

4. THE BUILDING

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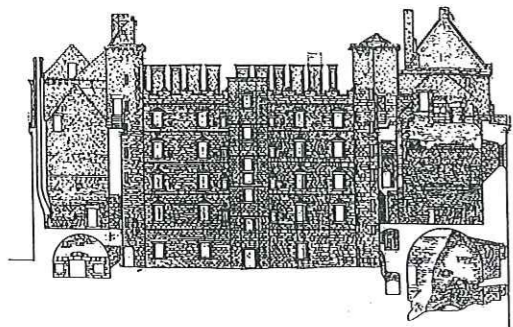
401 Introduction

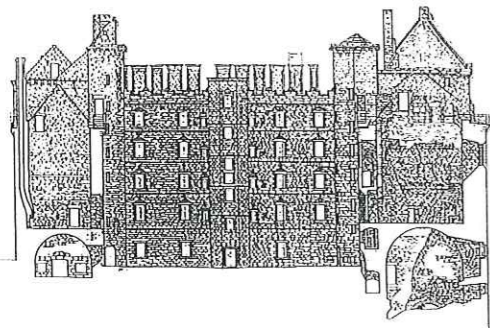
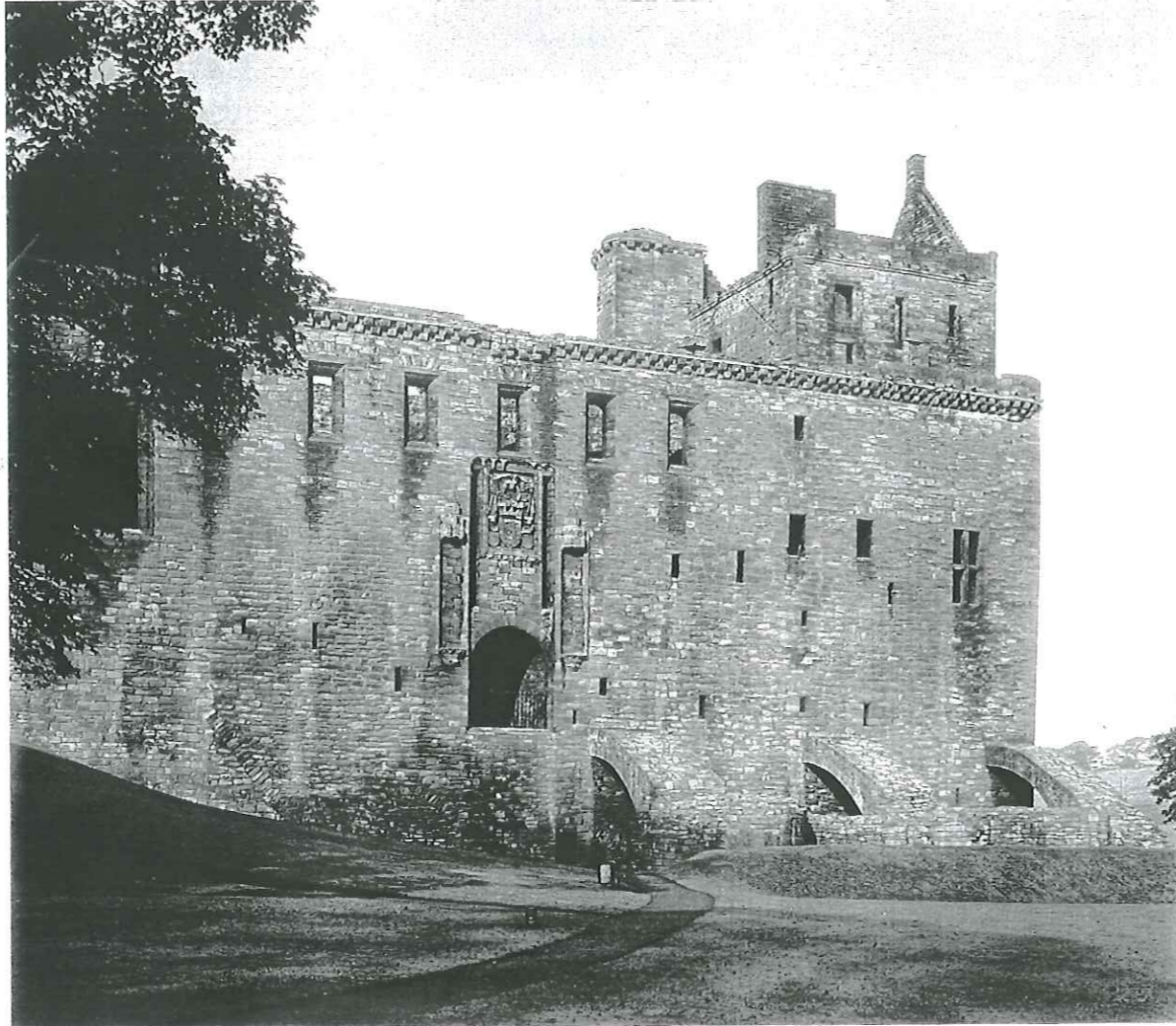
This Feasibility Study is perhaps the single most important historic commission placed within Scotland at the time of writing. We believe that the proposals will provide a solid framework upon which further design development can occur in the future. After considering a variety of options the final selected proposal has concentrated on a traditional approach to the reflooring and reroofing of the North Range.

402 Design Assumptions

Throughout the preparation of the study proposals, we have identified certain basic design assumptions which we believe to be correct, namely:

- * the floor levels within the North Range are accessed from three existing stone spiral staircases which will be suitable for access and fire escape purposes
- * from each upper floor level, two or more directions of travel are available, via circulation spaces, allowing escape into the three staircases
- * the main passenger lift could be designed and located to act as a fire evacuation lift, working in conjunction with a series of refuge locations at the protected stairways to provide full disabled fire escape from all floor levels
- * full disabled access can be provided to all areas within the North Range by using a single lift in conjunction with a series of localised ramps to overcome the differing floor levels
- * The Chief Building Control Officer of West Lothian Council welcomed our assumptions as positive first principals to be adopted in the rehabilitation of the North Range.





403 Access

The principal pedestrian and vehicle access to the Palace is from the High Street via the Kirkgate through the southern Gateway into the south car park, which lies between St Michael's Church and the Palace Quadrangle. The parking area has limited car spaces and the width and height of the Gateway prevents coach access and emergency fire fighting vehicle access directly into the Palace area.

In section 2 we have proposed the reinstatement of the East Gate as the main viable pedestrian access into the Palace, and the provision of a new car and coach park on the site of the Low Port Primary School annexe. (see Drawing 135 (L) 10 in Section 2). This has the dual advantage of not only reinstating the original James I Royal entrance to the Palace and allowing visitors to approach the Palace through the Peel, but also will relieve traffic levels within the High Street and Kirkgate.

Through effective traffic management we can direct all car and coach visitors to the new parking facility at Low Port and away from Kirkgate. Disabled car drivers, delivery vehicles and fire fighting vehicles will still be allowed to use Kirkgate, but through an alignment of the existing stone wall adjacent to the manse garden and the southern Gateway, it is possible to form access into the existing south car park.

This overcomes the restrictions of width and height imposed by the Palace Gatehouse and will also stop any further physical damage to the stonework. We have discussed the matter with the Church of Scotland and they are fully willing to support the proposal. Realignment of the wall would require Listed Building Consent but we see no reason why this should not be granted.

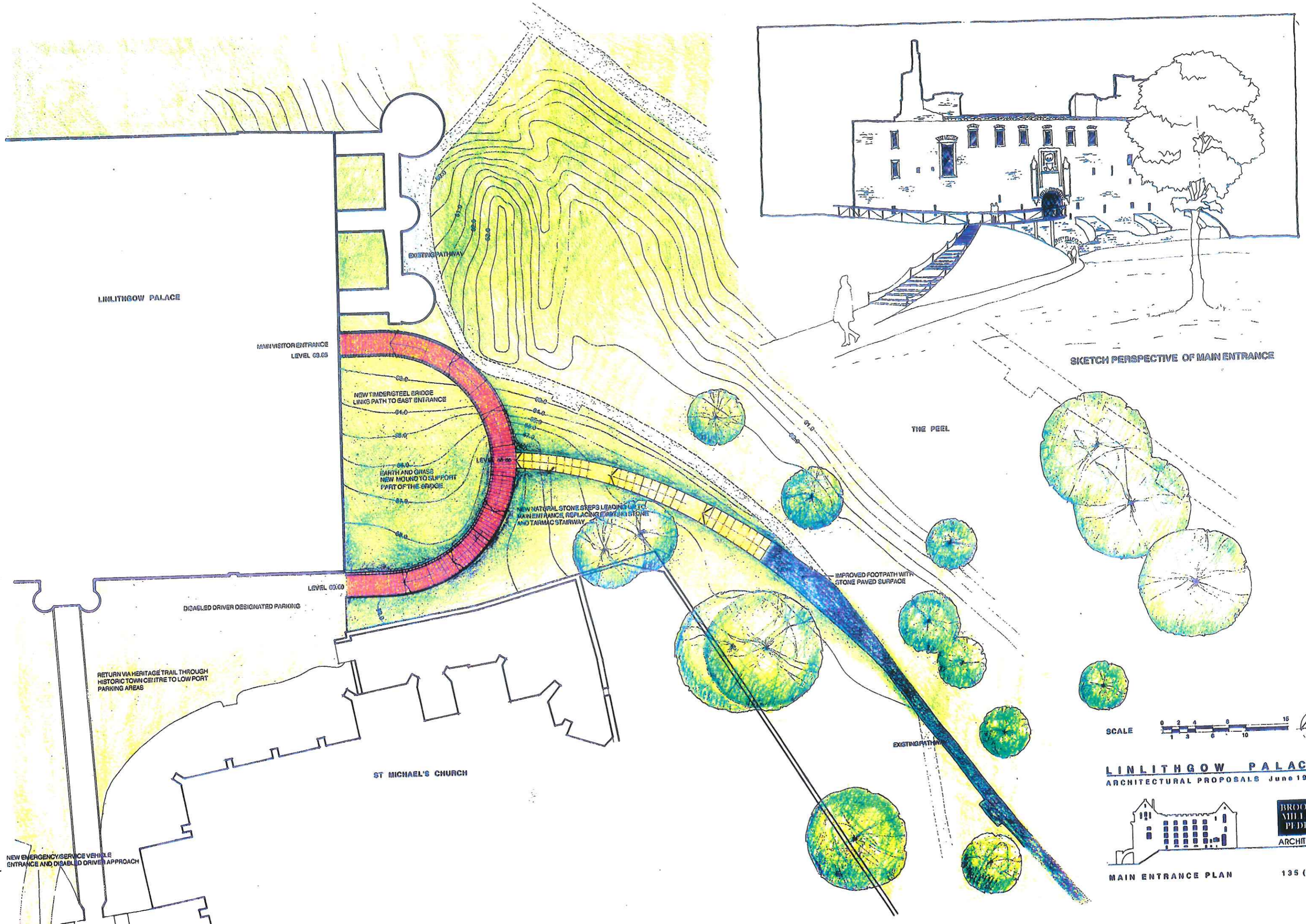
This solution retains the parking rights for the staff of the Palace and the congregation of St Michael's Church. Pedestrian access to the Church and Peel at that location would also continue as at present.

