7.3

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consulting engineers

SWAFFHAM
TOWN COUNCIL
29 JUL 2019
RECEIVED

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e: pdc@plandescil.co.uk
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Mr R. Bishop
Town Clerk
Swaffham Town Council
Town Hall
4 London Street
SWAFFHAM
PE37 7DQ

SJR/EAP/25115

24 July 2019

Dear Sir

Structural Appraisal of Bulging of Flint Wall to Rear (west) Elevation of Historic Portion of the Town Hall.
Site Visit: 18th July 2019
Weather: Mild and Overcast

We thank you for asking we advise on the above matter and for asking Graham West to escort us to the distress and discuss matters.

1.0 General

We attach the following to help your/others understanding of the issue.

1) Location plan, showing approximate position of distress
2) Photographs 01, 04, 021, 05, 026, 023, 032,035, 036, 037, 052, 039, 041, 050, 051
3) Sketches SK1 and SK2
4) Helifix method statements LR03 and LR04

The wall is accessed from the rear courtyard to the historic portion of the Town Hall. Scaffold access is currently provided to address problems with pigeons, blocking gutters etc. The wall is described when standing in the courtyard looking broadly eastwards.

The wall in question is recessed under the main roof envelope but at ground floor level has a single storey flat roofed infill back to *main* rear wall position.

Internally the wall is abutted by the attractive staircase that from the ground floor rises to the first and then second floor levels. There is an attractive semi-circular arched *feature* window (W1) as part of the staircase detailing. This sits with its top tight to the underside of the central linking flight between quarter landings of the staircase. A further window (W2) was seen to the left hand side with its head higher than the arch.

1.0 Continued...

Internally at the lower ¼ *landing* position of the staircase the wall was seen to have a drylining (with a hollow ring).

Above the next ¼ *landing* position the wall was seen to be solid with no drylining.

2.0 Distress

The scaffolding unfortunately prevented a clear photograph of the whole outside of the subject wall. However SK1 shows a schematic elevation on the externally exposed portion of the subject wall.

The left hand side encompassing the window W2 and below is in facing brick but elsewhere, apart from the brick W1 arch and ashlars, is in knapped flint.

The knapped flint had been repointed with an extremely *rich* cementious mortar. It could well be neat cement paste. It does not appear that the joints had been rigorously raked out and the repointing was probably largely a filling of the erosion of the original lime mortar

The cementious mortar is far less permeable than the original lime mortar and hence the ability for the historic wall to *breathe* has been reduced.

The mortar between bricks is designed to be permeable so that the driving rain can evaporate off the wall. Over many years this leads to a concentration of *salts* in the mortar. These salts attack the mortar and gradually cause the mortar to be eroded away. This is perfectly normal and the eventual need for repointing is part of the long term maintenance of a masonry walled property.

If a *rich cementious mortar* is used with brick the mortar is then less permeable than the brick. The result is then the brick is preferentially *eroded* away leaving the mortar standing proud.

However with this flint skin seen over much of the subject wall the application of a rich mortar would not be expected to *erode* the flint.

Purists would reason the rich mortar should be removed and replaced in well repointed lime mortar. However it is common place to allow the repointing of flint to *run its course* and repoint only once significant deterioration of the pointing has occurred. Whilst there is some deterioration of the repointing we would not regard it as currently significant.

2.0 Continued...

As such we would judge the matter can be deferred to a latter date (unless there is an appetite to address all matters rigorously at this stage).

The subject wall was gently bulged outwards on the outside face. No such corresponding movement was discerned on the inside face of the wall.

This indicates the wall is likely to be delaminating with the outside knapped flint gradually moving outwards. At this stage we do not know the nature of the inside face of the wall. A typical *rubble* wall would generally have an inner and outer leaf constructed in a lime mortar (often flint/flint or flint outer/ chalk inner or numerous less likely other variations). The middle of the wall was then *crudely* infilled with reject stone for the outer leaves and varying amounts of mortar. These outer leaves were not tied together and with the passage of time the outer leaf typically moves outwards from the effects of repeated heating/cooling, wetting/drying. The inner skin is bound together by the internal finishes and is not affected by the weathering effects and hence, as here, is often not prone to movement.

