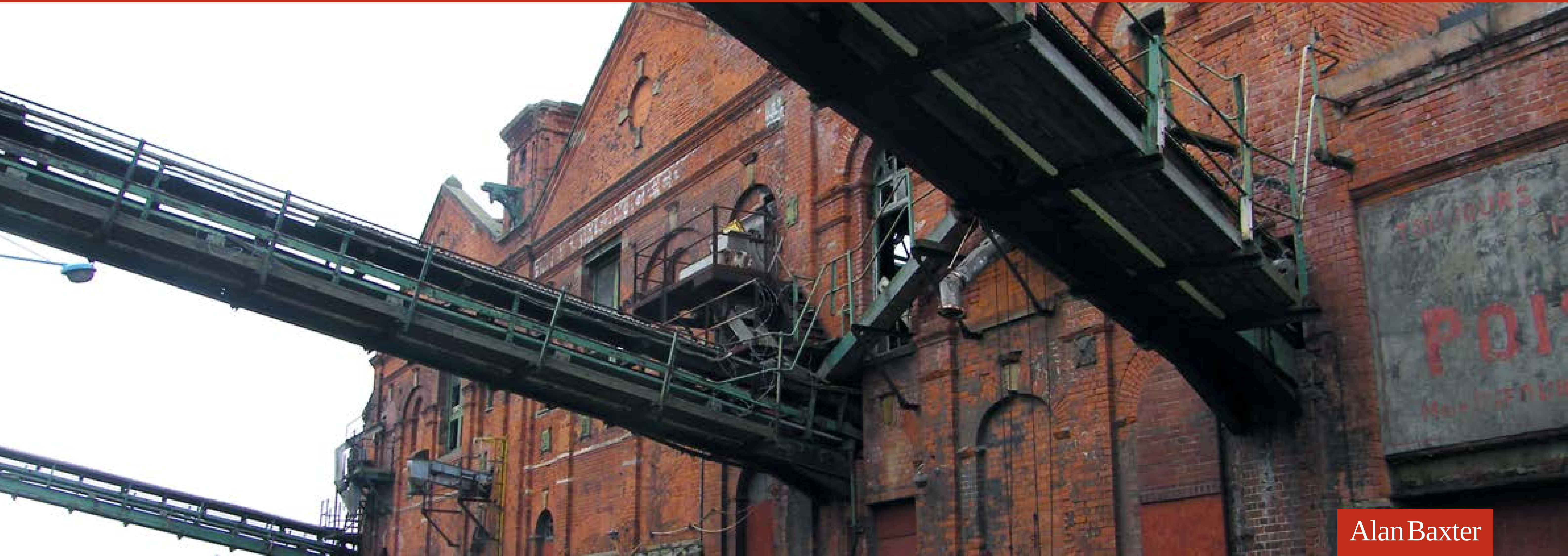
Ice Factory, Grimsby
Appraisal of Existing Structure

by Alan Baxter & Associates LLP
with Richard Griffiths Architects
and KMCS (Cost Consultant)

February 2010



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1.0 Summary

Structure

1.1 The Ice Factory comprises two main buildings built in 1900/1901 and 1907/1910. There is a small 1950s extension to the first building. The buildings are Listed Grade II*.

1.2 The structure to these buildings is typical of industrial buildings of their time with loadbearing brickwork walls and internal steel columns supporting steel and timber roofs and floors.

The form of the structure, however, is very particular to the purpose of the buildings, that is, to manufacture very large pieces of ice for the fishing industry.

In places the structure to the building forms a part of the structure to the machine/workings of the ice making process.

1.3 The buildings are large and are typically around 10m high with some areas extending a little below ground level. Some spaces have a full 10m clear height and others comprise of three storeys, e.g. two storeys of ice making over an undercroft for the distribution of services.

1.4 It appears that the original design and construction of the structure was of a reasonable quality producing some robust structures, necessary for the heavy duty manufacturing process carried out within the buildings.

1.5 The foundations generally appear to have performed well to date although in one corner of the 1907/1910 building the pattern of cracking in the brickwork wall suggests there may have been some differential settlement of the foundation. At present little is known about the form of the foundations, though given the poor ground conditions illustrated on the local geology maps and boreholes obtained from the British Geological Society it seems likely the foundations are supported on timber piles.

1.6 As the ice making process has developed throughout the working life of these buildings there has been a need for some alterations to the structure though these do not appear to have been of major structural significance.

1.7 These buildings have not been maintained in any form for many years, probably well in excess of the 20 years since they fell into disuse. Rainwater is cascading through the buildings from top to bottom.

1.8 Overall, and mostly as a result of the total lack of maintenance, combined with the aggressive environment created in the buildings from the manufacture of ice involving huge volumes of water moving around the buildings, the structure is now in a very poor state indeed.

1.9 In terms of a normal lifecycle for buildings of this nature, these buildings have missed their last two major overhauls and are now degrading at a rapidly increasing rate.

1.10 The following notes describe the above in greater detail together with proposals for the likely remedial works required to try to address the obvious defects in the structure, all in accordance with the Scope of Works set out by the NELC.

1.11 It does appear as if the basic structure to the buildings can be mostly retained though there is some extensive repair and improvements required.

1.12 A Conservation Statement is required to complement this study and help to understand what is historically important about these buildings, and to establish a clear and proper interpretation of their cultural value.

1.13 Refer also to the later sections on the fabric of the building by the Architect, Richard Griffiths Architects, and the cost estimates for the likely works by the Quantity Surveyor, KMCS.

1.14 The basic estimated cost by KMCS of the three options discussed with NELC are:

(C)	To bring the buildings to a re-usable standard	£4.75M
(B)	A reduced version of (C)	£3.5M
(A)	Temporary Protection with some Urgent Structural Repairs	£1.5M

Refer to Section 11.0 for further cost information.

2.0
Introduction

2.1 Alan Baxter & Associates LLP (ABA) have been instructed by North East Lincolnshire Council (NELC) to lead a team of consultants to carry out an appraisal of the existing structure, all in accordance with the submission to NELC dated 26.06.09, the Approach and Methodology submitted on 30.07.09 and discussions with NELC on 17.09.09, 14.01.10 and 27.01.10.

2.2 The others in the team of consultants are:

Richard Griffiths Architects (RGA)
and
KMCS (Quantity Surveyors)

2.3 The following report is a summary of our appraisal and comprises three main elements:

(i) Structure to the building By ABA

(ii) Fabric of the building By RGA

(iii) Cost Estimate of proposed works By KMCS

It is based on our desk top research, together with what we are able to see from our visits to the building on 17/09/09 and 14/01/10 and the output from workshops held at ABA's offices with the consultant team, and with the client.

2.4 Access to the building has kindly been provided by Associated British Ports (ABP) though internally access is severely restricted due to the unsafe nature of the floor structures in many places.

View from Gorton Street

3.0
History of the building and the Site

3.1 The Ice Factory comprises of two main buildings separated by a railway line (no longer in use and covered over). The main building to the south of the old railway was built in 1900/1901 by The Grimsby Ice Company and was the largest of all the ice factories in the town.

3.2 The Factory was extended in 1907/1910 with the construction of the building to the north of the old railway line.

3.3 In 1930/1933 the Factory was modernised with the old steam driven plant replaced with electricity driven plant. This apparently affected the machinery and its fittings more than its fabric. As part of this work the original boiler house chimney was demolished though its base remains.

3.4 In the early 1950s the original Factory was extended to incorporate a new compressor room, together with other alterations to the ice stores.

3.5 The Ice Factory closed in 1990 and has not been in use since.

3.6 The buildings were listed grade II* on 12 September 1990. A copy of the listing is enclosed in Appendix A.

View from Fish Dock Road

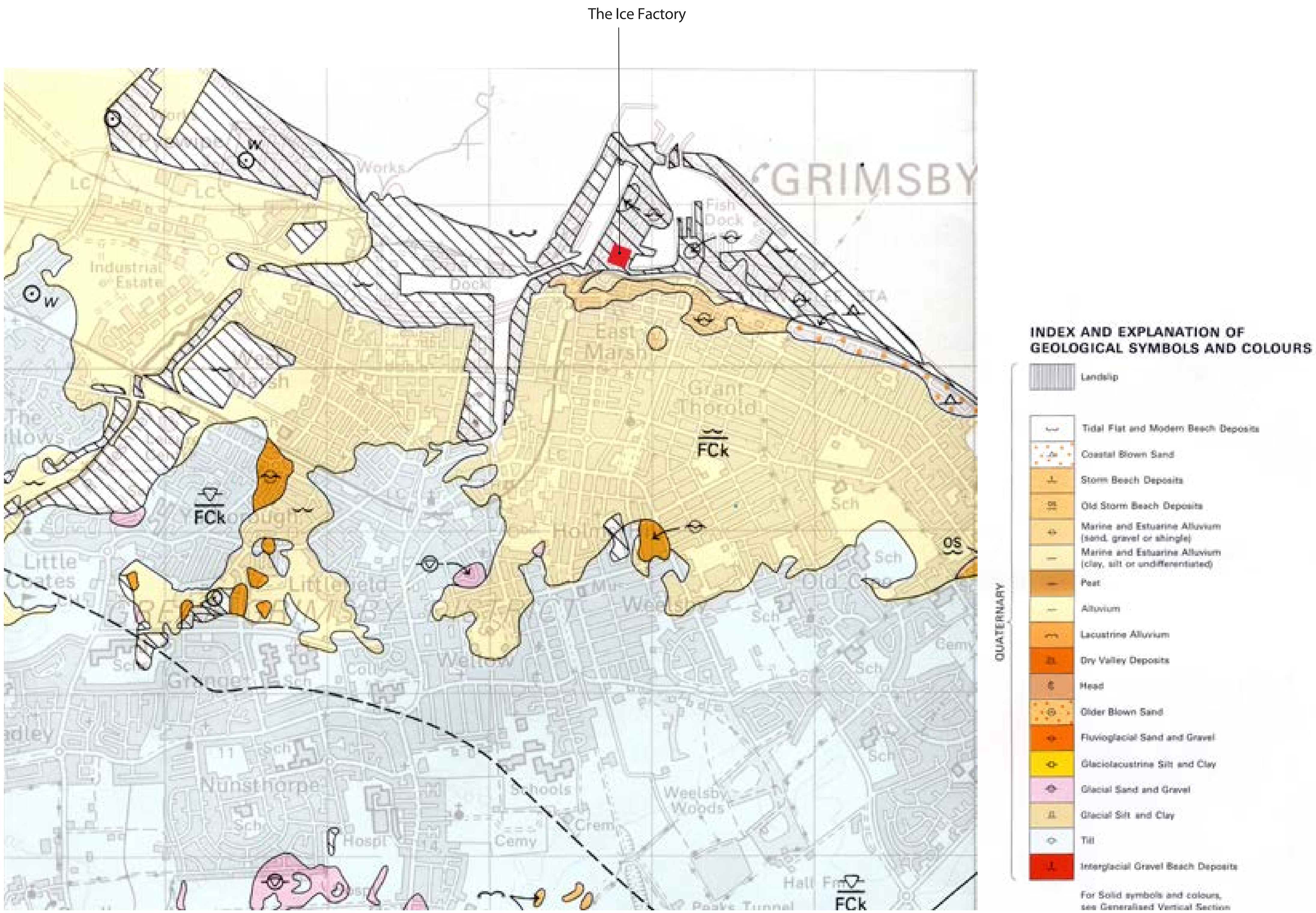
Aerial view

Recent aerial photo

1905

4.0 Geology

4.1 The geology map of this area shows the majority of the dock built on 'landslip' over Alluvium over sands and gravels.

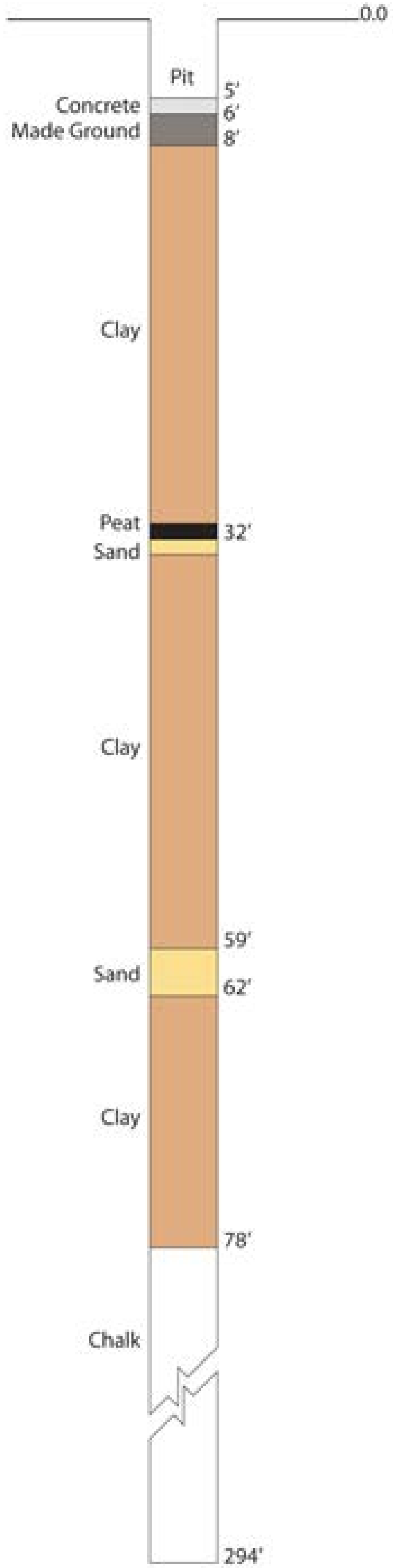


Geology map

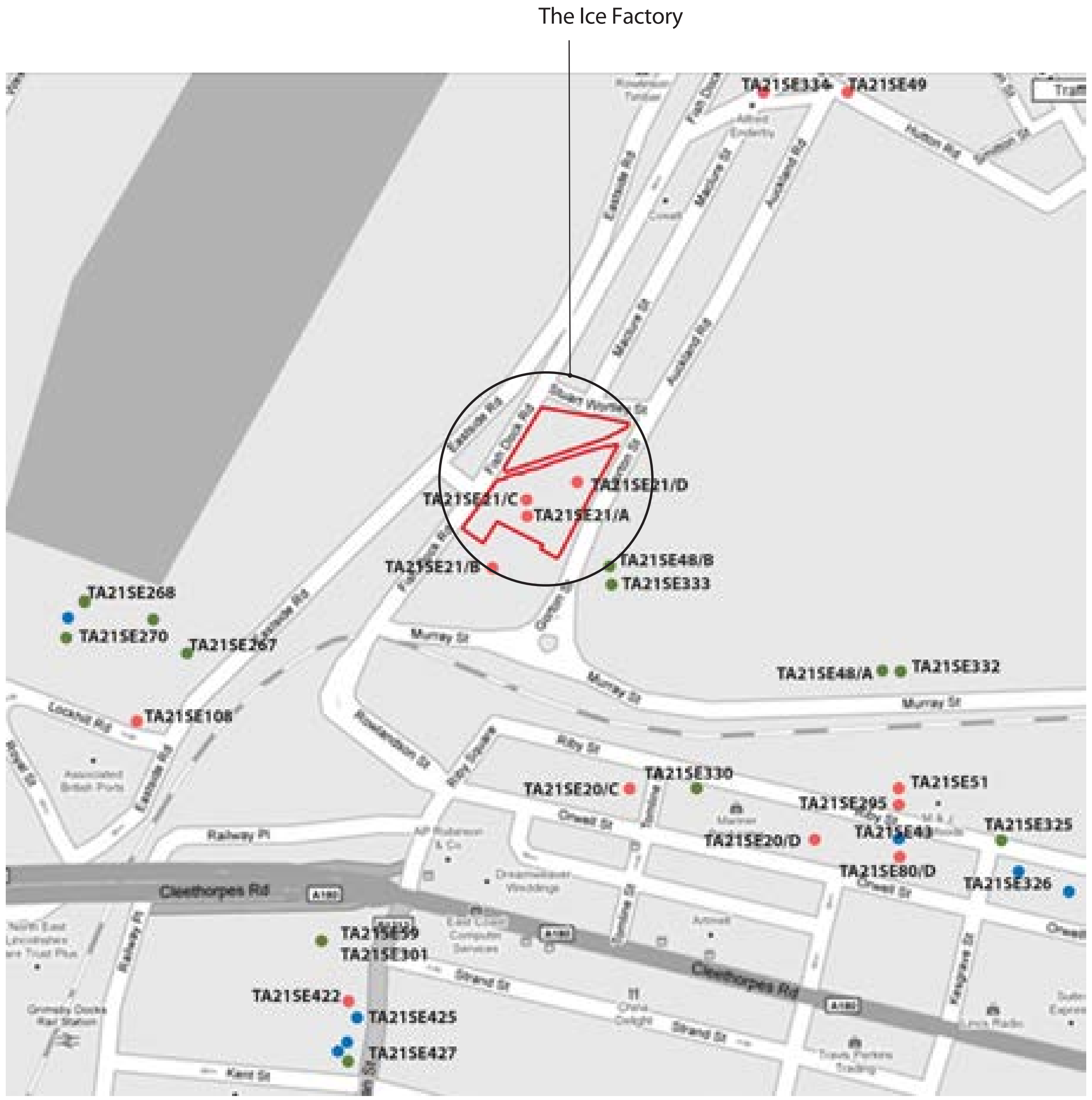
4.2 Boreholes obtained from the British Geological Society show the site to be underlain by made ground over soft silt, peat and clay with some thin layers of sand, over chalk which is found around 80ft (24mm) below ground level.

4.3 No details of the foundations to the Ice Factory have been obtained, but it is documented that the Grimsby Dock Tower built in 1851 is founded on timber piles probably driven into the clay. It seems likely that the Ice Factory is also supported on timber piles.

4.4 Boreholes from 1925 showed a depth to ground water of around 15ft (4.57m), whereas in 1950 the depth is shown as 21ft (6.4m) and from 1981 a depth of around 10ft (3m) is recorded.



BGIS Borehole Ref TA21/64A or Ref TA21SE/21A from the Ice Factory engine house

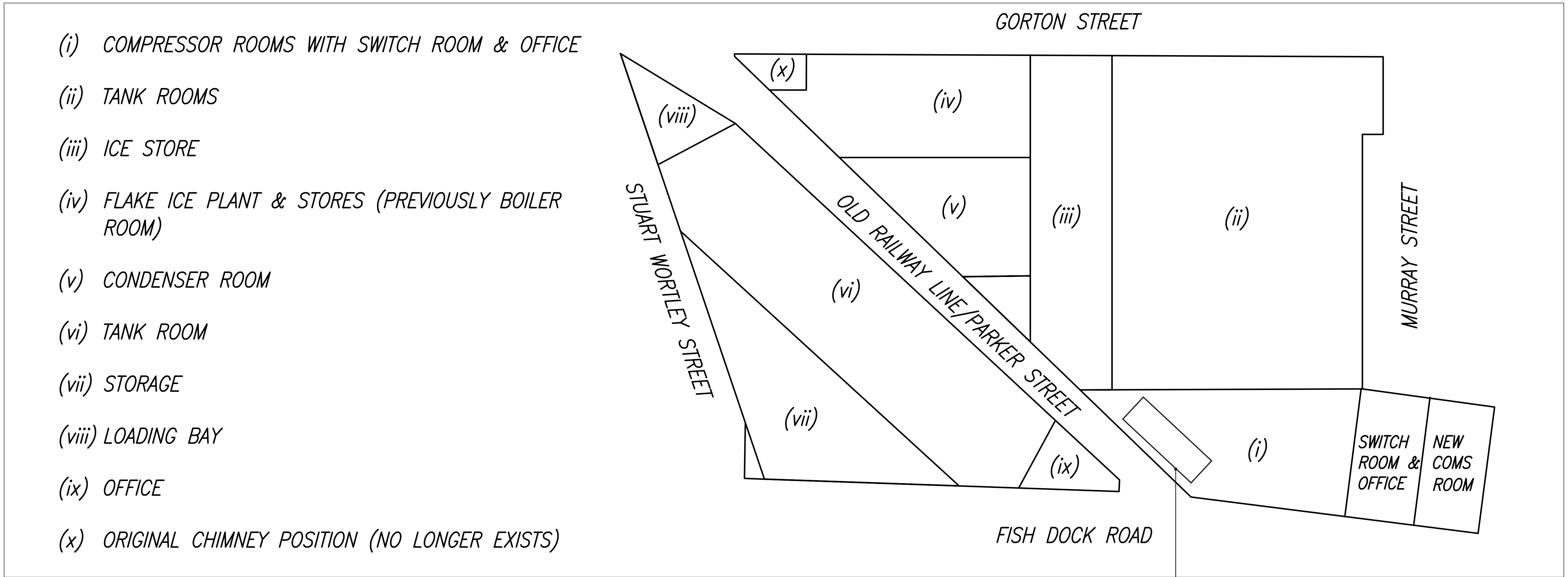


BGIS Borehole location plan

Alan Baxter

5.0
Form of Existing Structure

5.1 These buildings comprise of fairly conventional late 19th early 20th Century industrial structures forming such spaces as a boiler house, compressor rooms, switch rooms and offices e.g. areas (i), (iv), (v) and (ix), all there to support the principal parts of the building where the ice was manufactured or stored, ie areas (ii), (iii), (vi) and vii). In these ice-making areas the structure forms part of the machinery used to make the ice, and also supports the casing/envelope to the machines, ie the roof and walls.



Key plan

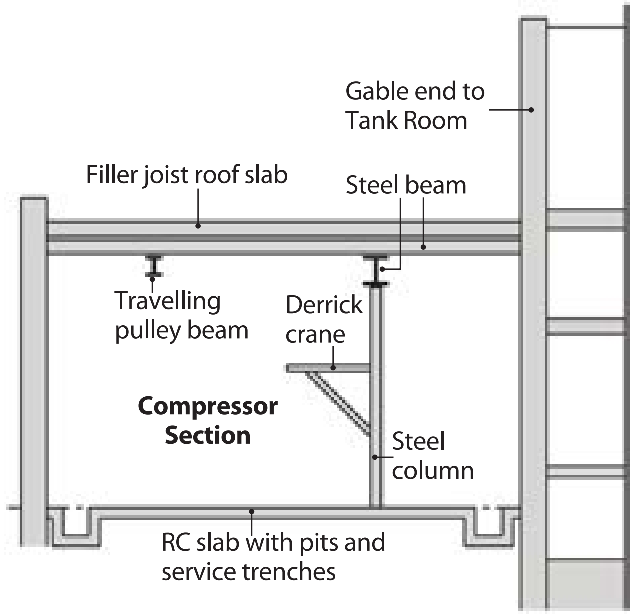
(i) Compressor House, Switch Room and Office:

The original compressor house comprises a tall single storey space around 9 metres high, with solid load bearing brick walls supporting steel roof beams and a concrete filler and steel joist flat roof. The longer spanning roof beams are propped off 3 steel columns towards one side of the room. These columns also support derrick cranes for servicing the compressors in the room.

The ground floor is of solid, probably reinforced concrete construction with numerous services trenches/pits incorporated into the slab. It is likely that the very heavy condenser plant is fixed down to thick reinforced concrete plinths as part of the slab.

Next to this space is the 1950s extension comprising of a switch room with an office at first floor level, and then another double storey height condenser room. The pitched roof over the office appears to be of timber ceiling joists and rafters supported on steel beams, and the first floor comprises of a filler joist floor slab spanning between steel beams. The new condenser room roof appears to be of in-situ reinforced concrete slab spanning between steel beams. The steel beams are supported on steel columns built into the brickwork side walls.

A large water tank is suspended above the roof of the original condenser room on a steel frame which spans between the loadbearing walls at roof level.



Typical section through Compressor Room


Original Compressor Room


Compressor Room roof


Services trench in ground floor


1950s Compressor Room


Water tank on roof

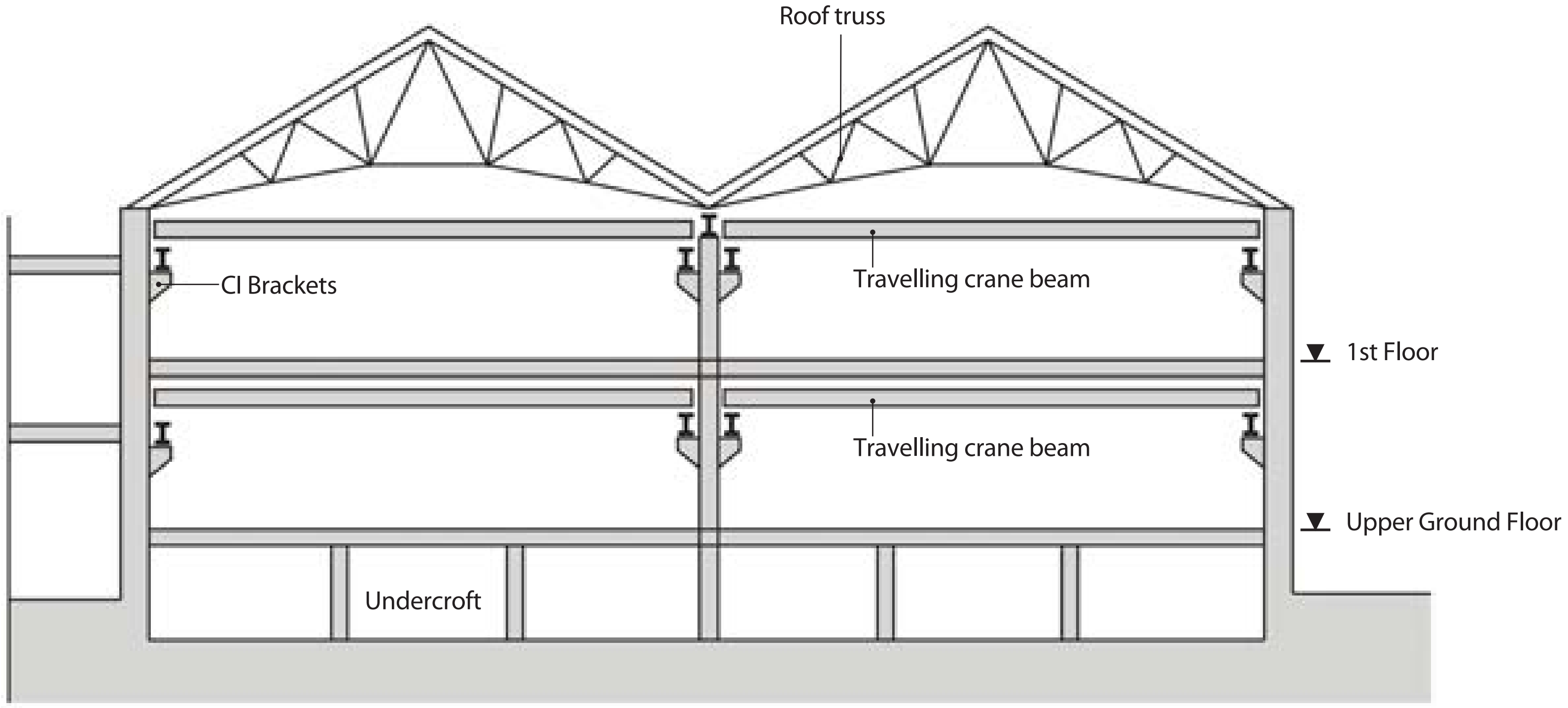
(ii) Tank Rooms:

This is the main part of the original 1900 building and comprises of two floors of ice making machinery over a semi-basement undercroft, all contained within an external loadbearing brickwork, and internal steel framed structure.

