Vibration and Impact Report on Structural Remains at Ballymount Great Dublin 22

By
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For
CIE/LRT

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Drawings

00215-02	Façade survey of wall ruins
BM98001	Excavation site layout

1 Introduction

1.1 This report details the mitigation measures necessary to protect the masonry structures and in situ archaeological deposits at Ballymount Great, Dublin 22. This site is a registered monument (DU021:015) consisting, *inter alia*, of a prehistoric henge, the subsurface remains of a medieval building or buildings and the extensive remains of a post-medieval manor house.

1.2 Line A of the LUAS, the proposed light rail system linking Tallaght and Abbey Street, is to pass through the site along a corridor that has been excavated to natural subsoil.

1.3 An initial report on the site was commissioned by An Foras Forbartha Teo in 1977. The author, Paddy Healy, outlined the multiperiod nature of the site and its significance as an archaeological landscape under developmental pressure.

1.4 Three excavations have been undertaken in the area of the monument. Stout (1998) excavated several trenches through the site prior to the construction of the adjacent M50 in 1982. Conway (1998) excavated trenches on the site in 1997 as part of the LUAS project. John Ó Néill (2001) excavated a trench in 2000 between the masonry structures directly on the line of the track. The results of the latter two excavations have been lodged with the National Museum of Ireland and Dúchas, the Heritage Service.

1.5 Although the masonry structures have been discussed in the excavation reports submitted to the authorities, there has been little concerted attempt made to interpret the remains and assign phases to their construction. This report does not propose to undertake such a task and accepts that a more detailed study of the standing remains at Ballymount Great is necessary in order that the site be preserved as a cultural artefact.

2 Characteristics of the Proposal

2.1 *General*

2.1.1 The LUAS alignment will be constructed along the west side of the existing M50 motorway through lands presently being developed by South Dublin County Council as a public park. The area is generally quite level, apart from the earthworks and masonry structures associated with the monument. A LUAS depot and park and ride facility are proposed for a site 500m away to the northwest at Red Cow.

2.1.2 The track will pass directly through the site in a 5.6m corridor, which, with the exception of a post-medieval wall left in situ, has been cleared to natural subsoil.

2.1.3 It has been additionally proposed to use this corridor through the site as a temporary access route for construction traffic during a topsoil-stripping operation to the south. The contractors are to use the following plant:

- Excavators 13–30 ton
- Backhoes 7 ton
- Wheel loaders 12 ton
- Vibrating roller compactor 15 ton
- Dump trucks 15 ton

2.2 *Vibration*

2.2.1 The presence of pneumatic tyres on the road vehicles passing along the M50 means that comparatively low vibration levels are transmitted to the monument. The vertical vibration level measured at ground level 100mm from the facades of several houses in the adjacent housing estate was between 0.03 mm/sec and 0.05mm/sec ppv (peak particle velocity). This level of vibration is imperceptible and is typical of vibration levels due to existing road traffic movements measured at twenty-four locations along the proposed LUAS route.

2.2.2 During the construction phase, vibrations will arise from the machinery and plant involved. During the operation phase, vibrations will arise from the dynamic interaction between the wheels of the rail cars and the rails.

2.2.3 However, no likely and significant impact due to vibration is predicted. Vibrations may arise and be just perceptible inside residential properties adjacent to the proposed track during the construction phase, but overall there will be a neutral impact.

2.3 ***Substrate Disturbance***

2.3.1 The laying of the track generally involves a substrate disturbance of 1m, to which a buffer zone of 400mm has been added where the track passes through archaeologically sensitive areas. In the case of Ballymount Great, the archaeology has been cleared to subsoil, and this report focuses more on the affects of the construction traffic and the LUAS itself on the adjacent masonry structures.

3 Description of Structures

3.1 *General*

3.1.1 This report does not pretend to be a full account of the standing structures at Ballymount Great. Such a study is, however, necessary and could be undertaken as part of a conservation plan for the monument.

3.1.2 The track will pass within 0.5m of a vaulted structure on its eastern side. This structure has been interpreted by Stout as being part of Sir William Parsons's manor house, constructed *c*. 1622.

3.1.3 A masonry wall connects the southwestern corner of this building with the northeastern corner of a dividing wall in a roofless structure located between 4m and 8m to the west of the proposed track.

3.1.4 The structure to the west of the track has both seventeenth-century and nineteenth-century walls within its fabric. The structure appears to be more nineteenth-century in date and probably consisted of spaces constructed to the south of the seventeenth-century courtyard wall.

