

ROTORUA LAKES COUNCIL

Te kaunihera o ngā roto o Rotorua



Rotorua Museum Oruawhata Drive, Rotorua Detailed Seismic Assessment Report



**Rotorua Museum
Oruawhata Drive
Government Gardens Rotorua
Detailed Seismic Assessment Report**

August 2017

Revision	0
Status	For Comment

Prepared By	Carl O'Sullivan MSc (Eng) GIPENZ	<i>Carl O'Sullivan</i> 23/08/2017
Prepared By	Mike Osborne MIPENZ	<i>Mike Osborne</i> 23/08/2017
Reviewed By	Keegan Williams CPEng. No. 1010192	<i>Keegan Williams</i> 29/8/2017
Peer Reviewed By	Robert Davey FIPENZ, CPEng No. 17912	<i>Robert Davey</i>
Approved By	Clement Fernando CPEng. No. 202146	<i>Clement Fernando</i> 29/8/2017

Prepared by:

GDC Consultants Ltd
1289 Haupapa Street, Rotorua 3040
New Zealand

Phone: +647 282 2173

Email: rotorua@gdcgroup.co.nz

Website: www.gdcgroup.co.nz

File No: J000949

Date: August 2017

RECORD OF AMMENDMENTS

Amendment Number	Amendment Date	Effective Date	Updated By	Updated Date

DISCLAIMER

We have prepared this report in accordance with the brief as provided and our terms of engagement. We disclaim all responsibility and will accept no liability to any other party without first obtaining the written consent of GDC Consultants and the author of this report. GDC Consultants reserves the right to alter, amend, explain, or limit any further information given to any other party. Recommendations and opinions in this report are based on data obtained from the investigations and site observations. No liability is accepted by GDC Consultants or any employee or sub-consultant of this company with respect to its use by any other parties.

This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval to fulfil a legal requirement. This report shall not be used to interpret any form of financial transaction.

ABBREVIATIONS

- IEP – Initial Evaluation Procedure
- DSA – Detailed Seismic Assessment
- NBS – New Building Standard
- NZSEE – New Zealand Society for Earthquake Engineering
- ULS – Ultimate Limit State
- EPB – Earthquake Prone Building
- NZSEE – New Zealand Society for Earthquake Engineering Inc.
- O-O-P – Out Of Plane
- O/T – Over Turning
- CSW – Critical Structural Weakness
- SSW – Severe Structural Weakness

Table of Contents

Executive Summary	6
1. Introduction	13
2. Detailed Assessment	18
2.1 Building and Site Description	18
2.2 Seismic Analysis and Assessment of Buildings	38
3. Building Seismic Rating/Discussion of Results	42
4: Seismic Retrofit Options	54
Option 1	54
Option 2	54
Option 3	55
Option 4 (option 3 with light weight roof)	56
5. Conclusions	57
6. Recommendations	57
7. Limitations	58
8. References	59

APPENDICES

Appendix A: Building Layout Plan
 Appendix B: Lift Pit information
 Appendix C: Detailed Seismic Assessment Calculations
 Appendix D: Deleted
 Appendix E: Retrofit Option 1 Concept
 Appendix F: Retrofit Option 2 Concept
 Appendix G: Retrofit Option 3 Concept
 Appendix H: Retrofit Option 4 Concept
 Appendix I: Temporary Opening Tarawera Gallery – Concept Design

Executive Summary

Background

GDC Consultants Limited have been commissioned by Rotorua Lakes Council (RLC) to undertake a Detailed Seismic Assessment (DSA) of the building located at Oruawhata Drive, Government Gardens, Rotorua (refer figure 1). Sigma Consultants have previously carried out an earthquake prone building assessment (2010) and rated the building at 35-40% New Building Standard (NBS) for an Importance Level 3 building (IL3).

Figure 1 – View of Rotorua Museum



Building Description

The original building was constructed in 1906 for use as a bathhouse and is based on Tudor type architecture from the United Kingdom. It is a unique variant of traditional half-timber frame construction with the exterior framing “half timbered” and constructed with mortise and tenon joints infilled with pumice concrete panels and a lath and plaster internal overlay.¹

The original building shows similar construction throughout. This comprises of a basement with unreinforced concrete columns on shallow foundation pads and unreinforced concrete foundation walls, a vaulted/arched unreinforced concrete ground floor, timber framed ground floor walls and a trussed/rafter roof system with a heavy clay tile roof. Unreinforced concrete

¹ (Council OmTrak System Various Files/Dates)

walls up to 10.5m height are also located at the junctions between the differing building sections (refer to appendix A for building layout plan).

The basic lateral load resisting elements above ground level are the timber framed walls and unreinforced concrete walls between the sections. At basement level, the lateral forces are resisted by the foundation walls.

Numerous modifications and alterations have taken place since the original construction at varying times, with the new South (2010) and North (2010) Wing Extensions, and modification of the South Intermediate Wing (2010) and North Wing (1997) being considered significant recent events. The modifications have involved multiple types of construction types (reinforced concrete frames, steel frames, concrete overlay, timber frames etc.). Due to the modifications and original structure, the building can be considered extremely complex when calculating its seismic capacity.

The new sections (post 2008) consist of steel framed structures supporting timber trussed or raftered roofs with a heavy tile roof. Walls are a mixture of timber frame, reinforced concrete masonry and cast insitu concrete supported by slab on grade foundations. Mid-floors consist of concrete precast units with a concrete topping and timber framed sections. The basic lateral load resisting elements in both directions for the new sections are steel portal or braced frames and reinforced masonry shear walls/reinforced concrete frames.

The South Intermediate Wing (i.e. Tarawera Gallery) alterations can be considered a seismic retrofit due to the installation of new steel braced frames along the external walls. No Seismic gap was constructed between this area and the atrium.

The building has had several different uses throughout its history and is currently used as the Rotorua Museum of Art and History with over 140,000² visitors per year. It is considered to be an important level 3 building and has Heritage 1 status with both national and international significance.

GDC Consultants have conducted limited site survey, destructive testing, concrete scanning and investigation of selected structural elements to facilitate the assessment process in addition, to the review of available files.

The building would have been originally designed and constructed to the applicable loading and material design standards of the time. There was no provision for earthquake loading at the time of the original construction. These standards have been revised over many times since then.

² (Johnston 2016)

Site conditions and Geology

Cheal Consultants were engaged to provide geotechnical reporting for the museum.³ They have advised that the site is, in general, underlain by Holocene river deposits comprising of alluvial gravel, sand, silt, mud and clay with local peat. It was reported that the site is classified as a subsoil class 'D' and that there is minimal liquefaction potential.

Soil bearing capacity values were provided for structural modelling. The surrounding area is characterised by geothermal activity but no specific geothermal hazards relevant to the current assessment were reported. However, it is noted that the environment has caused extensive corrosion to nailed connections and degradation to the unreinforced concrete structure.

In general terms, no geotechnical or natural hazards were identified by Cheal which significantly affects the seismic rating of the building.

Importance Level

The seismic rating is based on an Importance Level 3 (IL3) building classification, in accordance with AS/NZS 1170.0:2002.⁴ An importance level of 3 building consequence of failure is considered "High consequence for loss of human life, or very great economic, social or environmental consequences".

Assessed Seismic Ratings

The results of our Detailed Seismic Assessment indicate the building's seismic rating to be **19% NBS (IL3)** assessed in accordance with the MBIE publication "*The Seismic Assessment of Existing Buildings, Technical Guidelines for Engineering Assessments*⁵ (July 2017)".

This is the minimum rating which is governed from the Intermediate South Wing, the remaining areas in isolation (original bathhouse, new north wing) are rated at 27% NBS (IL3) and the new South Wing is rated at 74% NBS (IL3). Please note that the new North Wing Extension rating is governed by the adjacent Northern Wing rating.

Our assessment identified the following Critical Structural Weaknesses (CSW) governing the seismic rating of the building:

- **Intermediate South Wing** - Out of plane capacity & deformation of top chords beams in central truss in Intermediate South Wing. The top chord of the truss is likely to undergo significant deflection under a severe earthquake event and roof seating will be lost.
- **Original Bathhouse Areas** - The out of plane capacity of the unreinforced concrete walls at the junction of the central Atrium section and Intermediate South Wing/Intermediate

³ (Cheal Consultants Limited 2017)

⁴ (Cheal Consultants Limited 2017)

⁵ (MBIE 2016)

North Wing and the unreinforced concrete wall at the junction of the North Wing and new North Wing Extension.

- Note, if the building had the existing roof replaced with a light weight equivalent, the overall NBS% would remain unchanged for the original bathhouse section due to the above factor being the governing weakness.

In addition to the above CSW, the following potential Structural Weaknesses (SWs) were also identified as described below.

- Reid Bar capacity in the new South wing due to non-ductile behaviour
- The pull-out capacity of timber stringer connecting rafters to unreinforced concrete gable end walls
- Shear capacity of external mortise and tenon timber wall joints for in plane loading for selected walls
- The shear capacity of the rafters to top plate where severe corrosion of nailed joints has occurred
- Structural integrity of rafters which show advanced decay from moisture, in North Wing roof & North Intermediate roof (see Prendos report).
- Structural integrity of valley beam which shows advanced decay from moisture (valley between North Wing and North-East Wing roofs (see Prendos report).
- The out of plane capacity of the concrete nib walls.
- Foundation pads below the unreinforced concrete walls running in the North-South direction in the Atrium
- The central portal truss in the Intermediate South Wing has deflection incompatibly in the north-south direction.

The following secondary structural and non-structural aspects were considered in the assessment of the seismic rating:

Four staircases were assessed in accordance with MBIE practice note 13 in response to concerns about stair collapse and damage observed following the February 2011 Christchurch earthquake. The staircases in the Atrium (2) and North Wing (access to viewing platform) were considered to be potentially non-functional after a severe earthquake event due to the collapse of the adjacent unreinforced concrete walls. The staircase in the new South Wing is of timber frame construction and is considered to remain functional after an earthquake event.

It is also noted that the timber staircase that provides access to the upper viewing platform staircase (North wing) does not appear to meet current standards and requirements in respect of minimum dimensions for a designated escape route for fire. It is recommended that a fire engineer confirms these technical aspects where relevant.

Due to the building being used as a museum with highly valuable exhibits, consideration must

be given to non-structural damage. This needs to be considered during retrofit stage to determine to what level of damage is acceptable.

As part of the assessment we also note the following for consideration:

- Due to the age of the building, architectural detailing and surrounding geothermal environment, the building has suffered significant deterioration which affects the DSA result. For example, the nailed connections between the roof rafters and supporting structure are severely corroded in some locations. This in turn creates a structural weakness for earthquake loading and lower capacity associated with gravity and wind loads. In addition to this, numerous gravity supporting timber members in the roof were found to be severely deteriorated and in need of replacement.
- In the long term, the maintenance of the structure must be seriously considered and undertaken to maintain the current level of seismic performance.
- A review of the current live load capacity and ability of the existing unreinforced concrete floor. The result of this investigation is that this section of building is limited to a live load of 4KPa and the placement or movement of statues is carried out under supervision of an engineer. If no propping is carried out, the maximum statue load of 1500kg is recommended, spread over a minimum 2m² area.
- The new southern wing floor has been designed for a 450kg point load and live load of 4KPa.⁶
- A review of the lift pit regarding the current water/mud infiltration. This may have been caused by damage or non-performance of the water/gas proof membrane installed.
- A review of the Sigma 2010 seismic assessment report⁷ was carried out which rated the building at 35-40%. This apparent difference comes about primarily because it does not appear that the out of plane effects of earthquake loading has been accounted for.

Building Grade and Earthquake Prone Status

The museum is classified as a Grade E building following the NZSEE building grading scheme. Grade E buildings represent a relative risk to occupants 25 times greater than expected for a new building, indicating a very high exposure to risk.

A building with a seismic rating less than 34%NBS is considered to be an Earthquake-Prone Building (EPB) in terms of the Building (Earthquake-Prone Buildings) Amendment Act 2016.⁸ A building rating less than 67%NBS is considered by the New Zealand Society for Earthquake Engineering to be an Earthquake Risk Building (ERB). The Rotorua Museum Building therefore meets the requirements to be categorised as an Earthquake Prone Building.

⁶ (Sigma Consultants Ltd n.d.)

⁷ (Sigma Consultants Ltd 2010)

⁸ (Legislation 2016)

Seismic Retrofit Options

The Rotorua Museum is a salient part of the culture and landscape of New Zealand, and it is vital that its important aspects are identified prior to any strengthening work. In addition, all work shall be undertaken after consultation with all affected stake holders.

Options provided for retrofitting the building to a minimum of 67% NBS (IL3) will aim to reconcile the engineering goal of seismic strengthening of the buildings with the architectural goal of ensuring that its historic and aesthetic qualities are retained.

Please refer to appendix E to H for concept plans. The list of items below is a general overview of all strengthening options.

- Improvement of out of plane strength of unreinforced concrete walls - this can be done by the removal of walls and installation of light weight equivalent or installing a steel lattice structure to support the walls.
- Installation of counterforce walls adjacent to unreinforced concrete walls. This can be in the form of steel braced frames or upgrade of existing concrete walls.
- Installation of central internal horizontal truss at ceiling level (above corridor) in the Intermediate South Wing (Tarawera Gallery).
- Installation of glass fibre overlay to basement soffit of original bathhouse sections.
- Fixing of deteriorated timber elements and associated fixings in roof space of original bathhouse sections.
- Installation of diagonal members above ceiling joists to create effective roof diaphragms in original bathhouse sections.
- Upgrade of selected internal and external walls in the original bathhouse sections. This would involve the installation of steel plates to improve stud to bottom/top plate connections.
- Extension of selected footings in Atrium.
- Installation of steel sleeve to reduce overturning effects in concrete nib walls.

Temporary Opening of South Intermediate wing (Tarawera Gallery)

In order to achieve 34% NBS (IL3) and open the South Intermediate wing (Tarawera Gallery), a temporary propping solution could be installed in the central atrium section. This would involve the installation of a steel frame lattice to the unreinforced concrete walls and propping back to ground level (refer appendix I concept plans). In addition to this, two steel braced frames would be installed in the location of the current partition walls located in the main corridor. These would extend down to ground level. Temporary fencing would be required in front and back of the museum to stop visitors accessing areas to the reminder of the earthquake prone building. The above would require specific engineering design as necessary.

The central truss top chords would need to be horizontally restrained to prevent out of plane buckling failure and to reduce deflection to an acceptable limit. This could be achieved by horizontal steel struts between the top chords with diagonal cross bracing between the struts to create a truss.

Recommended Next Steps

We recommend that the consideration is given for the following next steps:

- In accordance with the requirements of the Building (Earthquake-Prone Building) Amendment Act, effective 1 July 2017, we recommend that the building be issued with an Earthquake-Prone Building notice.
- Given our investigation has identified that the museum structure limits the building's seismic rating to **19% NBS (IL3)**, we recommend that all stakeholders are notified of the seismic rating and all necessary signage is installed.
- Carry out specific engineering design of the temporary propping and truss top chord strut restraints/cross bracing option to allow the South Intermediate Wing (Tarawera Gallery) to be opened to the public with an acceptable level of risk to the Council.
- Development of concept retrofit options to allow for budget costings.
- Liaison with all stakeholders on available options.
- The scope of works does not include a seismic assessment of non-structural items and attachments such as mechanical plant and services plant. We would recommend a survey of these items be conducted if the building is reopened prior to strengthening being carried out.
- A fire engineer to comment on timber stairs to north wing viewing platform in respect of escape route requirements.

1. Introduction

GDC Consultants Limited have been commissioned by RLC to undertake a DSA of the building located at Oruawhata Drive, Government Gardens in Rotorua. Prior to this assessment, GDC Consultants have conducted multiple sub investigations to facilitate the process. A summary of the sub investigations can be found in table 1 below.

Table 1 – Summary of Results in Sub Investigations

No	Key Findings	Implications
Preliminary Investigation report October 2016 Visual Inspection of cracks in basement floor in New South and new North wing.	Upward movement of 1-4mm of some cracks in new South wing basement.	Indication of upward pressure on slab from either gas, hydro or upward soil movement. Further investigation required.
Rapid Response Assessment 15 th November 2016 Post Kaikoura Earthquake	Extensive cracking of soffit of ground floor slab. Cracking up to 2.5mm wide 3mm offset.	Reduced shear and flexural capacity of slab. Further investigation required.
Crack survey Original building (1906) Visual assessment of cracks in basement area. December 2016	67 major cracks (greater than 2mm width or settlement) observed. Increase of 41 major cracks since 1996 Kerslake and Partners report.	Reduced Capacity of unreinforced concrete slab in terms of flexure and shear capacity i.e. ability to resist gravity and transient loads. Load calculation assessment to be carried out as part of DSA.
As built factual information report for stage 1A January 2017 Identification and review of all available information	Large amount of information available through Council OmTrak System. However, large number of items to be verified and confirmed onsite.	Preliminary identification of critical structural weaknesses has found the following principal hazard areas: In-plane flexural capacity of the timber framed walls. Attention to high walls in the Bath House and Intermediate North Wing.

As built factual information report for stage 1A (Cont.) January 2017 Identification and review of all available information		• Out of plane flexural capacity of timber framed walls. • Out of plane flexural capacity of unreinforced concrete nib and high-level walls • In-plane capacity of basement concrete perimeter walls. • Ground floor slab to perimeter wall connection shear capacity. • Flexural strength of concrete floor in vertical direction for potential ground settlement associated with seismic event.
Invasive test report for stage 1B May 2017 Onsite destruction testing and investigation of key connections and elements	The joints of timber walls to concrete nib walls, floor to wall connections, and roof to wall connections is now understood by undertaking these invasive investigations. Seismic gaps from original plans have been verified. Timber and concrete properties assessed from laboratory testing.	A more accurate assessment of the actual seismic strength of the building can be undertaken.

1.1 Scope of Assessment

The purpose of this Detailed Seismic Assessment is to establish the likely seismic rating of the Museum Building and, if necessary propose conceptual seismic retrofit options to achieve a level of seismic risk acceptable to the RLC. Our scope of work includes:

- A review of GDC rapid response and crack survey information;
- A review of GDC stage 1A Asbuilt factual information report;
- A review of GDC stage 1B invasive testing report information;
- A review of 3D Asbuilt model;⁹
- A review of Prendos timber deterioration report;¹⁰
- A review of Cheal geotechnical investigation report;
- Multiple building inspections to confirm structural layout and load paths;

⁹ (As Built Model 2017)

¹⁰ (Prendos New Zealand Limited 2017)

- Research into similar type buildings and seismic performance of these structures in part earthquakes; ¹¹
- An evaluation of the overall seismic rating of the building based on the Simple Lateral Mechanism Assessment (SLaMA) methodology as described in The Seismic Assessment of Existing Buildings, Technical Guidelines for Engineering Assessments (Revised Draft – 10 October 2016); Additional modifications where made to this method due to the complexity of building.
- A commentary on the attributes of key building features such as stairs, exterior cladding elements and the like, and their associated seismic risk;
- Discussion of potential retrofit options and NBS percentage if roof was changed to light weight equivalent;
- A summary of the findings of our assessment and general recommendations for regarding further actions.

Our assessment presents the seismic rating in terms of a percentage of New Building Standard, typically referred to as %NBS.

In addition to the DSA, the following items were also reviewed:

- The gravity load carrying capacity of the existing unreinforced concrete floor structure;
- Condition assessment of roofing members in the original bathhouse section in conjunction with Prendos New Zealand Limited (Prendos);
- New South Wing lift pit regarding current leaking.

Regulatory Environment and Design Standards

Earthquake-Prone Buildings (EPBs) are defined under Section 122 of the Building Act 2004 as buildings whose ultimate capacity will be exceeded in a moderate earthquake and would likely result in injury, or death, or damage to any other property. A moderate earthquake is defined as approximately one-third as strong as the earthquake shaking assumed in the design of a new building when designed using the current version of AS/NZS 1170:2002.

Using Seismic Assessment of Existing Buildings, July 2017 (the Guidelines) terminology, a building that fails to achieve 34% of New Building Standard (%NBS) is categorised as Earthquake-Prone. The Guidelines also define a building achieving greater than 33%NBS, but less than 67%NBS as Earthquake-Risk. The New Zealand Society of Earthquake Engineering (NZSEE) recommend a minimum target strengthening level of 67%NBS.

The Government, under the Ministry of Business, Innovation and Employment (MBIE) has recently released guidance on the implementation of the changes to be implemented under

¹¹ (Buchanan, et al. 2011) (Langenbach, From “Opus Craticum” to the “Chicago Frame”: Earthquake-Resistant Traditional Construction 2007) (Griffith 2011)

the Building (Earthquake-Prone Buildings) Amendment Act, which has become effective in July 2017.

Once a building has been confirmed as Earthquake-Prone, strengthening work or demolition must be carried out within 12.5 years as per the Building Amendment Act.

The Amendment Act aims to better target districts, buildings and parts of buildings that pose the greatest risk based on knowledge gained from recent earthquakes, both here in New Zealand and overseas. Under this Amendment Act, the Rotorua area is designated as a medium seismic risk area.

Based on this, Figure 2 below, from MBIE defines the required assessment and remediation timeframes under the Amendment Act.

Seismic risk area	TAs must identify potentially earthquake-prone buildings within:		Owners must strengthen or demolish earthquake-prone buildings within timeframes below (from the date the EPB notice is issued):	
	Priority	Other	Priority	Other
High	2.5 years	5 years	7.5 years	15 years
Medium	5 years	10 years	12.5 years	25 years
Low	n/a	15 years	n/a	35 years

Figure 2: Time frames for identification and remediation of earthquake prone buildings under the Building Amendment Act (effective July 2017)

It is proposed that “Priority” buildings be prescribed in the act as hospitals, emergency and education facilities as well as those buildings with unreinforced masonry that could fall in an earthquake onto routes with sufficient traffic to warrant making these buildings a priority. Local Councils may also define “Priority” buildings through public consultation.

It is important to recognise that the %NBS rating is largely concerned with structural strength, while modern design standards also aim to impart a degree of resilience, or toughness, to a structure and achieve satisfactory performance in smaller (serviceability level) earthquakes.

Buildings designed in accordance with the New Zealand Loading Standard (AS/NZS 1170:2002) and the relevant material design standards are expected to present a low risk of collapse, even when subject to seismic shaking incrementally larger than that specified in the Loading Standard.

It is considered impractical and unaffordable to design every building to withstand the largest earthquake imaginable. Consequently, when designing structures for natural hazards, the New Zealand Loading Standard adopts a probabilistic approach that takes into account the exposure hazard at a given location in conjunction with the building's importance level. Thus, the Loading Standard may be said to adopt a risk management approach in setting the loading levels that a given building is required to withstand.

For normal use buildings (e.g. offices), the “design” earthquake load is set at the 1 in 500-year return period seismic event. This scale of event has, approximately, a 10% probability of exceedance over the assumed 50-year life of a building.

2. Detailed Assessment

2.1 Building and Site Description

With reference to the 'As built factual information report for stage 1A' and 'Invasive test report for stage 1B' completed by GDC Consultants, dated January 2017, the building has been examined and researched to identify the primary structural systems. Refer to appendix A for the general layout of the different building sections.

A specific description of the building sections is presented below:

Table 2 – Building Description

New South Wing	
Building	Description
Number of Storeys	Two distinct areas – Area 1 – 2.5 stories (basement + ground floor + mezzanine inside roof space) Area 2 - 4 stories (basement, 1 st floor, 2 nd floor and plant room)
Approximate Gross Floor Area(m ²)	700
Construction Period	2010
Current Use	Museum
Number of uses per year	140,000
Importance Level (IL)	IL3
Heritage Status	Historic Place Category 1 (No. 141)
Structural Alterations	- To preserve heritage value, an area of the original 1906 building was left in place (external wall on western gable face and adjacent external wall perpendicular in the east-west direction back to the edge of the South Intermediate (Tarawera Gallery) section, otherwise this building can be considered a new build in terms of seismic assessment.
Basement	A mixture of cast insitu reinforced concrete walls, reinforced concrete masonry walls and reinforced concrete columns/beams.

Gravity Load Resisting System	Gravity Load Resisting System Comprises: - Heavy ceramic tile roofing supported on timber rafters. Timber rafter system supported by steel frame structure which extends down to 1st floor level. Some reinforced concrete frames with masonry infill extend to roof level in the central section of the building. - 1st floor level is suspended concrete flat slab with prestressed precast Stahlton ribs sitting on either reinforced concrete masonry walls, cast insitu reinforced concrete walls or reinforced concrete beams. The beams are supported by reinforced concrete columns. - Upper levels are timber joists spanning to steel support members.
Lateral Load Resisting System	In both principal directions, the seismic loads are resisted primarily by the steel frame/diagonal bracing structure with selected concrete masonry shear walls (masonry shear walls are infill walls between concrete frames in central section of building) to 1st floor level. Below this there are concrete masonry and cast insitu concrete walls which provide the lateral load resisting system.
Roof System	The roof comprises: Heavy ceramic tile roofing supported on timber rafters
Floor System	1st floor level is suspended concrete precast Stahlton prestressed ribs sitting on concrete beams and a mixture of cast insitu concrete walls and reinforced concrete masonry walls. Upper levels are timber joists spanning to steel support members.
Foundation System	Reinforced concrete strip and pad footings
Geotechnical Considerations	Class D as per Cheal Geotechnical Report
Adjacent Buildings	The Intermediate South Wing (Tarawera Gallery) is to the north of the new South Wing. There has been a seismic gap created between these two sections of 50mm. It is unclear how this was achieved at the western interface of the two buildings and some load transfer may occur at this location.

Intermediate South Wing (Tarawera Gallery)	
Building	Description
Number of Storeys	Two (Basement + ground floor level)
Approximate Gross Floor Area(m ²)	Ground Floor – 280 m ²
Construction Period	Original construction circa 1906.
Current Use	Museum (Tarawera Gallery)
Number of uses per year	140,000
Importance Level (IL)	IL3
Heritage Status	Historic Place Category 1 (No 141)
Structural Alterations *note, many isolated activities and alterations have taken place, this is a brief overview of significant changes	From our site investigations, available as built drawings and research we established the following significant changes: - In 2010 there were major alterations to this area. The existing timber scissor roof trusses and external walls were left in place and all internal structure above the ground level floor was removed. Two steel trusses were constructed in the middle of the building to support the roof trusses. Between these truss bottom chords, a horizontal steel truss was created. - Steel frames with Reid bar bracing were installed at the external walls and junctions between the Atrium and new South Wing. These steel frames go through the floor down to ground level and are supported on new reinforced concrete foundation pads (note, at the location they penetrate through the floor an oversized penetration was made, approximately 100mm each side of steel column, this gap is filled with polystyrene. However, the additional 100mm thick concrete topping placed on top of the ground floor, has been cast around the steel columns, effectively providing floor strut action between the columns. - Two new internal walls (approximately 6m high, constructed of 140x45 studs) run parallel to the new trusses. These are held down with hold down anchors at approximately 1m crs.

Structural Alterations (Cont.) <i>*note, many isolated activities and alterations have taken place, this is a brief overview of significant changes</i>	- They are lined with customwood and glue and panel pin fixed (15 gauge). They are approximately 10m long each side. The connection at ceiling level has not been verified. - New timber framed walls were also installed next to the exterior and Atrium/South Wing steel work. This was done to hide the steel framing. Construction type appears to be 140xx45 framing at 600crs lined with Gib board lining. - The existing trusses had 140x45 extensions nailed to them (on bottom chord) and then 45x20 ceiling battens attached, then 17mm plywood and a 13mm fibrous plasterboard overlay. The ceiling was not constructed as a diaphragm. - A new 100mm overlay with 665mesh was installed throughout the Tarawera Gallery in 1967.
Basement	Unreinforced pumice concrete columns and foundation walls supporting 1906 construction Reinforced concrete pad foundations supporting new steel structure (2010)
Gravity Load Resisting System	Gravity Load Resisting System Comprises: - Heavy ceramic tile roofing supported on timber sarking which spans to timber scissor trusses - The trusses span to the external original walls and internally to two new steel trusses - Original 1906 external timber frame walls to unreinforced concrete nib walls, through to external unreinforced concrete foundation walls. The external timber frame walls consist of studs at 650-850mm.crs with mortise and tenon joints with a pumice infill concrete of approximately 50mm. - The timber trusses are supported by steel columns (part of bracing frame structure) which project to ground level and supported by reinforced concrete pads
Gravity Load Resisting System	- Internal unreinforced concrete arched/vaulted floor spans to unreinforced concrete columns then unreinforced pad footings.
Lateral Load Resisting System	In both principal directions, the seismic loads are primarily resisted by the steel framed structure which has internal Reid bar braced bays. Portal action will be developed on the central truss frames in the north-south direction.

