

# **STRUCTURAL REPORT**

## Detailed Seismic Assessment

252 High Street  
Hutt Central  
Lower Hutt



## DOCUMENT CONTROL

PROJECT INFORMATION	
Project	252 High Street Detailed Seismic Assessment
Reference	223139
Client	Superloans Property Group Lower Hutt Limited
Client representative	Tania Trevean
Address	252 High Street, Hutt Central, Lower Hutt
Local authority	Hutt City Council

DOCUMENT HISTORY	
Document	24 02 27 223139 CBP bn - DSA Report_252 High Street
Current revision	1
Date	5 March 2024
Status	Final Issue
Previous Revisions	
0	01/03/2024 Draft Issue

APPROVAL	
Completed:	Approved:
 Ben Norrish Senior Engineer BE (Hons), CMEngNZ CPEng 1024468	 Anthony Taylor Director BE (Hons), CMEngNZ, IntPE CPEng 228777

### NOTE:

It is understood that this document has been prepared at the request of Superloans Property Group Lower Hutt Limited, to be used for their purposes only and neither Clendon Burns & Park Ltd nor any of its employees accept any responsibility on any ground whatsoever to any other party or person who relies upon it.

## EXECUTIVE SUMMARY

### Background

A Detailed Seismic Assessment (DSA) of the building located at 252 High Street, Hutt Central, Lower Hutt, was carried out at the request of Tania Trevean on behalf of Superloans Property Group Lower Hutt Limited.

No known previous assessments have been undertaken.

### Basis for the Assessment

This assessment has been based on the following information:

- Original construction drawings and specification dated 5 March 1932.
- Original construction drawings and specification for the 'garage' addition dated 1 April 1932.
- Original construction drawings and for the 'western end' additions / alterations dated 21 November 1972.
- Original construction drawings and for the parapet alterations dated 10 December 1991.
- Original construction drawings and for the glass entry alterations dated 17 November 1992.
- On-site visual inspection of the interior and exterior of the building undertaken on 11 December 2023 and visual inspection of the ceiling cavity undertaken on 29 January 2024.
- Invasive investigations to expose existing structure and connections, undertaken on 9 February 2024 by the client's builder.
- Geotechnical borehole log data at the site dated 17 March 2017, sourced from the NZGS online database.

### Building Description

The building at 252 High Street was originally constructed in 1932 as a mechanical workshop. Since then, various alterations and extensions have been made to this original structure which include a 'garage' to the east side in 1936 and an extension to the west side in 1972. Other minor alterations also appear to have been undertaken in circa 1991 / 1992. The building is currently being used for retail purposes. A floor plan of the building is provided in Figure 1.1 below.

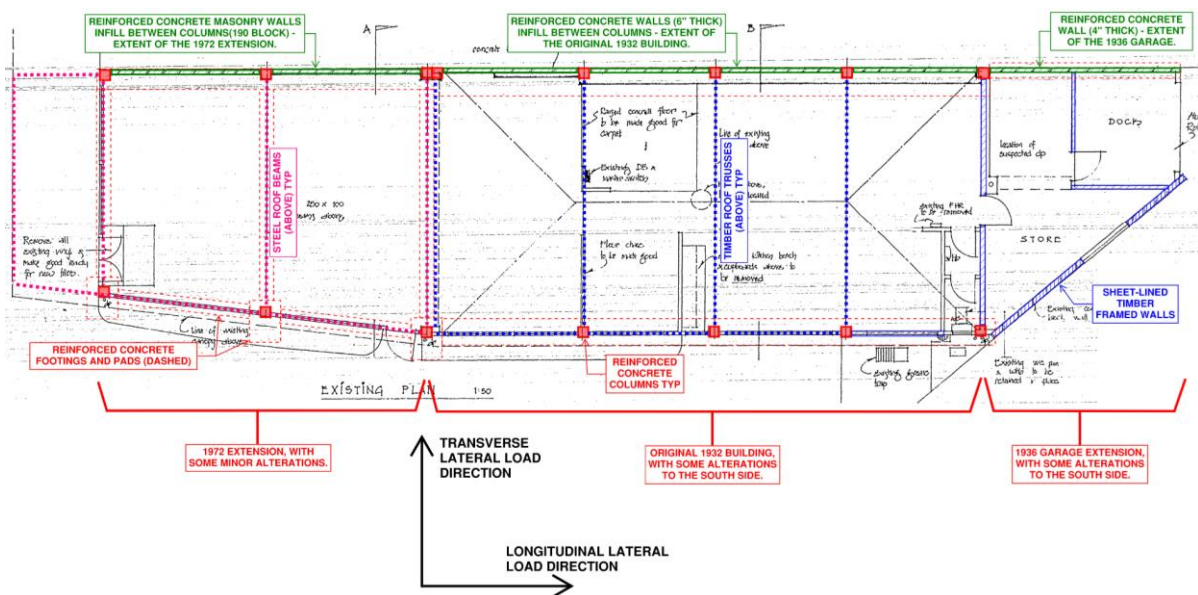


Figure 1.1: Floor plan of the building, showing the various alterations / extensions over time.

The original 1932 building was constructed with a light-weight corrugated iron roof supported on timber purlins. These purlins spanned between timber trusses which are supported by reinforced concrete columns. The north side of the building has a six-inch reinforced concrete infill wall between the columns. The south side of the building was originally constructed with reinforced concrete beams spanning between the columns, with small sections of infill concrete wall either side of openings, however it appears these beams / walls have been removed in subsequent alterations. The concrete columns and north concrete wall are founded on reinforced concrete strip footings, and the floor is formed with a concrete slab on-grade.

The 1936 garage extension has a four-inch reinforced concrete wall on the north side, and light-weight timber framed walls elsewhere. The roof is formed with light-weight timber framing. Nominal concrete footings support the structure, and the floor is also formed with a concrete slab on-grade.

The 1972 extension to the west side of the original, shares a similar structural form to the original building. It was constructed with a lightweight roof supported by timber purlins, however these are supported with steel roof beams as opposed to the timber trusses in the original portion. The roof on this portion was also built with a low pitch compared to the pitched hip roof at the original structure. The similarities continue with reinforced concrete columns supporting the roof structure, and reinforced concrete masonry infilling between the columns at the north wall. The structure is supported on a combination of reinforced concrete pad footings, tied together with reinforced concrete ground beams. As with the other parts of the building, the floor is formed with a concrete slab on-grade.

All three parts of the building described above are structurally adjoined and together they form the 'building' referred to herein. The north side of the building is located on the boundary to the neighbouring property, and the east / west sides face Waterloo Road and High Street, respectively. A 30mm separation joint / gap is provided between the north wall and the structure of the neighbouring building.

The building has also had some minor alterations, which includes alterations to the parapet around the east, south, and west sides of the building, and addition of a glass entry / conservatory structure along the south side of the building.

The lateral resisting structure in the transverse direction, as defined in Figure 1.1, is provided by cantilever concrete columns for the majority of the building, with some sheet lined timber framed walls at the garage / east end of the building. In the longitudinal direction, the north concrete / masonry wall and the south side cantilever concrete columns provide the majority of the bracing, again with some sheet lined timber framed walls at the garage. The original portion of the building is detailed with 25mm sarking on the roof and the west extension is detailed with 12.5mm plywood, which may be capable of providing some nominal diaphragm action.

The site has been classified as subsoil class D, corresponding to deep or soft soil sites as per NZS1170.5:2004. This classification aligns with the site-specific data in the geotechnical bore log at the site and with the NZSEE site subsoil map for Lower Hutt.

### **Assessed Seismic Rating**

The results of the DSA indicate the building's seismic rating to be 20 %NBS (IL2) assessed in accordance with the MBIE guideline document *The Seismic Assessment of Existing Buildings-Technical Guidelines for Engineering Assessments*, Version 1 dated July 2017. The earthquake rating assumes that Importance Level 2 (IL2), in accordance with the Joint Australian / New Zealand Standard - Structural Design Actions Part 0, AS/NZS 1170.0:2002, is appropriate.

This corresponds to a Grade D building following the NZSEE grading scheme. Grade D buildings represent a risk to occupants comparable to 10-25 times greater than expected for a new building, indicating a 'high' risk exposure.

A building with a seismic rating less than 34%NBS fulfils one of the requirements for the Territorial Authority (TA) to consider it to be an Earthquake-Prone Building (EPB) in terms of the Building Act 2004. A building rating less than 67%NBS is considered to be an Earthquake Risk Building (ERB) by the New Zealand Society for Earthquake Engineering (NZSEE). The building at 252 High Street, Hutt Central, Lower Hutt is therefore categorised as an Earthquake Risk Building and it meets one of the criteria that could categorize it as an Earthquake Prone Building.

In accordance with the provisions of the Earthquake Prone Building requirements of the Building Act 2004 the determined seismic rating requires the following actions for this building:

- This detailed seismic assessment report to be submitted to the Territorial Authority, Hutt City Council, for their assessment.
- The Building (Earthquake-prone Buildings) Amendment Act 2016 allows 15 years to strengthen from receipt of an earthquake prone building notice. If the building is identified by the Territorial Authority to be a priority building, the time to strengthen would reduce to 7.5 years.

The assessment identified the following Structural Weaknesses (SW's) in the building:

<b>STRUCTURAL WEAKNESSES (&lt;100%NBS)</b>		
Score	Element	Mode of Failure
20%NBS	Cantilever reinforced concrete columns	Flexural strength of the column, limited by embedment / development of the column bars into the concrete footings.
20%NBS	Reinforced concrete footings at the cantilever columns	Overtopping resistance of the footings.
<34%NBS	Heavy 'plaster' ceiling tiles	Tiles falling from the suspended ceiling grid.
55%NBS	Plasterboard lined walls at east (garage) end of building	Shear strength of the wall exceeded.
75%NBS	Cantilever reinforced concrete columns	Shear strength of the columns exceeded.

The Critical Structural Weakness (CSW) was found to be the flexural strength of the cantilevering reinforced concrete columns, limited by embedment / development of the column reinforcing into the concrete footings.

The following were assessed as possessing strengths of 100%NBS or greater:

<b>OTHER ELEMENTS (100%NBS)</b>		
Score	Element	Comments
>100%NBS	Reinforced concrete and concrete masonry walls along north side of the building	

The following secondary structural and non-structural (SSNS) elements were included or excluded from the assessment of the earthquake rating as follows:

SSNS ELEMENT	INCL	EXCL*	N/A †
Unreinforced Masonry/Concrete Chimney			✓
Unreinforced Masonry/Concrete Parapet			✓
Masonry veneer			✓
Heavy/precast concrete cladding			✓
Light cladding/curtain wall framing system			✓
Stairs			✓
Heavy non-load bearing partitions (>25kg/m <sup>2</sup> )	✓		
Ramps			✓
Heavy parapets	✓		
Canopies	✓		
Balconies			✓
Heavy ceilings/lightweight ceiling system above space class I, II or IV	✓		
Lightweight ceilings above space class III			✓
Heavy storage racking systems within generally occupied spaces			✓
Heavy plant within generally occupied spaces			✓
Vessels containing hazardous materials			✓
Signs, Billboards, and other heavy appendages			✓
Services and lightweight plant			✓
Sprinklers			✓

\* SSNS elements associated with fitouts have also been excluded from the assessment. An assessment of the excluded elements could affect the rating of the building and should be completed as a separate exercise.

† Elements categorised as not applicable are either not known to exist or do not require assessment. If any of these elements do exist on or within the building, they may require a separate Detailed Seismic Assessment.

From the assessment we also note the following:

- The intention of the assessment is to determine the point at which a life safety hazard is present or at which there is the potential for the building, or a building element, to damage adjacent property. It is not an assessment of the risk of damage to the building / building elements, or the effect that such damage would have on the operation of the building.
- Seismic weights were assessed from the existing structural plans. The seismic load was calculated using the equivalent static analysis method and a forced-based assessment was undertaken using these loadings. Probable strengths for the major structural elements were assessed from the available information and drawings.
- A lack of 'formal' lateral load resisting structure at the south, east and west sides of the building, is likely to result in a 'torsional' response to seismic loads. However, a tributary width / area approach has been applied to distribute the lateral loads between the various lateral resisting elements, which does not require specific assessment of the diaphragms or torsional behaviour. We do note that this uneven distribution of lateral resisting elements, and likely 'torsional' response of building as a result, is not a desirable behaviour in a seismic event.
- The governing mechanism for the cantilever reinforced concrete columns was determined to be embedment / development of the column bars into the concrete footings. We also note that at the same 20%NBS score, the overturning resistance of the base footings of the columns

are expected to be exceeded. These columns provide primary support to the roof structure which deems this 20%NBS score to be the governing rating for the building.

- The visual inspection of the building found that some heavy ‘plaster’ ceiling tiles are present in some locations. These pose a risk to life-safety in a seismic event and are recommended to be removed and replaced with lightweight ‘mineral fibre’ tiles, as seen elsewhere in the building. We note that these heavy tiles are only in isolated locations, not throughout the entirety of the building.

### **Seismic Retrofit Options**

Based on a high-level structural review, the following options are suitable for and likely improve the seismic performance of the building:

- Install steel cross bracing in both principal loading directions - this will have comparable stiffness to the existing concrete structure.

### **Recommended Next Steps**

In the short-term we recommend that the heavy plaster ceiling tiles are removed from the suspended ceiling and replaced with light-weight tiles.

We also recommend that a seismic strengthening scheme is commissioned to improve the seismic rating of the building to no less than 67% NBS, as also recommended by the New Zealand Seismic Earthquake Engineer society (NZSEE), or a %NBS level otherwise considered acceptable by the building owner / building tenants / building users.

## TECHNICAL SUMMARY

The following table summarises the results of a Detailed Seismic Assessment completed using Part C of The Seismic Assessment of Existing Buildings document. The overall report provides a detailed assessment of the building's %NBS seismic capacity, highlights the key risks and presents recommendations for improvements to mitigate potential risks. The table below presents a summary of the technical inputs to and findings of the assessment.

BUILDING INFORMATION	
Building name/ description	The building at 252 High Street
Street address	252 High Street, Hutt Central, Lower Hutt
Territorial authority	Hutt City Council
No. of storeys	1
Area of typical floor (approx. m <sup>2</sup> )	216
Year of design (approx.)	Original building - 1932, garage extension to the east - 1936, building extension to the west - 1972.
NZ standard designed to	Unknown
Structural system including foundations	<p>A single storey structure comprising of a light-weight roof supported by timber purlins/rafters spanning between timber trusses and steel beams. These steel beams are supported by reinforced concrete columns. There is reinforced concrete and reinforced concrete masonry wall infill along the full length of the north side of the building, forming the boundary wall adjacent to the neighbouring property. The building is founded on shallow reinforced concrete pads, footings and ground beams. Some reinforced concrete pads are also detailed to have compacted hardfill below them.</p> <p>The lateral resisting structure to the building is provided by the north reinforced concrete wall, reinforced concrete cantilever columns and timber framed walls with sheet linings at the 'garage' end of the building.</p>
Does the building comprise of shared structural form or shares structural elements with adjacent titles?	<p>No.</p> <p>A 30mm separation joint / gap provided between this building and the neighbouring building structure at the north boundary.</p>
Key features of ground profile and identified geohazards	<p>The building is located on a flat site.</p> <p>The site is classified as subsoil class D, as per NZS1170.5:2004.</p> <p>The site is located roughly 500m to the southeast of the Wellington Fault.</p> <p>The site is located in a '<i>high</i>' hazard zone for earthquake ground shaking as per the Greater Wellington Regional Council maps for Hazards and Emergency Management.</p> <p>The site is located in a '<i>moderate</i>' hazard zone for earthquake liquefaction potential as per the Greater Wellington Regional Council maps for Hazards and Emergency Management.</p>

<b>Previous strengthening and/or significant alteration</b>	A number of alterations have been undertaken to the original 1932 building, as documented in the noted drawings. No known seismic strengthening work has been undertaken to the building.
<b>Heritage Issues/status</b>	N/A
<b>Other relevant information</b>	N/A
<b>ASSESSMENT INFORMATION</b>	
<b>Consulting practice</b>	Clendon Burns & Park Ltd
<b>CPEng responsible, including:</b> <ul style="list-style-type: none"> <li>Name</li> <li>CPEng number</li> <li>A statement of suitable skills and experience in the seismic assessment of existing buildings</li> </ul>	Anthony Taylor CPEng 228777 Anthony is a Chartered Professional Engineer with 20+ years' experience in structural engineering. His work has seen him undertake structural design, construction monitoring, seismic assessment, and seismic strengthening of many commercial, industrial and residential buildings around the Wellington region and throughout New Zealand. As well as holding a Bachelor with Honours from the University of Canterbury, Anthony is a Professional Member of Engineering New Zealand and he is a qualified Building Emergency Management - Rapid Building Assessor. As part of the requirements for being registered as a Chartered Professional Engineer, he has maintained his continued competency in the latest research and developments in structural engineering.
<b>Documentation reviewed, including:</b> <ul style="list-style-type: none"> <li>Date/version of drawings/ calculations</li> <li>previous seismic assessments</li> </ul>	Original drawings and specification dated 5 March 1932. Garage addition drawings and specification dated 1 April 1936. Alterations drawings dated 21 November 1972. Alterations drawings dated 10 December 1991. Alterations drawings dated 17 November 1992.
<b>Geotechnical report(s)</b>	A geotechnical borehole log at the site, dated 17 March 2017, sourced from the NZGS database.
<b>Date(s) building inspected and extent of inspection</b>	<ul style="list-style-type: none"> <li>Visual inspection of the interior and exterior of the building undertaken on 11 December 2023.</li> <li>Visual inspection of the ceiling cavity undertaken on 29 January 2024.</li> <li>Invasive investigations to expose existing structure and associated connections, undertaken on 9 February 2024 by the building owners' builder.</li> </ul>
<b>Description of any structural testing undertaken and results summary</b>	N/A
<b>Previous assessment reports</b>	No known previous seismic assessments have been undertaken.
<b>Other relevant information</b>	N/A

### SUMMARY OF ENGINEERING METHODOLOGY AND KEY PARAMETERS USED

Occupancy type(s) and importance level	Currently used for retail purposes - Importance Level 2 (IL2) building.
Site subsoil class	D
Summary of how Part C was applied, including: <ul style="list-style-type: none"> <li>the analysis methodology(s) used from C2</li> <li>other sections of Part C applied</li> </ul>	A force-based assessment following the equivalent static analysis procedure for the primary lateral structure and a pseudo-equivalent static analysis of the diaphragms as per Part C2 of the guidelines.
Other relevant information	N/A

### ASSESSMENT OUTCOMES

Assessment status	Final	
Assessed %NBS rating	20%NBS (IL2)* * The seismic rating is based on those elements which have been explicitly identified as being assessed within the DSA report. If additional elements are present, they may affect the rating of the building.	
Seismic grade and relative risk (from Table A3.1)	Grade D, representing a risk to occupants comparable to 10-25 times greater than expected for a new building, indicating a 'high' risk exposure.	
Comment on the nature of Secondary Structural and Non-structural elements/parts identified and assessed	<p>From the available knowledge of the existing documentation and visual inspections undertaken, the following SSNS / parts were identified and assessed:</p> <ul style="list-style-type: none"> <li>Some heavy 'plaster' ceiling tiles were identified during the visual inspection of the building. These are assessed possess a seismic rating of less than 34%NBS.</li> <li>Parapets, canopies, and heavy concrete walls along the north boundary were assessed and found to possess a seismic rating of greater than 34%NBS.</li> </ul>	
Describe the governing Critical Structural Weakness	Flexural strength of the cantilevering reinforced concrete columns, limited by embedment / development of the column reinforcing into the concrete footings.	
If the results of this DSA are being used for earthquake prone building purposes, <u>and</u> elements rating <34%NBS have been identified (including Parts):	<p><b>Engineering Statement of Structural Weakness and Location</b></p> <p>Flexural strength of the cantilevering reinforced concrete columns along the north and south side of the building, limited by embedment / development of the column reinforcing into the concrete footings and particularly the bars which are close to the edge of the footings below.</p>	<p><b>Mode of Failure and Physical Consequence Statement(s)</b></p> <p>This will likely result in the column reinforcing 'pulling out' of the footing below, local cracking / breaking up of the slab and footing, cracking at the base of the column, and causing the column to 'rotate' at their base. Given the columns are providing gravity support to the roof, this element could lead to a local collapse of the roof.</p>

**Recommendations for  
EQP buildings**

The following actions are recommended base don the findings in this report:

- Undertaken seismic strengthen to the building in order to raise the seismic %NBS rating to an acceptable level.
- Remove the heavy plaster ceiling tiles and replace these with light-weight tiles.

Note that the Detailed Seismic Assessment is an assessment of possible structural weaknesses affecting life safety. It is not an assessment of the risk of damage to the building / building elements, or the effect that such damage would have on the operation of the building.

## INDEX

EXECUTIVE SUMMARY .....	ii
TECHNICAL SUMMARY .....	vii
1. INTRODUCTION .....	1
2. BUILDING DESCRIPTION .....	2
3. REGULATORY REQUIREMENTS .....	5
4. DETAILED SEISMIC ASSESSMENT .....	10
5. RESULTS OF THE DSA .....	11
6. SEISMIC RETROFIT OPTIONS .....	14
7. CONCLUSIONS .....	15
8. RECOMMENDATIONS .....	16
APPENDIX A - GLOSSARY .....	17
APPENDIX B - ASSESSMENT BASIS.....	20
APPENDIX C - EXISTING DRAWINGS .....	21

## 1. INTRODUCTION

This report has been prepared at the request of Tania Trevean on behalf of Superloans Property Group Lower Hutt Limited and its aim is to report the findings of a detailed seismic assessment undertaken on the building at 252 High Street, Hutt Central, Lower Hutt, herein referred to as the Building.

A glossary of terms and acronyms is provided within Appendix A. The assessment was completed using copies of the original 1932 drawings and the 1936, 1972, 1991, and 1992 extension / alteration drawings. A selection of these drawings is provided in Appendix C.

The assessment is based upon the following Technical Guidelines:

**TABLE 1.1: THE SEISMIC ASSESSMENT OF EXISTING BUILDINGS – TECHNICAL GUIDELINES FOR ENGINEERING ASSESSMENTS**

Part	Version	Date
A - Assessment Objectives and Principles	1	July 2017
B - Initial Seismic Assessment	1	July 2017
C1 - General Issues	1	July 2017
C2 - Assessment Procedures and Analysis Techniques	1	July 2017
C3 - Earthquake Demands	1	July 2017
C4 - Geotechnical Considerations	1	July 2017
C5 - Concrete Buildings	1	July 2017
C6 - Structural Steel Buildings	1	July 2017
C7 - Moment Resisting Frames with Infill Panels	1	July 2017
C8 - Unreinforced Masonry Buildings	1	July 2017
C9 - Timber Buildings	1	July 2017
C10 - Secondary Structural and Non-Structural Elements	1	July 2017

Collectively, these documents are herein referred to as the Guidelines.

The DSA is intended to provide a more reliable and consistent outcome than is available from an Initial Seismic Assessment (ISA).

The focus of the DSA is to achieve an understanding of the likely behaviour of the Building during a design level earthquake by quantifying the strength and deformation capacities of the various structural elements, and by checking the Building's structural integrity against the loads / deformation (demands) that would be used for the design of a similar building on the same site.

## 2. BUILDING DESCRIPTION

### 2.1 Current Structure

The building at 252 High Street was originally constructed in 1932 as a mechanical workshop. Since then, various alterations and extensions have been made to this original structure which include a 'garage' to the east side in 1936 and an extension to the west side in 1972. Other minor alterations also appear to have been undertaken in circa 1991 / 1992. The building is currently being used for retail purposes. A floor plan of the building is provided in Figure 2.1 below.

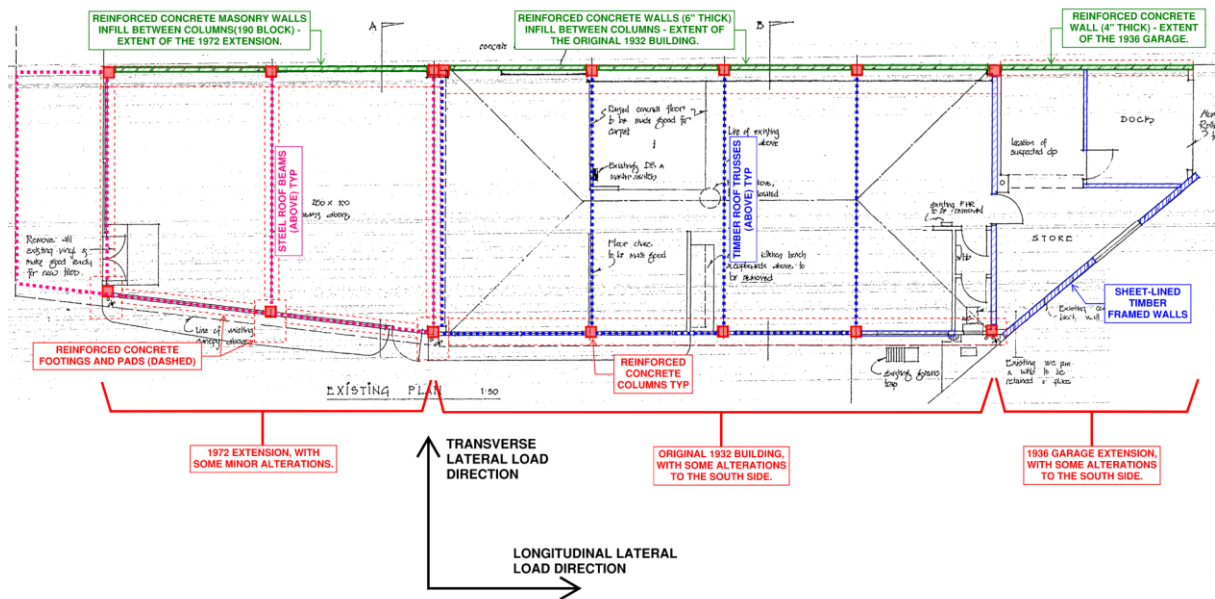


Figure 2.1: Floor plan of the building, showing the various parts added over time.