Disabled visitors to the Palace would be directed to use the East Gate and join with the main visitor flow into the Palace. A ramped semi circular pathway would link the car park to the East Gate. All other visitors would walk directly from Low Port, through The Peel, then up a series of steps, to join the semi circular ramped access into the Gateway. This proposal is shown on our main entrance plan. (Reference 135(L) 09).

The solution involves creating a mound of earth over the existing landscape contours. This should prevent major archaeological assessment being required and would ensure that any surviving archaeology below the surface would remain undamaged. The earth mound forms the partial support and starting point for a bridge link into the East Gate. New foundations for the bridge and ramp would not penetrate and damage existing archaeology.

We have not attempted to create an accurate ramp or drawbridge at the mouth of the Gateway, as little or no evidence survives today which tells us what the construction was. A simple bridge we believe is appropriate and it would be executed to a high level of detail using high quality materials. The final section of bridge approach could reflect on plan the size and form of a drawbridge. We would continue the theme of placing the structure onto the ground by suggesting a walkway leading visitors into the courtyard area. This would avoid damage to the present ground surface and would overcome the difficulties of disabled access on the uneven cobbles within the entrance itself.

The access strategy however, dictates that the Low Port School annexe is demolished. We have prepared costs which include for new classroom accommodation which could be relocated and constructed on land to the east of the existing school building. We believe that the benefits to the school are significant in that improved classroom accommodation and security measures are all proposed. This proposal for the Low Port area is included on our location drawing. The principals involved in this are a refinement of the proposals in the first stage report evolved in consultation with school representatives and West Lothian Council officials.



LINLITHGOW PALACE

MAIN VISITOR ENTRANCE
LEVEL 03.65

NEW TIMBER/STEEL BRIDGE
LINKS PATH TO EAST ENTRANCE

EARTH AND GRASS
NEW MOUND TO SUPPORT
PART OF THE BRIDGE

NEW NATURAL STONE STEPS LEADING TO
MAIN ENTRANCE REPLACING EXISTING
AND TARMAC STAIRWAY

THE PEEL

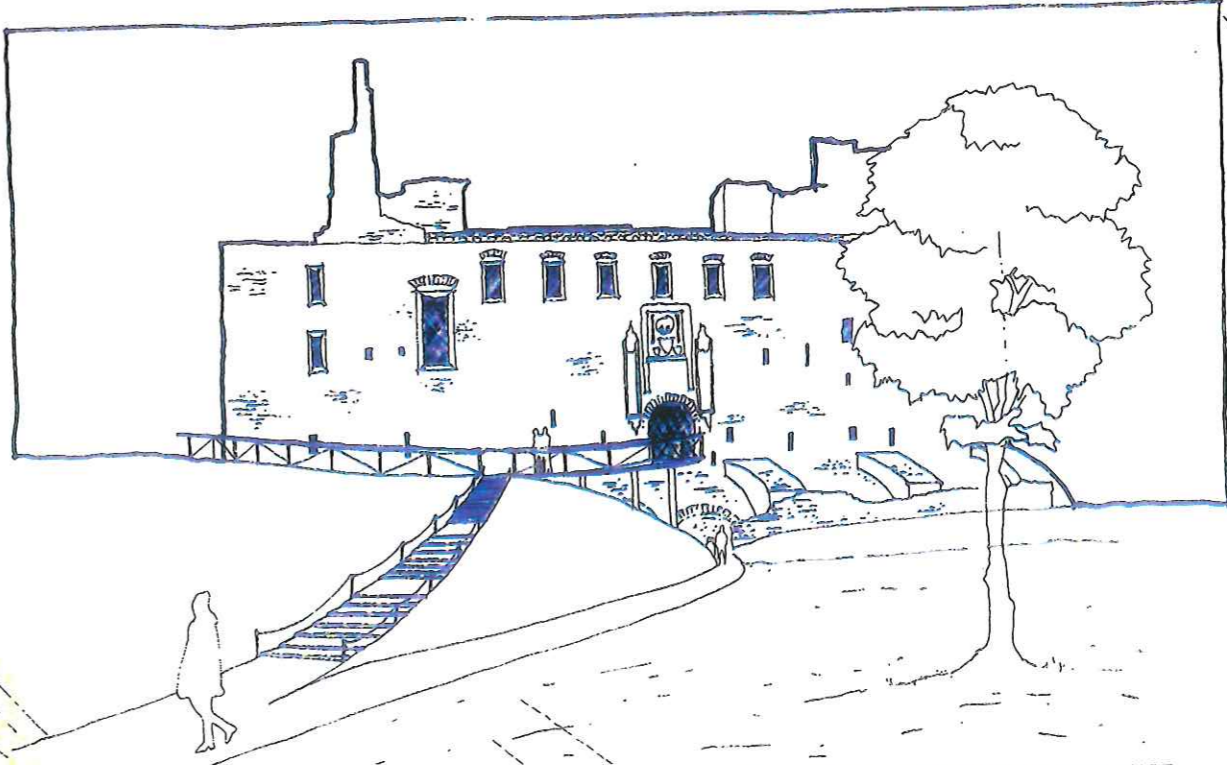
IMPROVED FOOTPATH WITH
STONE PAVED SURFACE

DISABLED DRIVER DESIGNATED PARKING

RETURN VIA HERITAGE TRAIL THROUGH
HISTORIC TOWN CENTRE TO LOW PORT
PARKING AREAS

ST MICHAEL'S CHURCH

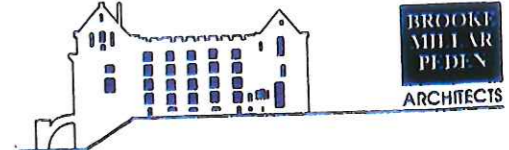
NEW EMERGENCY/SERVICE VEHICLE
ENTRANCE AND DISABLED DRIVER APPROACH



SKETCH PERSPECTIVE OF MAIN ENTRANCE



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404 The Courtyard Entrance

Once within the courtyard there is considerable scope to create drama and action for the visitor. The impressive and ornate North Range façade creates enclosure, but in the foreground stands the splendid King's Fountain, a richly carved hexagonal monument, and a unique surviving example of early 16th Century Scottish Renaissance carving. There is a very strong case for careful consolidation and protection of the existing fountain. The sections of carved stones, which have already been the subject of an earlier repair scheme, could be replaced in matching carved natural stone. The entire monument could be protected in-situ by a glass canopy or cover arrangement.

We, however are recommending that a new stone fountain is constructed using faithful carved stone to replicate the original carving. This process could employ and train stonemasons and be part of ongoing site interpretation. The new fountain would be set within the courtyard on a newly designed and laid out pattern of mixed stone and cobbled surfacing. Our costs take this into account.

From the entrance, the visitor will be guided, or directed, into the former stable area at the extreme south eastern corner of the courtyard which will serve as the ticketing and retail location for the Palace, the place where the Gallery Guide audio tour would be obtained and the starting point for tours and other events and activities occurring in the Palace.

Our proposals for the rest of the courtyard level or ground floor will not create any substantial physical damage to the present structure. No new openings are proposed, and no dismantling of existing masonry is needed or recommended. Our courtyard plan drawing shows these new uses (reference 135 (L) 12).

405 Architectural Considerations

From the outset our prime objective has been to capitalise on the inherent qualities of the spaces within the existing ruinous North Range. Our initial design concept attempted to integrate the architectural spaces with the evolving interpretive design and utilised an independent framed structure within the existing volumes of the North Range. This reversible solution offered a high degree of flexibility for the exhibition spaces that were created. The location of floors and even the form of the floor constructions, allowed free access between the floors, vertically and horizontally, either by fixed floors, walkways or moving hydraulic platforms between the floors.

This concept evolved from the strong desire by the exhibition designers to create a truly dramatic exhibition using the latest media technology available to them and projected into a framework suitable for sustaining an exciting visitor experience well beyond the year 2000.

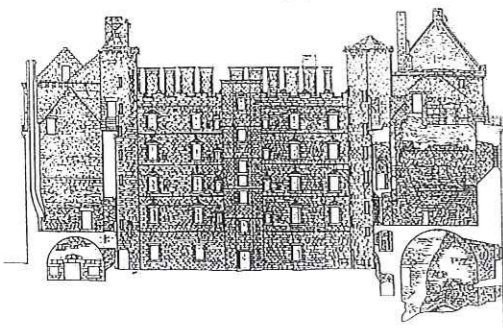
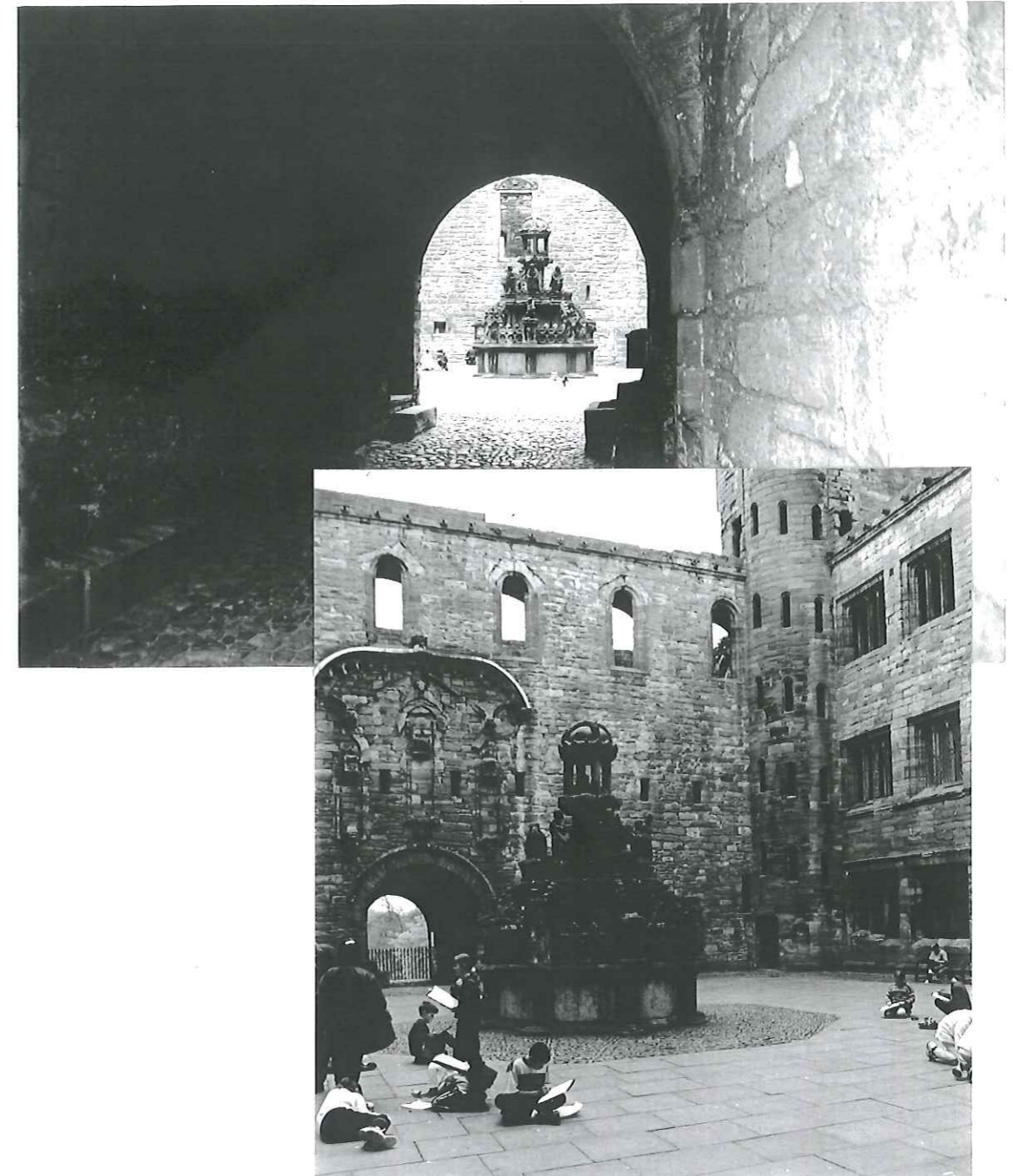
In the course of the process, the study team visited Koldinghus Castle in Denmark, where a form of semi-independent structure has been inserted into a ruin. The overall scale and form of the ruin had remarkable similarities to Linlithgow Palace. This Danish example offered an alternative solution to the treatment of a ruin, rather than the faithful restoration of the roof and floors.