Lateral Load Resisting System (Cont.)	In the north-south direction a secondary system of the 6m high partition walls (2, parallel to steel trusses) lined with MDF will also provide limited bracing capacity, even though this was not the design intent. The original 1906 external walls also provide bracing capacity as do the timber framed walls adjacent to the steel frames. Due to the differing stiffness's this creates a complex model for resisting earthquake forces. In the east-west direction there is a secondary system of timber framed internal walls adjacent to the steel frames. In the horizontal direction, the loads in the east-west direction are transferred by the horizontal steel truss, however this not at the same level as the ceiling so its effect is limited. Limited diaphragm action will be achieved by the ceilings lined in plywood due to the pitched nature of the scissor trusses. In the north-west direction, as mentioned above the ceiling will provide limited diaphragm action and at the roof plane level the sarking will provide diaphragm action to transfer lateral loads to the bracing lines. The suspended ground floor section is laterally resisted by the external and internal unreinforced concrete walls.
Roof System	The roof comprises: - Heavy ceramic tile roofing supported on timber sarking which spans to timber scissor trusses
Ground Floor System	The ground floor system is an unreinforced concrete slab arching in both directions which is supported on unreinforced concrete columns and walls with a 100mm overlay with 665 mesh installed in 1967.
Foundation System	Unreinforced concrete pads support columns. Perimeter internal and external concrete walls are supported by unreinforced strip footings.
Geotechnical Considerations	Soil Class D as per Cheal report
Adjacent Buildings	To the north of the building is the Atrium, this is integrally connected through the external walls and end truss of the two gable ends. At the south of the building is the new South Wing extension. There has been a 50mm seismic gap created internally throughout but there appears to be a connection still at the eastern interface (this was due to the original external walls being left in place in the construction of the new South Wing extension).

Central Atrium Section	
Building	Description
Number of Storeys	Three (Basement, ground & mezzanine)
Approximate Gross Floor Area(m ²)	Ground Floor – 345 m ² Mezzanine – 275 m ² (Excluding void area)
Construction Period	Original construction circa 1906.
Current Use	Museum
Number of uses per year	140,000
Importance Level (IL)	IL3
Heritage Status	Historic Place Category 1 (No 141)
Structural Alterations *note, many isolated activities and alterations have taken place, this is a brief overview of significant changes	From our site investigations, available drawings and research we established the following changes: - There is anecdotal evidence that the main turret was removed after the 1931 Napier Earthquake. It however can be seen that the turret has been strengthened at some time with the installation of 8 steel rods which are tensioned at each end and fixed into the supporting structure. - Installation of new 30mm reinforced concrete floor across Atrium (original floor was cut down and overlay installed). - Infilling of central bath to create level floor area.
Structural Alterations (Cont.) *note, many isolated activities and alterations have taken place, this is a brief overview of significant changes	- Installation of mezzanine dance floor circa 1964, then removal and reinstatement to match the original in 1998. - Addition of timber partition walls on the mezzanine floor at the east end, to form office space. - Application of spray on Renderroc concrete from basement level to increase overall thickness of slab in multiple slab locations.
Basement	Unreinforced pumice concrete columns and foundation walls supporting 1906 construction.

Gravity Load Resisting System

Gravity Load Resisting System Comprises:

- Heavy ceramic tile roof supported on timber sarking supported on king post/hammerbeam timber trusses which span the width of the atrium (north-south direction). Trusses are supported on the north and south internal walls. Truss timber is Kauri.
- North and south unreinforced concrete walls to truss corbel height (i.e. to the apex height of the adjacent north and south gallery gables). The remaining height of the wall up to the ceiling is constructed of timber framing with concrete infill panels. At basement level, these walls are supported by unreinforced concrete foundation walls.

External timber frame walls on the east and west side to unreinforced concrete nib walls, through to external unreinforced concrete foundation walls. The external timber frame walls consist of 200x150mm Totara timber studs at 650mm to 850mm crs. with mortise and tenon joints, and a pumice infill concrete of approximately 50mm.

- Timber truss frames at the east end of the roof are supported on the outer timber framed walls and their mid-supports are supported by internal walls below.
- Steel beam and column structure support timber joist mezzanine floor. Floor joists seated and embedded into the north and south concrete side walls.
- The central turret is constructed of 8 timber posts projecting from its truss/beam base support. Each timber post has a tensioned steel rod extending full height to tie the turret down to its supporting beams.
- Internal unreinforced concrete arched/vaulted ground floor spans to unreinforced concrete columns then unreinforced pad footings.

Lateral Load Resisting System

Lateral Load Resisting System Comprises:

- In the north-south direction the seismic loads are resisted by the in-plane action of the timber mortise and tenon jointed frames of the external walls which have diagonal cut in braces (compression only). The load is then transferred to the concrete nib walls and through into the foundation walls. Also in the north-south direction, seismic loads will be

Lateral Load Resisting System (Cont.)

- resisted by the out of plane action of the concrete side walls.
- The building is integrally connected to the Intermediate North Wing and Intermediate South Wing. Therefore, some load transfer will occur at roof and ceiling level between these sections.
- In the east-west direction the primary lateral load resisting elements are the unreinforced concrete walls. These walls transfer the loads down to ground level. In conjunction with this, there are sections of mortise and tenon jointed frames. These frames are overlaid internally with lath and plaster.
- The main turret is braced by a series of tensioned rods
- In the horizontal direction, there is a tongue and groove timber diaphragm to distribute lateral loads fixed to the exposed timber trusses at ceiling level.
- Above the eastern side mezzanine floor where there are no trusses there are a series of diagonal timber beams to transfer lateral loads. At roof plane level, the sarking will provide diaphragm action to transfer lateral loads to the bracing lines.
- The suspended ground floor section is laterally resisted by the external and internal unreinforced concrete walls.

Connections include the following:

- The timber trusses have pinned bolt and plate connections at member joints. The ends of the trusses are bolted into the supporting side walls.
- The mezzanine floor joists are socketed into the north and south concrete walls, at an embedment depth and height of approx. 300mm. At the other end, the floor joists are connected to the supporting steel beams by bolted plates.
- Sarking and roof trusses are connected using nail joints.
- Rafters connected to truss intermediate beams with nails.
- Timber wall framing connected by tenon and mortise joints.
- Timber wall baseplate connected to concrete nib wall with cast in anchors at 900/1200mm spacing.
- Corner wall timber stud connected to concrete wall by bolts at 1000mm spacing.

Roof System	The roof comprises: - Heavy ceramic tile roofing and 25mm thick Rimu sarking supported on timber rafters and trusses.
Floor System	The ground floor system is an unreinforced concrete slab arching in both directions which is supported on unreinforced concrete columns and walls. The mezzanine floor is timber joists supported by a beam and column arrangement.
Foundation System	Unreinforced concrete pads support columns. Perimeter internal and external concrete walls are supported by unreinforced strip footings.
Geotechnical Considerations	Soil Class D as per referenced Cheal report.
Adjacent Buildings	The building is integrally connected to the Intermediate North Wing and Intermediate South Wing (Tarawera Gallery). Therefore, load transfer will occur at roof and ceiling level between these sections during an earthquake event.

Intermediate North Wing	
Building	Description
Number of Storeys	Partly Two (Basement & ground floor level) Partly Three (Basement, ground & 1 st floor)
Approximate Gross Floor Area(m²)	Ground Floor – 282 m ² 1 st floor Classroom – 124 m ²
Construction Period	Original construction circa 1906.
Current Use	Museum/Cafeteria
Number of uses per year	140,000
Importance Level (IL)	IL3
Heritage Status	Historic Place Category 1 (No 141)

Structural Alterations

*note, many isolated activities and alterations have taken place, this is a brief overview of significant changes

From our site investigations, available drawings, and research undertaken, we established the following significant changes:

- Application of spray on Renderroc concrete from basement level to increase overall thickness of slab in multiple slab locations.
- Installation of gravity timber frames in basement to support the unreinforced concrete floor.
- Original public Rachel bath has been covered over with timber frame and ply/boards. This is situated at the south end of the café floor.
- The west wall along the café has had plasterboard installed over the original wall's internal lining.

Creation of café, 1st floor kitchen in the mid 1960's, then a third gallery in the 1980s, then demolition of the third gallery circa 1998 to create the current café and active theatre area. Steel cantilever posts (propped on floor) where installed to create the open café area, fixed down into new reinforced concrete foundations.

- The creation of the "active theatre" on the eastern side. This consisted of constructing new concrete foundations, columns and floor to support the existing floor and structure above this room.

Basement

Unreinforced pumice concrete columns and foundation walls supporting 1906 construction

Gravity Load Resisting System

Gravity Load Resisting System Comprises:

- Heavy ceramic tile roofing supported on timber sarking which spans to timber trusses. The trusses span approximately half the east-width direction to create a twin gable.
- On the external edges of the building the trusses are supported on external timber frame walls consisting of 200x150mm Totara timber studs at 650mm to 850mm crs.
- with mortise and tenon joints, and a pumice infill concrete of approximately 50mm. Internal wall lining is lath and plaster. These walls are supported by unreinforced concrete nib walls which are in turn supported by the unreinforced concrete foundation walls.

Gravity Load Resisting System (Cont.)

- Internally the trusses are supported by timber framed walls which are lined in lath and plaster which land on the unreinforced concrete floor with either columns and walls below to ground level.
- Ceilings are supported on timber ceiling joists which span to internal & external walls. The ceilings have lath and plaster overlay.
- As per the structural alterations section, the classroom/reception room above the active theatre is supported by a series of steel beams and columns. Beneath the active theatre there is a new reinforced concrete floor, columns and foundation pads. In the cafe area, there is a series of cantilever steel columns and steel beams which support the roof to ground level.

Lateral Load Resisting System

In the north-south direction the seismic loads are resisted by the timber mortise and tenon jointed frames of the external walls which have diagonal cut in braces (compression only). The load is then transferred to the concrete nib walls and through into the foundation walls. In addition to this there are the internal timber lath and plaster walls which transfer the load to the unreinforced concrete midfloor and then into the unreinforced foundation walls.

At the café section, there are two parallel rows of four (4) cantilever steel columns which are propped at ground floor level by the unreinforced concrete slab.

The building is integrally connected to the atrium and north wing so load transfer will occur at roof and ceiling level between these sections.

In the east-west direction the primary lateral load resisting element is the unreinforced concrete walls (2) at the intersection of the atrium and north wing. In addition to this there are two (2) internal timber framed, lath and plaster walls (in the corridor between the active theatre and the toilets) which provide some lateral resistance. These loads are transferred to ground level through unreinforced foundation walls.

In the horizontal direction at ceiling level there are lath and plaster ceilings which provide some diaphragm action. Under earthquake loading parallel to the roof gables the roof sarking provides a load path for lateral loads, however this has been severely degraded in some areas, due to timber moisture decay and advanced corrosion of nail connections.

Lateral Load Resisting System (Cont.)	The suspended ground floor section is laterally resisted by the external and internal unreinforced concrete walls. Connections include the following: - Roof end rafters are connected to the concrete gable walls with 12mm diameter bolts at 1000mm spacing. - Sarking and roof trusses are connected using nail joints. - Roof trusses are nailed to the outer walls top plate. - Timber framing connected by tenon and mortise joints. - Timber wall baseplate connected to concrete nib wall with cast in anchors at 1200mm spacing. - Corner wall timber stud connected to concrete wall by bolts at 1000mm spacing.
Roof System	The roof comprises: - Heavy ceramic tile roofing supported on 25mm thick Rimu sarking spanning between timber trusses. Sarking and rafters have experienced advanced moisture decay and corrosion of nail fixings (see Prendos report). - Timber ceiling joists support a lath and plaster ceiling.
Floor System	The ground floor system is an unreinforced concrete slab arching in both directions which is supported on unreinforced concrete columns and walls. Sprayed RenderRoc concrete overlay has been applied from the ground level in multiple areas to increase the overall thickness of the floor.
Foundation System	Concrete pads support intermediate columns and are not connected. Perimeter internal and external concrete walls are supported by strip footings.
Geotechnical Considerations	Soil Class D as per referenced Cheal report.
Adjacent Buildings	The building is integrally connected with the Atrium and North Wing.

North Wing	
Building	Description
Number of Storeys	2.5 (Basement, ground, viewing platform)
Approximate Gross Floor Area(m ²)	Ground Floor – 500 m ² Viewing Platform – 43 m ²
Construction Period	Original construction circa 1906.
Current Use	Museum
Number of uses per year	140,000
Importance Level (IL)	IL3
Heritage Status	Historic Place Category 1 (No 141)
Structural Alterations	From our site visits, available drawings and research we established the following significant changes - The western wing of the existing structure was made open plan for gallery space. Original internal load bearing walls were removed and replaced by the installation of two (2) parallel beam structures (assuming steel). This supports the roof trusses above. A horizontal steel truss was installed between the two beams. - Application of spray Renderroc concrete from basement level to increase overall thickness of slab in multiple slab locations
Structural Alterations (Cont.)	- Installation of gravity timber frames in basement to support the unreinforced concrete floor. - Removal of original internal bath partition walls to create the Bathhouse Expedition Room. - Creation of viewing platform at top of the roof gable height. This is constructed in structural steel and has a midlevel floor above ceiling level.
Basement	Unreinforced pumice concrete columns and foundation walls supporting 1906 construction

Gravity Load Resisting System

Gravity Load Resisting System Comprises:

- Heavy ceramic tile roofing with supporting sarking spanning to timber rafters and trusses.
- Trusses in east and west wings span onto outer timber framed walls and onto internal timber walls (with the exception of the NW Gallery, where beams support the trusses).
- Central section of the North Wing roof is comprised of queen post trusses supporting the roof framing. The end supports of the trusses are embedded into the concrete walls on the north and south ends. The internal truss supports are the internal timber walls below, which in turn are supported by rows of concrete basement columns.
- Viewing platform supported on steel structure which is fixed on steel beams which sit on existing timber frame structure.
- Timber frame walls to concrete nib wall
- Concrete basement walls and concrete columns

Lateral Load Resisting System

In the north-south direction the seismic loads are resisted by the timber mortise and tenon jointed frames of the external walls which have diagonal cut in braces (compression only). The load is then transferred to the concrete nib walls and through into the foundation walls. In addition to this there are the internal timber lath and plaster walls which transfer the load to the unreinforced concrete midfloor and then into the unreinforced foundation walls/rows of basement columns.

The building is integrally connected to the intermediate north wing so load transfer will occur at roof and ceiling level between these sections.

In the east-west direction the primary lateral load resisting element is the unreinforced concrete walls (2) at the intersection of the North Wing and new North Wing Extension. In addition to these there are internal lath and plaster walls which provide lateral resistance. These loads are transferred to ground level through unreinforced foundation walls/columns.

In the horizontal direction at ceiling level there are lath and plaster ceilings which provide some diaphragm action. Under earthquake loading parallel to the roof gables the roof sarking provides a load path for lateral loads, however this has been severely degraded in

Lateral Load Resisting System (Cont.)	some areas (see Prendos report). The suspended ground floor section is laterally resisted by the external and internal unreinforced concrete walls.
Roof System	The roof comprises: - Heavy ceramic tile roofing supported on 25mm thick Rimu sarking spanning between timber trusses and rafters. Sarking and rafters have experienced partial moisture decay and corrosion of nail fixings (see Prendos report). - Timber ceiling joists support a lath and plaster ceiling
Floor System	The ground floor system is an unreinforced concrete slab arching in both directions which is supported on unreinforced concrete columns and walls. Sprayed Renderoc concrete overlay has been applied from the ground level in multiple areas to increase the overall thickness of the floor.
Foundation System	Concrete pads support intermediate columns and are not connected. Perimeter internal and external concrete walls are supported by strip footings.
Geotechnical Considerations	Soil class D as per Cheal report
Adjacent Buildings	To the south of the building is the intermediate north wing, this is integrally connected. To the north is the new North Wing Extension. This has a 50mm seismic gap between.

New North Wing	
Building	Description
Number of Storeys	2.5 (Basement, ground, mezzanine in roof space)
Approximate Gross Floor Area(m ²)	Ground Floor – 175 m ²
Construction Period	2008
Current Use	Museum
Number of uses per year	140,000
Importance Level (IL)	IL3
Heritage Status	Historic Place Category 1 (No 141)
Structural Alterations	No significant alterations known off or visible
Basement	Reinforced concrete masonry and cast insitu reinforced concrete walls.
Gravity Load Resisting System	Gravity Load Resisting System Comprises: - Heavy ceramic tile roofing with supporting sarking spanning to timber rafters and steel frame portals. - Steel portals are seating on the Reinforced concrete masonry internal wall and external cast insitu reinforced concrete walls
Lateral Load Resisting System	In the north-south direction the seismic loads are transferred through the roof plane by steel cross bracing down to the knee of the portal frame. From the portal knee, the loads are transferred to plywood timber shear walls on the external walls. In the central section, the loads are transferred into a horizontal steel strut and picked up by 4 vertical “cantilever posts” (cantilever action gained by connection to truss below. The load is then transferred into the truss which creates portal action with each end column. Due to Reid bar cross bracing being located at the ceiling level plane potential torsion can be transferred to the perpendicular end walls. At ground floor level, the lateral horizontal loads are transferred through the concrete floor diaphragm into the reinforced concrete masonry central wall and reinforced cast insitu external walls.

Lateral Load Resisting System (Cont.)	In the east-west direction the horizontal loads are transferred through the Reid bar cross bracing at ceiling level to the external plywood timber shear walls. The horizontal truss below the vertical truss can also transfer lateral loads but is limited by the capacity of the steel cantilever post connections capacity. At ground floor level the lateral horizontal loads are transferred through diaphragm action of the reinforced concrete slab out to the reinforced cast insitu external walls.
Roof System	The roof comprises: - Heavy ceramic tile roofing supported on timber sarking spanning to roof purlins which span to steel support structure.
Floor System	The ground floor system is Stahlton precast prestressed ribs landing on internal block wall and external cast insitu concrete walls. The internal masonry support detailing appears inadequate (small seating length available), further investigation required.
Foundation System	Reinforced concrete foundation footings
Geotechnical Considerations	Soil class D as per Cheal report
Adjacent Buildings	To the south of the building is the north wing. There has been a 50mm seismic gap created.

Ground Conditions and Site Description

The site is located within the Government Gardens area to the east of Rotorua central business district and is located on the east side of Oruawhata Drive. To the east of the building approximately 20m away is the Rotorua Energy Events centre. The surrounding area is characterised by geothermal activity: Sulphur Point in Lake Rotorua is located approximately 60m south from the southern extent of the building; the Polynesian Spa and the Blue Baths are located nearby.

The site can be considered generally flat with the elevation varied from the western to eastern side by approximately 3m. This has been formed by the construction of a basement foundation wall and backfill of earth to the western side of the building.

Cheal Consultants where engaged to provide geotechnical and hazard reporting for the museum (Geotechnical Factual Report – May 2017 and Geotechnical Interpretive Report-May 2017). They have advised that the site is, in general, underlain by Holocene river deposits comprising alluvial gravel, sand, silt, mud and clay with local peat, includes modern river beds.

The site can be considered to have two distinct periods in regard to ground bearing capacity. Cheal referenced a July 2009 Terrane Consultants Ltd (Terrane) report that stated:

- *“The foundations of the original part of the Museum buildings is underlain by highly variable, soft to extreme soft, soils to a depth of approximately 2.0 metres. The material contains cavities, some of which extend directly underneath the foundations. The soil would be classified as having a collapsible structure;*
- *The risk of local failure of the foundations is accentuated by the absence of a surface hardbar which would otherwise help to raft over the very soft soils;*
- *The building has previously been classified as being earthquake prone. The severity of the ground conditions further increases the susceptibility to earthquake shaking”*

Due to the above factors Terrane proposed, designed and completed ground improvement works as below:

- Original Bathhouse area – grout injection
- New North wing – digout and replacement of up to 1.5m below ground level with approved engineered fill material
- New South wing – digout and replacement of up to 1.5m below ground level with WHAP40

Cheal have classified the subsoil as class D and that there is minimal liquefaction potential.

Soil bearing capacity and subgrade modulus values were provided for structural analysis. The surrounding area is characterised by geothermal activity but no specific geothermal hazards were reported.

It can be seen from visual inspection that settlement of the original bathhouse section has occurred in localised areas of the building. This is one of the contributing factors that has caused the cracking in the basement slab. A check of vertical settlement following the Kaikoura earthquake (November 2014) was carried out by Asbuilt Ltd. RLC engaged Asbuilt to provide a measure of levels pre-and post-earthquake. The result of this assessment was that no significant movement occurred (within bounds of survey instrument accuracy).

Notable Structural Features

- Unreinforced concrete walls – There are four high level unreinforced concrete walls, one on the northern and southern side of the atrium, and one on the northern and southern side of the north intermediate wing. The original unreinforced wall between the intermediate and new south wing appears to have been demolished. This needs to be verified onsite.
 - Walls of up to 10.5m height with a base thickness of approximately 0.5 to 0.55m located at the interfaces between the different sections. Due to no reinforcement being present these walls have low seismic capacity under out of

plane loading.

- Heavy Tile Roof
 - The roof has a heavy tile roof which adds significant seismic mass to the building.
- Unreinforced concrete ground floor, basement and walls
 - All original concrete elements are unreinforced and constructed with pumice aggregate concrete. This has a low compression capacity (4 MPa tested).
- Lath and plaster ceilings
 - All internal ceilings apart from the above the central wing atrium (timber sarking) have lath and plaster overlay. This has limited ability to redistribute lateral loads.

Timber and Joint Deterioration

Prendos New Zealand limited was engaged by RLC to carry out limited invasive investigation of wall and roof framing in the central (atrium) section, internal north wing and internal wing. The investigation was to determine if deterioration from water or other causes has affected the timber structure and supporting connections. Refer to Prendos Report 'Roof Framing Deterioration Assessment June 2017'.

The following critical items were identified:

- The fibrous plaster cladding system which relies on paint coatings are now subject to widespread failure. This has led to crater ingress and significant decay of the timber framing.
- The clay tiled roof and metal valleys are allowing water ingress. Water ingress is widespread and is leading to significant damage and decay of timber framing and corrosion to nail fixings.
- The valley gutters are leaking and are causing decay.
- Due to the clay tile roof leaking the timber sarking has advanced rot and considered to affect all elevations.
- Structural integrity of rafters which show advanced decay from moisture, in north wing roof & north Intermediate roof.
- Structural integrity of valley beam which shows advanced decay from moisture (valley between north wing and north-east wing roofs.
- The construction defects and roofing failure as observed where tested, are repetitive throughout all elevations and similar damage to the timber and roof framing can be expected.

The effect of this on the DSA result is that the load path from the heavy tile roof has been severely compromised and causes a potential severe structural weakness.

Lift Shaft Leaking

in addition to the DSA, RLC asked a review of the potential issues and causes of the reinforced masonry walls leaking in the lift pit. GDC Consultants has reviewed available information from RLC regarding the lift pit from the Council OmTrak System (Refer Appendix B for reviewed information).

It appears the gas membrane HDPE was to be installed up the wall and welded to a channel at the lift pit-ground floor junction. The membrane was to be protected with 17mm marine grade plywood.

This membrane should be preventing any moisture flow into the lift pit area. It is noted that a lift pit a sump was installed for pumping out of water from inside the pit.

RLC is currently monitoring levels of water entering the lift shaft. The leaking has only become apparent following a heavy rainfall.

The specification states the membrane has a 50-year warranty and it is recommended that the installer, Permathene Earth solutions be contacted for comment and advise.

At this stage, the current NBS% the rating (structural integrity) is not affected. However, if the situation is not remedied or monitored, the masonry block reinforcing steel will eventually corrode causing spalling and reduced capacity of the wall.

2.2 Seismic Analysis and Assessment of Buildings

The DSA of the Rotorua Museum Building has been carried out based on the *Seismic Assessment of Existing Buildings, Technical Guidelines for Engineering Assessments (July 2017)*[2]. Recognising the different building sections structure the building has been split into three sections for seismic assessment. These are discussed in detail below in sections 2.2.1 to 2.2.5.

2.2.1. New South Wing, New North Wing

These parts of the building were constructed in 2012. They have been designed according to the current standards. Therefore, the Equivalent Static Method was used. This method is discussed in full within the Guidelines and summarised for information below.

The Equivalent Static Method was used in accordance with NZS 1170 Part 5, 2004 and the appropriate seismic actions have been applied accordingly. This approach defines a series of forces acting on a building to represent the effect of earthquake ground motion, typically defined by a seismic design response spectrum. It assumes that the building responds in its fundamental mode. The following parameters from AS/NZS 1170 were used to calculate the seismic actions of the buildings:

• Building importance level	3
• Design life	50 years
• Annual probability of exceedance for ultimate limit state	1 in 1000 years
• Local seismic hazard factor	0.24
• Building period (Etabs calculated)	0.4 sec
• Ductility (New South Wing)	1.25
• Ductility (New North Wing)	3
• Structural performance factor (New South Wing)	0.925
• Structural performance factor (New North Wing)	0.7
• Damping Ratio	5%
• Soil Class	D

Note that the use of Reid bracing throughout the new south wing building governs the use of 1.25 for the ductility factor, as the end connections of the Reid braces are nominally ductile. Plywood shear wall governs the ductility in new north wing.

The material properties assumed in the detail seismic assessment of the building were taken from the provided structural drawings and converted to probable strengths as per the guidelines. The values are listed below:

- | | |
|--|--------------------------|
| • Reinforcement strength (fy) | 324MPa (300MPa nominal) |
| • Reinforcement strength (fy) | 540MPa (500MPa nominal) |
| • Probable Concrete Compressive Strength | 45MPa (30MPa nominal) |
| • Probable Masonry Compressive Strength | 17.5MPa (12MPa nominal) |
| • Structural Steel Yield Strength | 345MPa (300MPa nominal) |
| • Soil Bearing Capacity | 225kPa (EQ Load Case) |

2.2.2 Intermediate South Wing

This part of the building was constructed circa 1906. However, major retrofit works have taken place alongside the construction of South Wing. The assessment of the structure was limited to the new retrofit lateral resisting system. It has been designed according to the current standards. Therefore, the Equivalent Static Method was used. This method is discussed in full within the Guidelines and summarised for information below.

The Equivalent Static Method was used in accordance with NZS 1170 Part 5, 2004 and the appropriate seismic actions have been applied accordingly. This approach defines a series of forces acting on a building to represent the effect of earthquake ground motion, typically defined by a seismic design response spectrum. It assumes that the building responds in its fundamental mode. The following parameters from AS/NZS 1170 were used to calculate the seismic actions of the buildings:

- | | |
|---|-----------------|
| • Building importance level | 3 |
| • Design life | 50 years |
| • Annual probability of exceedance for ultimate limit state | 1 in 1000 years |
| • Local seismic hazard factor | 0.24 |
| • Building period (Etabs Calculated) | 0.4 |
| • Ductility | 1.25 |
| • Structural performance factor | 0.925 |
| • Damping Ratio | 5% |
| • Soil Class | D |

Note that the use of Reid bracing throughout the building governs the use of 1.25 for the ductility factor, as the end connections of the Reid braces are nominally ductile.

The material properties assumed in the detail seismic assessment of the building were taken from the provided structural drawings and converted to probable strengthening as per the guidelines. The values are listed below:

- | | |
|--|-------------------------|
| • Reinforcement strength (fy) | 324MPa (300MPa nominal) |
| • Probable Concrete Compressive Strength | 45MPa (30MPa nominal) |

- Structural Steel Yield Strength 345MPa (300MPa nominal)
- Soil Bearing Capacity 225kPa (EQ Load Case)

2.2.3 Atrium, Intermediate North Wing, North Wing.

These parts of the building have been constructed in 1906. The original structures are largely unchanged apart from some localised internal alterations.

These structures have underlying complexity originating from the age, materials and principal structural schemes. The combination of stiff brittle bases and softer but still brittle superstructure limits the options of modelling the structure behaviour.

SLaMA method principles from the guideline are applied and a NBS% was derived.

The following structural features were considered:

- Different load resisting systems in each direction with different stiffness's and responses to earthquake loading:
 - in the north-south direction - a combination of timber framed walls with infill concrete panels, timber framed walls with lath and plaster overlay and unreinforced concrete nib walls.
 - in the east-west direction there is a combination of unreinforced concrete walls, timber frame walls with infill concrete panels, timber framed walls with lath and plaster overlay and unreinforced concrete nib walls.
- Vertical irregularity - the central atrium section is much higher than the adjoining sections
- Horizontal irregularity – the north wings have pop out gable ends on the eastern and western side
- Flexible roof diaphragms.