The original 1932 building was constructed with a light-weight corrugated iron roof supported on timber purlins. These purlins spanned between timber trusses which are supported by reinforced concrete columns. The north side of the building has a six-inch reinforced concrete infill wall between the columns. The south side of the building was originally constructed with reinforced concrete beams spanning between the columns, with small sections of infill concrete wall either side of openings, however it appears these beams / walls have been removed in subsequent alterations. The concrete columns and north concrete wall are founded on reinforced concrete strip footings, and the floor is formed with a concrete slab on-grade.

The 1936 garage extension has a four-inch reinforced concrete wall on the north side, and light-weight timber framed walls elsewhere. The roof is formed with light-weight timber framing. Nominal concrete footings support the structure, and the floor is also formed with a concrete slab on-grade.

The 1972 extension to the west side of the original, shares a similar structural form to the original building. It was constructed with a lightweight roof supported by timber purlins, however these are supported with steel roof beams as opposed to the timber trusses in the original portion. The roof on this portion was also built with a low pitch compared to the pitched hip roof at the original structure. The similarities continue with reinforced concrete columns supporting the roof structure, and reinforced concrete masonry infilling between the columns at the north wall. The structure is supported on a combination of reinforced concrete pad footings, tied together with reinforced concrete ground beams. As with the other parts of the building, the floor is formed with a concrete slab on-grade.

All three parts of the building described above are structurally adjoined and together they form the 'building' referred to herein. The north side of the building is located on the boundary to the neighbouring property, and the east / west sides face Waterloo Road and High Street, respectively. A 30mm separation joint / gap is provided between the north wall and the structure of the neighbouring building. An elevation of the building, viewed from the south, is shown in Figure 2.2 below.



**Figure 2.2: Elevation of the building from the south.**

The building has also had some minor alterations, which includes alterations to the parapet around the east, south, and west sides of the building, and addition of a glass entry / conservatory structure along the south side of the building.

The lateral resisting structure in the transverse direction, as defined in Figure 2.1, is provided by cantilever concrete columns for the majority of the building, with some sheet lined timber framed walls at the garage / east end of the building. In the longitudinal direction, the north concrete / masonry wall and the south side cantilever concrete columns provide the majority of the bracing, again with some sheet lined timber framed walls at the garage. The original portion of the building is detailed with 25mm sarking on the roof and the west extension is detailed with 12.5mm plywood, which may be capable of providing some nominal diaphragm action.

## **2.2 Previous Structural Modification to the Existing Building**

Modifications to the original building were undertaken in 1936, 1972, 1991, and 1992 as noted above. Other documentation for the site indicates that other structures may have once existed, but have since been demolished / removed.

## **2.3 Existing Structural Condition**

A building walk through has been conducted and the Building was generally noted to be in good repair. A detailed condition survey of the existing building, which would typically involve the removal of wall linings and invasive investigation of the structure, has not been completed. For the purposes of the assessment, it has been assumed that the structural elements possess no durability issues.

## 2.4 Ground Conditions

A geotechnical investigation of the site has not been completed. For the purposes of the seismic assessment, class D site subsoil has been assumed corresponding to deep or soft soil sites as per NZS1170.5:2004. This classification aligns with the site-specific data in the geotechnical borehole log and with the NZSEE site subsoil map for Lower Hutt. The NZSEE subsoil class map is provided in Figure 2.3 below.

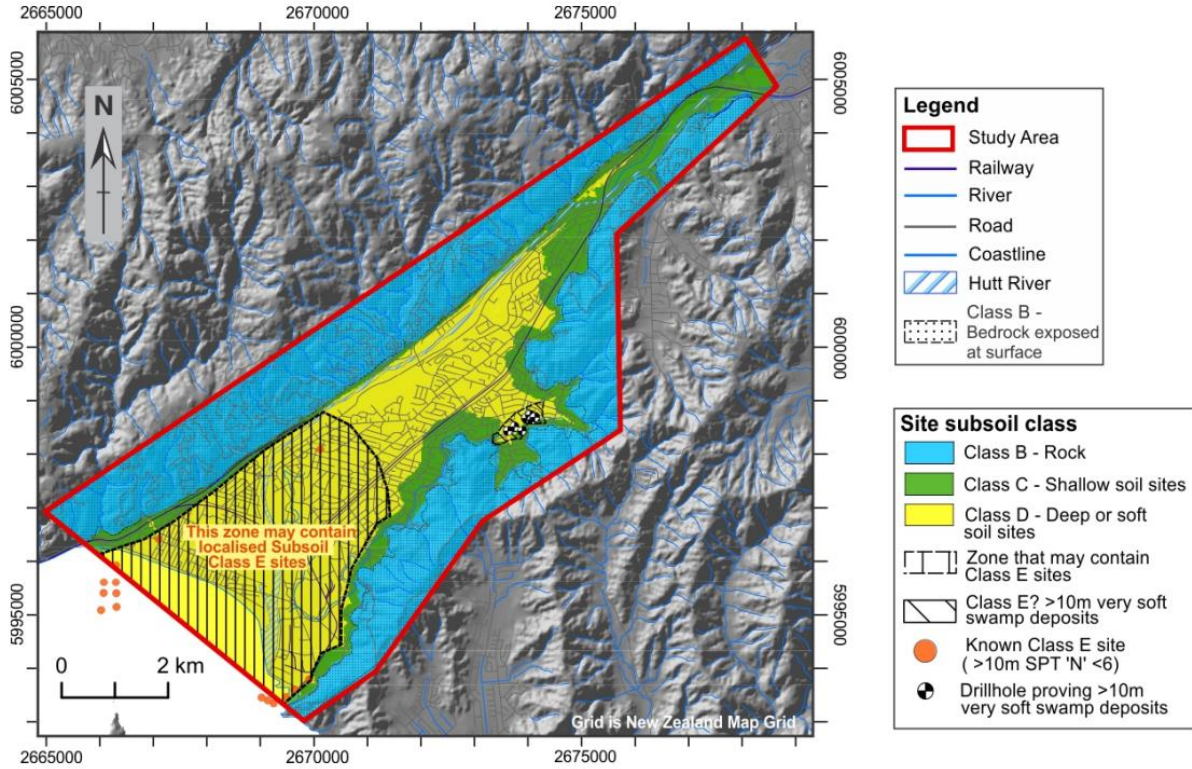


Figure 2.3: Site subsoil class, Hutt City - NZSEE / NZS1170.5:2004

## 3. REGULATORY REQUIREMENTS

### 3.1 Seismic Assessments for Earthquake-prone Building Purposes

The Ministry of Business, Innovation and Employment (MBIE) document “*EPB Methodology*”, produced in accordance with Section 133AV of the Building Act 2004, sets out the methodology to identify earthquake-prone buildings. This methodology requires that:

- TAs (Territorial Authorities) must identify potentially earthquake-prone buildings.
- Building owners of potentially earthquake-prone buildings must commission an engineering assessment.
- TAs must use this information to determine whether a building or one of its parts is earthquake prone.

### 3.2 Meaning of earthquake-prone building

Section 133AB of the Building Act 2004 sets out the meaning of earthquake-prone building. The definition was revised in the Building (Earthquake-prone Buildings) Amendment Act 2016.

The definition now:

- makes it clear that a building can be earthquake prone by virtue of its parts.
- makes it clear that a building must be assessed for its expected performance and possible consequence.
- ties the meaning to a moderate earthquake (as defined below).

The definition of an earthquake-prone building contained within the Building Act is:

#### 133AB Meaning of earthquake-prone building

- (1) A building or a part of a building is **earthquake prone** if, having regard to the condition of the building or part and to the ground on which the building is built, and because of the construction of the building or part, -
  - (a) the building or part will have its ultimate capacity exceeded in a moderate earthquake, and
  - (b) if the building or part were to collapse, the collapse would be likely to cause -
    - (i) injury or death to persons in or near the building or on any other property, or
    - (ii) damage to any other property.
- (2) Whether a building or part of a building is earthquake prone is determined by the Territorial Authority in whose district the building is situated: *see* section 133AK.
- (3) For the purpose of subsection (1)(a), **ultimate capacity** and **moderate earthquake** have the meanings given to them by regulations.

As covered in 133AB(3), to assist with application of this definition, both ultimate capacity and moderate earthquake are terms defined in the Building (Specified Systems, Change of Use, and Earthquake-prone Buildings) Regulations 2005 (as amended).

These regulations define **ultimate capacity** as:

The probable capacity to withstand earthquake actions and maintain gravity load support assessed by reference to the building as a whole and its individual elements or parts.

While defined for the purposes of undertaking engineering assessments of potentially earthquake-prone buildings, the definition for ultimate capacity is used for all types of seismic assessment carried out using the Guidelines as described in Section A6.3 of the Guidelines.

These regulations define **moderate earthquake** as:

In relation to a building, an earthquake that would generate shaking at the site of the building that is of the same duration as, but that is one-third as strong as, the earthquake shaking (determined by normal measures of acceleration, velocity, and displacement) that would be used to design a new building at that site if it were designed on 1 July 2017.

### 3.3 Development of the Guidelines

As our understanding of existing building performance evolves based on the learnings from research and development, the guidelines are updated to reflect the state of knowledge of the time. These are considered to be best practice for undertaking seismic assessments; however, the legislative definition of earthquake-prone is tied to the July 2017 version of the Guidelines (version 1). Assessments using subsequent versions of the guidelines fall outside of the Earthquake-prone Building Methodology. If a building is found to possess less than 34%NBS using subsequent versions of the Guidelines, the assessment must be revised to consider the original version in order to confirm the building rating for purposes of Earthquake-prone Building legislation.

### 3.4 Alterations

The basic requirement of Section 112 of the Building Act 2004 in terms of structure is that alterations cannot result in the building complying with the Building Code to a lesser extent than before the work (s112(1)(b)).

From a seismic point of view this requires that either the building's seismic capability is not diminished, or it can be shown that the building meets the minimum performance requirements of the Building Code.

It is considered that a seismic assessment carried out in accordance with the Guidelines will provide an evaluative tool to help establish that the test under section 112(1)(b) is met. It may also be necessary to confirm other requirements of the Building Code have been met to the required degree, e.g. for amenity, to fully comply with the requirements of the Building Act.

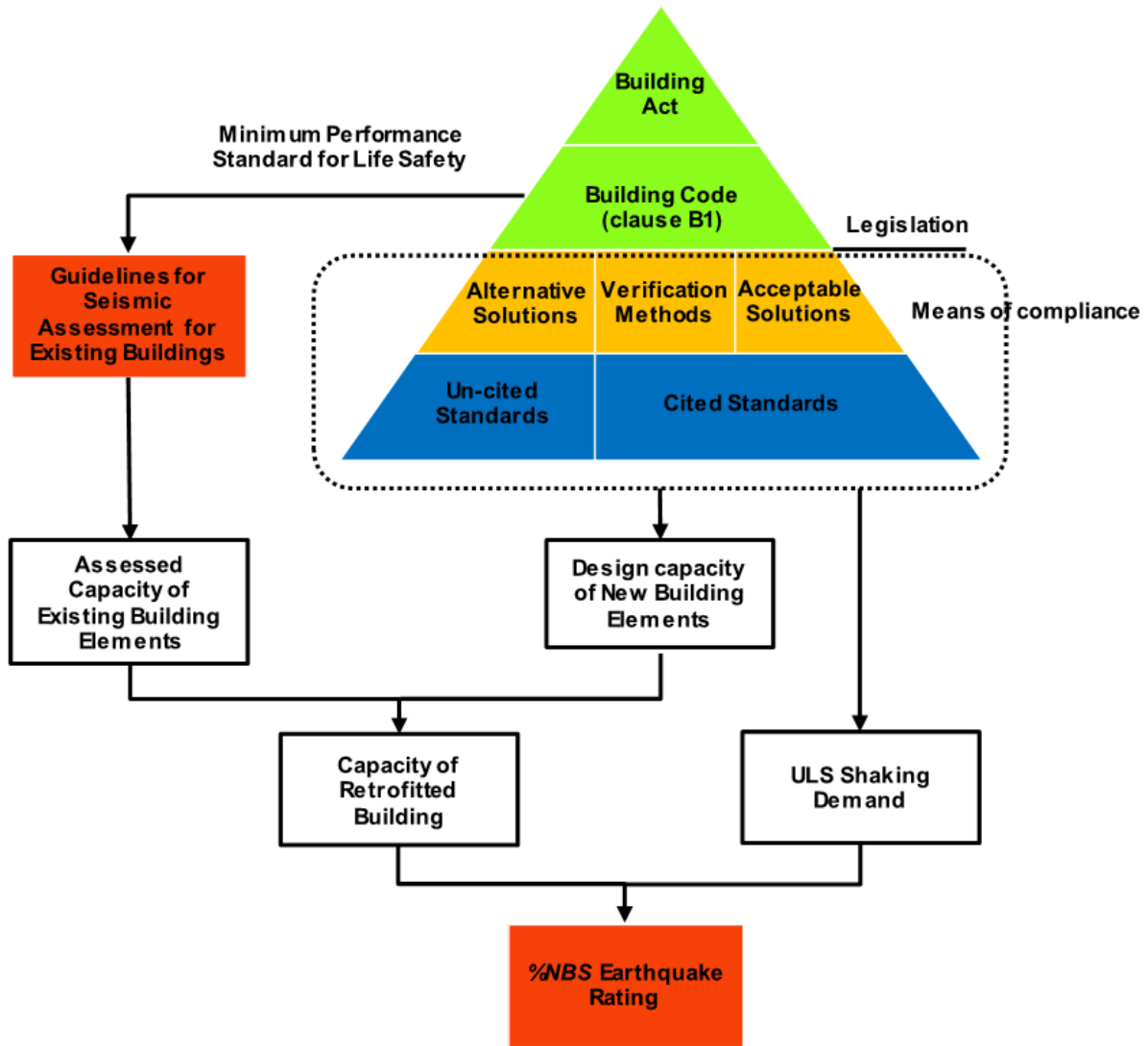


Figure 3.1: Use of the Guidelines and building Code to determine %NBS earthquake rating for alterations involving new building elements [Figure A3.1 Part A - Objectives and Principles]

Whether a building may be acceptable for alteration, with or without firstly, an engineering assessment and secondly, strengthening, will depend on the particular circumstances.

### 3.5 Alpha Grading Scheme

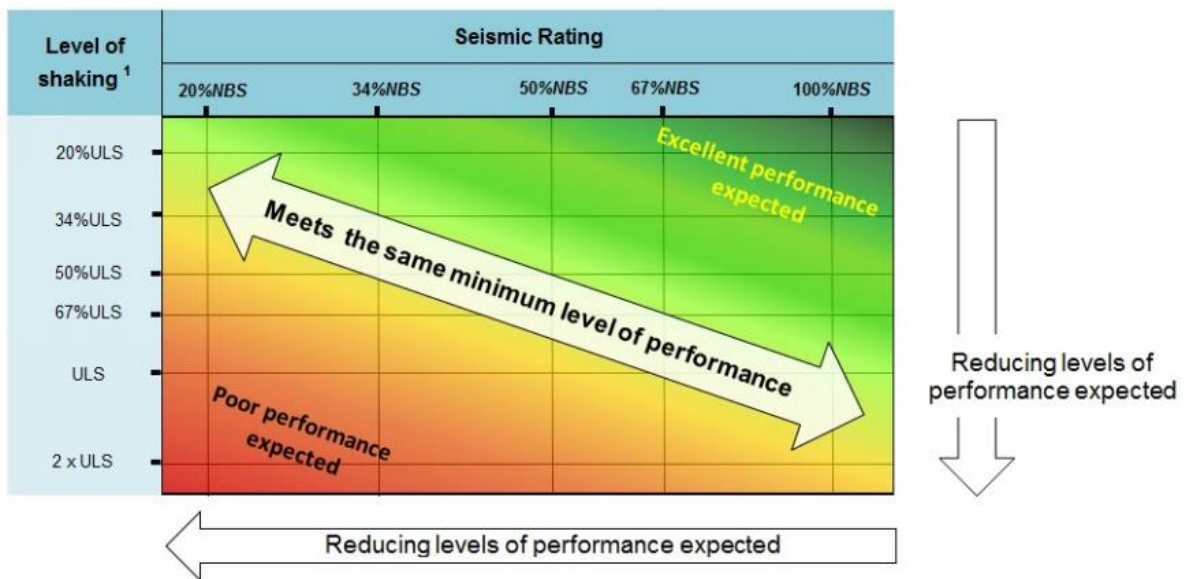
In addition to the legislative requirements set out above, in 2000 the NZSEE developed a scheme where buildings are given grades to reflect a relative risk description as it relates to life safety. Also given is an approximate indication of the risk relative to that of a new building.

**TABLE 3.1: ASSESSMENT OUTCOMES (POTENTIAL BUILDING STATUS)**  
[TABLE A3.1 PART A – OBJECTIVES AND PRINCIPLES]

Percentage of New Building Standard (%NBS)	Alpha rating	Approx. risk relative to a new building	Life-safety risk description
>100	A+	Less than or comparable to	Low risk
80 - 100	A	1 - 2 times greater	Low risk
67 - 79	B	2 - 5 times greater	Low to medium risk
34 - 66	C	5 - 10 times greater	Medium risk
20 - <34	D	10 - 25 times greater	High risk
<20	E	25 times greater	Very high risk

<sup>1</sup> The approximate relative risks given are the risk to occupants and / or to neighbouring buildings relative to a building that just meets the minimum performance standard indicated by Clause B1 of the Building Code.

<sup>2</sup> The risk description can be considered to be a relative life safety risk in the event of a large earthquake occurring.



**Notes:**

1. The diagram represents the tolerable (minimum) outcomes for buildings of any earthquake rating, at any level of shaking.
2. For any earthquake rating, the expected seismic performance represented on the vertical axis should be achieved over the full range of possible shaking levels.

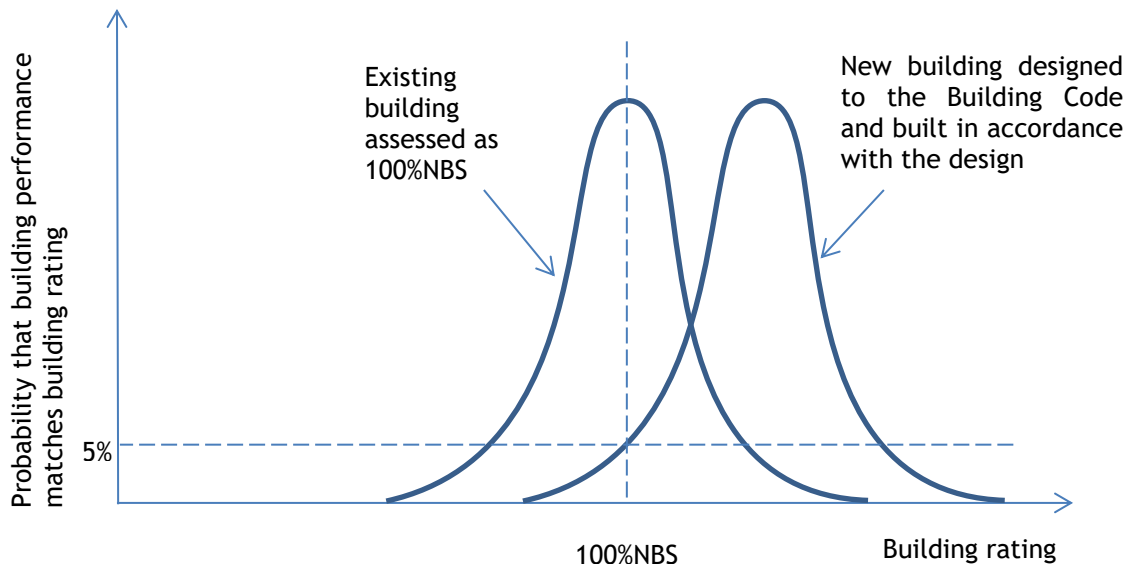
**Figure 3.2: Indicative relationship between seismic performance, earthquake rating and level of shaking [Figure A3.2 Part A - Objectives and Principles]**

### 3.6 Risk Relative to a New Building

The Guidelines compare the %NBS rating with the level of risk associated with a new building designed to the minimum standards of Clause B1 of the Building Code. This is provided to assist a risk-based assessment of a building’s likely performance during an earthquake.

Assessments of existing buildings provide a probable building rating; however, the actual seismic performance of the building may be higher or lower than the rating depending on the accuracy of the assumptions made for such things as the material strength. When assessing an existing building, the probable strength (50th percentile) is used for the material properties. New buildings, however, are designed to minimise the effects of material variability and construction imperfections. The design criteria for new buildings are far more stringent and therefore use lower values for material strengths (lower 5th percentile) together with appropriate safety reduction factors.

A comparison is made in Figure 3.3 between the potential strength of an existing building assessed as 100%NBS and the potential strength of a new building designed in accordance with the Building Code. Part A of the Guidelines postulates that many new buildings are likely to exceed the minimum requirements of the Building Code and therefore possess building ratings in excess of 100%NBS.



**Figure 3.3: Existing building rating relative to a new building**

The quantities of relative risks within Table 3.1 are therefore minimum probable relative risk approximations.

## 4. DETAILED SEISMIC ASSESSMENT

### 4.1 Assessment Objectives

The objectives of the DSA procedure set out in the Guidelines are to:

- Assess the level of earthquake shaking at which the ultimate capacity (seismic) is reached for an existing building and to identify the point at which the conditions are met for a significant life safety hazard.
- Provide a procedure that allows different engineers to produce consistent assessments when based on the same information and briefing.
- Determine an earthquake rating for that building in terms of %NBS that is more reliable than the rating available from an ISA.
- Where appropriate, provide details on the expected mode of failure to assist Territorial Authorities to make decisions on life safety issues to determine earthquake prone building (EPB) status.
- Determine whether a building is an earthquake risk building (ERB) (<67%NBS) as defined in the Guidelines.
- Provide guidance on the likely needs for retrofit.

### 4.2 Methodology of the Assessment

A detailed desk top assessment of the existing building was carried out based on the available original structural drawings. The analysis was based on the principles outlined in the Guidelines.

In assessing the capacity of the structure, the following procedures and assumptions were used:

- The Building's seismic design loads were assessed using relevant clauses of NZS 1170.5: 2004, using site subsoil class D.
- An Importance Level of 2, a Return Period Factor of 1 and a Structural Performance Factor of 0.9 were used.
- Seismic weights were assessed from the existing structural plans.
- The seismic load distributions were calculated using a tributary width / area approach with the earthquake shear demand at the roof determined using an equivalent static analysis.
- Probable strengths for the major structural elements were assessed from the available information and drawings. Assumed material strengths have been provided in Appendix B.
- The assessed strengths were compared to the design actions, as per the force-based assessment methodology, to determine the probable lateral capacity of the primary lateral structure.

## 5. RESULTS OF THE DSA

### 5.1 Findings

The findings from the Detailed Seismic Assessment of the Building are as follows:

- The Building was assessed to possess a strength of 20%NBS (IL2), governed by flexural strength of the cantilevering reinforced concrete columns, limited by embedment / development of the column reinforcing into the concrete footings.
- The primary lateral structure, in both lateral load directions, was assessed to possess a strength capacity of 20%NBS. This is governed by the mechanism described above.
- The foundations were assessed for their overturning capacity at the base of the cantilever concrete columns, which was also scored at 20%NBS.
- Pounding was considered with the northern neighbouring building, but due to some nominal (30mm) separation provided between the building and the neighbouring structure, and the similar vertical alignment of the roof between the two structures, the life-safety risk of pounding is low.
- The lateral load distribution to the various lateral resisting elements was assessed based on tributary area / width. This approach does not require a specific assessment of the roof diaphragm. However, we note that the original building has 25mm sarking and the west extension has 12.5mm plywood which will allow for some nominal diaphragm action between lateral resisting elements.
- Timber framed walls with plasterboard sheet linings provide bracing to the east end of the building (the 'garage'), which was assessed at 55%NBS in both directions.
- The reinforced concrete and reinforced concrete masonry walls along the north side of the building (adjacent to the neighbouring property), were assessed at 100%NBS in their in-plane direction.
- The heavy 'plaster' ceiling tiles observed on site pose a risk to life safety in an earthquake and are scored at less than 34%NBS. See figure 5.1 for a photo of these tiles.

### 5.2 Primary Lateral Structure

Aside from the long concrete and concrete masonry wall on the north side of the building, it lacks 'formal' bracing structure which can provide resistance against earthquake lateral loads. As such, elements such as cantilevering concrete columns are relied upon to brace the building. Insufficient embedment / development of the column reinforcing into the base footings limits the flexural strength of these columns to 20%NBS, which otherwise are capable of providing higher resistance to lateral loads. However, also at 20%NBS the overturning resistance of the column footings is exceeded.

### 5.3 Secondary Elements

Part C10 of the Guidelines requires that building elements which are not part of the primary lateral or gravity structure are assessed and allocated a score in terms of %NBS. These are referred to in the Guidelines as secondary structural and non-structural elements (SSNS). The intention of the assessment is to determine whether any of these elements pose a significant life safety hazard or has the potential to damage adjacent property should their capacity be exceeded. It is not an assessment of the risk of damage to the element itself or the effect that such damage would have on the operation of the Building.