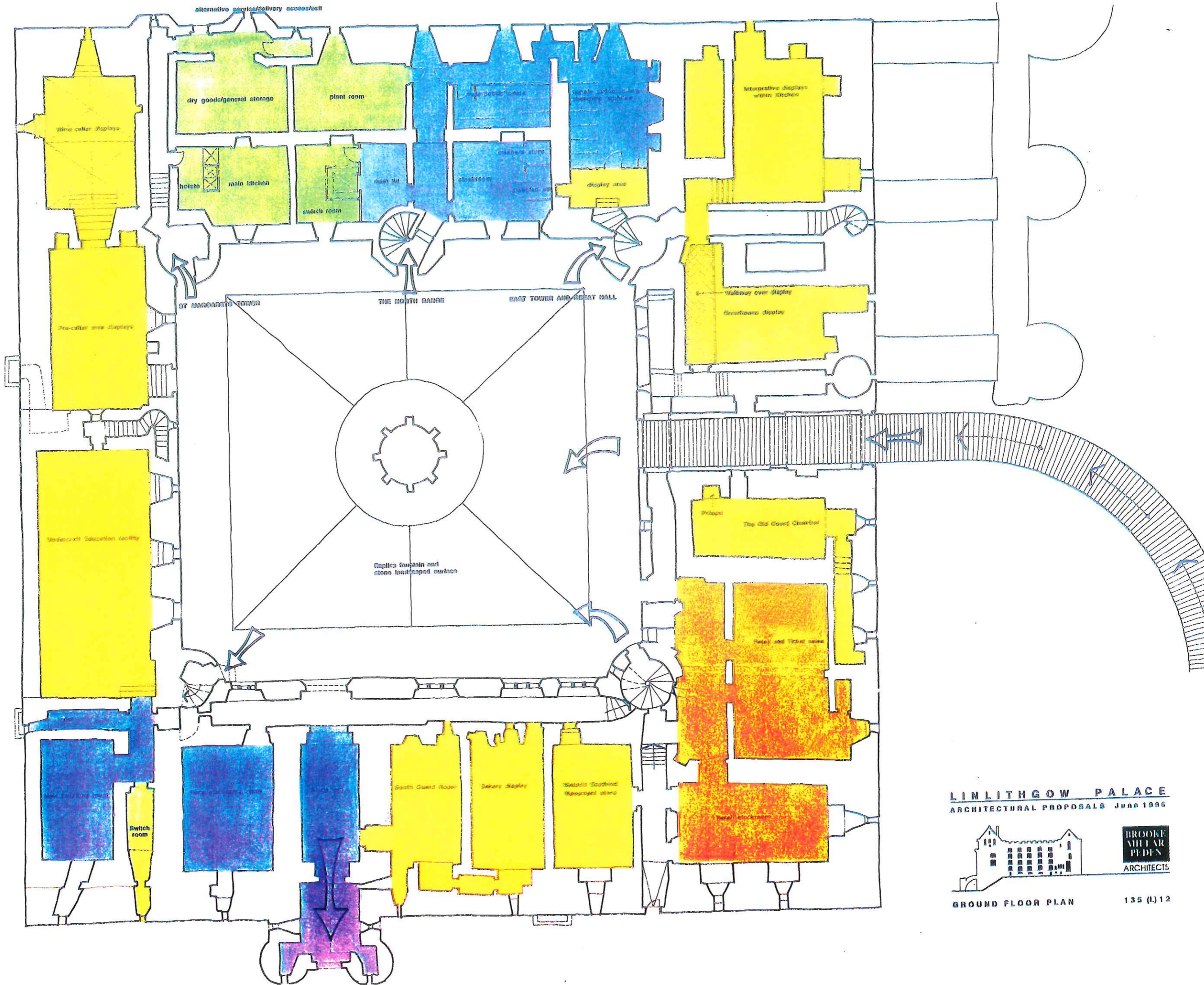
Our final proposal has attempted to work fully within the constraints imposed by the ruin. In other words we have used existing openings within the masonry walls and not created major structural changes. In fact, only two new doorways are proposed, and we have relocated floor levels and roof profiles in their original 17th century positions. Our recommendations are based on a sympathetic reflooring and rehabilitation of the North Range.

This approach:

- * reflects the status and dignity appropriate to this important royal Palace
- * minimises the impact on the physical fabric of the building particularly the need to create openings in the walls - thereby maintaining the historic integrity of the structure
- * ensures the free flow of visitors throughout the Palace thereby minimising the potential of bottlenecks and congestion points which was a particular client concern.

We considered utilising the entire eastern pantry tower as a second vertical access compartment incorporating both the lift and staircase into the area. The lift and staircase could then be used for fire escape purposes. An evacuation lift overcame the problem of providing full disabled escape from the higher floor levels. The interconnecting staircase in the eastern tower is vital, as it is the only means of allowing vertical circulation from the first floor to the second, third and fourth floor levels as the turnpike stair can only be accessed from a doorway at first floor level. As the proposals were further developed, the position moved out into the main south section of the floor plan, because in this location it provided the optimum series of circulation routes both vertically and horizontally through the functions of the North Range.





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406 **The Proposal for the North Range**

We have allocated a series of uses for the existing spaces within the North Range. The uses are:

Ground Floor

On the ground floor, which in the 17th century once contained cellarage on the north side of the spine wall and a series of offices to the courtyard side, we have indicated the location for the main kitchen storage and preparation areas, the main public toilets and disabled toilet facility, cloakroom and access lift. New concrete floors would be inserted at this level and the existing masonry walls would be reutilised for load bearing of the main structure above. The main kitchen is located on this level for ease of servicing and deliveries. All main services are also located and easily accessed at the ground floor level for these functions.

First Floor

On the first floor the important architectural space of the Long Gallery will be restored in a sympathetic manner and the remaining space will be devoted to an open area for displays or reception space adjacent to the Long Gallery. This would form a temporary bar area when the Long Gallery is used for banqueting and/or mediaeval plays. A small serving area is located adjacent to the Long Gallery and a chair store is provided off the Long Gallery.

Second Floor

On the second floor we have created the main exhibition devoted to the life of Mary, Queen of Scots together with offices and toilets.

Third Floor

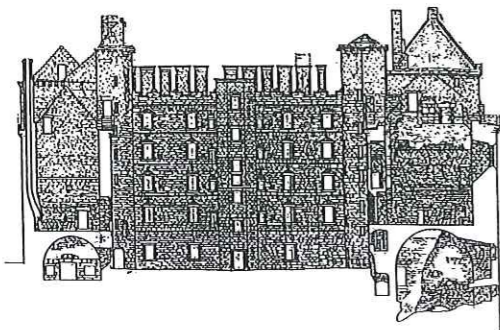
On the third floor level we have provided a 75 cover café/restaurant together with servery and the male and female public toilets. Again the serving area gives access to hoists directly between the main kitchen and the café preparation areas. This location provides a café function equidistant from the main display space and fourth floor seminar/education rooms and provides an added opportunity for views over the Loch from the seating area within the café.

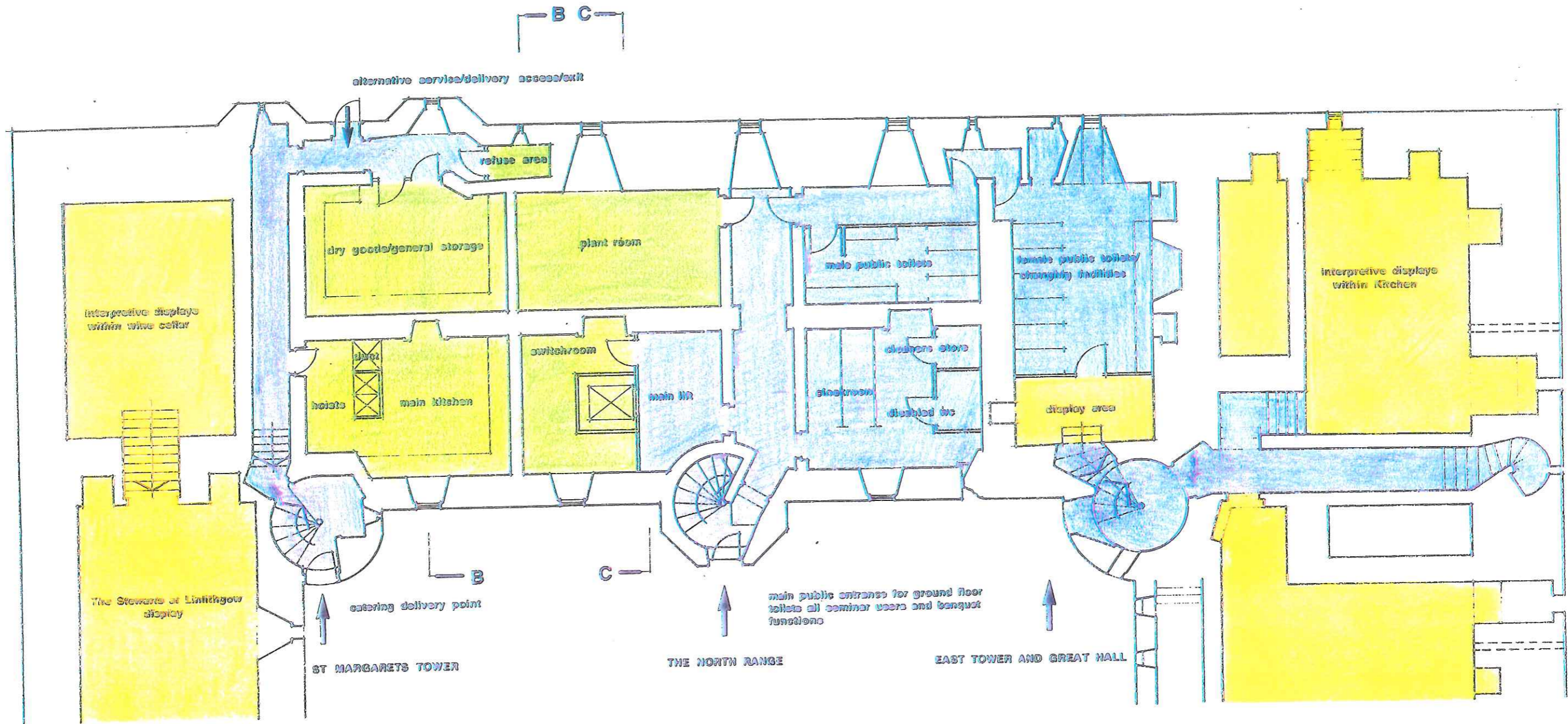
Fourth Floor

On the fourth floor we have created a series of multi purpose seminar or education rooms which are available for hire thereby generating valuable revenue income for the Palace.

