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INVESTIGATIONS CONDUCTED PRIOR TO SUBMITTING THE SMP APPLICATION FOR LW31-LW37

Structural Investigation Report: R0250

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EXECUTIVE SUMMARY

Site inspections were conducted throughout the Picton Industrial area, Picton High School, the Wollondilly Leisure Centre and the heritage sites at 2240 Remembrance Drive and 675 Thirlmere Way, Picton (Mill Hill). The inspections of the industrial buildings and the buildings at Picton High School were primarily conducted from the front of building with some exceptions, which are noted within the reports. The Wollondilly Leisure Centre and the main dwellings at the two heritage properties were inspected both internally and externally.

The purpose of the inspections was to identify structure types, structure and cladding ductility levels, whether dilapidation could be identified that could impair structural performance in the event that the structures are affected by mine subsidence and make recommendations for further actions prior to mining LW31-LW37. Reference has been made within the report to structure reference numbers provided by MSEC.

The front of building inspections, whilst limited, did not indicate that any of the structures inspected were in a condition that could be construed as being more susceptible to the impacts of mine subsidence due to their dilapidated condition. However, it is possible that some dilapidation could be discovered on further examination, which could be managed on a case-by-case basis.

The ductility of the various types of structures and cladding systems inspected was assessed based on structure ductility and performance requirements described in AS1170.4: Structural design actions - Earthquake actions in Australia. It is noted that the demand for structure ductility in earthquake events requires structures to undergo several cycles of loading and load reversal, which places more extreme demands on ductility than is likely to occur due to mine subsidence. However, it does provide guidance on relative ductility noting that masonry structures have been given a ductility rank 1 and ductile moment resisting steel portal frames have been given a ductility rank 4 with other structures ranging in between. Whilst there is a tendency to consider ductility in terms of arithmetic progression in ductility from rank one through four, the displacements associated with each rank in ductility are more likely to follow a geometric progression (more exponential) at the respective strength limits for various structure types.

Recommendations have been made with regard to the structures described in this report noting that prior to commencement of mining LW31-LW37; each structure will be evaluated on a case-by-case basis to:

a. Verify structure ductility and conduct more detailed analysis if required,
b. Identify tilt-sensitive plant and equipment and establish tolerances for each piece of plant and equipment
c. Establish trigger action response plans (TARPs) for structures, plant, and equipment if impacts exceed agreed trigger levels.
d. Develop independent management plans for each business and property owner
e. Implement mitigation to structures and business equipment when identified.
f. Develop a monitoring programme for ground displacement and visual/survey monitoring of structure and business equipment.

1 Picton Industrial Area

Address: Industrial buildings in Bridge Street, Redbank Place, Bollard Place and Henry Street, Picton

MSEC Structure References: Photographs of structures HH06a (100 Bridge St), HH09/1a (6 Redbank Pl), HH07/2d & 2e (19 Redbank Pl) have been referenced in this report

Age of structures (date in which structure first visible in aerial photograph): varying age, most structures less than 40years old.

Type of Inspections undertaken: External and internal inspection at 100 Bridge St, Picton

Date of Inspection: 26 November 2014

Existing Condition of Structures at time of inspection

The industrial structures that were inspected along Bridge Street and Redbank Place in Picton were for the most part in serviceable condition with no significant dilapidation.

The structures broadly conformed to the following types:

a. Type A: Structural steel portal frames buildings with cross braced panels with perimeter brick walls to around 3metres with clad metal framed walls above, to eave level. These buildings have one or two-storey front offices with cavity brickwork facades on jointed reinforced concrete ground slabs on engineered fill with columns supported by bored piers or pad footings founded on rock.

b. Type B: Structural steel portal frames buildings with cross braced panels with perimeter clad metal framed walls on jointed reinforced concrete ground slabs on engineered fill with columns supported by bored piers or pad footings founded on rock.

c. Type C: Tilt-panel wall structures that employ diaphragm roof bracing, constructed on jointed reinforced concrete ground slabs on engineered fill with bored pies supporting the tilt panel walls.

d. Type D: Elevated hoppers on cross-braced frames, such as visible at the concrete batching plants.