The following elements have been included or excluded from the assessment as specified:

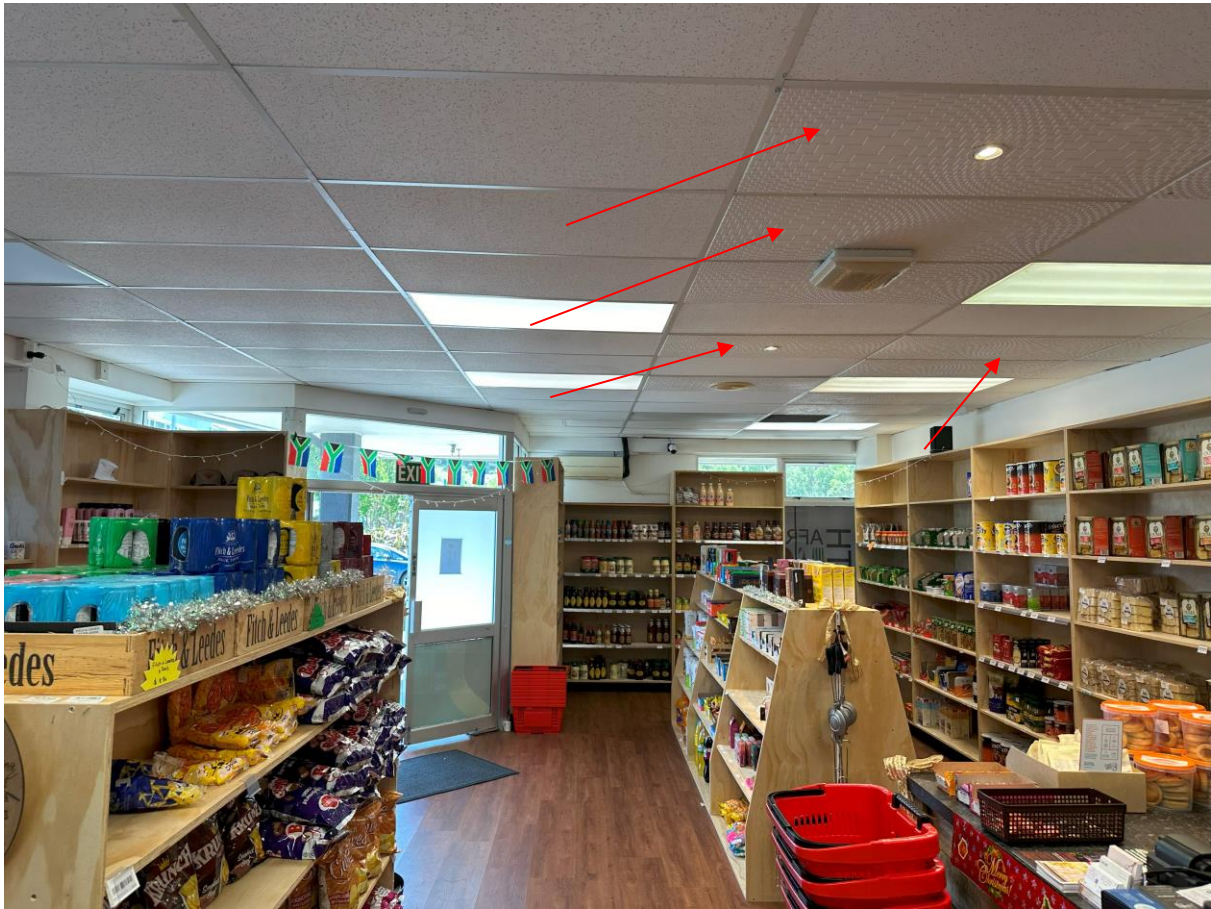
**TABLE 5.1: SSNS ELEMENTS INCLUDED IN THE DSA**

Included	Score	Mode of Failure
Heavy ceilings or lightweight ceiling system above space class I, II or IV (refer Table A4 of the Guidelines)	<34%NBS	Heavy tiles falling into space below. Pictured in figure 5.1 below.
Canopies	>34%NBS	
Parapets	>34%NBS	
Heavy external walls along the north boundary	>34%NBS	

**TABLE 5.2: SSNS ELEMENTS EXCLUDED FROM THE DSA**

Excluded	Reason
Lightweight ceilings above space class III (refer Table A4 of the Guidelines)	Not required in accordance with Table A4 of the Guidelines
Lightweight non-load bearing partitions ( $\leq 25\text{kg}/\text{m}^2$ ) or Heavy partitions within space class V	Not required in accordance with Table A4 of the Guidelines
Heavy non-load bearing partitions ( $> 25\text{kg}/\text{m}^2$ ) within space class I - IV	None identified
Heavy storage racking systems within generally occupied spaces	None identified
Heavy plant within generally occupied spaces ( $> 25\text{kg}$ )	None identified
Signs, billboards, and other heavy appendages	None identified
Services and lightweight plant ( $\leq 25\text{kg}$ )	Not required in accordance with Table A4 of the Guidelines
Unreinforced masonry/concrete chimney	None identified
Unreinforced masonry/concrete parapet	None identified
Masonry veneer	None identified
Heavy/precast concrete cladding	None identified
Support frames to light cladding systems including curtain walls above space class I	None identified
Ramps	None identified
Balconies	None identified
Sprinklers	Not specifically identified by C10 of the Guidelines and so considered to be classed as general building services

SSNS elements associated with tenant fitouts have also been excluded from the assessment. An assessment of the excluded elements could affect the rating of the Building and should be completed as a separate exercise.



**Figure 5.1: Heavy 'plaster' ceiling tiles, indicated with red arrows, which are recommended to be removed.**

## **6. SEISMIC RETROFIT OPTIONS**

A strengthening investigation proposal could be commissioned to determine strengthening options to enhance the %NBS rating of the Building to a desirable level.

Initial observations are that the Building might be strengthened using the following systems:

- Install steel cross bracing in both principal loading directions - this will have comparable stiffness to the existing concrete structure.

## 7. CONCLUSIONS

A Detailed Seismic Assessment of the building located at 252 High Street, Hutt Central, Lower Hutt, was carried out and the findings are as follows:

- The Building was found to possess approximately 20% NBS (IL2), governed by the flexural strength of the cantilevering reinforced concrete columns, limited by embedment / development of the column reinforcing into the concrete footings.
- The Building is therefore categorised as an Earthquake Risk Building and it meets one of the criteria that could categorize it as an Earthquake Prone Building.
- The Building (Earthquake-prone Buildings) Amendment Act 2016 allows 15 years to strengthen from receipt of an earthquake prone building notice. If the building is identified by the Territorial Authority to be a priority building, the time to strengthen would reduce to 7.5 years.
- The Building is classed as a grade D, “High Risk Building”, by the New Zealand Society for Earthquake Engineering (NZSEE), who consequently recommends that strengthening improvements to at least 67%NBS are carried out.
- Extensive strengthening works may be required to increase the building strength to an acceptable level.

## **8. RECOMMENDATIONS**

From the Detailed Seismic Assessment, we can make the following recommendations:

1. Remove the heavy plaster ceiling tiles and replace these with lightweight tiles.
2. Commission a seismic strengthening investigation with a scope to provide strengthening concepts to enhance the building strength to an acceptable level, no less than 67%NBS.

## APPENDIX A – GLOSSARY

C1 - Version 1 - July 2017

### C1.1.2 Definitions and acronyms

ADRS	Acceleration-displacement response spectrum (spectra)
BPON	Basic Performance Objective Equivalent to New Building Standards defined in ASCE 4-13 (2014) for use with that document
Catastrophic collapse	Complete collapse of one or more storeys in a building
Collapse prevention (CP) performance level	A performance level defined in ASCE 41-13 (2014) for use with that document
Critical structural weakness (CSW)	The lowest scoring structural weakness determined from a DSA. For an ISA all structural weaknesses are considered to be potential critical structural weaknesses.
Detailed Seismic Assessment (DSA)	A quantitative seismic assessment carried out in accordance with Part C of these guidelines
Earthquake Prone Building (EPB)	A legally defined category which describes a building that has been assessed as likely to have its ultimate capacity (which is defined in Regulations) exceeded in moderate earthquake shaking. In the context of these guidelines it is a building with an earthquake rating of less than 34%NBS (less than one third of new building standard).
Earthquake rating	The rating given to a building as a whole to indicate the seismic standard achieved in regard to human life safety compared with the minimum seismic standard required of a similar new building on the same site. Expressed in terms of percentage of new building standard achieved (%NBS). Also see earthquake score.
Earthquake Risk Building (ERB)	A building that falls below the threshold for acceptable seismic risk, as recommended by NZSEE (i.e. <67%NBS or two thirds new building standard)
Earthquake score	The score given to an individual aspect of the building (member/element/non-structural element/foundation soils) to indicate the seismic standard achieved in regard to human life safety compared with the minimum seismic standard required for the same aspect in a similar new building on the same site. Expressed in terms of percentage of new building standard achieved (%NBS). The aspect with the lowest earthquake score is the CSW and this score will represent the earthquake rating for the building.
Importance Level (IL)	Categorisation defined in the New Zealand Loadings Standard, NZS 1170.0:2002, used to define the ULS shaking for a new building based on the consequences of failure. A critical aspect in determining new building standard.
Initial Seismic Assessment (ISA)	A seismic assessment carried out in accordance with Part B of these guidelines. An ISA is a recommended first qualitative step in the overall assessment process.
Life safety (LS) performance level	A performance level defined in ASCE 41-13 (2014) for use with that document
Maximum Considered Earthquake (MCE)	Sometimes referred to as the Maximum Credible Earthquake. Often used to define the maximum level of shaking that needs to be considered in a design or assessment process.
Moderate earthquake (shaking)	The level of earthquake shaking (defined in Regulations) used in the process to determine whether or not a building is earthquake prone
Nonlinear time history analysis (NLTHA)	An analysis of the building using strong motion earthquake records and modelling the nonlinear behaviour of the structure (also referred to as nonlinear response history analysis)
Non-structural element	An element within the building that is not considered to be part of either the primary or secondary structure

(Performance) step change	A significant change in seismic performance with increasing earthquake shaking levels typically associated with collapse of a building rather than just an increase in damage to its members/elements. Can be in the structure and/or the foundations/foundation soils.
Primary gravity structure	Portion of the main building structural system identified as carrying the gravity loads through to the ground. Also required to carry vertical earthquake induced accelerations through to the ground. May also be part of the primary lateral structure.
Primary lateral structure	Portion of the main building structural system identified as carrying the lateral seismic loads through to the ground. May also be part of the primary gravity structure.
Probable capacity	The expected or estimated mean capacity (strength and deformation) of a member, an element, a structure as a whole, or foundation soils. For structural aspects this is determined using probable material strengths. For geotechnical issues the probable resistance is typically taken as the ultimate geotechnical resistance/strength that would be assumed for design.
Probable material strength	The expected or estimated mean material strength. For geotechnical issues assessed in accordance with these guidelines it is typically the ultimate geotechnical strength/resistance that would be assumed for design.
Secondary structure	Portion of the structure that is not part of either the primary lateral or primary gravity structure but, nevertheless, is required to transfer inertial and vertical loads for which assessment/design by a structural engineer would be expected. Includes precast panels, curtain wall framing systems, stairs and supports to significant building services items.
Serviceability limit state (SLS)	Limit state defined in the New Zealand loadings standard NZS 1170.5:2004
Severe structural weakness (SSW)	A defined structural weakness that is potentially associated with catastrophic collapse and for which the probable capacity may not be reliably assessed based on current knowledge
Significant life safety hazard	A hazard resulting from the loss of gravity load support of a member/element of the primary or secondary structure, or of the supporting ground, or of non-structural elements that would reasonably affect a number of people. When shelter under normally expected furniture is available and suitable, mitigation of the hazard below a significant status is assumed.
Simple Lateral Mechanism Analysis (SLaMA)	An analysis involving the combination of simple strength to deformation representations of identified mechanisms to determine the strength to deformation (push-over) relationship for the building as a whole
SSI	Soil-structure interaction
SSNS element	Secondary structural or non-structural building element
(Structural) element	Combinations of (structural) members that can be considered to work together; e.g. the piers and spandrels in a penetrated wall, or beams and columns in a moment resisting frame
(Structural) member	Individual items of a building structure; e.g. beams, columns, beam/column joints, walls, spandrels, piers
(Structural) resilience	Ability of the building as a whole to perform acceptably from a structural and geotechnical point of view at levels of earthquake shaking greater than XXX%ULS shaking. Includes potential impact of the supporting soils on the performance of the building structure.
Structural system	Combinations of structural elements or structural sub systems that form a recognisable means of lateral or gravity load support; e.g. moment resisting frame, frame/wall. Also used to describe the way in which support/restraint is provided by the foundation soils.

Structural weakness (SW)	An aspect of the building structure and/or the foundation soils that scores less than 100%NBS. Note that an aspect of the building structure scoring less than 100%NBS but greater than or equal to 67%NBS is still considered to be a structural weakness even though it is considered to represent an acceptable risk.
Ultimate capacity (seismic)	A term defined in regulations that describes the limiting capacity of a building for it to be determined to be an earthquake-prone building. This is typically taken as the probable capacity but with the additional requirement that exceeding the probable capacity must be associated with the loss of gravity support (i.e. it creates a significant life safety hazard).
Ultimate limit state (ULS)	A limit state defined in the New Zealand loadings standard NZS 1170.5:2004 for the design of new buildings
Unreinforced masonry (URM)	A member or element comprising masonry units connected together with mortar and not containing any steel, timber, cane or other reinforcement
(XXX)%NBS	<p>The ratio of the ultimate capacity of a building as a whole or of an individual member/element and the ULS shaking demand for a similar new building on the same site, expressed as a percentage.</p> <p>It is the rating given to a building as a whole expressed as a percent of new building standard achieved, based on an assessment of the expected performance of an existing building relative to the minimum that would apply under the Building Code (Schedule 1) to the Building Regulations 1992) to a new building on the same site with respect to life safety.</p> <p>A score for an individual building element is also expressed as a percent of new building standard achieved. This is expected to reflect the degree to which the individual element is expected to perform in earthquake shaking compared with the minimum performance prescribed for the element in Clause B1 of the Building Code (Schedule 1 to the Building Regulations 1992) with respect to life safety.</p> <p>The %NBS rating for the building as a whole takes account of, and may be governed by, the scores for individual elements.</p>
(XXX)%ULS shaking (demand)	<p>Percentage of the ULS shaking demand (loading or displacement) defined for the ULS design of a new building and/or its members/elements for the same site.</p> <p>For general assessments 100%ULS shaking demand for the structure is defined in the version of NZS 1170.5 (version current at the time of the assessment) and for the foundation soils in NZGS/MBIE Module 1 of the Geotechnical Earthquake Engineering Practice series dated March 2016.</p> <p>For engineering assessments undertaken in accordance with the EPB methodology, 100%ULS shaking demand for the structure is defined in NZS 1170.5:2004 and for the foundation soils in NZGS/MBIE Module 1 of the Geotechnical Earthquake Engineering Practice series dated March 2016 (with appropriate adjustments to reflect the required use of NZS 1170.5:2004). Refer also to Section C3.</p>

## APPENDIX B – ASSESSMENT BASIS

The parameters used in the Detailed Seismic Assessment were taken from ‘The Seismic Assessment of Existing Buildings’ Technical Guidelines as follows:

THE SEISMIC ASSESSMENT OF EXISTING BUILDINGS - TECHNICAL GUIDELINES		
Part	Version	Date
A - Assessment Objectives and Principles	1	July 2017
B - Initial Seismic Assessment	1	July 2017
C1 - General Issues	1	July 2017
C2 - Assessment Procedures and Analysis Techniques	1	July 2017
C3 - Earthquake Demands	1	July 2017
C4 - Geotechnical Considerations	1	July 2017
C5 - Concrete Buildings	1	July 2017
C6 - Structural Steel Buildings	1	July 2017
C7 - Moment Resisting Frames with Infill Panels	1	July 2017
C8 - Unreinforced Masonry Buildings	1	July 2017
C9 - Timber Buildings	1	July 2017
C10 - Secondary Structural and Non-Structural Elements	1	July 2017

The current Design Codes/Guidelines relevant to this assessment are:

DESIGN STANDARDS/GUIDELINES	
AS/NZS 1170.0:2002 (A5)	Structural Design Actions - General principles
AS/NZS 1170.1:2002 (A2)	Structural Design Actions - Permanent, Imposed, and other actions
NZS 1170.5:2004 (A1)	Structural Design Actions - Earthquake actions - New Zealand
NZS 3101:Part 1:2006 (A3)	Concrete Structures Standard
NZS 3404:Part 1:1997 (A2)	Steel Structures Standard
NZS 3603:1993 (A4)	Timber Structures Standard
NZS 4230:2004 (A1)	Design of Reinforced Concrete Masonry Structures

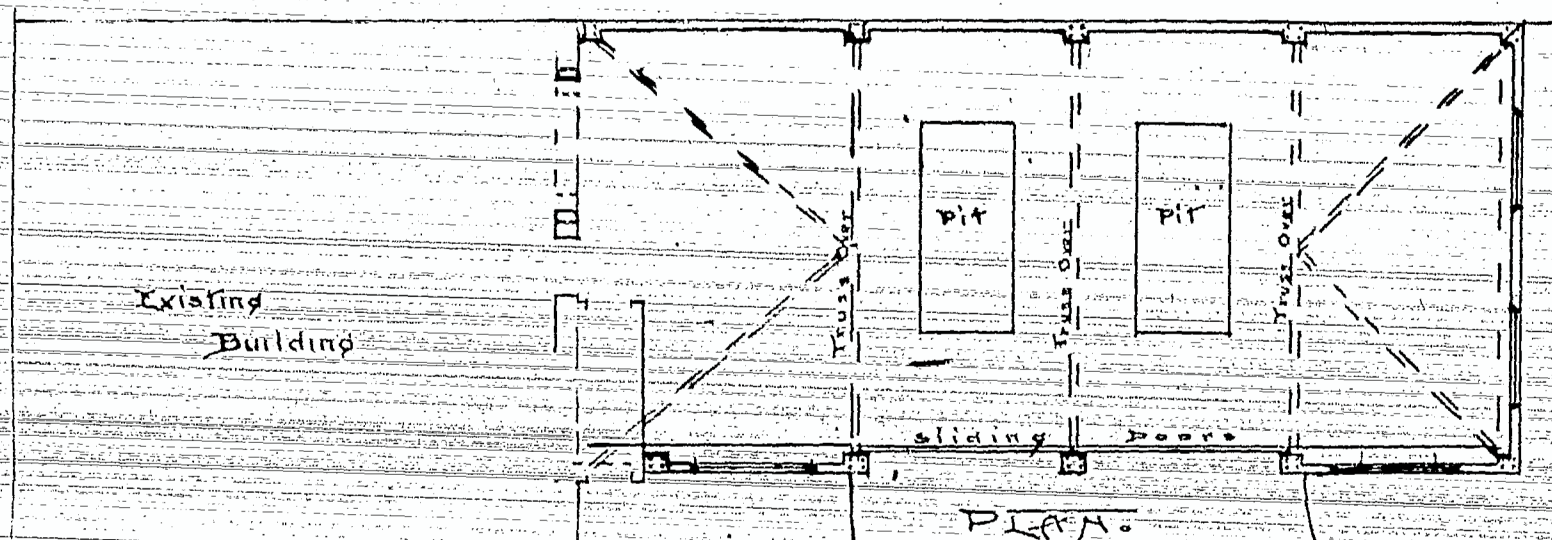
The assumed material properties used are:

MATERIAL PROPERTIES		
MATERIAL	Notation	Assumption
Concrete probable compressive strength, general	$f'_{c,prob}$	30 MPa
Concrete masonry probable compressive strength, general	$f'_{m,prob}$	18 MPa
Reinforcement probable yield strength (mild) - pre 1960	$f_{y,prob}$	280 MPa

The assumed material properties have been modified to obtain probable material strengths and overstrengths in accordance with the Guidelines where appropriate.

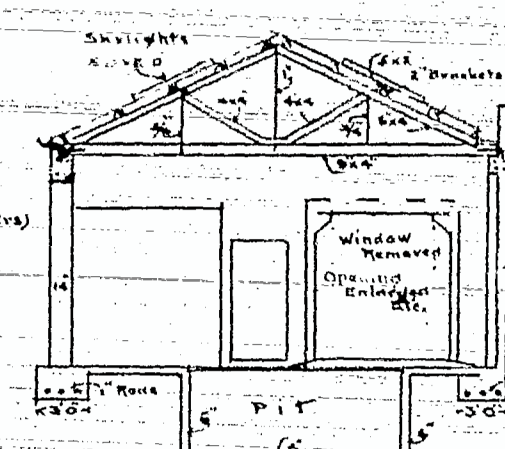
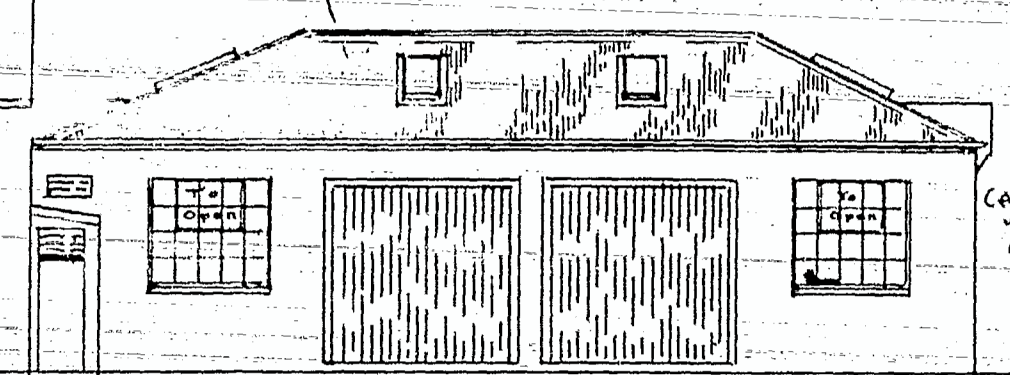
## **APPENDIX C – EXISTING DRAWINGS**

Page left blank. Assessment drawings start on the next page.



PROPOSED ADDITION TO SHOPS.  
 HIGH ST. LOWER HUTT.  
 FOR M.B.C. LAMB.  
 Scale: 8' to 1"

J.C. Ballou  
 Architect  
 2/3/32



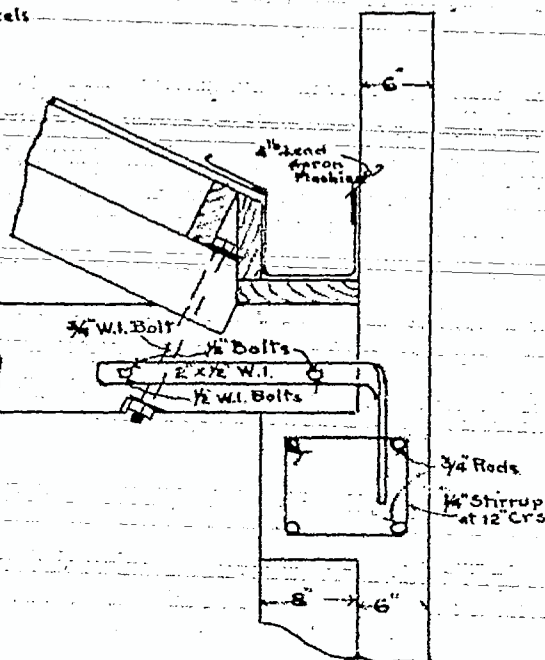
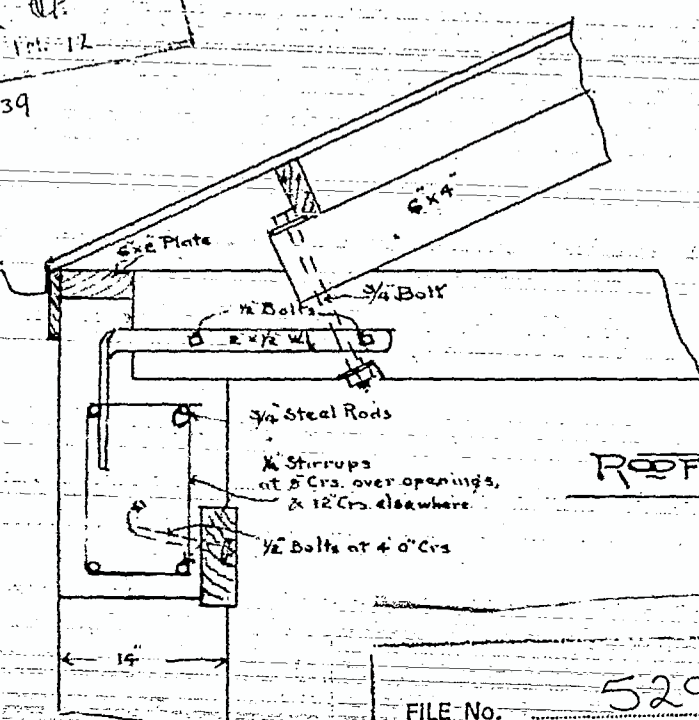
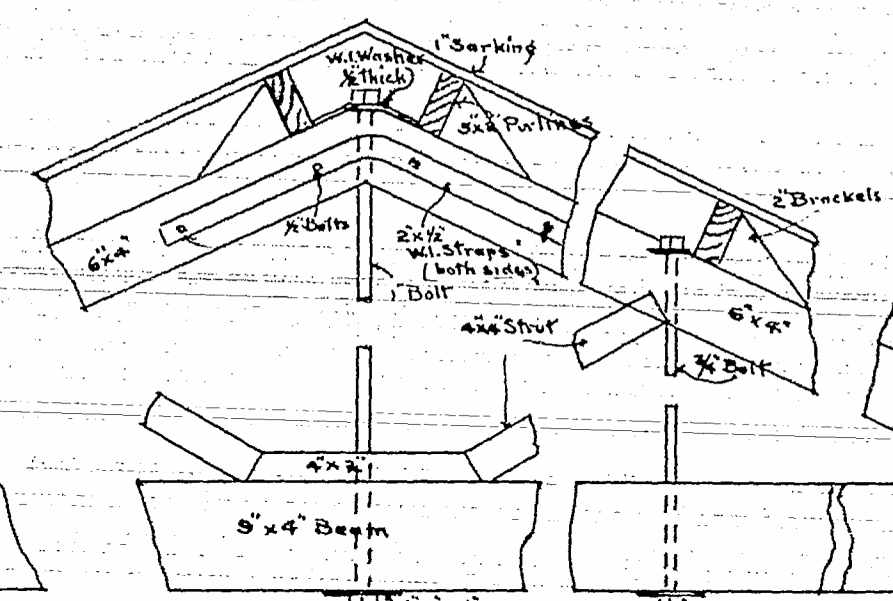
CORNER PIERS