Access is severely limited for safety reasons with no access available to the undercroft.

The structure to the two bay building comprises steel roof trusses supporting timber purlins, timber boards and slates, spanning between piers in the brickwork side walls and a row of steel columns on the line of the central valley.

There is a small brickwork tower at the east end of the tank rooms which appears to be supported, in part off the steel frame.



Typical section through 1900/1901 Tank Rooms

1st floor Tank Room

Some equipment remains in Tank Room

Internal column support to travelling crane brackets

The two floors of ice making equipment are supported off a grillage of steel beams spanning between the side walls, the central row of steel columns, and two further rows of columns in each bay of the building in the undercroft.

Travelling cranes span clear across each bay above both the two floors of ice making equipment, supported off cast iron brackets attached to the piers in the brickwork side walls and the central row of steel columns. The cast iron brackets on the piers are fixed through the brickwork to external plates.

(iii) Ice Store:

This part of the building comprises of a three storey external loadbearing brickwork wall supporting a flat roof of steel beams with probably a filler joist slab. It has also been converted for ice making and so contains travelling cranes and ice making equipment on the upper two storeys. The semi basement/undercroft is currently a storeroom full of fridges/freezers and was not accessible.

(iv) Flake Ice Plant (Previously Boiler House):

This single storey structure has loadbearing brickwork walls supporting a steel trussed roof with timber purlins, boards and slates.

Originally the boiler house had a tall brick chimney in the northernmost corner, but this was removed as part of the modernisation in the 1930s. It appears as if the base to this chimney remains.

Bracket support to travelling crane beam

Roof over Ice Store

Original Boiler House

External plates to crane beam brackets

View of 1907/1910 Tank Room roof

(v) Condenser Room/Stores:

These areas of the building are generally of two storeys with a basement/undercroft. Access was not possible to the basement. The floor and roof structures appear to be of filler joist construction supported on steel beams sprung between loadbearing brick walls.

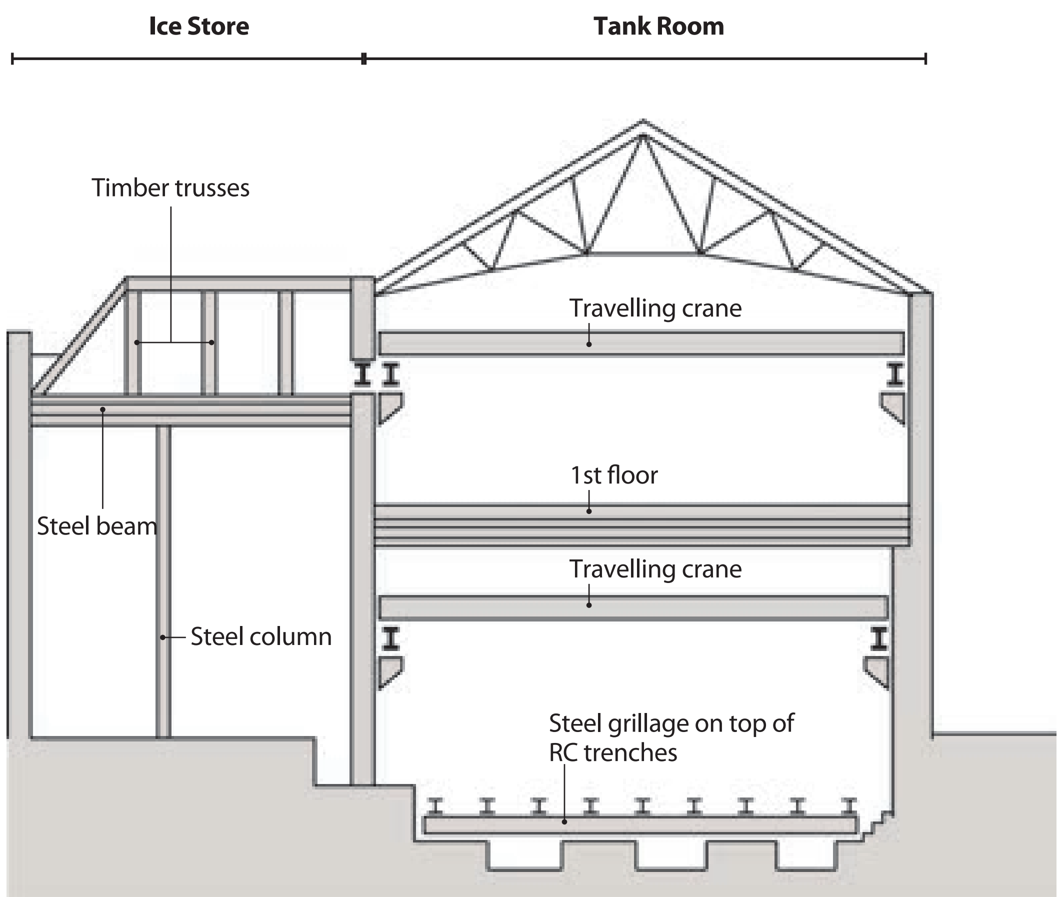
(vi) Tank Rooms:

This is the major part of the 1907/1910 extension and is of similar construction to the original tank room structure in 5.2(ii) above.

The building provided two storeys of ice making equipment supported by steel grillages at both the first floor and ground floor levels. Travelling crane beams to the first floor and the ground floor are both supported on one side by cast iron brackets in the piers to the solid loadbearing brick wall and on the other by brackets onto steel columns.

The lower level steel grillage is supported directly off the reinforced concrete ground floor. The floor is formed in such a way as to provide three trenches the full length of the building.

There is a small brickwork tower at the north end of the tank room which appears, at least in part, to be support off steel beams.



Typical section 1907/1910 Tank Room and Ice Store

1st floor 1907/1910 Tank Room

Ground floor steel grillage

Ground floor brench and foundations to brick pier

The roof comprises steel trusses spanning across the width of the building from the external loadbearing brickwork wall to the internal columns.

(vii) Ice Storage Area:

This is in effect a side extension to the Tank Rooms (vi) above forming a single very tall storey height space of over 10m.

The roof structure comprises timber trusses supporting timber purlins, rafters, boards and slates, spanning between steel valley beams supported over slender steel columns.

The ground floor appears to be timber boarded over steel beams possibly over an undercroft, but safe access here was not possible.

(viii) Loading Bay:

This area was not accessible but it looks as if the flat roof structure is possibly of steel filler joist construction on steel beams sprung between solid loadbearing brickwork walls.

(ix) Office:

At the west end of the tank room there is two floors of offices which appear to simply be an extension of the tank room structure with some partitions and false ceilings added to create the space.

5.2 There is a small pedestrian bridge between the 1900/1901 and the 1907/1910 buildings comprising of steel beams spanning between the external walls of each building with a timber boarded deck.

5.3 These are unusual buildings with some very large open spaces such as the store in the 1907/1910 building which has loadbearing brickwork walls of around 10m high.

The overall stability of the buildings appears to rely on the stiffness of the boarded roof structure and the floor structures to act as horizontal diaphragms tying together the walls.

Ice Store roof

Roof over end of Tank Room by Offices

Bridge between buildings

Base of internal columns between Tank Room and Ice Strore

Bridge between buildings

6.0
Obvious Defects in the Existing Structure

6.1 The four critical issues in assessing the overall condition of an existing structure are:

(i) The Quality of Original Design and Construction.

(ii) The Performance of its Foundations/the quality of the ground on which they are built.

(iii) Previous Alterations.

(iv) How well it has been maintained.

6.2 The Quality of Original Design and Construction:

From what we can see the original design and construction was generally of an above average quality for industrial buildings of this age, though the process of ice making with lots of water throughout the building and the abrasive nature of the ice making process created a fairly aggressive environment for both the exposed steel structure, and those steel elements built into the external walls and roof.

Surface corrosion and impact damage to steel beams

6.3 The Performance of its Foundations:

The BGIS boreholes indicate that the whole of the dock is underlain by a significant dept of soft material including peat, with the first layer of reasonable soil capable of supporting heavy structures such as the Ice Factory being the boulder clay at around 10m depth. It therefore seems likely that the foundations to the Ice factory are on driven timber piles.

There are many cracks in the loadbearing brickwork walls though these generally seem to be related to problems associated with the corrosion of steelwork built into the walls, thermal movements of the uninsulated roofs and not obviously to do with movement of the foundations.

The one area where the cracks in the walls may be related to differential settlement of the foundations is the north western end of the 1907/1910 building where there is a crack almost full height of the walls, and appears to be wider at the top than at the bottom. This is in the corner of the Ice Store.

Generally the existing foundations appear to have performed reasonably well to date.

6.4 Previous Alterations:

As with any industrial building housing a process over many years the repeated updating of the process generally involves some alteration to the structure and this is the case here in the Ice Factory. Overall, however, these alterations do not appear to have significantly affected the existing structure.

6.5 Maintenance of the Structure:

From the state of the buildings it is clear that they have not received any maintenance for many years probably from way before 1990 when the buildings were last in use. Large areas of the roof coverings have been removed, or have collapsed and are now in such a poor state, that rainwater is cascading top to bottom through the buildings.

This, together with the aggressive environment generated by the water based use of the building, has led to some extensive and significant degradation of the structure.

The most obvious factor in the degradation of the internal structure over time is naturally the prolonged exposure of the timber and steel structure to water as a result of the ice making production, leading to corrosion of the steelwork and wet rot in the timber structure. Several steel beams have also suffered from repeated collisions with other heavy metal items. This was

Cracked brickwork in Ice Store

Cracked brickwork in Compressor Room

Cracks in parapet walls

Roof to 1900/1901 Tank Room

Physical and corrosion damage to steelwork visible in beams over large openings in the external walls, and also internally where the movement of large steel items (eg cans for the ice making) clearly resulted in a lot of physical clashes with some of the structure.

6.6 External Walls:

6.6.1 Drawings numbers 1568/01/15 and 16 show elevations of the external brickwork walls marked up with our observations on the obvious structural defects eg approximate location of cracks and their likely cause.

Based on what we could see, the cracks in the brickwork were generally as a result of corrosion of steelwork built into the external walls, together with some thermal expansion of the uninsulated flat roofs and locally some impact damage.

6.6.2 Refer to the Architect's drawings for non-structural issues such as minor cracks, weathering etc.

6.6.3 The reinforced concrete window frame in the 1950s office and condenser rooms is in a poor condition with spalling of the concrete in several areas as a result of prolonged rainwater penetration of the concrete causing the reinforcement to corrode, expand and push off the concrete.


Roof beam and filler joist roof by 1900/1901 Ice Store


Crack in parapet to roof over Ice Store


Impact damage to brickwork around opening in wall


RC frame around windows in 1950s extension


Cracked concrete where reinforcement is corroding


Spalled concrete as a result of corroded reinforcement

6.7 Roof Structures:

6.7.1 Generally the timber boarding and purlins to the pitched roofs to the original tank rooms and boiler house appear to be in a poor state as a result of prolonged rainwater penetration. The steel trusses, however, seem to be in a reasonable condition though it would be prudent to expect to find some local problems to do with corrosion especially along the valley gutter to the original building.

6.7.2 The timber trusses to the ice store in the 1907/1910 building are likely to have been much more affected by rainwater penetration than the steel trusses and so we would expect to find some extensive wet and perhaps dry rot especially in the ends of the trusses along the valley gutters and around the edge of the building under the parapet gutter.

6.7.3 The timber structure to the shallow pitched roof over the office in the 1950s extension is likely to be in a very poor condition and some of the supporting steel beams also appear to be significantly corroded.

6.7.4 We noted some spalling of concrete locally in some areas of the underside of the reinforced concrete roof to the compressor room in the 1950s extension suggesting rainwater has been penetrating the roof finishes and the slab for many years. It is likely that there will be other areas where the reinforcement is corroded especially in the top of the slab.

6.7.5 All of the other flat roofs appear to be of filler joist construction and in several areas the concrete cover to the bottom of the steel joists has spalled exposing corroded steelwork. This is evident in the compressor room, ice store and condenser room roofs in the original building. We suspect this is also the case in the roofs to the loading bay in the 1907/1910 extension.


Roof to original Tank Rooms


Roof over Ice Store


Roof to 1950s Office


1950s Compressor Room


Original Compressor Room


Severely corroded steel joist in flat roof

6.8 Internal Structure:

6.8.1 Compressor Rooms (i)

Rainwater penetration over many years has led to some significant corrosion of the steel beams to the first floor in the office. The steel joists to the filler joist floor are also likely to be affected.

Elsewhere in the compressor rooms the internal steel structure generally appears to suffer from some surface corrosion only, which is not of major structural significance.

The concrete ground floor in all of this area contains numerous services trenches, plinths and recesses. Some trenches have steel covers, and some are partially filled with water.

6.8.2 Tank Rooms 1900/1901 (ii):

The steel structure above first floor level generally appears to be in a poor condition as a result of the prolonged rainwater penetration through the building. At this level the most obvious defect is surface corrosion of the steelwork and this varies considerably with only local areas that appear to be significant.

Whilst very limited access was possible across this area of the building, it appears that at first floor level (ie the upper ice making level), the effect of the rainwater and the aggressive environment during the ice making process has left the timber boarded floor in a very poor state and both the extent and severity of corrosion of the steel framed structure is much more serious than above.

At the upper ground floor level (ie the lower ice making level) the condition of the structure appears to be even more deteriorated than at first floor level.

No access was possible to the undercroft, as it was mostly filled with water, but from what could be seen from the entrance, the steelwork at this level is in an extremely poor state. Only a few beams and columns were visible and these were severely corroded and delaminating to such an extent that in places the flange and parts of the web of the beams and columns were missing.

It is likely that the floor to the undercroft is also in a very poor state.

First floor to 1950s Office

Services trench in Compressor Room ground floor

First floor Tank Room

Severely delaminating steel beam in Tank Room undercroft

Severely corroded steel column in Tank Room undercroft

6.8.3 Ice Store (iii):

The steel structure here appeared to be suffering much less from rainwater penetration than in 6.8.2 above, though it is likely that there will be some beams which are severely corroded.

6.8.4 Old Boiler House and Condenser Room (iv) and (v):

The ground floor slabs in these areas appear to be of reinforced concrete and contains some plant bases/plinths and trenches with a basement under the western-most area. The extent of this basement is not known as it was not accessible though it seems likely to be only under this small western-most space.

6.8.5 Tank Room (1907/1910) (vi):

The timber and steel framed structure supporting the first floor has suffered from rainwater penetration and the aggressive conditions within the ice making environment in a similar though seemingly not as severely as in the original tank rooms 6.8.2 above.

The steel grillage at ground floor level is suffering from extensive surface corrosion in places, in particular at the supports off the reinforced concrete ground floor. It is likely these will be areas of severe corrosion and delamination of the steelwork.

The ground floor contains three trenches which were about half full of water during our visit in January. We suspect the reinforced concrete is not in a good condition.

The steel columns supporting the roof and first floor have heavily gusseted bases where they are fixed to the top of the ground slab, which is thickened at each column position and must also be the foundation to the column. The steelwork column is covered in surface corrosion, but at their base the column and gusset plates are severely corroded and delaminating in places.

6.8.6 Store (vii):

The timber ground floor in this area is in an extremely poor condition with extensive rotten and collapsed areas of the floor structure.

6.8.7 Loading Bay (viii):

No access possible to this area.

6.8.8 Office (ix):

Local areas of the timber boarded first floor and the steel beam supports have suffered as a result of their prolonged wet state and in places the timber is close to collapse. There is extensive surface corrosion in the steel beams.

6.8.9 No access was possible to look at the steel frame supporting the large water tank over the condenser room. It seems very likely that this steelwork is in a poor condition especially where it is built into the brickwork walls.

First floor to Ice Store 1900/1901

U/s first floor to Tank Room 1907/1910

Ground floor to Tank Room 1907/1910

Gurretted bases to Columns in 1907/1910 Tank Room

Corrosion to bottom of Columns in 1907/1910 Tank Room

7.0
Proposals for Remedial Works to the Existing Structure

7.1 Our experience of buildings of this age shows that in order for them to cope with changes over time, and to continue to be useable, then typically they need an overhaul every 25 years or so, with major overhauls every 50 years or so. It is also very important that as part of these overhauls, all the defects in the structure not covered by the normal maintenance of a building are dealt with. Good buildings of this age can generally be kept going almost indefinitely if properly maintained.

Here at the Ice Factory it seems that its historical development followed along this typical path for a while, ie:

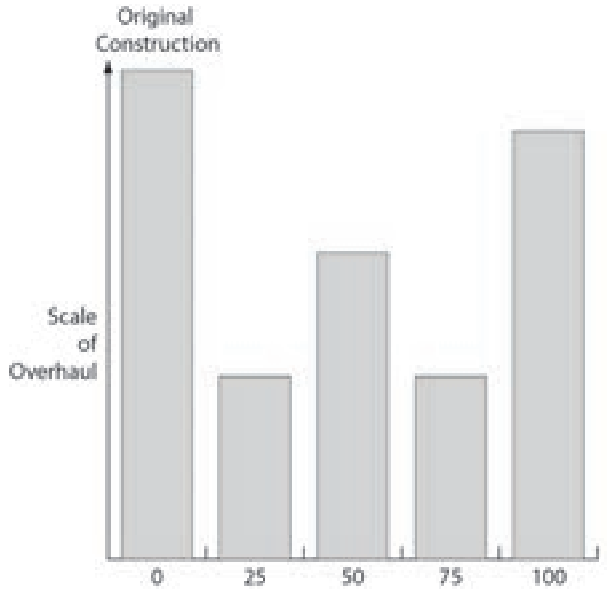
- Built 1990/1901 and 1907/1910
- First major overhaul 1930s
- Second overhaul 1950s

but then with the fishing industry in decline it looks as if the next two overhauls around 1975 and certainly in 2000 did not happen.

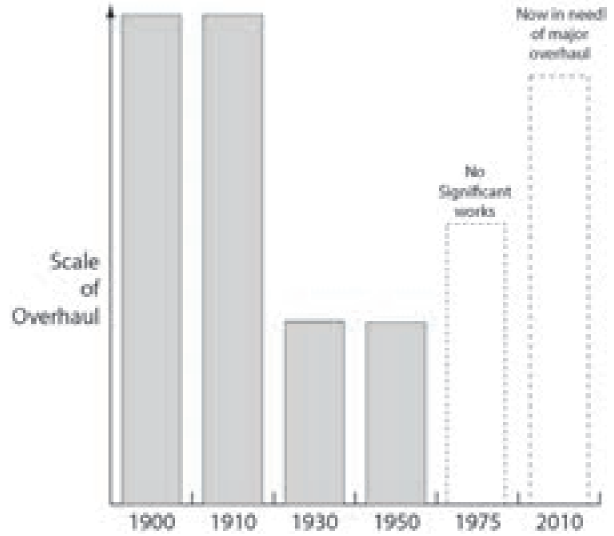
For the general condition of the structure it looks as if few, if any, of the defects in the structure have been addressed in this second half of its life.

The aggressive conditions generated in the Ice Factory meant that the building would have needed much more maintenance than other buildings of its age.

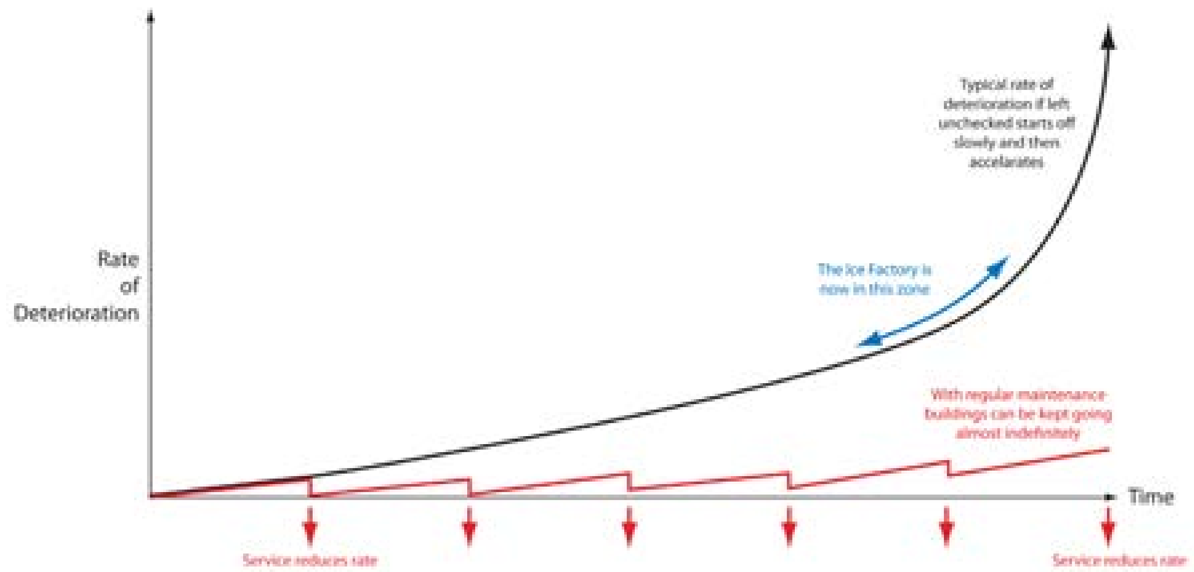
It is clear that the building has not had any maintenance carried out for many years and is now deteriorating at a rapidly accelerating rate.



Lifecycle between major services/overhauls for typical traditionally built building



Lifecycle between major services/overhauls for the Ice Factory



Rate of Deterioration

7.2 The following section outlines the approximate scope of remedial works required to the existing structure to address the obvious problems described earlier.

7.2.1 External Walls:

All the cracks in the brickwork need to be made good by carefully cutting out the cracked bricks and stitching in new brickwork. Where the cracks extend full width through the brickwork, this needs to be done from both sides (inside and outside).

Where the cracks are the result of corroded steelwork the cause of the cracking, ie the expansion of the steelwork as it corrodes and delaminates, also needs to be addressed. This involves carefully removing the brickwork around the embedded steelwork (eg beam end), introducing temporary supports to the steelwork where needed, so that the steelwork can be thoroughly wire brushed to remove all loose rust, cleaned, and then painted with two coats of bituminous paint, prior to making good the brickwork around the steel as above. In some locations the steelwork may be found to also need some repair and so a contingency should be allowed to cover this too.

Where steel beams are built into the external wall over openings such as to the loading bay (viii), allow for the first three courses of brickwork over the beam to be carefully cut out to allow the beam to be treated and then replaced.

Refer to drawing numbers 1568/01/07 to 08 which illustrates the likely approximate extent of brickwork repairs at this stage related to structural remedial works. Refer to the Architects' drawings for all other works to the external walls.

7.2.2 Roof Structure:

Whilst some detailed investigation will be appropriate in due course, it seems at this stage that the flat roofed areas have all suffered from extensive rainwater penetration over such a long period of time that it seems very likely that they will all need to be replaced, on top of the existing steel beams. This applies to all the steel filler joist roofs and the 1950s reinforced concrete roof over the new compressor room.

We suggest the way forward here is for the replacement works to commence with a staged removal of the roof finishes and then the concrete to expose the steel filler joists and reinforcement. The condition of the joists and reinforcement can be assessed as they are exposed and if found to be in a better condition to that currently expected then it may be possible to retain some of the steel joists and maybe patch repair the r.c. slab. At this stage, however, it would be prudent to allow for it all to be replaced.

The condition of the pitched roof structures varies considerably. The small pitched roof over the original 1900/1901 office, and the multi pitched roof over the store in the 1907/1910 building appear to be in the worst condition. At this stage we suggest an allowance is made for replacing the roof structure over the office completely. Over the store it looks likely that the steel valley beams will need some remedial work especially where they are built into the walls and the timber trusses are likely to need repairs/load rebuilding at their ends where they are supported off the valley beams. All boarding and purlins are likely to need replacement.

The longer span pitched roofs over the old boiler house, and the tank rooms (1900/1901 and 1907/1910) generally appear to be in a little better condition than the others. In these areas the timber boarding looks to be in a poor state in places, but elsewhere it may be possible to re-use the boards. Similarly, some of the timber purlins look as if they will need replacing and others look as if they can be retained.

We suggest that:

2. All the roof coverings are removed (see also Architects' report).
3. All timber boarding is removed and separated into that which can be re-used (say 30%) and that which cannot. The boards chosen for re-use will need to be dry, and/or dried in a controlled environment.
4. The timber purlins are removed, and separated to those that can be re-used (say 50%) and those which cannot.
5. The steel trusses can then be thoroughly wire brushed to remove all surface corrosion and repainted.
6. The new and retained purlins and boards can then be fixed in position.

Cracks in brickwork where steel beam is severely corroded

Roof over Ice Store 1900/1901

7.2.3 Internal Structure:

With the envelope of the buildings made good the internal structure will need time to dry out to determine the extent of remedial works, though to achieve this state and to tackle some of the obvious defects we suggest the following approach:

(ii) Clear out all the debris etc.

(iii) Remove all rotten/damaged timber boarding.

(iv) Pump out all the water from the trenches and undercrofts.

(v) Where steel columns have become significantly affected by corrosion/delamination these should either be replaced, or perhaps encased in reinforced concrete to maintain their structural function. This applies to some if not all of the columns in the undercroft beneath the original 1990/1901 tank rooms.

(vi) The buildings then need to be well ventilated to allow them to dry out. This needs to be done in a controlled and maintained way so that it is not only effective but also avoids further problems being generated such as dry rot manifesting itself in the timber structure.

7.3 Contractors Site Set Up

As part of these works there will be a substantial cost involved in the Contactor establishing his set up on site including all the temporary works necessary for safe access in order to clear out all the debris and carry out the remedial works. This will include access decks and stairs as well as protective decks for safe access.

8.0
Proposed Alterations to the Structure

8.1 At this stage there are no specific alterations proposed and NELC have requested some general comments on the feasibility of carrying out alterations and adding in new floors within the existing building, all based on the understanding we have of the existing structure, described above.

The following general comments assume that all the defects in the existing structure are addressed prior to carrying out any alterations.

8.2 Roof:

The flat roofed areas can probably be used to support some new lightweight plant. Should the existing water tank over the original compressor room be removed then that area of the roof should be able to cope with the addition of new plant/ accommodation of a similar mass to the water tank.

8.3 Walls:

The brickwork walls are generally robust and have been used to support very heavy imposed loads as part of the ice making process. It seems likely with the ice making process removed, that they could be used to support some significant new imposed loads from additional floors.

It looks feasible to be able to remove the travelling crane beams and their fixing brackets without significantly affecting the integrity of the brickwork piers/walls.