The following parameters from AS/NZS 1170 were used to calculate the seismic actions of the buildings:

- Building importance level 3
- Design life 50 years
- Annual probability of exceedance for ultimate limit state 1 in 1000 years
- Local seismic hazard factor 0.24
- Building period 0.4 sec
- Ductility Concrete Podium 1.25
- Ductility Timber Framed Panels with concrete infill 1.25

- Structural performance factor 0.925
- Damping Ratio 15%
- Soil Class D

The material properties assumed in the detailed seismic assessment of the building were taken as recommended in the Guidelines for timber and from onsite testing for concrete. The values are listed below:

- Reinforcement strength (fy) 324MPa
- Concrete Compressive Strength from Testing 4-6MPa
- Probable Masonry Compressive Strength 12MPa
- Structural Steel Yield Strength 300MPa
- Timber Totara(fb) 20MPa (Characteristic)
- Timber Totara(E) 6.4MPa (Characteristic)
- Soil Bearing Capacity 150kPa (EQ Load Case)

The SLAMA method system hierarchy is employed. Typical sample structural elements are analysed in detail, then these are assembled in structural subsystems building the lateral resisting structures for the distinguished building areas.

The assessment focuses on the loss of gravity load support and “brittle” inelastic mechanisms as these are considered leading to failures with catastrophic consequences.

3. Building Seismic Rating/Discussion of Results

South Wing

The results of our Detailed Seismic Assessment indicate that the South Wing section of the building achieves an overall seismic rating of **74% NBS (IL3)**. This corresponds to a **Grade B** building as defined by the New Zealand Society of Earthquake Engineering (NZSEE) building grading scheme. This is greater than the minimum threshold for Earthquake-Prone buildings (i.e. <34%NBS). Refer table 3 below for specific building sections;

Table 3 – Seismic Rating

New South Wing % NBS (IL3)			
Building Section + Structural Element	Direction		Comments
	East – West	North – South	
Reinforced Concrete Frame	100	87	Column flexure
Steel Frame	76	76	Combined column flexure + axial loading
Diagonal Bracing	100	74	Reid bar bracing capacity governs the seismic rating
Block Infill	100	100	
Original Timber Wall on nib wall	100	100	New steel frames screw fixed to walls

Intermediate South Wing (Tarawera Gallery)

The results of our Detailed Seismic Assessment indicate that the South Intermediate Wing achieves an overall seismic rating of **19% NBS (IL3)**. This corresponds to a **Grade E** building as defined by the New Zealand Society of Earthquake Engineering (NZSEE) building grading scheme. This is less than the minimum threshold for Earthquake-Prone buildings (i.e. <34%NBS). Refer table 4 below for specific building sections;

Table 4 – Seismic Rating

Intermediate South Wing (Tarawera Gallery) % NBS (IL3)			
Building Section + Structural Element	Direction		Comments
	East – West	North – South	
Level 1 Steel Frames	19	78	Displacement and out of plane flexure capacity of central truss top beams in east -west direction critical. North south direction deflection compatibility not met
Basement Concrete Foundation Walls	100	100	
Original Timber Wall/ Nib Wall out of plane	40	N/A	Out of plane capacity of nib wall
Atrium Concrete Wall	100	27	Out of plane capacity of unreinforced concrete wall

Central Atrium/Intermediate North Wing/North Wing

The results of our Detailed Seismic Assessment indicate that the building achieves an overall seismic rating of **27% NBS (IL3)**. This corresponds to a **Grade D** building as defined by the New Zealand Society of Earthquake Engineering (NZSEE) building grading scheme. This is less than the minimum threshold for Earthquake-Prone buildings (i.e. <34%NBS). Refer table 5 below for specific building sections;

Table 5 – Seismic Rating

Central (Atrium) Section % NBS (IL3)			
Building Section + Structural Element	Direction		Comments
	East – West	North – South	
Mezzanine Floor - Timber Shear Wall (External)	100	48	In plane capacity of external timber walls
Mezzanine Floor - Concrete wall 10.5m height (in plane)	100	N/A	In plane capacity of unreinforced concrete walls
Mezzanine Floor - Concrete wall 10.5m height (out of plane)	N/A	27	Out of plane capacity of unreinforced concrete walls
Ground Floor – Timber Shear Wall (External)	N/A	40	In plane capacity of external timber walls
Ground Floor – Concrete return walls (in plane)	N/A	43	In plane capacity of unreinforced concrete walls
Ground Floor - Concrete wall (out of plane)	42	27 (10.5m high walls)	Out of plane capacity of unreinforced concrete walls
Basement Concrete Foundation Wall	100	100	
Original Timber Wall on Concrete Nib Wall	40	n/a	Out of plane capacity of concrete nib wall
Basement foundations (Atrium) under internal concrete walls	n/a	<33	Soil bearing capacity

Table 5A – Seismic Rating

Intermediate North Wing % NBS (IL3)			
Building Section + Structural Element	Direction		Comments
	East – West	North – South	
Ground Floor - Timber Shear Wall	N/A	41	In plane capacity
Concrete wall in- plane	100	N/A	In plane capacity of unreinforced concrete walls
Concrete wall out of plane	N/A	27	Out of plane capacity of unreinforced concrete walls
Basement Concrete Foundation Wall	100	100	
Original Timber Wall Nib Wall out of plane	40	N/A	Out of plane capacity of nib wall

Table 5B – Seismic Rating

North Wing			
Building Section + Structural Element	Direction		Comments
	East – West	North – South	
Ground floor Timber Shear Walls In plane	N/A	51	In plane capacity
Concrete walls out of plane capacity	N/A	27	Out of plane capacity of unreinforced concrete walls

Concrete walls in plane capacity	100	N/A	In-plane capacity of unreinforced concrete walls
Basement Concrete Foundation Wall	100	100	
Original Timber Wall on nib wall out of plane	40	N/A	Out of plane capacity of concrete nib wall

North Wing Extension

The results of our Detailed Seismic Assessment indicate that the North Wing Extension in isolation achieves an overall seismic rating of **100% NBS (IL3)**. However, there is the potential of the neighbouring north concrete wall failing out of plane and collapsing into the north extension. Consequently, this will give the North Wing Extension an overall seismic rating of **27% NBS**, corresponding to a **Grade D** building as defined by the New Zealand Society of Earthquake Engineering (NZSEE) building grading scheme. This is less than the minimum threshold for Earthquake-Prone buildings (i.e. <34%NBS). Refer table 6 below for specific building sections;

Table 6 – Seismic Rating

New North Wing Extension % NBS (IL3)			
Building Section + Structural Element	Direction		Comments
	East – West	North – South	
Level 1 Timber Shear Wall	100	100	Plywood along outer walls
Level 1 Steel Frame	100	100	
North Wing Concrete Wall	100	27	Potential out of plane wall collapse into North Wing Extension.
Basement Concrete Shear Wall	100	100	

Based on the above, the overall building seismic rating is governed by the performance of the unreinforced concrete gable wall. This constitutes the building's Critical Structural Weakness. The unreinforced concrete walls lack capacity to accommodate out of plane flexural forces.

Table 7 below compares the seismic rating with the relative risk of collapse compared to a new building. For information, a new building, designed in accordance with AS/NZS1170:2002 and modern materials standards would have a low probability of collapse in a 1-in-500-year return period earthquake.

Table 7: Relative Seismic Risk Compared to a New Building

Building Grade	Percentage of New Building Strength (%NBS)	Relative Risk (Approximate) Compared to a New Building	Risk Description
A+	>100	<1 time	Low
A	80-100	1-2 times	Low
B	67-80	2-5 times	Low or Medium
C	33-67	5-10 times	Medium
D	20-33	10-25 times	High
E	<20	>25 times	Very High

As noted above, the Rotorua Museum is considered a Grade E building and therefore presents a Very High risk to occupants relative to a new building.

Severe Structural Weaknesses

A Severe Structural Weakness (SSW) is defined as a structural weakness that is potentially associated with catastrophic collapse of the structure leading to high fatality rates for building occupants and little or no chance of escape from the building following an earthquake. The seismic capacity of a SSW may not be reliably assessed based on current engineering knowledge.

Experience from past earthquakes suggests that SSWs are typically limited to a relatively small number of mechanisms and as such, the *Guideline* aims to define SSWs that require evaluation as part of any DSA. The below SSW have been identified in the assessment guidelines for different types of building construction. The museum does not exhibit any of the below

- *Lightly reinforced concrete columns and/or beam-column joints (refer to Section C5 for definition) with axial loads greater than $0.5 AAgf_f'c$ which are part of the primary gravity system of buildings with more than two storeys and where multiple fatalities, i.e.*

more than 20, would be possible if one or more storeys were to suffer full collapse. To be a SSW the failure of a column and/or beam/column joint would need to lead to a progressive collapse scenario for the entire storey.

- Single core shear walls with axial loads greater than $0.15 AAgf^c$ which are shear dominated and which are required to carry, in total, more than 60% of the seismic lateral demand in multi-storey buildings with more than two storeys and where multiple fatalities, would be possible if the building were to suffer full collapse.
- Flat slab configurations where the lateral capacity is reliant on low ductility slab to column connections and the gravity support is susceptible to imposed lateral drift and punching shear failure for buildings with more than two storeys and where multiple fatalities, would be possible if one or more storeys were to suffer full collapse. This is only intended to apply to systems with gravity-only shear demand exceeding 40% of the probable shear capacity ($v_{rc} + v_{rs}$) at the critical shear interface.
- Lack of positive connection between diaphragm(s) and primary lateral structure comprising a single element (e.g. shear core) of buildings with more than two storeys and where multiple fatalities, i.e. more than 20, would be possible if one or more storeys were to suffer full collapse.
- Complex slope failure resulting in significant ground mass movement and the loss of support over more than 50% of the building platform (i.e. where the building is on a slope or cliff edge).
- Liquefiable ground supporting poorly tied together URM buildings with more than two storeys.

Structural Weaknesses

During our seismic assessment, we identified the following structural weaknesses (SW) as being present in the Museum Building, refer table 8 below:

Table 8 Structural Weaknesses

Severe Structural Weaknesses	Impact	Solutions and new NBS% (IL3)
Reid Bar Capacity (New South Wing)	Brittle failure of joints, leading to collapse of gravity carrying system	Upgrade with new joints, Complete South wing upgraded to 100%
Out of plane flexural capacity of unreinforced concrete gable walls (Original Bathhouse sections)	Loss of gravity load carrying system. Support to above trusses and walls lost, hence a collapse	Removal of walls or installation of steel or concrete support frame with concrete/steel counter force walls. Minimum 67% NBS

The pull-out capacity of timber stringer connecting rafters to unreinforced concrete gable end walls (Original Bathhouse sections)	Loss of restraint of concrete wall, therefore the wall would act as cantilever reducing NBS% further	Upgrade of connection. New Bowmac type angle bracket 100% NBS
Shear capacity of external mortise and tenon timber wall joints for in plane loading for selected walls (Original Bathhouse sections)	Loss of gravity support structure for roof	Upgrade of connection. New plywood overlay nailed to existing 100% NBS
The shear capacity of the rafters to top plate where severe corrosion of nailed joints has occurred (Original Bathhouse sections)	Loss of gravity support for roof system to wall, hence collapse of roof under excessive deflection of wall	Replace and Upgrade connections. New nailed joint 100% NBS
The out of plane capacity of the concrete nib walls (Original Bathhouse walls)	Loss of gravity load carrying support of specific walls and supported roof	Install steel sleeve to reduce overturning effects Minimum 67% NBS
Roof framing, sarking and North-East Wing valley beams that have decayed	Continual decay will lead to loss in structural integrity leading to loss of gravity support of roof and eventual collapse of roof	Replace and upgrade framing elements. New nailed connections 100% NBS
Selected foundation footings in Atrium below concrete walls running in the north-south direction	Bearing capacity failure	Increase size of footing 100% NBS

Roof Beam in Atrium (behind central tower), spanning between trusses has experienced some cracking	Loss of gravity support	Identify beam on site and Replace. New bolted/nailed connections 100% NBS
Out of plane capacity & deformation of top chords beams in central truss in Intermediate South Wing. (Tarawera Gallery)	Excessive deflection leading to loss of gravity support for roof structure, hence collapse of roof.	Install horizontal struts and cross bracing between the truss top chords to create truss system. 100% NBS
Deflection compatability of central portal truss in Intermediate South Wing. (Tarawera Gallery)	Excessive deflection leading to damage/collapse of supported elements	Install braced frames in location of existing partition walls. 100% NBS

Secondary Risks

Risks from Adjacent Buildings

The Museum Building is approximately 20 m away from the closest neighbouring building being the Rotorua Energy Events centre to the east of the Museum. Therefore, there will be nil effect in respect to pounding with the museum building.

The new North Wing Extension of the museum has been constructed with a 50mm seismic gap to the original North Wing of the bathhouse section. From our assessment, the unreinforced concrete wall in the North Wing will collapse under significant earthquake event and cause damage to the new north wing.

The new South Wing of the museum has been constructed with a 50mm seismic gap to the South Intermediate (Tarawera gallery) section however there is a joint at the north-west corner at the location where the original walls were left in place. From our assessment will lead to some load sharing.

Risk of Soil Failure, Liquefaction and Lateral Spreading

The improved soils under the buildings are likely to have a low susceptibility to liquefaction. The impact of geotechnical aspects on the seismic response was deemed non-critical for

determination of the building's %NBS rating.

Staircases and Safe Egress Following an Earthquake

The Department of Building and Housing, now MBIE, issued a Practice Advisory note 13 in response to concerns about stair collapse and damage observed following the February 2011 Christchurch earthquake. The primary focus of this Practice Advisory concerned stairs designed to be able to slide at one end, and the potential for large inter-storey displacements to lead to a loss of seating at the sliding end causing a collapse of the stair.

Four stair cases were assessed:

Internal stair cases in Atrium (2)

- Due to the adjacent unreinforced concrete walls next to the atrium staircases, it is considered that these staircases would potentially not remain functional following a severe earthquake event due to the out of plane failure of these walls.

Internal staircase in North Wing (access to viewing platform)

- Due to the adjacent unreinforced concrete wall next to the staircase, it is considered that this staircase would potentially not remain functional after an earthquake event due to the out of plane failure of the adjacent wall. It is also noted that the staircase that provides access to the upper viewing platform area does not appear to meet current requirements regarding minimum dimensions for a designated escape route for fire. It is recommended a fire engineer to confirm this regard.

New South Wing internal staircase

- The timber staircase in the new South Wing is confined by the concrete shear walls either side and the expected deflection of these walls during an earthquake is considered small. It is therefore expected that this staircase remains operational after an earthquake event.

Central Atrium Turret Tower

The ingress of water into the central tower is a concern and if it is not prevented, will lead to the loss of structural integrity of the supporting framing.

The central turret tower is supported by a series of timber posts with 12mm diameter tie rods projecting up and through the middle of the posts. The threaded rods tie down the turret above. The threaded ends of the tie rods are fixed to the supporting timber beams below the turret and tied down with bolt nuts. Upon inspection, the tie rods look to be in reasonable

condition despite the ingress of water. Some of the tie down nuts in the support beams have experienced partial corrosion. Each tie down connection should be further assessed and replaced if advanced corrosion is present.

Ply lining on the inside of the tower is fixed between the posts providing lateral support. Efflorescence staining is visible on the ply and is a direct result from the moisture ingress. Where the tower projects pass the roof line, cross bracing is used to support the posts.

From visual inspections, the posts and supporting base beams show some deterioration. Samples from the beams and posts have been taken for timber decay tests. Results in the Prendos report state that partial decay has occurred in the timber posts and beams. However, if water leaks are stopped, further deterioration of timber can be prevented. An effective seal at the top of the tower platform and an impermeable roof membrane will be required to prevent future leaks. It should be noted that all framing was only viewed and tested from the inside.

Original Bathhouse Ceiling Diaphragms (Lath and Plaster)

The original 1906 lath and plaster ceiling provide limited flexible diaphragm action between the ground floor shear walls. There also sky lights in some locations of the ceilings which cause discontinuities that minimise ceiling diaphragm action between the ground floor shear walls. This issue will need to be addressed at the retrofit stage of the building.

Precast seating (New North and South Wing)

The detailing for the precast flooring units seated on the internal masonry wall (North End) and concrete beams (South End) are constructed without a bearing strip. This could potentially lead to spalling of the beams/wall under an earthquake event. It is not expected that seating will be lost and a catastrophic failure due to the small drift/movement associated with these two building sections.

Risk Presented by Non-structural Building Elements and Attachments

Recent experiences in Wellington following the Seddon and Kaikoura earthquakes have shown that non-structural building elements such as glazing, suspended ceilings, partitions and overhead services (i.e. HVAC, sprinkler pipes etc.) constitute a significant hazard to building occupants and typically contribute heavily to shut-down time and repair cost. An assessment of the non-structural items within the building is not included in the scope of works of this report. We recommend a survey of the non-structural items be conducted by a suitably qualified person.

The performance of the clay tiles in an earthquake event has not been assessed. The

performance of concrete and clay tiles in the Christchurch earthquake (February 2011) varied significantly depending on the location of the building. As reported by Buchanan;¹² *“The performance of concrete and clay tile roofs was variable. On the flat land, particularly in the north and west of Christchurch, the damage was relatively minor, with odd cases of ridge and hip tiles dislodging. At the other end of the spectrum, heavy tiles on hillside houses in south-west Christchurch behaved very poorly (Figure 21). Very often, heavy tiles had been laid on battens with no mechanical connection to the battens. While these tiles may be able to resist a reasonable degree of horizontal acceleration before dislodging, the high vertical accelerations experienced on the hills in this earthquake caused widespread rearrangement of these heavy roof tiles”.*

Further investigation and research will be required in this area.

¹² (Buchanan, et al. 2011)

4: Seismic Retrofit Options

An overview of potential seismic retrofit solutions are shown below.

Option 1	
Scope: Demolition of original bath house internal structure including central Atrium, Intermediate North and North Wing. Externals walls to be left in place and new support structure and roof installed. Retrofit of Intermediate South Wing including steel truss at central section at ceiling level and central steel truss above the corridor at ceiling level. Upgrade of Reid Bar Braces in New South Wing at ground floor level. Build to 100% NBS (IL3).	
Positives	Negatives
New Internal structure and Roof	Heritage aspect lost
100% NBS rating	Construction cost
Reduced maintenance costs	
50-year design life	
Building can be designed specific to needs of museum	
New floor designed to required load requirements of Museum	
Constructability	

Option 2
Scope: Complete removal of all unreinforced concrete gable walls. Replace with steel frame and timber infill equivalent, replacement of heavy roof with light weight equivalent (with new timber plywood sarking) throughout building excluding the Tarawera Gallery, Intermediate South wing, new South Wing and North Wing Extension. Installation of new steel truss at ceiling above the corridor. Roof replacement is primarily required for roof leakage issues. Installation of new steel truss at ceiling level in Central location of Tarawera Gallery. Upgrade of selected bracing walls with new connections between framing members. Installation of cross braces in roof to create effective diaphragm. Spray underside of basement soffit with glass fibre overlay in original bath house section. Installation of steel sleeve to reduce overturning effects in concrete nib walls. Upgrade of Reid Bar Braces in New South Wing at ground floor level. Minimum Target 67% NBS (IL3)

Positives	Negatives
Original building wall fabric preserved	Constructability, extensive temporary propping required
New Roof	Usability of museum
Reduced maintenance costs	Heritage tiles removed (note, original tiles on 1906 building where black)
Ground floor capacity increased	

Option 3

Scope: Installation of steel frame structure within the unreinforced concrete gable end walls. This would be achieved by routing out a pocket (approximately 150mm x 150mm) to create a lattice network then installation of a matching steel frame with epoxy bolt anchors at nominal centres. Leave heavy roof in place. Tie the unreinforced concrete walls to perpendicular concrete walls and install steel braced frames in the location of existing timber frame walls

Upgrade of selected bracing walls with new connections between framing members. Installation of cross braces in roof space to create effective diaphragms. Installation of horizontal diaphragms next to unreinforced concrete walls ceiling or mezzanine floor level. Spray underside of basement soffit with glass fibre overlay.

Install steel braced bays in South Intermediate Wing in the central partition wall locations and installation of steel truss at ceiling level above the corridor.

Installation of steel sleeve to reduce overturning effects in concrete nib walls.
Upgrade of Reid Bar Braces in New South Wing at ground floor level.

Minimum Target 67% NBS (IL3)

Positives	Negatives
Existing roof tiles remain	Roof leaking still an ongoing issue
Heritage features retained	Constructability
Wall thickness of unreinforced concrete gable walls retained	Maintenance issues/cost
Ground floor capacity upgraded	Usability of museum

Option 4 (option 3 with light weight roof)

Scope: Installation of steel frame structure within the unreinforced concrete gable end walls. This would be achieved by routing out a pocket (approximately 150mm x 150mm) to create a lattice network then installation of a matching steel frame with epoxy bolt anchors at nominal centres. Remove heavy roof and replace with light weight equivalent. Tie the unreinforced concrete walls to perpendicular concrete walls and install steel braced frames in the location of existing timber frame walls

Upgrade of selected bracing walls with new connections between framing members. Installation of cross braces in roof space to create effective diaphragms. Spray underside of basement soffit with glass fibre overlay.

Installation of horizontal diaphragms next to unreinforced concrete walls ceiling or mezzanine floor level.

Install steel braced bays in South Intermediate Wing in the central partition wall locations and installation of steel truss at ceiling level above the corridor.

Installation of steel sleeve to reduce overturning effects in concrete nib walls
Upgrade of Reid Bar Braces in New South Wing at ground floor level

Minimum Target 67% NBS (IL3)

Positives	Negatives
Reduced maintenance costs	Heritage tiles removed (note, original tiles on 1906 building were black)
Wall thickness of unreinforced concrete gable walls retained	Less seismic retrofit cost due to lower demand on building from reduced weight
Ground floor capacity upgraded	
External wall heritage features remain	

5. Conclusions

GDC Consultants Ltd have completed a Detailed Seismic Assessment of the Rotorua Museum Building at Oruawhata Drive, Rotorua. The seismic assessment has been carried out in principle with the Simple Lateral Mechanism Analysis (SLaMA) method defined in *The Seismic Assessment of Existing Buildings, Technical Guidelines for the Engineering Assessments (July 2017)*.

The Detailed Seismic Assessment indicates that the building has an overall seismic rating of **19% NBS (IL3)**. The governing factor is the out of plane capacity & deformation of top chords beams in central truss in Intermediate South Wing. The top chord of the truss is likely to undergo significant deflection under a severe earthquake event and roof seating will be lost. This seismic rating corresponds to a **Grade E** building as defined by the New Zealand Society of Earthquake Engineering (NZSEE). A building of this grade represents a very high risk to building occupants relative to a new building designed in accordance with current loading and material standards.

We recommend that the building be issued with an Earthquake-Prone Building notice and that strengthening or demolition be undertaken within 12.5 years of issue of this notice.

6. Recommendations

We recommend you consider carrying out the following next steps:

- Given our investigation has identified that the museum structure limits the building's seismic rating to **19% NBS (IL3)**, we recommend that all stakeholders are notified of the seismic rating and all necessary signage is installed.
- Development of the temporary propping option to allow the Intermediate South wing (Tarawera Gallery) to be opened to the public with an acceptable level of risk to the Council.
- Development of concept retrofit options to allow for budget costings
- Liaison with all stake holders on available options.
- The scope of works does not include a seismic assessment of non-structural items such as mechanical plant and services plant. We recommend a survey of these items be conducted if the building is reopened prior to strengthening is being carried out.
- Review of gravity load capacity of new viewing platform in the north intermediate wing.

- Fire engineer to comment on timber stairs to north wing viewing platform in regards to escape route requirements.

7. Limitations

This report is prepared with the limitations outlined below:

- This report is based on a visual inspection and limited X-ray concrete scanning to confirm reinforcing, intrusive investigation at discrete selected locations and a quantitative assessment of the building.
- Our professional judgement & services are performed using a degree of care, experience on similar structures as a reputable consultant practising in the field.
- This report is prepared for RLC. Our responsibility about this report is limited to the client to whom the report is addressed and to that client only. We disclaim all responsibility and will accept no liability to any other party without first obtaining the written consent of GDC Consultants and the author of the report. GDC Consultants reserves the right to alter, amend, explain or limit any further information given to any other party.
- Recommendations and opinions in this report are based on data obtained from the investigations and site observations.
- No liability is accepted by GDC Consultants or any employee or sub-consultant of this company with respect to its use by any other parties.
- This disclaimer shall apply notwithstanding that the report may be made available to other persons for an application for permission or approval to fulfil a legal requirement. This report shall not be used to interpret any form of financial transaction.

8. References

- As Built Model. 2017. *Rotorua Museum as-built Model*. Prod. Andrew Watson. Rotorua, 26 January.
- Buchanan, Andrew , David Carradine , Graeme Beattie, and Hugh Morris. 2011. "Performance Of Houses During The Christchurch Earthquake Of 22 February 2011." *Bulletin Of The New Zealand Society For Earthquake Engineering*, December: 342-357.
- Carradine, David. 2013. *P21 Testing of 600 mm walls with customwood sheathing*. Branz Structural Engineering report, Branz.
- Cheal Consultants Limited. 2017. "Rotorua Lakes Council Museum." Rotorua.
- Council OmTrak System. Various Files/Dates. *Bath - Buildings*. Rotorua.
- Council, Rotorua Lakes. 2016. *2.3 Seismic Policy and Risk Reduction Framework for Council Buildings*. 28 July. http://www.rotorualakescouncil.nz/our-council/PoliciesandBylaws/Policies/Documents/2017/Council_Policies/Seismic%20Policy%20and%20Risk%20Reduction%20Framework%20for%20Council%20Buildings.pdf.
- Department of the Army - U.S. Army Corps of Engineers. 2007. *Earthquake Design and Evaluation of Concrete Hydraulic Structures*. Engineering and Design-EARTHQUAKE DESIGN AND EVALUATION OF CONCRETE HYDRAULIC STRUCTURES, Department of the Army - U.S. Army Corps of Engineers.
- Dizhur, Dmytro , and Jason Ingham . 2015. *Seismic Improvement of Loadbearing Unreinforced Masonry Cavity Walls*. External Research Report , BRANZ.
- Giongo, Ivan , Aaron Wilson, Dmytro Y Dizhur, Hossein Derakhshan, Roberto Tomasi, Michael C. Griffith, Pierre Quenneville, and Jason M. Ingham. 2014. "Detailed seismic assessment and improvement procedure for vintage flexible timber diaphragms." *Bulletin Of The New Zealand Society For Earthquake Engineering*, June: 97-118.
- Graça, Vasconcelos , Paulo B Lourenço , and Elisa Poletti . 2013. "An overview on the seismic behaviour of timber frame structures." *Proceedings of the 1st International Symposium on Historic Earthquake-Resistant Timber Frames in the Mediterranean Region* . Italy.
- Griffith, Michael C. 2011. "Techniques for seismic improvement of unreinforced masonry buildings." *The Performance of Unreinforced Masonry Buildings in the 2010/2011 Canterbury Earthquake Swarm*.
- Havel, Dr Frank. 2017. *Rotorua Lakes Council -Museum, Government Gardens, Oruawhata Drive, Rotorua*. Geotechnical Interpretative Report , Cheal Consultants Limited.
- Johnston, RLC Toni. 2016. "Rotorua Lakes Council."
- Langenbach , Randolph . 2005. "Saga of the Half-timbered Skyscraper: What Does HalfTimbered Construction Have to Do with the Chicago Frame." *Proceedings of the Second International Congress on Construction History*. Cambridge. 1845-1866.