WALL PIERS

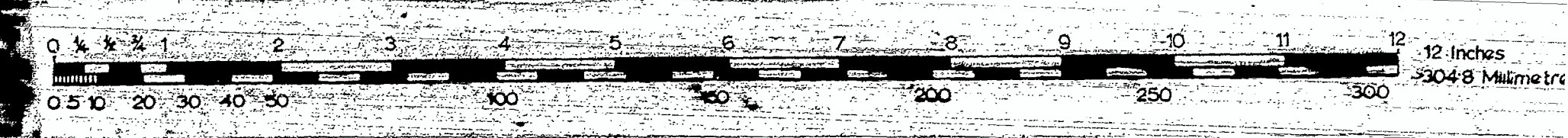
DOOR PIERS

7 3-7-32  
 5 3-32  
 2918  
 Permit No.  
 For M.B.  
 C. Lamb  
 Builder  
 High St.  
 29  
 12  
 Aspt. 4639

J. FLETCHER



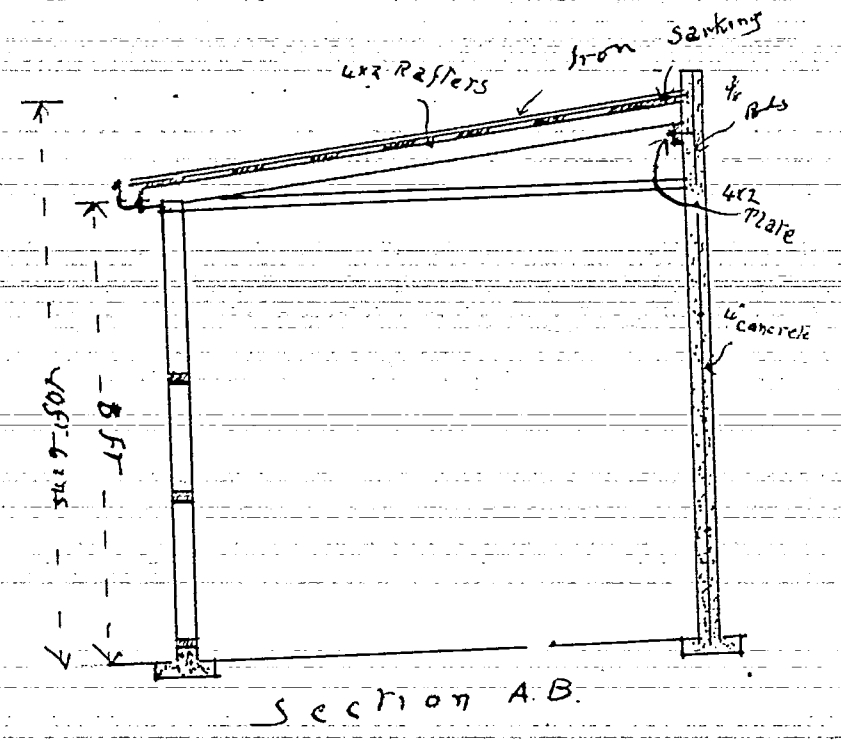
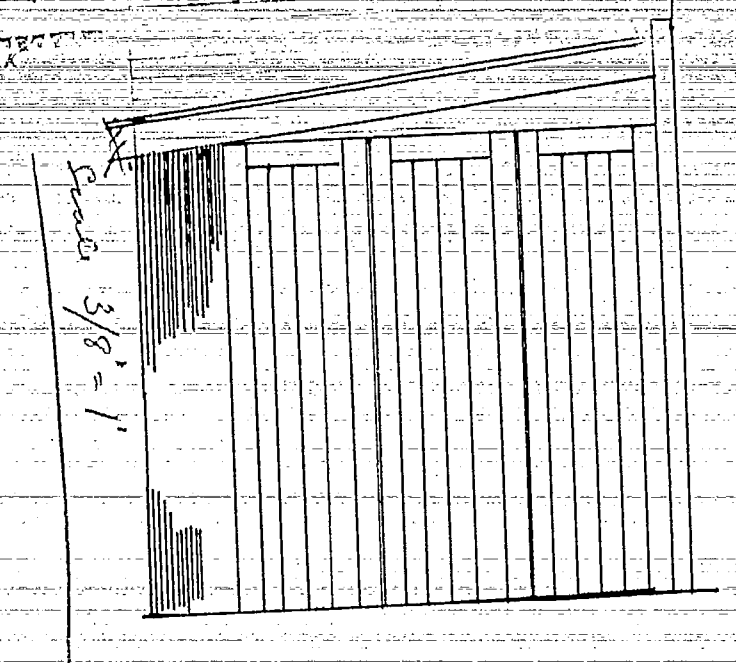
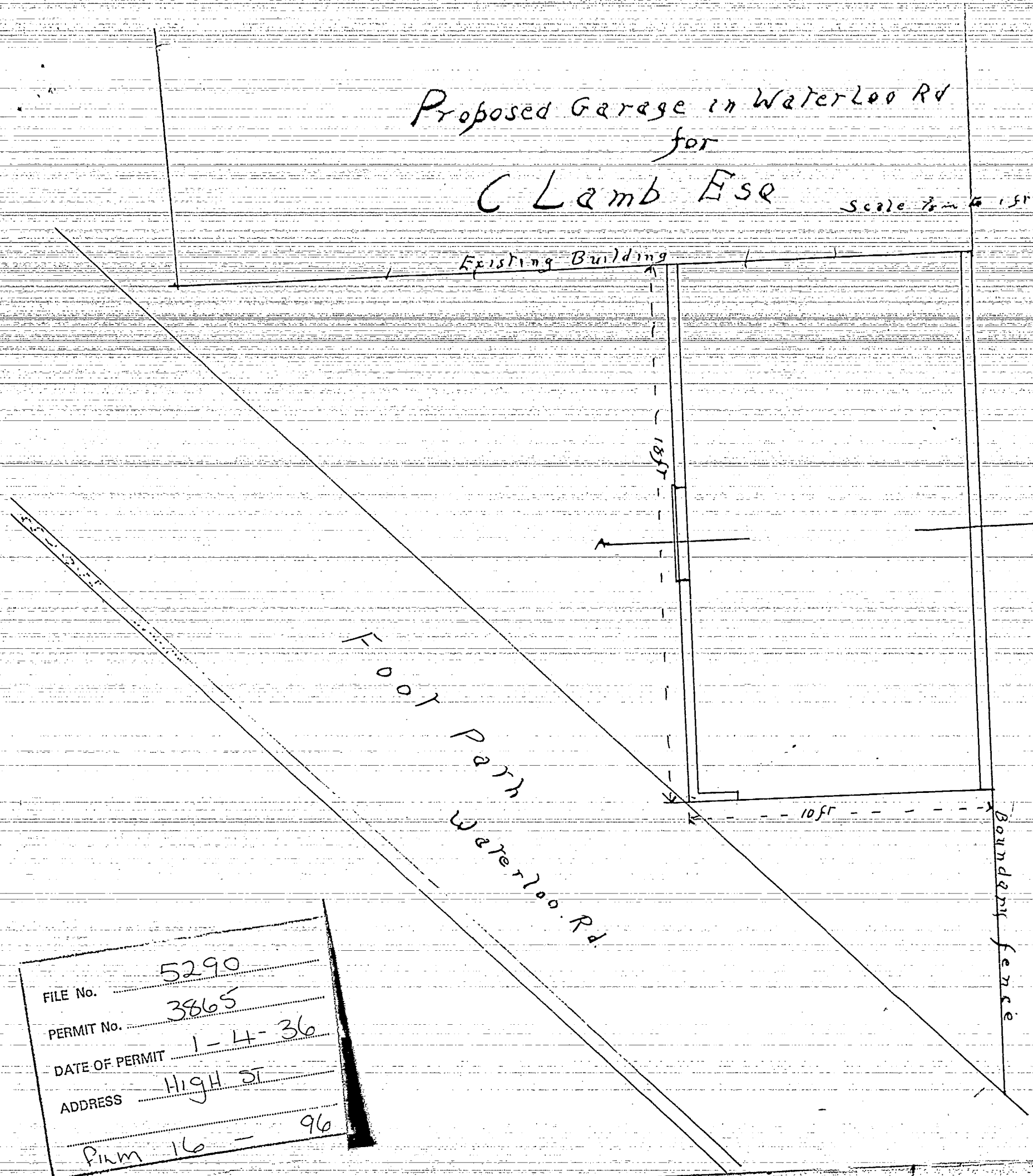
FILE No. 5290  
 PERMIT No. 2918  
 DATE OF PERMIT 5-3-32  
 ADDRESS High St  
 Film 16 - 95



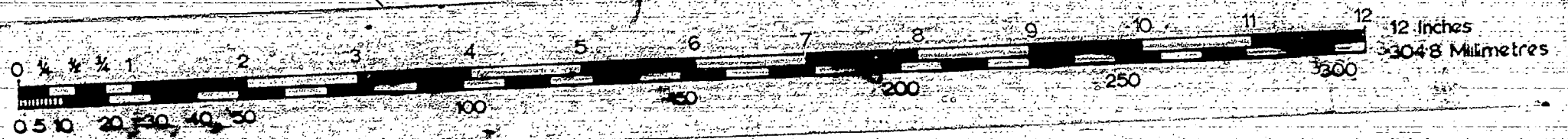
Proposed Garage in Waterloo Rd  
for  
C Lamb Esq

Scale 1/8" = 1'-0"

Plan No. 1-4-36  
 Plan Approved 1-11-36  
 File No. 3865  
 Applicant C. Lamb Esq  
 Owner C. Lamb  
 Engineer A. J. [unclear]  
 Street Waterloo Rd.  
 City [unclear]



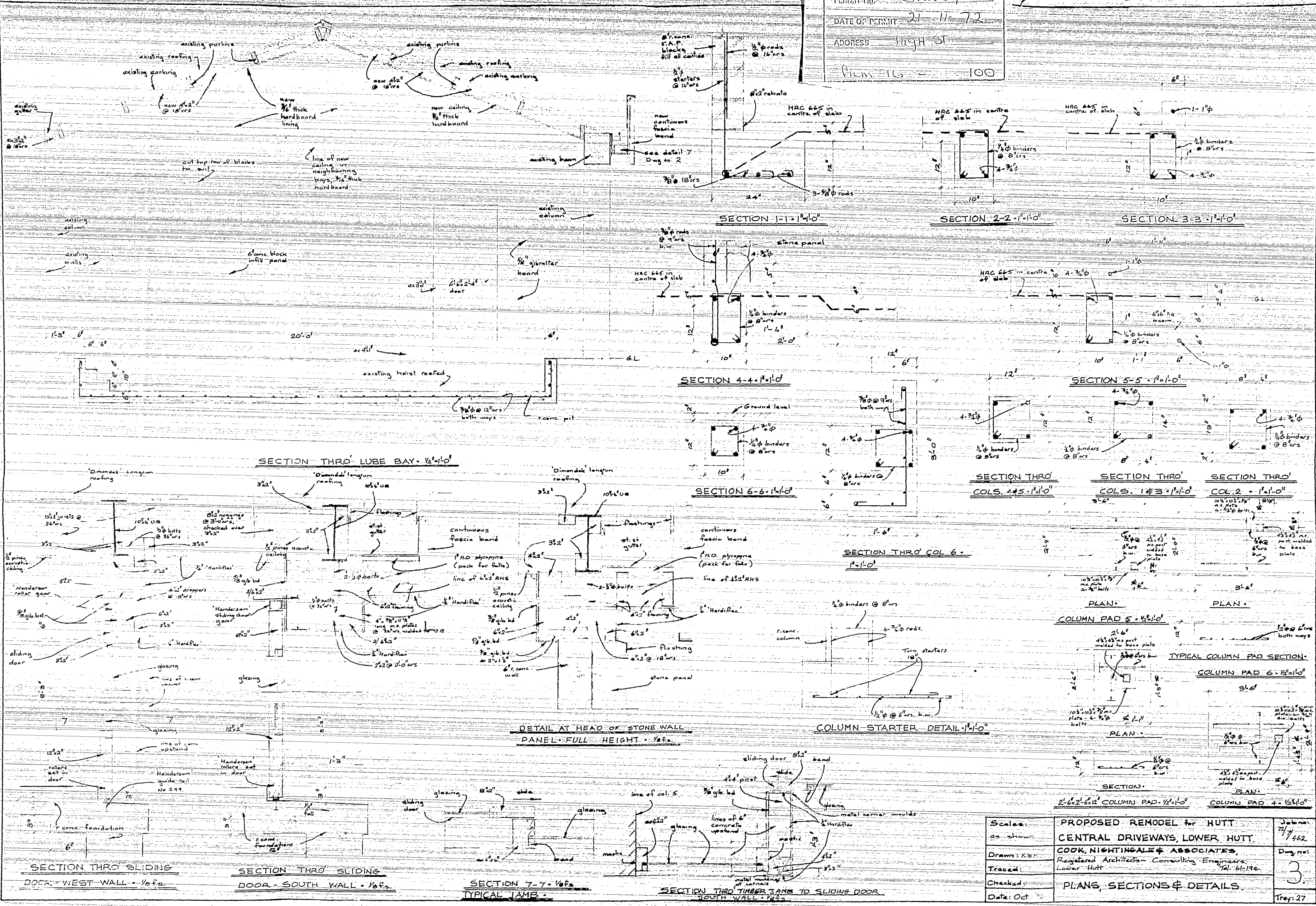
FILE No. 5290  
 PERMIT No. 3865  
 DATE OF PERMIT 1-4-36  
 ADDRESS High St  
 P11111 16 - 96