8.4 Floors:

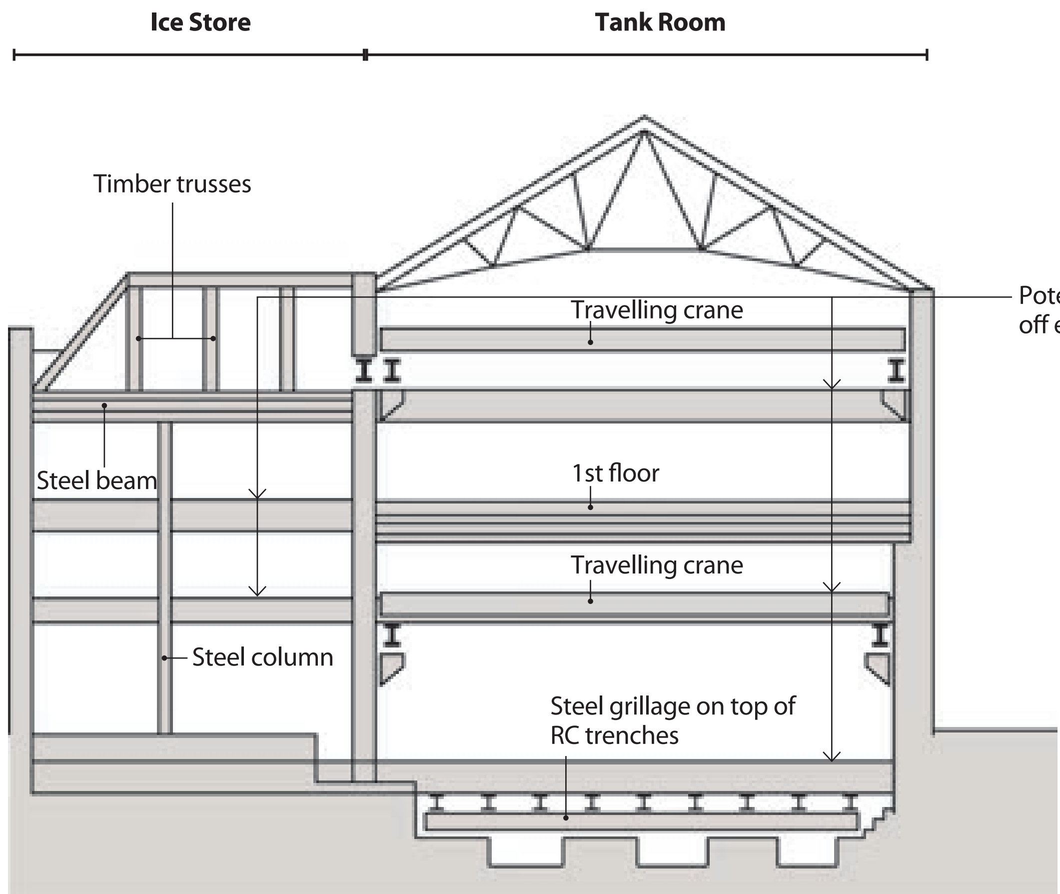
Currently it seems likely that the floors in the main tank rooms do contribute to the overall stability of the building and the brick piers.

Where the main floor beams are connected to the existing brickwork with external fixing plates it makes sense to retain these floor structures as part of any new scheme, though in principle it would be possible to remove them and replace them with new floor structures.

Depending on the proposed new uses it may be possible to replace (either all or in part) the existing very heavy duty floor structures in the tank rooms with several new lighter weight floor structures.

In the areas where there are no internal upper floors, e.g. original condenser room, boiler house and the 1907/1910 store, it is likely that the existing structure (walls and columns) could be used to support one or maybe two new floors.

Refer to typical section C.



Section C

9.0 Next Stage

9.1 This report is aimed at providing a very outline scope of works and a 'ball park' cost estimate of the likely remedial works needed to the existing building.

9.2 In order to prepare more detailed proposals for the purposes of obtaining tenders for the work then we suggest an enabling contract is built into the programme. This enabling contract would include some physical opening up works to assist in determining the severity of degradation of the structure and better define the extent of remedial works. It could also be used to carry out trial repairs for agreement with interested parties (e.g. English Heritage) prior to commencing the main works.

These investigation works would include:-

- Breaking out areas of the flat roofed structure to reveal the severity of corrosion of the embedded steel joists and/or reinforcement.
- Removal of areas of the rotten timber floors in the Tank Rooms and Ice Stores to help clarify the severity of corrosion of the steel structure.
- Trial pits to expose the foundations and check whether the building is supported off timber piles, and whether the piles extend above the current ground water level.
- Providing safe access to previously inaccessible areas of the buildings.
- Pumping out of water from the undercroft and Service Trenches.

9.3 As discussed with NELC this report has considered the likely scope of remedial works required to address all the issues raised in the NELC Scope of Work.

An estimated cost of these works have been prepared by KMCS.

Two further cost estimates have been prepared:

i. for works of a lesser scale than above just to address rainwater penetration of the building.

ii. Simply to enclose the building in a sheeted scaffold to try and keep the rainwater out.

In very general terms the likely effect of the three alternatives costed are:

i. Scaffold only: This will slow down the rate of escalation of the degradation of the structure, but should be considered as a temporary measure only before proceeding with more substantial works.

ii. Lesser Scale of Works: This will address the most obvious defects in the structure and provide a breathing space before carrying out the rest of the works in (iii) below.

iii. NELC Full Scope of Works: This should prepare the building generally for conversion or refurbishment once a use has been found.

9.4 It needs to be recognised that the scope of remedial works in (iii) above is aimed at addressing the obvious defects in the structure, it is the nature of buildings that some defects are hidden and may only become obvious either during the works on site, or indeed later in the life of the building.

All remedial works should be designed to sympathetically repair or improve the existing structure, though again it should be recognised that these works cannot be compared to new construction, and are aimed at extending the useful life of the building which is indeterminate, and relies on how well it is cared for in the future. It would be useful to develop a simple monitoring regime as part of the detailed proposals to assist with the assessment of the success of the proposals and as a check on future movements of the structure.

9.5 As part of the next stage of the works we recommend a conservation assessment is made of the buildings and their contents to assist in the preparation of the proposals.

10.0
Existing Fabric, by Richard Griffiths Architects (RGA)

RICHARD GRIFFITHS ARCHITECTS

The Ice Factory, Grimsby

Assessment of Condition of Existing Fabric

February 2010

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10.0 ASSESSMENT OF CONDITION OF EXISTING FABRIC

10.01 INTRODUCTION

The Grimsby ice factory consists of two large brick- built industrial buildings close to the quay side of Fish Dock no.2 in the Port of Grimsby. The southern block dates from 1900-01 and the northern one from 1907- 10. Together they occupy a roughly rectangular plot on plan with a diagonal road cut through between the two blocks, originally the route of a railway branch line. A wing in the southwest corner of the southern block dates from the 1950s and includes a generator. Now surrounded by empty and derelict land within the port compound, there were originally ancillary buildings to the south and other factories and warehouses to the north. The railway yard lay to the west and the fish sheds around the dock to the east. Ice was manufactured in large quantities for the preservation of fish off-loaded from the dock.

The exterior is of load-bearing brickwork with a regular rhythm of piers and openings. The openings are of semi- circular and flat- arched brickwork with a variety of timber and steel framed windows. The east elevation to the quay side is articulated with wider relieving arches, arched openings and pedimented gables, surmounted by a clock turret; all in red brick with a Staffordshire blue brick plinth. Tie plates through the external walls are associated with the internal gantry cranes rather than the steel building structure. The 1950s wing has a partly concrete-framed elevation.

Internally there are two large (approximately 30 x 40m and 13 x 50m), double -height (approx. 10m) ice making halls, spanned by steel trussed roofs supported on steel columns and beams. There are two levels of ice making tanks within each hall, the structure of the tanks being partly integral with the structure of the building. There is a basement beneath the ice hall in the southern block, which was flooded at the time of the inspection. The double-height generating halls and store rooms, which surround the ice making halls, have flat roofs of steel beam and concrete composite construction. The internal floors to other areas are of similar construction. The upper ice store in the 1900-01 building has since been converted into ice making tank no.7.

The factory has been abandoned since 1990 and is in a poor state of repair, although most of the ice making machinery and other plant remain in position, which is a rare survival. English Heritage published an architectural investigation report on the factory in 2001 (Ian Goodall, NBR Index 9915) and the buildings are listed Grade II*. Although a robust structure, if decay from water ingress and vandalism is not halted, it will reach a critical point at which viable repair and refurbishment becomes increasingly uncertain. As the building fabric and contents deteriorate the recommendations and costs of repair will need to be re-assessed as they become out of date.

Decisions as to the factory's future cannot be sensibly made until the building is secure and weather tight. The surviving machinery needs to be surveyed and assessed for it's intrinsic historic or scientific interest before it is damaged beyond salvage. English Heritage have requested such a survey and assessment before any decision is made on its removal. It is recommended that a Conservation Management Statement or Plan (CMP) is prepared to assist decisions on its future use.

10.02 THE REPORT

This report was commissioned by North East Lincolnshire Council, and was compiled following a site visit undertaken in January 2010 by Alan Baxter Associates, KMCS and Richard Griffiths Architects. It is intended to give an outline indication of the likely scope and phasing of repair works to secure the buildings in a weather-tight and structurally stable condition, prior to refurbishment or conversion. Only minimal works are included internally and to the mechanical and electrical services, pending decisions on any future use/s for the buildings. The recommendations also include works to provide safe access for maintenance and inspection. The present condition of the buildings are such that they are not safe for public access and this will not be possible until further refurbishments have been carried out.

The report concerns only the urgent repair of the exterior envelop and internal steel structure of the buildings, not the full refurbishment or conversion of the buildings. This should be borne in mind when planning and budgeting the works. The factory is a very substantial structure which is now in a poor state of repair; the scope of these holding works will therefore be a significant undertaking in themselves and will need to be carried out by a suitably experienced building contractor in accordance with current health and safety regulations.

This report is not intended as the basis for instructing such building work or seeking tenders from contractors. Further surveys will be needed and more detailed documentation will have to be drawn up by the consultant team. Certain items are indicated in the schedule as being required to be carried out as an enabling contract prior to the main works to assist in preparing tender documents.

This report should be read with the following drawings 478/ SU 01- 05 incl. (see Appendix 3).

10.0 Existing Fabric

General view of east elevation

General view of ice making hall

10.03 PHASING THE WORK

The Proposed Options Split chart below gives three broad options for works to the external envelop and structure:

A. Temporary protection, support and safe access
B. Essential repair works to roofs, walls and structure (phased)
C. Permanent repairs and upgrading into a reusable state.

Option A envisages covering the building, stripping the roofs and opening the windows within the protection to allow the building fabric to dry out. This would give time to fund raise and decide upon Options A or B to follow. The building should be made safe for access and surveyed for asbestos and timber decay as part of this option.

Alternatively, options A or B could be commenced immediately, but if funding is restricted could be phased. Option B has been shown split into roof repairs and external wall repairs, with the internal structural repairs done with the latter. Either or both options could be further phased with the two blocks done separately, as could option C.

Option C includes for upgrading windows and roof lights to double glazing and including insulation in the new roof finishes in order to meet current regulations and in anticipation of a future use. It also allows for more extensive repair of the exterior walls, including reconstruction of missing elements and for recovering the roofs in natural slate.

10.04 MACHINERY AND REUSE

The ice-making machinery, generators, gantry cranes, conveyor belts and other plant remain in position within the Factory, which is a key factor in the list status of the building. The brief for this report is for costings to return the building to a 'suitable state for reuse'. This is, however, difficult to determine without a decision on the machinery and proposed new use. A number of factors arise in this respect:

10.04.01 Floors

- The ice making machinery would need to be covered by or removed prior to forming new floor structures.
- Thorough repair of the existing steel frame and supporting structures might necessitate removal of the ice-making equipment.
- The levels of any new floors relative to the ice-making equipment is not yet known.

10.04.02 Cranes

- The gantry cranes and their supporting beams appear to be independent of the internal structure, although their removal would necessitate repairs and making good to the external walls.

10.04.03 External Features

- Conveyor belts connect the factory to the fish shed adjacent to No. 2 Dock – are these to be retained?
- Numerous alterations to the openings in the external walls have disfigured the original architectural design (see 10.05 below)
- Large water tanks externally on the roof of the turbine hall, with their supporting steel structures, will need to be taken down in order to repair the roof beneath – should these be reinstated after?

10.04.04 Costs

- The cost estimates have made the assumption that all the ice-making machinery will remain in position, or be reinstated if it has to be removed in order to facilitate a repair. This may not be realistic or desirable and therefore elements of Option C proposals remain speculative until a new use is known.

Water dispensing equipment in ice making hall

Turbines in the generating hall

10.05 APPROACH TO REPAIRS

There are a number of issues with regard to the approach to repairs and reinstatement works, which also have a considerable affect on cost, but which are subject to a view from English Heritage. This cannot be tested prior to preparation of a Conservation Management Statement or Plan and submission of a proposal, however it is necessary to make viable assumptions, given the size of the building and its poor condition. These issues include:

Brickwork:

- Should the aim in repairing the external brickwork be to 'repair as found' including all the various disfiguring alterations associated with its industrial use (Option B); or
- If a new use were found which required a smarter appearance could the various altered elements (e.g arched openings) be 'restored'(Option C)?
- Would mechanical re-pointing methods in hydraulic lime mortar be acceptable, subject of course to samples (Option B&C)?

Pitched roofs:

- Would the use of alternative roof finishes e.g. corrugated sheeting be acceptable either temporarily or permanently (Option B)?
- Would alternatives to natural welsh slates to match the existing coverings be acceptable (e.g. concrete slates, Spanish slates etc) subject to samples (Option C)?

Flat roof and floor structures:

- These are currently filler joist construction and severely decayed; could these be replaced with a modern alternative e.g. insitu concrete over a corrugated steel deck supported on the existing main beams (Option B); or
- Would these need to be replaced on a like for like basis (Option C)?

10.06 EXTERNAL WALLS

Generally the load bearing brick walls are divided into regular bays by piers with recessed double- height panels between. The walls rise to moulded brick eaves or to parapets and gables with York stone or precast concrete copings. There is a Staffordshire blue brick plinth, 12 courses high. The walls are generally of smooth red clay imperial facing bricks (Approx 81/2" long x 41/8" deep x 3" high); with 5/16" high joints of lime mortar in southern block and possibly cement mortar in northern block. The west elevation and other areas have been re-pointed in black ash cement mortar very shallowly. There are semi- circular, circular and flat arches to panels and openings of red rubber brickwork. The east elevation was once particularly decorative.

Extensive areas of the pointing have been washed out, particularly at high level on the west, east and south elevations, behind rainwater pipes and along both elevations to Parker Street (former railway cut). Areas of brickwork are saturated and supporting moss and fern growth. After this has been allowed to dry out for at least 18 months and the vegetation killed with biocide sprays, the brickwork could be cleaned and moss killed using a superheated water cleaning method. Such cleaning needs to be carried out carefully by a specialist after trials.

10.06.01 Enabling Works: samples of the exisitng mortar need to be analysed and source for replacement bricks found, as part of Option A.

10.06.02 Main Works: a full covered and sheeted scaffold to external walls is required, which could be phased by building or elevation. The remaining black ash mortar re-pointing is to be cut out with specialist mechanical cutter and by hand where easier; the method is to be agreed with English heritage following sample areas. All areas where are joints washed out or defective, are to be re-pointed in a naturally hydraulic lime: sharp sand mix, to match existing mortar. The joints to be finished semi recessed with a brushed texture. Option C allows to rebuild sections of brickwork which have been poorly altered or rebuilt; this approach will need to be discussed and agreed with English Heritage (see 10.05 above). Patches on west and east elevations need to be cut out and refaced. The bell turret needs to be partly taken down and rebuilt.

10.06.03 Decorative Features

The west elevation of the northern block has chequer pattern brickwork beneath rendered steel lintels between the ground and first floor windows. This will need to be opened-up to see the condition of structure behind. Provisional scope of work: strip off render, de-rust and treat before re-rendering. Cut out brickwork to expose ends of lintels, treat and reinstate.

10.06.04 Turrets

The east end of the 1907-10 block has a pair of decorative brick turrets apparently partly supported from the roof structure. These will need to be inspected more closely in order to schedule repairs.

10.06.05 Cornices and Parapets

There are moulded brick cornices to most elevations, which will need re-pointing and repaired. The parapets and upper parts of the walls may need to be rebuilt in those sections where the wall is saturated and rusting steel work has caused movement of the structure (Option B and C).

10.06.06 1950's Block

This block has reinforced concrete framed glazing set within brickwork. The concrete is badly spalling due to rusting steel work and may need to be renewed. The end wall was originally a party wall and needs to be clad in new stain of brickwork in order to protect the exposed steel work (Options B and C).

10.06.07 Lime Mortars

It appears from an initial survey that the earlier block is constructed of lime mortar, but that the 1907-10 block may be of an early cement mortar. Areas of the 1900 building have been repointed in a grey-coloured cement mortar, most likely during the 1950s alterations. This needs to be verified by testing samples in a laboratory.

Given the exposed location of the site, the nature of the original brickwork and the size of the buildings, we would recommend the use of a pre-mixed naturally hydraulic lime mortar, which can be supplied to site in a silo. The use of cement-based mortars in repairs would be very damaging to the saturated brickwork, causing long term failure of the bricks through the migration of salts to the surface. Modern hydraulic lime mortars are closer to historic cement mortars in chemical composition than modern Portland cement and therefore more suitable for repairs and repointing.

As highlighted above, given the size of the buildings, traditional methods of hand raking-out and repointing are unlikely to be affordable. Specialist mechanical cutters are now available to assist in cutting-out; re-pointing can be carried out through mechanical injection. Such methods have been assumed in the cost estimates but will need to be subject to samples approved by English Heritage in advance. It is important to engage an experienced contractor for this work because poorly executed work could

Part west elevation showing brickwork

Clock turret to east elevation

Detail of mortar joints

destroy the appearance of the elevations.

10.07 WINDOWS

There are a variety of types of window on the building, most of which have lost their glass and are partly or completely blocked. It has not been possible to make a detailed survey, however, it appears that many of the frames are robust and capable of repair. Most are timber transomed frames with steel opening lights set within the upper lights. The section of the frames is large enough to be re-glazed with modern slim-line sealed double glazed units with minimum effect on the appearance of the building. The timber frames will require repair, particularly to the cills, and this work will need to be scheduled after survey. In Options A and B, we recommend that the windows are left open, with security and anti-pigeon mesh over them, in order to provide maximum ventilation to allow the building to dry-out for at least 18 months.

10.08 ROOFS

All the roof finishes on the factory are beyond repair and their poor condition is allowing large volumes of water to penetrate into the structure and interiors. It is an urgent priority to cover the building and keep the weather out, if the buildings are to be saved. Option A includes for a temporary scaffold roof structure over the whole building, throwing the water clear of the building and allowing the structure to dry-out. This will then allow stripping of the original coverings and repair of the roof structures (Option B). Various options for re-roofing the pitched roof are included in the cost estimates but all will be subject to English Heritage approval (see comments above). The flat roofs will need to be completely renewed to new falls and may require additional outlets to improve drainage.

10.09 INSULATION

In Option C, it is assumed that insulation will be incorporated into the new roof finishes in order to upgrade the buildings to current building regulations. The nature of any new use will affect the standards required, but it is assumed not to be residential. Continuity of the insulation and the appearance of the edges of the roofs will need to be carefully thought through at the detailed design stage.

10.10 ROOF ACCESS

At present, access to the roof level is hazardous. It will be an important aspect for the scheme to provide access for inspection and maintenance, both temporarily in Option A and permanently in Options B and C, in order to comply with health and safety regulations. Balustrades to the perimeters of the flat roofs will be necessary because of the low parapets. Permanent ladders and walkways over the pitched roofs will assist in cleaning and repairs to rooflights, gutters and outlets. Safety eyes for use with harnesses and a fall arrest system may also be required in some areas. The high level bridge over Parker Street is currently unsafe and needs to be repaired. Internal access is also hazardous and safety measures need to be put in place to allow safe access for further surveys.

Windows to west elevation of 1907-10 building

Pitched roof to ice making hall in 1900-01 building

BUILDING ELEMENT	OPTION A: TEMPORARY PROTECTION & SUPPORT TO STRUCTURE & ENVELOPE	OPTION B: ESSENTIAL REPAIRS TO STRUCTURE & ENVELOPE (PHASED)		OPTION C: PERMANENT REPAIRS & UPGRADING TO STRUCTURE & ENVELOPE INTO REUSABLE STATE
		MINIMUM REPAIRS - ROOFS	MINIMUM REPAIRS - WALLS & STRUCTURE	
Temporary Works	Temporary roof and secure hoarding; anti-pigeon netting to all sides. Clear out debris. Protect machinery. Survey for asbestos. Survey for timber decay.	Access scaffold at parapet level and temporary roof to whole building; internal crash deck beneath roofs; pigeon netting to all sides; builders compound. Clear out debris. Survey structure for asbestos. Survey for timber decay.	Access scaffold to external walls, covered and sheeted; builder's compound.	Full sheeted access scaffold and temporary roof (phased?); builders compound; internal crash deck beneath roofs. Clear out debris.
STRUCTURE Basement	Pump out water Install pump Inspect condition of steelwork	As 'A'	-	As 'A'
External Walls	Temporary supports as required by Structural engineer Spray moss and vegetation with biocide Trial pits to expose footings Analyse samples of mortar and source replacement bricks Trial areas of re-pointing	As 'A'	Repair and re-point brickwork where required ('as found'), including all plinths, areas behind RWP's, parapets, gables, turrets and worst areas of decay; assume 50% average re-point; rebuild section of missing wall to south elevation.	Fully re-point brickwork (assume 80% average); repair/ rebuild all parapets, gables, turrets and worst areas of decay; reinstate missing features (e.g. arches). Rebuild sections of missing wall to south elevation and flank wall.
Pitched roof structures	Temporary supports as required by Structural engineer Temporary work to provide safe maintenance access	Inspect and repair steel trusses; de-rust, treat and redecorate; repair worst decay to steel *insitu* ; renew decayed timer purlins and re-fix salvaged lengths. (N.B. boarding performs a structural function therefore must be re-fixed or renewed	-	As 'B'
		Inspect timber trusses and purlins to 1907-10 building when dried-out; dismantle and renew decayed sections and connections (assume 50% renewal). Renew trusses to office extension.	-	As 'B'
Flat roof structures	As for pitched roofs Remove vegetation and silt build up	Take out and reinstate conc. decks; de-rust, treat and redecorate retained principal steels. Renew filler joists and concrete deck in corrugated steel sheet and concrete topping	-	Take out and reinstate conc. decks; de-rust, treat and redecorate retained principal steels. Reinstate steel filler joists and precast concrete filler slab with screed topping to match existing.
Building Frame	Temporary supports to steelwork in basement as required by Structural engineer	As 'A'	Inspect steel principal elements of frame; de-rust, treat and redecorate; repair worst decay in basement and at roof level *insitu* (in mild steel with mechanical connections or controlled hot works)	Inspect and repair all steelwork; de-rust, treat and redecorate reconstruct steel structure to basement/ lower tanks (assume 50% reuse) .

Floors	Temporary supports as required by Structural engineer Temporary work to provide safe maintenance access	As 'A'	Strip out decayed timber; repair steelwork *insitu* (N.B. in mild steel with mechanical connections or controlled hot works); install temporary access decking.	Strip out decayed timber floor panels over tanks and to stores; Cast new insitu concrete slabs on permanent steel deck to tanks room floors (subject to reuse proposals); renew timber boarding in Douglas fir on joists to match existing to store room
Stairs and Galleries	Temporary work to provide safe maintenance access	As 'A'	De-rust and redecorate iron stairs. Reinforce and repair stairs & landings: provide additional handrails/guardings.	Existing stairs as 'B'. Provide new stairs and walkways for public access to certain areas
SECONDARY ELEMENTS Roof lights	Dismantle with roof finshes	Renew treated timber skirts and flashings in zinc; re-glaze with transparent corrugated sheeting.	-	Renew treated timber skirts and flashings in zinc; re-glaze with double glazed , aluminium framed lights.
Louvres	Dismantle and stack salvageable members for reuse	Rebuild in treated and painted softwood incorporating existing members; re-glaze sloping apex with transparent corrugated sheeting; renew flashings and ridge in zinc.	-	Rebuild in treated and painted softwood incorporating existing members; re-glaze sloping apex with double glazed , aluminium framed lights; renew flashings and ridge in zinc.
Windows	Unblock windows and allow ventilation; fit temporary pigeon netting if none to scaffold enclosure.	As 'A'	Un-block and repair timber frames; de-rust and overhaul steel casements; redecorate both. Install temporary s/s grilles to allow ventilation instead of re-glazing.	Un-block, repair and redecorate timber frames; de-rust and overhaul steel casements; reinstate lost window frames; re-glaze all with double-glazed units ('Slimlite 4 'or equal); fit permanent ventilators. Install temporary s/s grilles to opening lights to allow ventilation over 18 -24 months.
External Doors	Temporarily make secure	As 'A'	Repair, redecorate woodwork and fit secure ironmongery	Repair/ renew to match original with new security ironmongery; redecorate.
Other external features	Renew deck and handrails to bridge over Parker Street; de-rust, treat and redecorate steelwork.	As 'A' Inspect steelwork supporting clock turret , de-rust and treat	-	De-rust, treat and redecorate steelwork to balconies, gantries, conveyors, water tanks and supporting framework Reinstate clock to east elevation
FINISHES Pitched roof Finishes	Strip slates and stack in secure store	Strip all roof coverings and boarding Fit corrugated sheeted roof panels to pitched roofs with structural fixings for wind loading.	-	Renew pitched roofs with Welsh slates in diminishing courses (assume 20% reuse) on battens on counter battens with rigid insulation board between; on new and salvaged (say 70:30%) timber diagonal boarding.
Flat roof finishes	Open-up sample areas of asphalt roofs for inspection; staged removal of finishes to	Renew asphalt roof finishes on new deck to improved falls. Take- down water tanks	-	Renew asphalt roofs on new PUR/ cork

	allow structure to dry out.	and supporting structure (re-erect?). Renew flashings and outlets in zinc or stainless steel (not lead).		insulation to improved falls. Include additional outlets; lightweight walkway tiles and chippings. Reinstate water tanks and supports (?).
Floor finishes	-	-	Set aside reusable timber flooring to dry out.	Relay areas of boarding over new floor structures (subject to reuse proposals)
Internal Finishes	Clean and disinfect interiors affected by pigeons.	-	As 'A'	Steam clean all interiors; disinfect interiors affected by pigeons.
SERVICES M&E Services	Test electrics, make safe and provide temporary lighting	As 'A'	-	Test and upgrade electrics
RW Disposal	Test and overhaul underground drainage;. Provide temporary RWPs draining temporary roof & conducted away from building.	Renew all RWPS, gutters in cast iron and decorate; test and overhaul underground drainage; renew gullies to all RWPs..	-	Test and overhaul underground drainage. Generally as 'B'; provide further RWPs to suit additional outlets
Security / Fire	Temporary intruder alarm to hoarding and temporary fire alarm & exit signs to access routes	As 'A'	-	New intruder alarm to external envelope; new fire detection, alarm and signage to access routes internally
Safety access	Temporary works as noted above	Install walkways, guardings, access ladders and lanyard systems to make all areas of roofs accessible for inspection and maintenance.	-	As 'B'
EXTERNAL WORKS	Clear vegetation; reduce over high ground levels; provide secure fencing	AS 'A'	-	Renew hard standing immediately around building to reduced levels if necessary including Parker Street and install new surface water gullies; install steel fencing and gates to compound area(?)

