

Derby Diocesan Association of Church Bellringers Consultant's Report	Report DDACB 12/05
Church of Saint Martin Alfreton – Inspection of Bells	Issue Date 22/11/05

1.0 Introduction

Grace Godwin, Churchwarden and Chair of the PCC, requested the inspection in a letter dated 25/10/2005 and Robin Lyon and Mike Banks, Bell Consultants to the Derby Diocesan Association of Church Bellringers, carried it out on 3/11/2005. Tape recordings were made of each bell to enable a harmonic analysis to be carried out and the results will be reported separately as soon as they are available. This inspection follows an earlier DDA inspection by John McCartney in 1998.

In summary, the current installation is suffering from lack of maintenance and bells 1,2,5 and 6 should not be rung again until remedial work recommended in section 9.1 has been carried out. This report gives a detailed description of the state of the installation and proposes ways forward in section 10.0.

2.0 Tower

The stone built tower is at the west end of the church and contains 8 bells hung for full circle ringing and a Sanctus bell. Entrance to the ground floor is either by a large doorway in the west wall or through the arch at the west end of the nave. The ground floor area is used for storage and ringing is carried out from the first floor. A spiral staircase in the northwest corner gives access to the ringing room and to the bell chamber. Access to the clock room, which lies between the ringing room and bell chamber, is via a ladder through the bell chamber floor. It is possible that up to the end of the 19th century the ringing chamber was at a higher level since there is a blanked off door opening from the spiral staircase high up in the existing ringing room wall.

3.0 Ringing Room (Figure 1)

The ringing room is reached via 15 steps up the spiral stairwell. It is clean, carpeted and well lit by natural light both through the large west window and also the glazed infill in the arch through to the nave. Electric lighting is good from two fluorescent tubes and one filament bulb.

The centre of the room is dominated by a wooden clock pendulum case which extends through the ceiling and finishes 2.26 metres above the floor. Although intrusive, the pendulum case does not seem to seriously affect rope sight.

4.0 Bell Chamber (Figure 2)

The bell chamber is reached by a further 29 steps. There are four louvre openings, one to each aspect of the tower and both natural and artificial lighting are adequate. Although there is metal mesh over the louvre openings it is not adequate to exclude birds as evidenced by considerable quantities of bird debris on the bell frame and floor. This debris retains moisture and promotes favourable conditions for the onset of rot in adjacent timbers. (It is also a health hazard). The debris should be removed and the louvre openings covered in "Galebreaker" porous sheeting.

The wall adjacent to the entrance door has been relieved to allow room for bell 5.

5.0 Clock Room

Headroom is severely limited with a ceiling height of 1650 mm. There are corbels on the north and south walls and the tower is offset on the east wall and probably the west wall. The bell chamber floor comprises very old planks resting on six old beams set north/south well above the corbels. The six beams have been slid to either side of the room presumably to permit passage of the bells in 1900. Some rot is evident in both the beams and the floor planks.

The three train clock is autowound and is housed in a large wooden case. It has a long pendulum beating 2 seconds with a pin wheel escapement and strikes on bells 4,5 and 8. At the time of the inspection it was not in operation.

6.0 Frames (Figure 2)

The upper steel frame carries bells 1 and 2 and is supported by a 305X127 steel universal beam set diagonally across the bell chamber. All of the steel work has considerable surface corrosion, although it appears to be structurally sound.

The bottom frame, carrying the other six bells, is a low-sided frame of wooden construction which appears to be in good condition. Since there is limited space for the bells and frame, the pits in which bells 3,4,6,7 and 8 swing have gallows ends and the whole frame is set above the tower offsets noted in section 5.0. The frame sits on four 350X200 wooden foundation beams, which are set east/west, and the top of the frame is roughly level with the louvre sills resulting in all bells being above the sill height. When heard from outside the church this results in some bells appearing louder than others dependent on which louvre is closest to the observer. (Ideally all bells should be below sill level to give an even sound at all compass points outside the church). None of the bells was rung to assess frame movement but it was considered that any movement would be acceptable given the good state of the frame. If any looseness were found in the frame, tightening of the metal frame ties would reduce it.