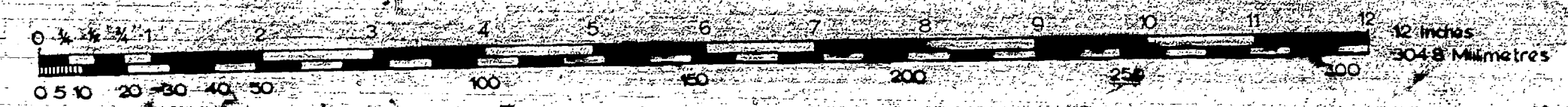
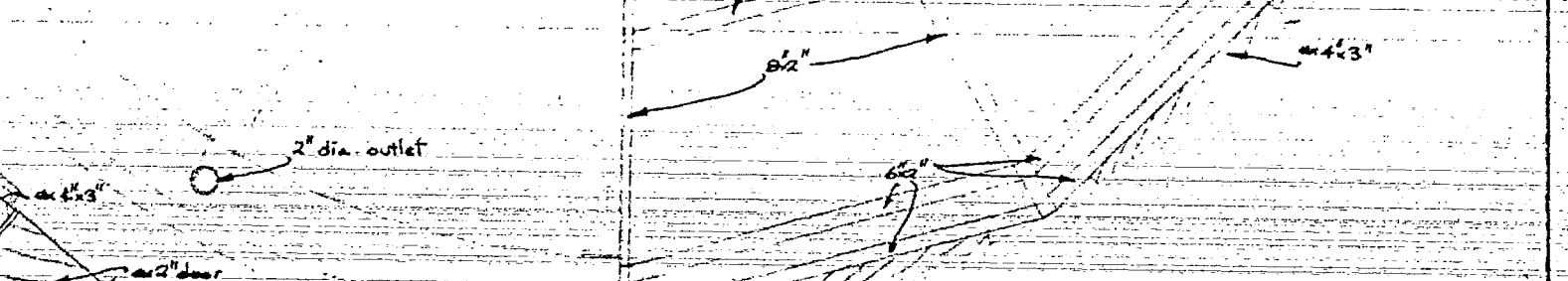
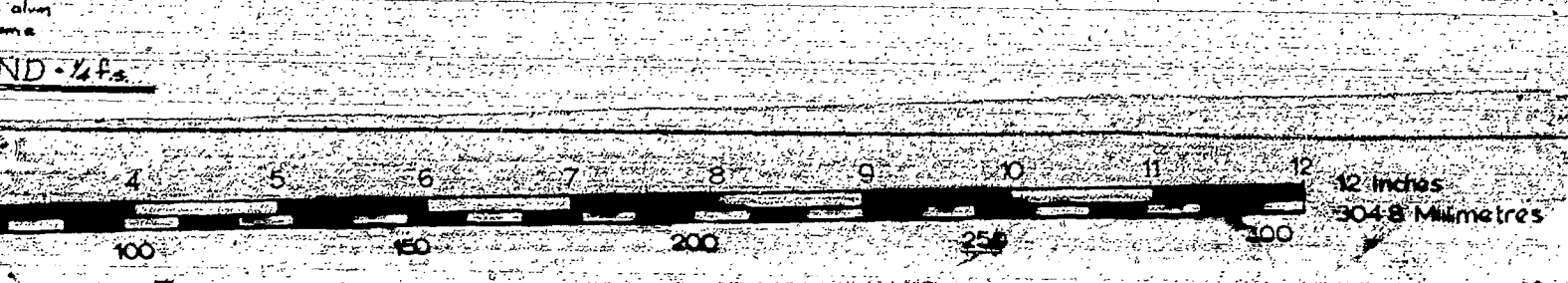
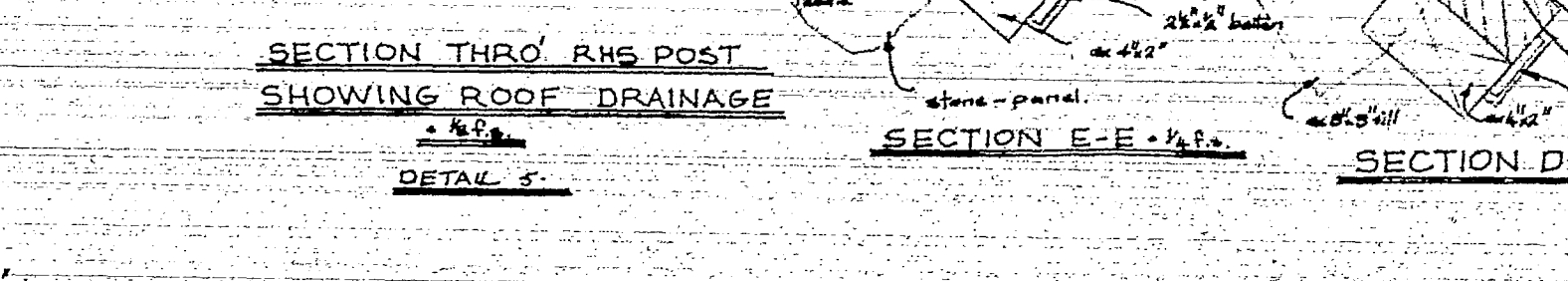
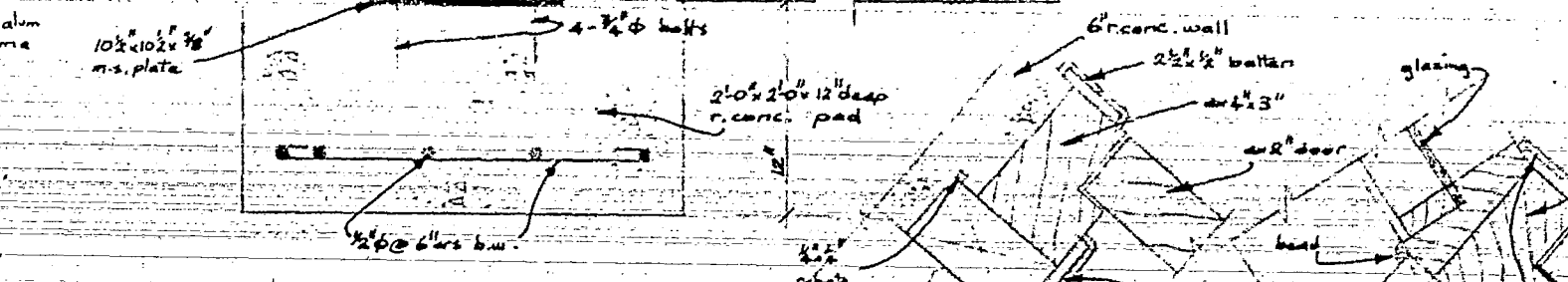
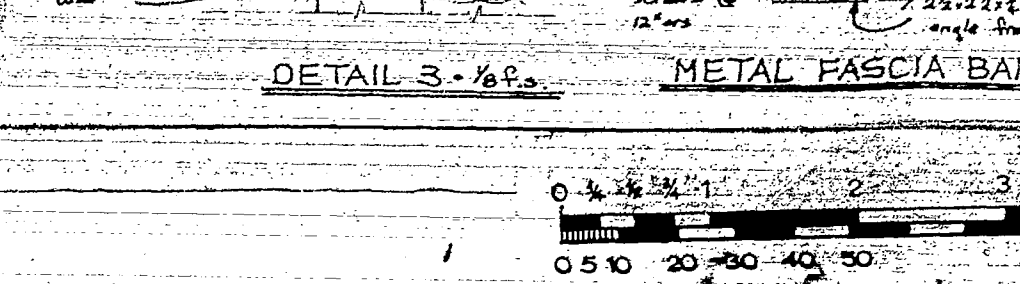
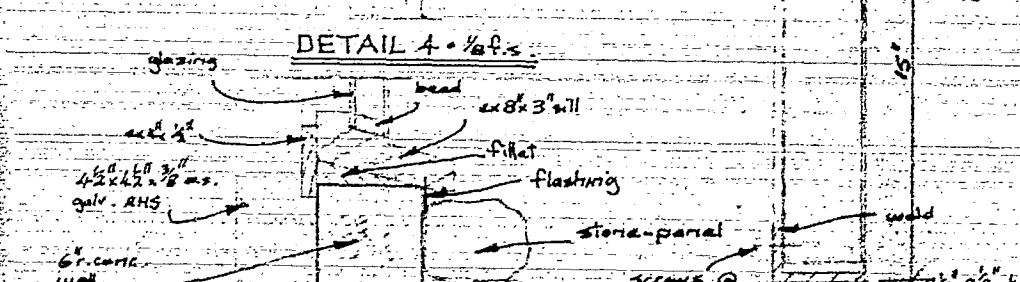
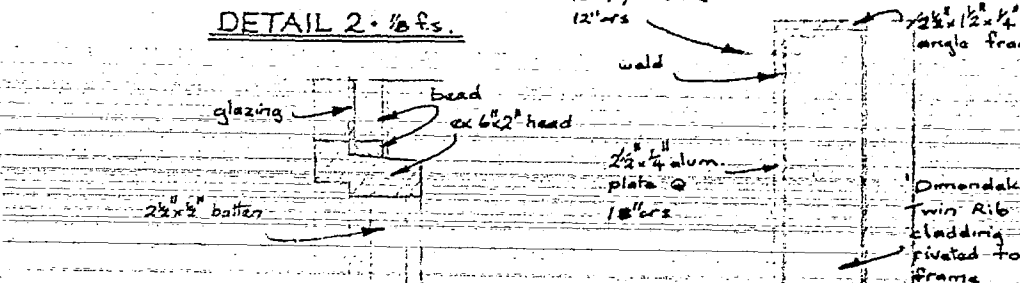
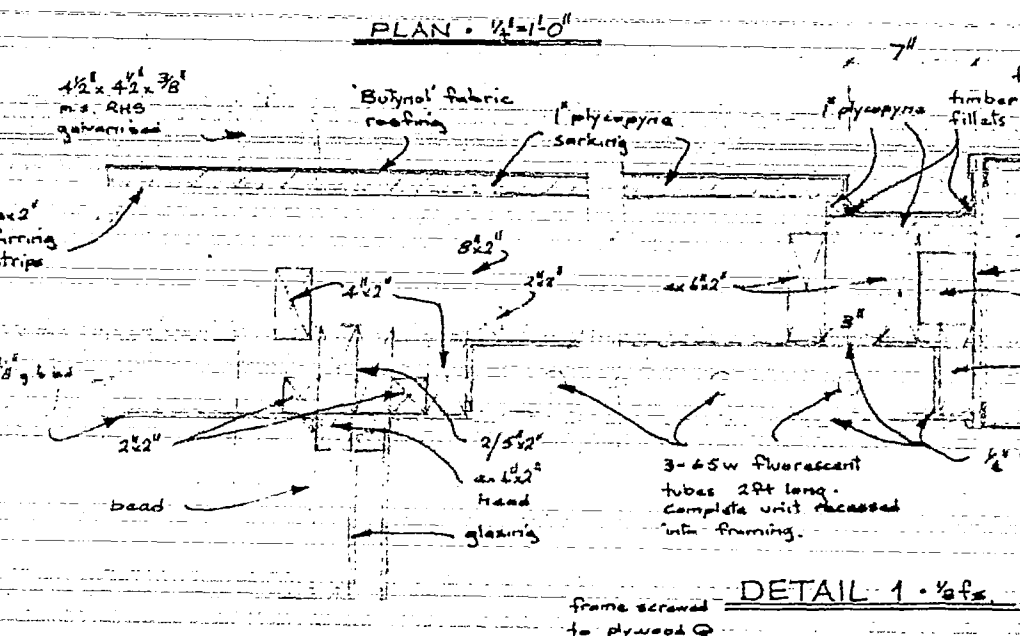
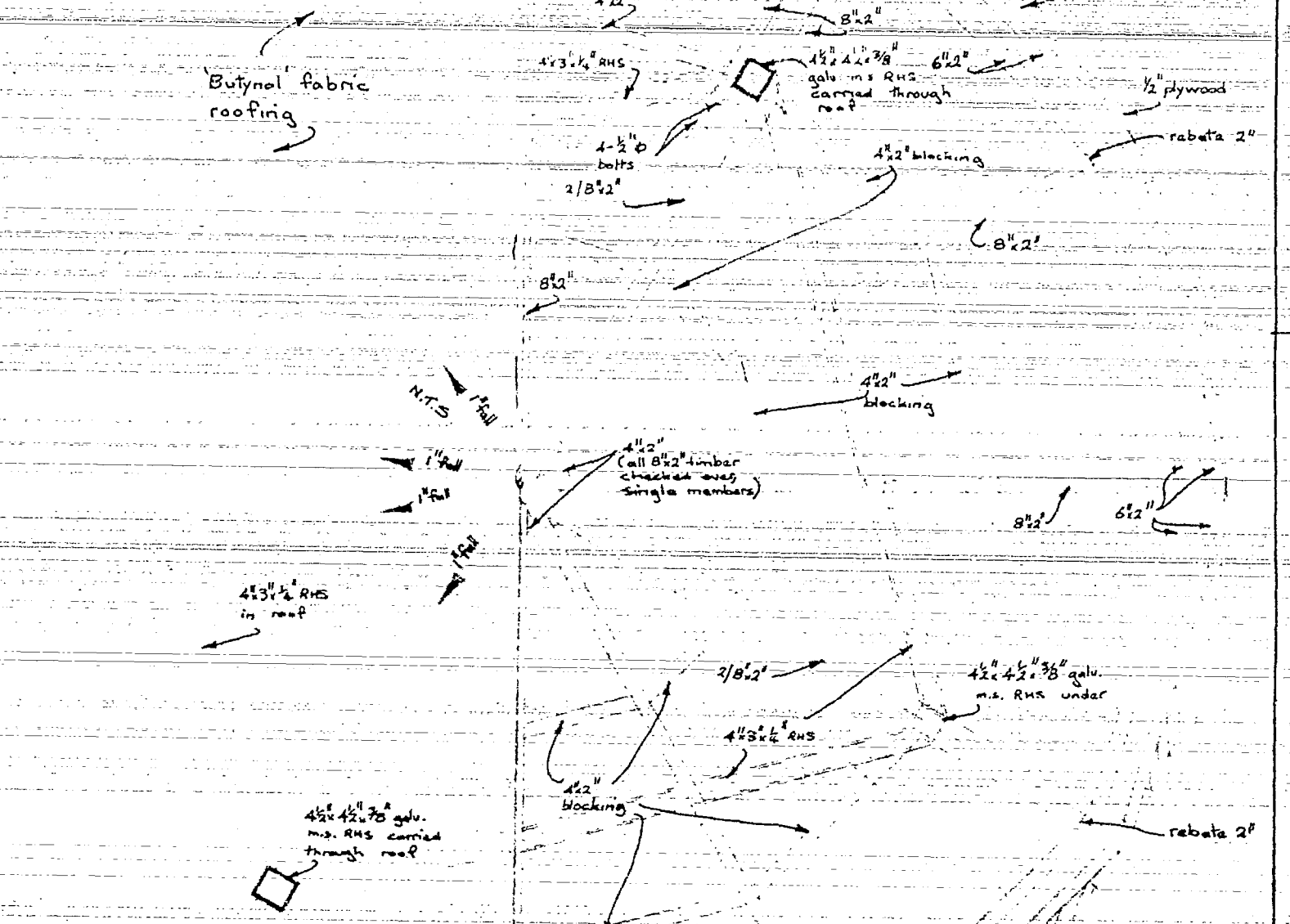
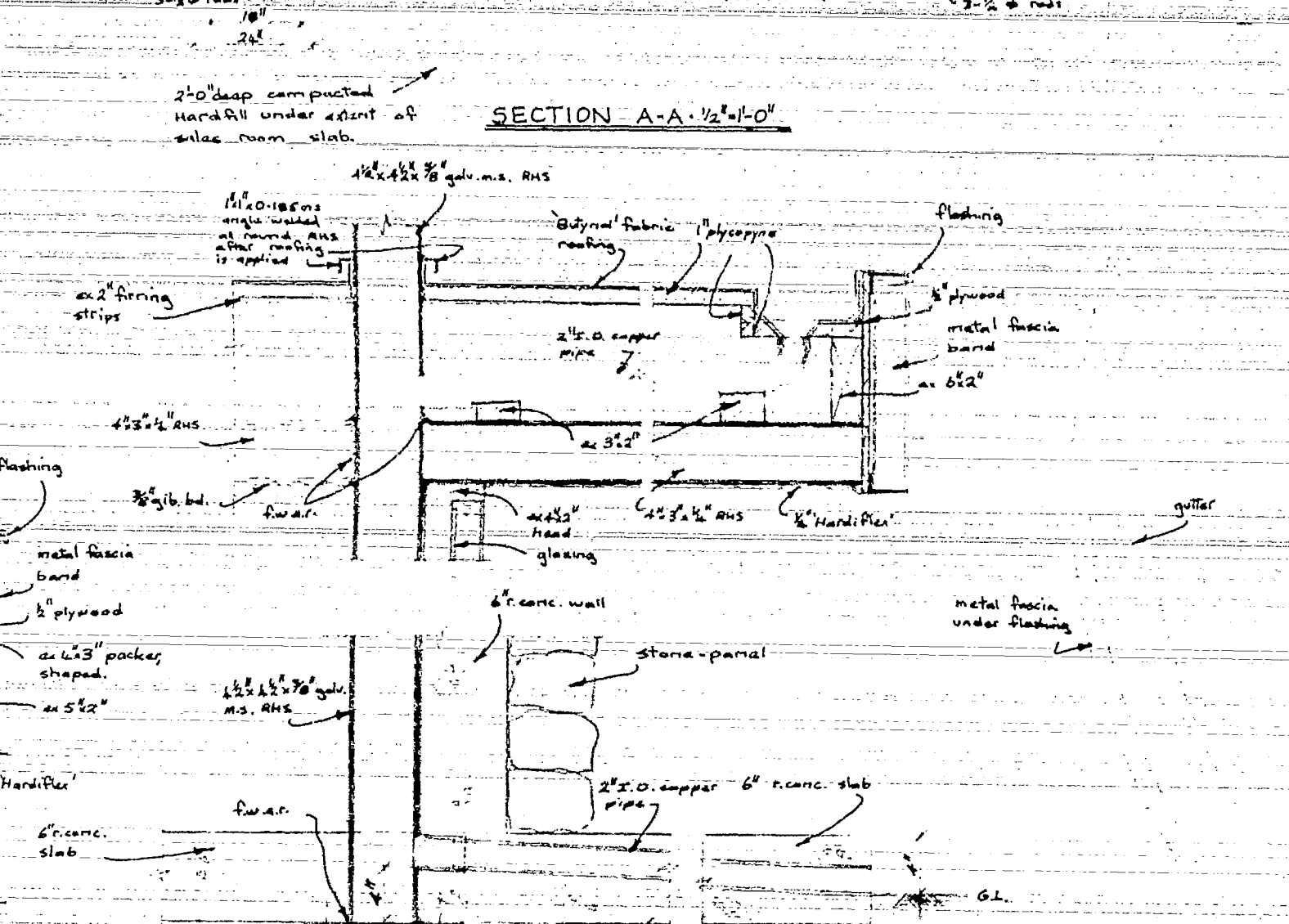
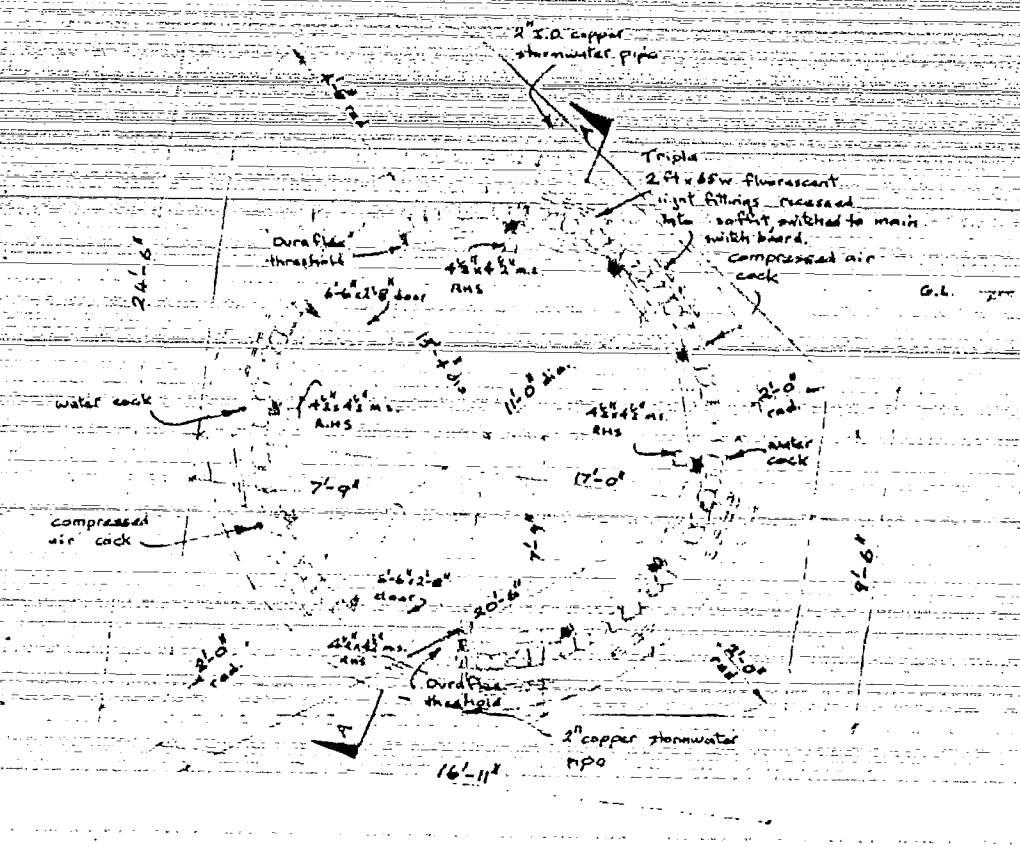
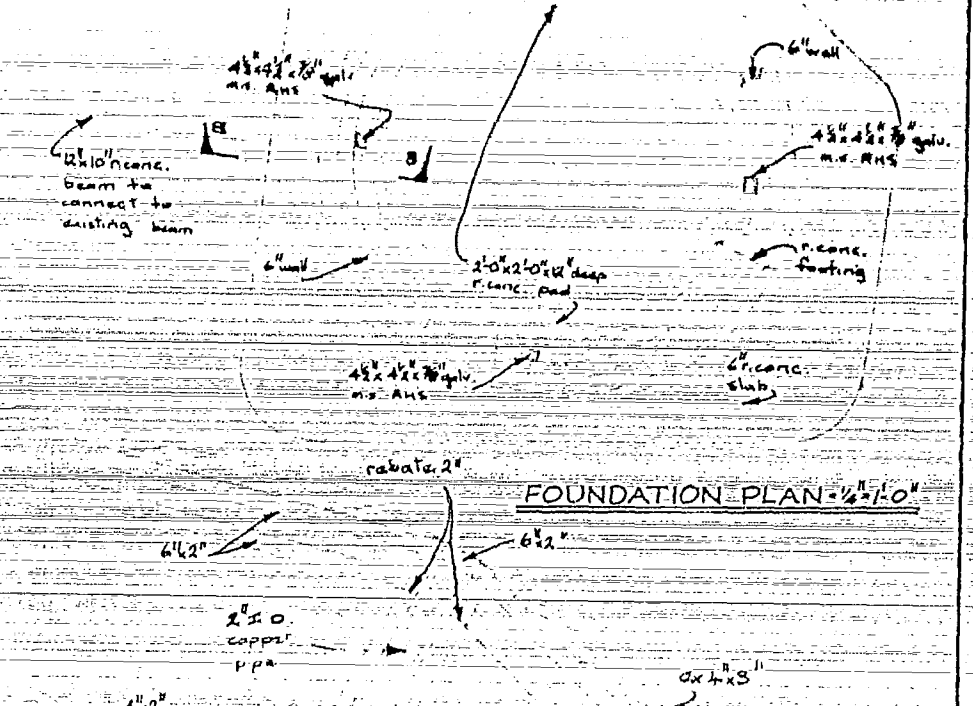
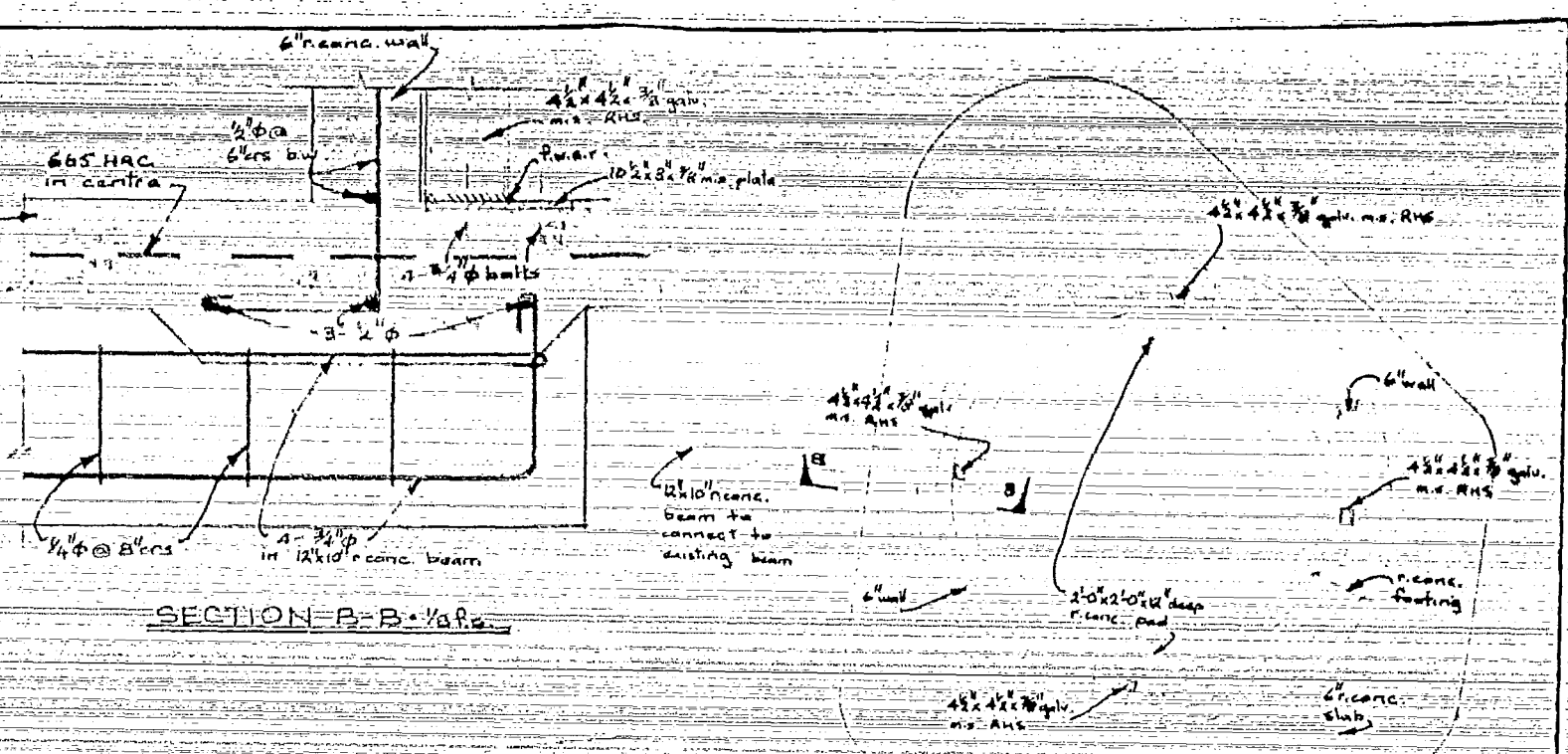
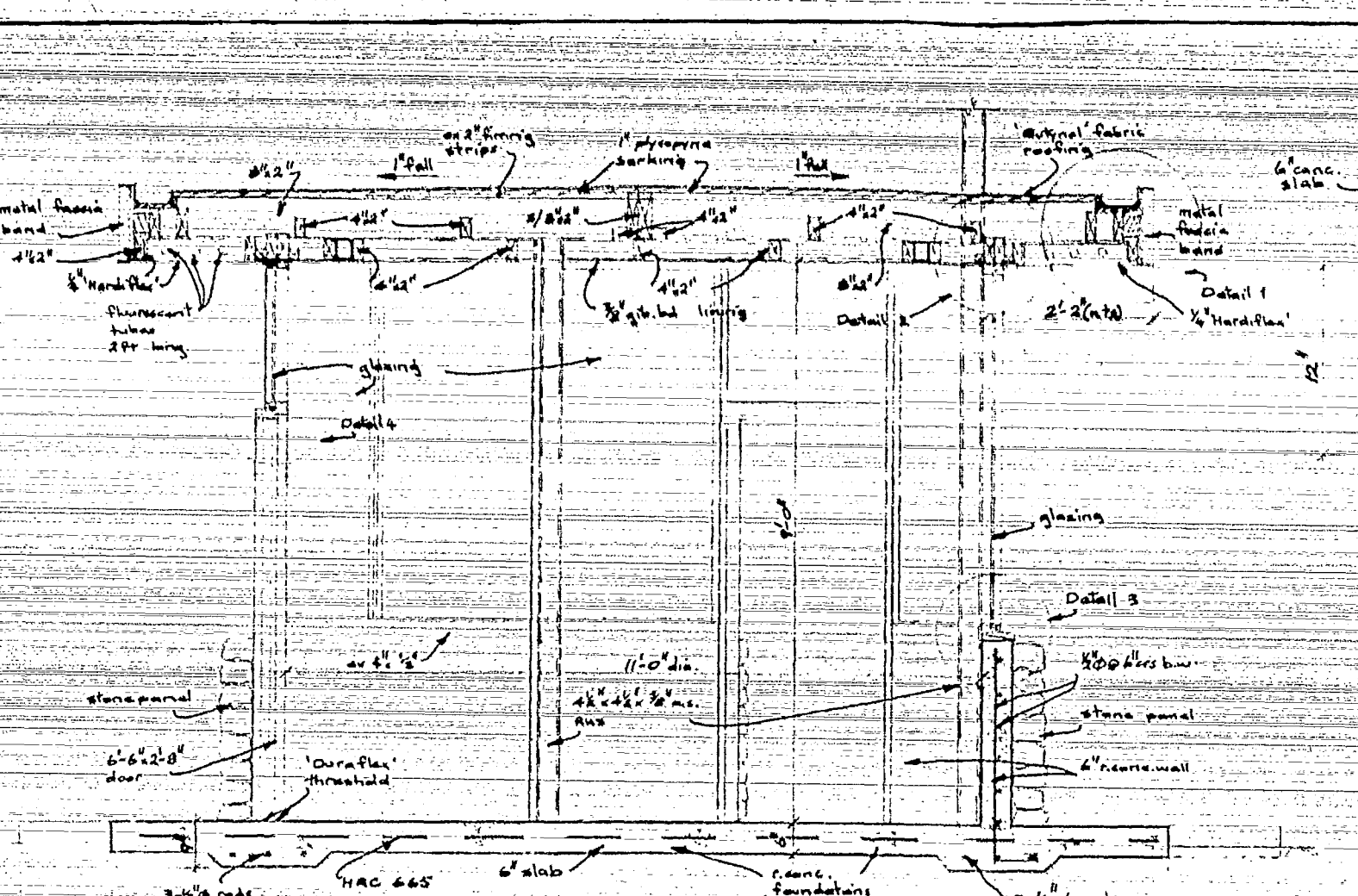
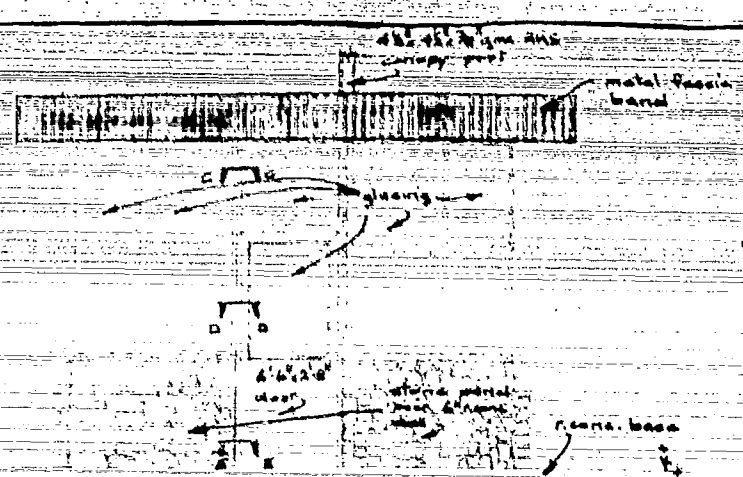




FILE No. 5290  
 PERMIT No. 32207  
 DATE OF PERMIT 21-11-72  
 ADDRESS High St  
 Plum TG = 100

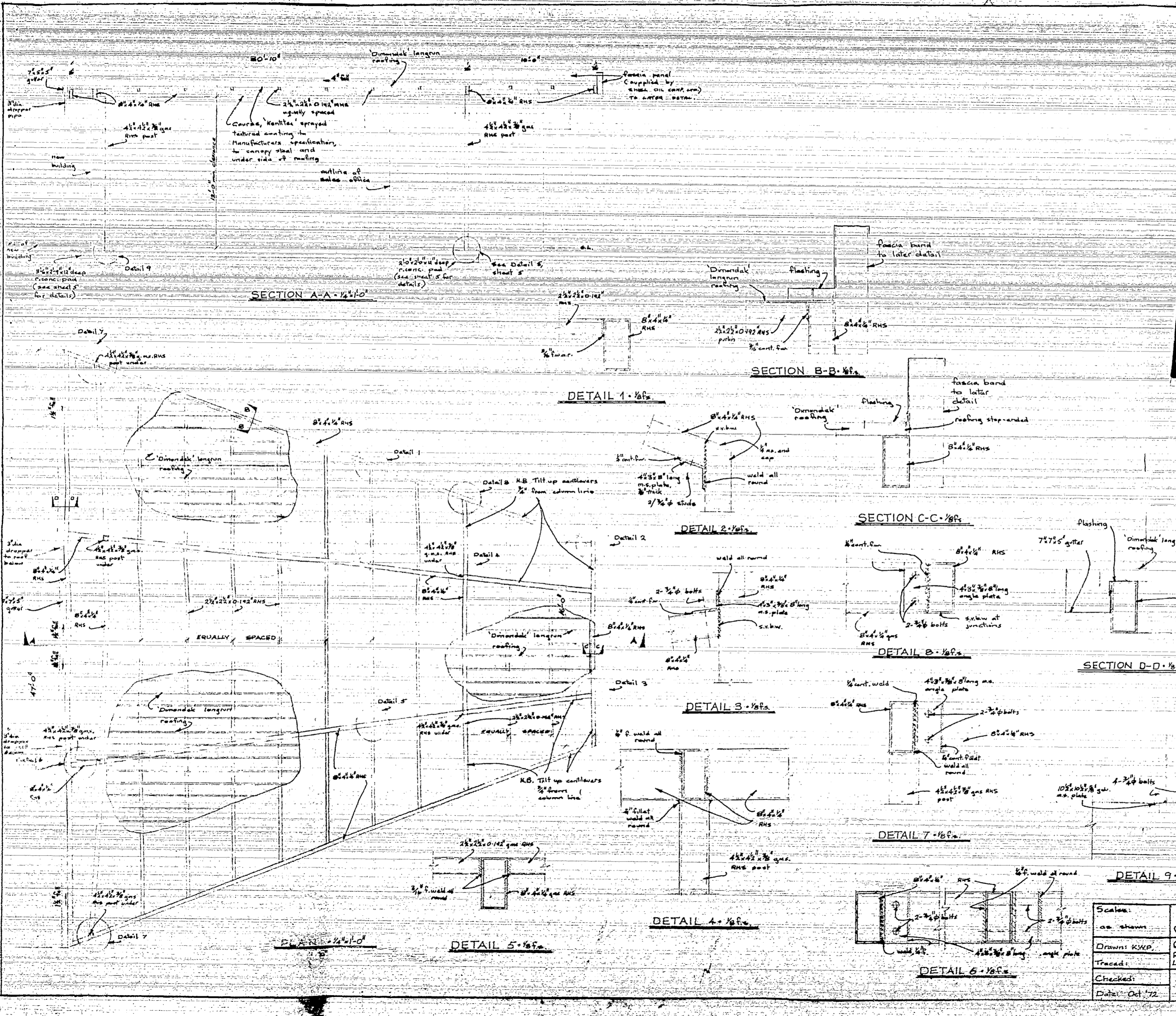


Scale:	PROPOSED REMODEL for HUTT	Date:	7/7/72
as shown	CENTRAL DRIVEWAYS, LOWER HUTT.	Drawn by:	KW
Drawn by:	COOK, NIGHTINGALE & ASSOCIATES,	Traced:	
Traced:	Registered Architectural Consulting Engineers	Checked:	
Checked:	Lower Hutt	Date:	Oct 72
Date:	PLANS, SECTIONS & DETAILS.	Tray:	27



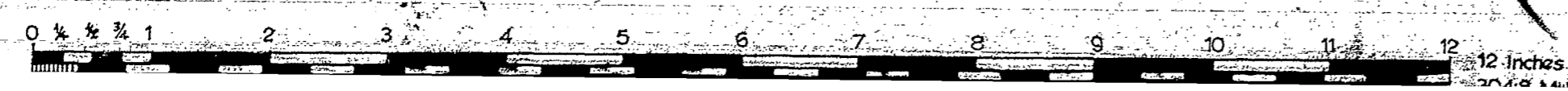
Scale:	as shown	PROPOSED REMODEL for HUTT CENTRAL DRIVEWAYS - LOWER HUTT.	Job no. 177/462
Drawn:	KWP	COOK, NIGHTINGALE & ASSOCIATES, Registered Architects - Consulting Engineers, Lower Hutt. Tel. 61-194.	DWG No. 5
Traced:		SALES OFFICE - DETAILS	Tray 27
Checked:			
Date:	Oct 77		