- Langenbach, Randolph . 2007. "From "Opus Craticum" to the "Chicago Frame": Earthquake-Resistant Traditional Construction." *International Journal of Architectural Heritage* 29-59. doi:10.1080/15583050601125998.
- . 2007. "Understanding What Works: Learning from Earthquake Resistant Traditional Construction." *Heritage at Risk*, 87-98. doi:http://dx.doi.org/10.11588/hr.2008.0.23256.
- Langenbach, Randolph , and Polat Gulkan. 2004. "The Earthquake Resistance Of Traditional Timber And Masonry Dwellings In Turkey." *13th World Conference on Earthquake Engineering - Paper No. 2297*. Vancouver, Canada.
- Legislation, New Zealand. 2016. *Building (Earthquake-prone Buildings) Amendment Act 2016*. 13 May. <http://www.legislation.govt.nz/act/public/2016/0022/22.0/DLM5616102.html>.
- Lester, J, A Brown, and J. Ingham. 2012. "Christchurch Cathedral of the Blessed Sacrament: Lessons learnt on the Stabilisation of a Significant Heritage Building." *2012 NZSEE Conference*. Auckland.
- Liew, Y. L. , C. F. Duffield, and E. F. Gad. 2002. "The Influence of Plasterboard Clad Walls on the Structural Behaviour of Low Rise Residential Buildings." *Electronic Journal of Structural Engineering*.
- MBIE. 2016. "The Seismic Assessment of Existing Buildings." Technical Guidelines for Engineering Assessments. Accessed October 10.
- Ministry of Business, Innovation, and Employment. 2004. *Building Act 2004*. Building Act 2004, Ministry of Business, Innovation, and Employment.
- New Zealand Society for Earthquake Engineering. 2006. "Assessment and Improvement of the Structural Performance of Buildings in Earthquakes." Recommendations of a NZSEE Study Group on Earthquake Risk Buildings. [http://www.nzsee.org.nz/db/PUBS/2006AISBEGUIDELINESCorr3_\(incl_2014_updates\).pdf](http://www.nzsee.org.nz/db/PUBS/2006AISBEGUIDELINESCorr3_(incl_2014_updates).pdf).
- Palermo, A. , S. Pampanin, and A.S. Tasligedik. 2011. "Damage Mitigation Strategies of 'Non-Structural' Infill Walls: Concept and Numerical-Experimental Validation Program." Proceedings of the Ninth Pacific Conference on Earthquake Engineering Building an Earthquake-Resilient Society, Auckland.
- Prendos New Zealand Limited. 2017. *Roof Framing Deterioration Assessment*. Assessment, Rotorua: Dirk Stahlhut.
- Region, Proceedings of the 1st International Symposium on Historic Earthquake-Resistant Timber Frames in the Mediterranean. 2013. *Proceedings of the 1st International Symposium on Historic Earthquake-Resistant Timber Frames in the Mediterranean Region*. Study Report, BRANZ.
- Roberts, John, Anton Fried, Alan Tovey, and Tony Threlfall. 2002. *The Development Of Simple 'Deemed to satisfy' Insitu Concrete Basement Dwellings*. Kingston University.
- Rotorua Lakes Council. 2009. "Earthquake-prone Buildings." *Rotorua Lakes Council*. 1 July. Accessed 2017. <http://www.rotorualakescouncil.nz/our-council/PoliciesandBylaws/Policies/Documents/Policy%20on%20Earthquake%20prone%20Buildings.pdf>.

- Ruggieri , Nicola, Gennaro Tampone, and Raffaele Zinno. 2015. *Historical Earthquake-Resistant Timber Frames in the Mediterranean Area*. Springer.
- Sigma Consultants Ltd. n.d. *Ammended Structural Calculator*. Page 318. Edited by Stahlton Email.
- Sigma Consultants Ltd. 2010. "Earthquake Prone Building Assessment Report." Rotorua. Accessed May 14, 2010.
- Standards Australia/ Standards New Zealand. 2002. *AS/NZS 1170 Structural Design Actions* . Standards for Structural Design Actions, Standards New Zealand.
<https://shop.standards.govt.nz/catalog/4028828607b5ba7a0107d4b4ea840003/view>.
- Standards New Zealand. 2006. *NZS 3101 Concrete Structures Standard*. Part1 - The Design of Concrete Structures, New Zealand Standard.
- . 1993. *Timber Structures Standard: NZS 3603*.
- The Scientific World Journal. 2014. "Experimental and Numerical Study on Tensile Strength of Concrete under Different Strain Rates." *The Scientific World Journal* (The Scientific World Journal).
- Thurston, S J. 2013. *Christchurch Cathedral of the Blessed Sacrament: Lessons learnt on the Stabilisation of a Significant Heritage Building*. Study Report, BRANZ.
- Wilson, A, Pierre Quenneville, FL Moon, and Jason Ingham. 2014. *Lateral Performance of Nail Connections from Century-Old Timber Floor Diaphragms*. The University of Auckland.
- Wilson, Aaron, Pierre Quenneville, and Jason Ingham. 2013. "Natural Period and Seismic Idealization of Flexible Timber Diaphragms." *Eathquake Spectra* 29: 1003-1019.
- World Conference on Timber Engineering. 2012. *A STUDY ON WOODEN LATH AND PLASTER WALL OF JAPANESE EARLY MODERN WOODEN ARCHITECTURE*. World Conference on Timber Engineering.

APPENDIX A

Building Layout Plan

APPENDIX B

Lift Pit Information

APPENDIX C

Detailed Seismic Assessment Calculations

APPENDIX D

Rotorua Lakes Council Earthquake Prone Policy

APPENDIX A

Building Layout Plan

Appendix A

New North Wing

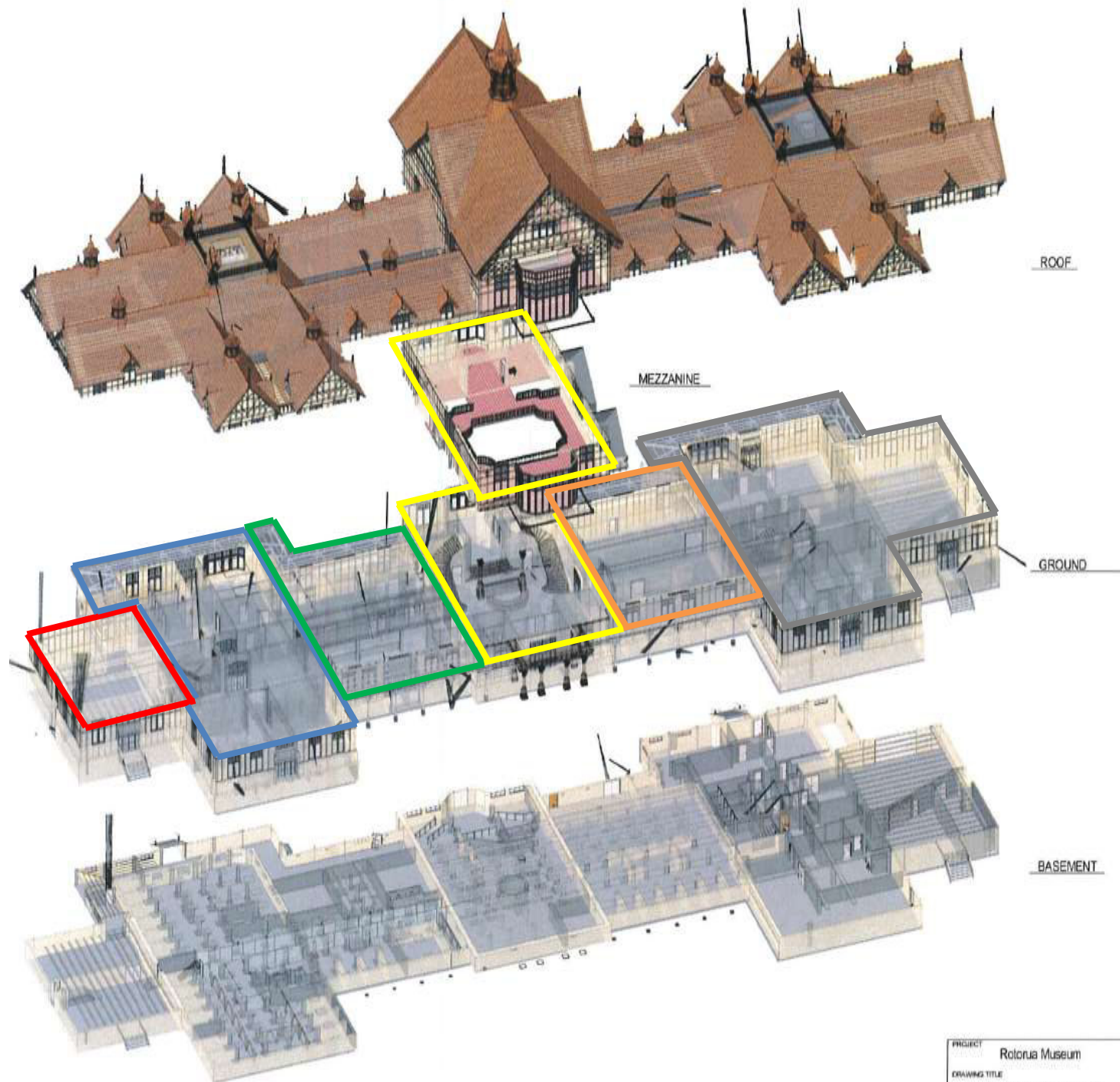
North Wing

Intermediate North Wing

Central Wing

**Intermediate South Wing
(Tarawera Gallery)**

New South Wing

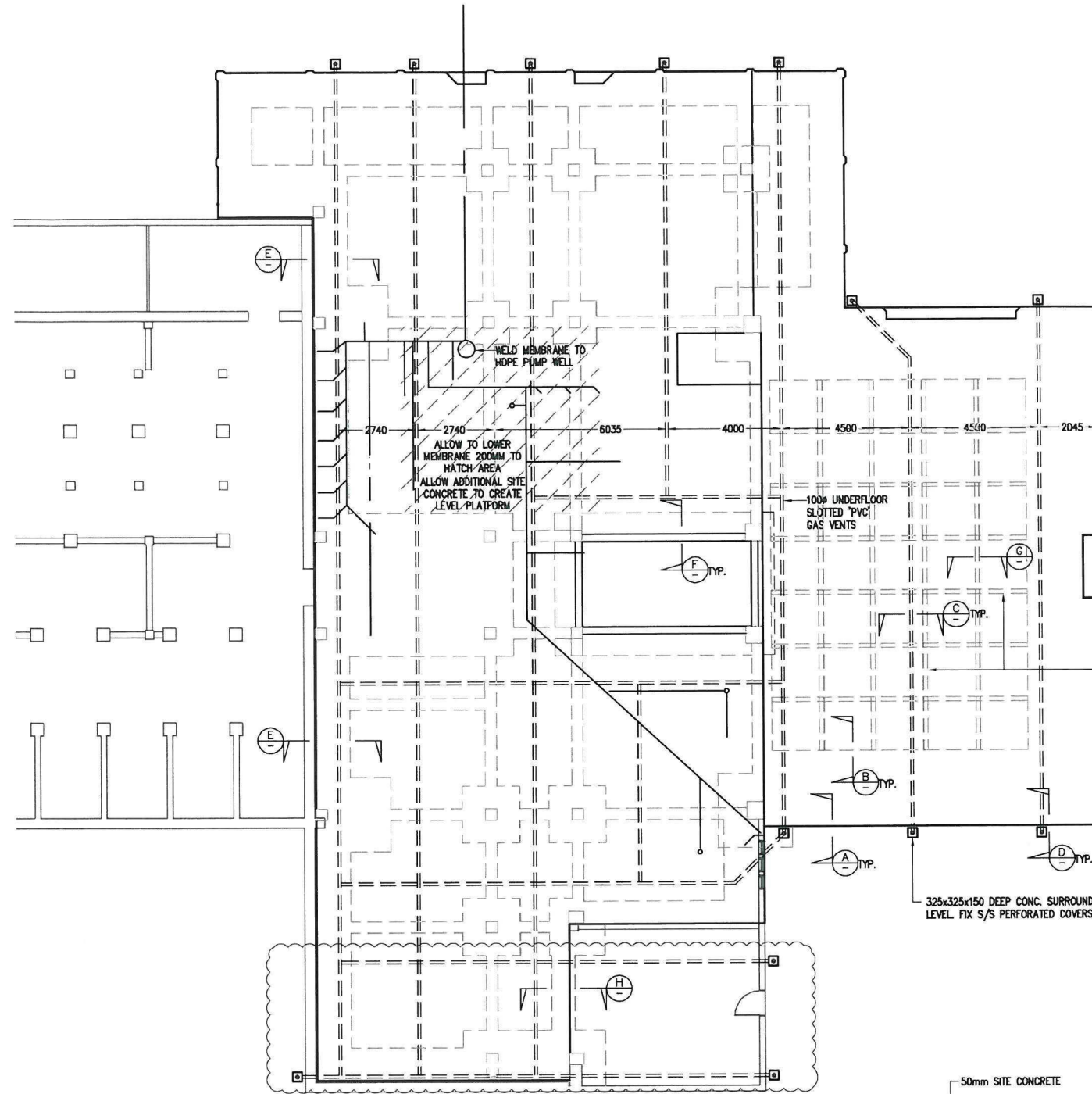


APPENDIX B

Lift Pit Information

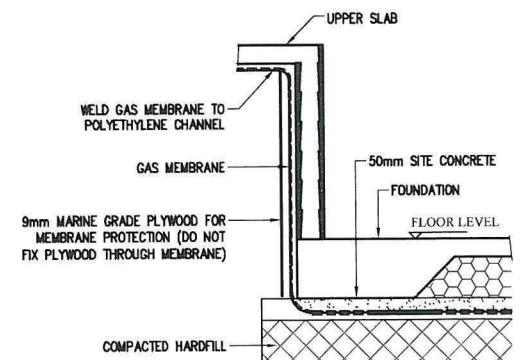
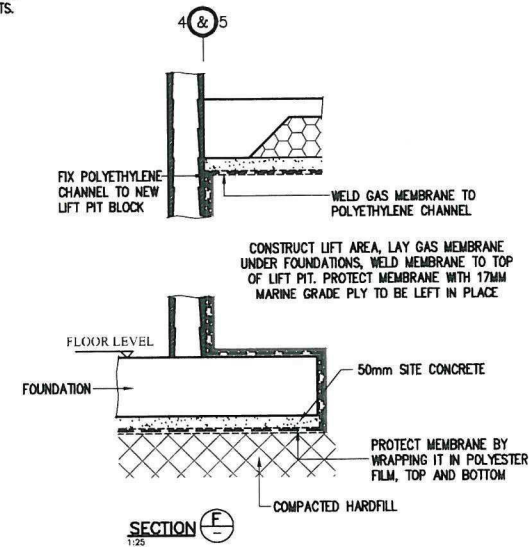
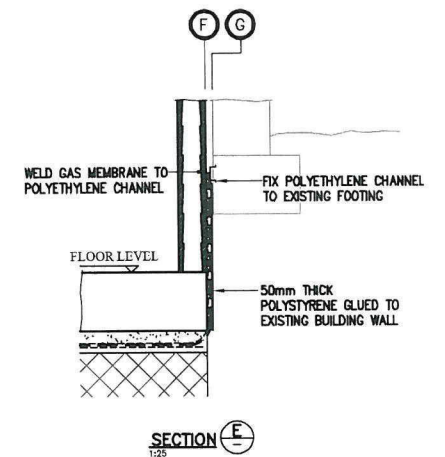
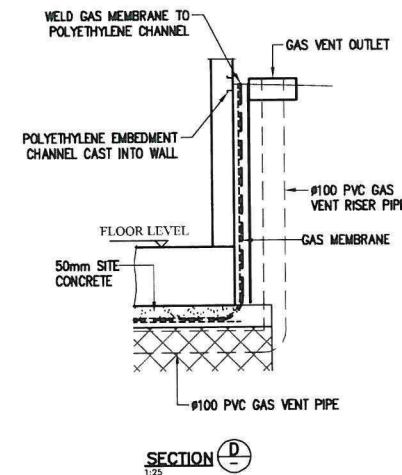
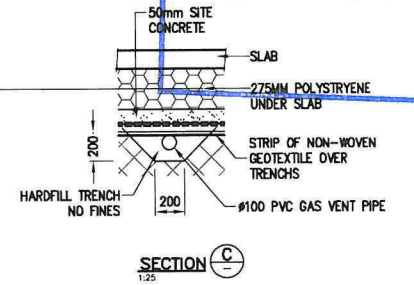
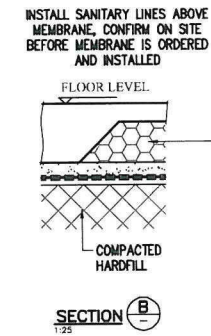
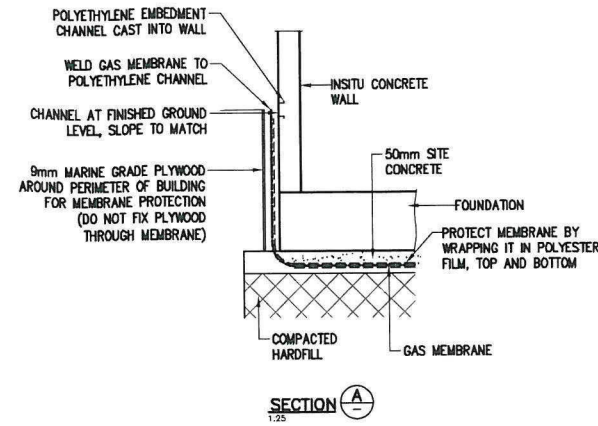
PIM/BC

63686



MEMBRANE PLAN

1:100



AS BUILT PLAN

no	date	issue/revision detail	by	chk
2	26/10/09	FOR CONSTRUCTION		
1	19/8/09	FOR CONSTRUCTION	MJ	PF
T	31/3/09	FOR TENDER		

client
ROTORUA TRUST GALLERY CENTENNIAL DEVELOPMENT

project
SOUTH WING EXTENSION

drawing title
FOUNDATION MEMBRANE PLAN

Scale
As Shown @ 'A1'

File Number
W:\8000\8129\Structure\8129-S(10)2000

drawing number
8129 - S(10)2050

rev.
2

SIGMA
ENGINEERS • ARCHITECTS • PLANNERS

Sigma Consultants Limited
115 Hinemoa Street
PO Box 553, Rotorua, New Zealand
Phone 07-347 3456, Fax 07-347 3459

SC#63686



Producer Statement Installation

Permathene Limited

Civil & Environmental

Highest Quality Since 1959



Date: 30 August 2011
Customer ID: WATX4100
Issued For: Rotorua District Council
Private Bag RO 3029
Rotorua

Project: Rotorua Museum of Art and History - Stage 3, HDPE Membrane & Geothermal Membrane
Queens Drive, Rotorua

1.5 mm smooth HDPE geomembrane laid on sand blinding, laid on concrete pad, to concrete block walls, to 1.74 girth max concrete columns, against concrete and blockwall of new building, including dressing of the HDPE geomembrane into HDPE profile, including all welding and testing specified for the project.

Permathene Limited

have been engaged by the building consent applicant to install

1.5 mm smooth HDPE geomembrane laid on sand blinding, laid on concrete pad, to concrete block walls, to 1.74 girth max concrete columns, against concrete and blockwall of new building, including dressing of the HDPE geomembrane into HDPE profile, including all welding and testing as specified in the attached conditions [of building consent], and am satisfied on reasonable grounds that the building work specified above has been completed to the extend required by that building consent and complies with the building consent. I understand that this Producer Statement, if accepted, will be relied on for the purposes of establishing compliance with the building consent, if required.

Signed by:

Nikolai Vakhroushev

Qualification: Project Engineer

Date:

30 August 2011

Phone (work) 09 968 8888

Mobile: 029 968 8888

Fax: 09 968 8890

Email: nikolai.vak@permathene.com



Box # 63686

Pipes to be placed in all of this area

Further Lift Pit Information Available on Request

APPENDIX C

Detailed Seismic Assessment Calculations

Table of Contents

South Wing	
South Intermediate Wing.....	
North Extension.....	
Atrium, Intermediate North & North Wing.....	
Unreinforced Concrete Walls Rating	1.01
Interior Timber Wall Rating.....	2.01
Exterior Timber Wall Rating	2.12
Atrium Rating.....	3.01
Intermediate North Wing Rating.....	3.09
North Wing Rating.....	3.11
Atrium Foundation Rating	3.13
Supplementary – Weights & Loads.....	

SOUTH WING

SOUTH-WING.

CONSTRUCTED 2012.

- TWO - STOREY BUILDING WITH BASEMENT & PLANT ROOM IN CEILING TO ROOF SPACE. INCLUDES VIEWING PLATFORM ON ROOF.
- BASEMENT - REINFORCED CONCRETE WALLS OF 20 SERIES MASONRY BLOCK WALLS.
- 1ST FL. LEVEL - FLOOR COMPOSED OF FLAT SLAB SUPPORTED ON STAHLTON BEAMS.
- 2ND FL. LEVEL - TIMBER FRAME FLOOR.
- PLANT ROOM - TIMBER FRAME FLOOR.
- ROOF - TIMBER FRAME WITH HEAVY CLAY TILES.
- GRAVITY SUPPORTING SYSTEM:
 - STEEL FRAMING
 - RC FRAMING WITH REINFORCED MASONRY INFILL (BETWEEN STAIRS & LIFT CORE).
 - BASEMENT WALLS & RC COLUMNS & BEAMS TO SHALLOW FOOTINGS.
- LATERAL LOAD RESISTING SYSTEM:
 - IN BOTH DIRECTIONS:
 - STEEL BRACING FRAMES
 - RC FRAMES WITH RC MASONRY INFILL
 - ROOF - DIAGONAL CROSS BRACING (REID BAR).

LOADS.

(i) 1st FL. LEVEL:

- G = SELF WEIGHT OF FLATSLAB &
SUPPORTING CONCRETE BEAMS.

- Q = 4.0 kPa.

(ii) 2nd FL. LEVEL:

- G =	25mm SARKING	0.15
	TIMBER JOISTS.	0.20
	17mm PLYWOOD	0.12
	MISC	0.08
		0.55 kPa.

- Q = 4.0 kPa.

(iii) PLANT ROOM:

- G = 0.70 kPa.

- Q = 5.0 kPa.

(iv) ROOF:

- G =	CLAY TILES	0.57
	BATTENS	0.03
	18mm PLYWOOD	0.10
	PURLINS	0.13
	MISC	0.07
		0.90 kPa.

(v) CEILING:

- G =	13mm PLASTER	0.13
	17mm PLY.	0.09
	BATTENS	0.08
	JOISTS	0.13
	MISC	0.07
		0.50 kPa.

(vi) INTERIOR WALLS:

- G =	150 STUDS @ 600	0.12
	BATTENS.	0.04
	17mm PLYWOOD	0.09
	13mm PLASTER	0.13
	MISC	0.07
		<u>0.45 kPa.</u>

(v) EXTERIOR WALLS:

- G =	150 STUDS	0.15
	7.5mm ETERPAN.	0.14
	BATTENS	0.15
	MISC	0.07
		<u>0.50 kPa.</u>

SEISMIC COEFFICIENT:

IMPORTANCE LEVEL = 3

DESIGN LIFE = 50

AEP (ULT) = 1:1000. $\rightarrow R_u = 1.30$

AEP (LS) = 1:25 $\rightarrow R_s = 0.25$

SOIL TYPE = D (FROM CHEAL GEOTECH REPORT)

HAZARD FACTOR = $Z = 0.24$.

$C_n(T) = 3.0$ $T = \text{ETABS PROGRAM CALCULATED.}$

$\mu = 1.25 \Rightarrow S_p = 0.925.$

$C_v(T) = 0.75$

Direction and Eccentricity

- | | |
|---|--|
| ☐ X Dir | ☒ Y Dir |
| ☐ X Dir + Eccentricity | ☒ Y Dir + Eccentricity |
| ☐ X Dir - Eccentricity | ☒ Y Dir - Eccentricity |

Ecc. Ratio (All Diaph.)

0.1

Overwrite Eccentricities

Overwrite...

Parameters

Site Subsoil Class

D

Hazard Factor, Z

0.24

Return Period Factor, R

1.3

Near Fault Distance, D (km)

30

Performance Factor, Sp

0.925

Ductility Factor, u

1.25

Time Period

- ☒ Program Calculated
- ☐ User Defined

T =

sec

Story Range

Top Story for Seismic Loads

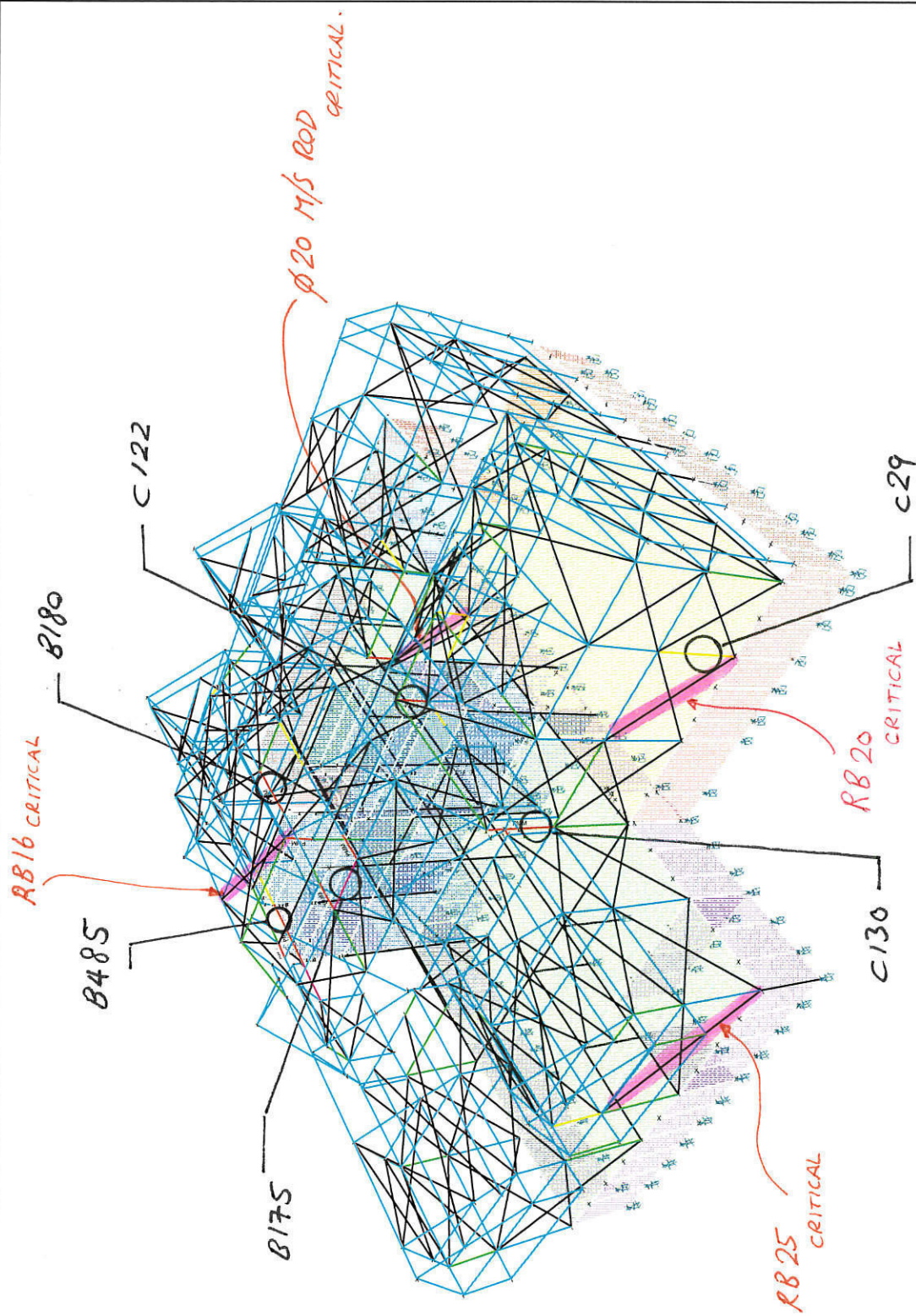
Roof

Bottom Story for Seismic Loads

Basement

OK

Cancel



STEEL CAPACITY CHECK - CRITICAL MEMBERS.

- 3 BEAMS
- 3 COLUMNS.
- BRACING (RB16, RB20, RB25 & Ø20 M/S ROD).



5.

MemDes Calculations @ 11:03:23 11-07-2017 by CO

Project : J000949

Description : column C29 (47).