Preliminary structural assessment

The structures have been ranked in terms of likely ductility levels for the primary structure and the cladding system, indicating the ability of each structural system to tolerate deformation.

Table 1

Structure type	Ductility‡ Rank for Primary Structure (1 to 5)†	Ductility‡ Rank for the Façade Elements (1 to 5)†
A	4	1
B	4	4
C	2	2
D	2 to 3	Not applicable

† A ductility rank of five indicates that the structure is extremely ductile such as a special moment resisting steel frame, whereas a rank of one indicates a relatively brittle structure such as unreinforced brick masonry.
‡ The ductility rank is based upon the ratio of the structural ductility factor/ the structural performance factor (μ/S_p) as described in AS1170.4.

Primary structures that have a ductility rank of 4 should tolerate significant mine subsidene ground displacements although it is noted that some of these industrial units have tilt-sensitive cranes, plant and equipment for which further pre-mining investigation should be conducted to establish tolerances for each piece of plant and equipment to establish trigger and response plans.

Primary structures that have a ductility rank of 2 to 3, still have significant capacity to tolerate mine subsidence ground displacements. By way of example, in the case of tilt panel wall framed buildings, the eave-tie members that commonly form a part of the roof diaphragm bracing, could plastically deform or bolts that connect the eave-ties to the tilt panel walls could shear, in the event that ground curvature and strain becomes localised at one particular panel joint. In the event that this occurs, plasticity would be localised and would not necessarily compromise the stability of the entire structure, allowing time to implement a suitable response.These structures should be investigated on a case by case basis in order to assess the impact of mine subsidence and to establish a trigger and response plan.

Elevated hopper structures have an elevated lumped mass at the top, supported by a steel framed structure down to ground and footing level. Tilt could increase structure overturning about the base and each elevated hopper structure should be assessed prior to active subsidence. Tilt could also affect feed conveyor and discharge outet performance.

Façade elements such as clad metal framed wall panels can typically tolerate significant differential displacement between adjoining portal frame columns and therefore subsidence impacts are expected to be slight. However, the effect of mine subsidence on single and two-storey residential masonry structures in Tahmoor is well documented and the masonry façade elements that were observed at some of the industrial properties are likely to respond in a similar manner and exhibit less ductile response to subsidence than clad metal frame walls.

Recommendations

The inspections conducted prior to submitting the SMP application for LW31-LW37 identified varying structure types with differing levels of ductility, which are identified in table 1. Furthermore, the inspections identified that some of the buildings, contain tilt-sensitive plant and equipment, which could be adversely affected by mine subsidence.

Prior to commencement of mining LW31-LW37, complete pre-mining inspections and evaluate each structure on a case-by-case basis, to verify structure ductility and conduct more detailed analysis if required, identify tilt-sensitive plant and equipment and establish tolerances for each piece of plant and equipment to establish trigger action response plans (TARPs) if impacts exceed agreed trigger levels. Develop independent management plans for each business and implement mitigation to structures, plant and equipment when identified. Develop a monitoring programme for ground displacement and visual/survey monitoring of structure and business equipment.

Selected photographs during inspection

Figure 1 Internal photograph taken at 100 Bridge Street Picton, showing the steel portal frames, bracing panels, gantry crane and sensitive plant located on ground slab

Figure 2 Steel portal frame baseplate hold-down bolts AT 100 Bridge Street

Figure 3 100 Bridge Street equipment. Note that this building has two overhead gantry cranes

Figure 4 100 Bridge Street equipment

Figure 5 Front elevation of 6 Redbank Place HH09/1b viewed from Bridge Street

Figure 6 Side elevation of 6 Redbank Place HH09/1b

Figure 7 Interface between HH09/1a & 1b

Figure 8 6 Redbank Place HH09/1a showing cantilevered steel awnings HH09/1c, 1d, 1e