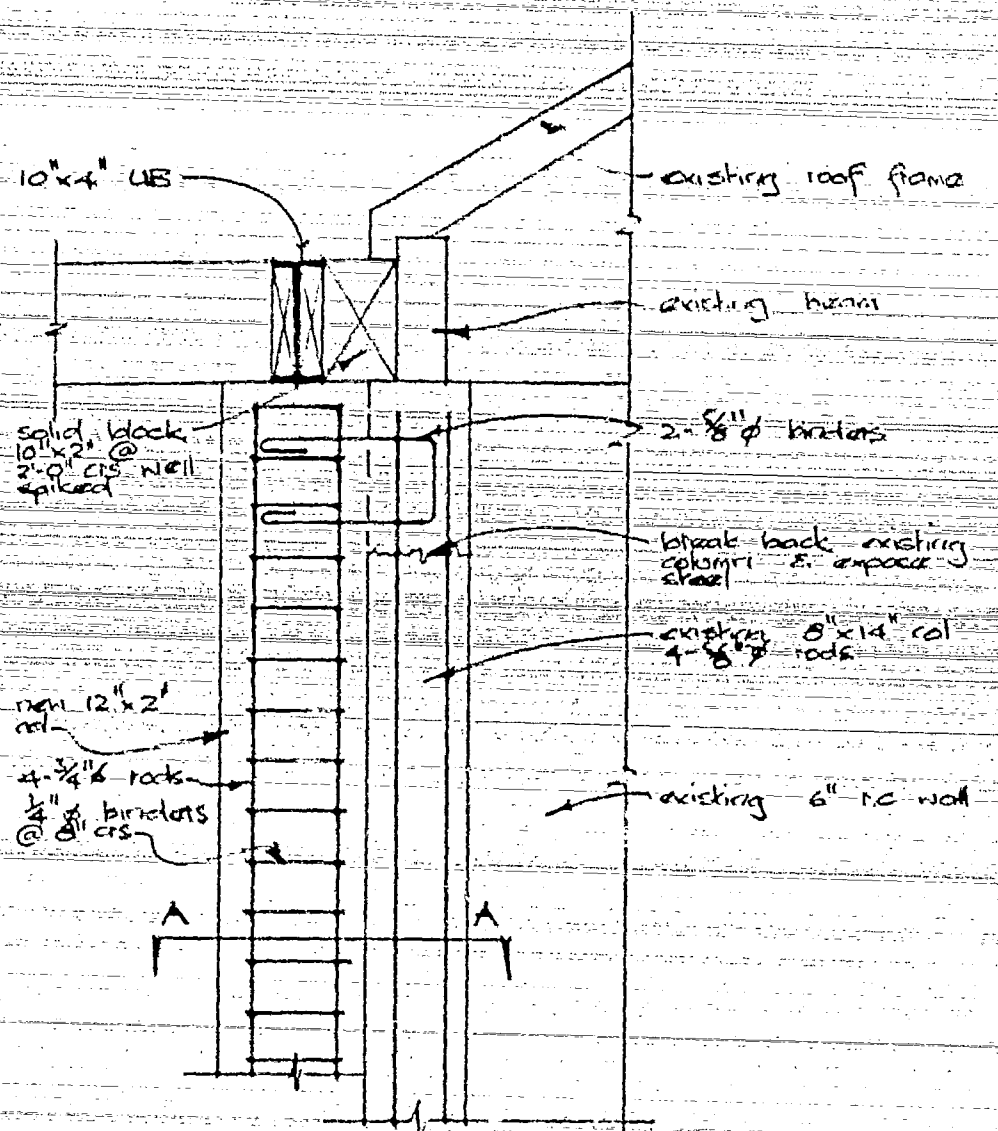
FILE No. 5290  
 PERMIT No. 32207  
 DATE OF PERMIT 21-11-72  
 ADDRESS HIGH ST  
 Film 16 - 100



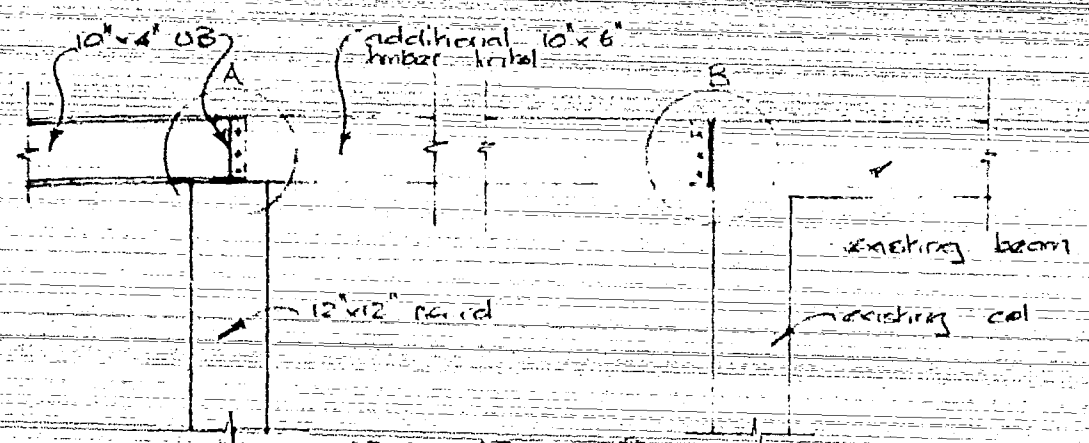
FILE No.	5290
PERMIT No.	32207
DATE OF PERMIT	21-11-72
ADDRESS	HIGH ST
Plan No.	100

Scale:	as shown	PROPOSED REMODEL for HUTT CENTRAL DRIVEWAYS, LOWER HUTT.	Job no. 72/1/462
Drawn:	KWP	COOK, NIGHTINGALE & ASSOCIATES, Registered Architects - Consulting Engineers, Lower Hutt	Dwg no. 6
Traced:			
Checked:		CANOPY PLAN, SECTIONS, DETAILS	
Date:	Oct '72		Tray 27

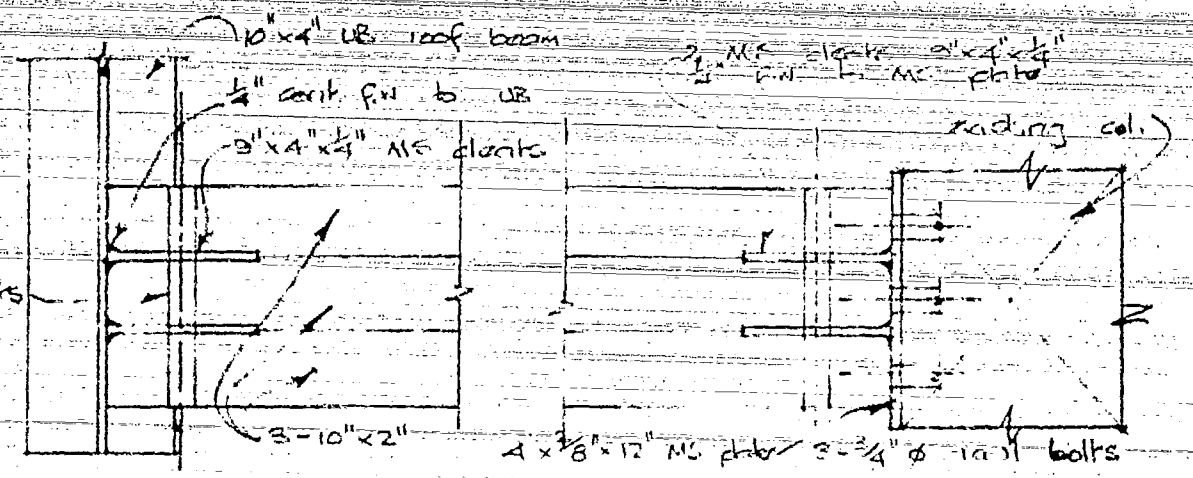




DETAIL AT COL (D) - junction of new building to old  
1" = 1'-0"

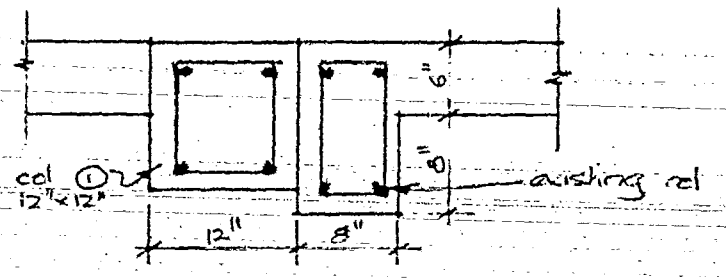


DETAIL AT COL (B)  
JUNCTION OF NEW BUILDING TO OLD  
1/2" = 1'-0"



DETAIL A  
1/2" = 1'-0"

DETAIL B  
1/2" = 1'-0"

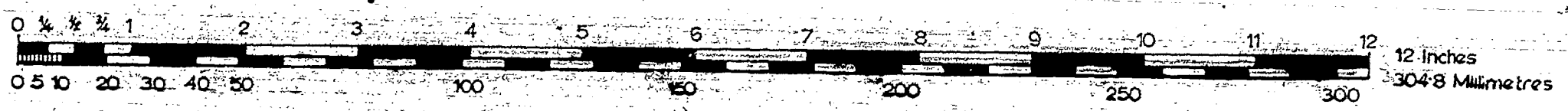


SECTION A-A  
1" = 1'-0"

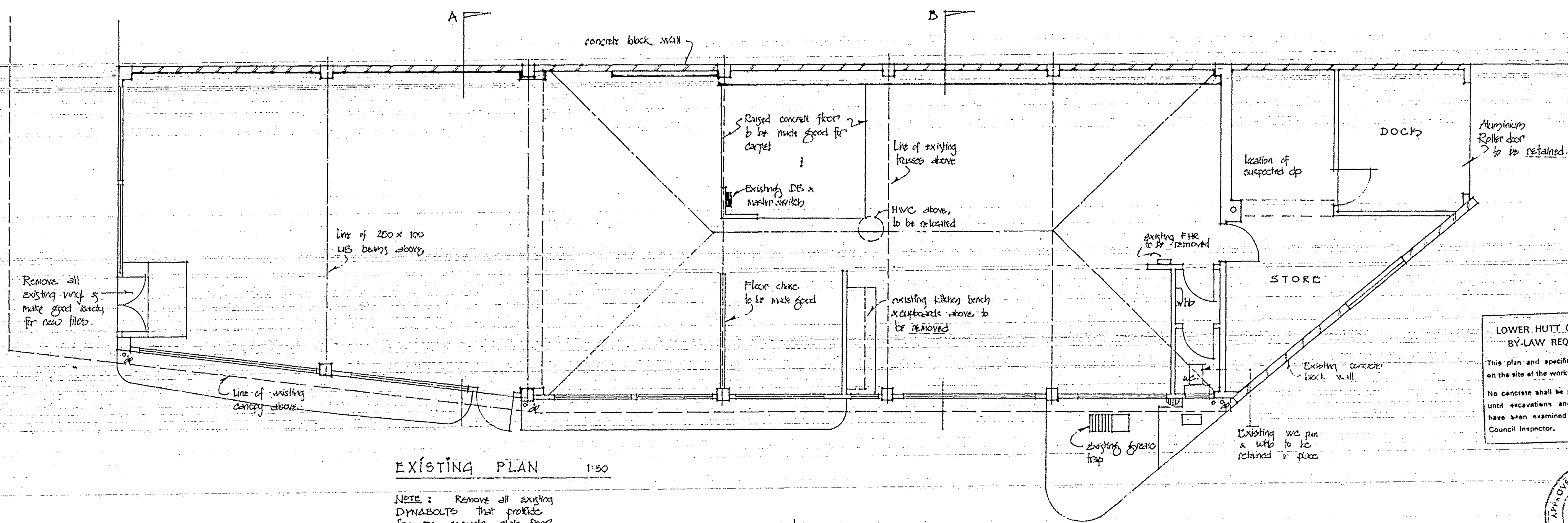
PROPOSED REMODEL FOR HUTT CENTRAL DRIVEWAYS + LOWER HUTT

COOK, NIGHTINGALE & ASSOCIATES  
Registered Architects - Consulting Engineers  
Lower Hutt Tel 61-134

Dwg No: 7



HIGH STREET



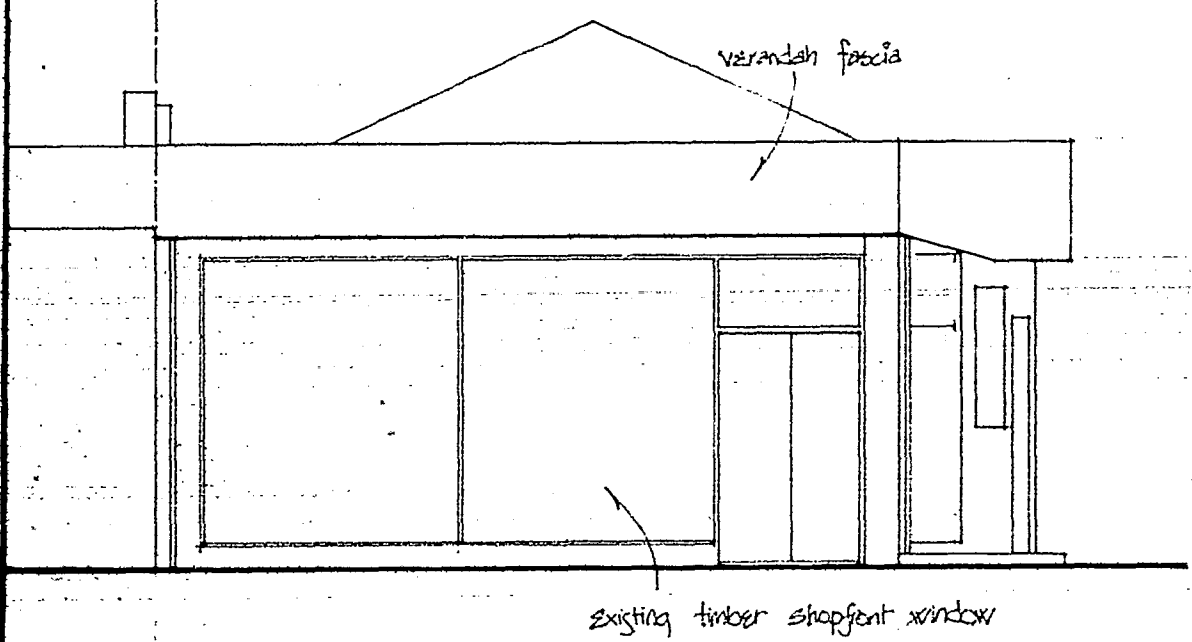
EXISTING PLAN 1:50

NOTE: Remove all existing DYNABOLTS that protrude from the concrete slab floor

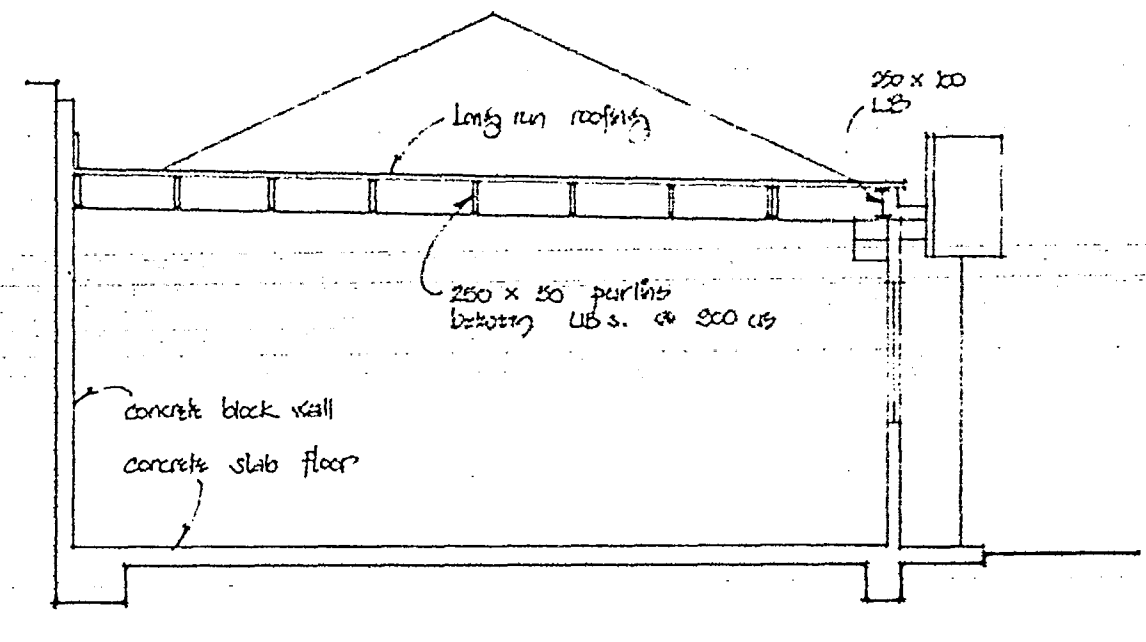
LOWER HUTT CITY COUNCIL BY-LAW REQUIREMENTS

This plan and specification must be kept on the site of the works during construction.

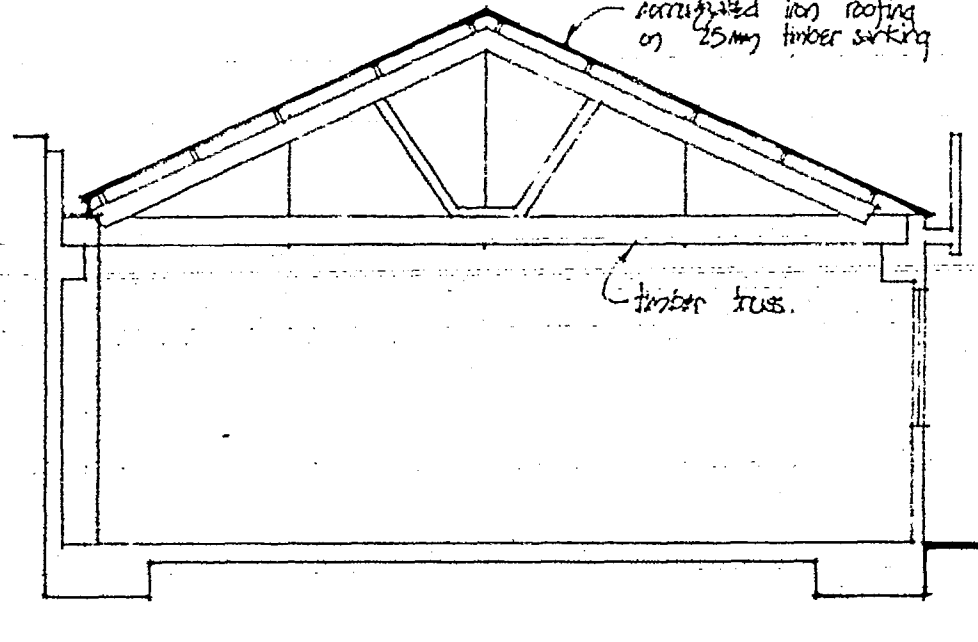
No concrete shall be placed in foundations until excavations and all reinforcements have been examined and passed by the Council Inspector.



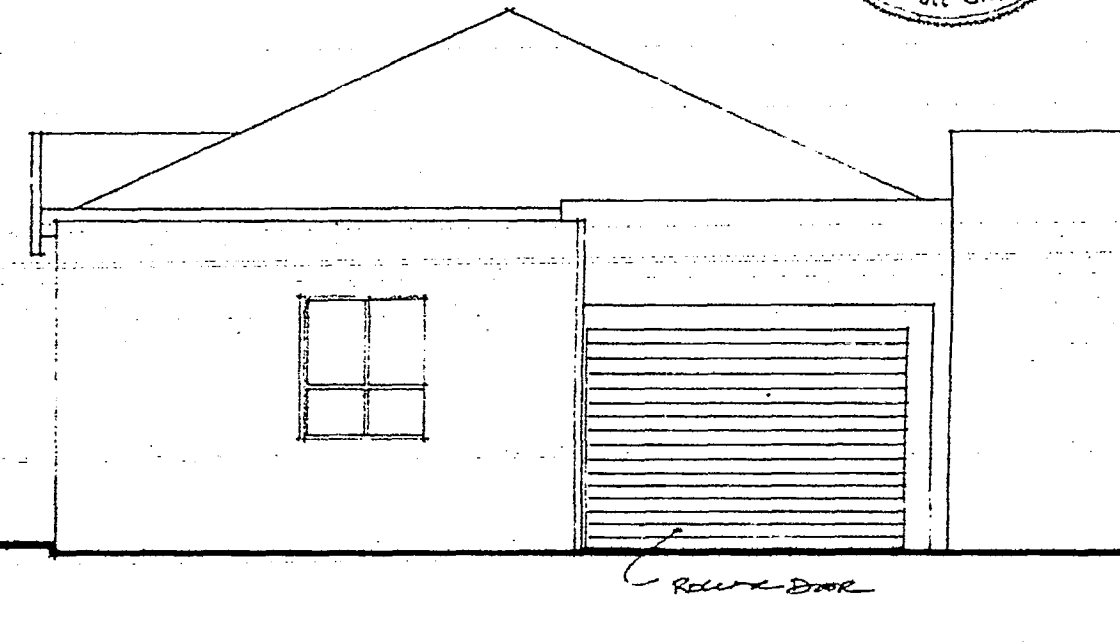
N.W. ELEVATION



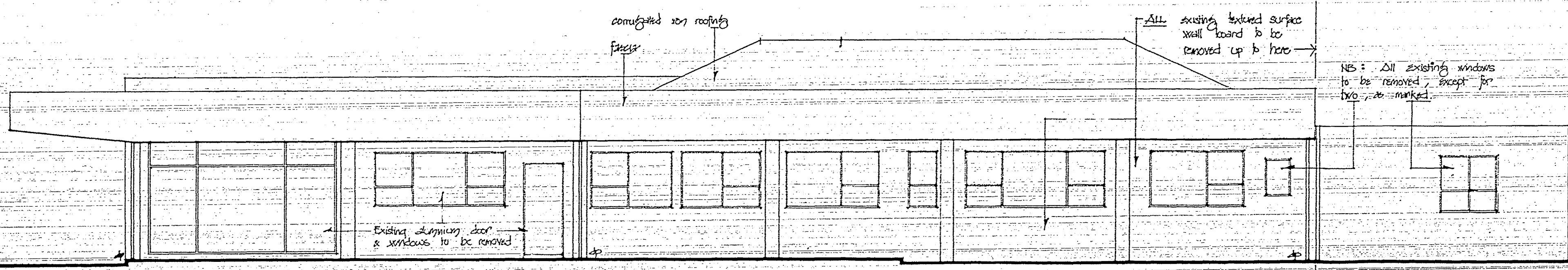
SECTION A



SECTION B



S.E. ELEVATION



S.W. ELEVATION

This building requires:

- Foundation Inspection
- Sub-Floor Inspection
- Prelining Inspection

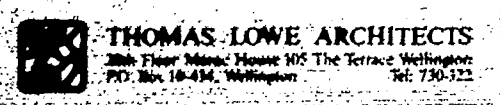
24 hours' notice, please.

FOR CONSTRUCTION

27/11/91, 1992

TENDER DOCUMENTS

Date 16.11.91



FILE No.....

PERMIT No. 57497

DATE 24/12/91

ADDRESS 252 HIGH STREET

16mm FILM 246-29

Proposed New TOTALISATOR AGENCY BOARD PREMISES AT 252 HIGH ST. LOWER HUTT.