3.2 *Vaulted Structure*

3.2.1 The structure to the east of the proposed track comprises a rectangular building of rubble walls in calp limestone, with a single ground floor space surviving beneath a vault. The external dimensions of the building are 10.9m (east–west) by 5.4m (north–south), with walls ranging in thickness from 700mm to 890mm.

3.2.2 The vault is oriented east–west and is approximately 330mm thick. It is constructed from calp rubble. The springing of the arch is 2.1m above the inside ground level, with the soffit of the arch a further 1.1m above the springing.

3.2.3 Some of the original walls between the first and second floors still exist, as does a section of the original chimney. The back of the fireplace at ground floor level has collapsed. There are six openings in the walls at ground floor level, the two largest of which are due to the walls partially collapsing. A crack approximately 4–5mm wide exists at the crown of the arched floor and runs the length of the building. A small portion of the arched floor has collapsed just above the main entrance into the building.

3.2.4 On each of the side walls are the remains of two projecting walls. These walls may have been abutments used to stabilise the first floor. The structure is almost entirely

covered by heavy vegetation. Access could not be gained onto the top of the arched floor.

3.3 *Nineteenth-Century Structure*

3.3.1 The ruin to the east of the proposed track is 7.4m (north–south) by approximately 18m (east–west). The eastern end of the structure has been truncated by the archaeological trench. Several building phases are evident in the structure, and there are at least two spaces at ground floor level.

3.3.2 The calp walls are all in the region of 700mm in thickness. The northern wall is probably part of the seventeenth-century courtyard, and two buttresses have been added on the northern side.

3.4 *Connecting Wall*

3.4.1 Both structures are connected by a calp wall of between 450mm and 520mm in thickness. This wall has also been interpreted as being part of Parsons's manor house and has been left in situ. It is presently exposed at between 63.235m OD and 63.381m OD, and the deposits at either side have been excavated.

4 Remedial Measures

4.1 The structures are in poor condition and should be fenced off from the public. It is recommended that an 8ft. timber hoarding be constructed around the structures. The purpose of the hoarding is primarily to protect the structures from coming into contact with construction traffic. The condition of the hoarding should be constantly monitored and any damage repaired immediately.

4.2 Any damage to the hoarding or the structures behind the hoarding should be immediately reported to the construction manager, Tony Perkovic of MVMBNI JV (telephone 086 6046254), and to the monitoring archaeologist, Franc Myles (telephone 086 8537281). The latter will report such incidents to Dúchas.

4.3 The passage of construction traffic through the corridor should be constantly monitored by a banksman. Strict speed controls should be applied, and no more than one vehicle at a time should travel through the corridor.

4.4 The composition of the proposed ramp through the monument should be discussed and finalised with Dúchas.

4.5 The foundations and bearing stratum of the structures were not examined and should be opened up, examined and assessed. The heavy vegetation on and around the ruin should be removed to allow a complete assessment of both the stone walls and the mortar. However, care must be taken, as the vegetation may be contributing in some way to the overall stability of the ruin.

4.6 As a short-term strategy, temporary raking shores could be installed in the same position as the abutment walls to stabilise the arched floor. An alternative to this would be to support the vault internally with two layers of 12mm plywood, supported underneath the soffit by a series of supporting timber beams on a braced arrangement of adjustable props.

4.7 During the construction phase, the best practical means will be utilised to minimise any vibration transmitted to the structures at Ballymount Great. The maximum allowable vibration, as measured near the monument, will be set at 5mm/sec ppv. This level accords with the German standard DIN 4150. It is considered very conservative and is used to protect against the onset of superficial damage in listed buildings or ancient monuments.

4.8 Tell-tales should be mounted on the structures in order to monitor the effects of construction traffic.

4.9 To reduce the vibration transmitted from the interaction of wheels on tracks to the ground and through to vibration-sensitive areas, vibration isolation techniques are to be employed

in the track and track-bed design. To take account of the possible amplification of any vibration that may occur, an amplification factor of three will be allowed for in the design of the track and track-bed.

4.10 During commissioning of the system, which is likely to last for up to six months, vibration levels will be monitored by suitably qualified personnel on behalf of CIE to check for compliance with the design criterion.

4.11 Under no circumstance is any work is to be undertaken in the area of the registered monument without the prior agreement of Dúchas. No ground reduction work is to be undertaken unless the monitoring archaeologist, or an archaeologist assigned by him, is present.

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Margaret Gowen & Co. Ltd.