7.0 Bells

In 1758 there were three bells but by 1781 this had increased to five. Taylors recast the fourth of these five in 1881 and this formed what are now the back five bells of the present ring of eight. Taylors augmented to eight bells in 1900 and in 1971 all bells were hung on ball bearings. (Details are taken from the book "The Church Bells Of Derbyshire" by Pat Halls and George Dawson).

Bell 6 is listed for preservation by the Council for the Care of Churches and so cannot be recast and any retuning, if permitted, would be very limited.

None of the bells has canons (loops cast into the top of the bell to facilitate hanging on its headstock) and so are attached to their respective headstocks by bolts passing through both the bell and headstock. Wear at the point where the clapper strikes the sound bow is generally moderate on all bells being most severe on bells 5 and 6. On bell 7 the wear extends over a wide arc due to the clapper being very loose in its headstock. The oldest bells (4,5,6 and 8) have in the past been quarter turned about their vertical axis to present unworn faces to the blows of their clappers.

TABLE 1 BELL DATA

Bell	Diameter mm (ins)	Weight (cwt/qrs/lbs)	Date	Founder
1	679 (26.75)	4-3-22	1899	Taylors
2	708 (27.875)	5-0-13	1900	Taylors
3	762 (30)	5-2-22	1897 recast 1900	Taylors
4	781 (30.75)	5-3-20	1780	Thomas Hedderley
5	851 (33.5)	6-3-9	1687 recast 1780	Thomas Hedderley
6	886 (34.875)	7-1-0	16 th C	Heathcotes (Chesterfield)
7	997 (39.25)	11-1-10	Recast 1881	Taylors
8	1114 (43.875)	13-3-14	1780	Thomas Hedderley
Sanctus	356 (14)	0-2-13	circa 1750	?

8.0 Bell Fittings

8.1 Headstocks. Bells 1 and 2 are fitted with cast iron headstocks which have heavy surface corrosion but are otherwise in serviceable condition. Bells 3,4,5,6,7 and 8 are fitted with wooden headstocks which are all in serviceable condition although their metal fittings are corroded.

8.2 Bearings. All bells are mounted on self-aligning ball bearings which show no signs of loss of lubricant (these bearings are sealed for

life and should not be regreased). Their condition was not assessed during the inspection but rolling element bearings have a very long life in this application and so it is safe to assume they are in serviceable condition.

8.3 Clappers. Each clapper is made from wrought iron and is fixed into its headstock by means of an independent crown staple i.e. a metal shaft passing centrally through the crown of the bell and headstock with a fork on the inside of the bell and a clamping nut on top of the headstock. The fork carries a pivot pin about which the clapper rotates. The clamping nut should be locked, usually by a split pin, but there is no locking on the nuts of clappers 1,2,5,7 and 8. The clappers of bells 4,5,6,7 and 8 are loose in their headstocks and, worryingly, the fork ends in clappers 5 and 6 are very loose on their shafts posing a danger that they may depart their bells. This can result in expensive damage and it is recommended that bells 5 and 6 are not rung again until their crown staples are repaired. Although tight in its headstock, the clapper in bell 3 has been incorrectly set since it swings at an angle to the direction of swing of the bell. Its crown staple nut should be slackened, the clapper reset, and the nut retightened. With the exception of clappers 7 and 8 the wear on the clapper pivots is moderate and acceptable despite no evidence of lubrication. However the pivots on clappers 7 and 8 are sufficiently loose to warrant immediate attention. All clapper strike faces have been extensively flattened over many years of service.

8.4 Wheels. The wheels on bells 1, 3, 5, and 7 are in good condition, except that one of the steel stays for wheel 3 is about to part company with its headstock and needs attention. The wheels on bells 4 and 8 are loose on their headstocks and should be tightened, although additionally bell 8 is missing two wooden seating blocks on the inside of the wheel adjacent to the headstock and these should be replaced at the same time. The wheel on bell 2 has a split in its soling but is otherwise OK and bell 6 has a loose clamping bolt which should be tightened.