NOTE :

CALCULATIONS AMENDED.

$$\phi = 1.0$$

$$f_y = 350 \times 1.10 = 385 \text{ MPa.}$$

Section : 150x150x6.0 SHS Grade 350

$$d = 150 \text{ mm} \quad b = 150 \text{ mm} \quad t_f = 6.0 \text{ mm} \quad t_w = 6.0 \text{ mm}$$

$$\text{Area} = 3330 \text{ mm}^2 \quad f_{yf} = 350 \text{ MPa} \quad f_{yw} = 350 \text{ MPa} \quad f_u = 430 \text{ MPa}$$

$$I_{xx} = 11.30 \text{ E}^6 \text{ mm}^4 \quad S_x = 178.00 \text{ E}^3 \text{ mm}^3 \quad Z_x = 150.00 \text{ E}^3 \text{ mm}^3 \quad r_x = 58.20 \text{ mm}$$

$$I_{yy} = 11.30 \text{ E}^6 \text{ mm}^4 \quad S_y = 178.00 \text{ E}^3 \text{ mm}^3 \quad Z_y = 150.00 \text{ E}^3 \text{ mm}^3 \quad r_y = 58.20 \text{ mm}$$

$$I_w = 0.00 \text{ E}^9 \text{ mm}^6 \quad J = 18400.00 \text{ E}^3 \text{ mm}^4 \quad k_f = 1.000 \quad \text{Manufact. Type} = \text{CF}$$

Compactness(x,y) = C, C

$$Z_{ex} = 178.00 \text{ E}^3 \text{ mm}^3 \quad Z_{ey} = 178.00 \text{ E}^3 \text{ mm}^3$$

**** MAJOR axis bending ****

$$\text{Flange : } l_e \text{ Ratio} = 27.2 / 40 = 0.68$$

$$\text{Web : } l_e \text{ Ratio} = 27.2 / 130 = 0.21$$

=> FLANGE = critical

$$l_s = 27.2, l_{sp} = 30, l_{sy} = 40$$

$$\text{Section is COMPACT, } Z_{ex} = 178.00 \text{ E}^3 \text{ mm}^3$$

**** MINOR axis bending ****

$$\text{Flange : } l_e \text{ Ratio} = 27.2 / 130 = 0.21$$

$$\text{Web : } l_e \text{ Ratio} = 27.2 / 40 = 0.68$$

=> WEB = critical

$$l_s = 27.2, l_{sp} = 30, l_{sy} = 40$$

$$\text{Section is COMPACT, } Z_{ey} = 178.00 \text{ E}^3 \text{ mm}^3$$

Member Effective Length Calcs

Torsional End Restraint Conds (TERC) are given as FF

$$\Rightarrow k_t = 1.00$$

User provided value of $k_l = 1.40$

With Lat. Rotn Restraints at neither end

$$\Rightarrow k_r = 1.00$$

$$\text{Eff. Len } L_e = L * k_t * k_l * k_r = 3.95 * 1.00 * 1.40 * 1.00 = 5.53 \text{ m}$$

Major Axis Bending

$$\text{Design Action } M_x^* = 21.0 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sx} = f_{yf} Z_{ex} = 62.30 \text{ kNm} \times$$

$$M_{sx} = 68.53 \text{ kNm.}$$

$$a_m = 1.7 * M_m^* / [(M_2^*)^2 + (M_3^*)^2 + (M_4^*)^2]^{0.5} \quad [\text{Eq 5.6.1.1(2)}]$$

$$= 1.7 * 21.0 / [(10.0)^2 + (0.0)^2 + (-10.0)^2]^{0.5} = 2.500$$

Reference Buckling Moment Calculation : M_o

$$\text{Temp. variable } \pi^2 E / L_e^2 = \pi^2 \times E / L_e^2 = 3.142^2 \times 205 \text{ E}6 / 5.530^2 = 66.2 \text{ E}06$$

$$M_o = [(\pi^2 E / L_e^2 * I_y) * (G J + (\pi^2 E / L_e^2 * I_w))]^{0.5}$$

$$M_o = 1049.0 \text{ kNm} \quad (\text{Eqtn 5.6.1.1(4)})$$

$$a_s = 0.6 * [(M_s / M_o)^2 + 3]^{0.5} - (M_s / M_o) = 1.00 \quad [(M_s / M_o) = 62.3 / 1049.0 = 0.059]$$

$$a_m \quad a_s \geq 1.0, \Rightarrow \text{Segment Fully Restrained}$$

$$M_{bx} = M_{sx} = 62.30 \text{ kNm} \times$$

$$M_{bx} = M_{sx} = 68.53 \text{ kNm.}$$

$$\text{Major axis capacity Ratio} = M_x^* / f M_{bx}$$

$$1 \quad \text{Ratio} = 21 / 68.53 = 0.30$$

$$= 0.37 \times \quad \text{--- OK ---} = 0.30$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 5.4 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sy} = 62.30 \text{ kNm}$$

$$\text{SHS Sectn} \Rightarrow M_{by} = M_{bx} = 62.30 \text{ kNm}$$

$$\text{Minor axis capacity ratio} = M_y^* / f M_{by} = 0.10, \times \quad \text{--- OK ---}$$

$$M_{sy} = 68.53 \text{ kNm}$$

$$M_{bx} = M_{by} = 68.53 \text{ kNm.}$$

$$\text{RATIO} = 5.4 / 68.53 = 0.078$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 8.0 \text{ kN}$$

$$V_w = 0.6 * 2 * F_{yw} * d1 * t_w = 1.2 * 350000 * 0.138 * 0.006$$

$$\text{Nominal Shear Yield capacity } V_w = 347.8 \text{ kN}$$

$$a_v = 9.08 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 347.8 \text{ kN}$$

$$\text{Mom-Shear Interaction Check : Moment ratio} \leq 0.75 \Rightarrow \text{Clause 5.12.2 N/A}$$

$$\text{Shear capacity ratio} = V_x^* / f V_u = 0.03, \quad \text{--- OK ---}$$

Axial Calculations

$$\text{Design Action } N_d = 264.6 \text{ kN [Comp]}, \text{ LeAxx} = 3.95 \text{ m}, \text{ LeAxy} = 3.95 \text{ m}$$

$$\text{Sect. Compression Capacity } N_s = k_f A_n f_{y\text{comb}}$$

$$= 1.000 * 3.3 \cdot 10^{-3} * 350$$

$$= 1165.5 \text{ kN} \times$$

$$(\text{where } A_n = A_g, \& f_y \text{ combined} = 350.0 \text{ MPa})$$

$$\text{Major axis buckling : } a_c = 0.7440$$

$$a_{cx} < 1.0 \Rightarrow N_{cx} = a_{cx} N_s = 867.1$$

$$\text{Minor axis buckling : } a_c = 0.7440$$

$$a_{cy} < 1.0 \Rightarrow N_{cy} = a_{cy} N_s = 867.1$$

$$\text{Minimum Capac. } N_{c\text{min}} = 867.1 \times$$

$$\text{Axial buckling capac. Ratio} = N_d / f N_{c\text{min}}$$

$$= 0.339, \quad \text{--- OK ---}$$

$$N_s = 1282.05 \text{ kN}$$

$$N_{cx} = N_{cy} = 953.81 \text{ kN}$$

Combined Actions Checks

Cl 8.1.1.1 : Have axial load, in conjunction with flexure, $\Rightarrow$ check Cl 8.1.4

Sig. Axial Load Check (Cl. 8.1.4) : Combined Actions check IS required

$$[\text{Is } N^* > 0.05 f N_s ? \quad 264.6 > 0.05 * 0.9 * 1165.5 ? : \text{YES} \Rightarrow \text{MUST DO CHECK}]$$

Loading FAILS Cl 8.1.4, $\Rightarrow$ Combined Actions Checks are required

+ Check Alternative Provisions, (Clause 8.1.5)

Cl 8.1.5(a) - Section Shape OK

Cl 8.1.5(b) : Plate element slenderness check

Major axis : Flg : Actual = 27.2, Allowable = 40

Web : Actual = 27.2, Allowable = 82 --- OK ---

Minor axis : Flg : Actual = 27.2, Allowable = 82

Web : Actual = 27.2, Allowable = 40 --- OK ---

Alt. Prov. Cl 8.1.5 (a)-(c) OK for Minor axis, OK for Major axis actions

+ Beta_M values from user input :

Beta_M - Out-of-plane, major axis = -2.00 (Alpha-m values not given)

Beta_M - In-plane, major axis = -2.00 (no value given)

Beta_M - In-plane, minor axis = -2.00 (no value given)

Clause 8.3.2/4 :

$$M_{rx} = M_{sx} (1 - N^* / f N_s) * 1.18, \leq M_{sx} \text{ [Alt. Prov. OK]}$$

$$= 62.3 (1 - 264.6 / 0.90 / 1166) * 1.18 \leq M_{sx}$$

$$= 55.0 \times$$

$$M_{rx} = 68.53 \left(1 - \left(\frac{264}{1166} \right) \right) 1.18$$

$$= 64.21 \text{ kNm.}$$

Clause 8.3.3/4 :

$$M_{ry} = M_{sy} (1 - (N^* / f N_s)) * 1.18, \leq M_{sy} \text{ [Alt. Prov. OK]}$$

$$= 62.3 * (1 - (264.6 / 0.90 / 1166)) * 1.18 \leq M_{sy}$$

$$= 55.0 \times$$

$$M_{ry} = 64.21 \text{ kNm. (As Above)}$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, Psi = 1.652

$$= (M_x^* / f M_{rx})^{Psi} + (M_y^* / f M_{ry})^{Psi}$$

$$= [21.0 / 0.9 / 55.0]^{1.65} + [5.4 / 0.9 / 55.0]^{1.65}$$

$$= 0.268, \times \text{ --- OK ---}$$

$$\text{Ratio: } \left(\frac{21}{64.21} \right)^{1.65} + \left(\frac{5.4}{64.21} \right)^{1.65} = 0.18$$

Clause 8.4.2.2 : Major : $M_{ix} = M_{sx} (1 - N^* / f N_{cx}) \leq M_{rx}$

$$= 62.3 (1 - 264.6 / 0.9 / 867) \leq 55.0$$

$$= 41.2 \times$$

$$M_{ix} = 45.0 \text{ kNm.}$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$

$$= 21.0 / (0.9 \cdot 41.2)$$

$$= 0.567, \times \text{ --- OK ---}$$

$$\text{Ratio} = 0.46$$

Clause 8.4.2.2 : Minor : $M_{iy} = M_{sy} (1 - N^* / f N_{cy}) \leq M_{ry}$

$$= 62.3 (1 - 264.6 / 0.9 / 867) \leq 55.0$$

$$= 41.2 \times$$

$$M_{iy} = 45.0 \text{ kNm.}$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$

$$= 5.4 / (0.9 \cdot 41.2)$$

$$= 0.146, \times \text{ --- OK ---}$$

$$\text{Ratio} = 0.12.$$

Clause 8.4.5.1 :

$$M_{cx} = M_{ix} = 41.2 \text{ (Full Lateral Restraint)}$$

Load / Capacity Ratio = $[M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$

$$= [21.0 / 0.9 / 41.2]^{1.4} + [5.4 / 0.9 / 41.2]^{1.4}$$

$$= 0.519, \times \text{ --- OK ---}$$

$$\text{Ratio} = \left(\frac{21}{45} \right)^{1.4} + \left(\frac{5.4}{45} \right)^{1.4}$$

$$= 0.40 < 1.0$$

SUMMARY

**** U.L.S. Capacity Check Passed, Load Cap. Ratio = 0.57 --- OK ---

$$NBS = 250 \phi.$$

MemDes v 2.1 : Calculations for New Zealand Steel

Project : J000949 at 11:03:23 a.m. on 11/07/2017

Description : column C29 by CO Powered By Steltech (<http://www.steltech.co.nz>)

MemDes Calculations @ 15:47:24 11-07-2017 by CO

Project : J000949

Description : column C122 (139)

Section : 150x150x6.0 SHS Grade 350

d = 150 mm b = 150 mm $t_f = 6.0$ mm $t_w = 6.0$ mm

Area = 3330 mm² $f_{yf} = 350$ MPa $f_{yw} = 350$ MPa $f_u = 430$ MPa

$I_{xx} = 11.30$ E6 mm⁴ $S_x = 178.00$ E3 mm³ $Z_x = 150.00$ E3 mm³ $r_x = 58.20$ mm

$I_{yy} = 11.30$ E6 mm⁴ $S_y = 178.00$ E3 mm³ $Z_y = 150.00$ E3 mm³ $r_y = 58.20$ mm

$I_w = 0.00$ E9 mm⁶ $J = 18400.00$ E3 mm⁴ $k_f = 1.000$ Manufact. Type = CF

Compactness(x,y) = C, C

$Z_{ex} = 178.00$ E3 mm³ $Z_{ey} = 178.00$ E3 mm³

**** MAJOR axis bending ****

Flange : l_e Ratio = 27.2 / 40 = 0.68

Web : l_e Ratio = 27.2 / 130 = 0.21

=> FLANGE = critical

$l_s = 27.2$, $l_{sp} = 30$, $l_{sy} = 40$

Section is COMPACT, $Z_{ex} = 178.00$ E3 mm³

**** MINOR axis bending ****

Flange : l_e Ratio = 27.2 / 130 = 0.21

Web : l_e Ratio = 27.2 / 40 = 0.68

=> WEB = critical

$l_s = 27.2$, $l_{sp} = 30$, $l_{sy} = 40$

Section is COMPACT, $Z_{ey} = 178.00$ E3 mm³

Member Effective Length Calcs

Torsional End Restraint Conds (TERC) are given as PP

=> Line3 of Tbl 5.6.3(1) => $k_t = 1.01$

Load Height is at Top Flange, with Load Position within segment

=> $k_l = 1.40$

With Lat. Rotn Restraints at neither end

=> $k_r = 1.00$

Eff. Len $L_e = L * k_t * k_l * k_r = 1.50 * 1.01 * 1.40 * 1.00 = 2.13$ m

Major Axis Bending

Design Action $M_x^* = 73.5$ kNm

Section Bending Capacity $M_{sx} = f_{yf} Z_{ex} = 62.30$ kNm *

User provided value for $a_m = 2.37$

Reference Buckling Moment Calculation : M_o

Temp. variable $Pi2_E_Le2 = \pi^2 * E / L_e^2 = 3.142^2 * 205 \text{ E6} / 2.126^2 = 447.5 \text{ E06}$

$M_o = [(Pi2_E_Le2 * I_y) * (G J + (Pi2_E_Le2 * I_w))]^{0.5}$

$M_o = 2728.4$ kNm (Eqtn 5.6.1.1(4))

$a_s = 0.6 * [((M_s / M_o)^2 + 3)^{0.5} - (M_s / M_o)] = 1.03$ [$(M_s / M_o) = 62.3 / 2728.4 = 0.023$]

a_m $a_s >= 1.0$, => Segment Fully Restrained

$M_{bx} = M_{sx} = 62.30$ kNm *

Major axis capacity Ratio = $M_x^* / f M_{bx}$

Note:

CALCULATIONS AMENDED.

$\phi = 1.0$.

$f_y = 350 * 1.10 = 385 \text{ MPa}$.

$f_y = 385 \text{ MPa}$

$M_{sx} = 68.53 \text{ kNm}$

$M_{bx} = M_{sx} = 68.53 \text{ kNm}$

1 RATIO = 1.07

9.

$$= 1.31, \times$$

**** FAIL ****

$$= 1.07$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 16.8 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sy} = 62.30 \text{ kNm} \times$$

$$\text{SHS Sectn} \Rightarrow M_{by} = M_{bx} = 62.30 \text{ kNm} \times$$

$$\text{Minor axis capacity ratio} = M_y^* / f M_{by} = 0.30, \times \quad \text{--- OK ---}$$

$$M_{sy} = 68.53 \text{ kNm}$$

$$M_{bx} = M_{by} = 68.53 \text{ kNm}$$

$$\text{Ratio} = 0.25$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 24.5 \text{ kN}$$

$$V_w = 0.6 * 2 * F_{yw} * d_1 * t_w = 1.2 * 350000 * 0.138 * 0.006$$

$$\text{Nominal Shear Yield capacity } V_w = 347.8 \text{ kN}$$

$$a_v = 9.08 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 347.8 \text{ kN}$$

*** Stupid value for MomRatio [1.311], limiting to 1.0 ***

Mom-Shear Interaction Check : Moment ratio > 0.75 $\Rightarrow$ reduced shear capacity available

$$V_{vm} = V_u * [2.2 - (1.6 * M^* / f M_s)] = 208.7 \text{ kN} \quad (\text{Cl. 5.12.2})$$

$$\text{Shear capacity ratio} = V_x^* / f V_{vm} = 0.13, \times \quad \text{--- OK ---}$$

Axial Calculations

$$\text{Design Action } N_d = 50.3 \text{ kN [Comp]}, \text{ Le}_{Ax} = 1.50 \text{ m}, \text{ Le}_{Ay} = 1.50 \text{ m}$$

$$\text{Sect. Compression Capacity } N_s = k_f A_n f_{y\text{comb}}$$

$$= 1.000 * 3.3 \cdot 10^{-3} * 350$$

$$= 1165.5 \text{ kN} \times$$

$$(\text{where } A_n = A_g, \text{ \& } f_y \text{ combined} = 350.0 \text{ MPa})$$

$$\text{Major axis buckling : } a_c = 0.9666$$

$$a_{cx} < 1.0 \Rightarrow N_{cx} = a_{cx} N_s = 1126.6 \times$$

$$\text{Minor axis buckling : } a_c = 0.9666$$

$$a_{cy} < 1.0 \Rightarrow N_{cy} = a_{cy} N_s = 1126.6$$

$$\text{Minimum Capac. } N_{c\text{min}} = 1126.6 \times$$

$$\text{Axial buckling capac. Ratio} = N_d / f N_{c\text{min}}$$

$$= 0.050, \quad \text{--- OK ---}$$

$$N_s = 1282.05 \text{ kN}$$

$$N_{cx} = N_{cy} = 1239.26 \text{ kN}$$

$$N_{c\text{min}} = 1239.26 \text{ kN}$$

Combined Actions Checks

Cl 8.1.1.1 : Have axial load, in conjunction with flexure, $\Rightarrow$ check Cl 8.1.4

Significant Axial Load test (Cl. 8.1.4(a)) NOT Satisfied **** NOK ****

Significant Axial Load test (Cl. 8.1.4(b)) NOT Satisfied **** NOK ****

Loading FAILS Cl 8.1.4, $\Rightarrow$ Combined Actions Checks are required

+ Check Alternative Provisions, (Clause 8.1.5)

Cl.8.1.5(a) - Section Shape OK

Cl 8.1.5(b) : Plate element slenderness check

$$\text{Major axis : Flg : Actual} = 27.2, \text{ Allowable} = 40$$

$$\text{Web : Actual} = 27.2, \text{ Allowable} = 82 \quad \text{--- OK ---}$$

$$\text{Minor axis : Flg : Actual} = 27.2, \text{ Allowable} = 82$$

$$\text{Web : Actual} = 27.2, \text{ Allowable} = 40 \quad \text{--- OK ---}$$

Alt. Prov. Cl 8.1.5 (a)-(c) OK for Minor axis, OK for Major axis actions

+ Beta_M values from user input :

Beta_M - Out-of-plane, major axis = -2.00 (Alpha-m values not given)

Beta_M - In-plane, major axis = -2.00 (no value given)

Beta_M - In-plane, minor axis = -2.00 (no value given)

Clause 8.3.2/4 :

$$M_{rx} = M_{sx} (1 - N^* / f N_s) * 1.18, \leq M_{sx} \text{ [Alt. Prov. OK]}$$

$$= 62.3 (1 - 50.3 / 0.90 / 1166) * 1.18 \leq M_{sx}$$

$$= \underline{62.3} \times$$

$$M_{rx} = 68.53 \left(1 - \frac{50.3}{1282.05} \right) 1.18$$

$$= \underline{77.69 \text{ kNm.}}$$

Clause 8.3.3/4 :

$$M_{ry} = M_{sy} (1 - (N^* / f N_s)) * 1.18, \leq M_{sy} \text{ [Alt. Prov. OK]}$$

$$= 62.3 * (1 - (50.3 / 0.90 / 1166)) * 1.18 \leq M_{sy}$$

$$= \underline{62.3} \times$$

$$M_{ry} = 77.69 \text{ kNm.} \quad \left(\begin{array}{l} \text{As.} \\ \text{Above} \end{array} \right)$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, Psi = 1.448

$$= (M_x^* / f M_{rx})^{\text{Psi}} + (M_y^* / f M_{ry})^{\text{Psi}}$$

$$= [73.5 / 0.9 / 62.3]^{1.45} + [16.8 / 0.9 / 62.3]^{1.45}$$

$$= \underline{1.654} \times \quad \text{**** FAIL ****}$$

$$\text{Ratio: } \left(\frac{73.5}{68.53} \right)^{1.45} + \left(\frac{16.8}{68.53} \right)^{1.45} = 1.23$$

Clause 8.4.2.2 : Major : $M_{ix} = M_{sx} (1 - N^* / f N_{cx}) \leq M_{rx}$

$$= 62.3 (1 - 50.3 / 0.9 / 1127) \leq 62.3$$

$$= \underline{59.2}$$

$$M_{ix} = 65.75 \text{ kNm.}$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$

$$= 73.5 / (0.9 \cdot 59.2)$$

$$= \underline{1.379} \times \quad \text{**** FAIL ****}$$

$$\text{Ratio} = 73.5 / 65.75$$

$$= \underline{1.12}$$

Clause 8.4.2.2 : Minor : $M_{iy} = M_{sy} (1 - N^* / f N_{cy}) \leq M_{ry}$

$$= 62.3 (1 - 50.3 / 0.9 / 1127) \leq 62.3$$

$$= \underline{59.2}$$

$$M_{iy} = 68.53 \left(1 - \frac{50.3}{1282.05} \right)$$

$$= 65.75 \text{ kNm.}$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$

$$= 16.8 / (0.9 \cdot 59.2)$$

$$= \underline{0.315} \times \quad \text{--- OK ---}$$

$$\text{Ratio} = 16.8 / 65.75 = 0.255$$

Clause 8.4.5.1 :

$$M_{cx} = M_{ix} = 59.2 \text{ (Full Lateral Restraint)}$$

Load / Capacity Ratio = $[M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$

$$= [73.5 / 0.9 / 59.2]^{1.4} + [16.8 / 0.9 / 59.2]^{1.4}$$

$$= \underline{1.767} \times \quad \text{**** FAIL ****}$$

$$\text{Ratio} = \left(\frac{73.5}{65.75} \right)^{1.4} + \left(\frac{16.80}{65.75} \right)^{1.4}$$

$$\text{Ratio} = 1.31 > 1$$

**** U.L.S. Capacity Check FAILED, Load Cap. Ratio = 1.77 *** FAIL ***

MemDes v 2.1 : Calculations for New Zealand Steel

Project : J000949 at 3:47:24 p.m. on 11/07/2017

Description : column C122 (139) by CO

Powered By Steltech (<http://www.steltech.co.nz>)

$$\text{NBS} = \frac{1}{1.31} = 76.3\%$$

Project : J000949

Description : column C130 (109)

Section : 150x150x6.0 SHS Grade 350

d = 150 mm b = 150 mm t_f = 6.0 mm t_w = 6.0 mm

Area = 3330 mm² f_{yf} = 350 MPa f_{yw} = 350 MPa f_u = 430 MPa

I_{xx} = 11.30 E⁶ mm⁴ S_x = 178.00 E³ mm³ Z_x = 150.00 E³ mm³ r_x = 58.20 mm

I_{yy} = 11.30 E⁶ mm⁴ S_y = 178.00 E³ mm³ Z_y = 150.00 E³ mm³ r_y = 58.20 mm

I_w = 0.00 E⁹ mm⁶ J = 18400.00 E³ mm⁴ k_f = 1.000 Manufact. Type = CF

Compactness(x,y) = C, C

Z_{ex} = 178.00 E³ mm³ Z_{ey} = 178.00 E³ mm³

**** MAJOR axis bending ****

Flange : l_e Ratio = 27.2 / 40 = 0.68

Web : l_e Ratio = 27.2 / 130 = 0.21

=> FLANGE = critical

l_s = 27.2, l_{sp} = 30, l_{sy} = 40

Section is COMPACT, Z_{ex} = 178.00 E³ mm³

**** MINOR axis bending ****

Flange : l_e Ratio = 27.2 / 130 = 0.21

Web : l_e Ratio = 27.2 / 40 = 0.68

=> WEB = critical

l_s = 27.2, l_{sp} = 30, l_{sy} = 40

Section is COMPACT, Z_{ey} = 178.00 E³ mm³

Member Effective Length Calcs

Torsional End Restraint Conds (TERC) are given as FF

=> k_t = 1.00

User provided value of k_l = 1.40

With Lat. Rotn Restraints at neither end

=> k_r = 1.00

Eff. Len L_e = L * k_t * k_l * k_r = 3.17 * 1.00 * 1.40 * 1.00 = 4.44m

Major Axis Bending

Design Action M_x^{*} = 9.6 kNm

Section Bending Capacity M_{sx} = f_{yf} Z_{ex} = (62.30 kNm) x

User provided value for a_m = 1.55

Reference Buckling Moment Calculation : M₀

Temp. variable Pi₂_E_Le₂ = PI² * E / L_e² = 3.142² * 205 E6 / 4.438² = 102.7 E06

M₀ = [(Pi₂_E_Le₂ * I_y) * (G J + (Pi₂_E_Le₂ * I_w))] ^{0.5}

M₀ = 1307.2 kNm (Eqtn 5.6.1.1(4))

a_s = 0.6 * [(M_s/M₀)² + 3] ^{0.5} - (M_s/M₀) = 1.01 [(M_s/M₀) = 62.3 / 1307.2 = 0.048]

a_m a_s >= 1.0, => Segment Fully Restrained

M_{bx} = M_{sx} = (62.30 kNm) x

Major axis capacity Ratio = M_x^{*} / f M_{bx}

= 0.17, ---- OK ----

NOTE:

CALCULATIONS AMENDED

φ = 1.0.

f_y = 350 * 1.10 = 385 MPa.

f_y = 385 MPa.

M_{sx} = 68.53 kNm

M_{bx} = M_{sx} = 68.53 kNm.