As the outer skin moves out, if the rubble fill is so loose as to be able to *flow*, it begins to develop an outward pressure pushing the outer skin outwards,

Experience shows trying to assess the quality of the rubble core to the wall is extremely difficult.

The flint wall could conceivably be just a decorative facing to a brick or clay lump wall behind. Again the deterioration happens as described before but there is not the *extra* possible ill effect of the loose rubble core.

The degree of the outer face movement was approximately quantified as below.

(W1) Top of arch

- 12mm new gap beyond historic repointing.
- Historic repointing 40mm say allow initial 10mm gap gives previous 30mm movement.
- Approximate total outward movement 12+30=42mm.

Side

- At the springing points of the arch the new gap had reduced to some 4mm width. This gap gradually reduced to some 1mm above the wall of the windows.

2.0 Continued...

(W2) Top of arch

- 7mm new gap beyond historic packing.
- Loose historic packing circa 20mm (less 10mm initially).
- Total movement circa 17mm

Side

- Some 22mm of mortar packing and new gap. 5mm at top to 0 at bottom of window.

3.0 Discussion

Left unaddressed the outward movement of the knapped flint skin can only be expected to gradually get worse. We judged in its current condition the wall was capable of insitu stabilisation rather than face reconstruction. Eventually it will get so bad that insitu stabilisation will not be an option. However determining how long before this occurs is difficult to judge.

Whilst we would recommend repair at this stage, utilizing the erected scaffolding, we would not be too concerned if the implementation were delayed, say up to 5 years.

Assuming you would wish to act now (or in the future) we would advise the following course of action.

1) Determinate exact nature of composition of the wall.
   i.e.
   a) It is a *rubble* wall with two untied skins? Nature of inter skin.
   b) Is the flint facing to a solid brick/clay lump backing wall?

   The outcome of these investigations will determine the final nature of remediation and ease with which it can be executed.

   We would advise the appointment of a specialist contractor well versed with such works. We envisage that the preference would be for *secret* repairs, so there is no visual evidence of the remediation. In these circumstances the wide spread use of Helifix products (or similar) is envisaged.

3.0 Continued...

2) Window (W2)

If you are uncomfortable with the loss of alignment then the flat arch needs to be removed and rebuilt. If not insitu stabilisation could be adopted.

It would probably be prudent to undertake the same strengthening whether rebuilt or retained.

We envisage a *best possible* implementation of Helifix method statement LR03 or LR04 (selection of dry fix/cemtie to be determined by specialist). There is insufficient anchorage length to the left hand side of the aperture to meet guidance but experience shows with a modest opening width (880mm) an effective provision can be made.

We would envisage Helibar *pinning* the entire perimeter of window back to the *inner leaf/*backing wall at 225mm centres if this is technically possible with the wall materials found.

3) Window (W1) semi-circular 218mm long brick arch

We envisage the following work:

- If possible insert at most appropriate levels (i.e. easiest to achieve) two lines of 2No. 6mm Helibars (in nominal bed horizontal coursed beds of knapped flint) in accordance with LR03/LR04 guidance. All to *help* the arch and remediate minor cracking to above the arch head.
  Vertical pinning cannot be undertaken into the flint.

- Helibar pin together 5No. broken bricks within arch.

- Helibar pinning to the perimeter (3No. sides) of the window back to the inner leaf/backing wall at 225mm centres.

4) Wall Panel

If technically possible install Helifix remedial ties between front leaf and inner leaf/back wall at staggered broadly 450mm centres in both directions.

3.0 Continued...

If this proves to be unfeasible revert to traditional through ties with steel pattress plate. Internal plates to be cut into the finished/wall in order to be disguised. Externally 200mm Ø cast iron load spreader plate.

7No. traditional ties in total as depicted on SK1 and in section on SK2.

You will appreciate the final nature of the remediation will be determined by the results of the initial exploration to establish the exact composition of the walls.

We can supply contacts for the specialist *Helifix* contractors.

We should be pleases to discuss any matter arising.