11.0
Cost Estimate, by KMCS

KMCS

ICE FACTORY, GRIMSBY - PROPOSED REMEDIATION WORK

PRELIMINARY BUDGET ASSESSMENTS

A. This Cost Report has been prepared following a brief inspection of the buildings and on the basis of information provided by / discussed with Alan Baxter Associates and Richard Griffiths Architects

B. In assessing possible costs we have considered three scenarios:

1. Temporary work required to make the buildings safe and watertight to prevent further deterioration and to allow completion of surveys.
2. Minimal repair expenditure - repair and renewal of various elements.
3. Full repair expenditure - extensive repair and upgrading of structure and external envelope of the buildings.

The scope of work within each scenario is described with the Architects Schedule.

C. Costs given within this Cost Report are intended as a guide as to possible levels of expenditure. Actual expenditure will be dependent on completion of full and proper surveys of the building and agreement on scope of work, specification, programme and method of procurement.

D. Costs given should be considered as being at current day levels with no allowance for future increases due to inflation. Currently inflation within the building industry is variously reported as nil or even as a negative percentage. This will, however, have to be monitored once a programme of work is agreed.

E. When considering the programme of works it must also be noted that this Report is based upon assessment of costs in relation to the building's current condition. If the buildings were to be left in their current unprotected condition for any length of time, further deterioration is probable resulting in additional costs for repair and remediation.

PHASING OF WORK

F. It should be noted that with both the Minimum Repair and Full Repair options, phasing of the works would be possible. We have not considered the implication of any phasing but can report that this would result in increased costs due to:-

- reduced scale of work to each element in each phase - this makes tendering less attractive and thus more expensive
- additional site organisation costs - site set up and dismantling for each phase
- cost inflation over the extended period of the work

G. **EXCLUSIONS**

Costs within this Report exclude the following:-

1. Fees (Professional, Planning and other Local Authority costs) - depending in the extent of work carried out this could range between 15% and 18%
2. Survey costs including Conservation Appraisal cost; analysis of mortar etc; sample panels - the scope of work will have to be identified but we would not expect these costs to be less than £150,000
3. Site acquisition costs and finance charges
4. Work to existing / original industrial machinery - repair / restoration or removal

ICE FACTORY, GRIMSBY - BUDGET COST APPRAISAL

OPTION A - TEMPORARY WORKS

		ORIGINAL BUILDING £	1910 EXTENSION £
1.	Temporary Works		
	a) Clear all rubbish and debris including pigeon guano from interior; clear all vegetation from external areas	65,000	40,000
	b) Provide scaffold enclosure to building with temporary roof, secure hoarding, anti pigeon netting.	250,000	150,000
2.	Structure		
	a) Pump out water to building and install pumps for continued use	25,000	10,000
	b) Enclose columns at basement level with concrete as Structural Engineers detail	240,000	50,000
	c) Allowance for temporary supports to external walls (subject to survey)	50,000	25,000
	d) Allowance for temporary supports to roof structures (subject to survey)	30,000	15,000
	e) Allowance for temporary supports to floors (subject to survey)	15,000	10,000
	f) Allowance for temporary work to provide safe maintenance access - work to existing floors, roof spaces and stairs	30,000	15,000
	g) Introduction of new stairs (scaffold) to improve access / safety, plus provision of mansafe system	75,000	50,000
3.	Finishes		
	a) Unblock windows (remove boarding and all glass) cover with mesh / boarding to allow ventilation but prevent access	35,000	35,000
	b) External doors - make secure, overhaul and leave in working order for access (high level doors fixed shut)	30,000	15,000
	c) Bridge over Parker Street - repair and make safe / new temporary balustrade	5,000	5,000
	d) Roofs - strip slates, store sound slates and remove debris; open up areas of asphalt to allow surveys; remove rooflights	5,000	5,000
4.	Services		
	a) Test electrical installation; provide temporary lighting to allow maintenance and surveys	25,000	15,000
	b) Temporary rainwater disposal from scaffold enclosure	5,000	3,000
	c) Survey drainage and ensure fully operational	10,000	-
	d) Temporary intruder alarm to external scaffold; temporary fire alarm and provision of exist / escape signage	8,000	5,000
		£ 903,000	£ 448,000
5.	Preliminaries - Site Organisation- assume six months on site	55,000	25,000
6.	Provide protection to key areas of original plant / equipment	10,000	-
7.	Contingency allowance	50,000	25,000
		£ 1,018,000	£ 498,000
	TOTAL - Both Buildings	**£ 1,516,000**	

Note:-

Item 1 (b) scaffold enclosure. This cost is based upon erection / dismantling and one years hire.

ICE FACTORY, GRIMSBY - BUDGET COST APPRAISAL

OPTION B - MINIMUM REPAIR OF STRUCTURE / ENVELOPE

		ORIGINAL BUILDING £	1910 EXTENSION £
1.	Temporary Works		
	a) Clear all rubbish etc as Option A	65,000	40,000
	b) Clean and disinfect interiors affected by Pigeons	5,000	3,000
	c) Provide scaffold / temporary roof as Option A - but with waterproofing sheeting and access walkway	280,000	170,000
	d) Provide crash decks beneath roof to allow repairs	85,000	42,000
2.	Structure		
	a) Pump out water / install pumps as Option A	25,000	10,000
	b) Enclose columns at basement level as Option A, repair concrete base slabs	300,000	60,000
	c) Allowance for temporary supports to external walls as Option A	50,000	25,000
	d) Repair and repoint areas of brickwork and carry out stone rebuild as Architects schedule	60,000	46,000
	e) Allowance for temporary supports to roofs as Option A	30,000	15,000
	f) Repair / decorate steel roof trusses	120,000	100,000
	g) Take out concrete decks to flat roofs and replace	194,000	19,000
	h) Repair / decorate steel supporting beams to flat roofs	25,000	5,000
	j) Allowance for repairs to steel frame (subject to survey)	100,000	50,000
	k) Strip out decayed timber floors, repair steel and install temporary decking (based upon 1000m² original and 600m² extension)	40,000	24,000
	l) De-rust and redecorate existing metal stairs; repair steps and landings	30,000	15,000
	m) Introduction of new stairs for access etc as Option A	75,000	50,000
3.	Finishes		
	a) Unblock windows (remove boarding and glass) overhaul and redecorate all windows and leave in working order; install grills for ventilation	90,000	90,000
	b) External doors - overhaul and repair, provide new ironmongery and redecorate	70,000	35,000
	c) Bridge over Parker Street as Option A	5,000	5,000
	d) Roofs - strip all roof coverings and boarding and take down water tanks and supporting structure	10,000	10,000
	e) Roofs - pitched - recover with corrugated sheet roof panels, renew rooflights	270,000	170,000
	f) Roofs - flat - renew asphalt finishes	50,000	5,000
	g) Provide new balustrades to low parapets	30,000	20,000
4.	Services		
	a) Test electrics / temporary lighting as Option A	25,000	15,000
	b) Renew all rainwater goods in cast iron	50,000	40,000
	c) Survey drainage and ensure fully operational as Option A	10,000	-
	d) Temporary intruder / fire alarm etc as Option A	8,000	5,000
		£ 2,102,000	£ 1,069,000
5.	Preliminaries - Site Organisation - assumes 12 months on site	140,000	70,000
6.	Provide protection to key areas of original plant / equipment	10,000	-
7.	Contingency allowance	200,000	100,000
		£ 2,452,000	£ 1,239,000
	TOTAL - Both Buildings	**£ 3,691,000**	

KMCS

ICE FACTORY, GRIMSBY - BUDGET COST APPRAISAL

OPTION C - FULL REPAIR AND UPGRADING STRUCTURE AND ENVELOPE

		ORIGINAL BUILDING £	1910 EXTENSION £
1.	Temporary Works		
	a) Clear all rubbish etc as Option A	65,000	40,000
	b) Clean and disinfect interiors affected by Pigeons as Option B	5,000	3,000
	c) Provide scaffold / temporary roof as Option B	280,000	170,000
	d) Provide crash decks as Option B	85,000	42,000
2.	Structure		
	a) Pump out water / install pumps as Option A	25,000	10,000
	b) Enclose columns etc at basement level as Option B	300,000	60,000
	c) Allowance for temporary supports to external walls as Option A	50,000	25,000
	d) Fully repoint brickwork, rebuild all parapets, gables etc and replace missing features as Architects schedule	188,000	133,000
	e) Allowance for temporary supports to roofs as Option A	30,000	15,000
	f) Repair / decorate steel roof trusses as Option B	120,000	100,000
	g) Take out concrete decks to flat roofs and replace as Option B	194,000	19,000
	h) Repair / decorate steel supporting beams to flat roofs as Option B	25,000	5,000
	j) Allowance for repairs to steel frame as Option B	100,000	50,000
	k) Strip out decayed timber floors, repair steel and renew timber boarding - see note below	60,000	36,000
	l) De-rust, redecorate / repair existing stairs as Option B	30,000	15,000
	m) Allowance for providing new permanent access stair to provide public access to certain areas; provision of mansafe systems for surveys etc	150,000	100,000
3.	Finishes		
	a) Unblock windows (remove boarding and glass) overhaul and redecorate all windows and leave in working order, reglaze and provide permanent ventilators	115,000	115,000
	b) External doors - overhaul and repair, provide enhanced ironmongery and redecorate	75,000	38,000
	c) Allowance for work to all retained external steel elements	30,000	20,000
	d) Roofs - strip all roof coverings etc as Option B	10,000	10,000
	e) Roofs - pitched - recover with Welsh slates, with battens, insulation, boarding as Architects schedule; renew rooflights	500,000	360,000
	f) Roofs - flat - renew asphalt finishes with insulation; improve rainwater disposal / drainage	70,000	7,000
	g) Provide new balustrades to low parapets	30,000	20,000
4.	Services		
	a) Test electrics / temporary lighting as Option A	25,000	15,000
	b) Renew all rainwater goods in cast iron; provide downpipes to additional outlets	55,000	45,000
	c) Survey drainage and ensure fully operational as Option A	10,000	-
	d) New permanent fire and intruder alarms; escape / access signage	30,000	20,000
		£ 2,657,000	£ 1,473,000
5.	Preliminaries - Site Organisation - assumes 12 months on site	140,000	70,000
6.	Provide protection to key areas of original plant / equipment	10,000	-
7.	Contingency allowance	250,000	150,000
		£ 3,057,000	£ 1,693,000
	TOTAL - Both Buildings	**£ 4,750,000**	

Note:- Structure - Item 2(k) - this work will leave timber floors with a finish to new / existing boarding. To make the building usable (as noted in Brief) it may be necessary dependant on use to provide concrete floor. This will further increase costs.

11.0 Cost Estimate

Appendices

Appendix A Information Received

Building Details:	Details:
Building Name: THE GRIMSBY ICE FACTORY INCLUDING RAILINGS **Parish:** GRIMSBY **District:** NORTH EAST LINCOLNSHIRE **County:** LINCOLNSHIRE **Postcode:** DN31 3LW	**LBS Number:** 479276 **Grade:** II* **Date Listed:** 12/09/1990 **Date Delisted:** **NGR:** TA2779910694

Listing Text:

GRIMSBY

TA2710NE GORTON STREET, The Docks
699-1/7/121 (West side)
12/09/90 The Grimsby Ice Factory including railings
(Formerly Listed as:
FISH DOCK ROAD, The Docks
(East side)
The Grimsby Ice Factory)

GV II*

Ice factory. 1900-1 with extension factory of 1907-8 and later alterations. By WF Cott, consulting engineer, for the Great Grimsby Ice Company Limited. Red brick with blue brick and ashlar dressings. Slate and glazed roofs; copper domes on north unit. Chamfered blue brick plinth. Approximately rectangular on plan, comprising 2 linked factories separated by a passage (formerly carrying a railway), cutting across at an angle. Factory has frontages to Gorton Street, Fish Dock Road, Stuart Wortley Street and the railway passage.
EXTERIOR: main front to Gorton St., facing Fish Dock Number 2: 2-storey 12-bay range to the left, and a single-storey 8-bay range to the right. Left range is divided into 3 sections: to the left are two 4-bay pedimented fronts with a narrow linking bay between topped by a short square tower, and to the right is a 3-bay parapeted section. Plinth to the sections on the left carries a narrow cantilevered balcony with plain iron railings. Pedimented sections have angle pilasters, the outer ones rising to small square turrets, the inner ones flanking the linking bay which has a central full-height keyed round-arched blind panel. The pedimented fronts form a handed pair, each with a full-height pilastered blind arcade of 4 arched panels with ashlar keystones and rubbed-brick impost mouldings, the outer panels round-arched, the wider twin central panels with elliptical arches, one of which in each section has been replaced by a first-floor loading door beneath a lintel.
Ground floor: central 2 bays to each section have segmental relieving arches and single sliding loading doors, the outer bays have round-headed glazing-bar windows. Large square cast-iron tie-bar ends at first-floor level with lettering "G G I Co Ld". Round-headed blind first-floor openings. Moulded brick cornices and friezes, that to right with painted inscription "THE GRIMSBY ICE CO LTD"; traces of former painted lettering to left frieze. Both pediments have a blind keyed oculus, stone coping with central finial. Central tower has

angle pilasters with blind slits, small central opening with a bracketed wooden bell-frame below, and a moulded and dentilled

brick cornice. Angle turrets have panelled sides, moulded cornices and pyramidal ashlar caps. 3-bay section to right also has a full-height pilastered blind arcade of recessed panels, the outer bays round-arched, the inner bay elliptical-arched, each containing keyed arched openings with moulded imposts: a blind opening to ground-floor centre, the openings to the left bay with glazing-bar windows, the others partly blocked and with various inserted C20 openings. Rebuilt coped parapet. These left-hand ranges have first-floor iron balconies and walkways, and a pair of overhead gantries with ice conveyors crossing the street to the dockside.
The lower 8-bay range to the right has a chamfered plinth and recessed panels to each bay, the 2 left bays rendered and with inserted C20 ground-floor doors, the 5 bays to the right with round-headed windows with glazing bars, stone sills and flush sill band, moulded brick imposts and impost band; blind panel to far right with sill and impost band.
The north factory unit, beyond the railway passage, has an angled 2-storey section with fronts to the passage and to Stuart Wortley Street (described below). Behind this is a taller section facing Gorton Street, with a 3-bay pedimented section with a tower adjoining to the left, both with angle pilasters.
The tower has a narrow round-headed blind panel to each side with an elongated keystone, moulded brick cornice, coped parapet; central copper dome surmounted by a flagpole, flanked by 4 small domes. Pedimented section has pilastered arcade with moulded brick imposts, round-headed keyed arches containing round-headed recessed panels, those to right with an inserted door and window. Tympanum has central blocked round-arched opening with keystone, stone coping with central ball finial; angle pilaster to right capped with small square turret.
Secondary front to Fish Dock Road: north factory unit, from left, has 2-storey 5-bay section and slightly taller 2-bay section with coped parapets, and a symmetrical 3-storey 5-bay section to right with central 3 bays topped with a pediment. Sections to left have full-height recessed panels to each bay; the first 5 bays with round-headed blind openings to ground floor and square-headed blind openings to first floor beneath cambered brick arches, all with sills. 2 bays to right have round-headed glazing-bar windows to ground floor, similar openings to first floor with lunettes above blind panels.
Pedimented section, flanked by pilasters, has 3 recessed segmental-arched panels below containing 3-light ground-floor windows with glazing bars beneath heavy steel lintels,

chequered brick panels above and 3-light first-floor windows with sills and glazing bars. Above is a pilastered blind arcade of narrow round-headed panels with moulded brick imposts and ashlar keystones, containing recessed round-headed glazing-bar windows with sills. Moulded brick cornice and frieze with painted lettering "THE GRIMSBY ICE COMPANY LTD". Pediment has moulded brick cornice, small oculus with elongated keystones, stone coping with central ball finial. Flanking pilasters capped with square turrets with blind panels, moulded cornices and pyramidal caps. Single flanking bays have continuation of cornice and frieze and pilasters capped with turrets: bay to left has a round-headed ground-floor entrance with double doors beneath a steel lintel, chequered brick tympanum and keyed arch; bay to right forms one side of an angle turret beside the railway passage.
South factory unit, to right of the railway passage: has front of 2 builds to Fish Dock Road. Earlier section to left has 1:3:1 bays with recessed panels to each bay. Wider outer bays have keyed round-headed ground-floor openings with glazing-bar

windows, that to right incorporating a central door; single circular windows above with glazing bars. 3 narrower central bays have recessed round-headed panels containing ground-floor

windows beneath lintels, and round-headed first-floor windows, all with stone sills and glazing bars. Coped parapet. Section to right has 2 large glazed panels, each of 6 lights, with 3 tiers of windows; coped parapet.
Stuart Wortley Road front of north factory unit: 2 storeys, with a tall 3-bay central section flanked by lower 6-bay sections. Recessed panels to each bay. Left section has 2 full-height blind panels and a wide ground-floor entrance to the right beneath a steel lintel, with 4 recessed panels above containing round-headed first-floor windows with glazing bars; parapet with later C20 concrete coping. Central 3-bay section has pilasters between bays and angle pilasters capped by

Appendices

square turrets. Ground floor: pair of tall keyed round-arched openings to left, one with loading door, the other partly blocked and with an inserted window, both with steel lintels at impost level and chequered brick tympana. Round-headed glazing-bar window to right. Above, recessed round-headed panels with keystones and moulded brick imposts, containing blind round-headed openings with sills, that to left with a small inserted door and iron balcony. Coped parapet ramped up to pedimented front to Gorton Street to left.
Railway passage elevations: northern factory unit, from left, has 20-bay section of 2 and 3 storeys, a single-bay tower, and a low 2-storey range with 5 irregular first-floor openings. 20-bay section has blue brick to ground floor, recessed panels to each bay. 4 bays to left have 3-light ground-floor and

first-floor windows with glazing bars beneath steel lintels, separated by chequered brick panels. Above are round-headed openings containing lunettes with sills above blind panels, one with a door to an iron gantry walkway linked to the southern factory unit. 15 bays to right have round-headed openings to ground floor, one with a blind panel, another with an inserted door, the others with glazing-bar windows, some beneath louvres. Above, round-headed blind panels with blind lunettes with sills. Stepped brick eaves cornice (for turret see Gorton Street front). Section to right has blocked ground-floor door to left of centre and wide 4-light wooden first-floor window with glazing bars and boarded apron beneath steel lintel; to left, a pair of blind square-headed first-floor openings; to right, 2 bays with recessed panels containing round-headed windows to each floor; coped parapet.
Railway passage elevation of southern factory unit has 5 2-storey parapeted sections of varying height, with 4, 5, 3, 2, and 5 first-floor openings. 3 sections to left have 3 square-headed doors, one blocked, and a blocked round-headed door, round-headed and segmental-headed glazing-bar windows to
ground and first floor. Taller 2-bay range to right of centre has recessed panels containing round-headed glazing-bar windows, that to first-floor right with a door and gantry walkway to northern factory unit. 5-bay section to right has full-height recessed round-headed panels with ground-floor and first-floor glazing-bar windows similar to adjoining Fish Dock Road front.
INTERIOR: massive girder construction supports 6 rows of refrigeration tanks on 2 floors complete with machinery for producing blocks of ice. The factory was converted to electricity in 1933 and compressors remain in the Compressor Room. The northern unit has been partly cleared but massive girder construction remains.
HISTORY: built following the amalgamation of the Grimsby Ice Company with the Co-operative Ice Company. The factory supplied ice for fish packing. The overhead gantries on the Gorton Street front carried ice into the dockside fish-landing building opposite. Ceased production 1990. The Grimsby Ice Company was one of Grimsby's leading fishing companies, and also built the Fisherlads' Home, for fishing apprentices, in Convamore Road (qv).
This ice factory illustrates Grimsby's importance as the world's foremost fishing centre in the earlier C20. This building is understood to be the earliest remaining ice factory in the UK. Furthermore it is believed to be the sole survivor, complete with its machinery, from this period.
(Ambler R W: Great Grimsby Fishing Heritage - a brief for a trail: Grimsby Borough Council: 1990: pp34-35; National

Fishing Heritage Centre: Great Grimsby Heritage Trail: 1991-).

Appendices

Appendix B
Drawings by ABA

THE ICE FACTORY

notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND THE SPECIFICATIONS.

10·02·10	ISSUED WITH REPORT	DS

job

ICE FACTORY
GRIMSBY

title

SITE PLAN

drawn	checked
HWe	DJ
date	scale (original - A3)
FEB' 10	N.T.S.

Alan Baxter

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1568/01/01

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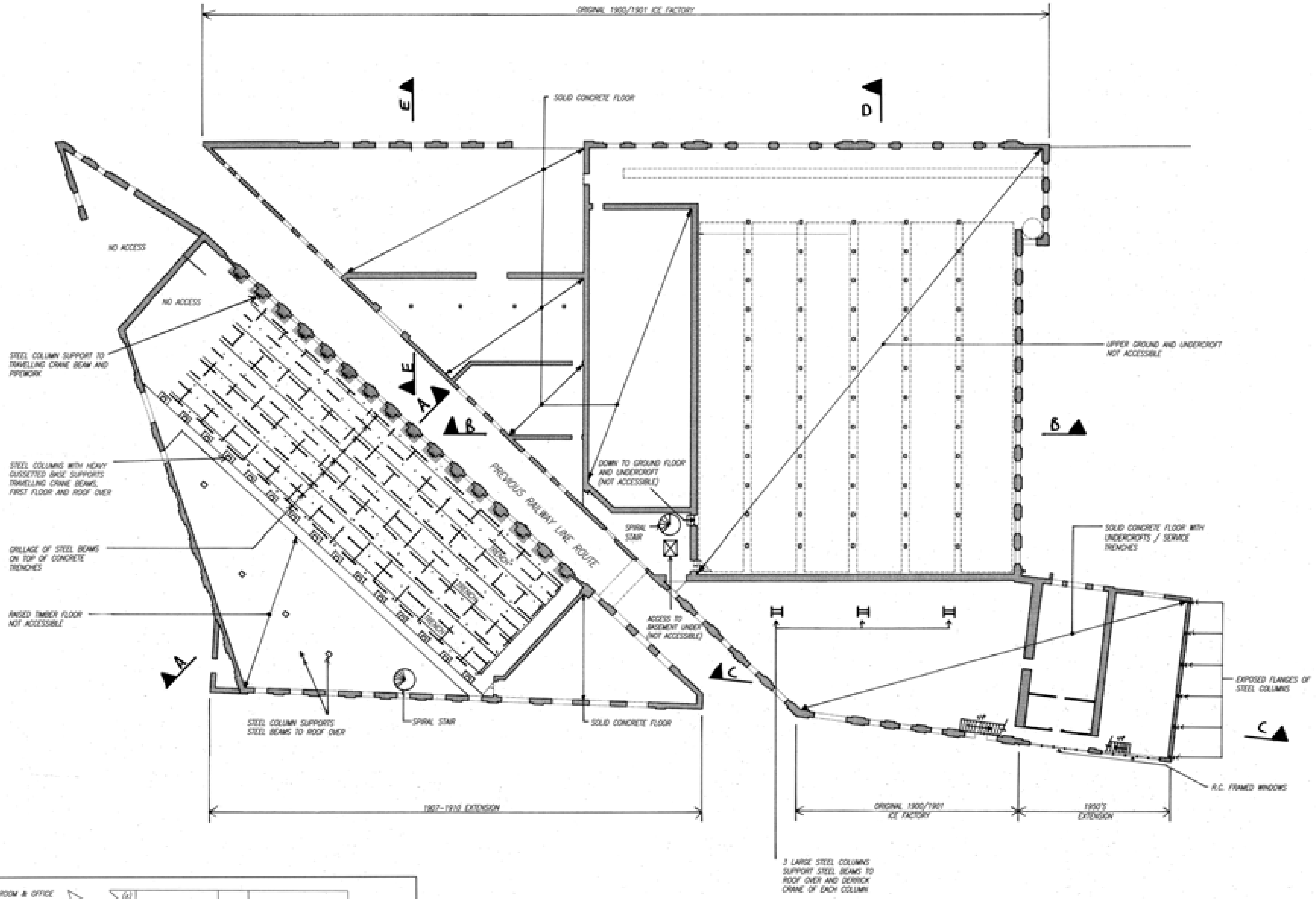
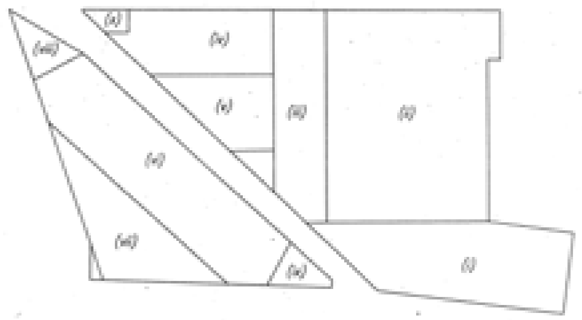


- (i) COMPRESSOR ROOMS WITH SWITCH ROOM & OFFICE
- (ii) TANK ROOMS
- (iii) ICE STORE
- (iv) FLAKE ICE PLANT & STORES (PREVIOUSLY BOILER ROOM)
- (v) CONDENSER ROOM
- (vi) TANK ROOM
- (vii) STORAGE
- (viii) LOADING BAY
- (ix) OFFICE
- (x) OLD CHIMNEY



KEY PLAN

notes

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECTS AND ENGINEERS DRAWINGS AND THE SPECIFICATIONS.
2. THIS DRAWING IS BASED ON SURVEY DRAWINGS BY HODSON ARCHITECTS, WHICH ARE NOTED AS BEING 'NOT TO SCALE', AND ON WHAT CAN BE SEEN OF THE EXISTING STRUCTURE DURING SITE VISITS IN SEPTEMBER 2009 AND JANUARY 2010. IT SHOULD BE NOTED THAT THERE ARE LARGE AREAS OF THE BUILDINGS THAT ARE NOT ACCESSIBLE FOR SAFETY REASONS, SO INFORMATION ON THESE DRAWINGS CANNOT BE RELIED ON. ALL DETAILS OF THE EXISTING STRUCTURE NEED TO BE CHECKED.
3. KEY TO EXISTING STRUCTURE
   - LOADBEARING BRICKWORK
   - STEEL COLUMN–COMPOSED OF ANGLES/PLATES/I–SECTIONS
   - LINE OF STEEL BEAM
   - TRUSS – LINE OF STEEL ROOF TRUSS