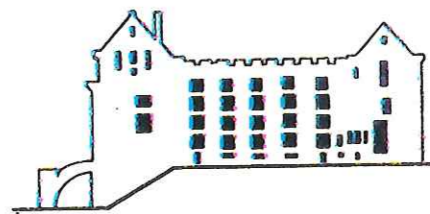
The division of space came partly from a desire to find sympathetic uses allied to the original uses and this, we feel, we have achieved on the ground and first floor. In the areas of the original sleeping accommodation on the second, third and fourth floors, it was more appropriate to provide new uses associated with the visitor attraction, i.e. the display areas, cafeteria and meeting rooms. We believe this provides the correct product mix to sustain a viable visitor attraction. The floor plans showing these different uses follow on the next pages.

Within the west tower, further accommodation has been planned at the original second floor level to form an interactive data base room which would be accessed from the north west stair tower only. Similarly in the pantry tower on the eastern side of the floor plan we have inserted the inter-connecting staircase, allowing access between the higher floor levels and the only existing door opening into the east most turnpike stair. This staircase would be constructed in quality contemporary materials. We have carefully considered how this staircase would be structurally inserted into the space without affecting existing fireplace locations. An independent support solution is proposed using base and roof connection rather than connections into the masonry walls.



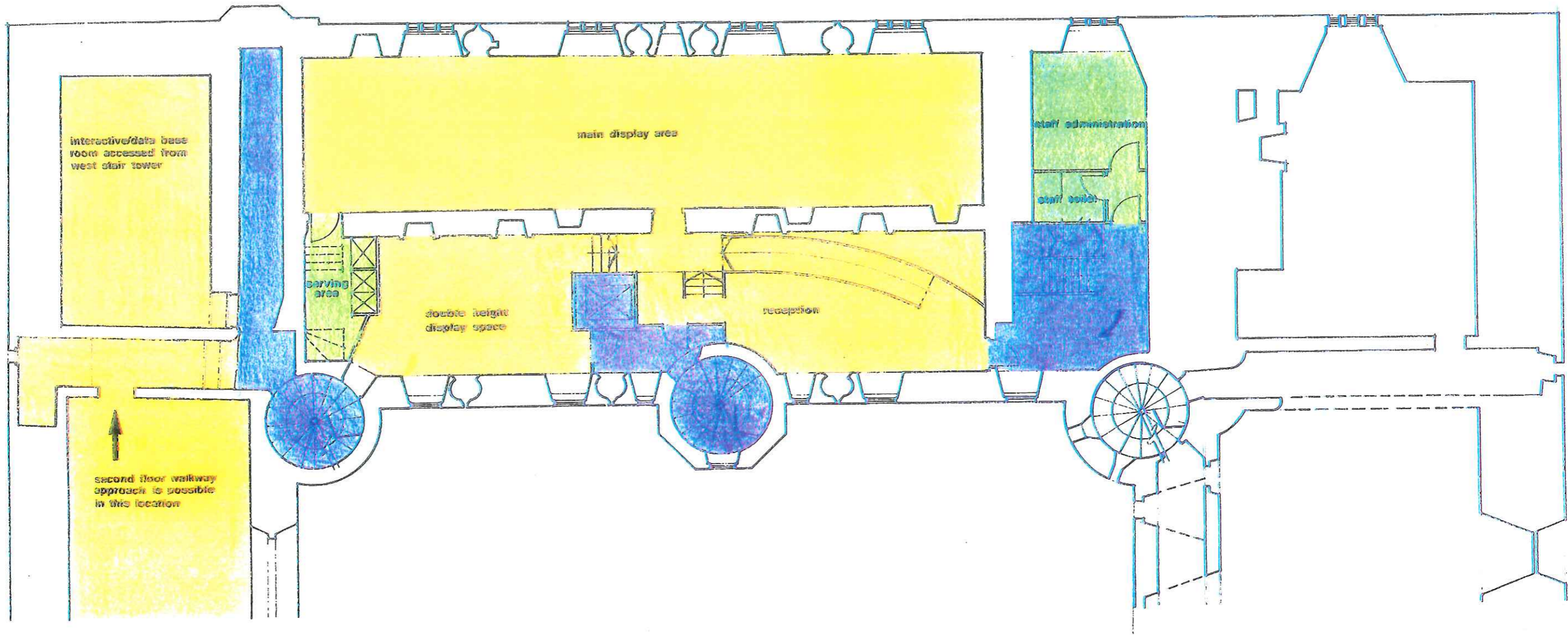


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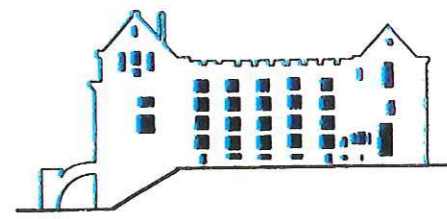


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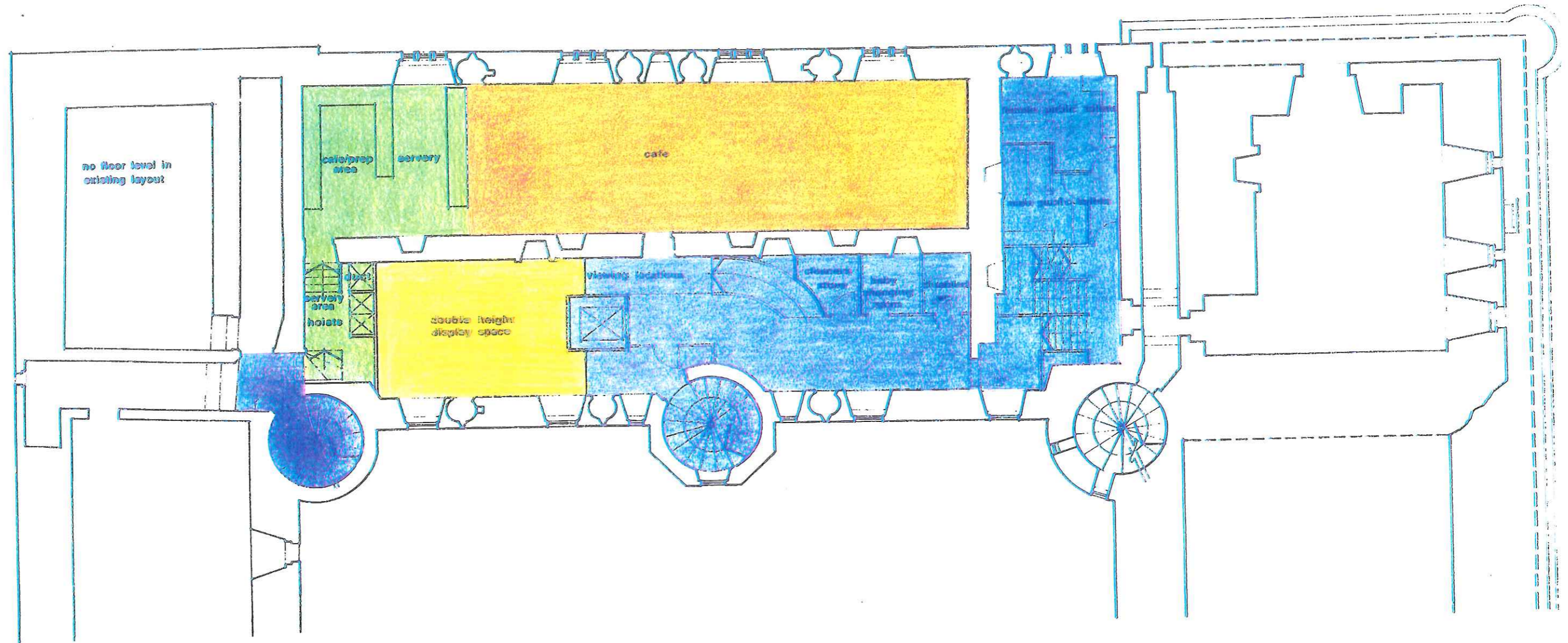


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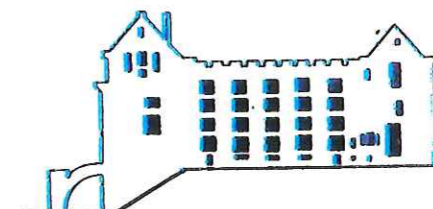
SECOND FLOOR PLAN

135 (L) 03





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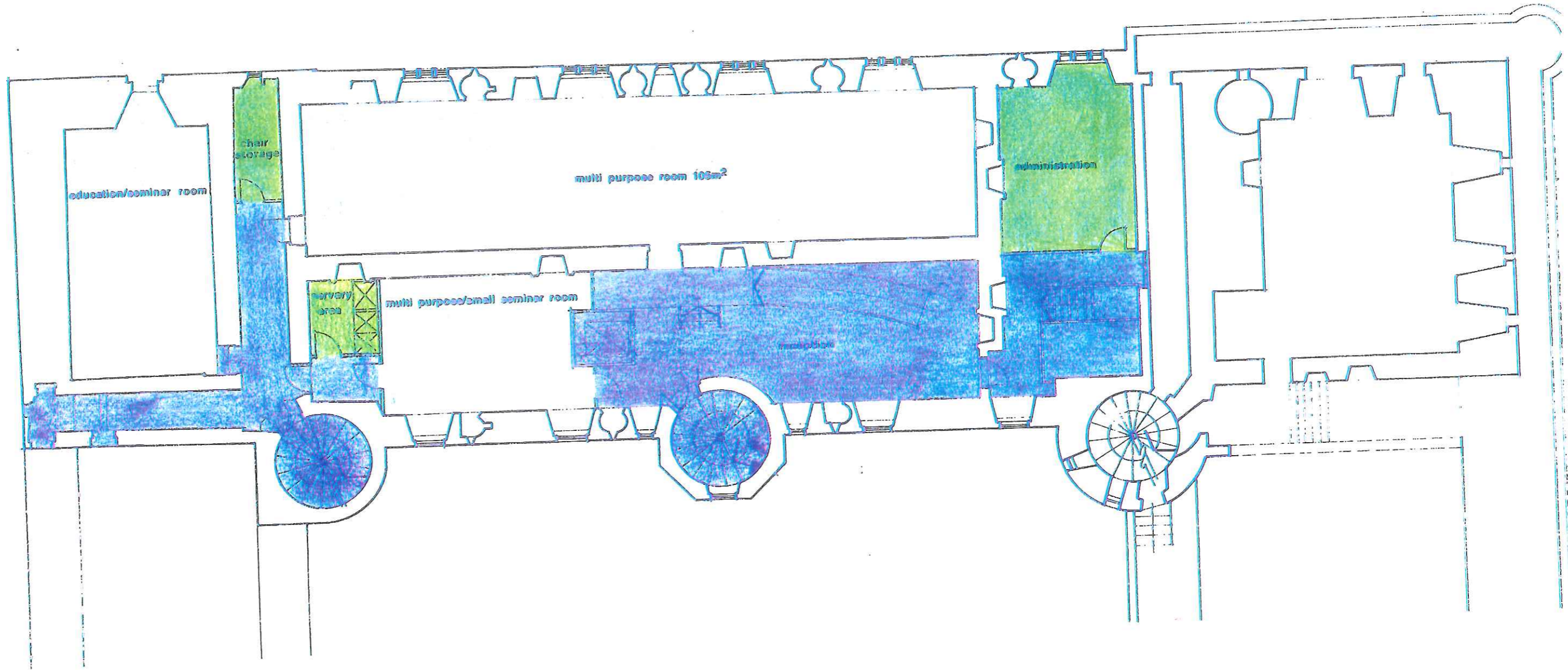
THIRD FLOOR PLAN