Yours faithfully

Simon J. Riley, BSc (Hons), C.Eng, MICE
Senior Director
For and on behalf of Plandescil Ltd
Encs

Photo 01 – Window W1 from inside

Photo 04 – Window W1 from inside

Photo 21 – Window W1 from inside

Photo 05 – W2 and W1 from north side externally

Photo 26 – W2 and W1 from courtyard

Photo 32 – Heads of W1 and W2 from outside

Photo 35 – Head of W2

Photo 036 – Head of W2

Photo 37 – Reveal of W2

Photo 52 – Wall below W2

Photo 39 – W1 head from west

Photo 41 – Head of W1

Photo 50 – Soffit to W1 arch

Photo 51 – Cill of W1 alongside flat roof to single story section

Plandescil..

Job No
25115

Swaffham Town Hall.

Location of subject window (Scale 1:1250)

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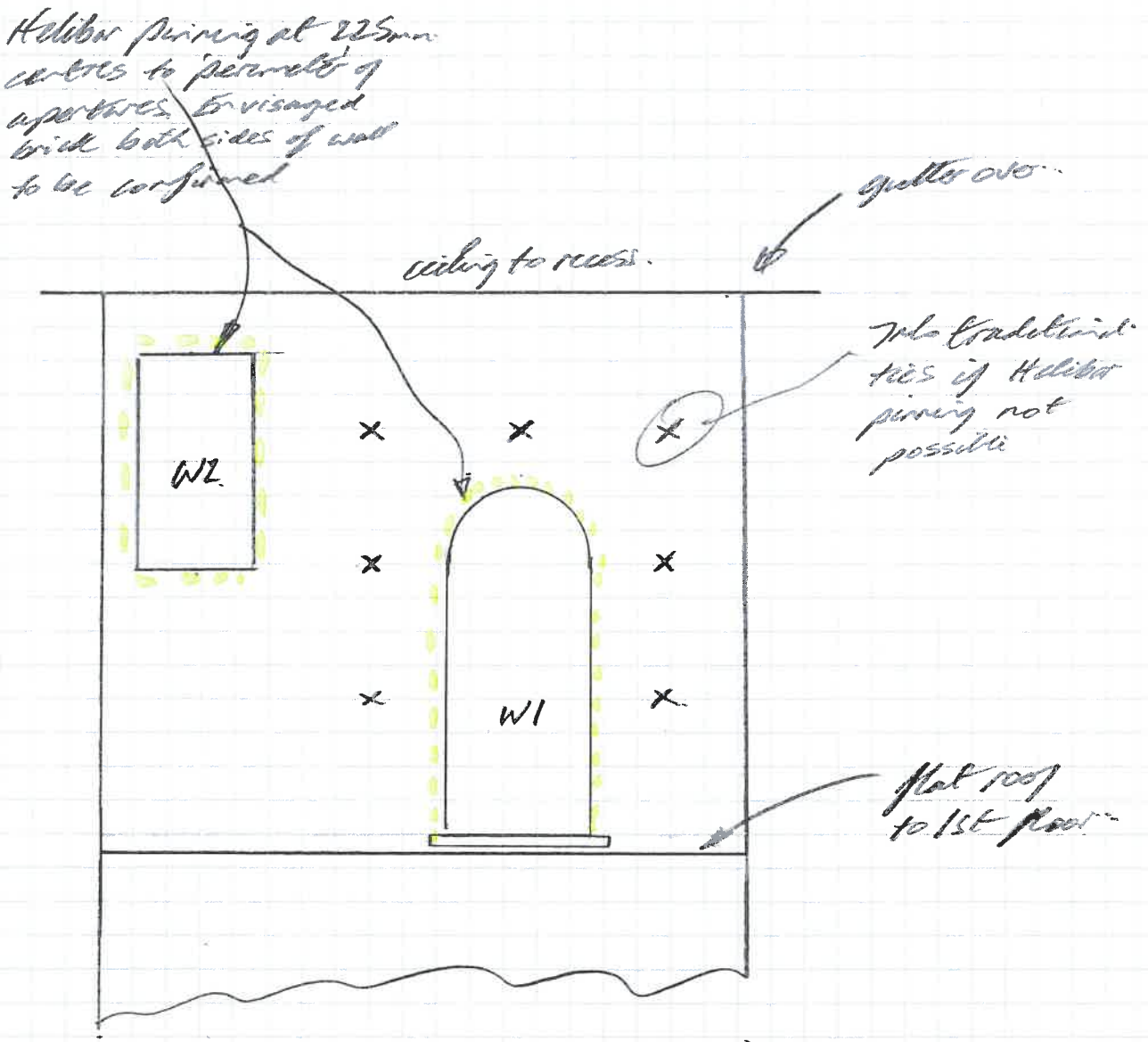
Swaffham Town Hall.
West wall by stairs..