Figure 9 6 Redbank Place HH09/1a showing tilt panel walls

Figure 10 Hoppers HH07/2d and HH07/2e left and right respectively at 19 Redbank Place

Figure 11 Hoppers HH26b and HH26/g left and right respectively at 85 Remembrance Drive

Figure 12 15 Redbank Place large structural steel portal frame with gantry crane and tilt-sensitive equipment. Two-storey tilt panel wall framed office

Figure 13 3 Redbank Place storage building with 2.4metre high articulated perimeter cavity brickwork and clad metal framed walls around a ductile steel portal framed structure

Figure 14 Single storey brick office at the front of a ductile structural steel portal framed structure at 61 Bridge Street on left hand side of image with the reinforced concrete framed SES building structure with cavity brick wall panels at 65 Bridge Street on right hand side of image

2 PICTON HIGH SCHOOL

Address: Picton High School, Picton

MSEC Structure References: PAR_210_pa01-pa65

Age of structures (date in which structure first visible in aerial photograph): Picton High School was established in 1958 and the structures are of varying age.

Type of Inspections undertaken: External

Date of Inspection: 5 December 2014

Existing Condition of Structures at time of inspection

Some of the structures that were inspected at Picton High School, Picton were constructed prior to 1958, when the school was established. The structures that were inspected ranged from very ductile steel framed structures to decreasingly less ductile reinforced concrete framed structures down to load-bearing masonry and concrete structures and brick veneer GLA buildings. However, the structures were broadly found to be in serviceable condition with no significant structure dilapidation noticeable.

The building/block identifiation used by Picton High School and to which reference is made in this report, is shown in figure 15.

The structures broadly conformed to the following types:

a. Single storey brick veneer GLA buildings with suspended timber ground floors, tiled-timber framed rooves on strip and pad footings, similar in construction to residential structures. Buildings are approximately 10metres wide and vary in length from 22 to 60metres, refer to figures 16 through 19 for typical photographs . Articulation of the long side walls of the GLA buildings results from the doorways (maximum 20m spacing and sidewall glazing.

b. Ductile and flexible structural steel framed roof structures over covered ways, refer to figures 17 & 18

c. Ductile and flexible structural steel framed COLA structures, refer to figures 20, 21 & 22.

d. Demountable GLA (Denoted P in figure 1 and amenities buildings founded on dry-stacked block piers, which are chained down to the concrete pad footings for tie-down, refer to figures 23 & 24.

e. Ductile structural steel storage sheds on concrete ground slabs, refer to figure 25.

f. Structural steel framed multi-purpose hall with perimeter articulated cavity brick work of relatively recent construction constructed on a concrete raft slab, refer to figure 26.

g. Block I is one of the oldest buildings at Picton high School noting that there has been some attempt to articulate the structure. The crucifirm arrangement of movement joints in the first floor slab and ground floor walls appears to be intended to relieve shrinkage strain moreso than the effects of mine-subsidence. However, the movement joints should allow some ground strain to be absorbed by joint opening or closure. Refer to figures 37 to 41 for photographs of Block I.

h. Block J is two-storey reinforced concrete framed beam and column structure that was most likely designed as an ordinary moment resisting frame in accordance with AS1170.4 and therefore has been assigned ductility rank 2. Refer figure 32 to 46 for photographs of the Block J.

i. Block N is a single storey articulated masonry structure with an internal structural steel frame surmounting a reinforced concrete raft slab, refer to figure 21.

j. Structural steel framed Block O, which has perimeter concrete block walls and clad metal walls, constructed on a concrete raft slab, refer to figure 27.

Preliminary structural assessment

The structures have been ranked in terms of likely ductility levels for the primary structure and the cladding system, indicating the ability of each structural system to tolerate deformation.