8.5 Pulleys. Single pulleys are fitted to bells 1,2,6 and 8; the remaining bells have double pulleys which enable the ropes to be pulled to one side to allow the ropes to fall more nearly in a circle in the ringing room. Since bells 1 and 2 are set on their own frame above the other bells they each have another pulley mounted on the floor of the bell chamber. The pulleys to bells 3, 5 and 6 are in a serviceable condition but all others need to be replaced. In fact the pulley boxes on bells 1 and 2 are split and loose and these bells should not be rung. Also the rope guides below these pulleys are in a very poor state and should be replaced.

8.6 Ropes. The rope on bell 5 needs changing due to wear in the garter hole but all other ropes are acceptable. It is recommended that

rope 6 be raised slightly to prevent excessive rope wear in the wheel garter hole.

8.7 Stays. With the exception of bells 1 and 2 all stays are in a fully serviceable condition. The Hastings stays in bells 1 and 2 appear to be short in their headstock pockets, allowing only one fixing bolt, resulting in unwanted sideways movement.

8.8 Sliders. All sliders are in sound condition although the slider on bell 4 is a little stiff to operate.

9.0 Refurbishment of existing installation.

Section 10.0 discusses longer-term options open to the PCC, but in the short term work listed in 9.1 should be carried out immediately.

9.1 Minimum work to be carried out immediately before ringing the bells again.

- Remove clappers and crown staples from bells 5 and 6 and have the fork ends reattached correctly to their staples and the clapper pivots rebushed by professional bell hangers. Refit with castellated nuts and split pins.
- Have the pivots for the clappers in bells 7 and 8 rebushed. Refit with castellated nuts and split pins.
- Tighten clapper 4 in its headstock.
- Replace/repair the pulley assemblies on bells 1 and 2.
- Install stays correctly in bells 1 and 2.
- Replace/repair rope guides for bells 1 and 2.

9.2 Minimum work to be carried out in near future.

- Remove all debris from the bell chamber paying particular attention to debris between the frame and the walls.
- Replace the anti bird mesh in the louvres with Galebreaker sheeting.
- Reset clapper 3 to swing correctly in the direction of swing of the bell.
- Tighten the wheel metal stay on bell 3.
- Tighten the wheel of bell 4 on to its headstock.
- Replace the missing wooden blocks on the headstock of bell 8 which locate the wheel and tighten the wheel on to the headstock.
- Tighten the clamp bolt holding the wheel halves together on bell 6.
- Replace pulleys 4,7 and 8.
- Fit lock nuts to the crown staples on bells 1 and 2.
- Replace the rope on bell 5.
- Slightly raise the rope on bell 6 to prevent excessive wear in the garter hole.
- Tighten frame ties on the lower wooden frame.
- Tighten all nuts on wooden headstocks.

- Remove all rust from the upper frame and headstocks and bell fittings for bells 1 and 2 – protect with three coats of paint as follows: - prime with red oxide, then undercoat and finally top coat with gloss paint.
- Similarly protect all metal fittings on the wooden frame and associated bell fittings (do not, of course, paint the bells).

10.0 Discussion

The installation has been neglected for many years and this shows in the details of the inspection. From this it is concluded that the PCC does not have the benefit of local skills to maintain the bells and that an important objective for any expenditure will be to create an installation which has low maintenance requirements. Of importance also is the PCC's responsibility to pass on to future generations a bell installation which is in good condition. The degree to which either of these objectives can be met will, of course, depend on the funding available.

Technically, the best installation will be an all-new one comprising a single level metal frame containing eight new bells harmonically tuned to modern standards. To achieve a balanced sound from each bell, as heard outside the church, the frame would be installed lower down the tower such that the lips of all bells when swung to their upright positions are below the louvre sills. Due to space constraints these bells would be smaller than the existing bells. This will be the most expensive course of action and due to their historical interest bells 4,5,6 and 8 will have to be preserved, probably by selling to new owners through the Keltek Trust. (The Keltek Trust is a charitable trust that recycles redundant bells). It is probable that the other bells could be broken up and used as feed metal for the new bells but it would be preferable to sell these also through the Keltek Trust. The clock would be reinstalled on the north wall in the ringing room or be replaced by a modern electric clock.