SCHEMATIC ELEVATION
ON EXTERNAL PORTION
OF WALL.. (≈ 1:50)

				REVISIONS
DATE 18/7/19	JOB No. 25115.	COMPILED BY SJR.	Q.A. CHECK SR	SHEET No. SK1..

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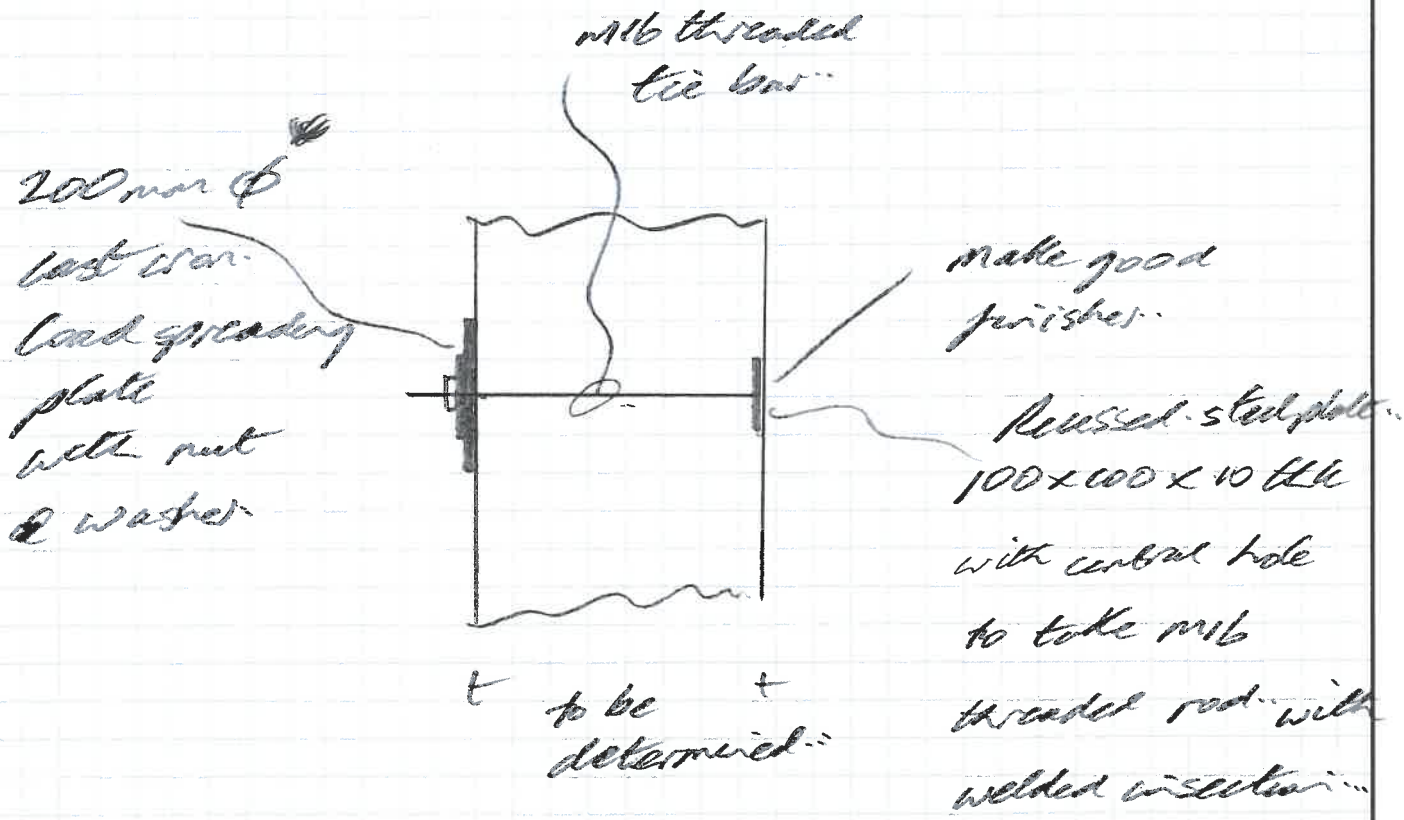
Swaffham Town Hall
West wall by stairs..