Minor Axis Bending

$$\text{Design Action } M_y^* = 69.2 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sy} = 62.30 \text{ kNm} \quad \times$$

$$\text{SHS Sectn} \Rightarrow M_{by} = M_{bx} = 62.30 \text{ kNm} \quad \times$$

$$\text{Minor axis capacity ratio} = M_y^* / f M_{by} = 1.23 \quad \times \quad \text{**** FAIL ****}$$

$$M_{sy} = 68.53 \text{ kNm.}$$

$$M_{by} = M_{bx} = 68.53 \text{ kNm.}$$

$$\text{Ratio} = 69.2 / 68.53 = 1.01$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 127.5 \text{ kN}$$

$$V_w = 0.6 * 2 * F_{yw} * d1 * t_w = 1.2 * 350000 * 0.138 * 0.006$$

$$\text{Nominal Shear Yield capacity } V_w = 347.8 \text{ kN}$$

$$a_v = 9.08 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 347.8 \text{ kN}$$

$$\text{Mom-Shear Interaction Check : Moment ratio} \leq 0.75 \Rightarrow \text{Clause 5.12.2 N/A}$$

$$\text{Shear capacity ratio} = V_x^* / f V_u = 0.41, \quad \text{---- OK ----}$$

Axial Calculations

$$\text{Design Action } N_d = 101.0 \text{ kN [Comp]}, \quad L_{eAx} = 2.22 \text{ m}, \quad L_{eAy} = 2.22 \text{ m}$$

$$\text{Sect. Compression Capacity } N_s = k_f A_n f_{y\text{comb}}$$

$$= 1.000 * 3.3.E-3 * 350$$

$$= 1165.5 \text{ kN} \quad \times$$

$$(\text{where } A_n = A_g, \text{ \& } F_y \text{ combined} = 350.0 \text{ MPa})$$

$$N_s = 1282.05 \text{ kN.}$$

$$f_y = 385 \text{ MPa.}$$

$$\text{Major axis buckling : } a_c = 0.9234$$

$$a_{cx} < 1.0 \Rightarrow N_{cx} = a_{cx} N_s = 1076.2 \quad \times$$

$$N_{cx} = N_{cy} = 1183.8 \text{ kN}$$

$$\text{Minor axis buckling : } a_c = 0.9234$$

$$a_{cy} < 1.0 \Rightarrow N_{cy} = a_{cy} N_s = 1076.2 \quad \times$$

$$N_{cmin} = 1183.8 \text{ kN.}$$

$$\text{Minimum Capac. } N_{cmin} = 1076.2 \quad \times$$

$$\text{Axial buckling capac. Ratio} = N_d / f N_{cmin} = 0.104, \quad \text{---- OK ----}$$

Combined Actions Checks

Cl 8.1.1.1 : Have axial load, in conjunction with flexure, $\Rightarrow$ check Cl 8.1.4

Sig. Axial Load Check (Cl. 8.1.4) : Combined Actions check IS required

$$[\text{Is } N^* > 0.05 f N_s ? \quad 101.0 > 0.05 * 0.9 * 1165.5 ? : \text{YES} \Rightarrow \text{MUST DO CHECK}]$$

Loading FAILS Cl 8.1.4, $\Rightarrow$ Combined Actions Checks are required

+ Check Alternative Provisions, (Clause 8.1.5)

Cl 8.1.5(a) - Section Shape OK

Cl 8.1.5(b) : Plate element slenderness check

$$\text{Major axis : Flg : Actual} = 27.2, \text{ Allowable} = 40$$

$$\text{Web : Actual} = 27.2, \text{ Allowable} = 82 \quad \text{---- OK ----}$$

$$\text{Minor axis : Flg : Actual} = 27.2, \text{ Allowable} = 82$$

$$\text{Web : Actual} = 27.2, \text{ Allowable} = 40 \quad \text{---- OK ----}$$

Alt. Prov. Cl 8.1.5 (a)-(c) OK for Minor axis, OK for Major axis actions

+ Beta_M values from user input :

$$\text{Beta}_M - \text{Out-of-plane, major axis} = -2.00 \text{ (Alpha-m values not given)}$$

$$\text{Beta}_M - \text{In-plane, major axis} = -2.00 \text{ (no value given)}$$

$$\text{Beta}_M - \text{In-plane, minor axis} = -2.00 \text{ (no value given)}$$

Clause 8.3.2/4 :

$$M_{rx} = M_{sx} (1 - N^* / f N_s) * 1.18, \leq M_{sx} \text{ [Alt. Prov. OK]}$$

$$= 62.3 (1 - 101.0 / 0.90 / 1166) * 1.18 \leq M_{sx}$$

$$= 62.3 \quad \times$$

$$M_{rx} = 68.53 \left(1 - (101 / 1 / 1282) \right) 1.18$$

$$= 74.50 \text{ kNm.}$$

Clause 8.3.3/4 :

$$M_{ry} = M_{sy} (1 - (N^* / f N_s)) * 1.18, \leq M_{sy} \text{ [Alt. Prov. OK]}$$

$$= 62.3 * (1 - (101.0 / 0.90 / 1166)) * 1.18 \leq M_{sy}$$

$$= 62.3 \quad \times$$

$$M_{ry} = 74.50 \text{ kNm. (AS ABOVE)}$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, $\Psi = 1.496$

$$= (M_x^* / f M_{rx})^{\Psi} + (M_y^* / f M_{ry})^{\Psi}$$

$$= [9.6 / 0.9 / 62.3]^{1.50} + [69.2 / 0.9 / 62.3]^{1.50}$$

$$= 1.441, \quad \times \quad \text{**** FAIL ****}$$

$$\text{Ratio} = \left(\frac{9.6}{74.50} \right)^{1.5} + \left(\frac{69.2}{74.50} \right)^{1.5}$$

$$= 0.94$$

Clause 8.4.2.2 : Major : $M_{ix} = M_{sx} (1 - N^* / f N_{cx}) \leq M_{rx}$

$$= 62.3 (1 - 101.0 / 0.9 / 1076) \leq 62.3$$

$$= 55.8 \quad \times$$

$$M_{ix} = 63.13 \text{ kNm.}$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$

$$= 9.6 / (0.9 * 55.8)$$

$$= 0.191 \quad \times \quad \text{--- OK ---}$$

$$= 9.6 / 63.13$$

$$= 0.15$$

Clause 8.4.2.2 : Minor : $M_{iy} = M_{sy} (1 - N^* / f N_{cy}) \leq M_{ry}$

$$= 62.3 (1 - 101.0 / 0.9 / 1076) \leq 62.3$$

$$= 55.8 \quad \times$$

$$M_{iy} = 63.13 \text{ kNm.}$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$

$$= 69.2 / (0.9 * 55.8)$$

$$= 1.378 \quad \times \quad \text{**** FAIL ****}$$

$$= M_m^* / f M_i$$

$$= 69.2 / (1.0 * 63.13)$$

$$= 1.10$$

Clause 8.4.5.1 :

$$M_{cx} = M_{ix} = 55.8$$

Load / Capacity Ratio = $[M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$

$$= [9.6 / 0.9 / 55.8]^{1.4} + [69.2 / 0.9 / 55.8]^{1.4}$$

$$= 1.665, \quad \times \quad \text{**** FAIL ****}$$

$$\text{Ratio} = \left(9.6 / 63.13 \right)^{1.4} + \left(69.2 / 63.13 \right)^{1.4}$$

$$= 1.20 > 1.0$$

SUMMARY

**** U.L.S. Capacity Check FAILED, Load Cap. Ratio = 1.66 *** FAIL ***

MemDes v 2.1 : Calculations for New Zealand Steel

Project : J000949 at 11:59:50 a.m. on 11/07/2017

Description : column C130 by CO Powered By Steltech (<http://www.steltech.co.nz>)

$$NBS = \frac{1}{1.20} = 83\%$$

MemDes Calculations @ 14:08:55 11-07-2017 by CO

Project : J000949

Description : beam B485 (513)

NOTE:

CALCULATIONS AMENDED

$$\phi = 1.0$$

$$f_y = 300 \times 1.15 = 345 \text{ MPa}$$

Section : 250UC72 Grade 300+

$$d = 254 \text{ mm} \quad b = 254 \text{ mm} \quad t_f = 14.2 \text{ mm} \quad t_w = 8.6 \text{ mm}$$

$$\text{Area} = 9320 \text{ mm}^2 \quad f_{yf} = 300 \text{ MPa} \quad f_{yw} = 320 \text{ MPa} \quad f_u = 440 \text{ MPa}$$

$$I_{xx} = 114.00 \text{ E}^6 \text{ mm}^4 \quad S_x = 992.00 \text{ E}^3 \text{ mm}^3 \quad Z_x = 897.00 \text{ E}^3 \text{ mm}^3 \quad r_x = 111.00 \text{ mm}$$

$$I_{yy} = 38.80 \text{ E}^6 \text{ mm}^4 \quad S_y = 463.00 \text{ E}^3 \text{ mm}^3 \quad Z_y = 306.00 \text{ E}^3 \text{ mm}^3 \quad r_y = 64.50 \text{ mm}$$

$$I_w = 557.00 \text{ E}^9 \text{ mm}^6 \quad J = 586.00 \text{ E}^3 \text{ mm}^4 \quad k_f = 1.000 \quad \text{Manufact. Type} = \text{HR}$$

$$\text{Compactness}(x,y) = N, N$$

$$Z_{ex} = 986.00 \text{ E}^3 \text{ mm}^3 \quad Z_{ey} = 454.00 \text{ E}^3 \text{ mm}^3$$

$$f_y = 345 \text{ MPa}$$

Member Effective Length Calcs

Torsional End Restraint Conds (TERC) are given as FF

$$\Rightarrow k_t = 1.00$$

Load Height is at Top Flange, with Load Position within segment

$$\Rightarrow k_l = 1.40$$

With Lat. Rotn Restraints at neither end

$$\Rightarrow k_r = 1.00$$

$$\text{Eff. Len } L_e = L * k_t * k_l * k_r = 3.83 * 1.00 * 1.40 * 1.00 = 5.36 \text{ m}$$

Major Axis Bending

$$\text{Design Action } M_x^* = 47.8 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sx} = f_{yf} Z_{ex} = 295.80 \text{ kNm} \quad \times$$

$$\text{User provided value for } a_m = 1.04$$

Reference Buckling Moment Calculation : M_o

$$\text{Temp. variable } \pi^2 E / L_e^2 = \pi^2 \times E / L_e^2 = 3.142^2 \times 205 \text{ E}6 / 5.362^2 = 70.4 \text{ E}06$$

$$M_o = [(\pi^2 E / L_e^2 * I_y) * (G J + (\pi^2 E / L_e^2 * I_w))]^{0.5}$$

$$M_o = 484.8 \text{ kNm} \quad (\text{Eqtn 5.6.1.1(4)})$$

$$a_s = 0.6 * [(M_s / M_o)^2 + 3]^{0.5} - (M_s / M_o) = 0.74 \quad [(M_s / M_o) = 295.8 / 484.8 = 0.610]$$

$$a_m \quad a_s < 1.0, \Rightarrow \text{Segment NOT Fully Restrained}$$

$$M_{bx} = 1.04 * 0.74 * 295.8 = 226.3 \quad \times$$

$$\text{Major axis capacity Ratio} = M_x^* / f M_{bx}$$

$$= 0.23, \quad \times \quad \text{--- OK ---}$$

$$M_{sx} = 343.28 \text{ kNm}$$

$$M_{bx} = 264.20 \text{ kNm}$$

$$\text{RATIO} = 0.18$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 159.8 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sy} = 136.20 \text{ kNm}$$

$$M_{by} = M_{sy} = 136.20 \text{ kNm} \quad \times$$

$$\text{Minor axis capacity ratio} = M_y^* / f M_{by}$$

$$= 1.30, \quad \times \quad \text{**** FAIL ****}$$

$$M_{by} = M_{sy} = 156.63 \text{ kNm}$$

$$\text{RATIO} = 1.02$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 123.2 \text{ kN}$$

$$V_w = 0.6 * F_{yw} * d * t_w = 0.6 * 320000 * 0.254 * 0.009$$

$$\text{Nominal Shear Yield capacity } V_w = 419.4 \text{ kN}$$

$$a_v = 7.63 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 419.4 \text{ kN}$$

Mom-Shear Interaction Check : Moment ratio $\leq 0.75 \Rightarrow$ Clause 5.12.2 N/A

$$\begin{aligned} \text{Shear capacity ratio} &= V_x^* / f V_u \\ &= 0.33, \quad \text{--- OK ---} \end{aligned}$$

Axial Calculations

$$\text{Design Action } N_d = 46.4 \text{ kN [Comp]}, \text{ LeAxx} = 2.68 \text{ m}, \text{ LeAxy} = 2.68 \text{ m}$$

$$\begin{aligned} \text{Sect. Compression Capacity } N_s &= k_f A_n f_{y\text{comb}} \\ &= 1.000 * 9.3 \cdot 10^{-3} * 305 \\ &= 2838.1 \text{ kN} \quad \times \end{aligned}$$

$$(\text{where } A_n = A_g, \text{ \& } f_y \text{ combined} = 304.5 \text{ MPa})$$

$$\text{Major axis buckling : } a_c = 0.9553$$

$$a_{cx} < 1.0 \Rightarrow N_{cx} = a_{cx} N_s = 2711.2 \quad \times$$

$$\text{Minor axis buckling : } a_c = 0.8797$$

$$a_{cy} < 1.0 \Rightarrow N_{cy} = a_{cy} N_s = 2496.6 \quad \times$$

$$\text{Minimum Capac. } N_{c\min} = 2496.6 \quad \times$$

$$\begin{aligned} \text{Axial buckling capac. Ratio} &= N_d / f N_{c\min} \\ &= 0.021, \quad \text{--- OK ---} \end{aligned}$$

$$N_s = 3263.82 \text{ kN}$$

$$N_{cx} = 3117.89 \text{ kN}$$

$$N_{cy} = 2871.09 \text{ kN}$$

$$N_{c\min} = 2871.09 \text{ kN}$$

Combined Actions Checks

Cl 8.1.1.1 : Have axial load, in conjunction with flexure, $\Rightarrow$ check Cl 8.1.4

Significant Axial Load test (Cl. 8.1.4(a)) NOT Satisfied **** NOK ****

Significant Axial Load test (Cl. 8.1.4(b)) NOT Satisfied **** NOK ****

Loading FAILS Cl 8.1.4, $\Rightarrow$ Combined Actions Checks are required

+ Check Alternative Provisions, (Clause 8.1.5)

Cl.8.1.5(a) - Section Shape OK

Cl 8.1.5(b) : Plate element slenderness check

Major axis : Flg : Actual = 9.5, Allowable = 10

Web : Actual = 29.7, Allowable = 82 --- OK ---

Minor axis : Flg : Actual = 9.5, Allowable = 10

Web : Actual = 29.7, Allowable = 1000 --- OK ---

Alt. Prov. Cl 8.1.5 (a)-(c) OK for Minor axis, OK for Major axis actions

+ Beta_M values from user input :

Beta_M - Out-of-plane, major axis = -2.00 (Alpha-m values not given)

Beta_M - In-plane, major axis = -2.00 (no value given)

Beta_M - In-plane, minor axis = -2.00 (no value given)

Clause 8.3.2/4 :

$$\begin{aligned} M_{rx} &= M_{sx} (1 - N^* / f N_s) * 1.18, \leq M_{sx} [\text{Alt. Prov. OK}] \\ &= 295.8 (1 - 46.4 / 0.90 / 2838) * 1.18 \leq M_{sx} \\ &= 295.8 \quad \times \end{aligned}$$

$$\begin{aligned} M_{rx} &= 343.28 (1 - (46.4 / 3263.82))^{1.18} \\ &= 399 \text{ kNm} \end{aligned}$$

Clause 8.3.3/4 :

$$\begin{aligned} M_{ry} &= M_{sy} (1 - (N^* / f N_s)^2) * 1.19, \leq M_{sy} [\text{Alt. Prov. OK}] \\ &= 136.2 * (1 - (46.4 / 0.90 / 2838)^2) * 1.19 \leq M_{sy} \\ &= 136.2 \quad \times \end{aligned}$$

$$\begin{aligned} M_{ry} &= 156.63 (1 - (46.2 / 3263)^2)^{1.19} \\ &= 184.80 \text{ kNm} \end{aligned}$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, Psi = 1.418

$$\begin{aligned} &= (M_x^* / f M_{rx})^{\text{Psi}} + (M_y^* / f M_{ry})^{\text{Psi}} \\ &= [47.8 / 0.9 / 295.8]^{1.42} + [159.8 / 0.9 / 136.2]^{1.42} \\ &= 1.544, \quad \times \quad \text{**** FAIL ****} \end{aligned}$$

$$\begin{aligned} \text{Ratio} &= \left(\frac{47.8}{399} \right)^{1.42} + \left(\frac{159.8}{184.80} \right)^{1.42} \\ &= 0.86 \end{aligned}$$

$$M_{ix} = 343.28 \left(1 - 46.4 / 3117.89 \right) = 338.17 \text{ kNm.}$$

Clause 8.4.2.2 : Major : $M_{ix} = M_{sx} (1 - N^* / f N_{cx}) \leq M_{rx}$
 $= 295.8 (1 - 46.4 / 0.9 / 2711) \leq 295.8$
 $= 290.2 \quad \times$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$
 $= 47.8 / (0.9 \cdot 290.2)$
 $= 0.183 \quad \text{--- OK ---}$

Clause 8.4.2.2 : Minor : $M_{iy} = M_{sy} (1 - N^* / f N_{cy}) \leq M_{ry}$
 $= 136.2 (1 - 46.4 / 0.9 / 2497) \leq 136.2$
 $= 133.4 \quad \times$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$
 $= 159.8 / (0.9 \cdot 133.4)$
 $= 1.331 \quad \times \quad \text{**** FAIL ****}$

$$M_{iy} = 156.63 \left(1 - 46.4 / 2871.09 \right) = 153.51 \text{ kNm.}$$

$$\text{RATIO} = 159.8 / 153.51 = 1.04$$

Clause 8.4.4.1 : User provided value for a_m , hence unable to calculate b_m <<<<

>>> => Cannot Access Alternative Design Provisions <<<<

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

$M_{ox} = M_{bx} (1 - N^* / f N_{cy}) \leq M_{rx}$
 $= 226.3 (1 - 46.4 / 0.9 / 2496.6) \leq 295.8$
 $= 221.7 \quad \times$

$$M_{ox} = 264.20 \left(1 - 46.4 / 2871.09 \right) = 260 \text{ kNm.}$$

Load / Capacity Ratio = $M_x^* / f M_{ox}$
 $= 47.8 / (0.9 \cdot 221.7)$
 $= 0.240, \quad \text{--- OK ---}$

$$\text{RATIO} = 47.8 / 260 = 0.183.$$

Clause 8.4.5.1 :

$M_{cx} = \min(M_{ix}, M_{ox}) = \min(290.2, 221.7) = 221.7$

Load / Capacity Ratio = $[M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$
 $= [47.8 / 0.9 / 221.7]^{1.4} + [159.8 / 0.9 / 133.4]^{1.4}$
 $= 1.628, \quad \text{**** FAIL ****}$

$$M_{cx} = M_{ox} = 260 \text{ kNm.}$$

$$\text{RATIO} = \left(\frac{47.8}{260} \right)^{1.4} + \left(\frac{159.8}{153.51} \right)^{1.4}$$

===== SUMMARY =====
 **** U.L.S. Capacity Check FAILED, Load Cap. Ratio = 1.63 *** FAIL ***

$$\text{RATIO} = 1.15 > 1$$

MemDes v 2.1 : Calculations for New Zealand Steel
 Project : J000949 at 2:08:55 p.m. on 11/07/2017
 Description : beam B485 (513) by CO

Powered By Steltech (<http://www.steltech.co.nz>)

$$NBS = \frac{1}{1.15} = 87\%$$

17.

Note:

CALCULATIONS SHOW
DEMAND/CAPACITY RATIO
IS > 1.0.

MemDes Calculations @ 15:29:03 11-07-2017 by CO

Project : J000949

Description : beam B175 (357)

Section : 360UB44 Grade 300+

$d = 352 \text{ mm}$ $b = 171 \text{ mm}$ $t_f = 9.7 \text{ mm}$ $t_w = 6.9 \text{ mm}$

Area = 5720 mm^2 $f_{yf} = 320 \text{ MPa}$ $f_{yw} = 320 \text{ MPa}$ $f_u = 440 \text{ MPa}$

$I_{xx} = 121.00 \text{ E}^6 \text{ mm}^4$ $S_x = 777.00 \text{ E}^3 \text{ mm}^3$ $Z_x = 689.00 \text{ E}^3 \text{ mm}^3$ $r_x = 146.00 \text{ mm}$

$I_{yy} = 8.10 \text{ E}^6 \text{ mm}^4$ $S_y = 146.00 \text{ E}^3 \text{ mm}^3$ $Z_y = 94.70 \text{ E}^3 \text{ mm}^3$ $r_y = 37.60 \text{ mm}$

$I_w = 237.00 \text{ E}^9 \text{ mm}^6$ $J = 161.00 \text{ E}^3 \text{ mm}^4$ $k_f = 0.930$ Manufact. Type = HR

Compactness(x,y) = N, N

$Z_{ex} = 770.00 \text{ E}^3 \text{ mm}^3$ $Z_{ey} = 140.00 \text{ E}^3 \text{ mm}^3$

Member Effective Length Calcs

Torsional End Restraint Conds (TERC) are given as LL

$$\Rightarrow k_t = 1.00$$

Load Height is at Top Flange, with Load Position within segment

$$\Rightarrow k_l = 1.40$$

With End Restraints of LL, $\Rightarrow k_r = 1.00$

$$\text{Eff. Len } L_e = L * k_t * k_l * k_r = 2.88 * 1.00 * 1.40 * 1.00 = 4.04 \text{ m}$$

Major Axis Bending

$$\text{Design Action } M_x^* = 6.0 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sx} = f_{yf} Z_{ex} = 246.40 \text{ kNm}$$

User provided value for $a_m = 1.09$

Reference Buckling Moment Calculation : M_O

$$\text{Temp. variable } \Pi^2_{E_Le2} = \Pi^2 * E / L_e^2 = 3.142^2 * 205 \text{ E}6 / 4.039^2 = 124.0 \text{ E}06$$

$$M_O = [(\Pi^2_{E_Le2} * I_y) * (G J + (\Pi^2_{E_Le2} * I_w))]^{0.5}$$

$$M_O = 206.1 \text{ kNm} \quad (\text{Eqn 5.6.1.1(4)})$$

$$a_s = 0.6 * [((M_s/M_O)^2 + 3)^{0.5} - (M_s/M_O)] = 0.55 \quad [(M_s/M_O) = 246.4 / 206.1 = 1.196]$$

a_m $a_s < 1.0$, $\Rightarrow$ Segment NOT Fully Restrained

$$M_{bx} = 1.09 * 0.55 * 246.4 = 146.5$$

$$\text{Major axis capacity Ratio} = M_x^* / f M_{bx} = 0.05, \quad \text{---- OK ----}$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 25.2 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sy} = 44.80 \text{ kNm}$$

$$M_{by} = M_{sy} = 44.80 \text{ kNm}$$

$$\text{Minor axis capacity ratio} = M_y^* / f M_{by} = 0.63, \quad \text{---- OK ----}$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 16.0 \text{ kN}$$

$$V_w = 0.6 * F_{yw} * d * t_w = 0.6 * 320000 * 0.352 * 0.007$$

$$\text{Nominal Shear Yield capacity } V_w = 466.3 \text{ kN}$$

$$a_v = 2.26 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 466.3 \text{ kN}$$

Mom-Shear Interaction Check : Moment ratio $\leq 0.75 \Rightarrow$ Clause 5.12.2 N/A

$$\begin{aligned} \text{Shear capacity ratio} &= V_x^* / f V_u \\ &= 0.04, \quad \text{---- OK ----} \end{aligned}$$

Axial Calculations

Design Action $N_d = 8.6 \text{ kN}$ [Comp], $L_{eAx} = 2.88 \text{ m}$, $L_{eAy} = 2.88 \text{ m}$

$$\begin{aligned} \text{Sect. Compression Capacity } N_s &= k_f A_n f_{y\text{comb}} \\ &= 0.930 * 5.7.E-3 * 320 \\ &= 1702.3 \text{ kN} \end{aligned}$$

(where $A_n = A_g$, & f_y combined = 320.0 MPa

Major axis buckling : $a_c = 0.9729$

$$a_{cx} < 1.0 \Rightarrow N_{cx} = a_{cx} N_s = 1656.2$$

Minor axis buckling : $a_c = 0.6545$

$$a_{cy} < 1.0 \Rightarrow N_{cy} = a_{cy} N_s = 1114.2$$

Minimum Capac. $N_{c\min} = 1114.2$

$$\begin{aligned} \text{Axial buckling capac. Ratio} &= N_d / f N_{c\min} \\ &= 0.009, \quad \text{---- OK ----} \end{aligned}$$

Combined Actions Checks

Cl 8.1.1.1 : Have axial load, in conjunction with flexure, $\Rightarrow$ check Cl 8.1.4

Significant Axial Load test (Cl. 8.1.4(a)) NOT Satisfied **** NOK ****

Significant Axial Load test (Cl. 8.1.4(b)) NOT Satisfied **** NOK ****

Loading FAILS Cl 8.1.4, $\Rightarrow$ Combined Actions Checks are required

+ Check Alternative Provisions, (Clause 8.1.5)

Cl.8.1.5(a) - Section Shape OK

Cl 8.1.5(b) : Plate element slenderness check

Major axis : Flg : Actual = 9.6, Allowable = 10

Web : Actual = 54.5, Allowable = 82 ---- OK ----

Minor axis : Flg : Actual = 9.6, Allowable = 10

Web : Actual = 54.5, Allowable = 1000 ---- OK ----

Eqtn 12.8.3.2(2), Max Ratio = $1.90 - 54.535 / 44.2 = 0.67$

Cl 8.1.5(c) $N_d / f N_s = 0.006, \leq 0.666, \text{ ---- OK ----}$

Alt. Prov. Cl 8.1.5 (a)-(c) OK for Minor axis, OK for Major axis actions

+ Beta_M values from user input :

Beta_M - Out-of-plane, major axis = -2.00 (Alpha-m values not given)

Beta_M - In-plane, major axis = -2.00 (no value given)

Beta_M - In-plane, minor axis = -2.00 (no value given)

Clause 8.3.2/4 :

$$\begin{aligned} M_{rx} &= M_{sx} (1 - N^* / f N_s) * 1.18, \leq M_{sx} [\text{Alt. Prov. OK}] \\ &= 246.4 (1 - 8.6 / 0.90 / 1702) * 1.18 \leq M_{sx} \\ &= 246.4 \end{aligned}$$

Clause 8.3.3/4 :

$$\begin{aligned} M_{ry} &= M_{sy} (1 - (N^* / f N_s)^2) * 1.19, \leq M_{sy} [\text{Alt. Prov. OK}] \\ &= 44.8 * (1 - (8.6/0.90/1702)^2) * 1.19 \leq M_{sy} \\ &= 44.8 \end{aligned}$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, $\Psi = 1.406$

$$\begin{aligned} &= (M_x^* / f M_{rx})^{\Psi} + (M_y^* / f M_{ry})^{\Psi} \\ &= [6.0/0.9/246.4]^{1.41} + [25.2/0.9/44.8]^{1.41} \end{aligned}$$

$$= 0.523, \quad \text{---- OK ----}$$

Clause 8.4.2.2 : Major : $M_{ix} = M_{sx} (1 - N^* / f N_{cx}) \leq M_{rx}$
 $= 246.4 (1 - 8.6 / 0.9 / 1656) \leq 246.4$
 $= 245.0$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$
 $= 6.0 / (0.9 \cdot 245.0)$
 $= 0.027 \quad \text{---- OK ----}$

Clause 8.4.2.2 : Minor : $M_{iy} = M_{sy} (1 - N^* / f N_{cy}) \leq M_{ry}$
 $= 44.8 (1 - 8.6 / 0.9 / 1114) \leq 44.8$
 $= 44.4$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$
 $= 25.2 / (0.9 \cdot 44.4)$
 $= 0.630 \quad \text{---- OK ----}$

Clause 8.4.4.1 : User provided value for a_m , hence unable to calculate b_m <<<<
 >>> => Cannot Access Alternative Design Provisions <<<<
 >> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

$M_{ox} = M_{bx} (1 - N^* / f N_{cy}) \leq M_{rx}$
 $= 146.5 * (1 - 8.6 / 0.90 / 1114.2) \leq 246.4$
 $= 145.2$

Load / Capacity Ratio = $M_x^* / f M_{ox}$
 $= 6.0 / (0.9 \cdot 145.2)$
 $= 0.046, \quad \text{---- OK ----}$

Clause 8.4.5.1 :

$M_{cx} = \min(M_{ix}, M_{ox}) = \min(245.0, 145.2) = 145.2$
 Load / Capacity Ratio = $[M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$
 $= [6.0 / 0.9 / 145.2]^{1.4} + [25.2 / 0.9 / 44.4]^{1.4}$
 $= 0.538, \quad \text{---- OK ----}$

NBS > 100 %

SUMMARY

**** U.L.S. Capacity Check Passed, Load Cap. Ratio = 0.63 ---- OK ----

MemDes v 2.1 : Calculations for New Zealand Steel
 Project : J000949 at 3:29:03 p.m. on 11/07/2017
 Description : beam B175 (357) by CO Powered By Steltech (<http://www.steltech.co.nz>)

CALCULATIONS SHOW
DEMAND / CAPACITY RATIO
IS > 1.0.