Table 2

Structure type	Ductility‡ Rank for Primary Structure (1 to 5)†	Ductility‡ Rank for the Façade Elements (1 to 5)†
Administration Block A and Blocks B-G inclusive, library, canteen and amenities	1	1
Covered way roof structure	4	-
COLA structures	4	-
Demountable buildings denoted P, in figure 15	4	4
Ductile steel storage sheds	4	4
Articulated brick storage shed	2	2
Multi-purpose hall	4	2
Block N	4	2
Block O	4	Clad metal walls - 4 Non-articulated blockwork - 1
Block J	2	2
Block I	1	1

† A ductility rank of five indicates that the structure is extremely ductile such as a special moment resisting steel frame, whereas a rank of one indicates a relatively brittle structure such as unreinforced brick masonry.
‡The ductility rank is based upon the ratio of the structural ductility factor/ the structural performance factor (μ/S_p) as described in AS1170.4.

The buildings where the primary structure is rank four or higher, are unlikely to be affected by the predicted subsidence in any significant way. However, some of these structures have façade elements of lesser ductility. By way of example, the multi-purpose hall has a ductile structural steel frame, which is expected to respond well to the predicted subsidence. By comparison, the articulated cavity brickwork façade, whilst articulated in accordance with preferred mine subsidence detailing, could develop slight cracking in the event that subsidence impacts are concentrated and therefore has been assigned a ductility rank of two.

The structures, which require more detailed site inspection and structural investigation before active subsidence occurs on this site are Blocks N, O, J & I. Whilst the multi-purpose hall is of more recent construction, this building should also be inspected with a brief report confirming that the structure has been detailed as it appears from the external inspection.

Recommendations

The inspections conducted prior to submitting the SMP application for LW31-LW37 identified varying structure types with differing levels of ductility, which are identified in table 2. Prior to commencement of mining LW31-LW37, complete pre-mining inspections and evaluate each structure on a case-by-case basis, to verify structure ductility and conduct more detailed analysis, if required, to establish trigger action response plans (TARPs) if impacts exceed agreed trigger levels. Develop a comprehensive management plan for Picton High School and implement mitigation to structures when identified. Develop a monitoring programme for ground displacement and visual/survey monitoring of the structures.

Selected photographs during inspection

Figure 15 Picton High School building identification

Figure 16 Block A gable wall has windows. Note vertical control joint in brickwork below window sill

Figure 17 D Block looking north

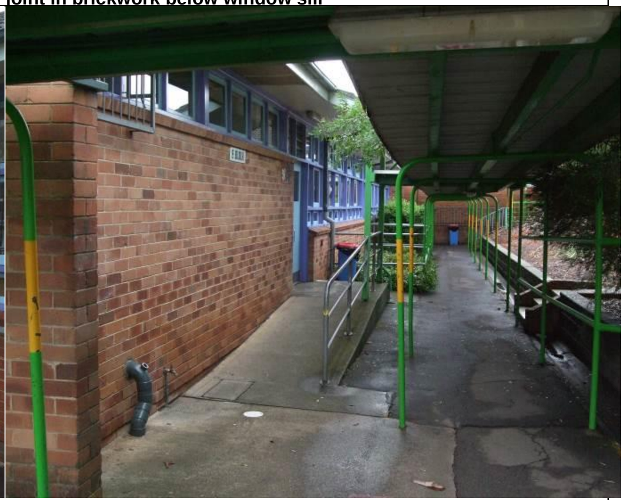

Figure 18 E Block looking south

Figure 19 C Block looking north, note the roof structure above the covered way areas that typically links the buildings on the site


Figure 20 COLA structure PAR_210_pa30


Figure 21 COLA structure PAR_210_pa31


Figure 22 COLA structure PAR_210_pa35


Figure 23 Ductile steel framed demountable GLA buildings


Figure 24 Demountable amenities blocks on left hand side PAR_210_pa53 & 54 and the GLA buildings on right hand side of the image PAR_210_pa 27 to 29.