TYPICAL SECTION ON TRADITIONAL TIE ROD PROVISION (IF NEEDED)..

* Cast iron plate available from East Coast Casting Carbrooke.. 01953 881741..

					REVISIONS
DATE 18/7/19	JOB No. 25115	COMPILED BY STR..	Q.A. CHECK SAV..		SHEET No. SK2

LR03 Repair of Failed Soldier Course Lintels using HeliBars and CemTies

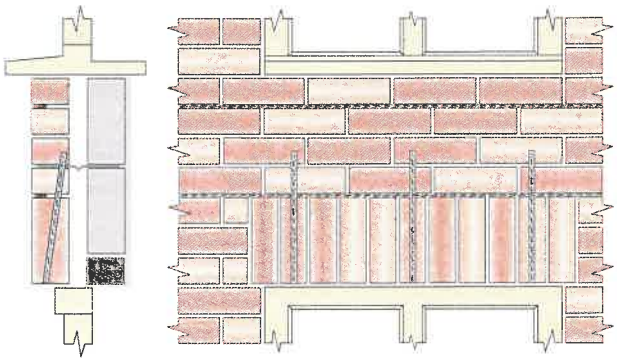
METHOD STATEMENT

1. Using a twin-bladed, diamond-tipped wall chaser with vacuum attachment followed by a hand or power chisel, cut slots into the horizontal mortar joints to the specified depth and at the required vertical spacing. Ensure that NO mortar is left attached to the exposed brick surfaces in order to provide a good masonry/grout bond.
2. Mark the positions for the CemTie holes on the underside of the soldier course.
3. Drill 14mm clearance holes (16mm if the CemTie is longer than 450mm) at the required angle and to the specified depth. The angle of drilling should be such that the hole will pass behind the lower HeliBars (when installed) and penetrate at least 50mm into the course of masonry above the reinforcement.
4. Remove ALL dust and mortar from the slots and holes and thoroughly flush with water. Where the substrate is very porous or flushing with water is inappropriate, use HeliPrimer WB. Ensure the slot and holes are damp or primed prior to commencing steps 7 and 15.
5. Mix HeliBond cementitious grout with a power mixer and load into the Helifix Pointing Gun HD.
6. Fit the appropriate mortar nozzle.
7. Inject a bead of HeliBond grout, approx. 15mm deep, into the back of the slot.
8. Push the first 6mm HeliBar into the grout to obtain good coverage.
9. Inject a second bead of HeliBond grout over the exposed HeliBar.
10. Push the second 6mm HeliBar into the grout to obtain good coverage.
11. Inject a third bead of HeliBond grout over the exposed HeliBar and iron it into the slot using a finger trowel. Inject additional HeliBond grout as necessary leaving 10-15mm for new pointing.
12. Repeat steps 7 to 11 for the lower slot.
13. Attach the required length of CemTie pinning nozzle to the gun and pump grout to fill the nozzle.
14. Wind the CemTie into the nozzle and ensure that it is fully covered in grout.
15. Insert the nozzle to the full depth of the drilled hole and pump the grout.
16. Make good the CemTie holes and point up the remaining slots with a suitable matching mortar and weather-proof any cracks with an approved Helifix bonding agent e.g. HeliBond or CrackBond depending on the width of the crack. Make good the surface or leave ready for any decoration.
17. Clean tools with clean, fresh water.