Alternatively, since the inscriptions on bells 1,2,4,5 and 8 relate directly to past benefactors of the church, the PCC may wish to keep the existing eight bells together in the church and so preserve their historical context. However there is always the fact that this ring of bells has evolved over the centuries, rather than being installed as a matched set, and so not perfectly tuned one to the other. It would be beneficial to have them retuned although this can never make them a completely matched set, particularly due to the constraints on tuning of bell 6 which is a listed bell. Available options using the existing bells are: -

- Install the retuned bells at a single level (with new fittings) in a new metal "H" frame set at the same level as the existing wooden frame. Figure 3 shows that this may be feasible (the width of each rectangle is the bell diameter and the length is the wheel diameter) however this will need to be confirmed by a professional bell hanger.
- If the above is not possible, install bells 3,4,5,6,7 and 8 with new fittings in a new metal frame lower down the tower and refurbish the existing steel frame and fittings for bells 1 and 2. The clock would be reinstalled

on the north wall in the ringing room or be replaced by a modern electric clock.

- Refurbish the existing installation as described in section 9.0.

The next step will be for the PCC to decide how it wishes to proceed and to produce a specification to enable quotations to be obtained from three bell hangers. Table 2 summarises the above proposals and is intended as background information to help the PCC and its bells project manager. If invited to do so, the DDA bell consultants will be pleased to attend any meetings to clarify details in this report and to help, free of charge, with preparation of a specification and any other future activities relating to this project.

Advice given in good faith, no liability accepted.

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TABLE 2 SUMMARY OF OPTIONS

OPTION	DESCRIPTION	PROS	CONS
1	<ul style="list-style-type: none"> • New ring of eight harmonically tuned bells with new fittings • Single level metal frame set lower in tower • New bell chamber floor • Clock reinstalled on north wall of ringing room or replaced by electric clock • Galebreaker sheet applied to louvre openings 	<ul style="list-style-type: none"> • Optimum sounding bells • Will last for many generations • Low maintenance 	<ul style="list-style-type: none"> • Most expensive option • Historical context of old bells lost • Clock must be reinstalled elsewhere or replaced
2	<ul style="list-style-type: none"> • Existing eight bells retuned, 1/8 turned and with new fittings • Single level metal “H” frame set at current wooden frame height • Galebreaker sheet applied to louvre openings 	<ul style="list-style-type: none"> • Historical context of bells preserved • Better sounding than current installation • Will last for several generations • Low maintenance 	<ul style="list-style-type: none"> • Bells not perfectly tuned • Different bells will sound louder from different louvres • Difficult to move around frame for maintenance
3	<ul style="list-style-type: none"> • Existing eight bells retuned, 1/8 turned and with new fittings • Bells 3,4,5,6,7 and 8 in single level metal frame set lower in tower • New bell chamber floor • Bells 1 and 2 in existing upper refurbished metal frame • Clock reinstalled on north wall of ringing room or replaced by electric clock • Galebreaker sheet applied to louvre openings 	<ul style="list-style-type: none"> • Historical context of bells preserved • Better sounding than current installation • Lower six bells will sound evenly from each louvre • Will last for several generations • Low maintenance 	<ul style="list-style-type: none"> • Bells 1 and 2 will tend to sound disproportionately loud • Bells not perfectly tuned • Clock must be reinstalled elsewhere or replaced
4	<ul style="list-style-type: none"> • Existing eight bells with refurbished fittings • Existing frames refurbished • Galebreaker sheet applied to louvre openings 	<ul style="list-style-type: none"> • Historical context of bells preserved • Cheapest option • Bells rescued from possible dereliction 	<ul style="list-style-type: none"> • Requires most maintenance • Bells sound as they always have; different bells sound louder from different louvres