Figure 25 Ductile structural steel storage shed PAR_210_pa32

Figure 26 Multi-purpose hall PAR_210_pa16

Figure 27 COLA structure PAR_210_pa15 with covered way roof structure PAR_210_pa38 in the foreground.

Figure 28 Miscellaneous steel sheds and a demountable GLA building in the agricultural area PAR_210_pa57 & 58.

Figure 29 Canteen and amenities structures PAR_210_13 & 21 respectively

Figure 30 Articulated brick shed on a concrete ground slab PAR_210_pa33

Figure 31 Block J PAR_210_pa12, two storey reinforced concrete beam/slab and column frame with perimeter articulated cavity brick

Figure 32 Block J PAR_210_pa12 under croft showing beam/slab and columns

Figure 33 Block J PAR_210_pa12 ground floor showing beam/slab and columns and infill internal brick walls

Figure 34 Block J PAR_210_pa12 east elevation

Figure 35 Block J PAR_210_pa12 west elevation

Figure 36 Block I PAR_210_pa10, two-storey load-bearing cavity brickwork structure, with suspended first floor concrete slab and a cruciform arrangement of movement joints, supported by a concrete ground and footings

Figure 37 Block I PAR_210_pa09 & 08 at first floor showing slab movement joint reflected in balustrade

Figure 38 Block I PAR_210_pa09 & 08 at first floor stair up to first floor at western end of courtyard

Figure 39 Block I PAR_210_pa10 & 09 showing movement joint, which is reflected in the ground floor brickwork and the ground floor slab

Figure 40 Block I PAR_210_pa10 & 11 east elevation

3 WOLLONDILLY LEISURE CENTRE

Address: Wollondilly Leisure Centre, Picton

MSEC Structure References: PAR_254_pa03a External Swimming Pool, PAR_254_pa03b Main Building

Age of structures (date in which structure first visible in aerial photograph): less than 13years

Type of Inspections undertaken: External and some internal (100 Bridge St) visual inspection

Date of Inspection: 26 November 2014

Existing Condition of Structures at time of inspection

The structures that were inspected at the Wollondilly Leisure Centre, Picton, were constructed during 2001 and 2002 and were found in serviceable condition with no significant dilapidation.

The structures broadly conformed to the following types:

a. 50m long in-ground reinforced concrete olympic sized swimming pool.

b. 25m long suspended reinforced concrete swimming pool with suspended concrete perimeter concourse slabs and a suspended concrete ballast tank located between the indoor pool and the pump room that is located adjacent to the amenities block.

c. Basket ball court with a synthetic sports floor constructed on engineered fill.

d. Gymnasium area with a welded vinyl flooring over a reinforced concrete ground slab constructed on engineered fill.

e. A ductile structural steel portal framed building with 3m high perimeter reinforced concete wall panels and overlying clad metal framed wall panels extending to eave level with a full height fire wall, separating the pool area from the basketball court, which was bolted to the end wall columns in the basketball court area.

Preliminary structural assessment

The structures have been ranked in terms of likely ductility levels for the primary structure and the cladding system, indicating the ability of each structural system to tolerate deformation.

Table 3

Structure type	Ductility‡ Rank for Primary Structure (1 to 5)†	Ductility‡ Rank for the Façade Elements (1 to 5)†
Olympic Pool	2	-
Indoor Pool and ballast tank	2	-
Basketball and gymnasium floor	2	-
Main building structure	4	Clad metal framed walls - 4 Precast concrete wall panels - 2

† A ductility rank of five indicates that the structure is extremely ductile such as a special moment resisting steel frame, whereas a rank of one indicates a relatively brittle structure such as unreinforced brick masonry.

‡The ductility rank is based upon the ratio of the structural ductility factor/ the structural performance factor (μ/S_p) as described in AS1170.4.