MemDes Calculations @ 15:04:13 11-07-2017 by CO

Project : J000949

Description : beam B180 (681)

Section : 360UB44 Grade 300+

d = 352 mm b = 171 mm $t_f = 9.7$ mm $t_w = 6.9$ mm

Area = 5720 mm² $f_{yf} = 320$ MPa $f_{yw} = 320$ MPa $f_u = 440$ MPa

$I_{xx} = 121.00$ E⁶mm⁴ $S_x = 777.00$ E³mm³ $Z_x = 689.00$ E³mm³ $r_x = 146.00$ mm

$I_{yy} = 8.10$ E⁶mm⁴ $S_y = 146.00$ E³mm³ $Z_y = 94.70$ E³mm³ $r_y = 37.60$ mm

$I_w = 237.00$ E⁹mm⁶ $J = 161.00$ E³mm⁴ $k_f = 0.930$ Manufact. Type = HR

Compactness(x,y) = N, N

$Z_{ex} = 770.00$ E³mm³ $Z_{ey} = 140.00$ E³mm³

Member Effective Length Calcs

Torsional End Restraint Conds (TERC) are given as FL

$$\Rightarrow k_t = 1.00$$

Load Height is at Top Flange, with Load Position within segment

$$\Rightarrow k_l = 1.40$$

With End Restraints of FL, $\Rightarrow k_r = 1.00$

$$\text{Eff. Len } L_e = L * k_t * k_l * k_r = 2.95 * 1.00 * 1.40 * 1.00 = 4.13\text{m}$$

Major Axis Bending

$$\text{Design Action } M_x^* = 39.4 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sx} = f_{yf} Z_{ex} = 246.40 \text{ kNm}$$

User provided value for $a_m = 1.75$

Reference Buckling Moment Calculation : M_o

$$\text{Temp. variable } \Pi^2_{E_Le2} = \Pi^2 * E / L_e^2 = 3.142^2 * 205 \text{ E6} / 4.130^2 = 118.6 \text{ E06}$$

$$M_o = [(\Pi^2_{E_Le2} * I_y) * (G J + (\Pi^2_{E_Le2} * I_w))]^{0.5}$$

$$M_o = 198.5 \text{ kNm} \quad (\text{Eqtn 5.6.1.1(4)})$$

$$a_s = 0.6 * [((M_s/M_o)^2 + 3)^{0.5} - (M_s/M_o)] = 0.53 \quad [(M_s/M_o) = 246.4 / 198.5 = 1.242]$$

a_m $a_s < 1.0$, $\Rightarrow$ Segment NOT Fully Restrained

$$M_{bx} = 1.75 * 0.53 * 246.4 = 230.1$$

$$\text{Major axis capacity Ratio} = M_x^* / f M_{bx} = 0.19, \quad \text{---- OK ----}$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 28.2 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sy} = 44.80 \text{ kNm}$$

$$M_{by} = M_{sy} = 44.80 \text{ kNm}$$

$$\text{Minor axis capacity ratio} = M_y^* / f M_{by} = 0.70, \quad \text{---- OK ----}$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 16.5 \text{ kN}$$

$$V_w = 0.6 * F_{yw} * d * t_w = 0.6 * 320000 * 0.352 * 0.007$$

$$\text{Nominal Shear Yield capacity } V_w = 466.3 \text{ kN}$$

$$a_v = 2.26 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 466.3 \text{ kN}$$

Mom-Shear Interaction Check : Moment ratio $\leq 0.75 \Rightarrow$ Clause 5.12.2 N/A

$$\text{Shear capacity ratio} = V_x^* / f V_u \\ = 0.04, \quad \text{---- OK ----}$$

Axial Calculations

Design Action $N_d = 30.7 \text{ kN [Comp]}$, $Le_{Ax} = 2.95 \text{ m}$, $Le_{Ay} = 2.95 \text{ m}$

$$\text{Sect. Compression Capacity } N_s = k_f A_n f_{y\text{comb}} \\ = 0.930 * 5.7.E-3 * 320 \\ = 1702.3 \text{ kN}$$

(where $A_n = A_g$, & f_y combined = 320.0 MPa

Major axis buckling : $a_c = 0.9713$

$$a_{cx} < 1.0 \Rightarrow N_{cx} = a_{cx} N_s = 1653.4$$

Minor axis buckling : $a_c = 0.6412$

$$a_{cy} < 1.0 \Rightarrow N_{cy} = a_{cy} N_s = 1091.4$$

Minimum Capac. $N_{c\text{min}} = 1091.4$

$$\text{Axial buckling capac. Ratio} = N_d / f N_{c\text{min}} \\ = 0.031, \quad \text{---- OK ----}$$

Combined Actions Checks

Cl 8.1.1.1 : Have axial load, in conjunction with flexure, $\Rightarrow$ check Cl 8.1.4

Significant Axial Load test (Cl. 8.1.4(a)) NOT Satisfied **** NOK ****

Significant Axial Load test (Cl. 8.1.4(b)) NOT Satisfied **** NOK ****

Loading FAILS Cl 8.1.4, $\Rightarrow$ Combined Actions Checks are required

+ Check Alternative Provisions, (Clause 8.1.5)

Cl.8.1.5(a) - Section Shape OK

Cl 8.1.5(b) : Plate element slenderness check

Major axis : Flg : Actual = 9.6, Allowable = 10

Web : Actual = 54.5, Allowable = 82 ---- OK ----

Minor axis : Flg : Actual = 9.6, Allowable = 10

Web : Actual = 54.5, Allowable = 1000 ---- OK ----

Eqtn 12.8.3.2(2), Max Ratio = $1.90 - 54.535 / 44.2 = 0.67$

Cl 8.1.5(c) $N_d / f N_s = 0.020, \leq 0.666$, ---- OK ----

Alt. Prov. Cl 8.1.5 (a)-(c) OK for Minor axis, OK for Major axis actions

+ Beta_M values from user input :

Beta_M - Out-of-plane, major axis = -2.00 (Alpha-m values not given)

Beta_M - In-plane, major axis = -2.00 (no value given)

Beta_M - In-plane, minor axis = -2.00 (no value given)

Clause 8.3.2/4 :

$$M_{rx} = M_{sx} (1 - N^* / f N_s) * 1.18, \leq M_{sx} [\text{Alt. Prov. OK}] \\ = 246.4 (1 - 30.7 / 0.90 / 1702) * 1.18 \leq M_{sx} \\ = 246.4$$

Clause 8.3.3/4 :

$$M_{ry} = M_{sy} (1 - (N^* / f N_s)^2) * 1.19, \leq M_{sy} [\text{Alt. Prov. OK}] \\ = 44.8 * (1 - (30.7 / 0.90 / 1702)^2) * 1.19 \leq M_{sy} \\ = 44.8$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, $\Psi = 1.420$

$$= (M_x^* / f M_{rx})^{\Psi} + (M_y^* / f M_{ry})^{\Psi} \\ = [39.4 / 0.9 / 246.4]^{1.42} + [28.2 / 0.9 / 44.8]^{1.42}$$

$$= 0.688, \quad \text{--- OK ---}$$

Clause 8.4.2.2 : Major : $M_{ix} = M_{sx} (1 - N^* / f N_{cx}) \leq M_{rx}$
 $= 246.4 (1 - 30.7 / 0.9 / 1653) \leq 246.4$
 $= 241.3$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

$$\text{Load / Capacity Ratio} = M_m^* / f M_i$$

$$= 39.4 / (0.9 \cdot 241.3)$$

$$= 0.181 \quad \text{--- OK ---}$$

Clause 8.4.2.2 : Minor : $M_{iy} = M_{sy} (1 - N^* / f N_{cy}) \leq M_{ry}$
 $= 44.8 (1 - 30.7 / 0.9 / 1091) \leq 44.8$
 $= 43.4$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

$$\text{Load / Capacity Ratio} = M_m^* / f M_i$$

$$= 28.2 / (0.9 \cdot 43.4)$$

$$= 0.722 \quad \text{--- OK ---}$$

Clause 8.4.4.1 : User provided value for a_m , hence unable to calculate b_m <<<<
 >>> => Cannot Access Alternative Design Provisions <<<<
 >> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

$$M_{ox} = M_{bx} (1 - N^* / f N_{cy}) \leq M_{rx}$$

$$= 230.1 (1 - 30.7 / 0.90 / 1091.4) \leq 246.4$$

$$= 222.9$$

$$\text{Load / Capacity Ratio} = M_x^* / f M_{ox}$$

$$= 39.4 / (0.9 \cdot 222.9)$$

$$= 0.196, \quad \text{--- OK ---}$$

Clause 8.4.5.1 :

$$M_{cx} = \min(M_{ix}, M_{ox}) = \min(241.3, 222.9) = 222.9$$

$$\text{Load / Capacity Ratio} = [M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$$

$$= [39.4 / 0.9 / 222.9]^{1.4} + [28.2 / 0.9 / 43.4]^{1.4}$$

$$= 0.736, \quad \text{--- OK ---}$$

SUMMARY

**** U.L.S. Capacity Check Passed, Load Cap. Ratio = 0.74 --- OK ---

NBS > 100%

MemDes v 2.1 : Calculations for New Zealand Steel

Project : J000949 at 3:04:13 p.m. on 11/07/2017

Description : beam B180 (681) by CO Powered By Steltech (<http://www.steltech.co.nz>)

REIDBAR DIAGONAL BRACING.

FROM ETAB RESULT OUTPUTS:

<u>TENSION MAX, N_t^* (kN)</u>	<u>BAR DIAMETER, ϕ (mm)</u>
(i) 150	RB 16.
(ii) 226.40	RB 20
(iii) 190.20	RB 25
(iv) 119	$\phi 20$ M/S ROD

CAPACITY CHECK:

(i) FOR RB 16. (ELEMENT B569)

$$f_y = 500 \text{ MPa} \times 1.08 = 540 \text{ MPa.}$$

$$\phi = 1.0.$$

$$\therefore \phi N_t = 1.0 (540) (0.008^2 \pi) / 1000 = 110.50 \text{ kN.}$$

$$\therefore \phi N_t = 110.50 \text{ kN} < N_t^* = 150 \text{ kN.}$$

$$\text{NBS} = 110.5 / 150 = \underline{74\%}.$$

NBS %

(ii) FOR RB 20. (ELEMENT D340)

$$\phi N_t = 1.0 (540) (0.01^2 \pi) / 10^3 = 172.80 \text{ kN.}$$

$$\phi N_t = 172.80 \text{ kN} < N_t^* = 226.40 \text{ kN.}$$

$$\text{NBS} = 172.80 / 226.40 = 0.76 = \underline{76\%}$$

NBS %

ASSUMPTIONS:

ASSUMING
REIDBAR
USES FULL NUT
ASSEMBLY.

(iii) FOR RB 25. (ELEMENT D322)

$$\phi N_t = 1.0 \left(\frac{540}{10^3} \right) (0.0125^2 \pi) = 270 \text{ kN.}$$

$$\therefore \phi N_t = 270 \text{ kN} > 187.20 \text{ kN} = N_c^*$$

NBS %

$$NBS = \frac{270}{187.20} = 1.42 = \underline{142\%}$$

(iv) FOR $\phi 20$ M/S ROD. (ELEMENT D171)

$$f_y = 300 \text{ MPa} \times 1.08 = 324 \text{ MPa.}$$

$$\phi N_t = (1.0) (324 \times 10^{-3}) (0.01^2 \pi) = 101.70 \text{ kN}$$

$$\therefore \phi N_t = 101.70 \text{ kN} < N^* = 119 \text{ kN}$$

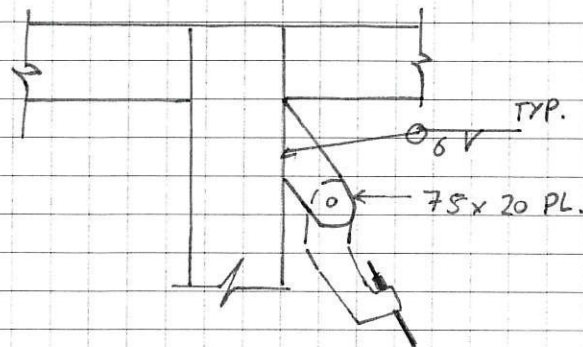
NBS %

$$NBS = \frac{101.70}{119} = 0.85 = \underline{85\%}$$

//

BRACE CONNECTIONS:

TYPICAL REIDBRACE CONNECTIONS FROM
SIGMA DWG. 2700.

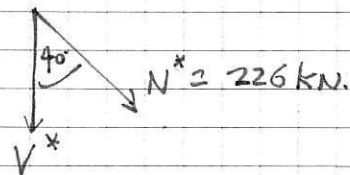


RB16 & RB20 LUG DETAIL

- LENGTH OF WELD CONNECTION VARIES FROM BRACE TO BRACE.
BUT FOR THE CRITICAL BRACE AT AN APPROX ANGLE OF 40° , the WELD LENGTH IS APPROX. 900 mm. (180 mm - WELD BOTH SIDES).
- $N^* = 226 \text{ kN}$.

$$V^* = \cos 40^\circ (226 \text{ kN})$$

$$V^* = 173 \text{ kN}$$



$$V_w = 173 \text{ kN} / 180 \text{ mm}$$

$$= 0.96 \text{ kN/mm}$$

ASSUMING WELD E48xx/WSxx:

$$\text{WITH } \phi = 1.0$$

$$\phi V_w = 0.978 / 0.8 = 1.22 \text{ kN/mm}$$

$$\therefore \phi V_w / V_w^* = 1.27 > 1 \quad \therefore \text{NBS} > 100\%$$

$$\therefore \text{HOWEVER REIDBAR CAPACITY GOVERNS} \Rightarrow \text{NBS} = 71\%$$

1

MASONRY INFILL CHECK - IN PLANE

2nd STOREY INFILL PANEL ON G.L 4 & 5.

PROBABLE IN-PLANE STRENGTH, V_{prob} :

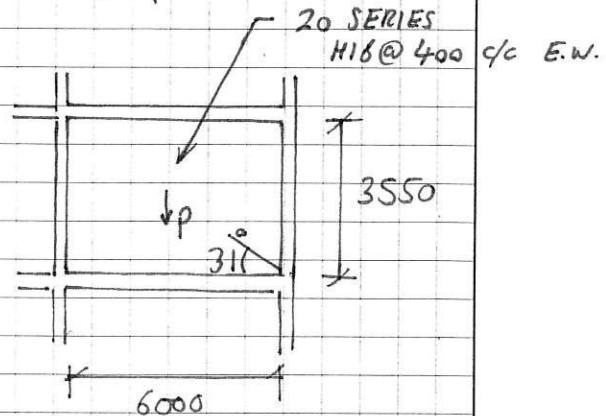
$$t = 200 \text{ mm}$$

$$L_{inf} = 6000 \text{ mm.}$$

$$h_{inf} = 3550 \text{ mm.}$$

$$f_m' = 17.5 \text{ MPa.}$$

$$f_y = 540 \text{ MPa.}$$



(i) INFILL SHEAR STRENGTH, V_{in} :

LESSER OF :

$$\begin{aligned} a) \quad V_{in} &= 0.33 \sqrt{f_m'} \cdot t \cdot L_{inf} \\ &= 0.33 \sqrt{17.5} (200) (6000) \\ &= 1,656,587 = 1657 \text{ kN} \end{aligned}$$

$$\begin{aligned} b) \quad V_{in} &= 0.83 \cdot t \cdot L_{inf} \\ &= 0.83 (200) (6000) = 996000 = 996 \text{ kN} \end{aligned}$$

$$\begin{aligned} c) \quad V_{in} &= 0.41 \cdot t \cdot L_{inf} + 0.45 P \\ &= 0.41 (200) (6000) + 0.45 (104.32) \\ &= 492 + 42 = 539 \text{ kN} \end{aligned}$$

$$\therefore V_{in} = 539 \text{ kN.}$$

REFERENCE:

NZEE GUIDELINES
CLAUSE C7.7.2.2

$P = \text{S.W of infill}$

$$\begin{aligned} P &= 24.5 \times 6 \times 3.55 \times 0.2 \\ P &= 104.32 \text{ kN.} \end{aligned}$$

EFFECT OF REINFORCEMENT:

$$V_s = \rho_w \cdot f_y \cdot t \cdot L_{inf}$$

$$A_s = \pi (16)^2 / 4 (1000 / 400) = 503 \text{ mm}^2 / \text{m}$$

$$d = 0.8 L_w = 0.8 (6\text{m}) = 4.800\text{m}$$

$$b_w = 190 \text{ mm}$$

$$\rho_w = A_s / b_w \cdot d = (503 \text{ mm}^2 / \text{m} \times 6\text{m}) / (4800 \times 190) \\ = 0.00331$$

$$V_s = 0.0033 (540 \text{ MPa}) (200) (6000) \times 10^3 = 2138 \text{ kN}$$

$$\therefore V_{in} = 539 \text{ kN} + 2138 \text{ kN} = 2677 \text{ kN}$$

(ii) CORNER CRUSHING STRENGTH:

$$V_{cc} = k \cdot t \cdot f_m' = 250 \text{ mm} (200 \text{ mm}) 17.5 \text{ MPa} \times 10^{-3} \\ = 875 \text{ kN}$$

$$\therefore V_{prob} = 875 \text{ kN} \quad \text{as } V_{cc} < V_{in}$$

- SHEAR DEMAND, V^* :

FROM ETABS OUTPUT:
COMPRESSION IN EQV. STRUT = 594 kN.

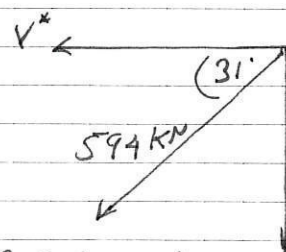
$$\Rightarrow V^* = 594 (\cos 31^\circ)$$

$$V^* = 509.2 \text{ kN}$$

$$\therefore V_{prob} > V^*$$

$$V_{prob} / V^* = 875 / 509 = 1.72 > 1 \quad \text{OK}$$

$$> 100\% \text{ NBS}$$



REINFORCEMENT
HD16 @ 400 c/c
E.W.

REFERENCE
NZEE GUIDELINES
SECTION C7.7.2.4

NZEE GUIDELINES
SECTION C7.7.2.3

NBS %

2.

MASONRY INFILL CHECK - OUT-OF PLANE

OUT-OF PLANE DEMAND.

FOR PARTS:

DESIGN WORKING life = 50 yrs.

IMPORTANCE LEVEL = 3

Soil TYPE = D

$\mu_p = 1.25$

$Z = 0.24$

$h_i = 5.14m$

$h_n = 6.95m$

$C_{H1} = 1 + h_i/6 = 1.86$

$C_H(0) = 1.12$

$R_u = 1.3 \quad C(0) = 0.35$

$C_i(T_p) = 2.0$

$$C_p(T_p) = C(0)(C_{H1}) C_i(T_p) \\ = 0.35(1.86)(2.0) = 1.30$$

$C_{ph} = 0.85$

$R_p = 1.0$

$$\text{HORIZ. DESIGN COEFFICIENT} = C_p(T_p) C_{ph} R_p \\ = 1.30(0.85)(1.0) \\ = 1.10$$

REFERENCE

NBS 1170.5:2004

SECTION 8

WEIGHT OF PART, W_p :

$$W_p = 24.5 \text{ kN/m}^3 \times 0.19 \text{ m} \\ = 4.66 \text{ kPa}$$

$$F_p = 1.10 (4.66 \text{ kPa}) = 5.12 \text{ kPa}$$

FOR 1m WIDTH:

$$F_p = 5.12 \text{ kN/m}$$

DESIGN MOMENT, M^* :

$$M^* = 5.12 \text{ kN/m} \times 6.0 \text{ m}^2 / 8 \\ = 23.04 \text{ kN.m/m}$$

$$f_y = 540 \text{ MPa} \\ f_c = 17.5 \text{ MPa}$$

USING HD16 @ 400 c/c.

$$A_s = 502.70 \text{ mm}^2/\text{m}$$

$$b = 1000$$

$$\phi = 1.0$$

$$a = 502.70 (540) / 0.85 (1000) (17.5) \\ = 18.24$$

$$d = 190 - 95 = 95 \text{ mm}$$

$$\phi M_n = 1.0 (502.70) (540) \left[95 - \frac{18.2}{2} \right] \\ = 23.32 \text{ kNm/m}$$

$$\phi M_n = 23.32 \text{ kNm/m} \approx M^* = 23.04 \text{ kNm/m}$$

NBS %

$$\phi M_n / M^* = 1 \Rightarrow \boxed{100\% \text{ NBS}}$$

PIM/BC

10 - - 63686

AS BUILT
PLAN

Pg. 30

SIGMA
ENGINEERS - ARCHITECTS - PLANNERS
Sigma Consultants Limited
PO Box 555, Victoria Park, Auckland
Phone 09 307 1100, Fax 09 307 1105

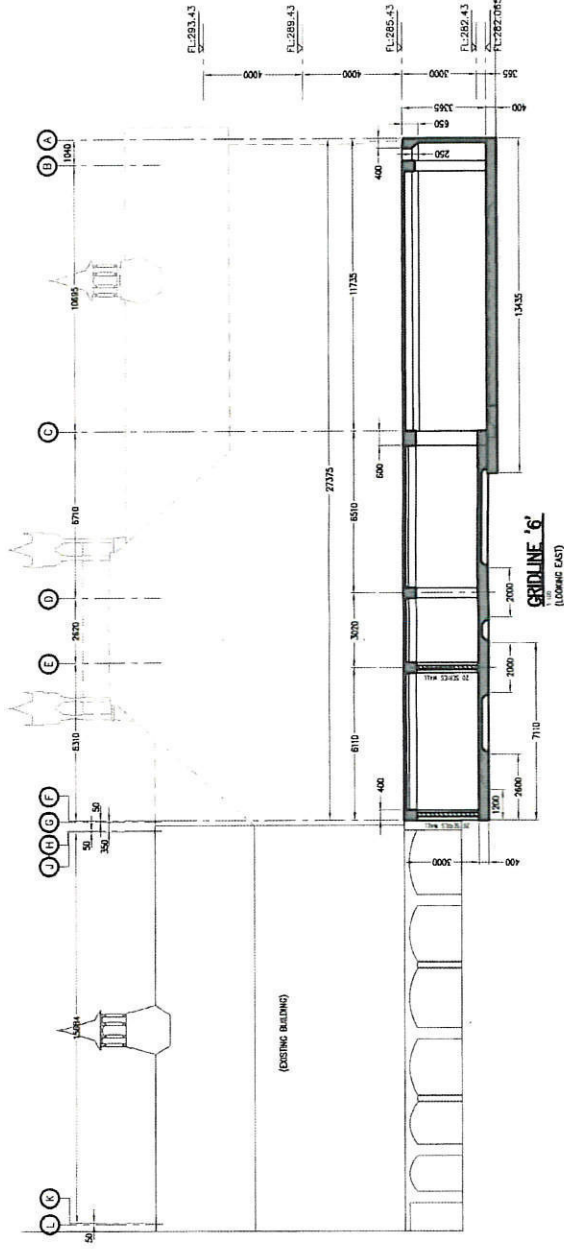
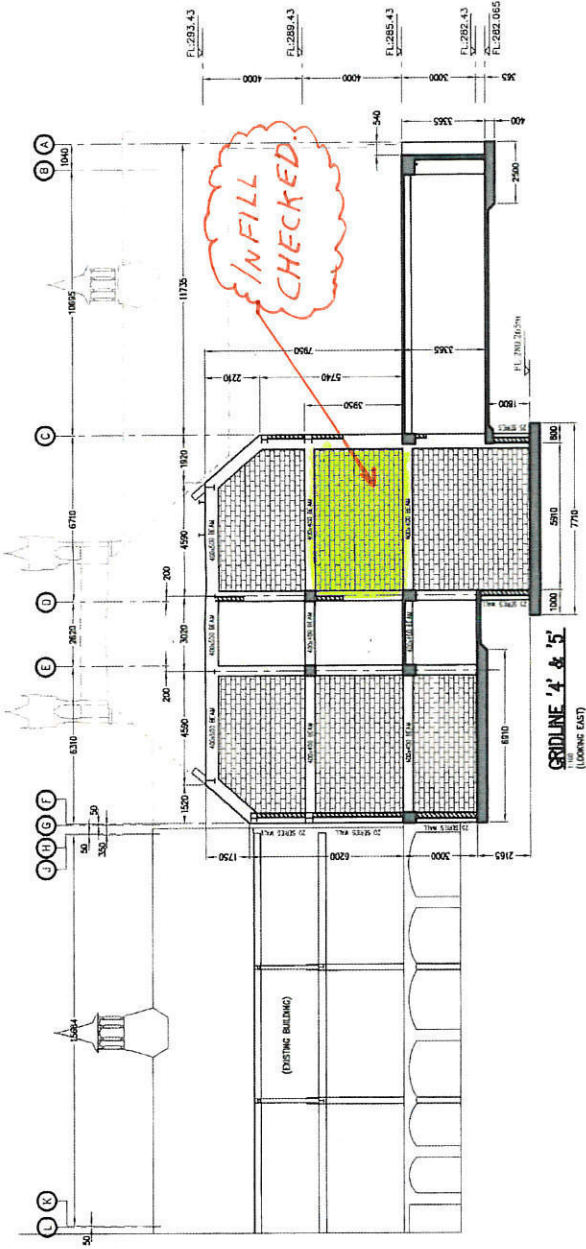
Scale: As Shown @ 1/1"
File Number: W:\8000\8129\Structure\8129-S(10)2000
Drawing Number: 8129 - S(10)2101
Rev: 1

SECTIONS

SOUTH WING
EXTENSION

ROTORUA TRUST GALLERY
CENTENNIAL DEVELOPMENT

Client	Project	Drawing Title	Section	Rev	By	Chk
1	19/01/08	FOR CONSTRUCTION	8129	1	1	1
2	17/02/08	FOR TENDER	8129	2	1	1
3	18/07/08	FOR CONSTRUCTION	8129	3	1	1



Find solid infill equivalent struct width, a:

Gridline 4&5 Infill No. 1

Parameters

h_{col}	3950 mm
h_{inf}	3550 mm
E_f	29171.24 Mpa
E_m	15750 MPa
I_{bc}	2133333333 mm ⁴
L_{inf}	5900 mm
r_{inf}	6885.7 mm
t_{inf}	250 mm
θ	31.03510865 degrees
2θ	1.083329659 radians
$\sin(2\theta)$	0.883522278
λ	0.001408588

Frame column size

b	400 mm
d	400 mm
f_c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$

$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a 807.0002123 mm

3478868.97
8.8369E+17
8.8369E+17

Find solid infill equivalent struct width, a:

Gridline 4&5 Infill No. 3

Parameters

h_{col}	3000 mm
h_{inf}	2600 mm
E_f	29171.24 Mpa
E_m	15750 MPa
I_{bc}	2133333333 mm ⁴
L_{inf}	5900 mm
r_{inf}	6447.5 mm
t_{inf}	250 mm
θ	23.78203042 degrees
2θ	0.830149467 radians
$\sin(2\theta)$	0.738032235
λ	0.001455668

Frame column size

b	400 mm
d	400 mm
f_c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$

$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a 802.8171504 mm

2906001.92
6.4721E+17
6.4721E+17

Find solid infill equivalent struct width, a:

Gridline C Infill No. 1

Parameters

h_{col}	1840 mm
h_{inf}	1540 mm
E_f	29171.24 Mpa
E_m	15750 MPa
I_{bc}	2133333333 mm ⁴
L_{inf}	3000 mm
r_{inf}	3372.2 mm
t_{inf}	200 mm
θ	27.17294115 degrees
2θ	0.948514581 radians
$\sin(2\theta)$	0.812550565
λ	0.001607466

Frame column size

b	400 mm
d	400 mm
f_c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$
$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a	462.8533589 mm	2559534.28
		3.8335E+17
		3.8335E+17

Find solid infill equivalent struct width, a:

Gridline C Infill No. 2

Parameters

h _{col}	3100 mm
h _{inf}	2800 mm
E _f	29171.24 Mpa
E _m	15750 MPa
I _{bc}	2133333333 mm ⁴
L _{inf}	5000 mm
r _{inf}	5730.6 mm
t _{inf}	200 mm
θ	29.24882634 degrees
2θ	1.020976644 radians
Sin(2θ)	0.852618758
λ	0.001401066

Frame column size

b	400 mm
d	400 mm
f _c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$
$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a 714.5276517 mm

2685749.09
6.97E+17
6.97E+17

Find solid infill equivalent struct width, a:

Gridline F Infill No. 1

Parameters

h_{col}	2400 mm
h_{inf}	2100 mm
E_f	29171.24 Mpa
E_m	15750 MPa
I_{bc}	2133333333 mm ⁴
L_{inf}	3000 mm
r_{inf}	3662.0 mm
t_{inf}	200 mm
θ	34.9920202 degrees
2θ	1.221451929 radians
$\sin(2\theta)$	0.939597315
λ	0.001542552

Frame column size

b	400 mm
d	400 mm
f_c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$
$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a	475.1974667 mm	2959731.54
		5.2275E+17
		5.2275E+17

Find solid infill equivalent struct width, a:

Gridline F Infill No. 2

Parameters

h_{col}	4050 mm
h_{inf}	2650 mm
E_f	29171.24 Mpa
E_m	15750 MPa
I_{bc}	2133333333 mm ⁴
L_{inf}	3000 mm
r_{inf}	4002.8 mm
t_{inf}	200 mm
θ	41.45523354 degrees
2θ	1.447060635 radians
$\sin(2\theta)$	0.992354501
λ	0.001475416

Frame column size

b	400 mm
d	400 mm
f_c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$
$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a	460.834799 mm	3125916.68
		6.5966E+17
		6.5966E+17

Find solid infill equivalent struct width, a:

Gridline F Infill No. 2

Parameters

h _{col}	4050 mm
h _{inf}	2650 mm
E _f	29171.24 Mpa
E _m	15750 MPa
I _{bc}	2133333333 mm ⁴
L _{inf}	3000 mm
r _{inf}	4002.8 mm
t _{inf}	200 mm
θ	41.45523354 degrees
2θ	1.447060635 radians
Sin(2θ)	0.992354501
λ	0.001475416

Frame column size

b	400 mm
d	400 mm
f _c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$
$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a	460.834799 mm	3125916.68
		6.5966E+17
		6.5966E+17

Find solid infill equivalent struct width, a:

Gridline F Infill No. 4

Parameters

h_{col}	2750 mm
h_{inf}	2500 mm
E_f	29171.24 Mpa
E_m	15750 MPa
I_{bc}	2133333333 mm ⁴
L_{inf}	7000 mm
r_{inf}	7433.0 mm
t_{inf}	200 mm
θ	19.65382406 degrees
2θ	0.686047881 radians
$\sin(2\theta)$	0.633484163
λ	0.00133816

Frame column size

b	400 mm
d	400 mm
f_c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$
$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a	966.0028906 mm	1995475.11
		6.2232E+17
		6.2232E+17

Find solid infill equivalent struct width, a:

Gridline F Infill No. 5

Parameters

h_{col}	2750 mm
h_{inf}	2500 mm
E_f	29171.24 Mpa
E_m	15750 MPa
I_{bc}	2133333333 mm ⁴
L_{inf}	5755 mm
r_{inf}	6274.6 mm
t_{inf}	200 mm
θ	23.48036094 degrees
2θ	0.819619216 radians
$\sin(2\theta)$	0.730885998
λ	0.001386873

Frame column size

b	400 mm
d	400 mm
f_c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$
$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a	808.1891442 mm	2302290.89
		6.2232E+17
		6.2232E+17

Find solid infill equivalent struct width, a:

Gridline F Infill No. 6

Parameters

h_{col}	2750 mm
h_{inf}	2500 mm
E_f	29171.24 Mpa
E_m	15750 MPa
I_{bc}	2133333333 mm ⁴
L_{inf}	3460 mm
r_{inf}	4268.7 mm
t_{inf}	200 mm
θ	35.84974322 degrees
2θ	1.25139211 radians
$\sin(2\theta)$	0.949422663
λ	0.001480605

Frame column size

b	400 mm
d	400 mm
f_c	45 Mpa

$$a = 0.18(\lambda_1 h_{col})^{-0.25} r_{inf}$$

$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{\frac{1}{4}}$$

a 540.9072464 mm

2990681.39
6.2232E+17
6.2232E+17

3

EQUIVALENT STRUT FOR INFILL WALLS:

SOLID INFILL PANELS.