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Fearon O'Neill Rooney, Consulting Engineers

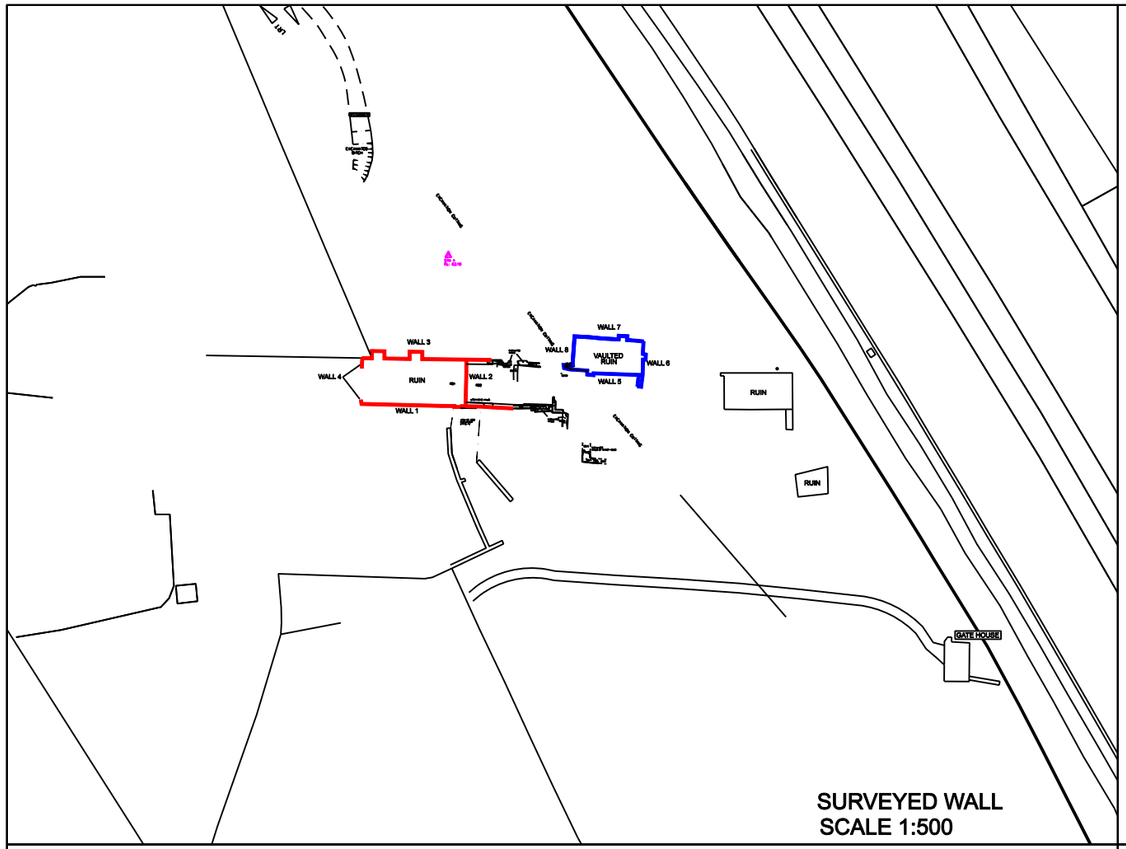
August 29, 2001

References

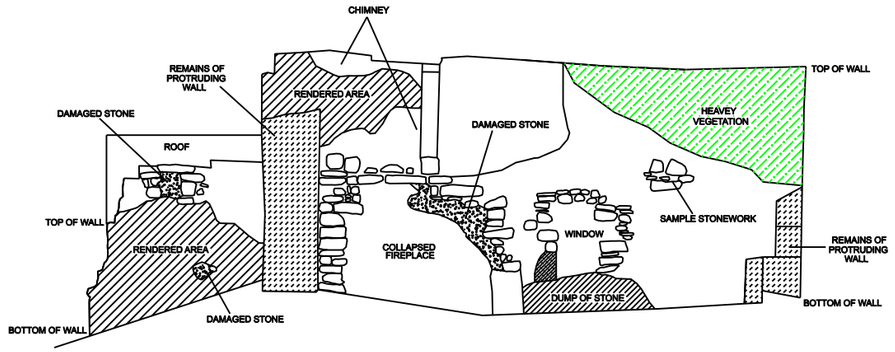
Conway, M. (1998) *Archaeological assessment and excavations at Ballymount Great, Co. Dublin (licence no. 97E0316).* Margaret Gowen & Co. Ltd. Unpublished report lodged with the Heritage Services.

Ó Néill, J. (2001) *Preliminary excavation report: Ballymount Great, Dublin 22 (licence no. 00E0538).* Margaret Gowen & Co. Ltd. Unpublished report lodged with the Heritage Services.