N.B. Pointing may be carried out as soon as is convenient after the HeliBond has started to gel.

This repair is to be undertaken by a Helifix Approved Installer only.

HELIFIX APPROVED INSTALLER



RECOMMENDED TOOLING

For cutting slots up to 40mm deep ..... Twin bladed cutter with vacuum attachment

To achieve final depth of slot beyond 40mm ..... Hand or power chisel

For drilling ..... SDS rotary hammer drill 650/700w

For mixing HeliBond ..... 3-jaw-chuck drill with mixing paddle

For injection of HeliBond into slots ..... Helifix Pointing Gun CS with mortar nozzle

For insertion of CemTies ..... Helifix Pointing Gun HD with pinning nozzle

For smoothing pointing ..... Standard finger trowel

Specification Notes

The following criteria are to be used unless specified otherwise:

A. Depth of slot into the masonry to be 40mm to 55mm.

B. Height of slot to be equal to full mortar joint height, with a minimum of 8mm. For thin mortar joint specifications refer to the Helifix Technical Dept.

C. Top and bottom reinforcements should be positioned as far apart as practicable, up to a maximum distance equivalent to 12 brick courses (approx. 900mm). The upper course should be reinforced first.

D. HeliBar to be long enough to extend a minimum of 500mm beyond each side of the opening.

E. Any fractures in the masonry within the 'beam zone' MUST be stabilised by Crack Stitching, injecting CrackBond TE or replacement of the masonry.

F. Depth of hole to be CemTie length +25mm.

G. Any missing or very poor quality masonry MUST be replaced.

H. If existing wall ties are defective in any way additional Helifix remedial ties should be installed.

I. In hot conditions ensure the masonry is well wetted or primed to prevent premature curing of the HeliBond due to rapid de-watering. Ideally additional wetting of the holes and slots, or priming with HeliPrimer WB, should be carried out just prior to injecting the HeliBond grout.

J. Do not use HeliBond when the air temperature is +4°C and falling or apply over ice. In all instances the holes and slots must be thoroughly damp or primed prior to injection of the HeliBond grout.

The above specification notes are for general guidance only and Helifix reserves the right to amend details/notes as necessary.

GENERAL NOTES

If your application differs from this repair detail or you require specific advice on your particular project, call the Helifix Technical Sales Team on **020 8735 5222**. Our Technical Department can provide you with a full support service including:

- Advice, assistance and recommendations on all structural repair matters
- Devising and preparing complete repair proposals for specific situations
- An insurance-backed warranty via our Approved Installers scheme