The main building that houses the indoor pool, basketball courts, gymnasium and miscellaneous office/administration area has a ductility rank of 4. The primary structure and the clad metal wall frames should tolerate significant mine subsidence ground displacements. However, the precast wall panels, which appear to be horizontaly spanning and are bolted to the column flanges, are less ductile than the steel portal frames and some damage could develop where differential movement develops between the steel portal frame and precast wall units.

The internal concrete ground slabs could develop significant cracking particularly where joint spacings are relatively wide such as in the basketball court area and the pool concourse area. However, the main building appears to be in close proximity to the 20mm subsidence line and ground strain and tilt may not exceed survey tolerance and the impacts could be slight.

There was no detail information concerning the swimming pools available at the time of drafting. However, significant ground strains are likely to concentrate at exansion/movement joints and some tile cracking or dislocation is possible.

Recommendations

The inspections conducted prior to submitting the SMP application for LW31-LW37 identified the in-ground pool structures, suspended concrete water ballast tanks and braced structural-steel portal framed structures with a mixture of concrete and clad-metal framed walls, with differing levels of ductility, which are identified in table 3. Furthermore, the inspections identified that the main building, the outdoor pool, indoor pool ad pool ballast water tank and possibly the pool plant could be ground strain, possibly tilt sensitive, and thus could be adversely affected by mine subsidence.

Prior to commencement of mining LW31-LW37, complete pre-mining inspections and evaluate each structure on a case-by-case basis, to verify structure ductility and conduct more detailed analysis, if required. Identify tilt-sensitive plant and equipment, establish ground strain tolerances for the outdoor and indoor pool and water-balance tank in addition to tilt and ground strain tolerances for each piece of plant and equipment to establish trigger action response plans (TARPs) if impacts exceed agreed trigger levels. Develop a comprehensive management plan for the Wollondilly Leisure Centre and implement mitigation to structures when identified. Develop a monitoring programme for ground displacement and visual/survey monitoring of structure, plant and equipment.

Selected photographs during inspection (refer to pages 20-21)