135 (L) 04

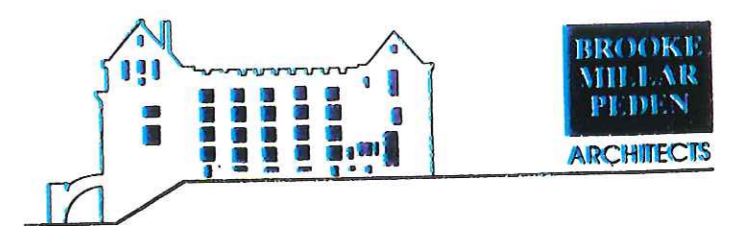


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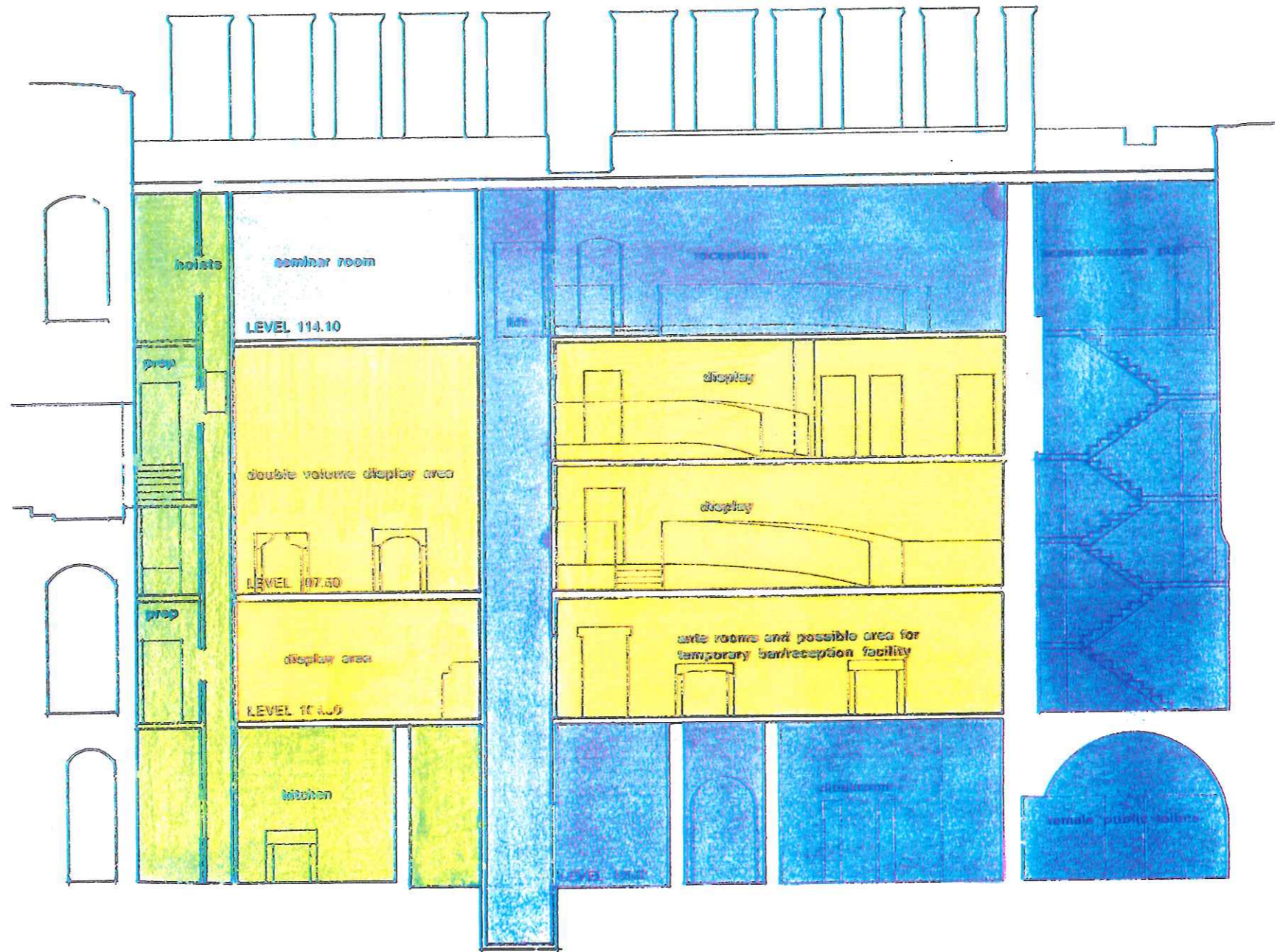
FOURTH FLOOR PLAN

135 (L) 05

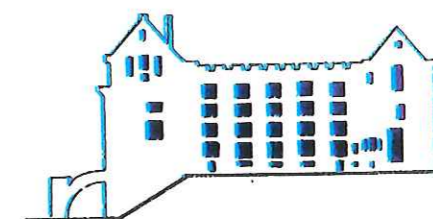


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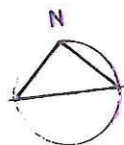
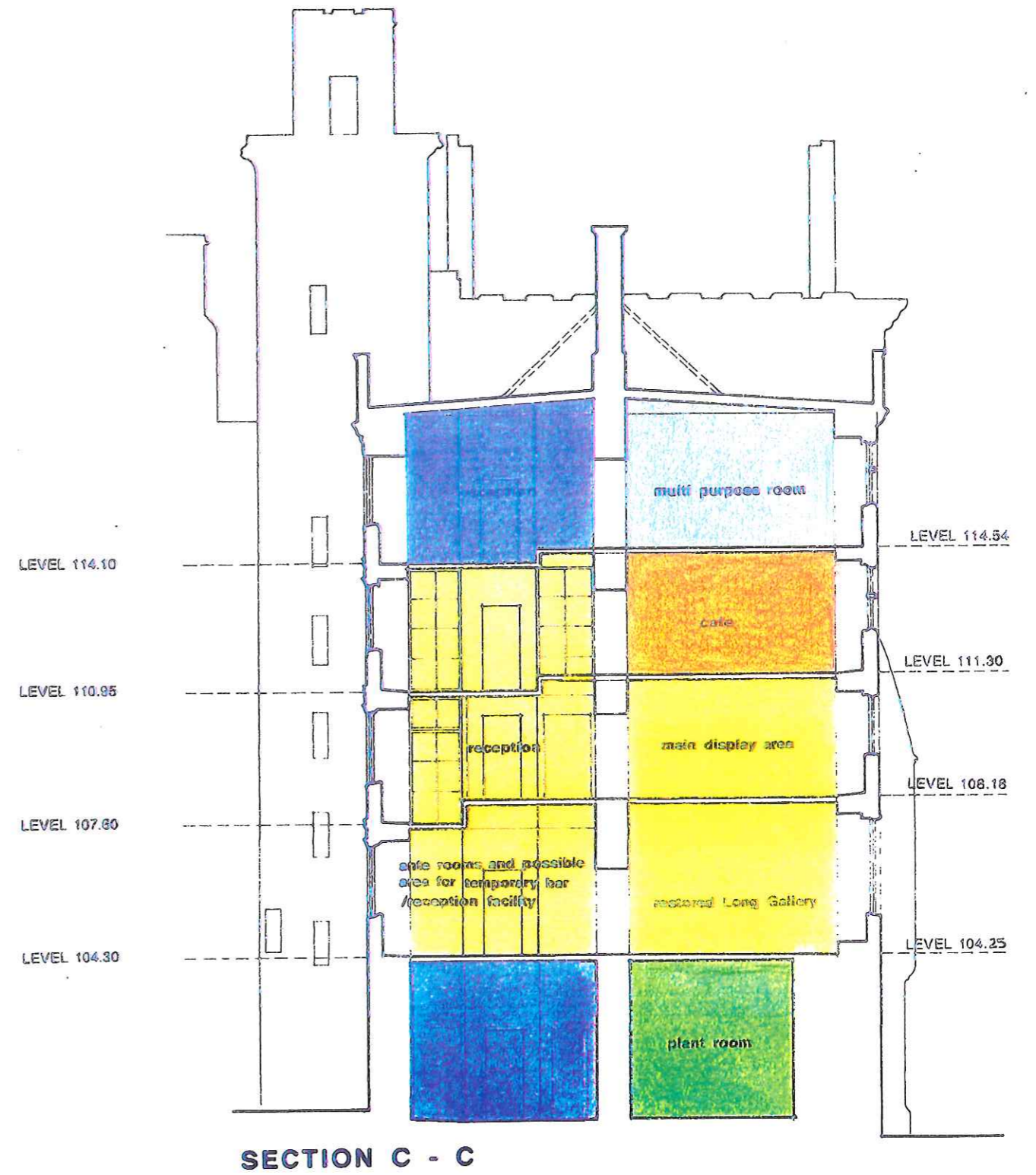
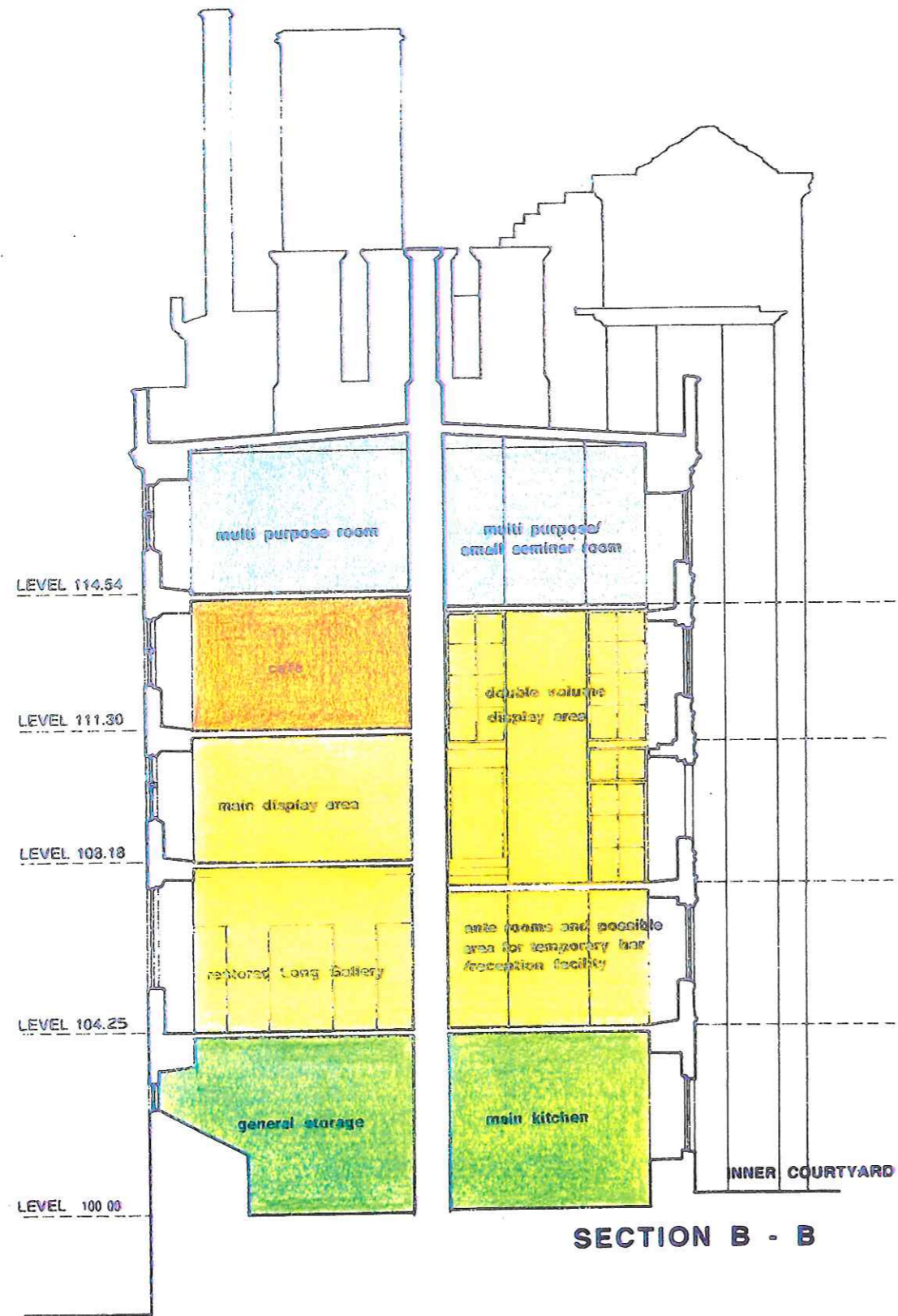
SECTION A-A

