage study

#### **Wollondilly Heritage Study**

**JRC Planning Services (September 1993)**

- **House, Tahmoor [55-59 Remembrance Drive, Tahmoor] (Item WO331)**

## 2.4 Summary of heritage listings

The subject property is listed on the *Draft Wollondilly Local Environmental Plan 2009* as an item of local significance.

## 3.0 HISTORICAL CONTEXT

### 3.1 Introduction

Historical research has been undertaken to identify the historical context of the Study Area. This history incorporates an understanding of land-use, building patterns, areas of disturbance, as well as land owner histories. This research will lead to understanding historical archaeological potential for the study, and significance of the heritage items identified.

The historical analysis in this report is based on information extracted from Biosis Research 2009, as the investigation undertaken for that specific project effectively covers that required for the subject property.

The historic background is based on information held at the following repositories:

- *State Library of NSW – Mitchell Library*

The Mitchell library contains many primary source maps and plans for NSW, as well as many secondary sources that relate to the history of NSW. Histories of the area were consulted, and subdivision plans were searched for any that related to the Study Area.

- *NSW Land Titles Office*

Historic parish maps, crown plans, and other property plans were accessed through the Land Titles Office to give information on the initial grants and subsequent ownership of the land in the Study Area. Some title research was carried out where it was thought that this would provide further information on particular heritage items.

- *NSW State Records*

The online indices were searched for information on the early owners of the Portions comprising the Study Area.

- *Other source material*

Online collections of historic images were accessed through Picture Australia. The online edition of the *Australian Dictionary of Biography* provided information on some of the better-known owners of land in the Study Area.

### 3.2 History and development of the Study Area

The detailed history of Tahmoor can be found in Biosis Research (June 2009) and will not be repeated here. The following information is specific to the subject property at 55-59 Remembrance Driveway.

The Study Area is Portion 201 of the Parish of Couridjah (Plate 1). The history of the Study Area is described in the following section according to Portion.

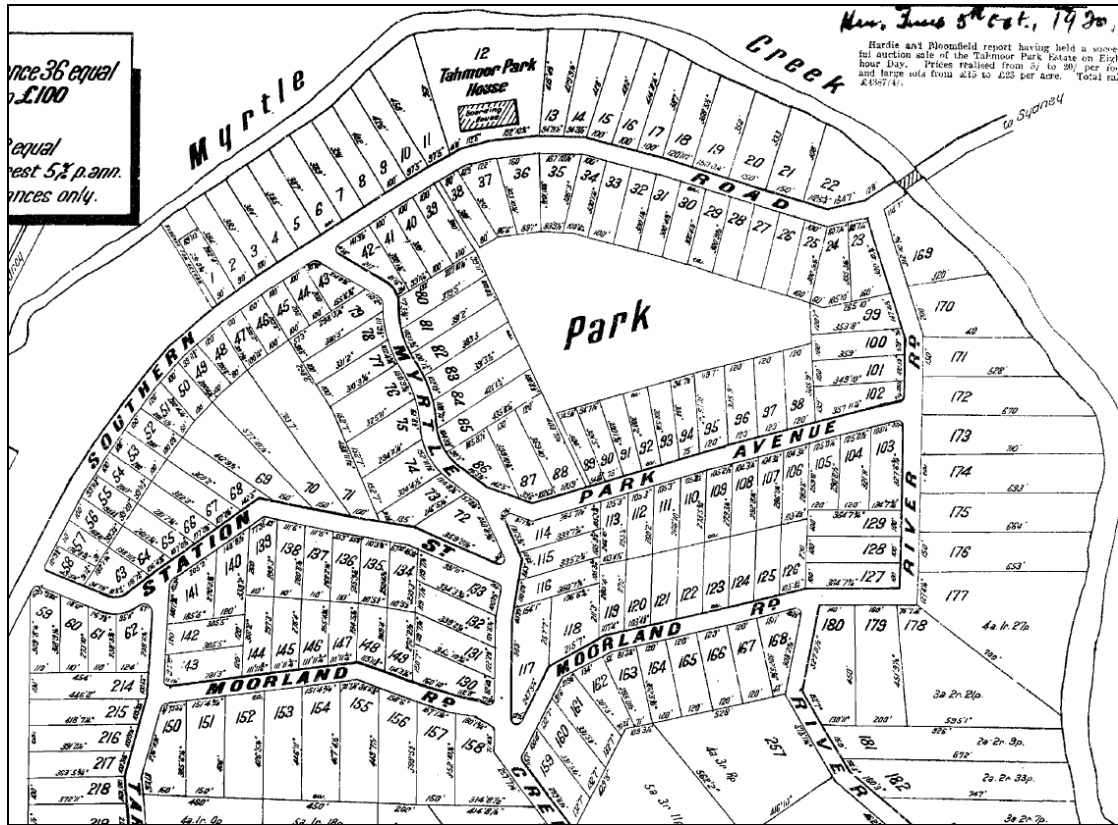


**Plate 1:** Detail of a 1951 map of the Parish of Couridjah, showing Portion 201, which crosses the road to the north (source: Department of Lands, Parish Map Preservation Project, Image ID 14086001).

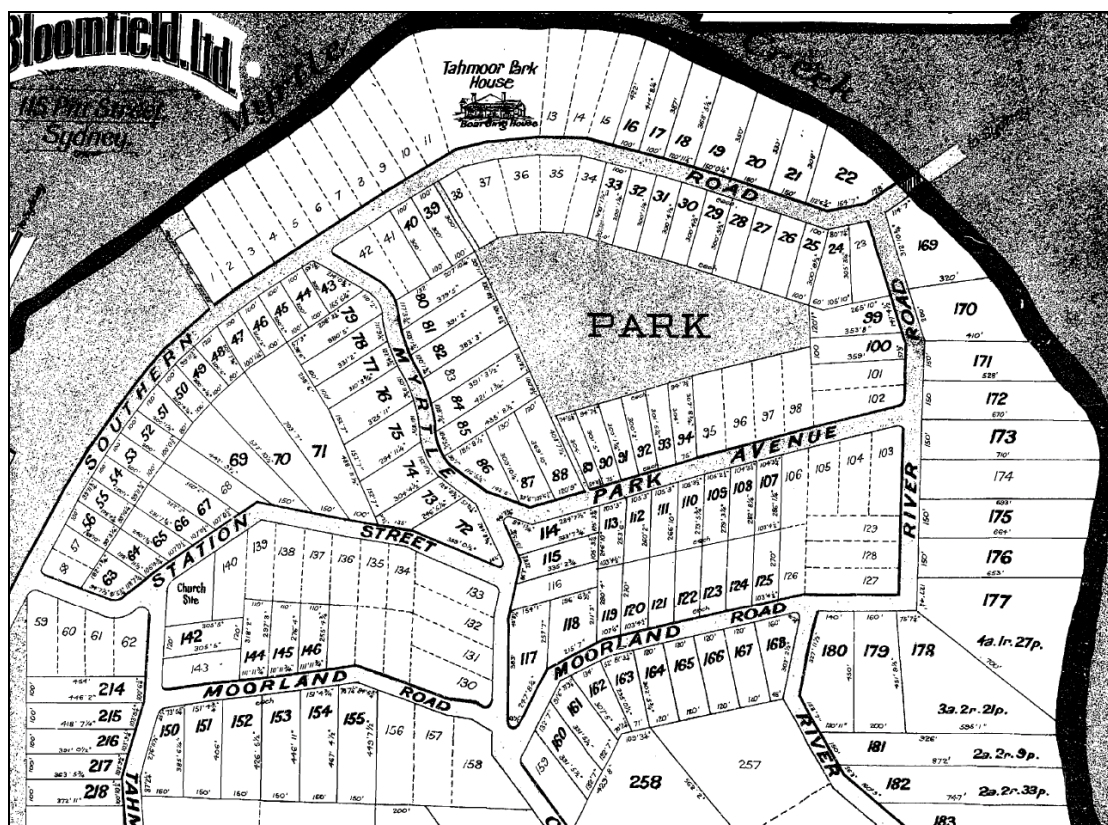
### 3.2.1 Portion 201

Portion 201 was granted to Edward Allen in 1822 and consisted of 50 acres.