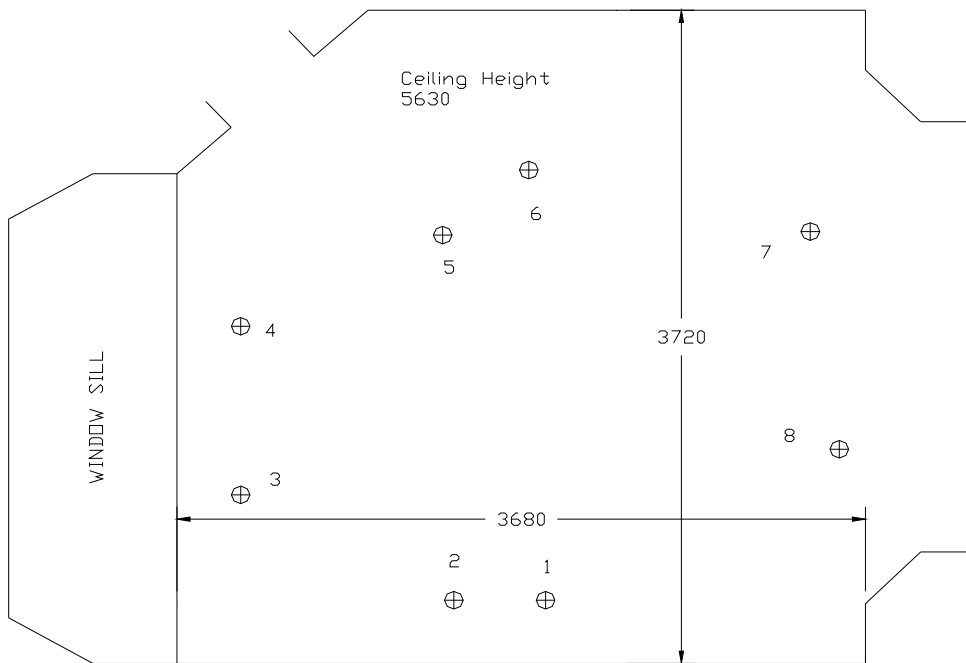


FIGURE 1
Ringing Room

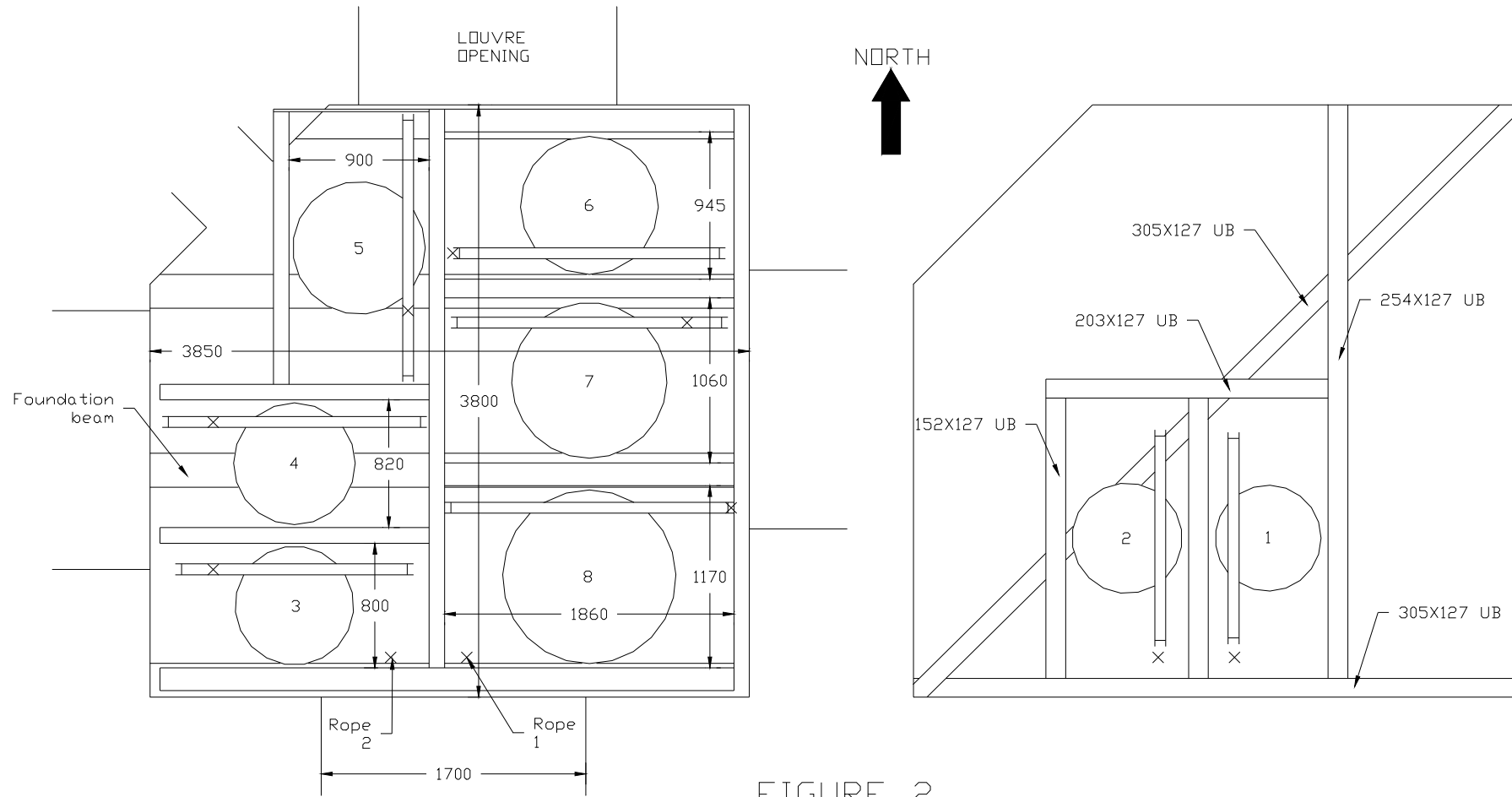
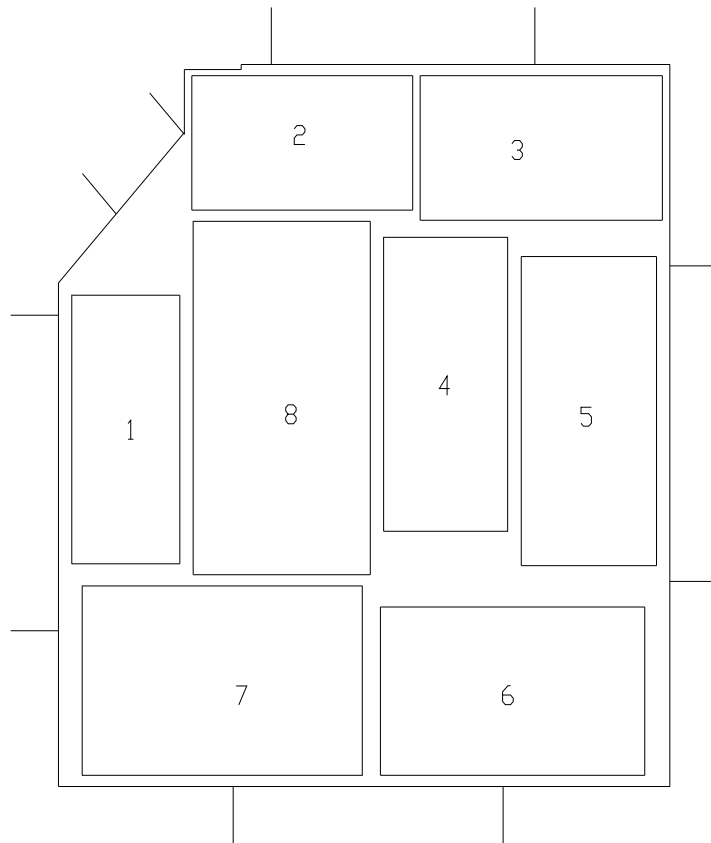


FIGURE 2
 Bell Chamber and Frames



NORTH



FIGURE 3
Possible arrangement
of existing bells in
single level "H" frame
(subject to confirmation
of professional bell
hanger)