135 (L) 06



SCALE

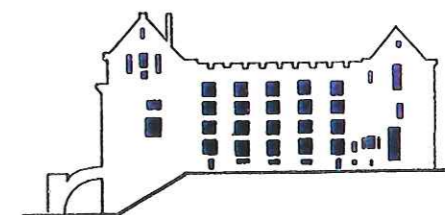




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SECTION B-B & C-C

135 (L) 07

407 Restoration of Long Gallery

We have considered the appropriate materials and applied finishes which would have been originally used in the construction of the Long Gallery. We know that towards the end of the 17th century, Scottish detailing became bolder and much more elaborate both in terms of wall panelling and certainly in terms of decorative plaster work to ceilings. Given the date of the Long Gallery early in the 17th century, we believe that the decorative plaster work on the ceiling would have been quite simple with single moulded ribs forming panels with only occasional isolated ornament. This treatment has been proposed for the purposes of the capital costs (in section 7 of this report).

Further, we propose that the walls would be simple oak boarding with 'planted on boarding' to create a framed panel finish to the oak boarding. The oak boarding would rise to almost full height within the room, topped by an ornate timber frieze with plaster cornice above. Beyond that there would be a plaster frieze and final cornice before the ribbed ceiling. We have proposed an oak floor of random boards, both in lengths and widths, with a lively grain.

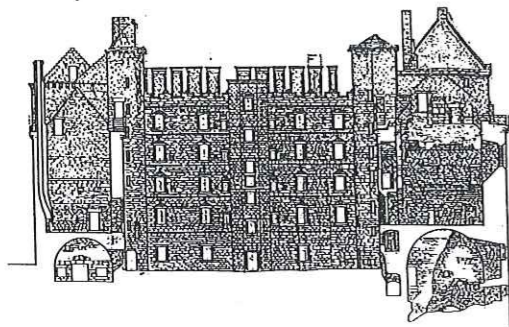
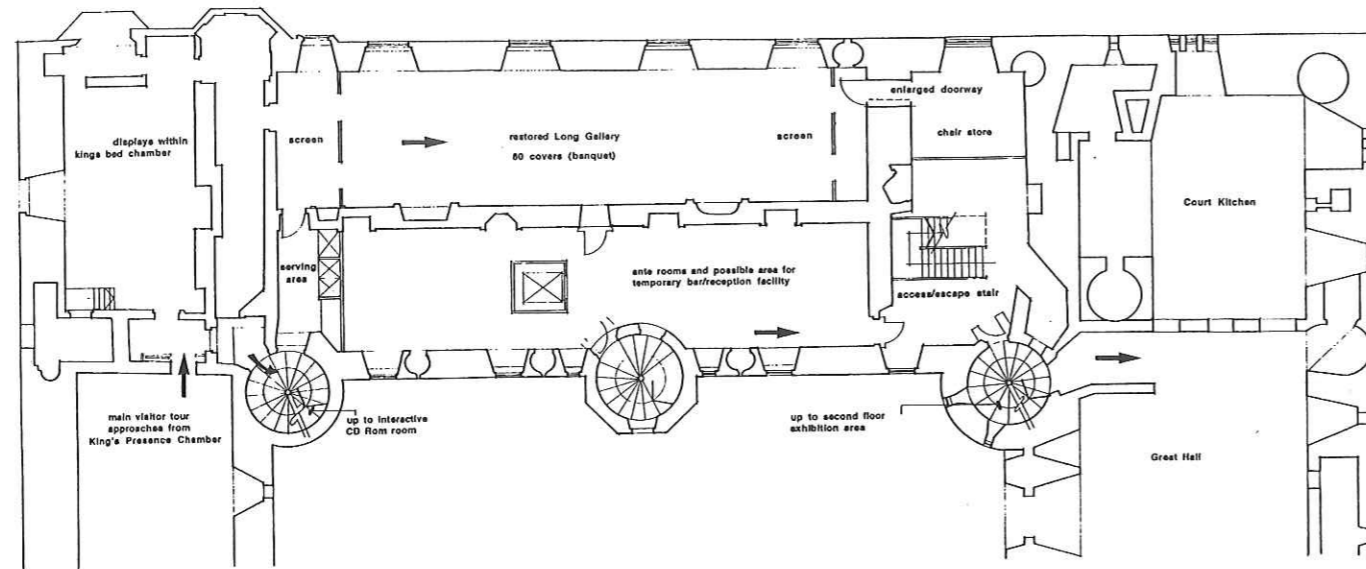
Consideration of the finishes has, quite naturally, generated considerable debate between the design team and the client group within Historic Scotland. It is worth noting that a good example of the more decorative plaster ceiling exists a short distance away at the House of the Binns, near Linlithgow. Although the date of both High Hall and the Kings Bedroom are slightly later than the construction of the Long Gallery it is highly likely that the Long Gallery represented a simpler style to that shown within the House of the Binns. What we can use as an aid to the wall finishes within the Long Gallery is, perhaps, the ground floor living or Blue Room within the House of the Binns in which we can see the simple painted timber panelling dating from 1620. We have assumed, for the purposes of the cost plan, that the Long Gallery would have been decorated with very similar painted timber wall panelling.

408 Building Control Issues and Visitor Safety

In order to gauge the likely response to the reuse of the North Range in terms of Building Control legislation, we discussed the proposals directly with the Chief Building Control Officer at West Lothian Council. His initial response was positive and constructive. Key factors considered were:

- * The height of the building dictates that a compartment floor will be required at fourth floor level. The result of this is that the construction would have to be of non-combustible materials. We have considered this matter later in the report and discuss the possibilities of different floor construction.

The basic assumption of reusing the three stone spiral staircases, was accepted and the matter of escape from the East Tower straight flight staircase into the spiral staircase was also discussed. The initial response from Building Control was that the whole matter of fire escape provision and the inclusion of a fire evacuation lift and refuge areas would be looked at in totality, together with life prevention fire detection and general improvements to the entire provision of access and egress from the building. The proposals as presented therefore appeared acceptable and it was generally agreed that given the unique nature of the Scheduled Ancient Monument, relaxations on certain elements within the Technical Standards of the Building Regulations would be expected, and would be given careful consideration. In view of his initial positive response, we see no major impediment which would be likely to prevent implementation of the proposals, as indicated at present.



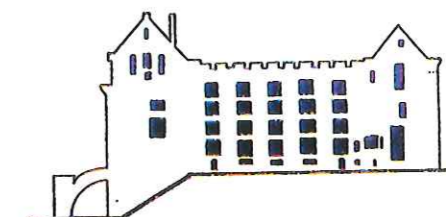
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FIRST FLOOR PLAN 135 (4) 02



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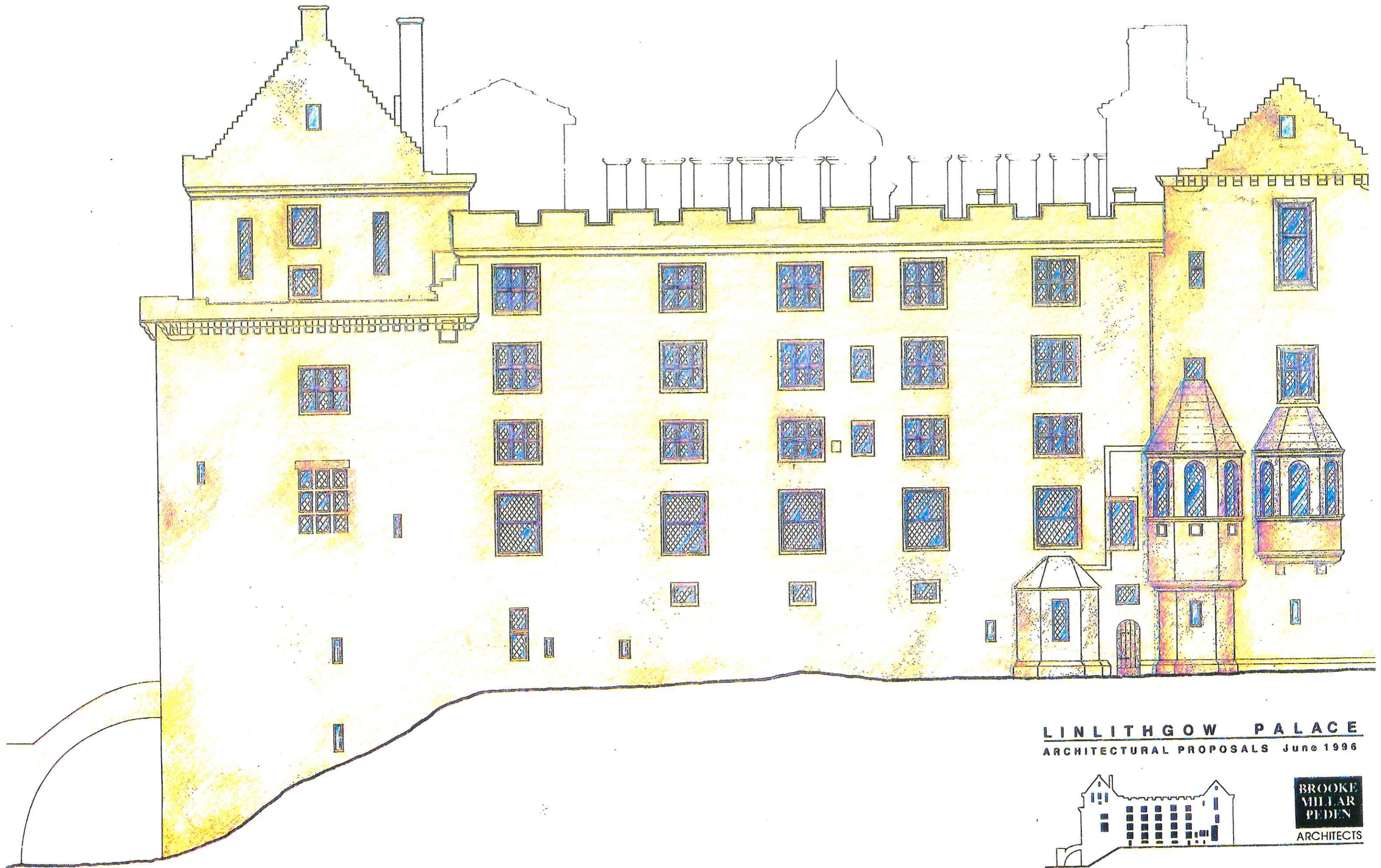