ISSUED WITH REPORT

job
ICE FACTORY
GRIMSBY

title
GROUND FLOOR LEVEL
EXISTING STRUCTURE

drawn: HWe
checked: DJ
date: JAN '10
scale (original - A1): APPROX 1:200

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dwg no.
1568/01/02

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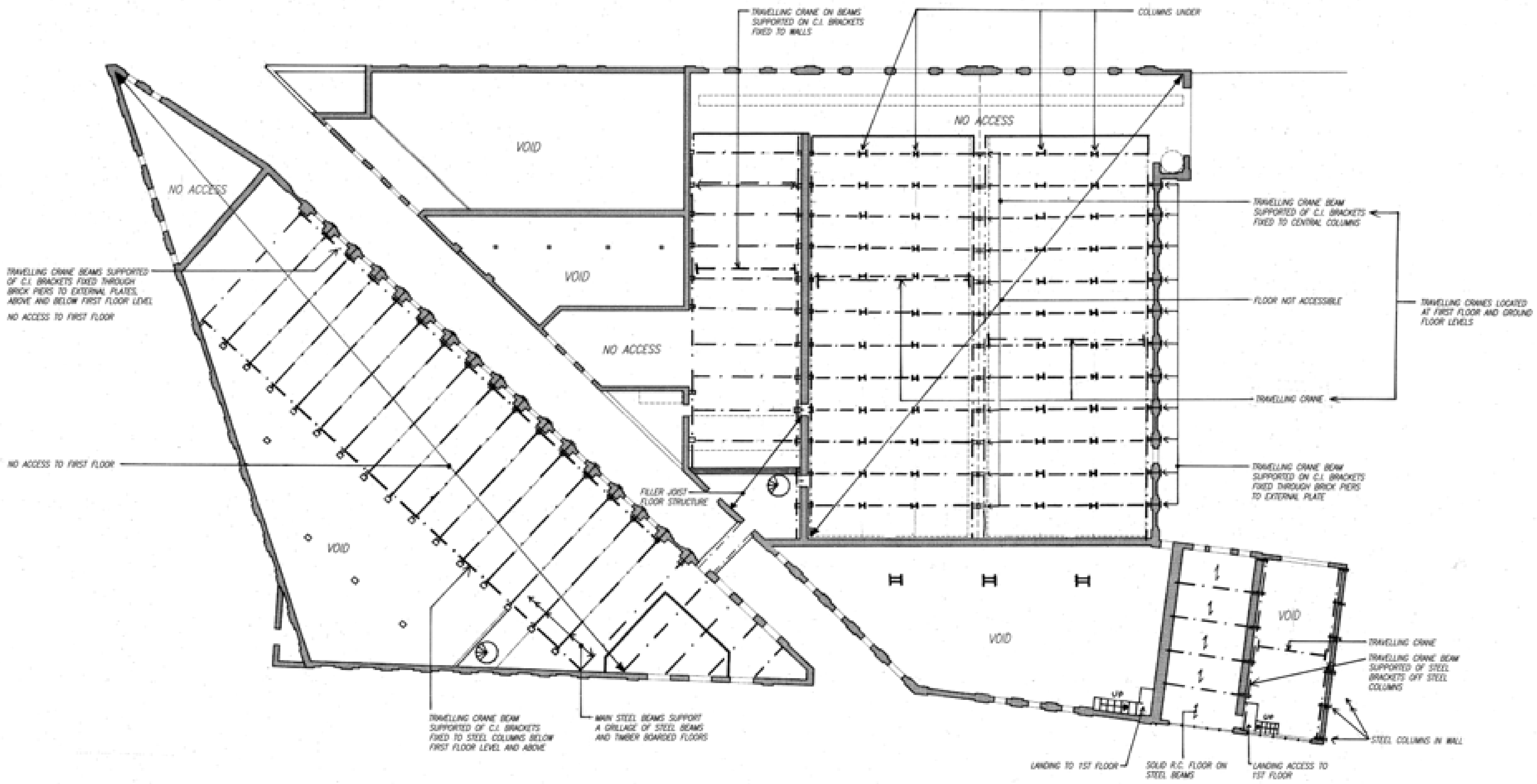

notes

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3. KEY TO EXISTING STRUCTURE

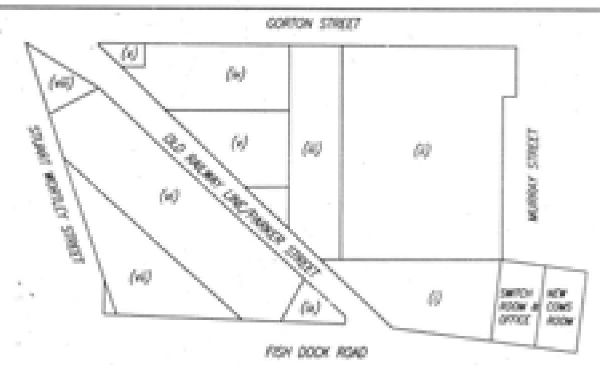
- = LOADBEARING BRICKWORK
- = STEEL COLUMN–COMPOSED OF ANGLES/PLATES/I–SECTIONS
- = LINE OF STEEL BEAM
- TRUSS = LINE OF STEEL ROOF TRUSS
- = APPROXIMATE EXTENT OF 1ST FLOOR

ISSUED WITH REPORT

job
ICE FACTORY GRIMSBY

title
FIRST FLOOR LEVEL
EXISTING STRUCTURE

(i) COMPRESSOR ROOMS WITH SWITCH ROOM & OFFICE
(ii) TANK ROOMS
(iii) ICE STORE
(iv) FLAKE ICE PLANT & STORES (PREVIOUSLY BOILER ROOM)
(v) CONDENSER ROOM
(vi) TANK ROOM
(vii) STORAGE
(viii) LOADING BAY
(ix) OFFICE
(x) OLD CHIMNEY



KEY PLAN

drawn HWe	checked DJ
date JAN '10	scale (original - A1) APPROX 1:200

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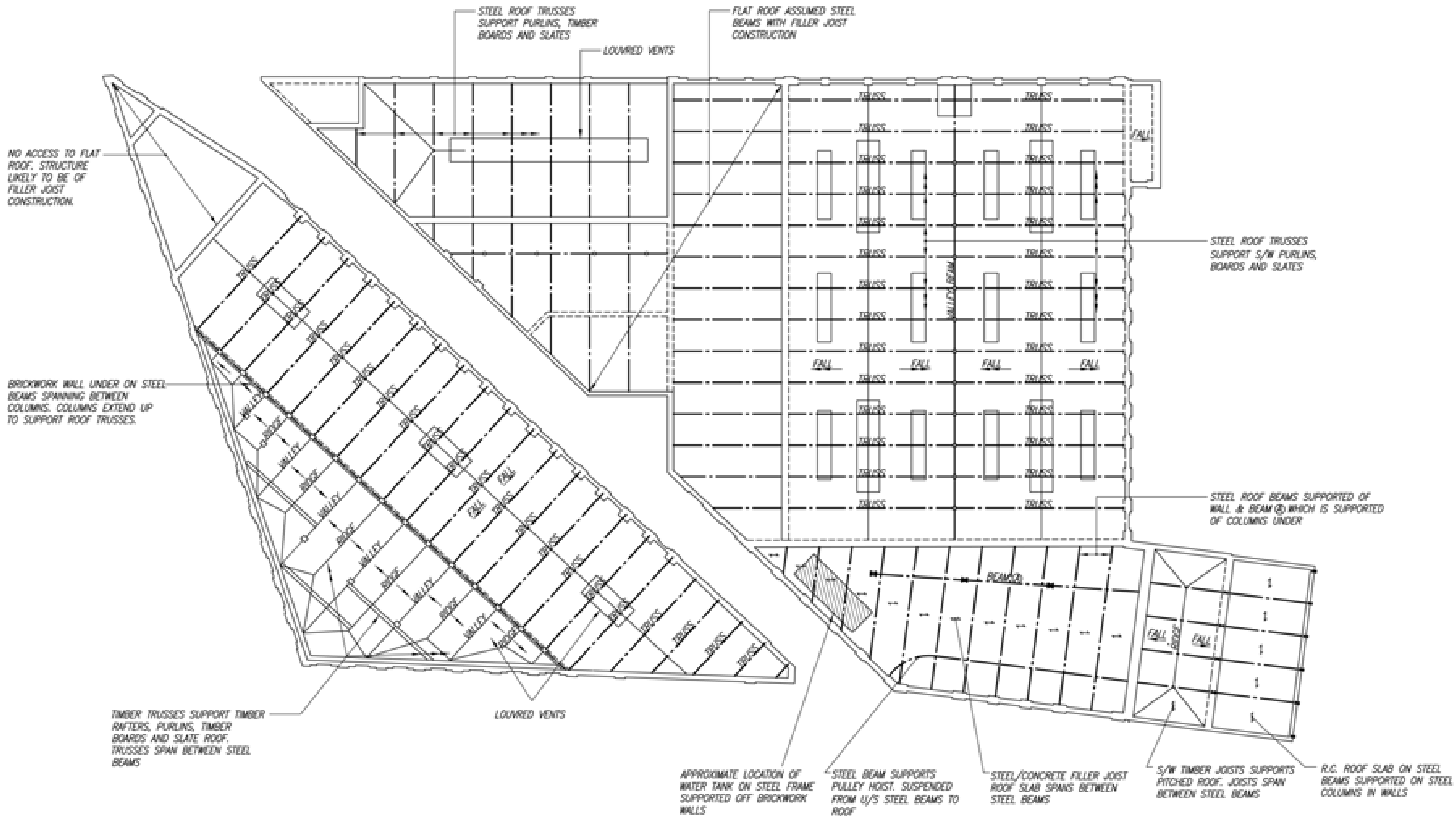
dwg no.
1568/01/03



notes

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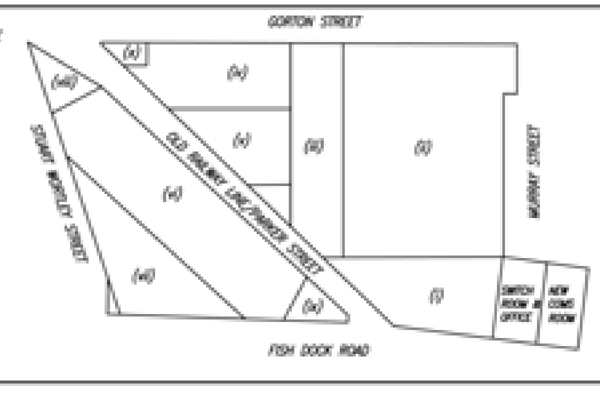
2. THIS DRAWING IS BASED ON SURVEY DRAWINGS BY HODSON ARCHITECTS, WHICH ARE NOTED AS BEING "NOT TO SCALE", AND ON WHAT CAN BE SEEN OF THE EXISTING STRUCTURE DURING SITE VISITS IN SEPTEMBER 2009 AND JANUARY 2010. IT SHOULD BE NOTED THAT THERE ARE LARGE AREAS OF THE BUILDINGS THAT ARE NOT ACCESSIBLE FOR SAFETY REASONS, SO INFORMATION ON THESE DRAWINGS CANNOT BE RELIED ON. ALL DETAILS OF THE EXISTING STRUCTURE NEED TO BE CHECKED.
3. KEY TO EXISTING STRUCTURE
   - LOADBEARING BRICKWORK
   - STEEL COLUMN–COMPOSED OF ANGLES/PLATES/I–SECTIONS
   - LINE OF STEEL BEAM
   - TRUSS – LINE OF STEEL ROOF TRUSS

(i) COMPRESSOR ROOMS WITH SWITCH ROOM & OFFICE
(ii) TANK ROOMS
(iii) ICE STORE
(iv) FLAKE ICE PLANT & STORES (PREVIOUSLY BOILER ROOM)
(v) CONDENSER ROOM
(vi) TANK ROOM
(vii) STORAGE
(viii) LOADING BAY
(ix) OFFICE
(x) ORIGINAL CHIMNEY POSITION (NO LONGER EXISTS)



KEY PLAN

ISSUED WITH REPORT.

job
ICE FACTORY GRIMSBY

title
ROOF LEVEL
EXISTING STRUTCTURE

drawn	checked
HWe	DJ
date	scale (original - A1)
JAN '10	APPROX 1:200

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1568/01/04

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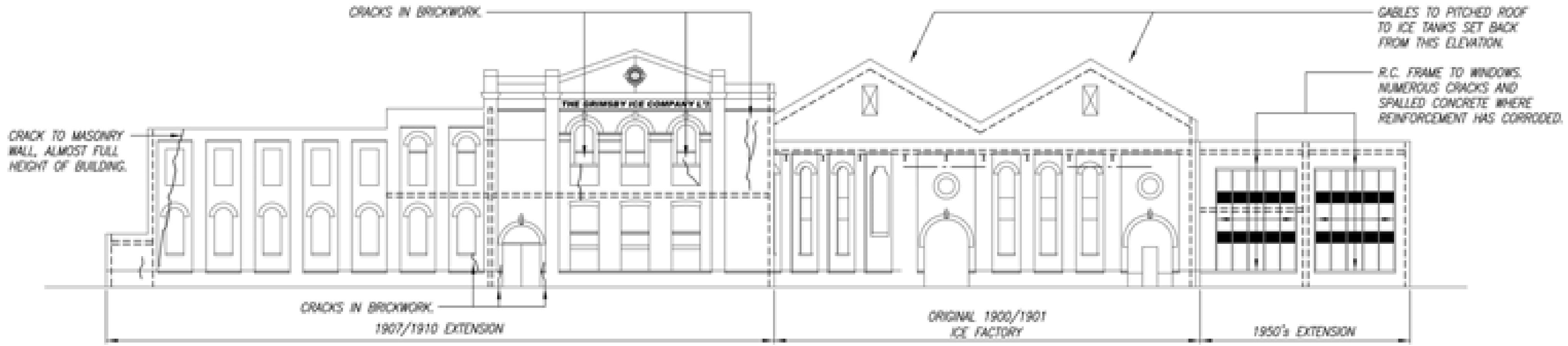
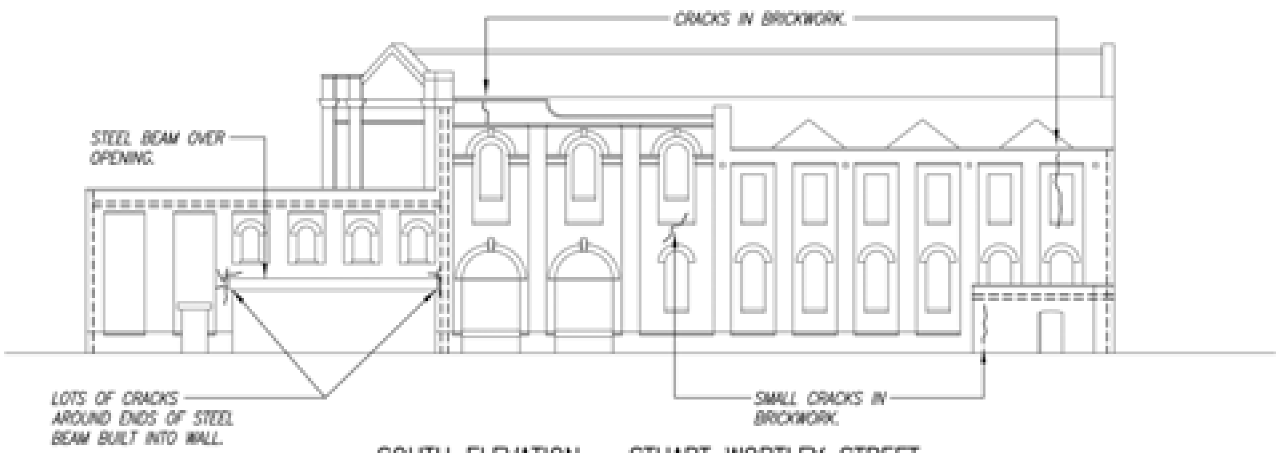
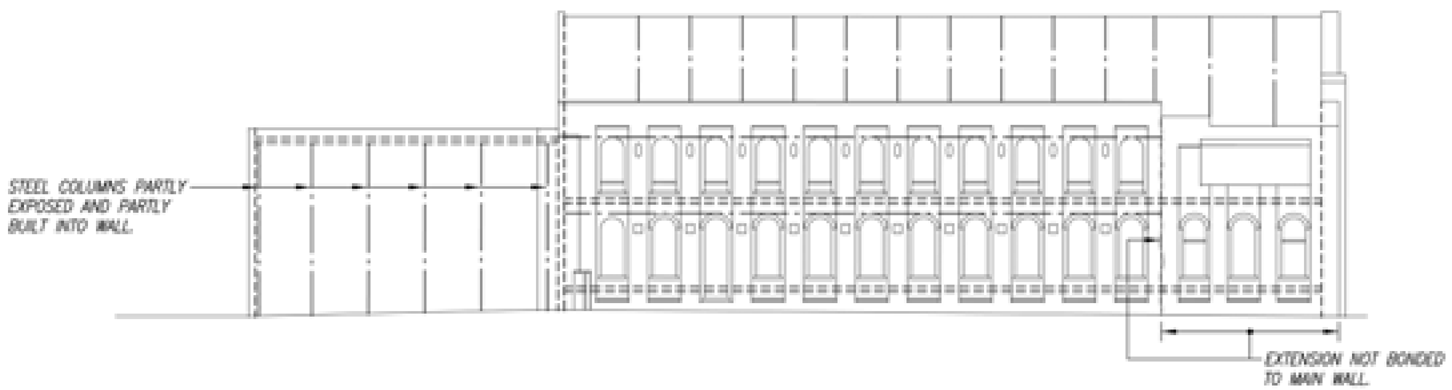


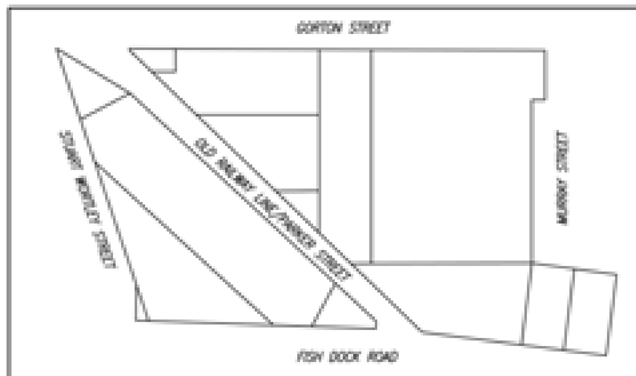
WEST ELEVATION – FISH DOCK ROAD



SOUTH ELEVATION – STUART WORTLEY STREET



NORTH ELEVATION – MURRAY STREET



KEY PLAN

notes

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2. THIS DRAWING IS BASED ON SURVEY DRAWINGS BY HODSON ARCHITECTS, WHICH ARE NOTED AS BEING "NOT TO SCALE", AND ON WHAT CAN BE SEEN OF THE EXISTING STRUCTURE DURING SITE VISITS IN SEPTEMBER 2009 AND JANUARY 2010. IT SHOULD BE NOTED THAT THERE ARE LARGE AREAS OF THE BUILDINGS THAT ARE NOT ACCESSIBLE FOR SAFETY REASONS, SO INFORMATION ON THESE DRAWINGS CANNOT BE RELIED ON. ALL DETAILS OF THE EXISTING STRUCTURE NEED TO BE CHECKED.
3. KEY TO EXISTING STRUCTURE
   - ☐ – LOADBEARING BRICKWORK
   - – STEEL COLUMN–COMPOSED OF ANGLES/PLATES/I–SECTIONS
   - – LINE OF STEEL BEAM
   - TRUSS – LINE OF STEEL ROOF TRUSS

	10.02.10	ISSUED WITH REPORT.	DJ

job
ICE FACTORY
GRIMSBY

title
ELEVATIONS SHEET 1
EXISTING STRUCTURE MARKED UP WITH OBSERVATIONS FROM SITE VISIT

drawn	checked
HWe	DJ
date	scale (original - A1)
JAN '10	APPROX 1:200

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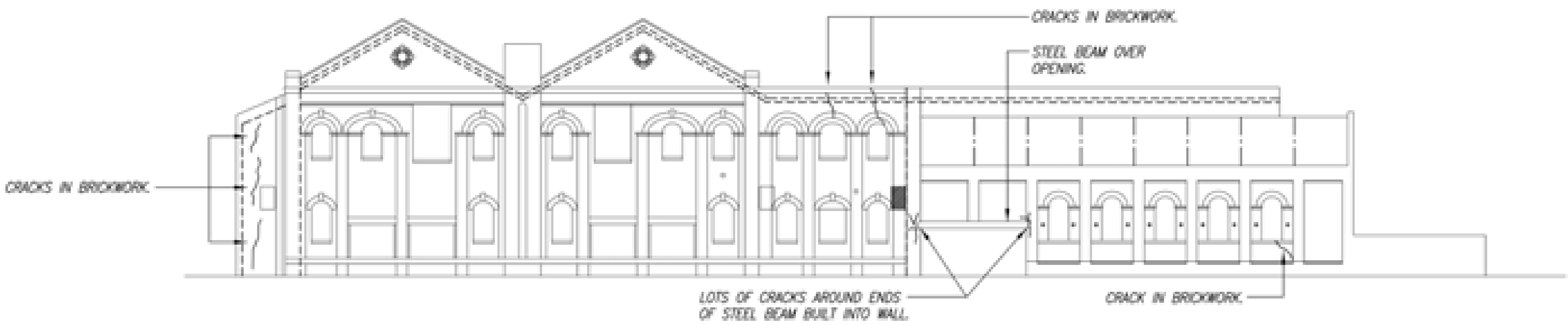
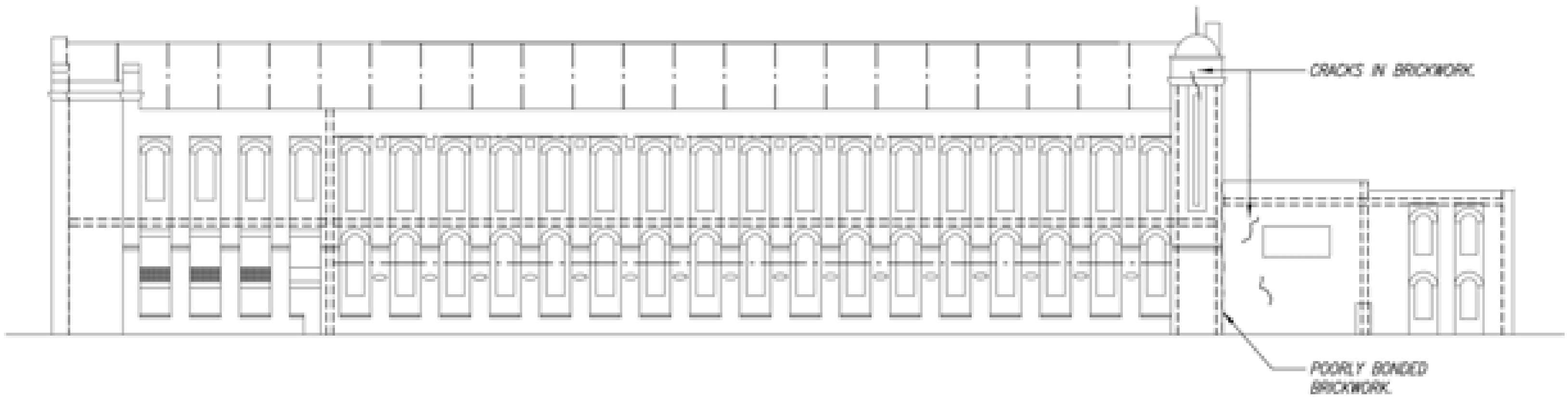
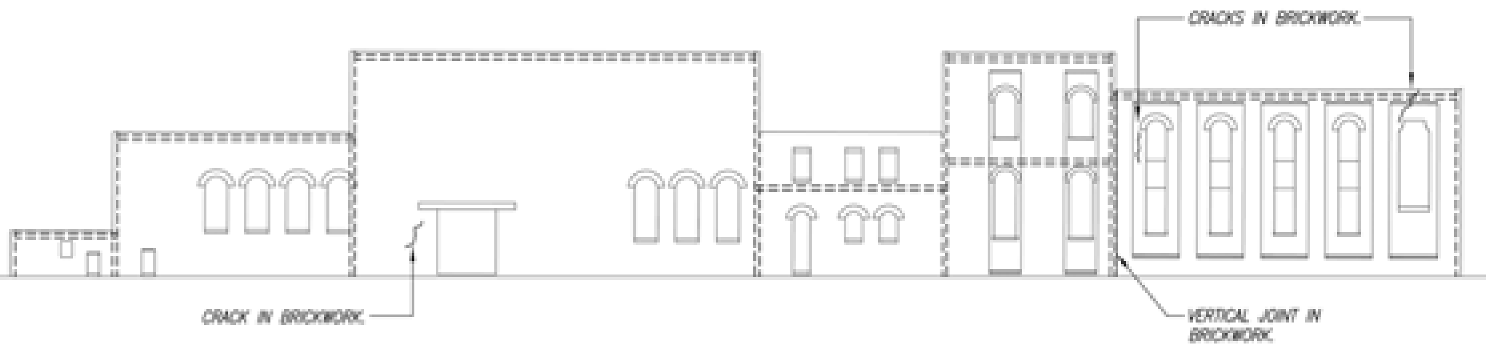


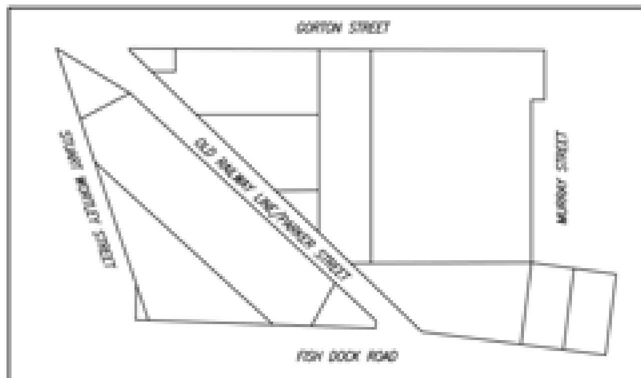
EAST ELEVATION – GORTON STREET



NORTH ELEVATION – PARKER STREET



SOUTH ELEVATION – PARKER STREET



KEY PLAN

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3. KEY TO EXISTING STRUCTURE

- LOADBEARING BRICKWORK
- STEEL COLUMN–COMPOSED OF ANGLES/PLATES/I–SECTIONS
- LINE OF STEEL BEAM
- TRUSS – LINE OF STEEL ROOF TRUSS