LR04 Repair of Failed Soldier Course Lintels using HeliBars and DryFix

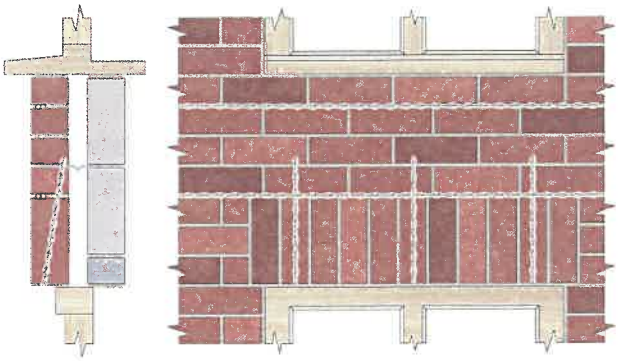
METHOD STATEMENT

1. Using a twin-bladed, diamond-tipped wall chaser with vacuum attachment followed by a hand or power chisel, cut slots into the horizontal mortar joints to the specified depth and at the required vertical spacing. Ensure that NO mortar is left attached to the exposed brick surfaces in order to provide a good masonry/grout bond.
2. Mark the positions for the DryFix pilot holes on the underside of the soldier course.
3. Drill 6mm pilot holes (this may need adjusting depending on the strength of the masonry), at the required angle and to the specified depth, using a rotary percussion, 3-jaw chuck drill. The angle of drilling should be such that the hole will pass behind the lower HeliBars (when installed) and penetrate at least 50mm into the course of masonry above the reinforcement.
4. Remove ALL dust and mortar from the slots and holes and thoroughly flush with water. Where the substrate is very porous or flushing with water is inappropriate, use HeliPrimer WB. Ensure the slot and holes are damp or primed prior to commencing step 7.
5. Mix HeliBond cementitious grout using a power mixer and load into the Helifix Pointing Gun CS.
6. Fit the appropriate mortar nozzle.
7. Inject a bead of HeliBond grout, approx. 15mm deep, into the back of the slot.
8. Push the first 6mm HeliBar into the grout to obtain good coverage.
9. Inject a second bead of HeliBond grout over the exposed HeliBar.
10. Push the second 6mm HeliBar into the grout to obtain good coverage.
11. Inject a third bead of HeliBond grout over the exposed HeliBar and iron it into the slot using a finger trowel. Inject additional HeliBond grout as necessary leaving 10-15mm for new pointing.
12. Install the DryFix ties into the pre-drilled pilot holes using a DryFix Power Driver Attachment fitted to an SDS hammer drill.
13. Repeat steps 6 to 10 for the installation of the HeliBar in the lower slot.
14. Make good the DryFix holes, point up the remaining slots with a suitable matching mortar and weather-proof any cracks with an appropriate Helifix bonding agent e.g. HeliBond or CrackBond depending on the width of the crack, and make good the surface or leave ready for any decoration.
15. Clean HeliBond tools with clean, fresh water and resin tools with a suitable solvent.

N.B. Pointing may be carried out as soon as is convenient after the HeliBond has started to gel.

This repair is to be undertaken by a Helifix Approved Installer only.

HELIFIX APPROVED INSTALLER



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For installation of DryFix ..... DryFix Power Driver Attachment

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I. Do not use HeliBond when the air temperature is +4°C and falling or apply over ice. In all instances the slot must be thoroughly damp or primed prior to injection of the HeliBond grout.

The above specification notes are for general guidance only and Helifix reserves the right to amend details/notes as necessary.

GENERAL NOTES

If your application differs from this repair detail or you require specific advice on your particular project, call the Helifix Technical Sales Team on **020 8735 5222**. Our Technical Department can provide you with a full support service including:

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- Devising and preparing complete repair proposals for specific situations
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7.4

Town Hall – Telephone system *(including Swaffham Museum)*

Background

BT are planning to shut off their traditional (ISDN and PSTN) phone lines, in favour of IP systems - VOIP and SIP – wef 2020.

The Basics

- **PSTN - Public Switched Technology Network** - a traditional landline setup you may be familiar with and may currently have in your business.
- **ISDN - Integrated Services Digital Network - a** digital phone system that uses a traditional PSTN network.

Old systems now

- **IP technology** - IP stands for Internet Protocol. There are two main types of IP phone system.
  - **VOIP - Voice Over Internet Protocol** - makes and receives phone calls over the internet. This is the most common IP system.
  - **SIP - Session Initiation Protocol** - Rather than just sending voice data like the VOIP phone system, SIP will send and receive any multimedia data - such as video calls.

In technical terms, IP systems work by turning analogue voice into digital signals that are then transferred through the internet - *calls are routed through the internet rather than fixed*

Aim

We need to swap out our current system for a VOIP or Cloud system or look elsewhere for an alternative solution asap.- Town Hall & Museum:

1. Move to new internet based systems – monthly outlay
2. Set up costs – including new handsets

Benefits	Concerns
Cheaper Costs - As calls are routed through the internet, rather than traditional copper lines, this reduces the cost of the calls. Installation charges and maintenance are also relatively cheap for this type of system. **Improved Flexibility -** Not being restricted to fixed lines means you can make and take calls whenever you need to with your business phone system. If you have staff who work in a different location, or work from home, you can all still stay connected through one central phone system.	• The Cloud system is totally reliant on our internet connection. •

Specification:

Phone Lines & handsets:

a. 01760721230 – Swaffham Heritage
   1. Tourist Information Centre - shop
b. 01760722922 – main office line
   1. Richard 2. Claire 3. Hannah 4. Kerry 5. Sue/Ruth 6. Graham 7. Room 3 8. Chamber room