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SCALE METRES

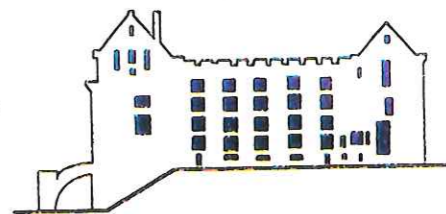
COURTYARD
NORTH ELEVATION

135 (L) 08



SCALE 0 1 2 4 8 10 METRES
0.5 1.5 3 6

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NORTH ELEVATION

135 (L) 11

409 Structural Implications : Existing Situation

The masonry walls are some 370 years old and the interior surfaces have been exposed, initially to fire and then to the elements since the loss of the roof and internal structure some 250 years ago. Nevertheless they have remained stable, with maintenance, and appear to be reasonably robust. The ongoing consolidation work by Historic Scotland should ensure their continuing stability.

From a visual inspection the existing structures, in the part of the North Range within the area of the current proposals, appear to be in reasonable condition. Evidence of some local settlement of the west end of the south (courtyard) wall has been noted. This has caused some distortion of the window openings above but this movement appears to have occurred a long time ago and now seems to be stable.

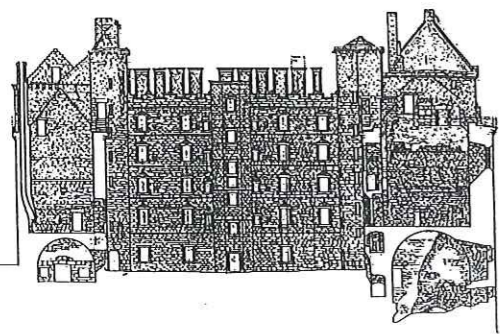
The internal spine wall is of relatively slender construction being 800mm overall in thickness but punctured by eight doorways together with twenty seven fireplaces and associated flues.

Recent survey drawings of the main walls in the North Range provided by Historic Scotland indicate the location of windows, doorways and fireplaces. No quantitative information is available on the depth or form of any foundation for the existing structures, and a ground penetrating radar survey commissioned by Historic Scotland has not yielded information on underground structures or rock levels sufficient for structural assessment purposes. It has been assumed, for the purposes of the preliminary calculation of foundation bearing pressures, that the walls do not widen below ground. It is important to stress, however, that the only satisfactory method of establishing the nature and depth of the base of the walls and obtaining the parameters of the supporting soils at the point of contact with the walls is by the excavation of trial pits which have not previously been possible due to archaeological constraints.

A borehole ground investigation has been carried out and it has been possible to assess the likely ground conditions in the area of the wall footings. The investigation revealed sands and gravels with some clay to a maximum depth of 35 metres. The presence of charcoal suggests that the ground in depths of up to 15 metres has redeposited natural material following the fire, however it is not possible to determine whether or not earthworks took place to the wall construction and whether some or all of the charcoal deposits may have been related to this.

The borehole survey supports our reference to the geological maps of the area which suggest that the ground upon which the Palace is constructed may largely comprise sands and gravels in the form of an ester or some other periglacial deposit overlying bedrock of volcanic turf of the carboniferous age. It also bears out the historical references which suggest that the ground in the vicinity of the Palace may have been built up so that it is possible that some of the walls of the North Range may not be founded on natural material but man-made fill and also remnants of the foundations of previous structures.

Taking into account the information gleaned from the Barlow site investigation and the apparent absence of significant distress in the walls we have concluded that there is no over stressing of the subsoil below the wall footings. When the original floors were in place the maximum dead load at the wall footings is likely to have been 10% greater than the load under the self weight of the walls themselves and even with occupancy of the building it is unlikely that a further 5% increase would have taken place. Whilst it is not possible to be precise with the information available to us all the existing evidence supports the view that, provided any new superstructure is similar in weight to that which is likely to have existed, there will be no need for strengthening of the existing wall foundations.



410 Structural Implications of the Proposals

The new proposals will involve reroofing parts of the North Range and the introduction of new floors, stairs, lift enclosure etc. within the existing shells. All new structural work will be designed to current standards and codes of practice. In addition the existing walls will be adopted as support for the new five storey internal structure. They will become part of the new structure the whole of which will be designed to comply with the requirements of the Building Regulations in respect of disproportionate collapse. No structural problem is envisaged in supporting new roof structures off the existing walls (assuming the roofs are of "traditional" construction - namely timber structures supporting lead or slate coverings).

We have taken account of the following factors in developing the structural solution :

- * the ability of the existing wall "foundations" to sustain the additional loadings without significant movement
- * the ability of the existing walls (particularly the spine wall) to support the new additional load without distress
- * the ability of the existing walls to resist the Building Regulation requirements in respect of disproportionate collapse
- * the degree of "irreversible" alteration (e.g. strengthening) to the existing structure which would be necessary.

The interrelation between the wall footings and the ground has been discussed in 409 1 above. Taking this into account and the ability of the existing walls to support new additional load the aim has been to ensure that new load onto the walls is kept to a minimum. This can be achieved by designing a lightweight floor structure for the four floors and to orientate this structure such that full advantage is taken of the existing outer, spine and cross walls, to distribute load to foundations. In essence, the first floor load is supported by the cross walls and the second, third and fourth floors, together with the roof are supported from the outer and spine walls. A fuller description of the floor structure is given in 411.

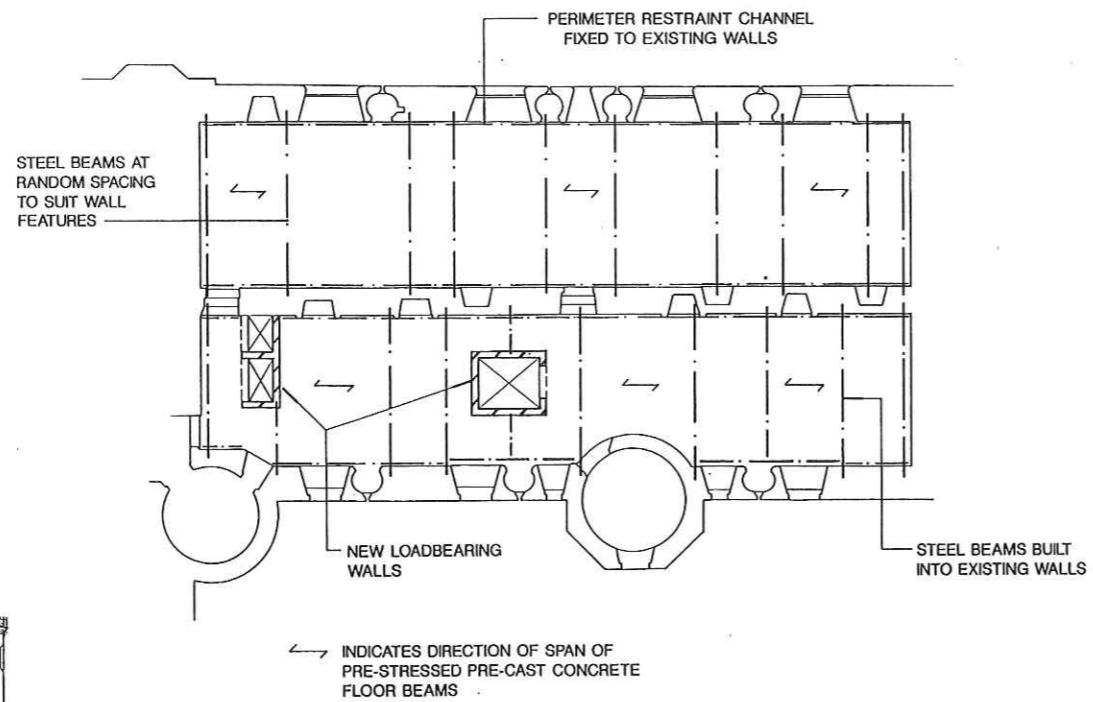
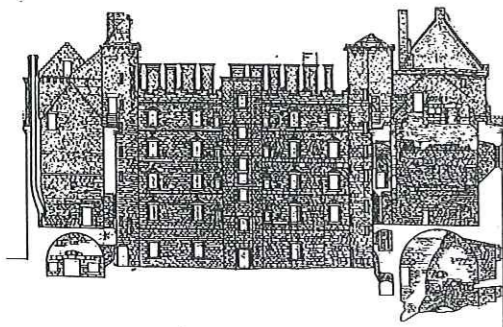
A second factor influencing the ability of existing structure to support additional load is the extent to which floors will be subjected to 'superimposed loading'. This comprises finishes, fixtures and fittings in the building together with live load. For each independent floor the total superimposed load designed for is 5kN/m² which allows for areas of heavy loading on each part of every floor. An instance of this may be during a function when a floor would be able to sustain approximately 5 people per square metre or a total of 1100 people per floor. Clearly this exceeds the realistic practical occupancy of a single floor. Nonetheless the requirement to design each floor for 5kN/m² is a Building Regulation requirement and essential for any part of the floors which could be subjected to crowd loading.

The probability of all floors being subjected to the maximum design loading is very low. With the realistic maximum capacity of visitors in the building being, say 1000 people, the total superimposed load, including finishes, fixtures and fittings would be 1.5kN/m² onto the walls and foundations. There is no provision in the current British Standards for such a reduction and a relaxation would need to be sought from Building Control.

On the basis of the orientation of the new structure, the lightweight nature of the new floors and roof, the opportunity to use a reduced superimposed load on the walls and foundations, the filling of flues in the spine wall, and satisfactory confirmation of the wall footings from trial pitting, we are of the opinion that the existing walls can be used without the need for new vertical structure and associated foundations.