	10.02.10	ISSUED WITH REPORT.	DJ

job
ICE FACTORY GRIMSBY

title
ELEVATIONS SHEET 2
EXISTING STRUCTURE MARKED UP WITH OBSERVATIONS FROM SITE VISIT

drawn	checked
HWe	DJ
date	scale (original - A1)
JAN '10	APPROX 1:200

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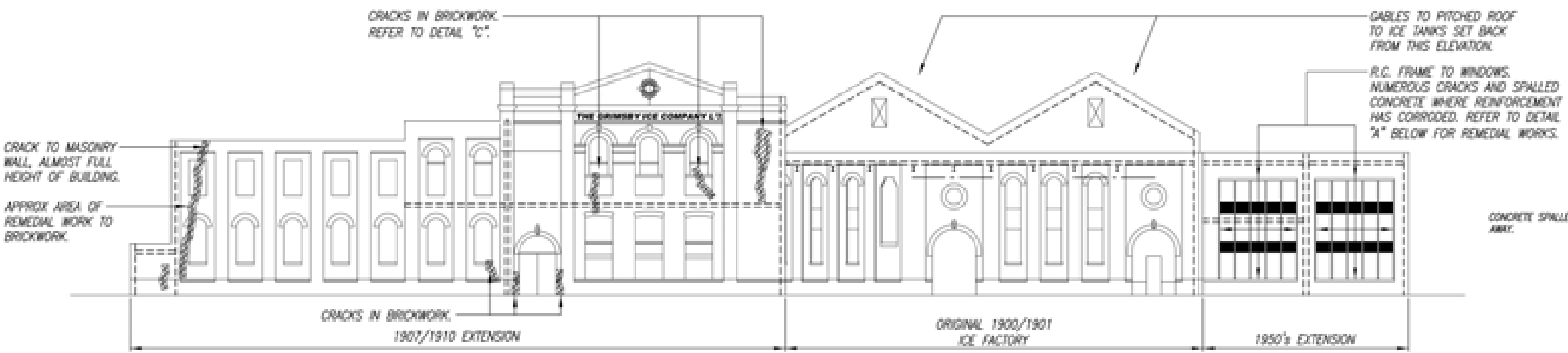
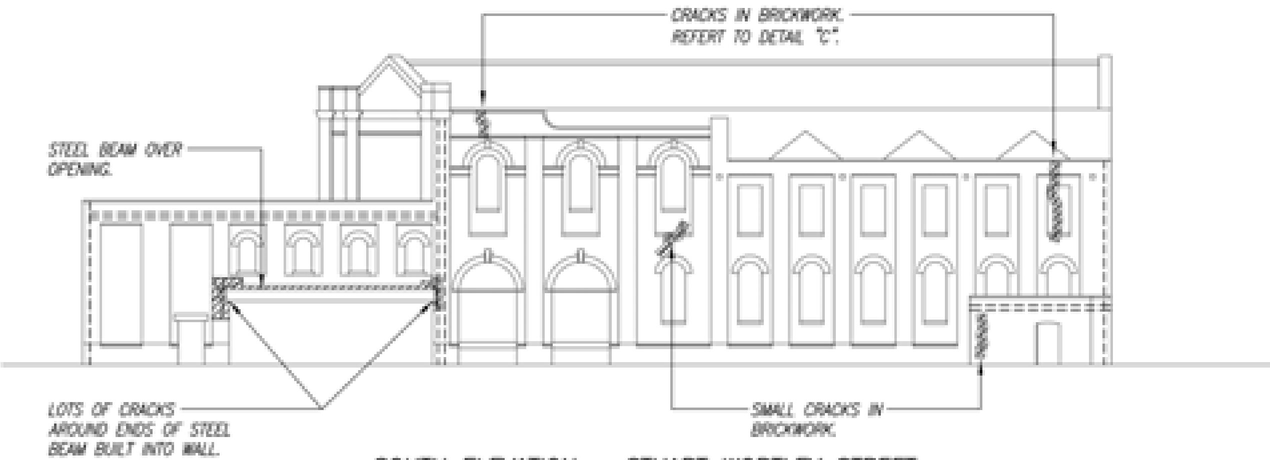
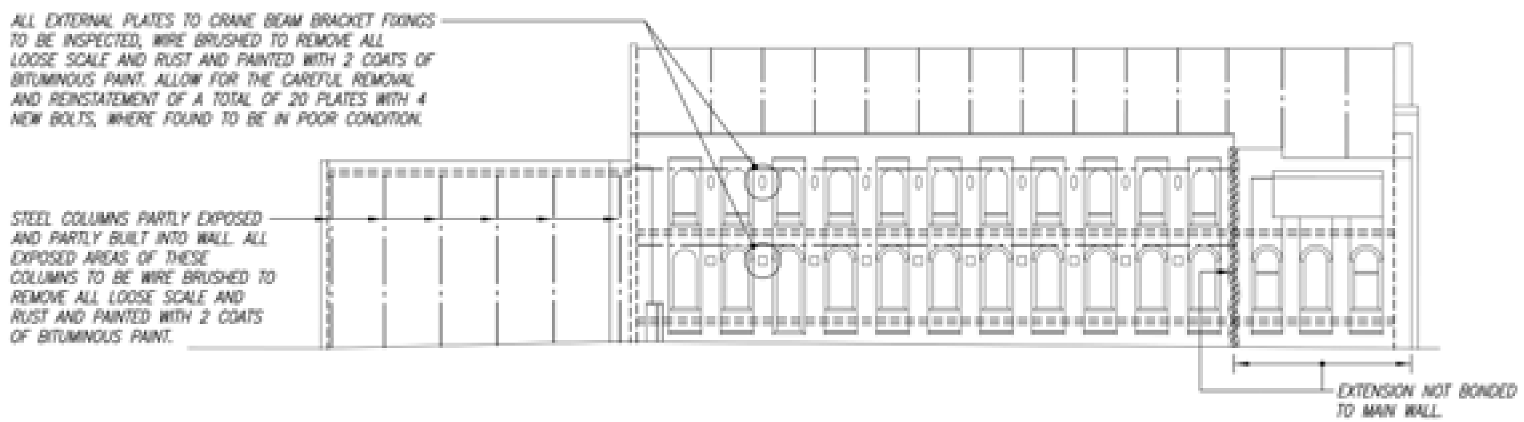


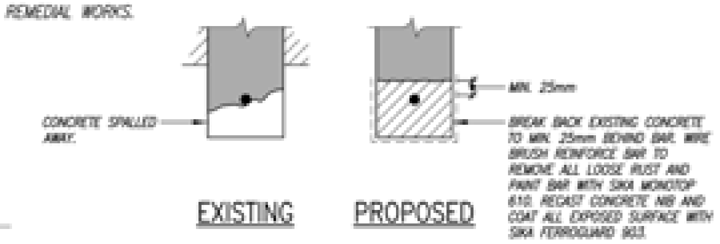
WEST ELEVATION – FISH DOCK ROAD



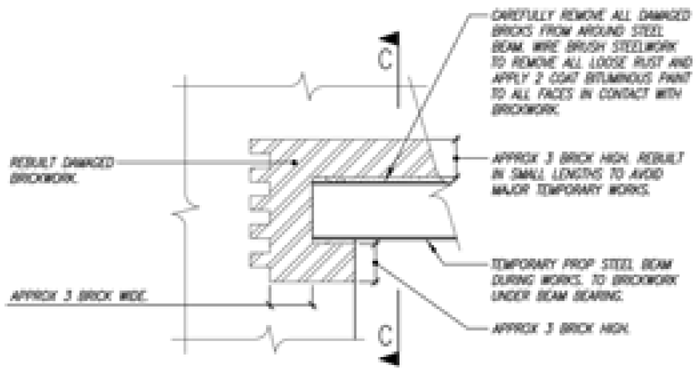
SOUTH ELEVATION – STUART WORTLEY STREET



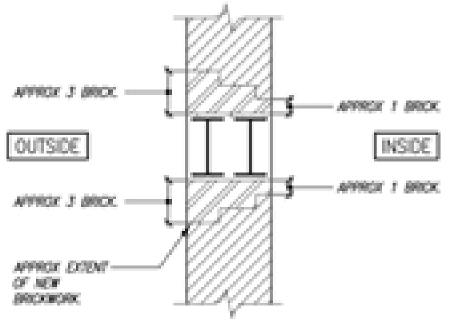
NORTH ELEVATION – MURRAY STREET



REMEDIAL DETAIL A APPLIES TO 50% LENGTH OF R.C. FRAME.

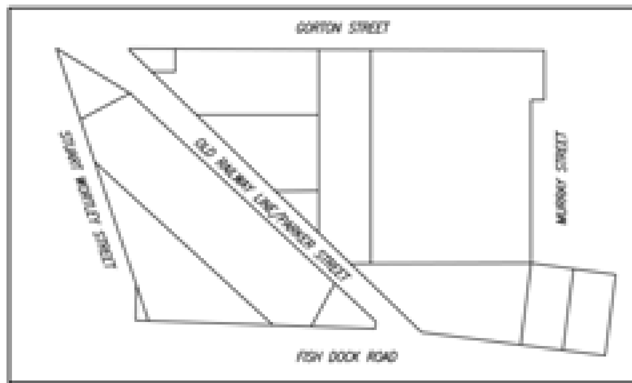


REMEDIAL DETAIL B



SECTION C–C

THIS DRAWING SHOWS ONLY THE STRUCTURAL REPAIRS PROPOSED, REFER TO ARCHITECTS DETAILS FOR AN OTHER REMEDIAL WORKS.



KEY PLAN

notes

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3. KEY TO EXISTING STRUCTURE
   - LOADBEARING BRICKWORK
   - STEEL COLUMN–COMPOSED OF ANGLES/PLATES/I–SECTIONS
   - LINE OF STEEL BEAM
   - TRUSS – LINE OF STEEL ROOF TRUSS
   - APPROX AREA OF BRICKWORK TO BE REBUILT AS PART OF REMEDIAL WORKS. SEE TYPICAL DETAIL "A" AND "B" ON THIS DRAWING AND DETAIL "C" ON DRAWING No. 1568/01/08.

	10.02.10	ISSUED WITH REPORT.	DJ

job
ICE FACTORY
GRIMSBY

title
ELEVATIONS SHEET 1
EXISTING STRUCTURE MARKED UP WITH APPROX EXTENT OF REMEDIAL WORKS TO STRUCTURE

drawn	checked
HWe	DJ
date	scale (original – A1)
JAN '10	APPROX 1:200

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dwg. no.	rev.
1568/01/07	

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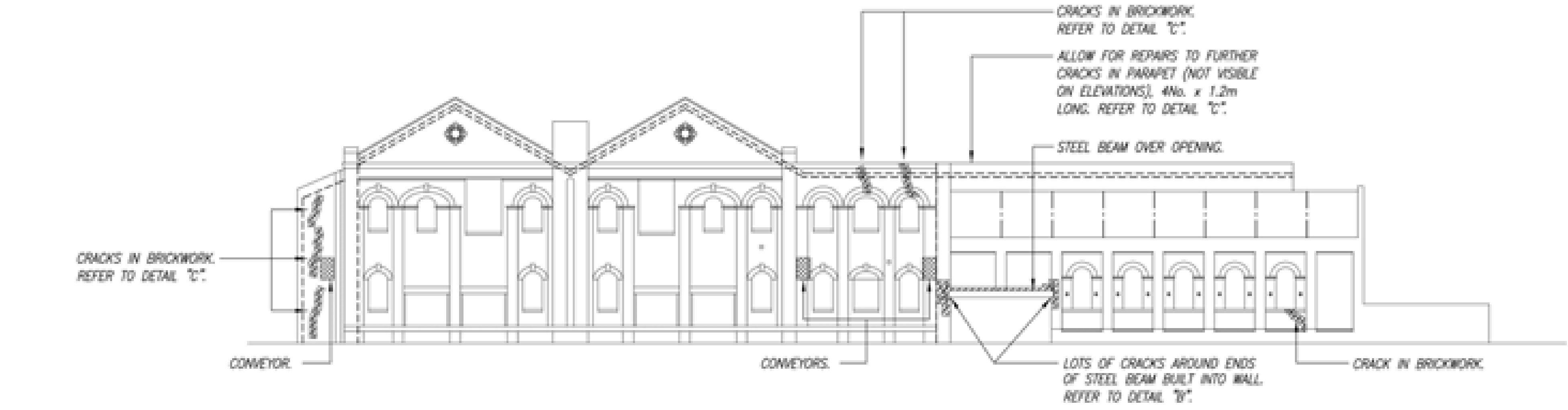
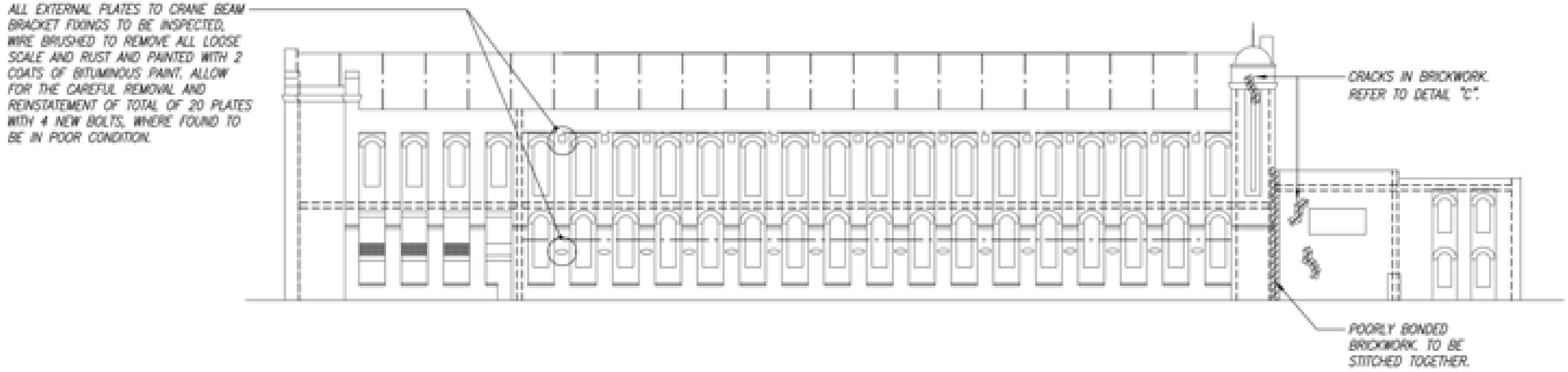
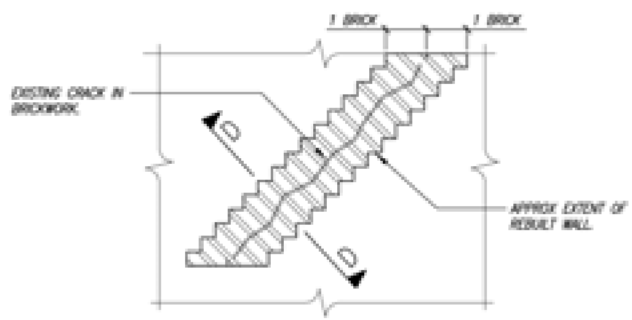


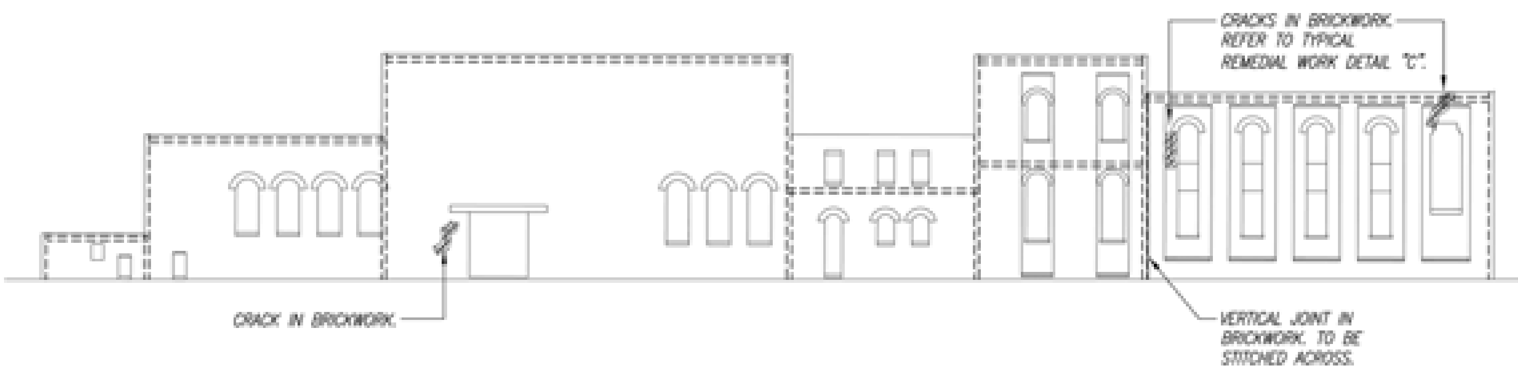
EAST ELEVATION – GORTON STREET



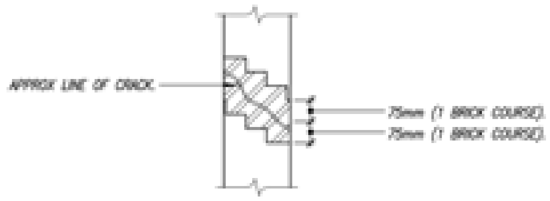
NORTH ELEVATION – PARKER STREET



TYPICAL CRACK REPAIR DETAIL C

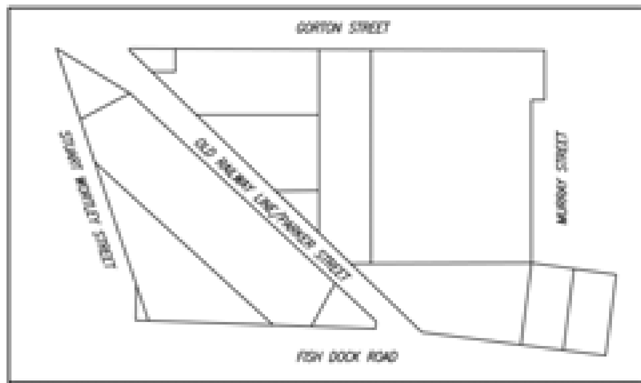


SOUTH ELEVATION – PARKER STREET



SECTION D–D

THIS DRAWING SHOWS ONLY THE STRUCTURAL REPAIRS PROPOSED, REFER TO ARCHITECTS DETAILS FOR AN OTHER REMEDIAL WORKS.



KEY PLAN

notes

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   - LOADBEARING BRICKWORK
   - STEEL COLUMN–COMPOSED OF ANGLES/PLATES/I–SECTIONS
   - LINE OF STEEL BEAM
   - TRUSS – LINE OF STEEL ROOF TRUSS
   - APPROX AREA OF BRICKWORK TO BE REBUILT AS PART OF REMEDIAL WORKS. SEE TYPICAL DETAILS "A" AND "B" ON DRAWING No. 1568/01/07 AND DETAIL "C" ON THIS DRAWING.

	10.02.10	ISSUED WITH REPORT.	DJ

job
ICE FACTORY GRIMSBY

title
ELEVATIONS SHEET 2
EXISTING STRUCTURE MARKED UP WITH APPROX EXTENT OF REMEDIAL WORKS TO STRUCTURE

drawn	checked
HWe	DJ
date	scale (original – A1)
JAN '10	APPROX 1:200

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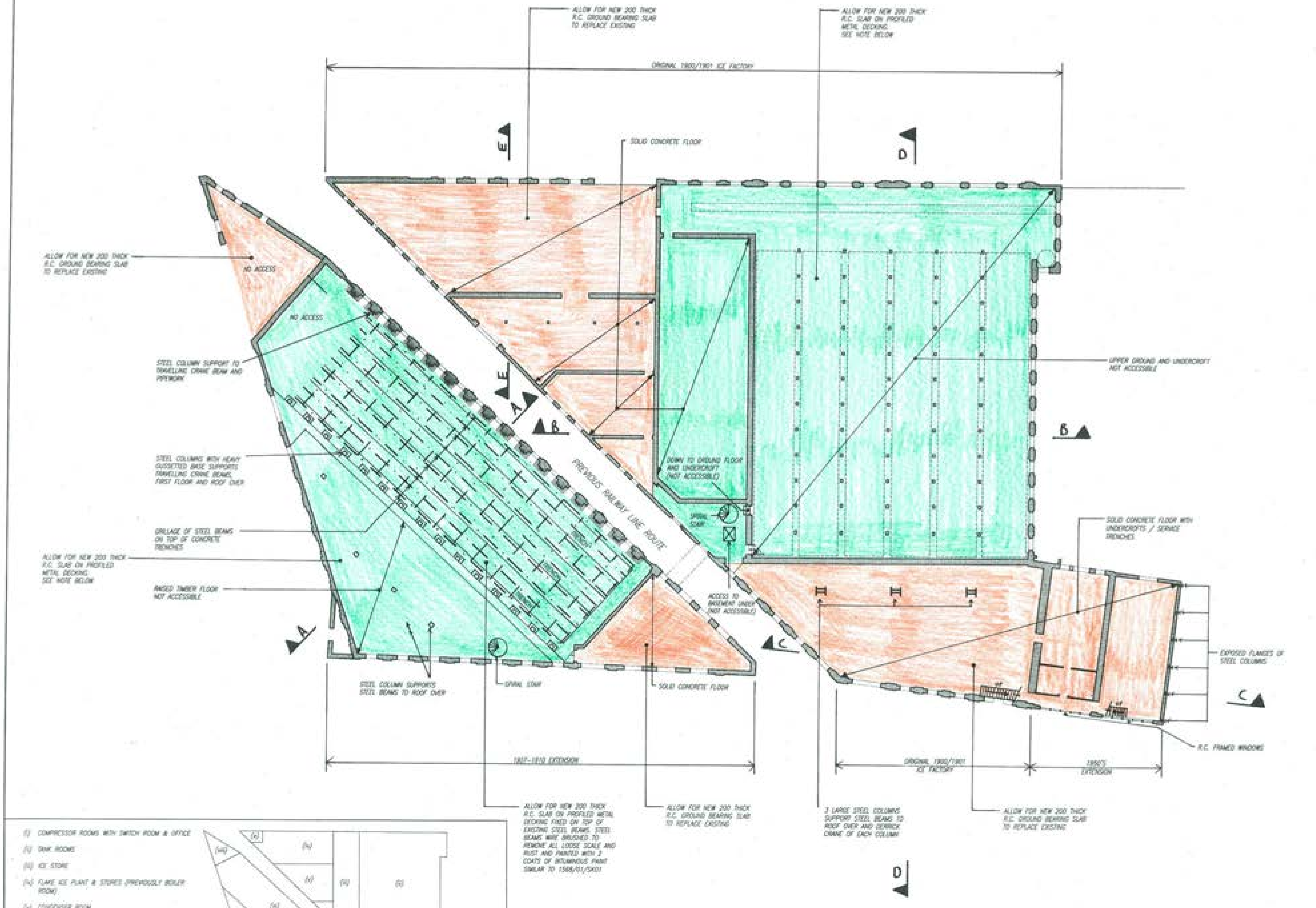
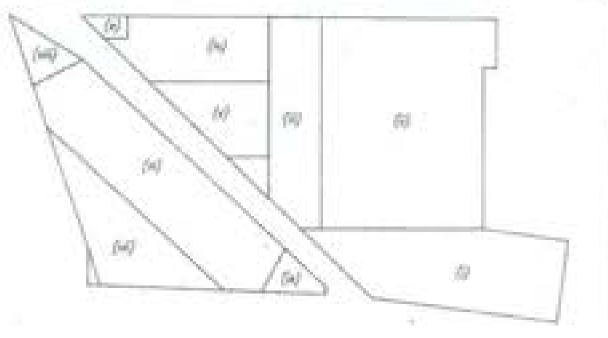


(i) COMPRESSOR ROOMS WITH SWITCH ROOM & OFFICE
(ii) TANK ROOMS
(iii) ICE STORE
(iv) FLAKE ICE PLANT & STORES (PREVIOUSLY BOILER ROOM)
(v) CONDENSER ROOM
(vi) TANK ROOM
(vii) STORAGE
(viii) LOADING BAY
(ix) OFFICE
(x) OLD CHIMNEY



KEY PLAN

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3. KEY TO EXISTING STRUCTURE
- LOADBEARING BRICKWORK
- STEEL COLUMN-COMPOSED OF ANGLES/PLATES/I-SECTIONS
- LINE OF STEEL BEAM
- LINE OF STEEL ROOF TRUSS

	26-02-10	ISSUED WITH REPORT	05

ICE FACTORY
GRIMSBY

GROUND FLOOR LEVEL
EXISTING STRUCTURE - MARKED UP TO SHOW LIKELY REMEDIAL WORKS

drawn	checked
HWe	DJ
date	scale (original - A1)
JAN '10	APPROX 1:200

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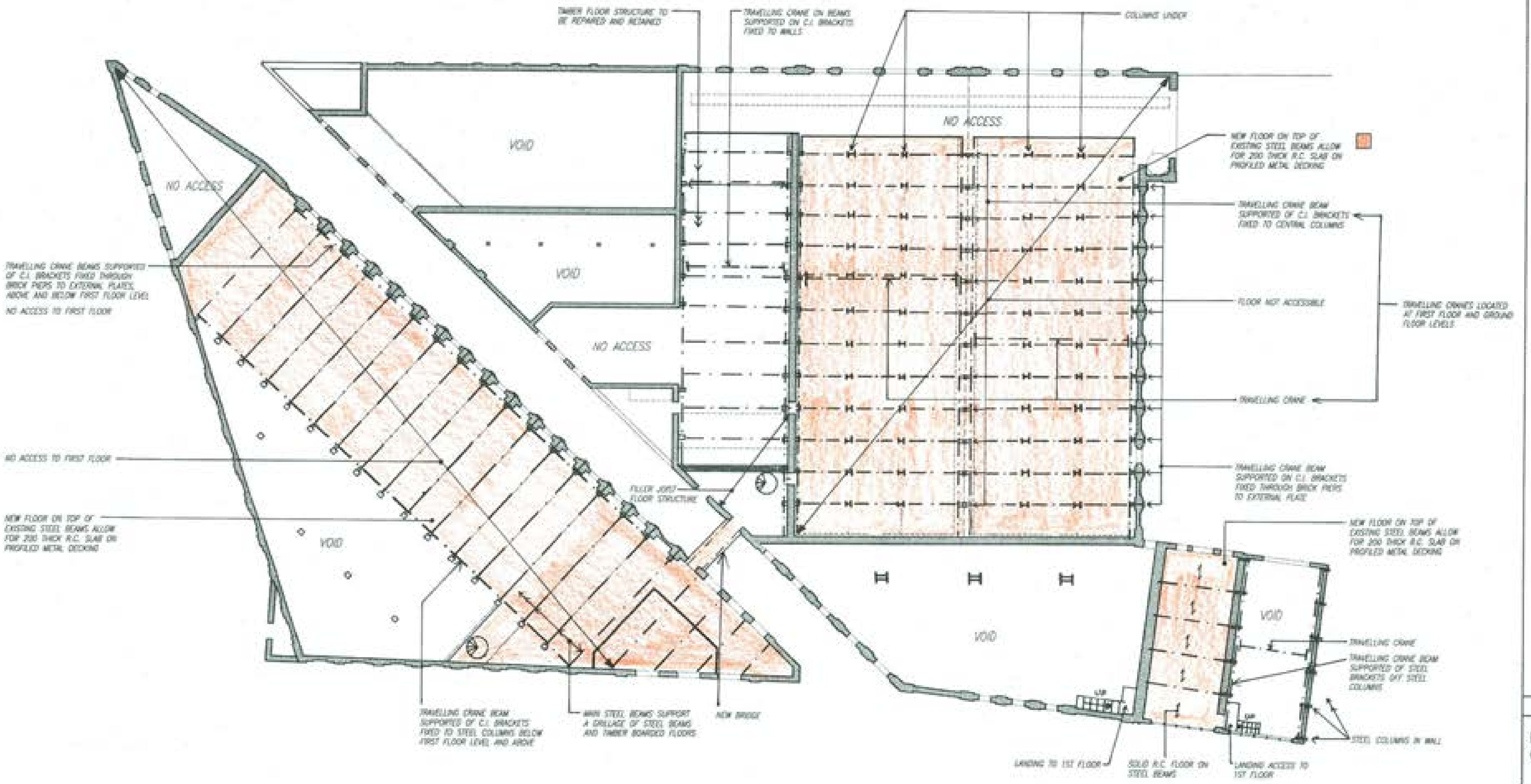

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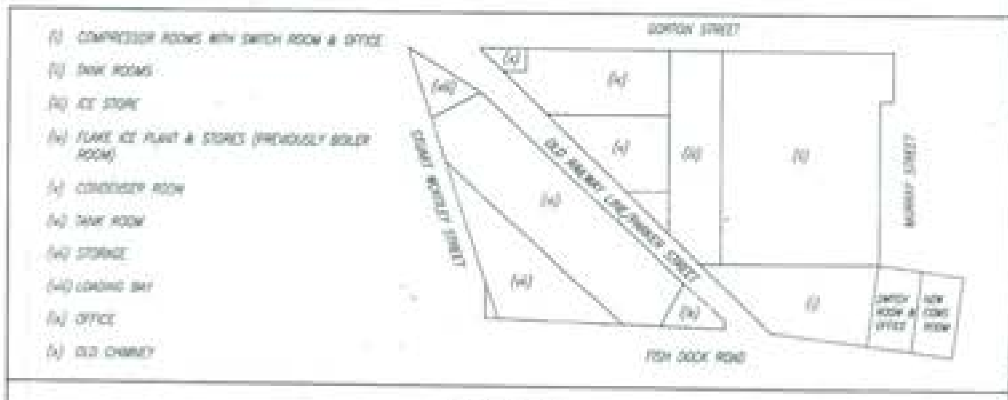
   - STEEL COLUMN–COMPOSED OF ANGLES/PLATES/I-SECTIONS
   - LINE OF STEEL BEAM
   - TRUSS – LINE OF STEEL ROOF TRUSS
   - APPROXIMATE EXTENT OF 1ST FLOOR



KEY PLAN

	10-03-10	ISSUED WITH REPORT	03

ICE FACTORY GRIMSBY

FIRST FLOOR LEVEL
EXISTING STRUCTURE - MARKED UP TO SHOW LIKELY REMEDIAL WORKS

drawn: HWa	checked: DJ
date: JAN '10	scale: APPROX 1:200

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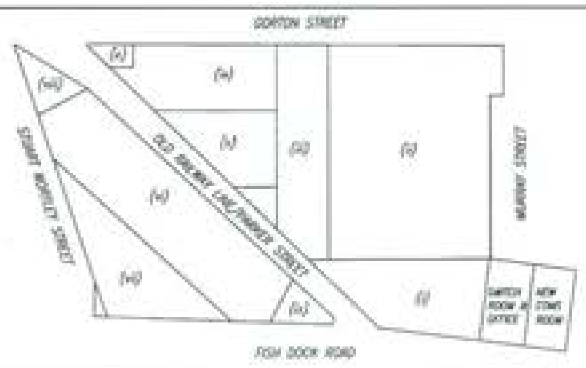
dwg no: 1568/01/10

LIKELY REMEDIAL WORKS

- ALLOW FOR REPLACING EXISTING FILLER JOIST OR R.C. ROOF SLAB WITH A NEW 200 THICK R.C. SLAB ON PROFILED METAL DECKING. SEE DETAIL 1568/01/SK01 THIS INVOLVES BREAKING OUT EXISTING SLAB, WIRE BRUSHING THE STEEL ROOF BEAMS TO REMOVE ALL LOOSE SCALE AND RUST, PAINTING THE ROOF BEAMS AND THEN FIXING AND CASTING THE SLAB.
  IT MAY BE POSSIBLE TO RETAIN SOME OF THE EXISTING SLAB BUT AT THIS STAGE ALLOW FOR TOTAL REPLACEMENT.
- ALLOW FOR NEW S/W BOARDING AND PURLINS ON WIRE BRUSHED AND PAINTED STEEL TRUSSES. SEE DETAIL 1568/01/SK02.
- ALLOW FOR NEW S/W BOARING, RAFTERS AND PURLINS ON S/W TIMBER TRUSSES PLUS REPAIRS TO ENDS OF TRUSSES. SEE DETAIL 1568/01/SK03.