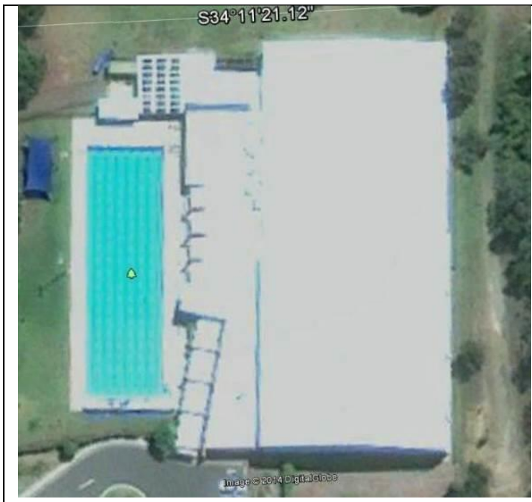

Figure 41 Olympic Pool and Main Building

Figure 42 Olympic Pool and Main Building 2002

Figure 43 Structure over entry connecting with gymnasium

Figure 44 Southern wall to gymnasium & basketball courts

Figure 45 Gymnasium

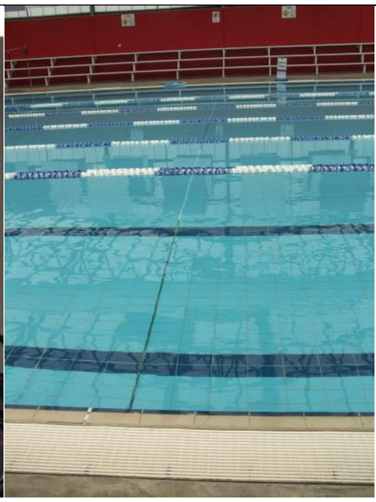

Figure 46 Indoor pool expansion joints

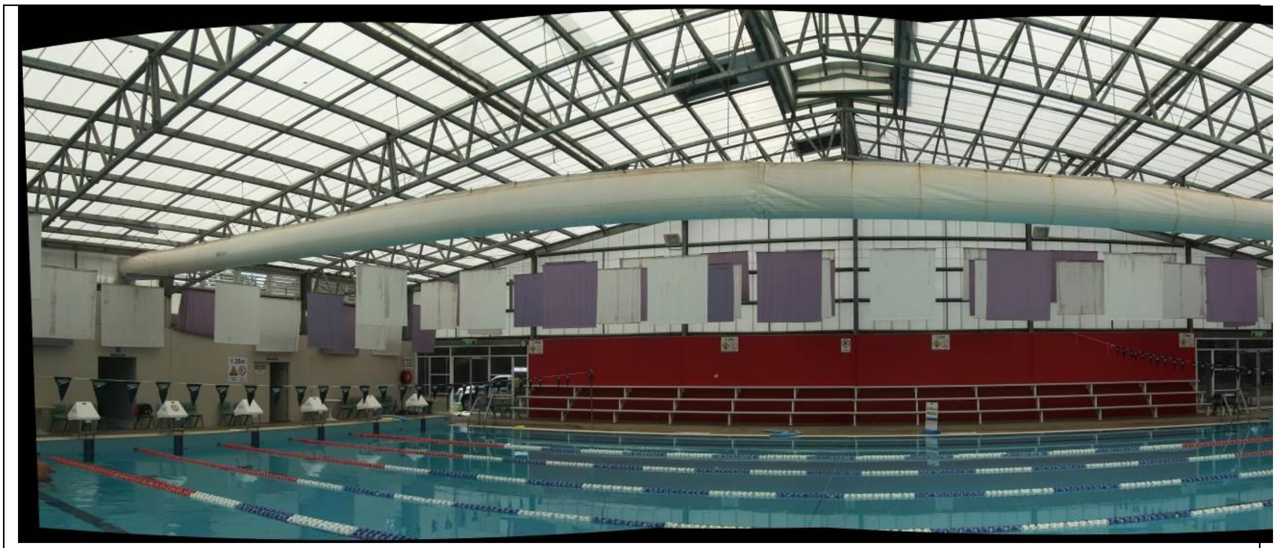

Figure 47 Photomontage of indoor pool showing trussed portal framed structure

Figure 48 panel junction concealing steel portal frame column

Figure 49 External view of north elevation wall looking south

Figure 50 Photomontage of indoor basketball court looking east and south

4 2240 Remembrance Drive: Heritage Site

Address: 2240 Remembrance Drive, Picton

MSEC Structure Reference: GG32a

Age of structure (date in which structure first visible in aerial photograph): 130years

Type of Inspection undertaken: External and internal visual inspection

Date of Inspection: 26 November 2014

Existing Condition of Structures at time of inspection

The main dwelling was constructed using full masonry on brick foundations with a suspended timber ground floor supported by brick piers surmounted by a timber framed and corrugated steel clad roof . The internal brick walls continue down to a brick foundation as do the perimeter walls and there are numerous internal walls aligned with the main building axes, which provide significant lateral rigidity to the dwelling.

At the time of the inspection, the structure of the main dwelling was in serviceable condition with slight under-sill cracking being detected around the external window openings, which is a common occurrence for masonry structures founded in reactive soil foundations. The caretakers residence was constructed in a similar fashion with a more recent extension on the southern side. The Dairy was constructed as a full masonry structure on brick footings with an internal compacted earth floor. The shed structure adjacent to the dairy was constructed in two stages, firstly with a cross-braced steel frame clad with corrugated metal roof and a more recent extension that was constructed with a structual steel frame with perimeter brick walls and a concrete ground slab.

Preliminary structural assessment

The main dwelling, caretakers cottage, dairy building and more recent brick walls surrounding the shed extension, could experience cracking of the masonry elements due to mine subsidence ground movements. There is significant structural redundancy in all of the masonry structures such that with the implementation of an effective management plan, they should remain safe and serviceable during mining. The subsidence management plan should be developed in consultation with the owner prior to the influence of mine subsidence. As part of the development of a subsidence management plan for the property, the effect of mine subsidence ground displacements should be investigated in detail. The heritage value of the structures is likely to require that intervention measures be designed to minimise the effect of mine subsidence on the structures.