A plan from 1920 shows the subdivision of Portions 201 to 206, as the Tahmoor Park Estate. Tahmoor Park House is the only structure shown standing on the estate. The Park is reserved, and all the present streets are shown, and were presumably laid out at this time (Plate 2). A plan from the following year shows that several of the lots had been sold (Plate 3).



**Plate 2:** A 1920 plan of the subdivision of Portions 201-206, as the Tahmoor Park Estate (source: ‘Tahmoor Park Estate Tahmoor ... Monday 4<sup>th</sup> October 1920. Mitchell Library, Subdivision Plans: Tahmoor, ZTP:T1/3).



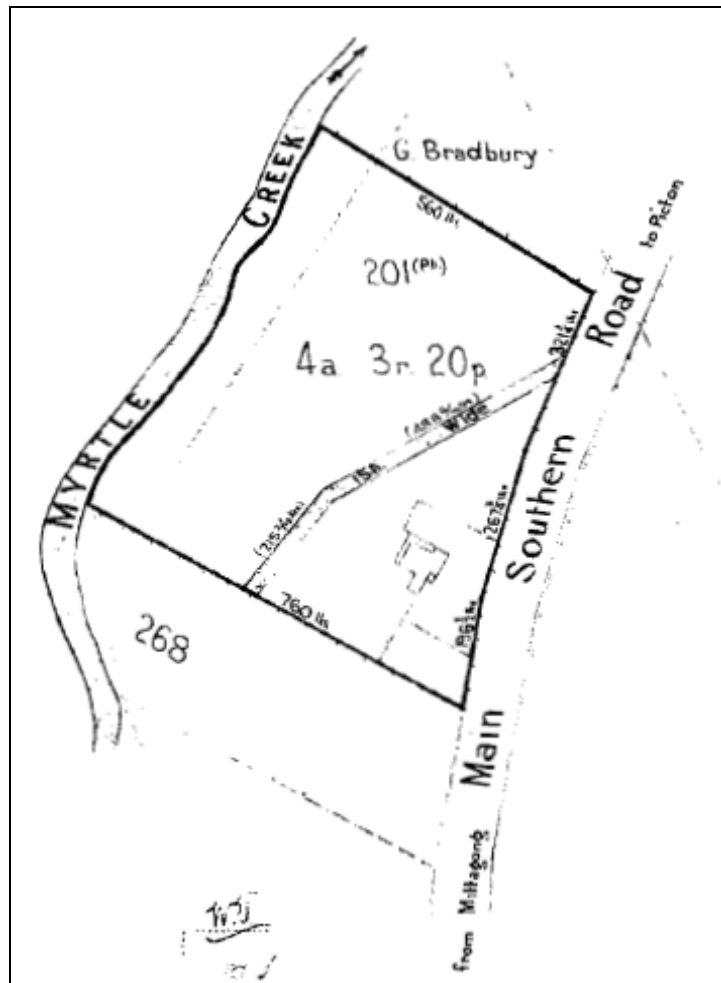
**Plate 3:** A 1921 plan of the subdivision of Portions 201-206, as the Tahmoor Park Estate (source: 'Tahmoor Park Estate Tahmoor ... Saturday 12<sup>th</sup> March 1921. Mitchell Library, Subdivision Plans: Tahmoor, ZTP: T1/8).

The northern part of Portion 201, bordering Myrtle Creek, was not included in the subdivision and sale of the Tahmoor Park Estate. Part of this northern area had been set aside, as Portion 268, for the establishment of a public school (Plate 4). It was still reserved for this purpose in at least 1905 (LTO PA 13803). However, no evidence has been found that a school was established on this site, and the property was eventually sold by the Education Department (Map of the Parish of Couridjah, Image ID 14086001).

To the north of the school site (subject property), a lot containing 4 acres 3 roods 20 perches was sold by the Bradburys to Charles Butler of Picton, gentleman, in 1887 (LTO Bk 377 No.718). Butler is thought to have built a house on the property in 1888 (Fairfax n.d.: 'Historic Buildings'). In 1903 Butler sold the property to Clarence William Henry Garling and Henry Chester-Master Garling (LTO PA 13803). It is possible that the Garlings were trustees for the Robertsons, who, according to Fairfax (n.d.: 'Historic Buildings'), bought the property in 1904 (Vol 1911, Fol 128 puts the date of the transfer at 1908). In 1905, the property was said to be in the occupation of Sophia Isabel Robertson and John Johnstone Robertson (LTO PA 13803). The Robertsons named the house Couridjah. After the First World War, it was occupied by one of their sons, Struan Robertson, who was employed by the Postal Department delivering the mail to Tahmoor, Bargo and Pheasants Nest (Fairfax n.d.: 'Historic Buildings').

In 1939 the property was sold to Pauline Rose Payten, wife of Reuben Rose Payten of Tahmoor, clerk (LTO Vol.1911 Fol.128). Payten named the house 'Ironmongie', and lived there until her death in 1956 (Fairfax n.d.: 'Historic Buildings'), after which the property was sold to Leslie Thomas Watten of Tahmoor, retired, and Olive Bessie Victoria Watten, his wife (LTO Vol.1911 Fol.128).

The property was subdivided further in 1996 and the title changed from Lot 14 DP 562319 to Lots 141 & 142 DP 864238.



**Plate 4:** A 1908 plan showing the house on the northern part of Portion 201, which is currently Lot 142 DP 864238. The subject building is shown on the plan (source: Land Titles Office, Vol.1911 Fol.128).



**Plate 5:** A view of the house “Ironmongie” or “Couridjah”, in c1911 (Fairfax n.d.: ‘Historic Buildings: Ironmongie’). The view is to the south west and not from Remembrance Driveway.



## 4.0 PREVIOUS ARCHAEOLOGICAL SURVEY

### 4.1 Historical Survey

The information presented in this section has been reproduced verbatim from the survey of a larger Study Area in 2009.

#### 4.1.1 Survey team summary

A targeted survey within the Study Area was conducted on Monday 2 March and Wednesday 4 March 2009 by Fenella Atkinson and Renée Regal (Biosis Research) as part of a larger project that included a number of historical heritage items as well as survey for Aboriginal sites. The survey included an assessment of the subject property at 55 to 59 Remembrance Drive from the property boundary to the street as access was not gained.