(i) COMPRESSOR ROOMS WITH SWITCH ROOM & OFFICE
(ii) TANK ROOMS
(iii) ICE STORE
(iv) FLAKE ICE PLANT & STORES (PREVIOUSLY BOILER ROOM)
(v) CONDENSER ROOM
(vi) TANK ROOM
(vii) STORAGE
(viii) LOADING BAY
(ix) OFFICE
(x) ORIGINAL CHIMNEY POSITION (NO LONGER EXISTS)



KEY PLAN

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   - LINE OF STEEL BEAM
   - TRUSS – LINE OF STEEL ROOF TRUSS

	10.02.10	ISSUED WITH REPORT.	DJ

ICE FACTORY
GRIMSBY

ROOF LEVEL
EXISTING STRUTCTURE - MARKED UP TO SHOW LIKELY REMEDIAL WORKS

drawn: HWe — checked: DJ
date: JAN '10 — scale: APPROX 1:200

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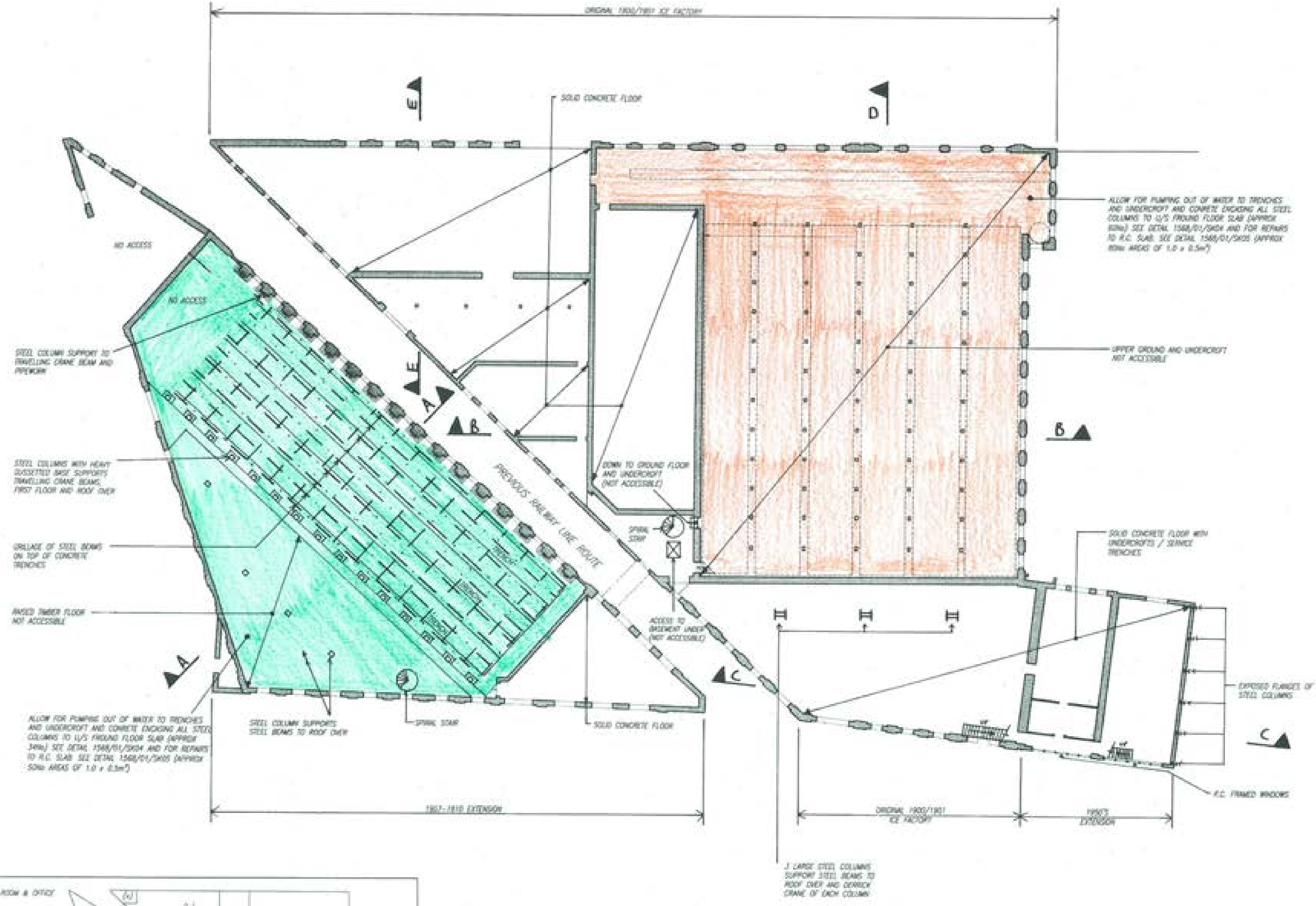

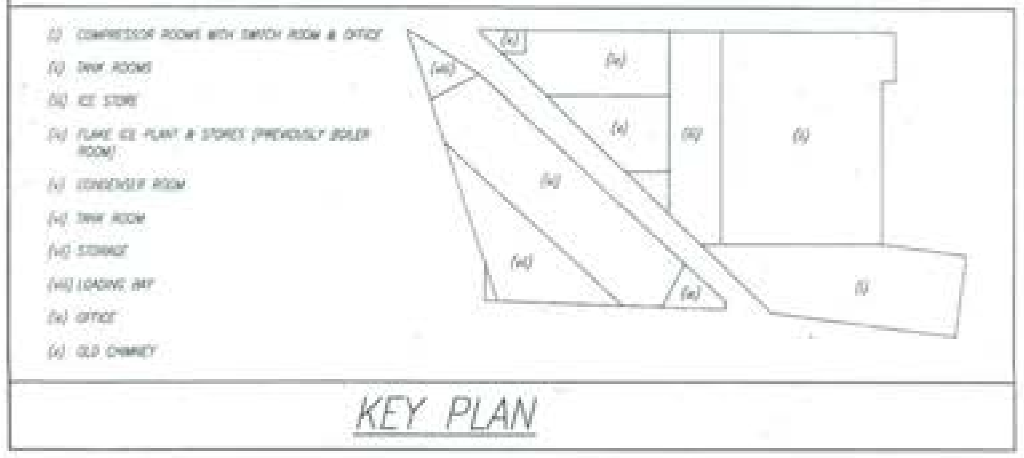

NOTES

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   - LINE OF STEEL BEAM
   - TRUSS - LINE OF STEEL ROOF TRUSS

ISSUED WITH REPORT | 03

ICE FACTORY
GRIMSBY

UNDERCROFT LEVEL
EXISTING STRUCTURE - MARKED UP
TO SHOW LIKELY REMEDIAL WORKS

drawn: HWe | checked: DJ
date: JAN'10 | scale: APPROX 1:200

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1568/01/12

Project	Job no.	Date	Sheet	
ICE FACTORY GRIMSBY	1568/01	JAN '10	1568/01/ SK01	Alan Baxter
	Engineer: DJ	Checked by:		

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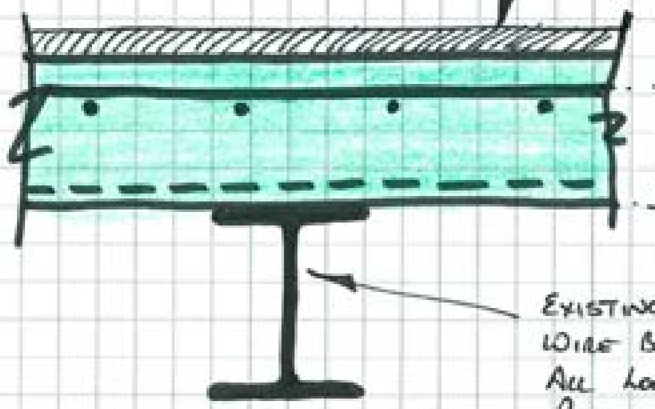

TYPICAL ROOF or FLOOR SLAB REPLACEMENT ON TOP OF EXISTING STEEL BEAMS

NOTE: SOME EXISTING STEEL BEAMS MAY BE FOUND TO BE IN A VERY POOR CONDITION, SUFFERING FROM SIGNIFICANT CORROSSION. IN THESE LOCATIONS SOME LOCAL REMEDIAL WORK MAY BE REQUIRED e.g FIXING NEW STEEL PLATES TO THE TOP FLANGE OF THE EXISTING BEAM.
A CONTINGENCY SHOULD BE ALLOWED TO DEAL WITH THIS.

Project	Job no.	Date	Sheet	
ICE FACTORY GRIMSBY	1568/01	JAN '10	1568/01/ SK02	Alan Baxter
	Engineer: DJ	Checked by:		

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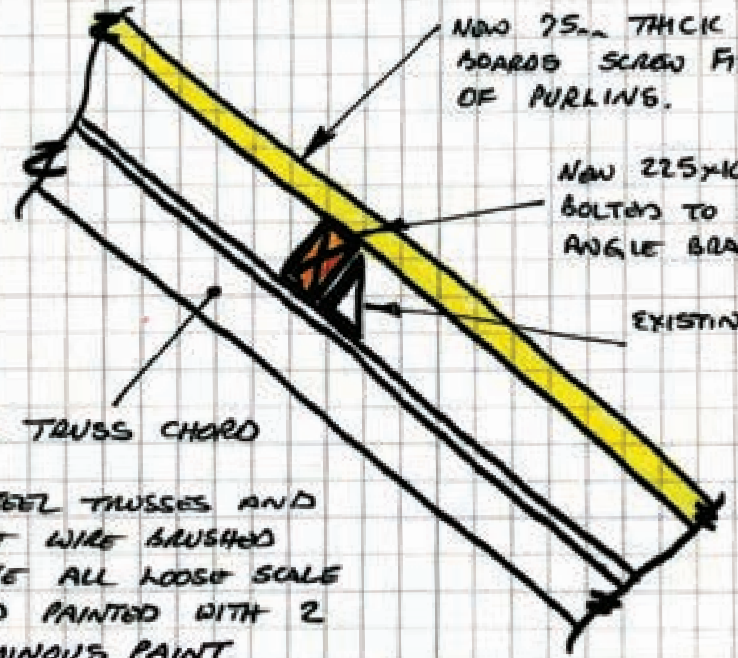

TYPICAL DETAIL SHOWING NEW ROOF BOARDING + PURLINS SUPPORTED OFF EXISTING STEEL TRUSSES (TANK ROOMS & OLD BOILER HOUSE)

NOTE: SOME EXISTING STEEL BRACKETS AND TRUSS ELEMENTS MAY BE FOUND TO BE IN A VERY POOR CONDITION, SUFFERING FROM SIGNIFICANT CORROSSION.
IN THESE LOCATIONS SOME REMEDIAL WORK MAY BE REQUIRED e.g REPLACEMENT OF ANGLE BRACKETS, AND SPLICING OF NEW STEEL MEMBERS TO EXISTING CHORDS ETC OF THE TRUSSES.
A CONTINGENCY SHOULD BE ALLOWED TO DEAL WITH THIS.

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Project	Job no.	Date	Sheet	
ICE FACTORY GRIMSBY	1568/01	JAN 10	1568/01/ SK03	Alan Baxter
	Engineer: DJ	Checked by		

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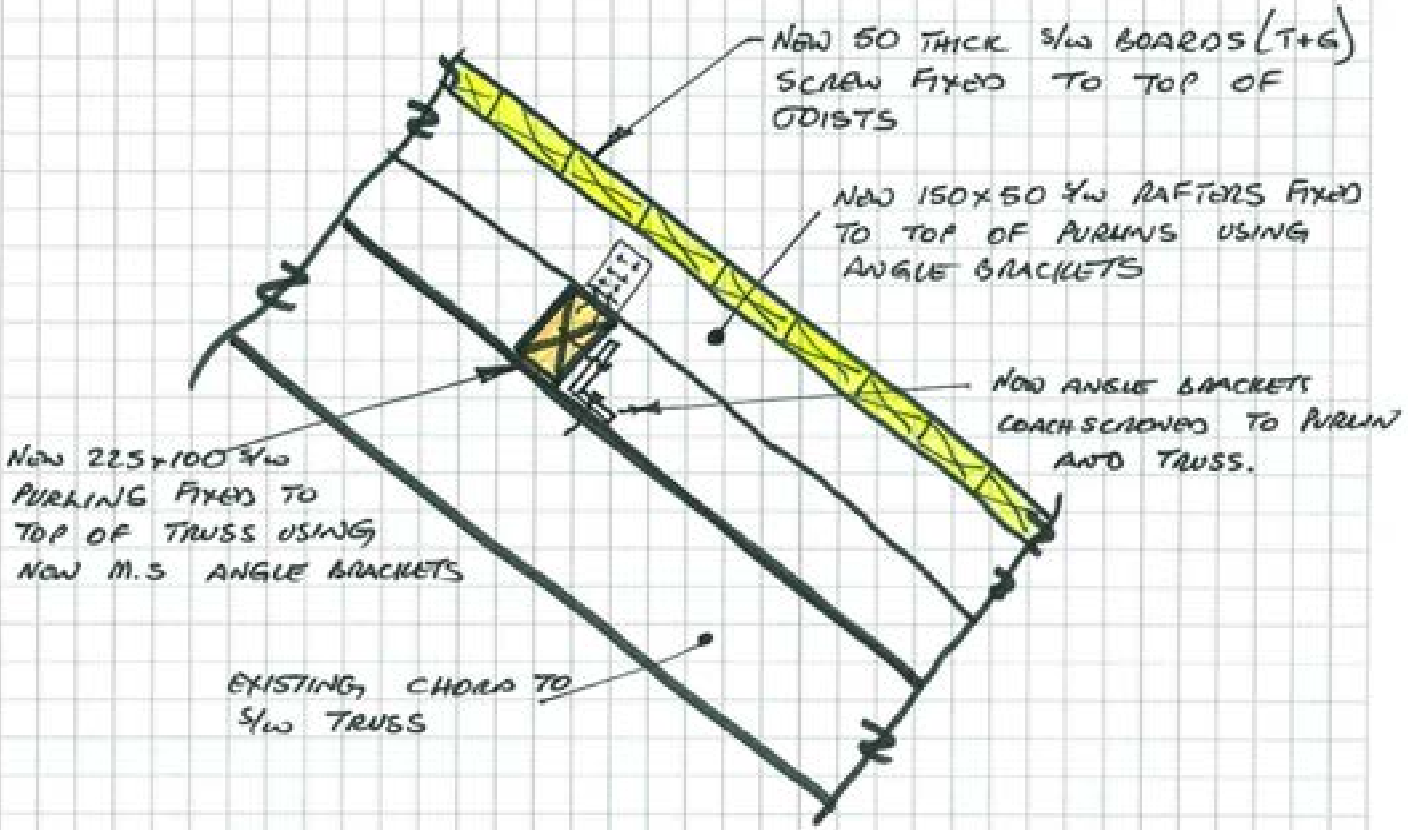

TYPICAL DETAIL SHOWING NEW ROOF BOARDING RAFTERS AND PURLINS SUPPORTED OFF EXISTING TIMBER TRUSSES (1907 ICE STORE)

NOTE: SOME AREAS OF THE EXISTING S/W TRUSSES ARE LIKELY TO BE SUFFERING FROM SIGNIFICANT DECAY AS A RESULT OF PROLONGED DAMP (ie WET ROT, AND POSSIBLY DRY ROT) ALLOW A CONTINGENCY TO COVER THE SPLICING IN OF NEW TIMBER ELEMENTS, ESPECIALLY AT VALLEY GUTTER LOCATIONS.

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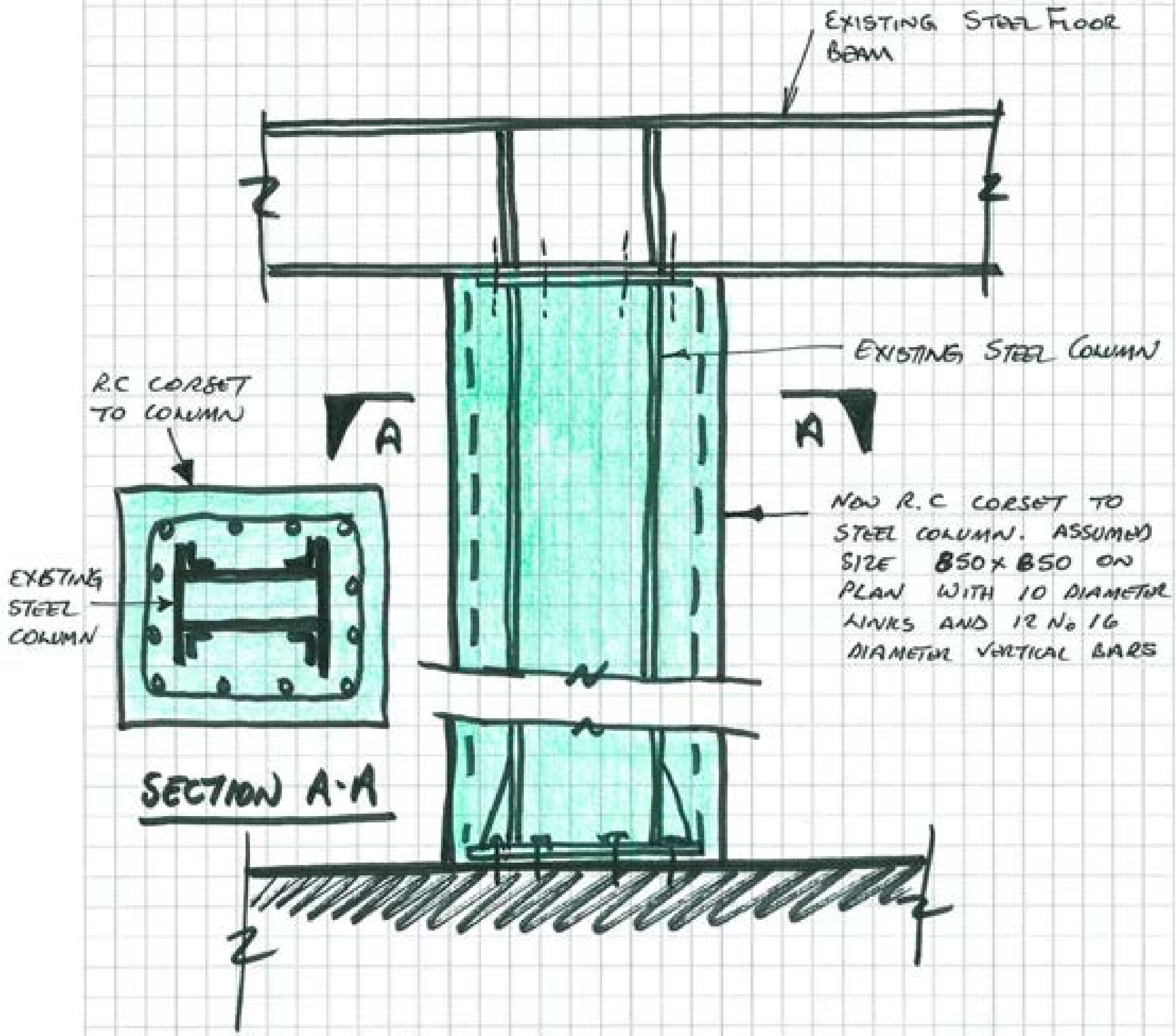

TYPICAL R.C CORSET TO EXISTING STEEL COLUMNS IN BASEMENT / UNDERCROFT

NOTE:
- EXISTING COLUMN TO BE WIRE BRUSHED TO REMOVE ALL LOOSE SCALE AND RUST PRIOR TO PLACING CONCRETE
- ALLOW FOR TEMPORARY SUPPORT TO BEAMS PRIOR TO STARTING WORK
- ALLOW GENEROUS CONTINGENCY FOR REMEDIAL WORKS TO BEAMS AND FOR REPLACING THE STEEL COLUMNS MOST SIGNIFICANTLY AFFECTED BY CORROSSION

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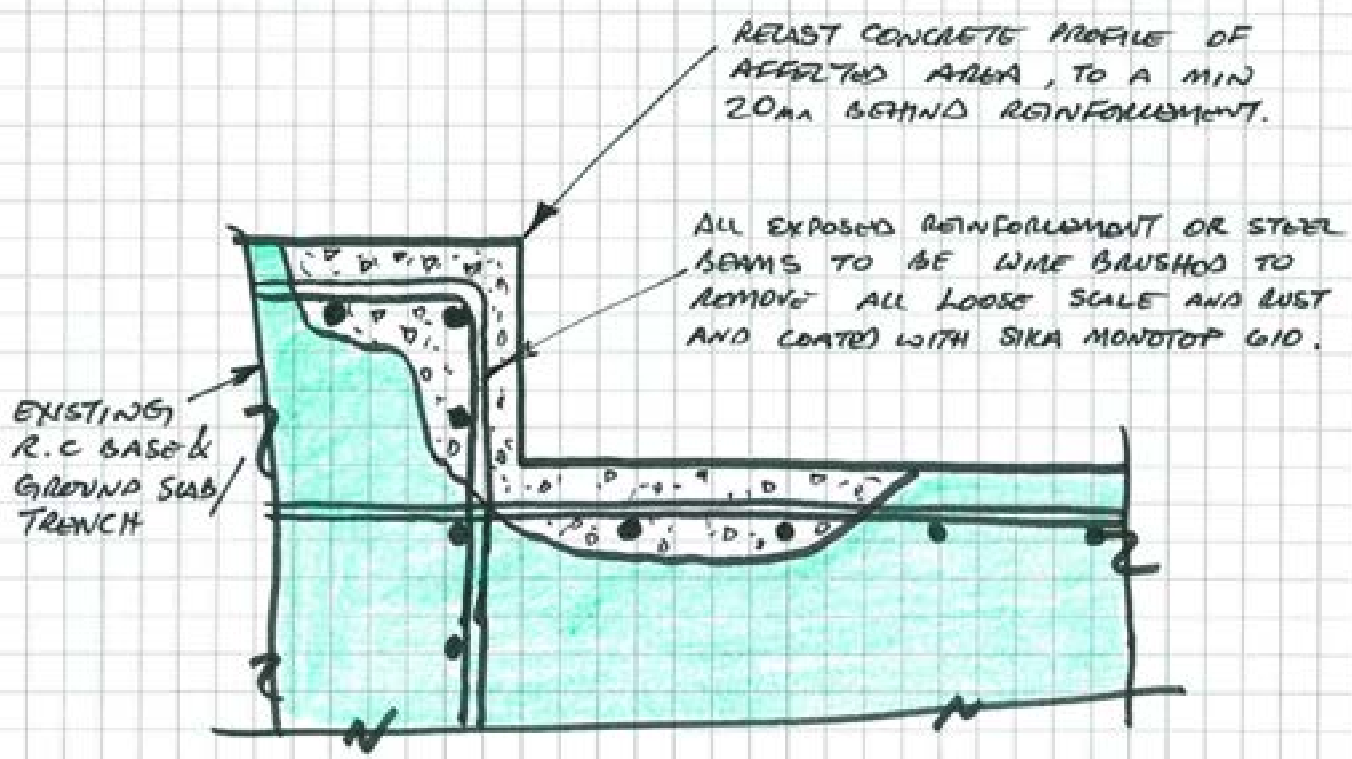
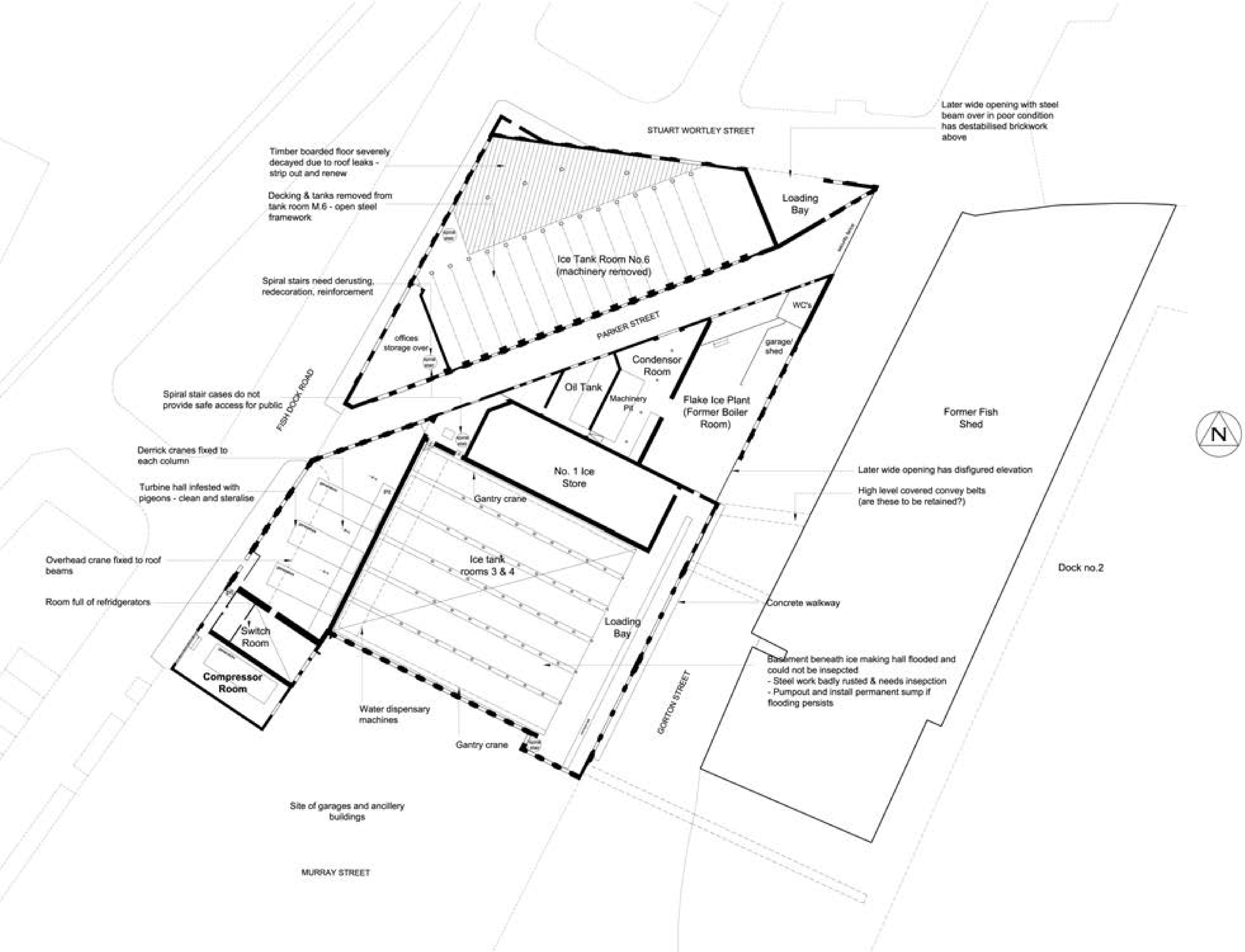
ICE FACTORY GRIMSBY	1568/01	JAN '10	1568/01/ SK05	Alan Baxter 75 Cowcross Street London EC1M 6EL tel 020 7250 1555 fax 020 7250 3022 email aba@alanbaxter.co.uk www.alanbaxter.co.uk
	Engineer: OJ	Checked by:		



TYPICAL REPAIR DETAIL TO R.C. CONCRETE BASE/TRENCH/SLAB.