AMENDMENTS:

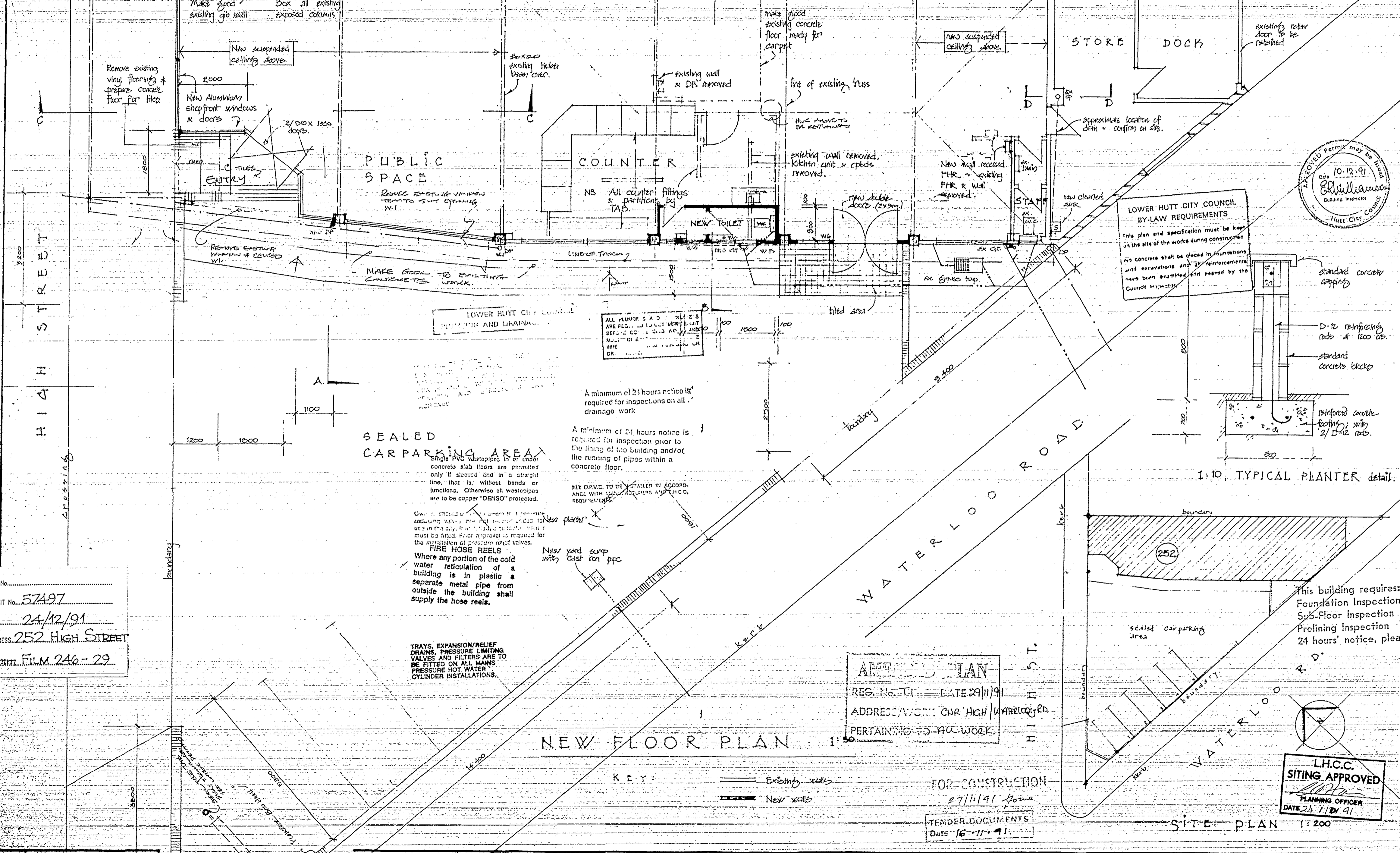
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK

SHEET TITLE: EXISTING PLAN, EXISTING ELEVATIONS

SCALE 1:50

JOB & SHEET No		916IT WD.2 (A)	
DATE	12/1/91	SERIES No	
DRAWN	ELT		
TRACED			
CHECKED			2/7

Description of Job: 252 High St.  
 Lot: 15-12-91  
 Owner: L.A. B.  
 Date of Permit: 24/12/91  
 Permit No.: 57497



FILE No. ....  
 PERMIT No. 57497  
 DATE: 24/12/91  
 ADDRESS: 252 HIGH STREET  
 16mm FILM 246-29

**THOMAS LOWE ARCHITECTS**  
 200 Main Street, Room 101 The Terrace Wellington  
 Tel: 374 1234

**Proposed New Totalisator Agency Board  
 PREMISES AT 252 HIGH ST. LOWER HUTT.**

**AMENDED PLAN**  
 REG. No. 11 DATE 29/11/91  
 ADDRESS/VORN: CNR HIGH / WATERLOO RD.  
 PERTAINING TO THE WORK.

FOR CONSTRUCTION  
 27/11/91 Home  
 TENDER DOCUMENTS  
 Date 16-11-91

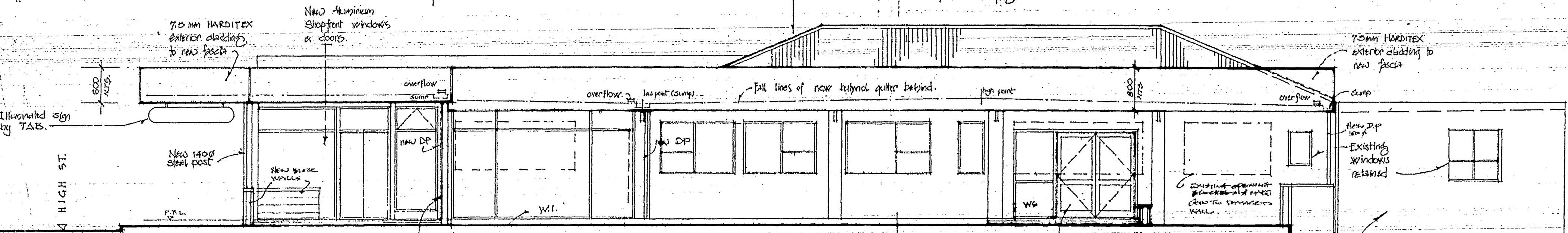
**LOWER HUTT CITY COUNCIL  
 BY-LAW REQUIREMENTS**  
 This plan and specification must be kept on the site of the works during construction.  
 No concrete shall be placed in foundations with excavations and all reinforcements have been examined and passed by the Council Inspector.

APPROVED PERMIT MAY BE ISSUED  
 Date 10.12.91  
 Building Inspector  
 Hutt City Council

**L.H.C.C.  
 SITING APPROVED**  
 PLANNING OFFICER  
 DATE 24/12/91

AMENDMENTS: E.F. FRONT CORNER WALL REMOVED; TOILET, H.V.C., BLUE WALL, SUE BROWN AMENDMENTS	SHEET TITLE: <b>SITE PLAN          FLOOR PLAN</b>	JOB & SHEET No. <b>2/16/TWD.1.(B)</b>
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK	SCALE: AS SHOWN	DATE: 27/11/91 DRAWN: G.L.P. TRACED: G.L.P. CHECKED: G.L.P.

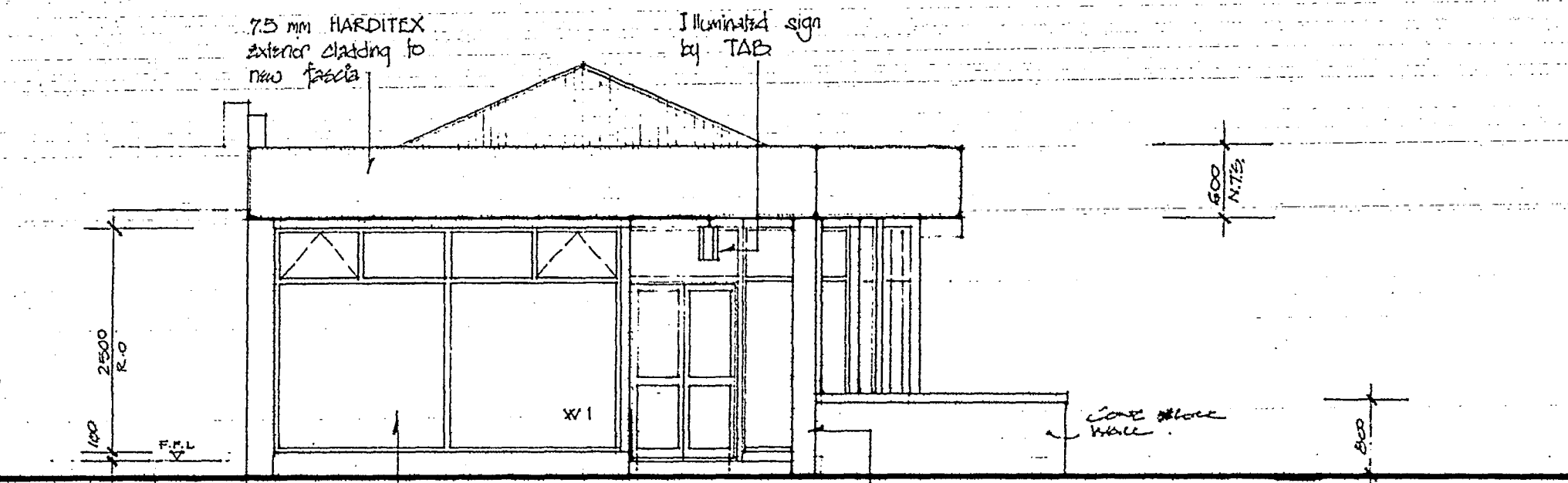
Line of existing hipped roof -  
existing corrugated iron removed -  
replaced with colour-coated  
BROWNBUILT 300 rafting.



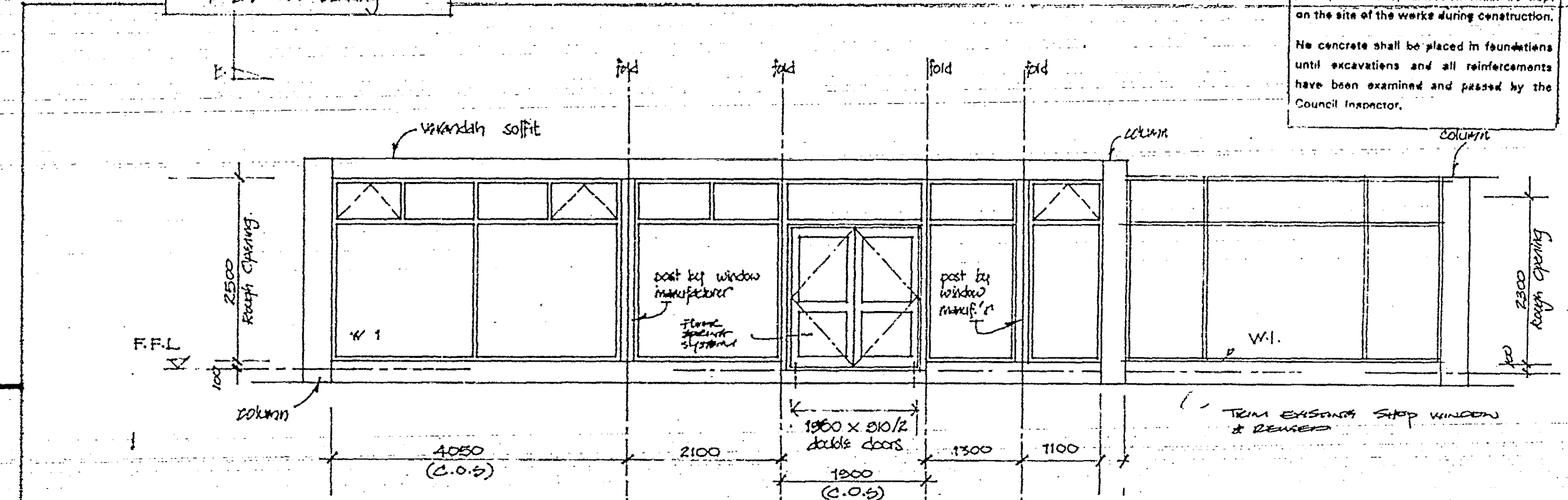
NEW SOUTH-WEST ELEVATION 1:50

NB: All existing exterior cladding shall be removed. Walls to be framed up & take new cladding.

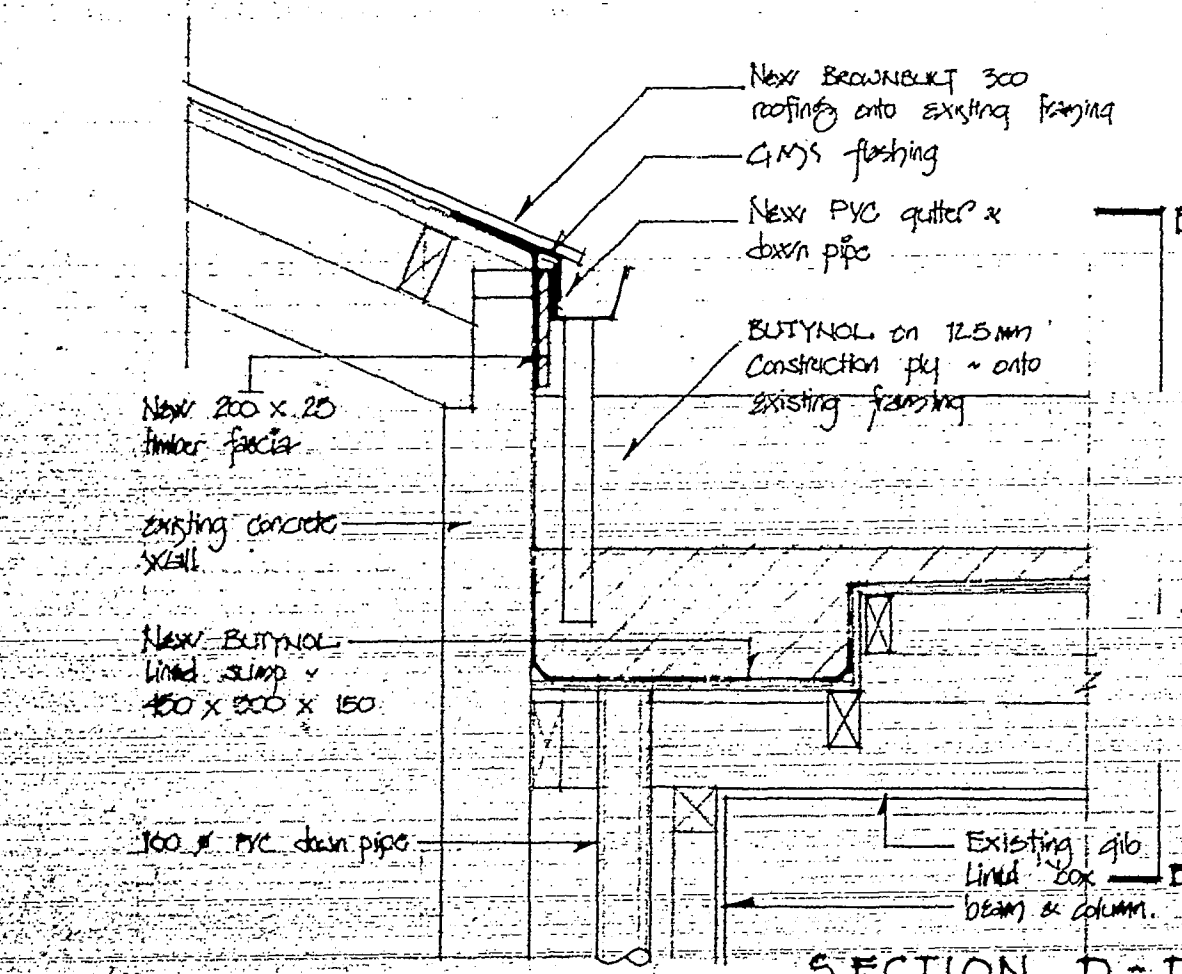
**LOWER HUTT CITY COUNCIL BY-LAW REQUIREMENTS**  
This plan and specification must be kept on the site of the works during construction. No concrete shall be placed in foundations until excavations and all reinforcements have been examined and passed by the Council Inspector.



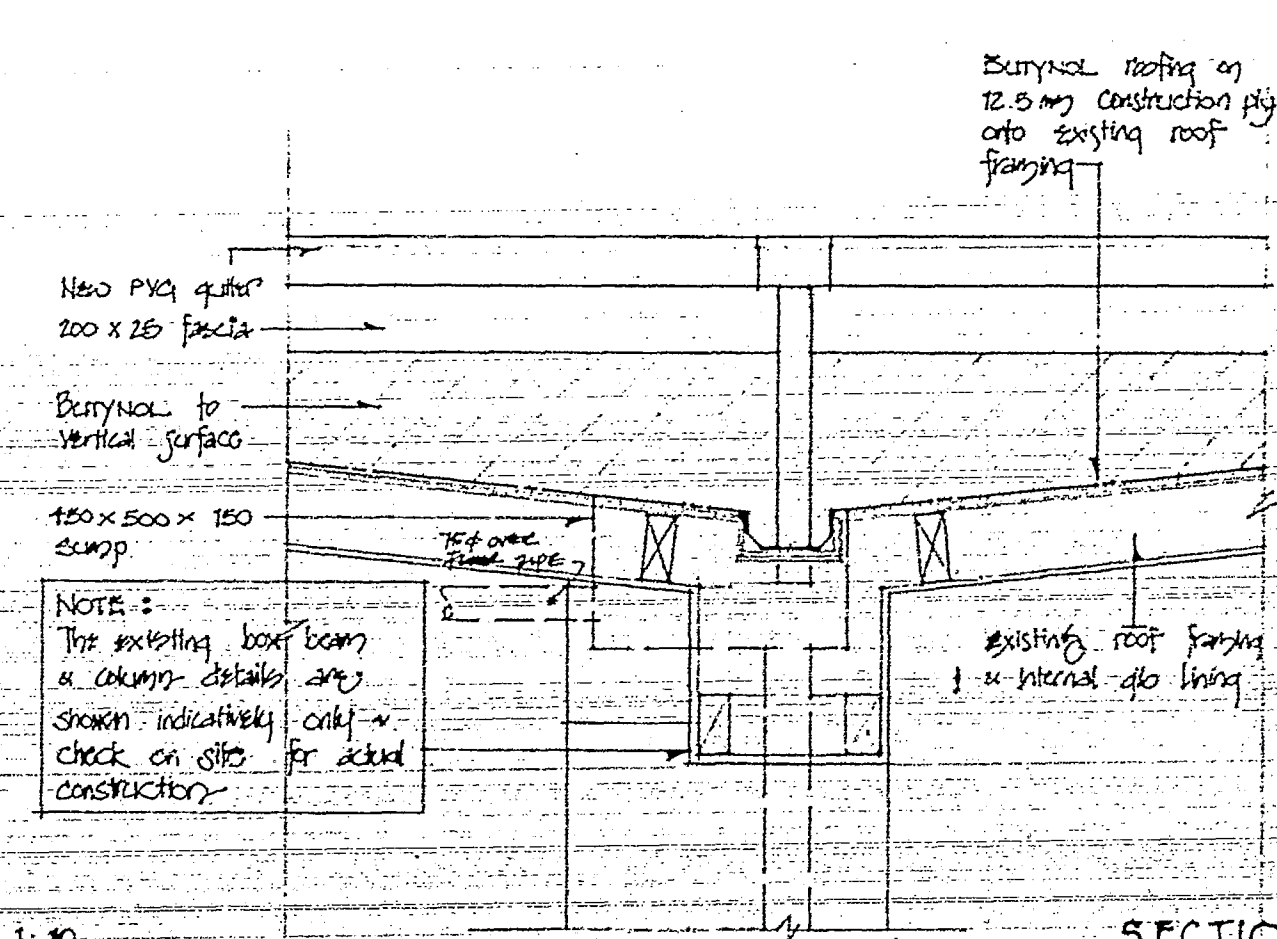
NEW High St. ELEVATION (NW) 1:50



UNFOLDED ELEVATION OF NEW SHOPFRONT (W1) AS SEEN FROM THE OUTSIDE 1:50

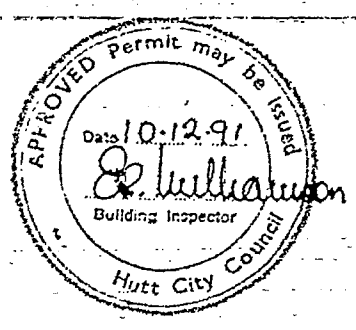


SECTION D-D 1:10



SECTION E-E 1:10

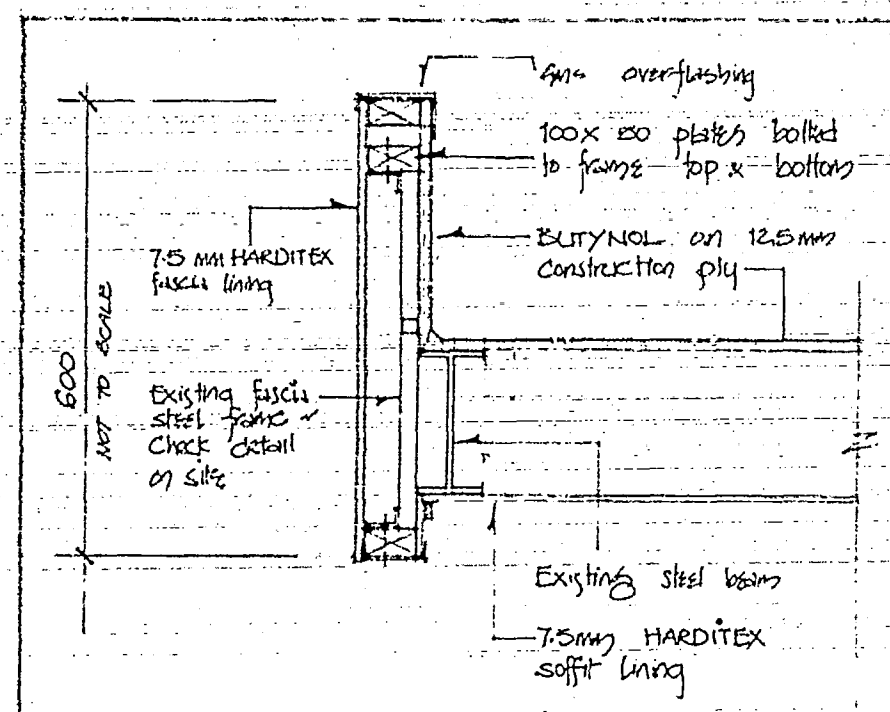
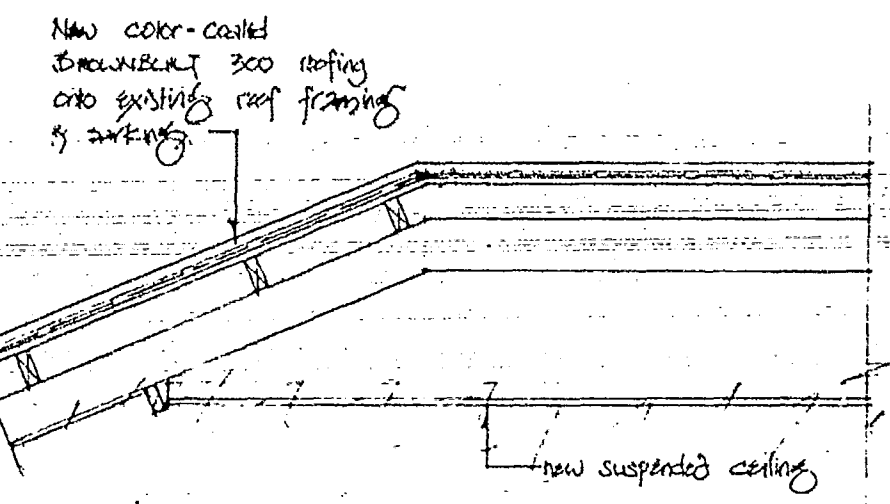
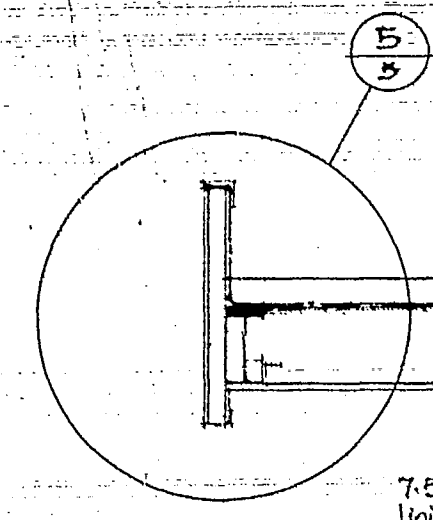
NOTE: The existing box beam & column details are shown indicatively only - check on site for actual construction.



This building requires:  
Foundation Inspection   
Sub-Floor Inspection   
Prolining Inspection   
24 hours' notice, please.

FILE No. ....  
PERMIT No. 57497  
DATE 24/12/91  
ADDRESS 252 HIGH STREET  
KONTAK FILM 246-29

FOR CONSTRUCTION  
27/11/91, Gove  
TENDER DOCUMENTS  
Date 16.11.91



DETAIL B-5 1:10

Existing long run roofing removed replace with BUTYNOL on 12.5mm decking grade construction ply, onto existing framing.

Mechanical vent.

Existing roof structure.

7.5 HARDITEX lining to soffit

New suspended ceiling

New Aluminium Shopfront window

PUBLIC SPACE

2700 (c.o.s.) height of suspended ceiling

Existing timber beam boxed around with 9.5mm gyfiboard + Nolt's Confining trys detail on site

Make good boxing to joistboard columns

C.I. 2550 ceiling on site (to inside side of new cyclone)

3650 height of suspended ceiling

Existing concrete floor

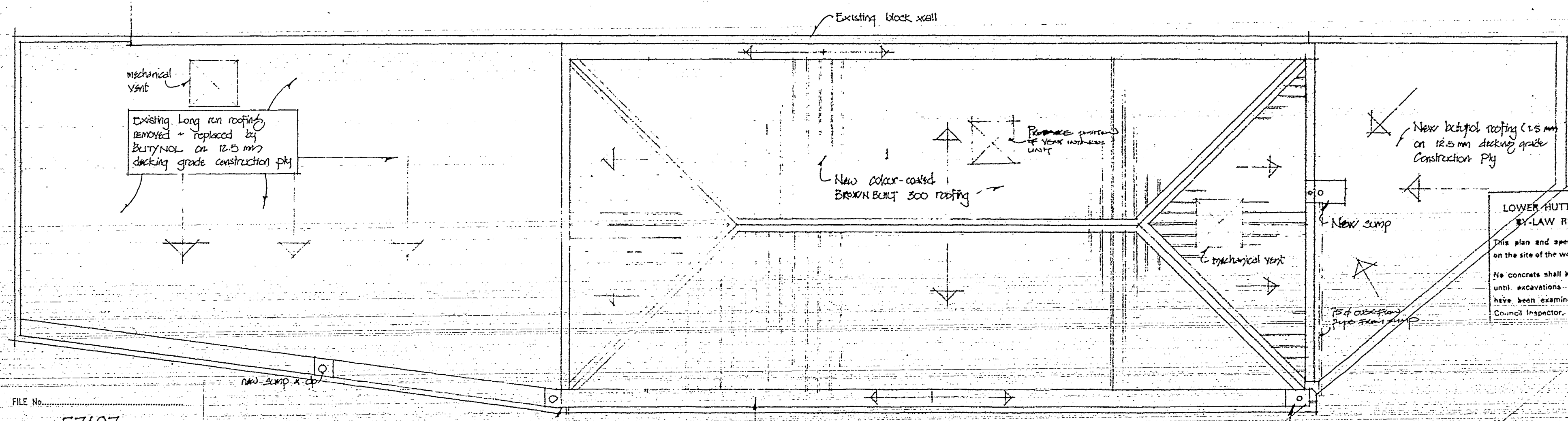
Note: Head & Sill window details are shown indicatively only - check on site conditions before fabrication & confirm details with architect.