Recommendations

The inspection conducted prior to submitting the SMP application for LW31-LW37 identified that the main dwelling, caretakers cottage and the dairy could be affected by mine subsidence as the perimeter and internal full masonry walls have no articulation (other than doorways and windows). The full masonry walls have been constructed on brick footings on a reactive foundation and there is already evidence of the effects of foundation reactivity in the external brick walls.

The large in-ground concrete swimming pool and surrounding garden walls have been constructed and are embedded within an excavation that was made into the side of the hill. These structures could be affected by tilt, ground strain and curvature.

The shed structure is a mixture of older and more recent construction noting that the original steel framing is cross-braced and the more recent extension includes perimeter brick walls, which brace the structure but may be susceptible to mine subsidence.

Prior to commencement of mining LW31-LW37, complete pre-mining inspections and evaluate each structure on a case-by-case basis, to verify structure ductility in the case of the swimming pool and identify intervention measures that could limit the effect of mine subsidence on the masonry structures and establish a trigger action response plan (TARP) if impacts exceed agreed trigger levels. Develop a comprehensive management plan for the property owner and implement mitigation to structures when such a need is identified. Develop a monitoring programme for ground displacement and visual/survey monitoring of the structures.

Selected photographs during inspection

Figure 51 Southern elevation of the main dwelling

Figure 52 Eastern elevation of the main dwelling

Figure 53 Northern elevation of the caretaker's cottage

Figure 54 Northern elevation of the dairy

5 675 Thirlmere Way, Picton (Mill Hill): Heritage Site

Address: 675 Thirlmere Way, Picton

MSEC Structure Reference: V06a

Age of structure (date in which structure first visible in aerial photograph): 110years

Type of Inspection undertaken: External and internal visual inspection

Date of Inspection: 26 November 2014

Existing Condition of Structures at time of inspection

The original dwelling was constructed using weatherboard clad timber framed construction with a suspended timber ground floor supported on brick piers surmounted by a timber framed and corrugated steel clad roof. A more recent two-storey weatherboard clad timber framed extension has been integrated into the structure of original dwelling, which was found to be in serviceable condition. However, there was a significant pre-existing floor tilt from west to east along the hallway leading in an easterly direction within the original section of the dwelling.

The other structures on the site are relatively flexible or ductile and are unlikely to be significantly affected by mine subsidence. The in-ground fibreglass pool shell was notably dilapidated and is not in service; refer to figure 58.

Preliminary structural assessment

Weatherboard-clad timber framed structures can tolerate significant ground strain and tilt, whilst remaining serviceable. Therefore, the effect of mine subsidence ground-displacements on the structure is likely to be slight. However, given the age of the structure, the structure should be assessed for the impact of the predicted mine subsidence ground displacements to determine whether further action is required.

Recommendations

The inspection conducted prior to submitting the SMP application for LW31-LW37 identified that the main dwelling and shed structures could be affected by mine subsidence. However, the impacts of mine subsidence are expected to be slight due to the inherent flexibility of the weatherboard clad timber-framed main dwelling, small timber framed shed and the steel framed shed.

Prior to commencement of mining LW31-LW37, complete pre-mining inspections, evaluate each structure on a case-by-case basis, and establish a trigger action response plan (TARP) if impacts exceed agreed trigger levels. Develop a comprehensive management plan for the property owner and implement mitigation to structures when such a need is identified. Develop a monitoring programme for ground displacement and visual/survey monitoring of the structures.

Selected photographs during inspection

Figure 55 Western elevation of the main dwelling

Figure 56 Timber framed shed

Figure 57 Steel framed shed

Figure 58 Dilapidated fibreglass in-ground pool