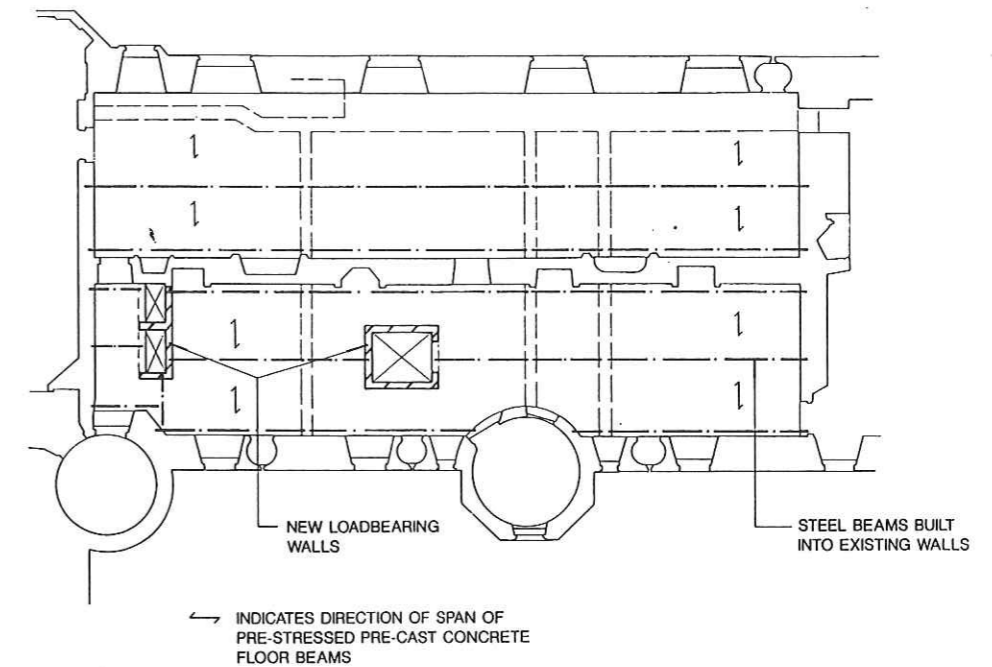
Turning now to the subject of 'progressive collapse', much can be learned from the stability of the walls as they exist at present. Over the period of 250 years since the fire which removed the floors and roof, the walls have stood against the effects of wind pressures which will have been close to, or possibly even exceeded, the maximum pressures which are calculable from the British Standards requirements. This allows us to assess the magnitude of stresses which are likely to have occurred in the walls subjected to the wind pressures. The progressive collapse condition can be satisfied by ensuring that walls will remain in place under extreme loading such as could occur in an explosion. By tying the walls at each floor level and using the plate action of the floors to distribute that loads to 'strong points' in the building we are able to satisfy ourselves that the stresses set up in the walls will be within acceptable limits.

Finally, with regard to the degree of "irreversible alteration", this is kept to a minimum. There will be additional holes and pockets in the walls to take the new floors and in the event of reversibility being required these could be made good using stone, perhaps which had been set aside into storage during the proposed buildings operations. One irreversible operation would be the filling of chimney voids in the spine wall although the existing fireplace openings would be left intact.



TYPICAL SUSPENDED FLOOR SHOWING STEEL BEAMS
SUPPORTED ON EXTERNAL AND SPINE WALLS

ARUP



LOWEST SUSPENDED FLOOR SHOWING STEEL BEAMS
SPANNING ONTO EXISTING INTERNAL CROSS WALLS

ARUP

411 Structural Details

From the above discussion it will be seen that the choice of structure has been limited by weight considerations and that the form of structure will be such that the required mass of the floor for sound insulation purposes is achieved with the minimum structural self weight.

Three floor construction options were considered before selection of a fourth scheme appropriate to the requirements of the building. These can be summarised as follows:

Option 1

This comprises solid or laminated timber beams spanning between the walls and spaced at approximately 0.4 metre centres to suit the existing pockets in the walls. The flooring would comprise plywood or timber planking spanning between the beams. Additional sound insulation could be provided by lightweight concrete blocks cut to fit between the beams and supported on timber runners fixed to the side of the beams. The ends of the beams would be encased in a damp proof membrane to protect the timber against deterioration due to rot.

This option would provide only a limited tying action between the walls to comply with progressive collapse requirements and would have to be augmented by additional steel ties fixed to the existing walls and running in the floor void from wall to wall. Although it provides an acceptably lightweight floor it could not be used as a fire compartment and therefore would not be suitable in all locations.

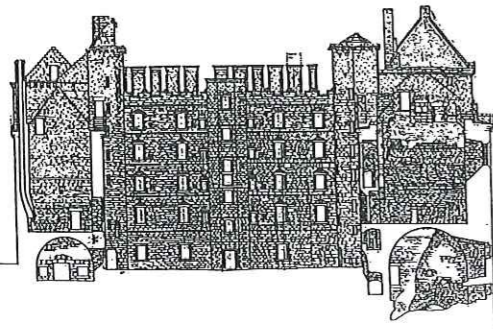
Option 2

This comprises a combination of steel and timber beams. The steel beams would span between the existing walls and be built into enlarged pockets cut in the walls. These beams would be placed at varying centres, up to a maximum of about 3.0m, to suit the layout of existing windows and wall recesses. The steel beams would also serve the secondary function of acting as ties between the walls by ensuring that they are adequately fixed to the masonry.

The remainder of the floor would comprise conventional timber joist spanning between the steel beams with flooring and sound insulation as Option 1. As such this would provide an acceptably lightweight floor but could not be used as a fire compartmentation floor.

Option 3

This comprises a development of Option 2 with steel beams spanning between the existing walls at varying centres of up to about 3.0 metre centres. In this case the timber floor would be replaced by a concrete comprising either precast concrete units or an in-situ slab cast on conventional timber shuttering, permanent metal deck shuttering or precast deck units. A floating timber floor would be provided above the structural slab. This option would provide the required sound insulation and fire compartmentation requirements but at the expense of an unacceptable increase in weight, even with the use of lightweight concrete in place of normal weight concrete.



Selected Option

The structural scheme we would propose, and has been used for costing purposes, comprises structural steel beams spanning onto the existing walls with precast floor ribs spanning laterally between the steel beams and being supported from the bottom flange. The floor ribs are profiled to receive lightweight concrete blocks as in fill and timber boarding and would be supported off battens across the concrete ribs.

The benefits of this solution are:

- * easy to construct in a confined space
- * lightweight, minimising additional load onto foundations
- * good sound insulation between floors
- * good fire compartmentation (although the steel beams will need to be fire clad)
- * relatively easy to provide ties to the existing walls for the progressive collapse condition
- * minimal alterations to existing walls.

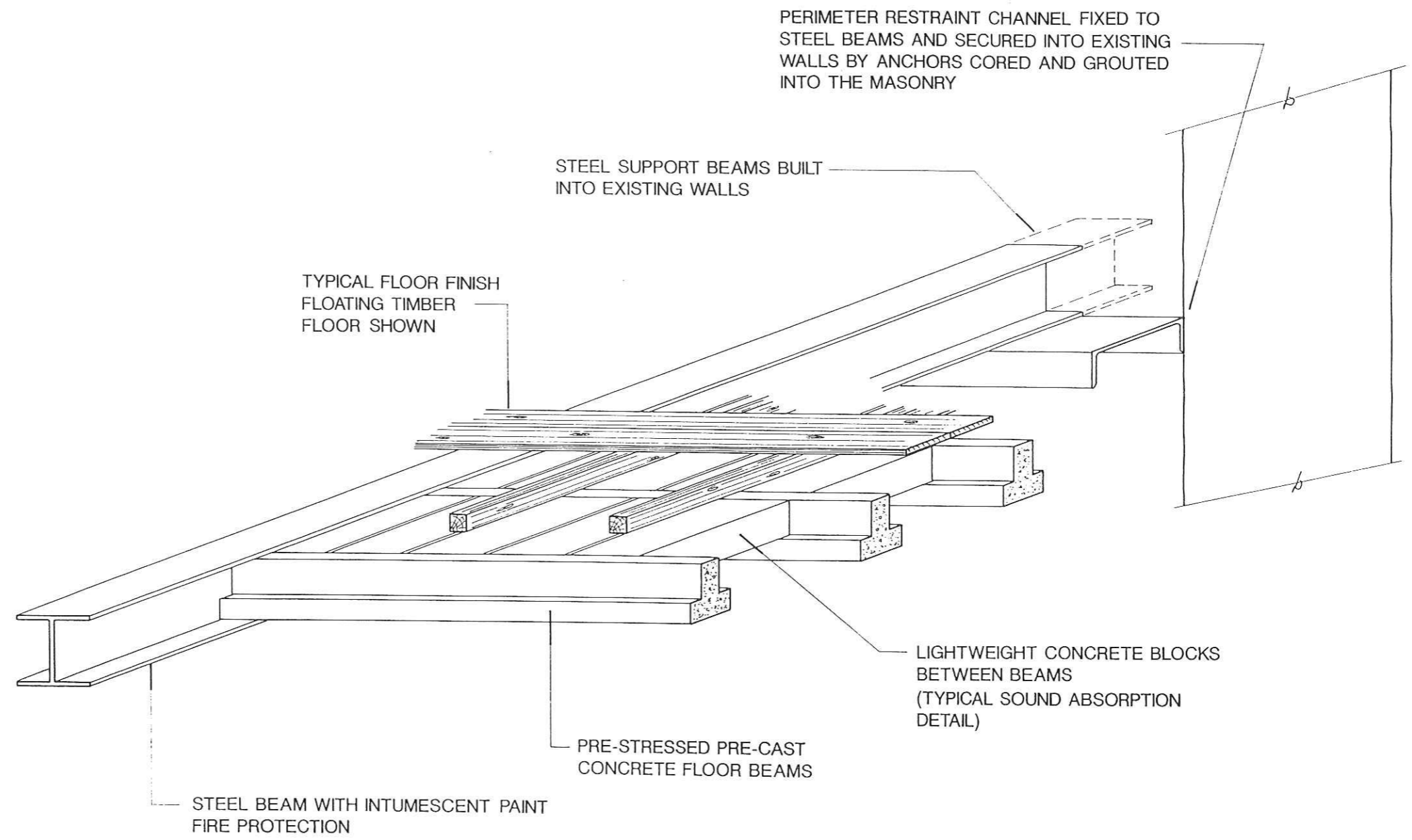
The details of the floor spanning arrangements are shown on the plans.

The roof would consist of timber beams set into the existing pockets in the walls which would support timber boarding and the lead waterproof outer finish. Thermal and acoustic insulation would be provided to comply with necessary requirements.

Where appropriate the same general form of construction of floors and roof would be used for the North West Tower and area at the east end of the North Range. However, the roof to the North West Tower would comprise a traditional slate clad pitched roof while the new stair to the east would comprise steel construction. This would be designed and detailed to meet architectural requirements and consideration has been given to supporting it, or at least partly supporting it from high level so as to minimise its impact on existing fireplaces in the main pantry wall.

412 Conclusion

Our architectural and structural proposals clearly demonstrate that viable and compatible new uses can be provided within the North Range. The basic assumptions we have adopted and the proposals we have indicated will form the framework for further design development. Reroofing and reflooring of the North Range is therefore possible and structurally can be supported by the existing external and internal masonry walls.



TYPICAL FLOOR BUILD UP