Appendix C
Drawings by RGA



01 Ground Floor Plan - As Existing

SCALE 1:500@A3

Marked up to show repairs (provisional)
Jan. 2010

N

0 5 10 15 20
METRES

DO NOT SCALE FROM THIS DRAWING

General Notes:

These notes are preliminary and all areas need to be surveyed in detail before work is scheduled and costed

- Safe access for public not available at present
- Interiors on very large scale
- Most areas affected by water ingress from defective roofs above
- All turbines, icemaking equipment, gantry cranes ect. remian insitu
- Ice tanks are partly integral with structure
- Electrical services have not been inspected and need to be made safe
- All steel structure needs to be inspected by engineer, reinforced where neccessary, de-rusted and redecorated
- Access platforms and / or mobile platforms required (specialist)
- All interiors need to dry out over at least two seasons
- All interior surfaces are robust but dirty - industrial clean - vacuum and high pressure steam (?)

FOR REPORT

GRIMSBY ICE FACTORY

GROUND FLOOR
PLAN AS EXISTING

478	SU01	-
HP	1:500@A3	JAN 10

RICHARD GRIFFITHS ARCHITECTS

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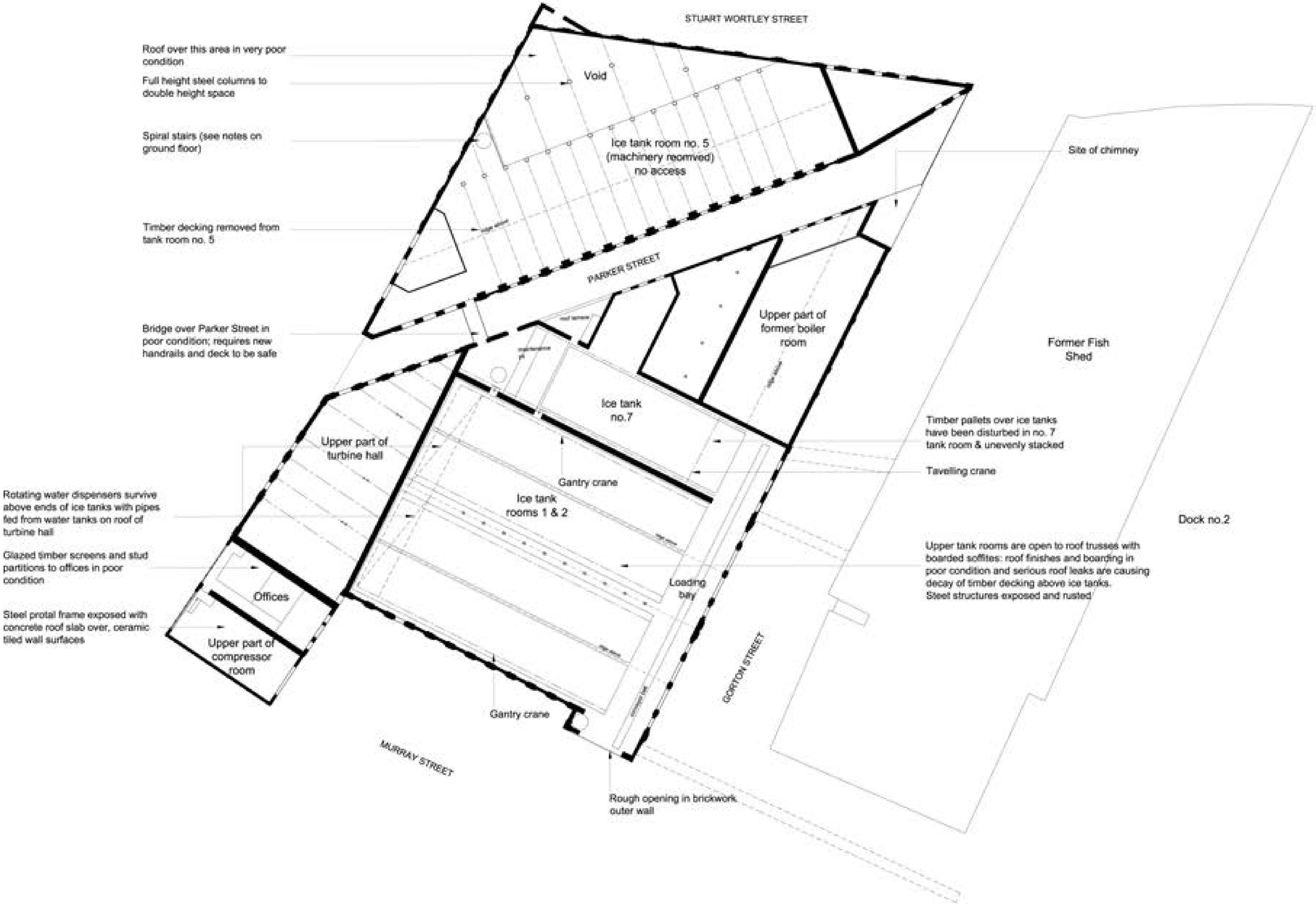
DRAWING TO BE READ IN CONJUNCTION WITH ALL OTHER ARCHITECTS AND ENGINEER'S CONTRACT DRAWINGS & SPECIFICATIONS.
ANY DISCREPANCIES MUST BE BROUGHT TO THE ATTENTION OF THE ARCHITECT IMMEDIATELY.
THE CONTRACTOR MUST VERIFY ALL DIMENSIONS BY SITE MEASUREMENT BEFORE ORDERING MATERIALS OR MANUFACTURING COMPONENTS.
SUBSTITUTE MATERIALS & PRODUCTS TO THOSE NAMED WILL BE ACCEPTABLE IF PROVEN TO BE OF EQUAL OR HIGHER PERFORMANCE AND NOT IN CONFLICT WITH OTHER ELEMENTS.



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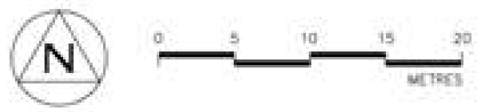

01 First Floor Plan - As Existing
SCALE 1:500@A3

Marked up to show repairs (provisional)
Jan. 2010

FOR REPORT

GRIMSBY ICE FACTORY

FIRST FLOOR
PLAN AS EXISTING

478	SU02	-
HP	1:500@A3	JAN 10

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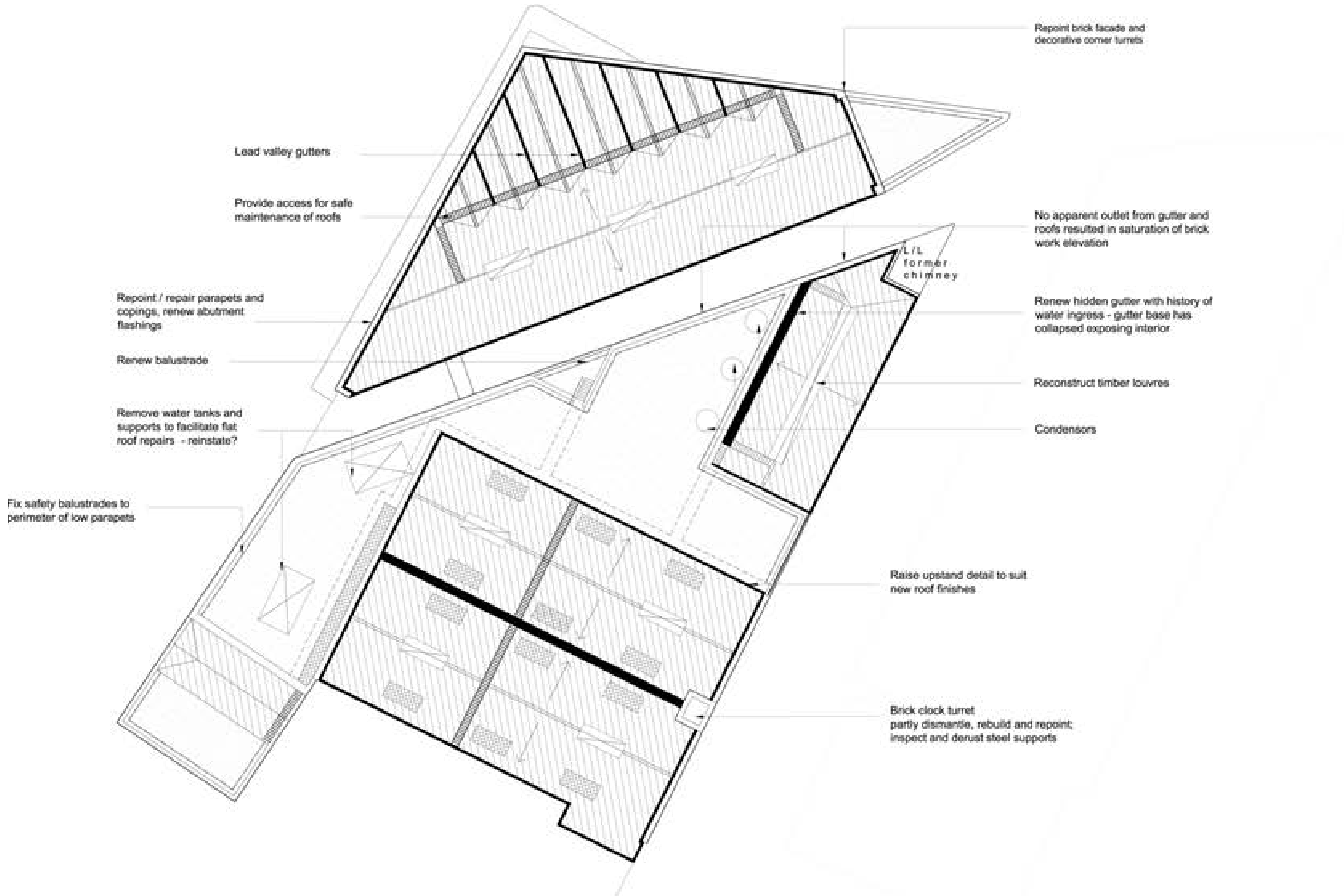


Notes:

These notes are preliminary and all areas need to be surveyed in detail before work is scheduled and costed

Flat Roofs:

- Open up (say) 5no. areas to inspect condition of structure
- Assume replacement of 100% finishes and structure
- Include crash deck beneath
- Retain and derust principle steel beams
- Renew filler joist slabs with PCC light weight planks and screed topping
- New falls formed in cork/ EPU insulation slabs (min. 75mm)
- Renew asphalt and l/stone chippings

Access Ladders and Balustrades:

New bespoke galz. steel access ladders with handrails and safety cables

Access walkways to flat roof

Water Tanks and Steel Structure:

Dismantle, derust, redecorate and reassemble (remove?)

Timber Louvres:

Dismantle, repair, reassemble and redecorate; renew lead coverings

Roof Lights:

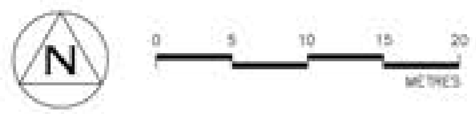
Dismantle, derust, reglaze, renew coverflashings and fixings (or replace and double glaze?)

Slate Pitched roofs:

- Strip slates, battens and boarding
- Repair, derust and decorate steel trusses
- New treated softwood boarding
- Rigid EPU insulation boards
- Batten and counter batten
- Reslate, reusing approx. 20% slates (Diminishing courses)

- Renew lead gutters and boarding to improved falls
- Renew lead abutment flashings to all sides of roofs (pitched and flat).

Marked up to show repairs to roofs (provisional)
Jan. 2010



01 Roof Plan - As Existing

SCALE 1:500@A3

FOR REPORT

GRIMSBY ICE FACTORY

ROOF PLAN AS EXISTING

478	SU03	-
HP	1:500@A3	JAN 10

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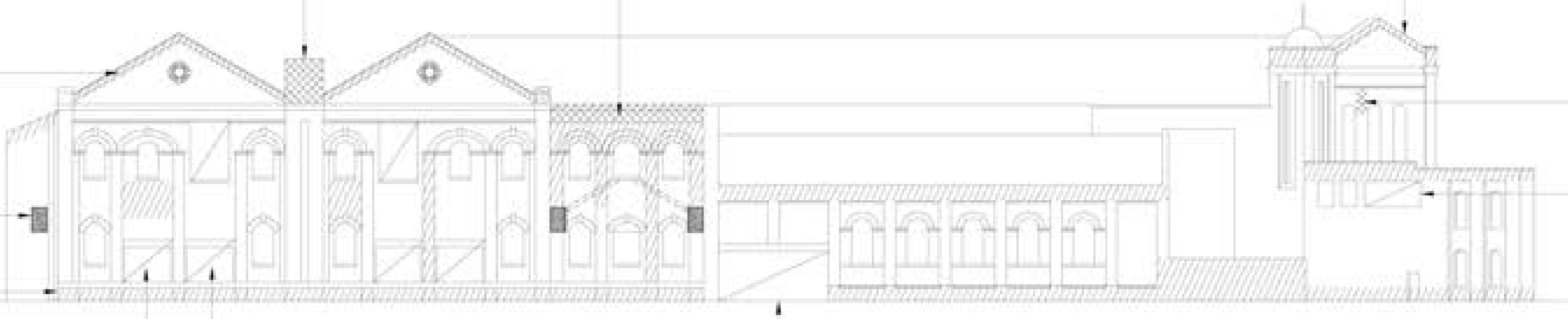
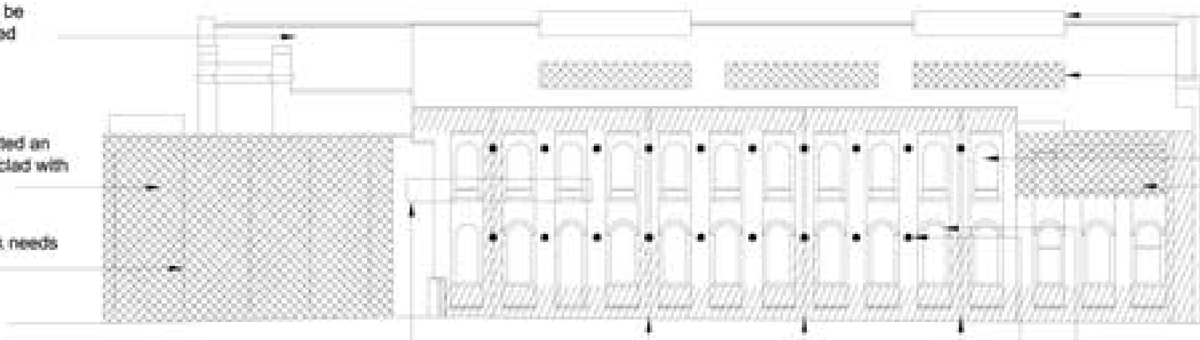


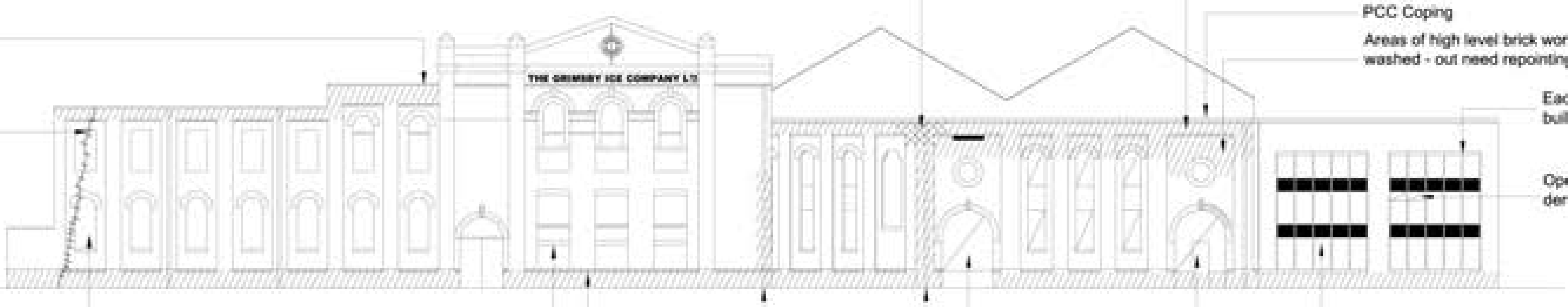
01 East Elevation - As Existing

SCALE 1:200@A1, 1:400@A3



02 South Elevation - As Existing

SCALE 1:200@A1, 1:400@A3



03 West Elevation - As Existing

SCALE 1:200@A1, 1:400@A3

General Notes:

These notes are preliminary and all elevations need surveying in detail before work is scheduled and costed

- All cast iron rain water goods require replacement
- U/G drainage requires inspection and remedial work
- Most glass has been lost to windows
- Timber and steel window frames in fair condition - repair and reglaze with narrow profile double glazed units
- In short term unblock all windows and fit with secure grilles to ventilate interiors

Approx. areas of brickwork where joints washed-out in need of priority re-pointing

Apporx. areas where brickwork requires rebuilding

Marked up to show condition and repairs (provisional) Jan 2010

0 5 10 20

METRES

FOR REPORT

GRIMSBY ICE FACTORY

ELEVATIONS AS EXISTING

478	SU04	-
HP	1:200@A1, 1:400@A3	JAN 10

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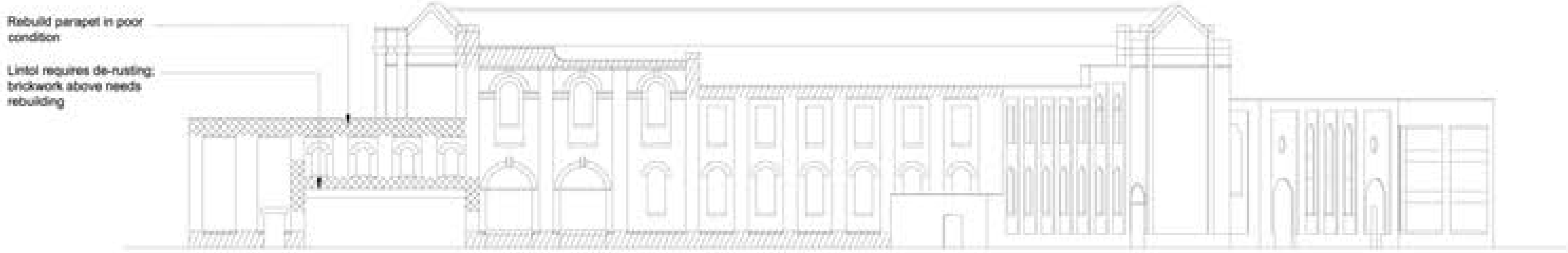


01 North Elevation - As Existing (elevations obscured)

SCALE 1:200@A1, 1:400@A3

General Notes:

These notes are preliminary and all elevations need surveying in detail before work is scheduled and costed

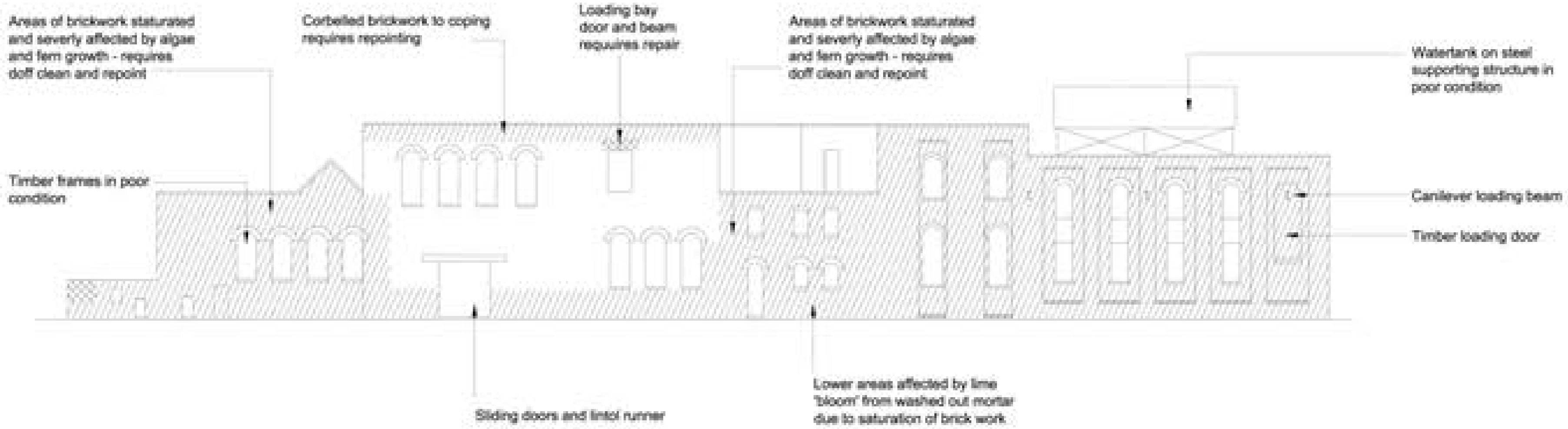
- All cast iron rain water goods require replacement
- U/G drainage requires inspection and remedial work
- Most glass has been lost to windows
- Timber and steel window frames in fair condition - repair and reglaze with narrow profile double glazed units
- In short term unblock all windows and fit with secure grilles to ventilate interiors

Approx. areas of brickwork where joints washed-out in need of priority re-pointing

Approx. areas where brickwork requires rebuilding

Marked up to show condition and repairs (provisional)
Jan 2010

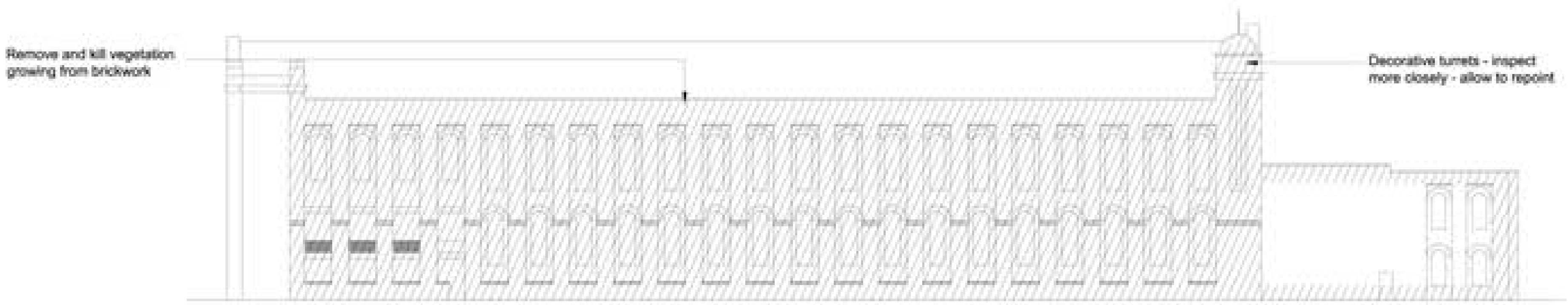
0 5 10 20
METRES



Elevations to Parker Street severely affected by rising damp and water ingress at high level

02 South Elevation Parker Street - As Existing

SCALE 1:200@A1, 1:400@A3



03 North Elevation Parker Street - As Existing

SCALE 1:200@A1, 1:400@A3

FOR REPORT

GRIMSBY ICE FACTORY

ELEVATIONS AS EXISTING

478	SU05	-
HP	1:200@A1, 1:400@A3	JAN 10

RICHARD GRIFFITHS ARCHITECTS

Alan Baxter

Prepared by David Johncox, with sections from Richard Griffiths Architects by John Woodcock, and from KCMS by Colin Hayward.
Reviewed by Michael Coombs
Issued February 2010

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