Stout, G. (1998) 'The archaeology of Ballymount Great, Co. Dublin.' In C. Manning (ed.), *Dublin and beyond the Pale. Studies in honour of Patrick Healy,* ppg. 145–54. Bray.

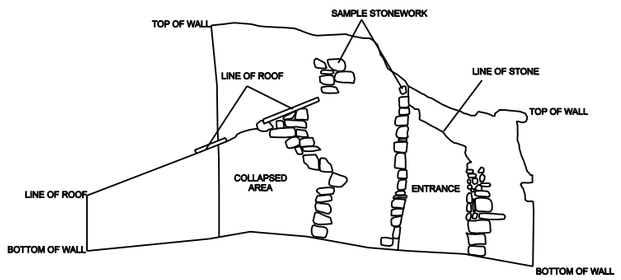


SURVEYED WALL
SCALE 1:500



WALL 5

SCALE 1:50



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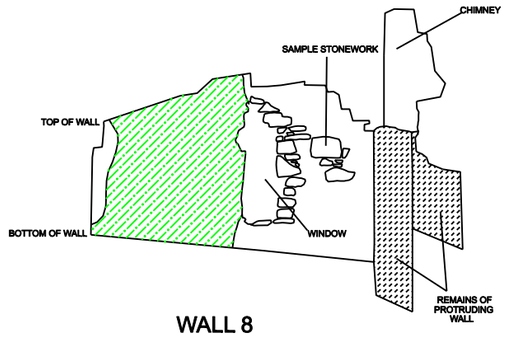

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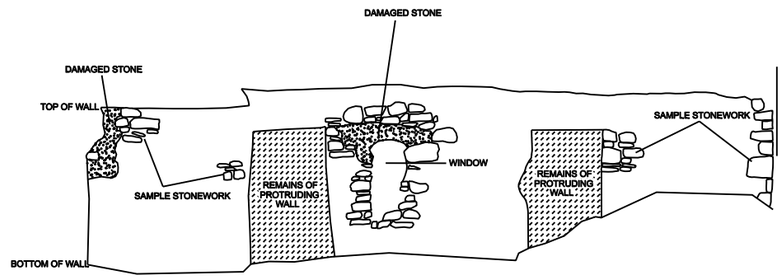

WALL 7

SCALE 1:50

REVISIONS:	BY:	DATE:	REV:

CONSULTANT ENGINEERS:

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CLIENT: CIE\LRT

PROJECT: BALLYMOUNT

TITLE: FACADE SURVEY

DRAWING NO.: 00215-02

JOB NO.: 00215

DATE: 27\10\2000

SCALE: 1\50

PRODUCED BY: M.POVEDA

SCALE: 1/750

LRT ROUTE

CULVERT

WESTERN PARKWAY MOTORWAY

MOUND

VIEW 1

20m Buffer

EXCAVATION CUTTING

VIEW 2

TEST TRENCH (NO REMAINS)

GATE HOUSE

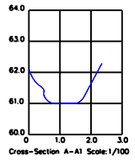
20m Buffer

LRT ROUTE

VIEW 1
SCALE: 1/200

CULVERT

EXCAVATION CUTTING

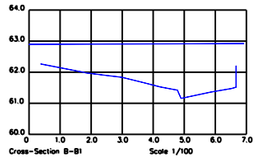


B1

A1

B

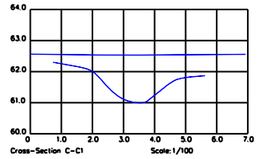
A



PRESUMED LINE OF DITCH

1982 EXCAVATION AREA

EXCAVATION CUTTING



DISTURBED

1982 EXCAVATION AREA

EXCAVATED DITCH

C1

C

EXCAVATION CUTTING

N

VIEW 2
SCALE: 1/100

EXCAVATION CUTTING

SEWER POSITION

EXCAVATED WALLS

63.381

63.235

63.145

63.36

DRAIN

62.09

VAULTED RUIN

COURTYARD COBBLED AREA

RB1

RB2

UPSTANDING WALLS

TBM

63.36

63.26

EXCAVATED WALLS

63.29

SEWER POSITION

EXCAVATION CUTTING

AREA OF 1982 EXCAVATION (TR 6-7)

GONE

EXCAVATED WALLS OF MANOR HOUSE

63.11

GONE

REVISIONS:	BY:	DATE:	REV.
20m Buffer zones	KG	13/11/01	A

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CLIENT: LRT

PROJECT: BALLYMOUNT EXCAVATION

TITLE: SITE LAYOUT

DRAWING NO.: BM-98001

JOB NO.: 9734

DATE: 19/05/98

SCALE: 1/750

PRODUCED BY: K. GOUCHER