#### 4.1.2 Cottage, 55-59 Remembrance Drive, Tahmoor (Lots 141 & 142 DP 864238)

This is a one-storey building, the main part of which is on sandstone footings with two painted or rendered chimneys, which are probably of brick. It has a hipped corrugated iron roof, with a separate bullnose corrugated iron roof over the verandas. Parts of the verandas have been filled in with weatherboards (Plate 6). To the south of the main building is a small stone structure, also with a hipped corrugated iron roof (Plate 7). It has a chimney, of which the base is stone and the top brick. The house faces north, rather than east towards Remembrance Drive, so this stone outbuilding is at the rear. It is likely to have been the kitchen, or possibly the dairy (JRC Planning Services September 1993: WO331). There are some mature exotic trees on the property, particularly along the boundary with the road.



**Plate 6:** The north-east corner of the cottage (source: Atkinson 2009).



**Plate 7:** The south-east corner of the house, showing the stone building that was possibly the kitchen (source: Atkinson 2009).

## 4.2 Discussion

### 4.2.1 Historical heritage and archaeological sites

The background research indicates that the subject property was constructed in the late 1880s on a much larger portion of land that was originally granted to Edward Allen in 1822.

The subject property includes a sandstone, brick and weatherboard building with an associated outbuilding, most likely a separate kitchen. Mature plantings consisting of exotic species are standard for this period buildings as they were used to delineate boundaries, provide shade and for general aesthetic purposes.

The site survey does not note the visibility of relics within the subject property; however the possibility of relics occurring on the site was raised in Biosis Research 2009 (“Discussion” page 36) and should be considered if a potential site is noted.

## 5.0 ASSESSMENT OF SIGNIFICANCE

### 5.1 Heritage Assessment Criteria

Cultural heritage legislation protecting Aboriginal and historic heritage places applies in New South Wales. These places are an important part of our heritage. They are evidence of more than 50,000 years of occupation of New South Wales by Aboriginal people, and of the more recent period of post-contact settlement.

Heritage places can provide us with important information about past lifestyles and cultural change. Preserving and enhancing these important and non-renewable resources is encouraged.

It is an offence under sections of legislation to damage or destroy heritage sites without a permit or consent from the appropriate body (see Appendix 1 for a discussion of relevant heritage legislation and constraints).

When a project or new development is proposed, it must be established if any cultural heritage places are in the area and how they might be affected by the project. Often it is possible to minimise the impact of development or find an alternative to damaging or destroying a heritage place. Therefore, preliminary research and survey to identify heritage places is a fundamental part of the background study for most developments.

The first stage of a study usually incorporates background research to collect information about the land relevant to the proposed development project (the Study Area). A second stage often involves a field survey of this area.

Possibly the most important part of the study involves assessing the cultural heritage significance of heritage places in the Study Area. Understanding the significance of a heritage place is essential for formulating management recommendations and making decisions.

The State Heritage Register, which was established by the amendments to the NSW *Heritage Act* in 1999, has a separate set of significance assessment criteria broadly based on those of the Australia ICOMOS Burra Charter (1999).

To be assessed for listing on the State Heritage Register an item will need to meet one or more of the following criteria:

**Table 1:** Criteria for the assessment of historic cultural heritage.

| <i>CRITERION</i> | <i>DESCRIPTION</i>   | <i>CATEGORY</i> |
|------------------|--|-----------------|
| A                | An item is important in the course, or pattern, of NSW's cultural or natural history;  | Nature of       |
| B                | An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history; | Nature of       |

| <i>CRITERION</i> | <i>DESCRIPTION</i>   | <i>CATEGORY</i> |
|------------------|--|-----------------|
| C                | An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW;                        | Nature of       |
| D                | An item has strong or special association with a particular community or cultural group in NSW for social, cultural or spiritual reasons;                | Nature of       |
| E                | An item has the potential to yield information that will contribute to an understanding of NSW's cultural and natural history;                           | Nature of       |
| F                | An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history;   | Comparative     |
| G                | An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments. | Comparative     |

Amendments to the *Heritage Act* clarify and strengthen responsibility for the management of heritage items at the Local and State level. These criteria can be applied to items of State and Local significance. Consequently, items can be assessed as having **Local** or **State** level significance. These assessment criteria are useful in considering a wide range of heritage items, and may be applied to sites with items of standing heritage as well as areas with the potential to contain archaeological deposits.

The basis for these assessments is determined on a case-by-case scenario and is outlined in the following significance assessments. These assessments are based on previous reports concerning the various items, inspection of the items where access was available, and limited historical research. The assessments should therefore be considered provisional, and should be revised if additional relevant historical information is identified.

## 5.2 Assessment of Significance

### 5.2.1 Cottage, 55-59 Remembrance Drive, Tahmoor (Lots 141 & 142 DP 864238)

**Criterion A:** *An item is important in the course, or pattern, of NSW's cultural or natural history (or the cultural or natural history of the local area)*

The property has not been found to be significant according to this criterion.

**Criterion B:** *An item has strong or special association with the life or works of a person, or group of persons, of importance in NSW's cultural or natural history (or the cultural or natural history of the local area)*

At least one of the occupants of the house was of importance in the local area; Struan Robertson, the postman in the period after the First World War, after whom a nearby street was named. Further research is likely to reveal other occupants of local importance.

**Local significance.**

**Criterion C:** *An item is important in demonstrating aesthetic characteristics and/or a high degree of creative or technical achievement in NSW (or the local area)*

The date and location of the construction of the house, in the 1880s beside the main southern road, indicate that the structure and associated plantings would have been an important landmark in the area. This is reinforced by the fact that the house faces north, towards Tahmoor House and the bend in Myrtle Creek, rather than east towards Remembrance Drive. The northern aspect would have been seen by travellers coming south along the main road. The property is of local significance according to this criterion.

**Local significance.**

**Criterion D:** *An item has strong or special association with a particular community or cultural group in NSW (or the local area) for social, cultural or spiritual reasons*

The property has not been found to be of significance according to this criterion.

**Criterion E:** *An item has the potential to yield information that will contribute to an understanding of NSW's cultural or natural history (or the cultural or natural history of the local area)*

Information could be derived from the house and associated plantings that would shed light on the history of the occupation of the property, and thereby contribute to the understanding of the cultural history of the local area, as outlined under Criteria B, C, F and G. It is possible that archaeological relics of former associated features, including outbuildings such as stables, also exist on the property. Any such relics could also yield relevant information.

**Local significance.**

**Criterion F:** *An item possesses uncommon, rare or endangered aspects of NSW's cultural or natural history (or the cultural or natural history of the local area)*

In the 1880s, when the house was built, settlement in the area was still sparse. Other local houses from the second half of the nineteenth century, such as Whitfield's and Goodlet's, have since been destroyed or demolished. The property therefore possesses rare aspects of the cultural history of the local area.

**Local significance.**

**Criterion G:** *An item is important in demonstrating the principal characteristics of a class of NSW's cultural or natural places; or cultural or natural environments (or a class of the local area's cultural or natural places; or cultural or natural environments)*

The standing structure, and associated plantings and potential archaeological relics demonstrate principal characteristics of late nineteenth century residences in the area.

**Local significance.**

***Statement of Significance:***

55 - 59 Remembrance Drive is of local heritage significance, again largely due to the early period of its construction, settlement being relatively sparse in the area in the late nineteenth century. The house is also associated with at least one figure of importance locally; Struan Robertson. The significance of the property is represented in the extant house and associated plantings, and may also be represented in archaeological relics.