Incudes 2 extra handsets – Graham & Room 3

Quotes

The following quotes have been obtained for consideration:

***Current Costs** - Immervox – broadband, telephone lines etc - **£95.69** p/m plus calls*		
1. Move to VOIP	**Cloud**	**2. Set up** - costs one off
Immervox		
9 x iVox IP Telephony - subscription 1 x iVox Broadband – voice broadband 1 x iVox Telephony - Premium Analogue **£151.05 per month**	Don't do	9 x iVox Voice Equipment - Horizon - Handset - Polycom VVX411 1 x iVox Voice Equipment - Horizon - Delivery Band 1 1 x iVox Broadband - Assured - Activation & Router – 1 x iVox Data Equipment - Netgear 16 port POE switch 2 x Porting of your existing ISDN services **£708.77**
Convergence Communications, Ely – Lee Harrison		
Cloud server located on premise x1 16 port POE Switch x1 managed router x9 Business Licenses for all users x9 HD display WP480G colour handsets x1 full installation x1 full user and administration training **£120.00 per month** 3-year term (owned by Swaffham Town Council after this period) *For outright purchase price of* ***£3,595.00+Vat*** **PLUS –** **Monthly services** x1 FTTC converged high speed internet circuit (60-80 Mbps Downstream & 17-20 Upstream) x3 SIP lines which include local, national and UK mobile calls 1x PSTN Analogue line to support circuit 1x inclusive maintenance support **£100.00 per month**	1 x FTTC Circuit for Internet & Cloud Assured connection (60-80Mbps downstream 17-20 Mbps Upstream) 1 x line rental 9 x Cloud User profiles 9 x Polycom VVX411 IP HD Handsets 9 x Mobile Apps 1 x All Local, national and UK mobile calls 1 x TP Link router 9 x AC Adaptors 1 x Installation 1 x Porting of multiple existing number 1 x Delivery 1 x Full Ongoing support **£164.50 per month** **(3 year contract)**	(no upfront fees)
8x8 UK		
Don't do	1 x 8x8 Implementation Starter 9 x Series - X1 1 x Base Number 9 x Polycom VVX 201 handsets 9 x Polycom Power Supply for **£90.00 per month**	**£54.00 – delivery charge**
Network Telecom		
Booked in to visit 28/6 – if we want a further comparison		
BT – Cloud		
Awaiting quote		

Recommendation

An onsite visit is needed by any agreed provider – to agree exact requirements, ensure no hidden costs etc

GETVOIP | Cloud Communication Advisor

The Best Business VoIP Phone Providers of 2019

We've researched over 200 business VoIP phone systems, and filtered out the best providers on their reliability, customer service, features, customer reviews, and pricing. Compare our top picks below.

PROVIDER	FEATURES	MONEY BACK	REVIEWS	MORE DETAILS
#1 BEST RATED 8x8	**8x8 X Series Transforms the Customer Experience** ✓ Voice, Text, Web Conferencing & Mobile Apps ✓ Unlimited Calling Plans with Flexible Pricing ✓ Simple Administration + First Month Free	Cancel Anytime. Terms Apply	4.9 READ REVIEWS	Get Pricing >
RingCentral	**The Leader in Cloud Communications** ✓ New Customer Promo - Save 38% Annually ✓ Integrates Seamlessly with 100+ Apps ✓ All-in-one Voice, Video & Team Messaging	30 days. Cancel anytime.	4.6 READ REVIEWS	Get Pricing >
Vonage Business	**UKs Trusted Leader in Cloud Communications** ✓ Conferencing, App, CRM Integration and More ✓ Unlimited Calls to UK Landlines & Mobiles - £16/mo ✓ Mix-n-Match Plans from £9/mo Per Your Usage	N/A, 24/7 complete care package	4.5 READ REVIEWS	Get Pricing >
BT	**Flexible, Agile and Powerful Call Management** ✓ 24/7 Dedicated Helpdesk Support ✓ Recieve Calls on One Number From Anywhere ✓ Feature-Rich System For Mobile Workers	30 days, full refund	4.1 READ REVIEWS	Get Pricing >