Selected carpet by TAB

New skirtings throughout

100 x 50 plate set onto existing upstand (c.o.s)

SECTION C-C 1:20



ROOF PLAN 1:50

LOWER HUTT CITY COUNCIL BY-LAW REQUIREMENTS

This plan and specification must be kept on the site of the works during construction.

No concrete shall be placed in foundations until excavations and all reinforcements have been examined and passed by the Council Inspector.

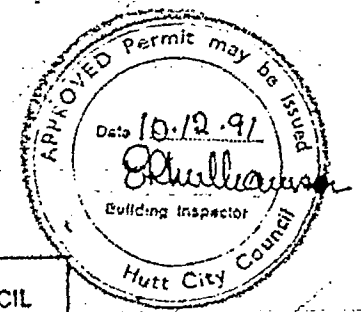
- This building requires:
- Foundation Inspection
  - Sub-Floor Inspection
  - Practising Inspection
- 24 hours' notice, please.

FOR CONSTRUCTION

27/11/91, Uows

TENDER DOCUMENTS

Date 16-11-91.



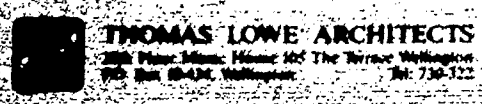
FILE No. 57497

PERMIT No. 57497

DATE 24/12/91

ADDRESS 252 HIGH STREET

16mm FILM 246-29



PROPOSED NEW TOTAUKATOR AGENCY BOARD PREMISES AT 252 HIGH ST. LOWER HUTT.

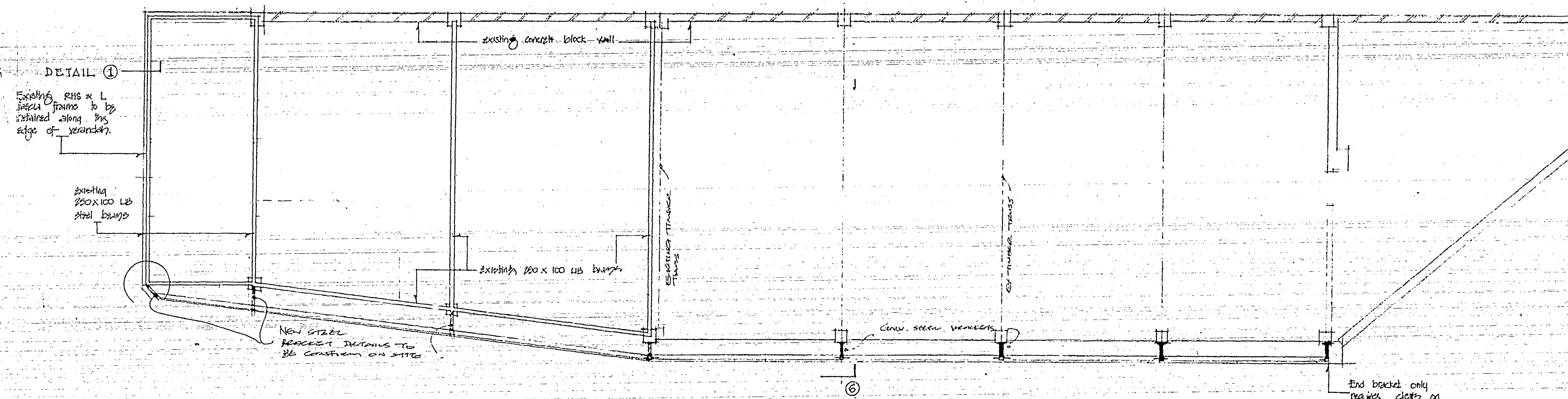
AMENDMENTS:  
B. Roof & S. Ceiling Details 15/11/91

CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK.

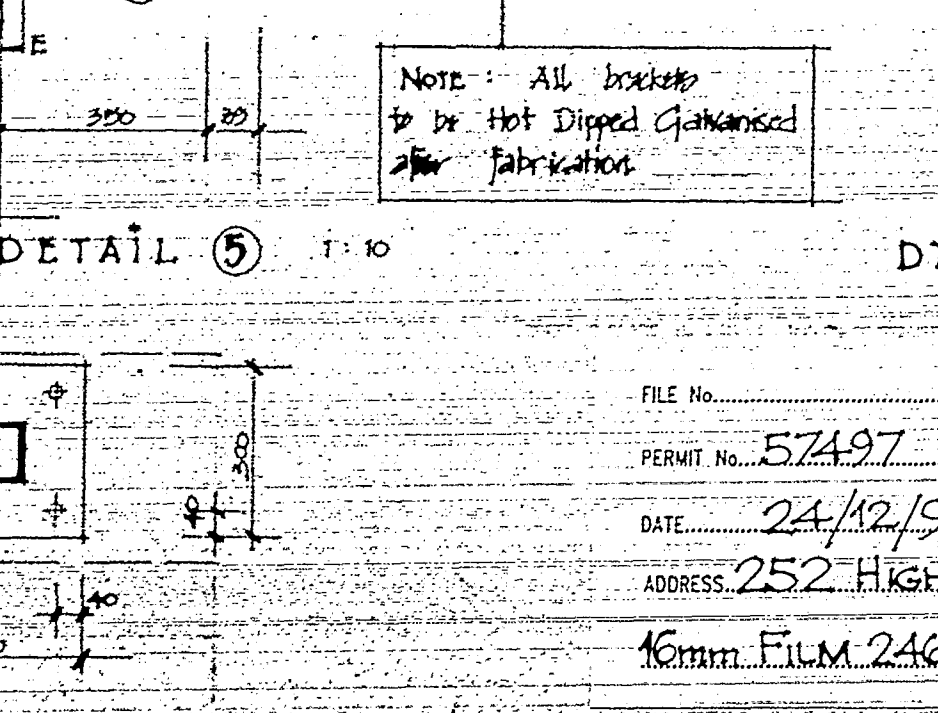
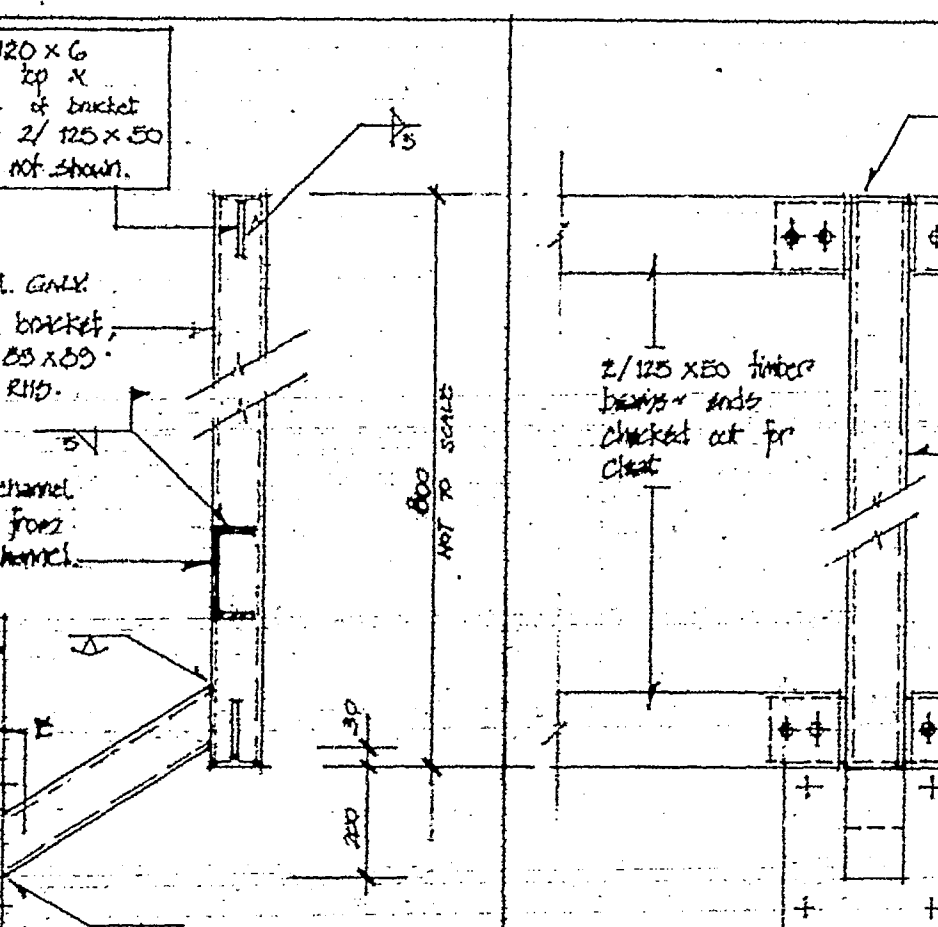
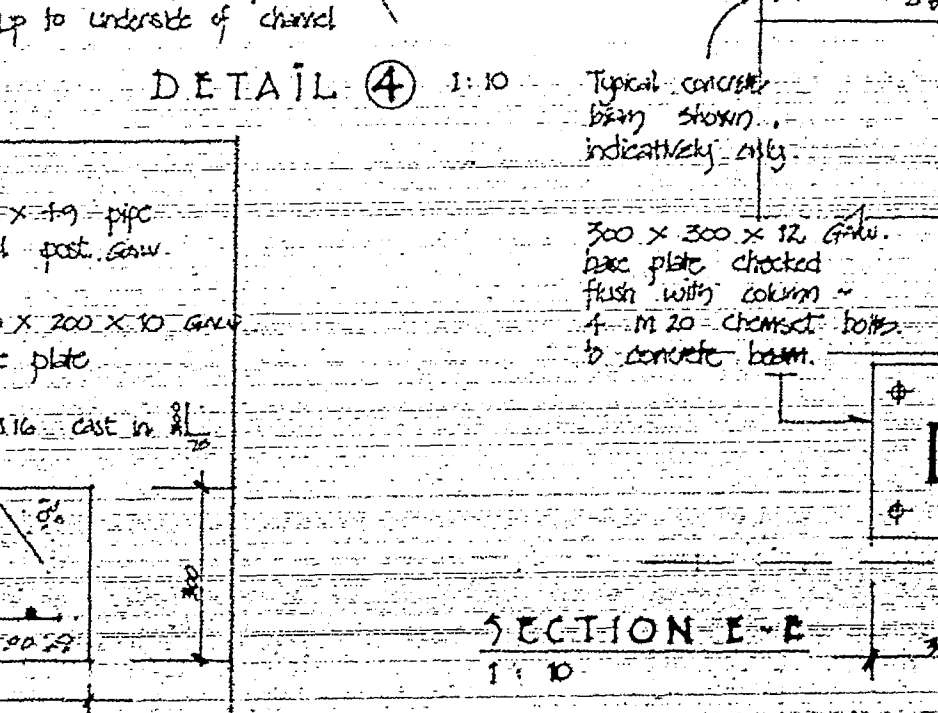
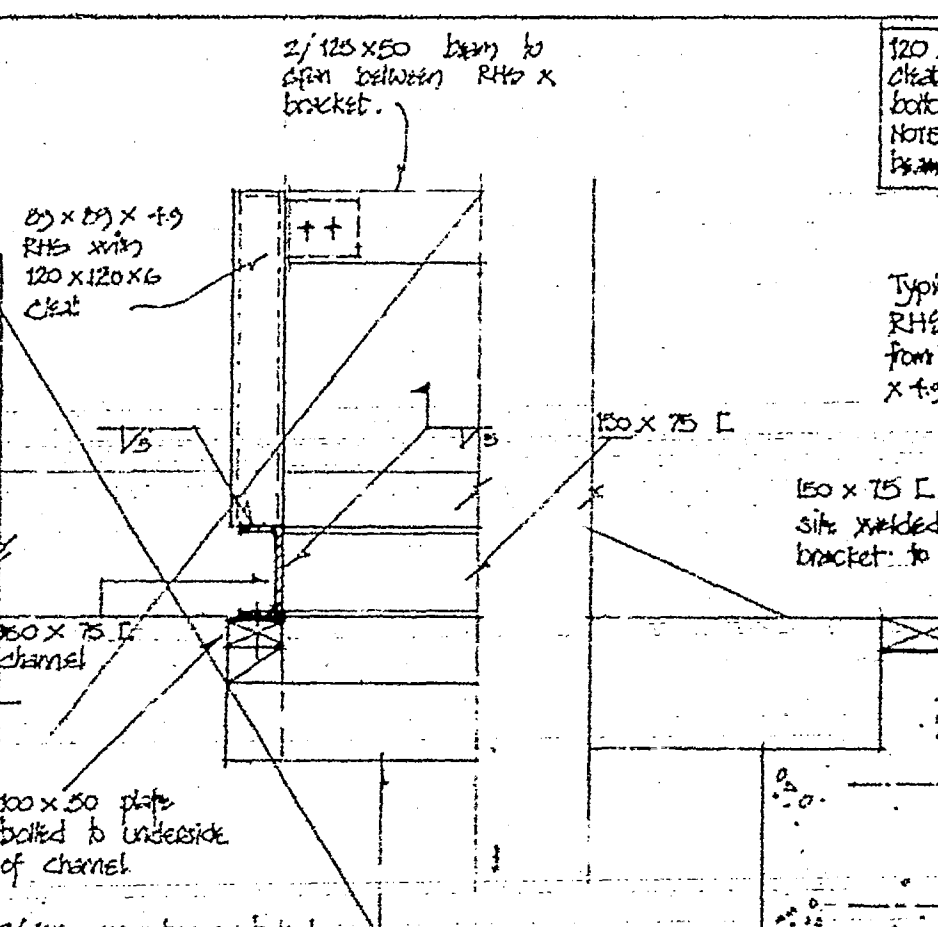
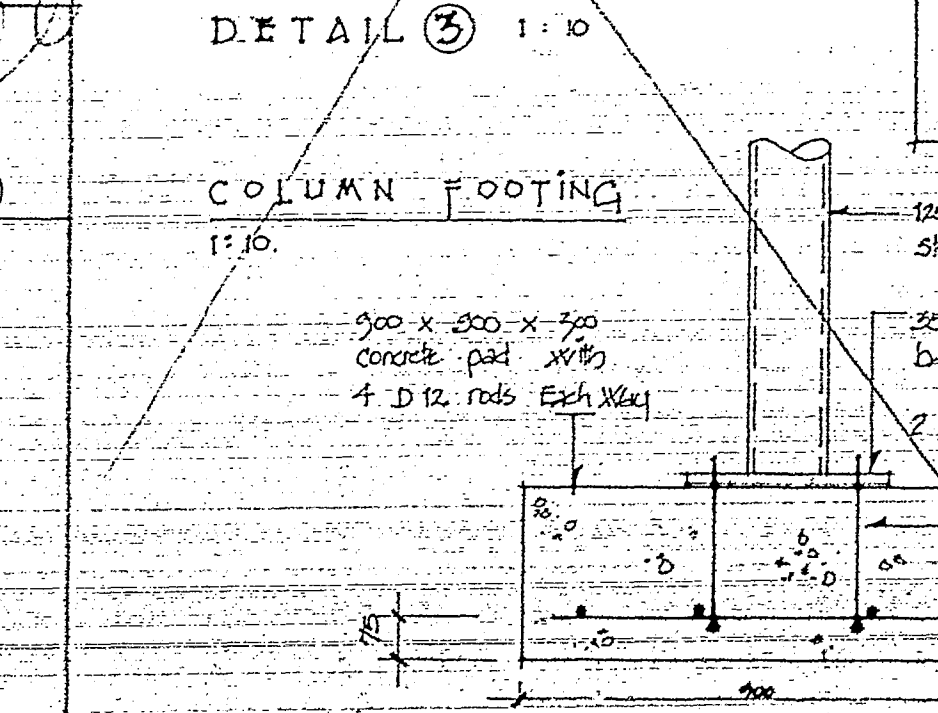
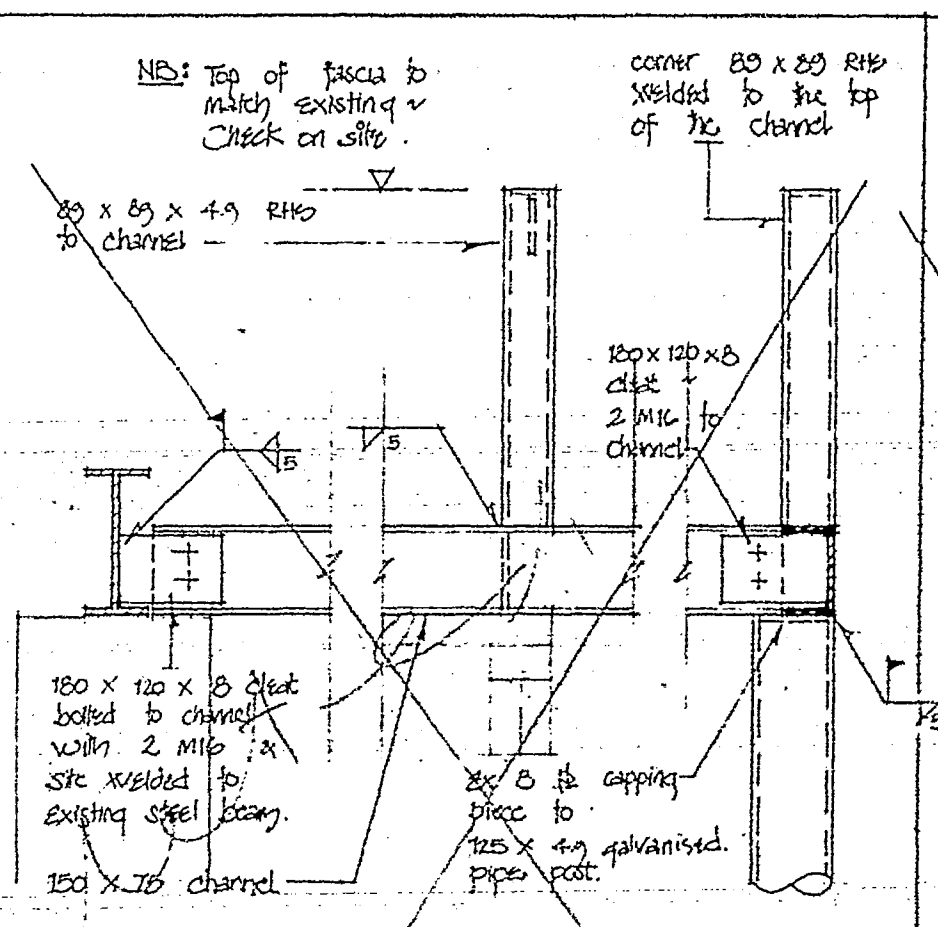
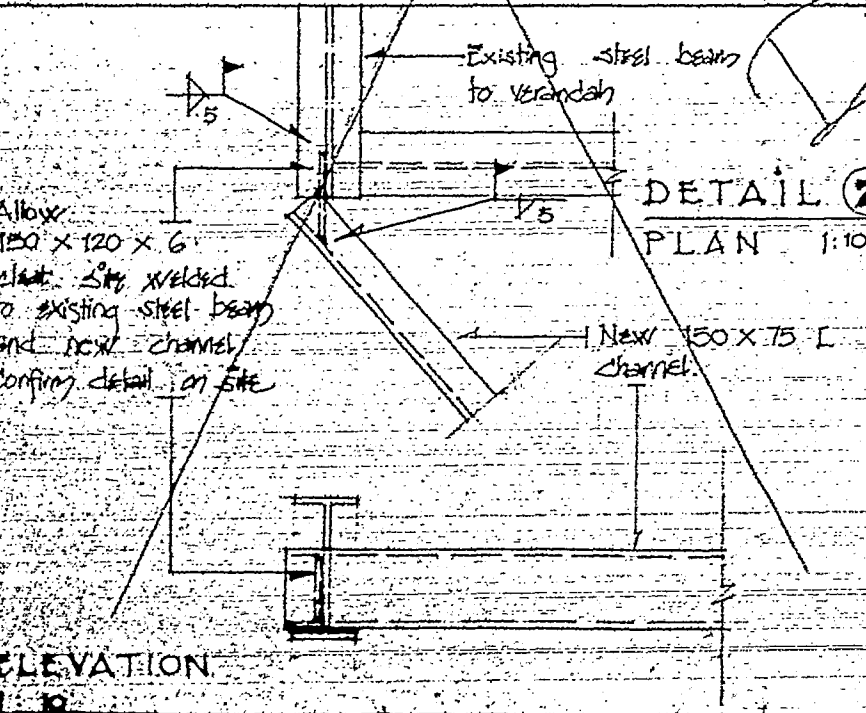
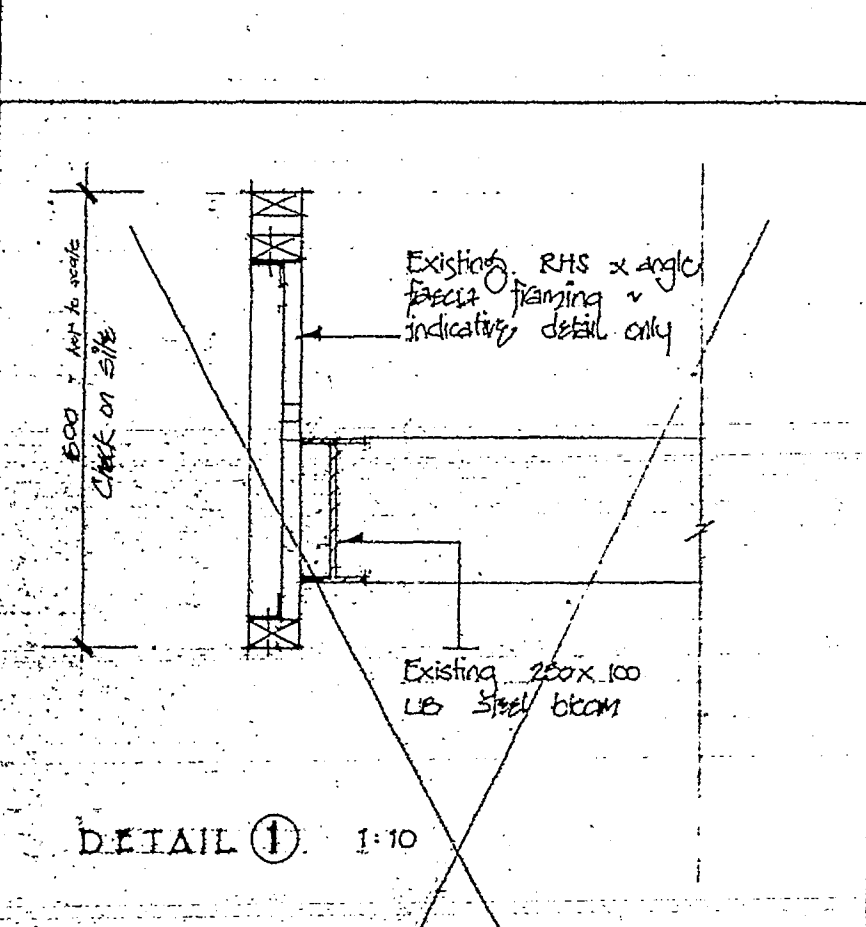
SHEET TITLE:  
SECTION 5  
ROOF PLAN

SCALE: As shown

JOB & SHEET No. 21/61TWS.5.0		SERIES No. 5/7
DATE OCT 91		
DRAWN CUP		
TRACED		
CHECKED		

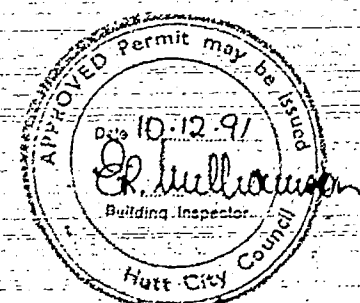


**STRUCTURAL PLAN** 1:50  
[AT ROOF LEVEL, SHOWING NEW VERANDAH]



**LOWER HUTT CITY COUNCIL - BY-LAW REQUIREMENTS**  
This plan and specification must be kept on the site of the works during construction.  
No concrete shall be placed in foundations until excavations and all reinforcements have been examined and passed by the Council Inspector.

This building requires:  
Foundation Inspection   
Sub-Floor Inspection   
Planning Inspection   
24 hours' notice, please.



FILE No. ....  
PERMIT No. 57497  
DATE 24/12/91  
ADDRESS 252 HIGH STREET  
Komm. FilM 246-29

**NOTICE FOR CONSTRUCTION**  
21/12/91  
TENDER DOCUMENTS  
Date 16/11/91

**THOMAS LOWE ARCHITECTS**  
200 Papanui Road, Lower Hutt, New Zealand  
Tel: 781 5111

**PROPOSED NEW TOTALISATOR AGENCY BOARD  
PREMISES AT 252 HIGH ST. LOWER HUTT.**

AMENDMENTS:	SHEET TITLE: <b>STRUCTURAL DETAILS</b>	JOB & SHEET NO: <b>91/611 WR 2 (A)</b>
CONTRACTOR MUST VERIFY ALL DIMENSIONS ON SITE BEFORE COMMENCING WORK	SCALE: <b>AS SHOWN</b>	DATE: <b>17/12/91</b>

The logo for Bayleys, featuring the word "BAYLEYS" in a bold, white, sans-serif font, centered within a dark blue rectangular box with a thin white border.

## **DISCLOSURE STATEMENT**

1. The following information has been supplied to Capital Commercial (2013) Limited ("Bayleys") to be made available for distribution on the vendor's behalf to potential purchasers to assist purchasers with their due diligence and to use at the purchaser's discretion.
2. Bayleys and the Vendor do not warrant the accuracy or completeness of the information and recommends that all recipients undertake their own due diligence, obtain their own reports to their satisfaction and seek independent advice prior to committing to purchaser.