## 6.0 IMPACT ASSESSMENT

### 6.1 Potential Impacts

The potential impact of longwall mining relates to the subsidence that occurs during and after the extraction of the coal, and can be approximately predicted using a number of parameters. In predicting the potential impact of Tahmoor Colliery Longwall 26 on cultural heritage, MSEC has primarily used the parameters of subsidence, tilt and curvature (both hogging and sagging). The following definitions are taken from MSEC (2007: 8).

#### **Subsidence**

Subsidence usually refers to vertical displacement of a point, but subsidence of the ground actually includes both vertical and horizontal displacements. These horizontal displacements can in many cases be greater than the vertical subsidence, where the subsidence is small. The amplitude of subsidence is usually expressed in millimetres.

#### **Tilt**

Tilt is calculated as the change in subsidence between two points divided by the distance between those points. Tilt is, therefore, the first derivative of the subsidence profile. The sign of tilt is not important, but the convention usually adopted is for a positive tilt to indicate the ground increasing in subsidence in the direction of measurement.

The maximum tilt, or the steepest portion of the subsidence profile, occurs at the point of inflection in the subsidence trough, where the subsidence is roughly equal to one half of the maximum subsidence. Tilt is usually expressed in millimetres per metre.

#### **Curvature**

Curvature is the second derivative of subsidence, or the rate of change of tilt, and is calculated as the change in tilt between two adjacent sections of the tilt profile divided by the average length of those sections. Curvature is usually expressed as the inverse of the radius of curvature with the units of  $1/\text{km}$ , or  $\text{km}^{-1}$ , but the value of curvature can be inverted, if required, to obtain the radius of curvature, which is usually expressed in kilometers.

Curvature is convex or ‘hogging’ over the goaf edges and concave or ‘sagging’ toward the bottom of the subsidence trough. The convention usually adopted is for convex curvature to be positive and concave curvature to be negative [in this report both types of curvature are given as positive measurements].

In addition, for the Myrtle Creek Bridge impact predictions, measurements of upsidence and closure have also been used. These are subsidence effects observed at creeks, river valleys and gorges. In these locations, subsidence is often less than would otherwise be expected, and this reduction in subsidence is known as upsidence. Subsidence is accompanied by a reduction in the width of the affected valley, which is known as closure.

In predicting the potential impact on standing structures, MSEC has used Repair Categories, ranging from Nil to R5. The definitions of the categories are outlined in Table 2. As discussed below, the category R5 would not apply to heritage items:

The Repair Category R5 is reserved for instances where the Mine Subsidence Board has deemed that the cost of repair exceeds the cost of replacement. In the case of items of heritage significance, such a commercial decision would not apply and all attempts would be undertaken to minimise subsidence induced impacts to the houses progressively during active subsidence.

(MSEC 2009: 147)

**Table 2:** The classification system used for houses, based on the extent of repairs (source: MSEC 2009: 173).

| Repair Category |                   | Extent of Repairs  |
|-----------------|-------------------|--|
| Nil             |                   | No repairs required  |
| R0              | Adjustment        | One or more of the following, where the damage does not require the removal or replacement of any external or internal claddings or linings:-<br>Door or window jams or swings, or<br>Movement of cornices, or<br>Movement at external or internal expansion joints.   |
| R1              | Very Minor Repair | One or more of the following, where the damage can be repaired by filling, patching or painting without the removal or replacement of any external or internal brickwork, claddings or linings:-<br>Cracks in brick mortar only, or isolated cracked, broken, or loose bricks in the external façade, or<br>Cracks or movement < 5 mm in width in any external or internal wall claddings, linings, or finish, or<br>Isolated cracked, loose, or drummy floor or wall tiles, or<br>Minor repairs to any services or gutters.   |
| R2              | Minor Repair      | One or more of the following, where the damage affects a small proportion of external or internal claddings or linings, but does not affect the integrity of external brickwork or structural elements:-<br>Continuous cracking in bricks < 5 mm in width in one or more locations in the total external façade, or<br>Slippage along the damp proof course of 2 to 5 mm anywhere in the total external façade, or<br>Cracks or movement < 5 mm in width in any external or internal wall claddings, linings, finish, or<br>Several cracked, loose or drummy floor or wall tiles, or |



|    |                    |  |
|----|--------------------|--|
|    |                    | Replacement of any services.   |
| R3 | Substantial Repair | <p>One or more of the following, where the damage requires the removal or replacement of a large proportion of external brickwork, or affects the stability of isolated structural elements:-</p> <p>Continuous cracking in bricks of 5 to 15 mm in width in one or more locations in the total external façade, or</p> <p>Slippage along the damp proof course of 5 to 15 mm anywhere in the total external façade, or</p> <p>Loss of bearing to isolated walls, piers, columns, or other load-bearing elements, or</p> <p>Loss of stability of isolated structural elements.</p> |
| R4 | Extensive Repair   | <p>One or more of the following, where the damage requires the removal or replacement of a large proportion of external brickwork, or the replacement or repair of several structural elements:-</p> <p>Continuous cracking in bricks &gt; 15 mm in width in one or more locations in the total external façade, or</p> <p>Slippage along the damp proof course of 15 mm or greater anywhere in the total external façade, or</p> <p>Relevelling of building, or</p> <p>Loss of stability of several structural elements.</p>  |
| R5 | Re-build           | Extensive damage to house that requires it to be re-built as the cost of repair is greater than the cost of replacement.   |

## 6.2 Historical Archaeological and Heritage Sites

MSEC (2009) has modelled and calculated the potential impacts from mining subsidence movements to the standing structures that have either been identified as heritage items or that stand on properties identified as heritage items. Although there are potential historical archaeological relics within the subject property, the exact nature of these relics is unknown. Impact predictions are therefore not possible for these relics. However, as the relics are in general likely to be fragmentary in nature, the strains experienced due to subsidence are likely to be less than those experienced by whole structures. The potential for impact on any relics is therefore likely to be low (Daryl Kay, pers. comm., 01.06.09). Similarly, impact predictions for the flora associated with the heritage items have not been made, but the likelihood of impact is considered to be remote, based on previous experience (Daryl Kay, pers. comm., 01.06.09).

According to the MSEC report (2009: 76), the method of subsidence prediction used should ‘generally provide realistic and possibly conservative predictions of subsidence, tilt and curvature for the proposed longwalls’. Although subsidence prediction for a specific point is

more difficult, these predictions have been found to be typically 'within or more than  $\pm 15\%$  of the observed subsidence, or within  $\pm 50$  mm where the magnitude is small' (MSEC 2009: 76).

A summary of the impact predictions for 55 - 59 Remembrance Drive is presented in the following section, and in Table 2. More detail is contained in the MSEC report (2009).

***Cottage, 55-59 Remembrance Drive, Tahmoor (Lots 141 & 142 DP 864238)***

The weatherboard house on this property is predicted to experience a maximum of 835 mm of subsidence, following the extraction of Longwall 26. The potential damage to the structures is predicted to be low, with the most likely repair category being Nil or R0 (Table 3). As discussed above, should the previously observed increased subsidence continue, this property is at slightly increased risk of impact.

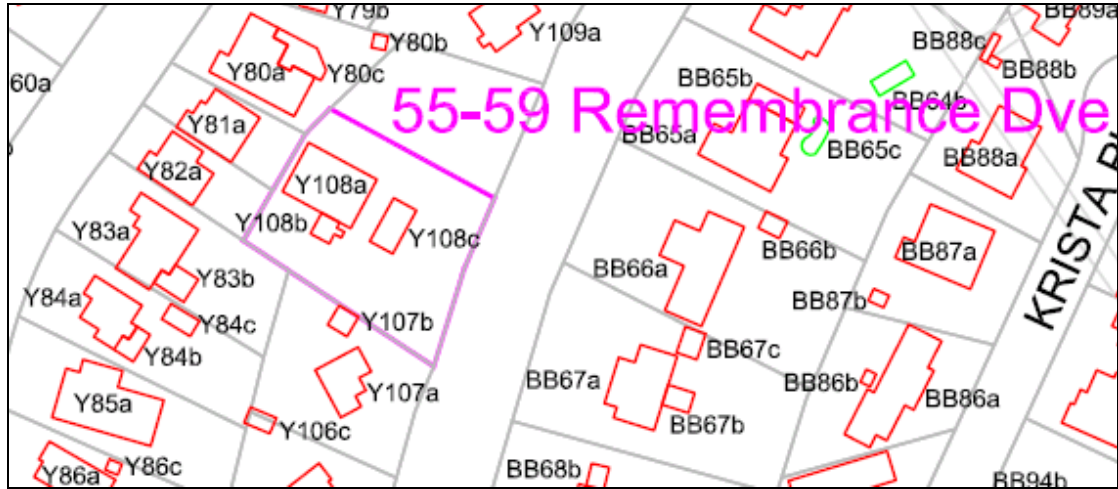
The MSEC discussion of the predictions is as follows:

*The probability of impacts to the small stone building (Ref. Y108b) is greater than the main house as the method of assessment does not take the size of the structure into account. Structure Y108b has a maximum plan dimension of 5 metres and experience during the mining of Longwalls 22 to 24 indicates there is a reduced frequency of impact for smaller buildings. If impacts occur to the stone building, they will most likely occur at the junction between Structure Y108a (main house) and Y108b, as they are constructed with different foundations.*

*55-59 Remembrance Drive is located on Remembrance Drive near the southern end of Longwall 26. If the cause of the observed increased subsidence above Longwalls 24A to 25 is related to the Nepean Fault, it is possible that this property will experience slightly increased subsidence, tilt and curvature, as shown in Drawing No. MSEC355-41. The property is located near the interface between the transition zone and normal subsidence.*

*The majority of subsidence movements will occur during the mining of Longwall 26.*

(MSEC 2009: 148-149)



**Plate 8:** Detail of a plan showing the structures at 55-59 Remembrance Driveway, Tahmoor (source: MSEC, 31/3/09, Drawing No. MSEC355 – Map 32, Rev. No. A).

**Table 3:** Maximum predicted cumulative subsidence, tilt and curvature; and assessed probability of impacts for standing structures identified as historical heritage items within the Study Area (source: MSEC 2009:149).

| Location                         | Structure | Stage of Mining | Maximum Cumulative Predicted |             |                          |                          | Repair Category |          |          |    |
|----------------------------------|-----------|-----------------|------------------------------|-------------|--------------------------|--------------------------|-----------------|----------|----------|----|
|                                  |           |                 | Subsidence (mm)              | Tilt (mm/m) | Hogging Curvature (1/km) | Sagging Curvature (1/km) | Nil or R0       | R1 or R2 | R3 or R4 | R5 |
| 55-59 Remembrance Drive, Tahmoor | Y108a     | After LW 26     | 835                          | 5.8         | 0.03                     | 0.08                     | -               | -        | -        | -  |

## 7.0 MANAGEMENT MEASURES

Ideally heritage management involves conservation of sites through the preservation and conservation of fabric and context. The most appropriate and desired outcome of the mining operations for the subject property would be that no impacts occur. However, in some cases where conservation is not possible or practical, several options for management are available.

The subject property is located within an area that has been identified potentially as being affected by subsidence. It is comprised of standing structures that are currently a home; demolition and inaction are not an option for this reason and because the property has heritage value. Relics, should they exist, are presently beneath the ground and are unlikely to be affected by mine subsidence movements.

It is not intended to impact the ground surface within the property except in extenuating circumstances: If monitoring of the ground and/or building indicates that the structure may be severely damaged by subsidence, some physical works may be undertaken to protect the building. These works may include excavations to provide additional support to the foundations, or excavation of a trench around the building perimeter. The trench would be in the vicinity of 1-2 m deep and 0.3 m wide; its purpose to absorb ground movement before it reaches the fabric of the house and causes unacceptable levels of damage. In the event that a decision to excavate is made, an approval under s140 of the Heritage Act 1977, or an exception notification under the same Act will be necessary. Recommendations 2 & 3 address impacts to the ground surface.

It would be prudent for Tahmoor Coal to enter into discussion with Wollondilly Council regarding the preparation of a plan of management for the property. It is suggested such a plan includes:

- A condition assessment for the entire property including the gardens and plantings, and a structural report for the standing structures.
- mitigation measures in place prior to the commencement of mining
- a regular monitoring and reporting program
- actions to be undertaken should impacts occur

Actions proposed to avoid or halt impacts due to mining operations would be assessed for their potential to detrimentally affect the property and the method used should be appropriate for items of heritage value.

Impacts from the mining operations would be assessed by the structural engineer and the heritage consultant and the conservation actions applied by Tahmoor Coal.

## 8.0 RECOMMENDATIONS

### 8.1 Recommendations

#### 8.1.1 Statutory Requirements

The subject property at 55-59 Remembrance Driveway Tahmoor, is not listed on the LEP currently in force. It is, however listed on the *Draft Wollondilly LEP 2009*, and should the LEP be adopted as is, the property including the existing buildings and the potential archaeological site would be protected under Clause 5.10 of that instrument.

Archaeological relics, as defined in the *Heritage Act 1977*, are protected by that Act. Disturbance to any such relics requires an Excavation Permit or Exception Notification, issued by the Heritage Branch of the Department of Planning.

#### 8.1.2 Recommendations

Based on the subsidence predictions provided by MSEC (2009), and the nature of the subject property, there is some potential for impacts to occur resulting from the proposed longwall mining. The following recommendations are intended to address the statutory requirements with regard to the potential impact on heritage items, and minimise or manage this potential impact.

##### **Recommendation 1 – Consultation with Wollondilly Shire Council**

Wollondilly Shire Council should be consulted, prior to the commencement of the mining of Longwalls 26, with regard to the subject property, which as been identified as a heritage item on the *Draft Wollondilly LEP 2000* and includes a potential archaeological site.

##### **Recommendation 2 – Develop plan of management with mitigation measures & ameliorative actions**

In response to the conditions of approval (DA 67-98) prepare a plan of management for subject property, or include it in an existing plan. A plan of management would be endorsed by Council and be used to identify potential impacts and provide practical ameliorative actions should they be required. Refer to section 7 for guidance with the plan's structure. The proposed plan of management should include provision of an archaeological program for any excavation works (refer Recommendation 3).

##### **Recommendation 3 – Archaeological monitoring in certain cases**

A minor possibility exists that excavations around the house will be required to protect the structure from potential subsidence impacts. Should excavations around the existing foundations, trenching, or any other ground disturbance, be required with regard to the current

proposal it would be prudent to conduct an archaeological test excavation or archaeological monitoring program during any excavation works.

Include the requirement for an archaeological program and the methodology in the recommended plan of management (refer Recommendation 2). A permit or exception notification will be required to undertake the work, therefore it is strongly advised that this issue is addressed with the Heritage Branch as soon as possible; an exception notification for potential trenching should be sought at the earliest stages to avoid delays that would be experienced through permit/exception processing times.

All archaeological relics are protected under the NSW *Heritage Act 1977*. The impact predictions developed and used by MSEC are designed principally for standing structures. Relics have not been discovered on the subject site, however the possibility remains that archaeological resources related to the existing building may occur on site.

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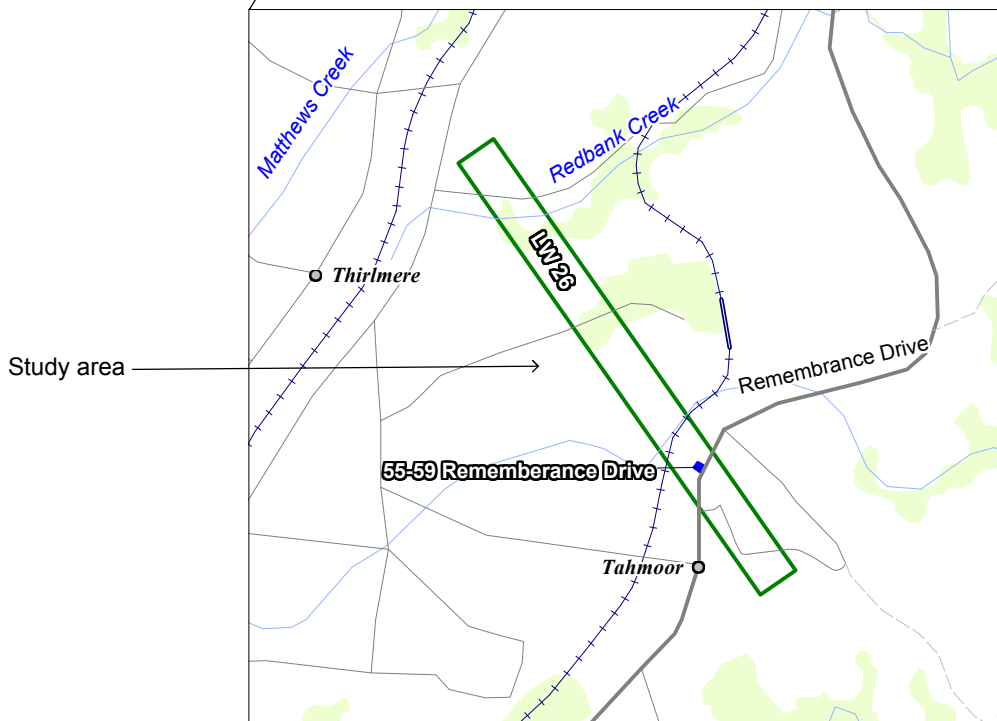
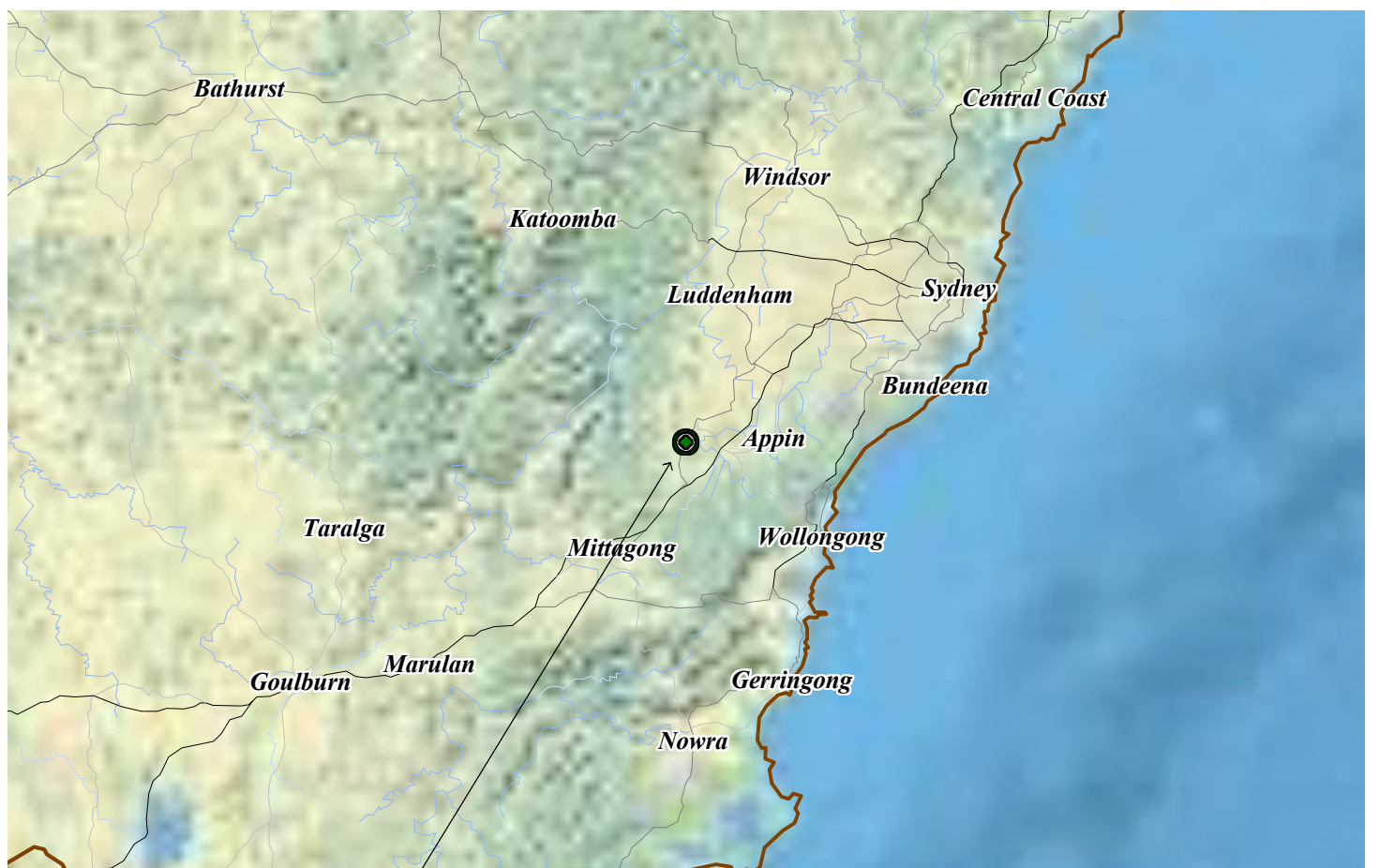
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## FIGURES



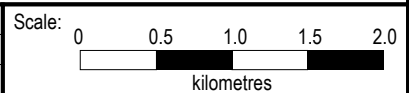
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NEW SOUTH WALES 2500

Figure 1: Location of the Study Area in a regional context

|   |                |
|---|----------------|
| Date: 8 June 2010                                       | Drawn by: ANP  |
| File number: 11768                                      | Checked by: MT |
| Location: P:\11700s\11768\Mapping\11768 F1_Locality.WOR |                |





**Legend**

- 55-59 Rememberance Drive
- Longwall 26
- Longwall
- Cadastre

55-59 Rememberance Drive

LW 26

LW 27

LW 28

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Figure 2: Subject Property in relation to longwall 26.

|  |                |
|--|----------------|
| Date: 8 June 2010  | Drawn by: ANP  |
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0 0.1 0.2 0.3 0.4 0.5  
 kilometres

Scale: 1:10,000 at A3  
 Map Projection: Universal Transverse Mercator  
 Horizontal Datum: Geodetic Datum of Australia 1994  
 Map Grid: Map Grid of Australia Zone 56



Figure 2

## APPENDICES

## APPENDIX 1: LEGISLATION

### COMMONWEALTH LEGISLATION

#### ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

In January 2004 the Commonwealth *Australian Heritage Commission Act 1975* was repealed and in its place amendments to the EPBC Act were made. The amendments were contained in three new pieces of Commonwealth Heritage Legislation. The three new Acts are the:

1. Environment and Heritage Legislation Amendment Act (No. 1) 2003 which:
  - (a) amends the Environment Protection and Biodiversity Conservation Act 1999 to include 'national heritage' as a new matter of National Environmental Significance and protects listed places to the fullest extent under the Constitution
  - (b) establishes the National Heritage List
  - (c) establishes the Commonwealth Heritage List
2. Australian Heritage Council Act 2003 which establishes a new heritage advisory body to the Minister for the Environment and Heritage, the Australian Heritage Council, and retains the Register of the National Estate.
3. Australian Heritage Council (Consequential and Transitional Provisions) Act 2003 which repeals the Australian Heritage Commission Act, amends various Acts as a consequence of this repeal and allows for the transition to the new heritage system.

Any place that has been nominated and assessed as having cultural heritage significance at a national level can be added to the National Heritage List.

Under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) an action requires approval from the Federal Environment Minister if the action will, or is likely to, have a significant impact on a matter of national environmental significance. Matters of national environmental significance relating to cultural heritage are:

- World Heritage Places, and
- National Heritage Places.

An action includes a project, development, undertaking, activity, or series of activities.

Actions that are likely to have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land), and actions taken by the Commonwealth that are likely to have a significant impact on the environment anywhere in the world, may also require approval under the EPBC Act.

## PROTECTION OF MOVABLE CULTURAL HERITAGE ACT 1986

In 1970 the United Nations Educational, Scientific and Cultural Organisation (UNESCO) adopted the UNESCO Convention on the Means of Prohibiting the Illicit Import, Export and Transfer of Ownership of Cultural Property. Australia ratified the convention by passing the *Protection of Movable Cultural Heritage Act 1986* (the Act), giving the 1970 Convention force in Australian law.

The Act regulates the export of Australia's significant cultural heritage objects. It is not intended to restrict normal and legitimate trade in cultural property and does not affect an individual's right to own or sell within Australia.

It implements a system of export permits for certain heritage objects defined by the Act as 'Australian protected objects'. Australian protected objects are objects which form part of the movable cultural heritage of Australia and which meet the criteria established under the National Cultural Heritage Control List. The Control List is located in the Regulations to the Act, and divides Australian protected objects into two classes:

- Class A objects which may not be exported
- Class B objects which may be exported if granted a permit under the Act.

A person wishing to export a Class B object is required to apply for a permit in writing. Applications are processed in accordance with the legislative process established under section 10 of the Act.

Certificates of Exemption, granted under section 12 of the Act, allow Australian protected objects that are currently overseas to be imported into Australia and subsequently re-exported. This includes Class A objects.

The Act also includes provisions that allow Australia to respond to an official request by a foreign government to return movable cultural heritage objects that have been illegally exported from their country of origin.

The *Protection of Movable Cultural Heritage Act 1986* is administered by the Minister for the Environment and Heritage. This responsibility was transferred from the Minister for Communication, Information Technology and the Arts in November 2001.

The Movable Cultural Heritage Unit in the Department of the Environment and Heritage provides the Secretariat to the National Cultural Heritage Committee

## STATE LEGISLATION

### HERITAGE ACT 1977

The *Heritage Act 1977* details statutory responsibilities for historic buildings and gardens, historic places and objects, historical archaeological sites, and historic shipwrecks. The Act is administered by the Heritage Council of New South Wales, through the NSW Heritage Branch of the Department of Planning.

The aim of the Act is to conserve the ‘environmental heritage’ of the state, which includes items such as buildings, works, relics, moveable objects or precincts significant for historical, scientific, cultural, social, archaeological, architectural, natural or aesthetic values. A ‘Place’ is defined as an area of land, with or without improvements and a ‘Relic’ is defined as any:

*deposit, object or material evidence:*

- (a) *which relates to the settlement of the area that comprises New South Wales, not being Aboriginal settlement, and*
- (b) *is of State or local heritage significance..*

An excavation permit is required for any works, excavations or activities, associated with an archaeological site. Excavation permits are issued by the Heritage Council of New South Wales in accordance with sections 60 or 140 of the *Heritage Act*.

It is an offence to disturb or excavate land to discover, expose or move a relic without obtaining a permit from the NSW Heritage Council.

#### *139 Excavation permit required in certain cases*

- (1) *A person must not disturb or excavate any land knowing or having reasonable cause to suspect that the disturbance or excavation will or is likely to result in a relic being discovered, exposed, moved, damaged or destroyed unless the disturbance or excavation is carried out in accordance with an excavation permit.*
- (2) *A person must not disturb or excavate any land on which the person has discovered or exposed a relic except in accordance with an excavation permit.*

Excavation permits are usually issued subject to a range of conditions that will relate to matters such as reporting requirements and artefact cataloguing, storage and curation. A permit may be required from the Heritage Council of NSW for works or activities associated with a registered place or object. In certain cases, where potential impacts are assessed to be minor, an exception or exemption notification may be required, removing the requirement for a permit approval. Exceptions and exemptions as management options are determined by a number of factors and cannot be applied to the destruction of substantial and intact relics.

General queries about site issues and permit applications can be made to the archaeological officers at the Heritage Branch. The contact details are:

NSW Heritage Branch

3 Marist Place

PARRAMATTA NSW 2150

Ph: (02) 9873 8500

Fax: (02) 9873 8599

Consultation and discussion with the NSW Heritage Branch should begin well before lodging an application for a permit to disturb or destroy a historical archaeological site.

### **ENVIRONMENTAL PLANNING AND ASSESSMENT ACT 1979**

The *NSW Environmental Planning and Assessment Act* will have relevance for all development projects because it requires that environmental impacts are considered in land-use planning and decision making. The definition of ‘environment impacts’ includes impacts on the cultural heritage of the project area. The Act has three relevant parts: Part III, which governs the preparation of planning instruments; Part IV, which relates to development where consent is required under an environmental planning instrument (EPI); and Part V, which relates to activity where development consent is not required but some other government approval assessments are needed.

Under the Act, local government authorities and The Department of Infrastructure, Planning and Natural Resources (formerly Planning NSW) prepare local and regional environmental planning instruments (LEPs and REPs) to give statutory force to planning controls. These may incorporate specific provisions for conserving and managing archaeological sites.

Integrated Development Assessment (IDA) was introduced under the *Environmental Planning and Assessment Act* so that all matters affecting a development application would be considered by the consent authority in an integrated way.

Integrated Development is one which requires development consent as well as one or more approvals from different government agencies. Such agencies may include NSW DEC or the NSW Heritage Council. If a development is likely to impact a heritage item, the consent authority must refer it, to NSW DEC (for Indigenous objects) or the NSW Heritage Council (for sites listed on the State Heritage Register) prior to approval determination.



***The Local Government Act 1993***

Under the State Local Government Act, councils can prepare local approvals policies that set out specific matters for consideration in relation to applications to demolish, build or undertake works. Archaeological sites are also considerations under such policies.

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# 59 Remembrance Drive, Tahmoor

Structural Inspection Report:

# 59 Remembrance Drive, Tahmoor

Structural Inspection Report:

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| DOCUMENT HISTORY |          |                                      |        |
|------------------|----------|--------------------------------------|--------|
| Revision         | Date     | Amendments                           | Author |
| Rev1.0           | 04.06.10 | Draft                                | JM     |
| Rev 2.0          | 01.12.10 | Report revised to include 7mm/m Tilt | JM     |
|                  |          |                                      |        |
|                  |          |                                      |        |
|                  |          |                                      |        |

# 59 Remembrance Drive, Tahmoor

Structural Inspection Report:

John Matheson & Associates Pty Ltd

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## INTRODUCTION

This report has been prepared at the request of Tahmoor Colliery. A site visit was attended by Mr. John Matheson from this office in the company of Ms Belinda Clayton on 13<sup>th</sup> May 2010 for the purpose of gaining some information about the construction type and condition of the building.

The inspection was cursory in nature and was limited to the visible structure that could be observed from the driveway. No internal inspection was carried out and non-destructive examination of the buildings could not be undertaken during the inspection as access was not available at the time of the inspection.

## OBSERVATIONS

The original building is single storey and has been constructed using random sandstone masonry for the perimeter walls and chimney (southern elevation) with a corrugated steel clad timber framed roof. The sandstone masonry continues below ground level and is most likely founded upon sandstone footings on clay or possible rock. The internal floor appears to be elevated and access to the front door is gained by a concrete ramp constructed upon earth fill retained by random sandstone masonry walls on both sides. Hardwood timber tongue and groove flooring was visible on the floor of the entry and from this a suspended timber framed ground floor supported by internal piers has been inferred.

The dimensions of the sandstone building are estimated to be 3.5m high x 3m wide x 4m long. The east and south façade walls could be observed when viewed from the driveway and the visible masonry appeared to be in serviceable condition without significant visible cracks and whilst the junction between the sandstone chimney and southern façade wall revealed what appeared to be a sub 1mm crack (interpretation of photographs taken at a distance) in the corner, the wall junction appeared to be in serviceable condition.

The main residence was constructed as a single storey timber framed structure with an enclosed perimeter verandah, which abuts the original stone building. This timber framed building has been constructed with a corrugated steel roof and fibre cement lined walls with a suspended timber floor. The southern and eastern timber framed walls appeared to be supported on brick masonry dwarf walls but similar support along the other two elevations could not be confirmed. The suspended timber ground floor is most likely to be supported internally by brick piers but this could not be confirmed. The plan dimensions of the more recent timber framed building are estimated to be 10m x 13m with 3m high walls.

In the case of both the original sandstone masonry and the more recent timber framed buildings, a detailed inspection was not possible and it was therefore not possible to ascertain whether or not there are any pre-existing structural issues that may affect the behaviour of each building when subsidence impacts occur at this site. The performance of similar types of structures in the southern coalfields is increasingly well documented and to date there is no record of a structural collapse due to subsidence impacts.

## POSSIBLE SUBSIDENCE IMPACTS

This report has been prepared without any site specific subsidence parameters being available at the time of writing. The limited scale of the original sandstone masonry building and the knowledge that the building has been constructed with four perimeter masonry walls down to footing level is expected to result in some limited masonry cracking not expected to exceed Category 2.

# 59 Remembrance Drive, Tahmoor

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The larger timber framed building is expected to tolerate more intense curvature and tensile ground strain than an equivalent sized masonry structure and subsidence impacts due to curvature and ground strain are not expected to exceed category 1 cracking.

Structure Tilt in the order of 7mm/m has been predicted by MSEC and the structure of the original sandstone building was modeled for the normal dead, live and wind loads in accordance with AS1170.1 & 2 acting in conjunction with ground displacements consistent with 7mm/m ground tilt. The calculations show that the additional 7mm/m ground tilt (factored by 1.5 for the strength limit state to 10.5mm/m) increases the calculated overturning moment in the resisting walls, at the stability limit state, by marginally less than 10%, which is within the normal engineering tolerance interval for structure review. The calculated resisting wall bending capacity (building tilt acting in the narrow direction of the building in conjunction with wind) exceeds the calculated overturning moment. A ground tilt of 7mm/m tilt is therefore not expected to impair the serviceability of the masonry or timber-framed walls.

The most significant impact due to tilt, curvature and ground strain is likely to be observed at the interface between the original masonry structure and the more recent timber framed building due in part to different ways in which curvature and tilt may affect each of the buildings. Curvature impacts on the sandstone building may tend to manifest as uniform (no change in tilt across the length of the sandstone masonry building) whereas curvature is likely to manifest as continuing change in tilt across the width of the timber framed building. This may tend to concentrate the curvature at a point (possibly the interface of the two buildings), possibly resulting in a horizontal opening across the interface at eave level due to tensile ground strain. The opposite behavior is possible under compressive ground strain and some crushing of the fibre cement clad timber framed walls against the masonry structure of the original building is possible.

## CONCLUSIONS

The performance of similar types of structures in the southern coalfields is increasingly well documented and to date there is no record of a structural collapse due to subsidence impacts.

The limited size of the sandstone masonry structure and the flexibility of the fibre cement lined timber framed construction of the more recent addition indicate that subsidence impacts are unlikely to exceed Category 2 damage, generally, provided that ground strain and structure tilt does not exceed 1mm/m and 7mm/m respectively. Local damage at the interface between the stone and timber framed buildings may exceed Category 2 if a change in tilt greater than 1.5mm/m occurs at the interface between the two sections of building. This relies upon the buildings being constructed in accordance with practice considered to be normal at the time of construction and is based upon previous experience of subsidence impacts upon similar types of residential building structures in Tahmoor.

There is some risk that defective structure may be present in one or other of the two buildings, which could not be detected due to the cursory nature of the site visit. It is possible that subsidence movement could exacerbate pre-existing defects, which may become visible as subsidence movements intensify through the period of peak subsidence.

However, the performance of similar types of structures in the southern coalfields is well documented and to date there is no record of a structural collapse due to subsidence movements and it is understood that a limited number of residential buildings have been impacted in Tahmoor to date due to subsidence due to LW23, LW24 & LW25.

## 59 Remembrance Drive, Tahmoor

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It is recommended that an internal inspection of the building be carried out during a pre-mining inspection and that the buildings should be monitored weekly during the period of peak subsidence during the mining of LW26 to monitor for subsidence impacts. This could be carried out by a building inspector and reported to the Structural Engineer for advice as part of the subsidence management plan.

Yours faithfully

John Matheson & Associates Pty Ltd

A handwritten signature in black ink, appearing to read 'John Matheson', is centered within a light gray rectangular box.

John Matheson