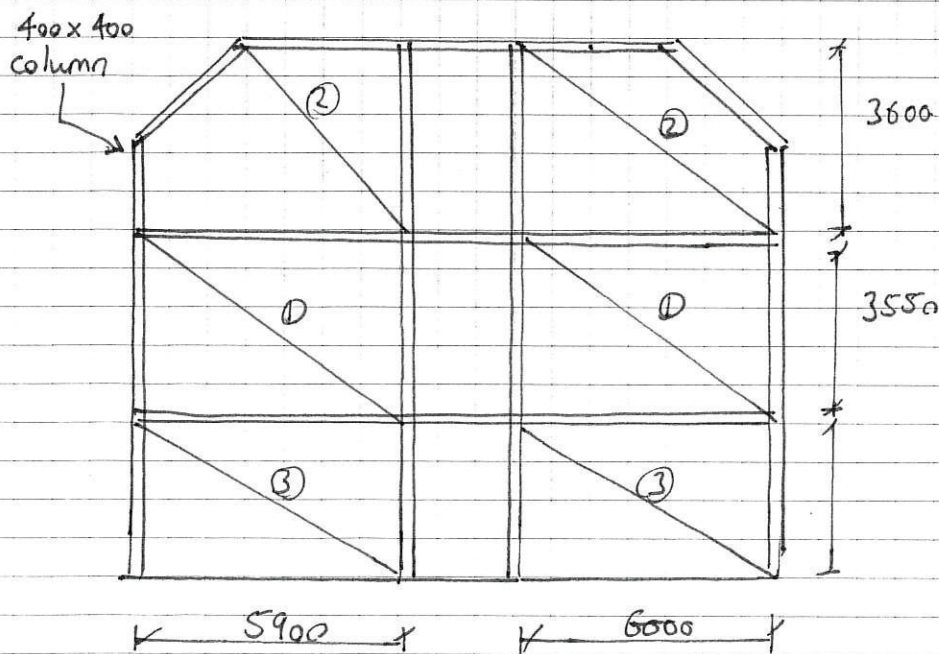
- EQUIVALENT STRUTS APPLIED TO ETABS MODEL, TO SIMULATE PROBABLE ELASTIC IN-PLANE STIFFNESSES OF SOLID MASONRY INFILL PANELS.

- STRUTS TO HAVE SAME THICKNESS & E_m AS THE INFILL IS REPRESENTS.

- EQUIVALENT STRUT WIDTH, a :

$$a = 0.18 (\lambda_1 h_{col})^{-0.25} r_{inf.}$$

- STRUT WIDTH CALCULATED FOR THE INFILL PANELS BELOW. SEE FOLLOWING SPREADSHEET CALCS.

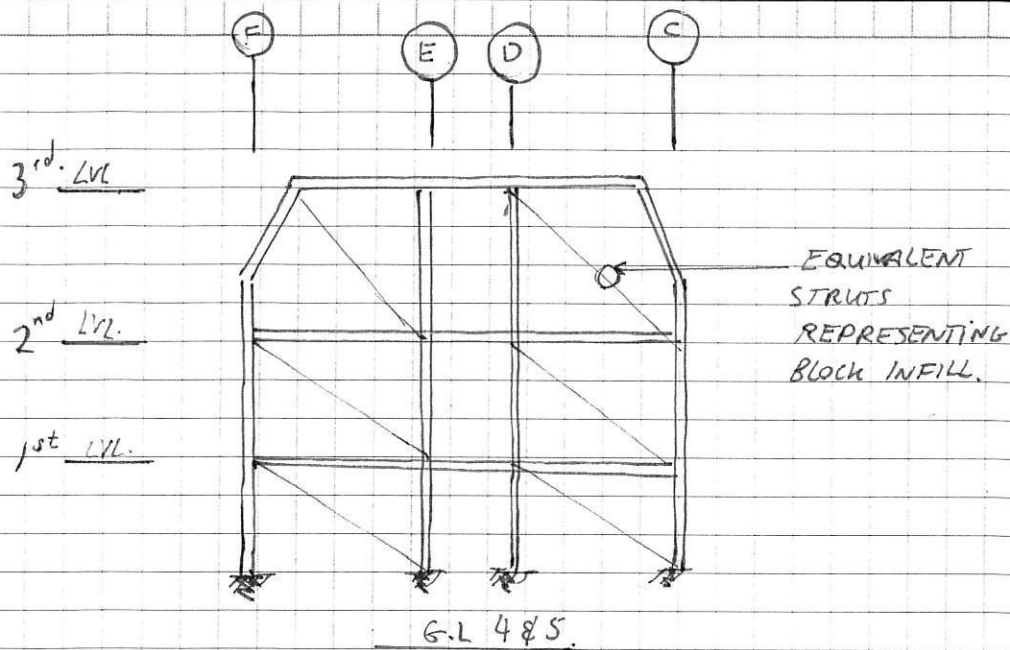


GRIDLINE 4 & 5. ON
SIGMA DWGS.

REFERENCE

NZEE GUIDELINES
SECTION C7.7.1.2

RC FRAME CHECK.



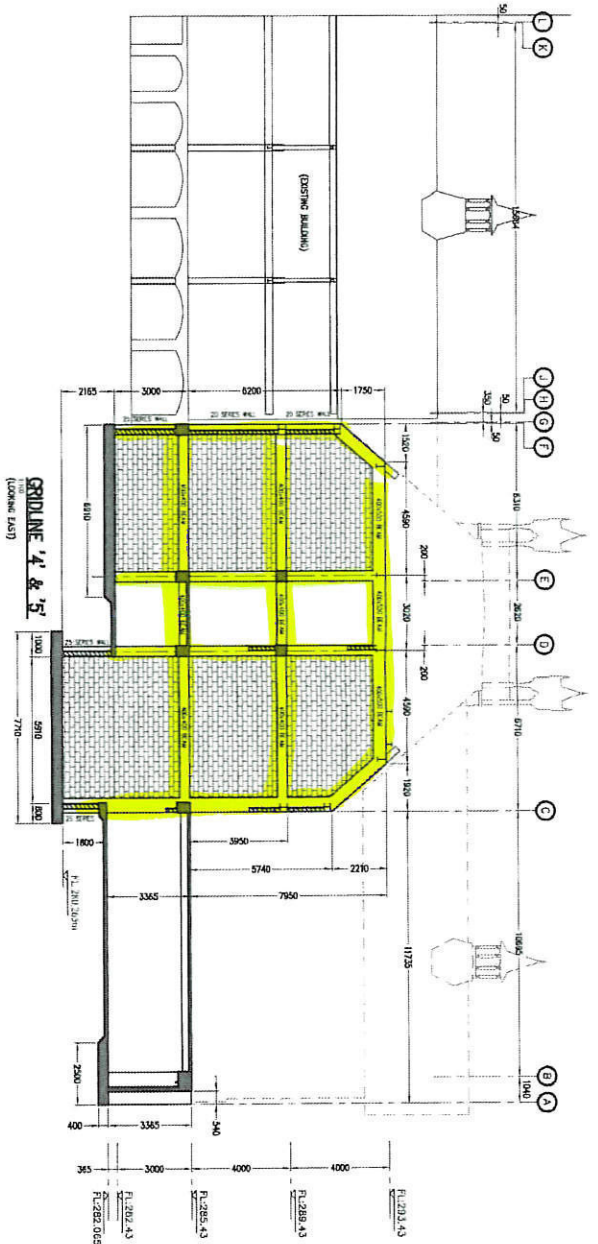
NOTE:
RC FRAME
REFERENCE GLS
AS PER AS-BUILT
PLANS.

<u>BEAMS.</u>	<u>M* (kNm)</u>	<u>V* (kN)</u>
• 3 rd Lvl.	182	156
• 2 nd Lvl.	242	192
• 1 st Lvl.	200	165

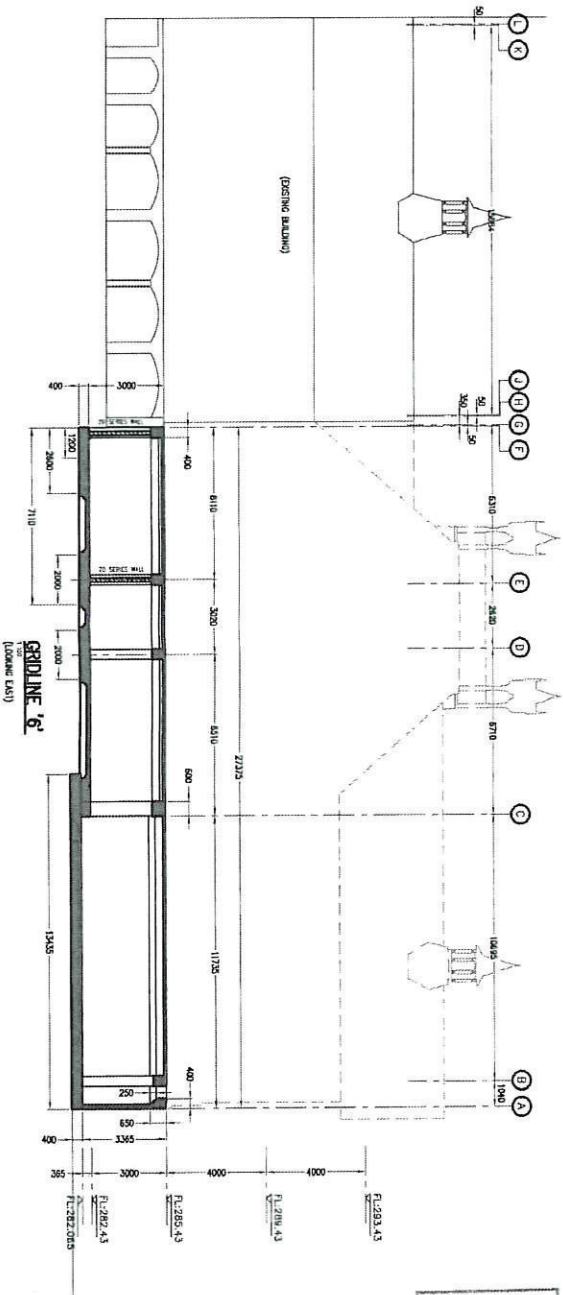
NOTE
CRITICAL
COMBINATIONS
OF
ACTIONS.
FROM
ETABS
RESULTS

<u>COLUMNS.</u>	<u>M* (kNm)</u>	<u>V* (kN)</u>	<u>N* (kN)</u>
• C	461	208	275
• D	162	93	167
• E	147	81	180
• F	99	69.	351

PIM/BC
112 - 63686



AS BUILT
PLAN



ROTORUA TRUST GALLERY
CENTENNIAL DEVELOPMENT

SOUTH WING
EXTENSION

SECTIONS

Client	
Project	
Drawn	
Checked	
Reviewed	
Approved	
Date	
By	
For	

Scale	
As Shown @ 1/4"	
The Building	
W. 100/00 (8129) Structure (8129 - S1(10)2000	
drawing number	
8129 - S1(10)2101	
1	

Σ SIGMA
CONSULTANTS + ARCHITECTS + ENGINEERS
Signo Consultants Limited
112, The Arcade, 112, The Arcade, 112, The Arcade
Phone 01-231 3400, Fax 01-231 3400

GDC Consultants Ltd Chartered Professional Engineers & Mediators 18 Rostrevor Street, PO Box 9403, Hamilton 3204 Phone: 07 838 0090 Fax: 07 838 0014		Date:	17/07/2017
		Designed:	CO
		Checked:	MO
		Job No:	J000949
Name:	Museum South Wing		
Beam Description:	Concrete Frame GL 4 & 5 - 1st level beam		
CONCRETE BEAM - STRENGTH CHECK			
Design Actions			
Flexure	$M^* =$	200 kNm	
Shear	$V^* =$	165 kN	
Materials Properties			
Concrete strength	$f'_c =$	45 MPa	
Steel yield stress	$f_y =$	540 MPa	
Stirrup yield stress	$f_{yt} =$	324 MPa	
Beam Parameters			
Height	$h =$	500 mm	
Width	$b =$	400 mm	
Cover		30 mm	
Effective depth	$d =$	442 mm	
Strength in Flexure			
Number of tension bars		2	
Bar diameter	$d_b =$	25 mm	
Bar area	$A_s =$	981.75 mm ²	Asmin 549.08 mm ² OK
Depth of compression block	$a = A_s f_y / 0.85 f'_c b$		
		34.65 mm	
Flexure capacity	$\Phi Mn = \Phi A_s f_y (d - (a/2))$		
		225.14 kNm	$\geq$ 200 kNm OK
			NBS >100%
Strength in Shear			
Stirrups diameter	$d_v =$	6 mm	
Stirrups spacing	$s =$	150 mm	
Stirrups area	$A_v =$	56.55 mm ²	
Concrete shear strength	$v_c = \text{less of } [(0.07 + 10 p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$		
		0.84 MPa	
	$k_a =$	1	
	$k_d =$	0.98	
	$v_c = k_d k_a v_b$		
		0.82 MPa	
Shear reinforcement strength	$v_s = A_v f_{yt} / sb$		
		0.31 MPa	
Nominal shear strength	$v_n = v_c + v_s$		
		1.13 MPa	
	$\Phi V_n = \Phi v_n b d$		
		199.20 kN	$\geq$ 165 kN OK
			NBS >100%

Name:	Museum South Wing
Beam Description:	Concrete Frame GL 4 & 5 - 2nd level beam

CONCRETE BEAM - STRENGTH CHECK

Design Actions

Flexure	$M^* = 242$ kNm
Shear	$V^* = 192$ kN

Materials Properties

Concrete strength	$f'_c = 45$ MPa
Steel yield stress	$f_y = 540$ MPa
Stirrup yield stress	$f_{yt} = 324$ MPa

Beam Parameters

Height	$h = 500$ mm
Width	$b = 400$ mm
Cover	30 mm
Effective depth	$d = 442$ mm

Strength in Flexure

Number of tension bars	2			
Bar diameter	$d_b = 25$ mm			
Bar area	$A_s = 981.75$ mm ²	Asmin	549.08 mm ²	OK
Depth of compression block	$a = A_s f_y / 0.85 f'_c b$			
	$= 34.65$ mm			
Flexure capacity	$\Phi M_n = \Phi A_s f_y (d - (a/2))$			
	$= 225.14$ kNm	$\geq$	242 kNm	not OK
				NBS 95%

Strength in Shear

Stirrups diameter	$d_v = 6$ mm
Stirrups spacing	$s = 150$ mm
Stirrups area	$A_v = 56.55$ mm ²

Concrete shear strength $v_c = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$

$= 0.84$ MPa

$k_a = 1$

$k_d = 0.98$

$$v_c = k_d k_a v_b$$

$$= 0.82 \text{ MPa}$$

Shear reinforcement strength $v_s = A_v f_{yt} / sb$

$= 0.31$ MPa

Nominal shear strength $v_n = v_c + v_s$

$= 1.13$ MPa

$$\Phi V_n = \Phi v_n b d$$

$$= 199.20 \text{ kN} \geq 192 \text{ kN} \quad \text{OK}$$

NBS >100%

- PROBABLE SHEAR CAPACITY - BEAM LEVEL 2
GL 4 & 5.

$$V_{prob} = 0.85(V_c + V_s + V_n)$$

$$V_c = \alpha \beta \gamma \sqrt{f_c'} (0.8 A_g)$$

where: $\alpha = 3 - \frac{M}{V D} \leq 1.5$

$$= 3 - \frac{242}{192(0.5)} = 0.48 < 1$$

$$\therefore \alpha = 1$$

$$V_c = (1)(0.6)(0.3) \sqrt{45} [0.8(0.2)]$$

$$= 0.193 \text{ MN}$$

$$= 193 \text{ kN}$$

$$\beta = 0.5 + 20 \rho_t$$

$$= 0.5 + 20(0.005)$$

$$\beta = 0.60$$

$$\gamma = 0.30$$

$$V_s = \frac{A_v f_{yt} d}{s}$$

$$= \frac{56.55 (324) 442}{150}$$

$$V_s = 53.9 \text{ kN}$$

$$V_{prob} = 0.85(193 \text{ kN} + 54 \text{ kN}) = 210 \text{ kN}$$

$$\therefore V_{prob} > V^* = 192 \text{ kN}$$

$$NBS > 100\%$$

REFERENCE

SECTION C5.5.2.3

NZEE GUIDELINES

Date:	17/07/2017
Designed:	CO
Checked:	MO
Job No:	J000949

Name:	Museum South Wing
Beam Description:	Concrete Frame GL 4 & 5 - 3rd level beam

CONCRETE BEAM - STRENGTH CHECKDesign Actions

Flexure	$M^* =$	200	kNm
Shear	$V^* =$	165	kN

Materials Properties

Concrete strength	$f'_c =$	45	MPa
Steel yield stress	$f_y =$	540	MPa
Stirrup yield stress	$f_{yt} =$	324	MPa

Beam Parameters

Height	$h =$	500	mm
Width	$b =$	400	mm
Cover		30	mm
Effective depth	$d =$	442	mm

Strength in Flexure

Number of tension bars		2				
Bar diameter	$d_b =$	25	mm			
Bar area	$A_s =$	981.75	mm ²	Asmin	549.08	mm ² OK
Depth of compression block	$a = A_s f_y / 0.85 f'_c b$					
		34.65	mm			
Flexure capacity	$\phi Mn = \phi A_s f_y (d - (a/2))$					
		225.14	kNm	$\geq$	200	kNm OK
						NBS >100%

Strength in Shear

Stirrups diameter	$d_v =$	6	mm
Stirrups spacing	$s =$	150	mm
Stirrups area	$A_v =$	56.55	mm ²

Concrete shear strength $v_c = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$

$$= 0.84 \text{ MPa}$$

$$k_a = 1$$

$$k_d = 0.98$$

$$v_c = k_d k_a v_b$$

$$= 0.82 \text{ MPa}$$

Shear reinforcement strength $v_s = A_v f_{yt} / sb$

$$= 0.31 \text{ MPa}$$

Nominal shear strength $v_n = v_c + v_s$

$$= 1.13 \text{ MPa}$$

$$\phi V_n = \phi v_n b d$$

$$= 199.20 \text{ kN}$$

$\geq$

$$165 \text{ kN}$$

OK

NBS >100%

Name: Rotorua Museum South Wing
Column Description: Concrete Frame GL 4 & 5 - column GL C

CONCRETE COLUMN DESIGN - RECTANGLE

Design Actions

Axial	$N^* =$	275	kN
Shear	$V^* =$	208	kN
Flexure	$M^* =$	461	kNm

Materials Properties

Concrete strength	$f'_c =$	45	MPa
Vertical bars yield stress	$f_y =$	540	MPa
Spiral yield stress	$f_{yt} =$	324	MPa

Column Dimensions

Width	$b =$	600	mm
Height	$h =$	600	mm
Cover		30	mm
Effective depth	$d =$	541	mm

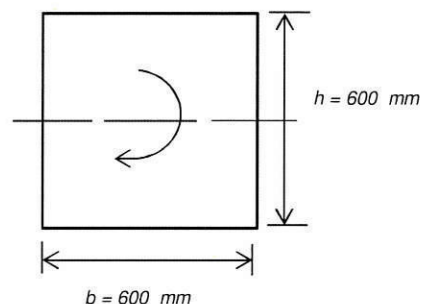


Figure: Column showing dimensions and direction of bending (not to scale)

Strength in Flexure

From chart	540	/	45	/	0.79	$M/bh^2 =$	2.13
use	500		40			$N/bh =$	0.76
						$p =$	1%

Bar area required	$A_{s \text{ required}} =$	3600.00	mm ²
Number of vertical bars		8	
Bar diameter	$d_b =$	25	mm
Bar area provided	$A_{s \text{ provided}} =$	3926.99	mm ²

$\geq 3600.00 \text{ mm}^2$

NBS >100%

Strength in Shear

Tie diameter	$d_s =$	8	mm
Tie spacing	$s =$	200	mm
Tie area	$A_v =$	201.06	mm ²

x 2

Concrete shear strength

$$p_w = 0.45\%$$

$$v_b = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$$

$$= 0.77 \text{ MPa}$$

$$k_a = 0.85$$

$$k_n = (1 + 3N^*/A_g f'_c)$$

$$= 1.05$$

$$v_c = k_a k_n v_b$$

$$= 0.69 \text{ MPa}$$

Shear reinforcement strength

$$v_s = A_v f_{yt} / sb$$

$$= 0.54 \text{ MPa}$$

10.3.10.4.2

Nominal shear strength

$$v_n = v_c + v_s$$

$$= 1.23 \text{ MPa}$$

$$\phi V_n = \phi v_n b d$$

$$= 399.90 \text{ kN} \quad \geq \quad 208 \text{ kN} \quad \text{OK}$$

NBS >100%

- PROBABLE SHEAR CAPACITY. - COLUMN C.
GL. 4 & 5.

$$V_{prob} = 0.85 (V_c + V_s + V_n)$$

$$V_c = \alpha \beta \gamma \sqrt{f_c'} (0.8 A_g)$$

$$\text{where: } \alpha = 3 - \frac{M}{V D} \leq 1.5$$

$$= 3 - \frac{461}{208(0.6)} = -0.69 < 1$$

$$\therefore \alpha = 1$$

$$V_c = (1)(0.72)(0.15) \sqrt{45} [0.8(0.36)]$$

$$= 0.208 \text{ MN.}$$

$$= 208 \text{ kN}$$

$$V_s = \frac{A_v f_{yt} d'' \cot 30^\circ}{s}$$

$$= \frac{0.201 \times 10^{-3} (324) 0.47 \left(\frac{\cos 30}{\sin 30} \right)}{0.20}$$

$$= 0.265 \text{ MN} = 265 \text{ kN}$$

$$V_n = N^* \tan \alpha = 275 (\tan 5^\circ)$$

$$= 24 \text{ kN.}$$

$$V_{prob} = 0.85 (V_c + V_s + V_n)$$

REFERENCE

SECTION C5.5.2.3.
NZEE GUIDELINES.

$$\beta = 0.5 + 20 \rho_t$$

$$= 0.5 + 20(0.011)$$

$$\beta = 0.72 < 1.0$$

$$\beta = 0.72$$

$$\gamma = 0.15$$

$$L = 3.55 \text{ m}$$

$$D = 0.6 \text{ m}$$

$$\alpha = 5^\circ$$

$$V_{prob} = 0.85(208 + 265 + 24).$$

$$= 497 \text{ kN.} > V^* = 208 \text{ kN.}$$

$$\therefore \text{NBS} > 100\%$$

//

GDC Consultants Ltd Chartered Professional Engineers & Mediators 18 Rostrevor Street, PO Box 9403, Hamilton 3204 Phone: 07 838 0090 Fax: 07 838 0014		Date:	17/07/2017
		Designed:	CO
		Checked:	MO
		Job No:	J000949
Name:	Rotorua Museum South Wing	Page No.	
Column Description:	Concrete Frame GL 4 & 5 - column GL D		

CONCRETE COLUMN DESIGN - RECTANGLE

Design Actions

Axial	$N^* = 167$ kN
Shear	$V^* = 93$ kN
Flexure	$M^* = 162$ kNm

Materials Properties

Concrete strength	$f'_c = 45$ MPa
Vertical bars yield stress	$f_y = 540$ MPa
Spiral yield stress	$f_{yt} = 324$ MPa

Column Dimensions

Width	$b = 400$ mm
Height	$h = 400$ mm
Cover	30 mm
Effective depth	$d = 347$ mm

Strength in Flexure

From chart	540	/	45	/	0.72	$M/bh^2 = 2.3$
use	500		40			$N/bh = 1.04$
						$p = 0.85\%$

Bar area required $A_{s\text{ required}} = 1360.00$ mm²

Number of vertical bars 4

Bar diameter $d_b = 20$ mm

Bar area provided $A_{s\text{ provided}} = 1256.64$ mm² ≥ 1360.00 mm² not OK

NBS = 92%

Strength in Shear

Tie diameter	$d_s = 6$ mm
Tie spacing	$s = 125$ mm
Tie area	$A_v = 56.55$ mm ²

Concrete shear strength

$p_w = 0.45\%$

$v_b = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$

$= 0.77$ MPa

$k_a = 0.85$

$k_n = (1 + 3N^*/A_g f'_c)$

$= 1.07$

$v_c = k_a k_n v_b$

$= 0.70$ MPa

Shear reinforcement strength $v_s = A_v f_{yt} / sb$ 10.3.10.4.2

$= 0.37$ MPa

Nominal shear strength $v_n = v_c + v_s$

$= 1.07$ MPa

$\Phi V_n = \Phi v_n b d$

$= 148.21$ kN ≥ 93 kN OK

NBS > 100%

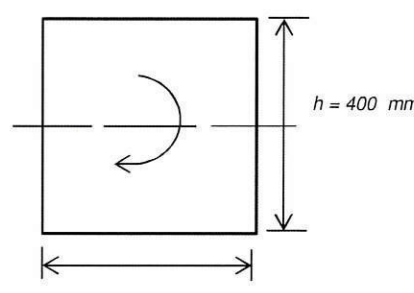


Figure: Column showing dimensions and direction of bending (not to scale)

GDC Consultants Ltd Chartered Professional Engineers & Mediators 18 Rostrevor Street, PO Box 9403, Hamilton 3204 Phone: 07 838 0090 Fax: 07 838 0014		Date:	17/07/2017
		Designed:	CO
		Checked:	MO
		Job No:	J000949
Name:	Rotorua Museum South Wing	Page No.	
Column Description:	Concrete Frame GL 4 & 5 - column GL E		

CONCRETE COLUMN DESIGN - RECTANGLE

Design Actions

Axial	$N^* = 180$ kN
Shear	$V^* = 81$ kN
Flexure	$M^* = 147$ kNm

Materials Properties

Concrete strength	$f'_c = 45$ MPa
Vertical bars yield stress	$f_y = 540$ MPa
Spiral yield stress	$f_{yt} = 324$ MPa

Column Dimensions

Width	$b = 400$ mm
Height	$h = 400$ mm
Cover	30 mm
Effective depth	$d = 347$ mm

Strength in Flexure

From chart	540	/	45	/	0.72	$M/bh^2 = 2.13$
use	500		40		0.7	$N/bh = 1.13$
						$p = 0.9\%$

Bar area required $A_{s \text{ required}} = 1440.00 \text{ mm}^2$

Number of vertical bars 4

Bar diameter $d_b = 20$ mm

Bar area provided $A_{s \text{ provided}} = 1256.64 \text{ mm}^2$ ≥ 1440.00 mm²

NBS = >87%

Strength in Shear

Tie diameter	$d_s = 6$ mm	x 1
Tie spacing	$s = 125$ mm	
Tie area	$A_v = 56.55 \text{ mm}^2$	

Concrete shear strength

$p_w = 0.45\%$

$v_b = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$

$= 0.77 \text{ MPa}$

$k_a = 0.85$

$k_n = (1 + 3N^*/A_g f'_c)$

$= 1.08$

$v_c = K_a k_n v_b$

$= 0.70 \text{ MPa}$

Shear reinforcement strength $v_s = A_v f_{yt} / sb$ 10.3.10.4.2

$= 0.37 \text{ MPa}$

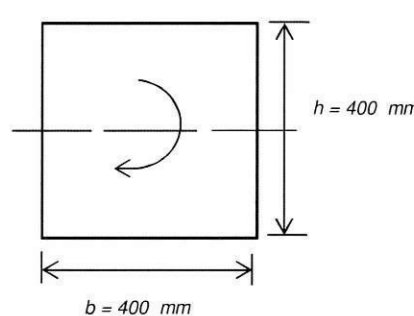
Nominal shear strength $v_n = v_c + v_s$

$= 1.07 \text{ MPa}$

$\Phi V_n = \Phi v_n b d$

$= 148.70 \text{ kN}$ ≥ 81 kN OK

NBS >100%



$h = 400 \text{ mm}$

$b = 400 \text{ mm}$

Figure: Column showing dimensions and direction of bending (not to scale)

Date:	17/07/2017
Designed:	CO
Checked:	MO
Job No:	J000949
Page No.	

Name:	Rotorua Museum South Wing
Column Description:	Concrete Frame GL 4 & 5 - column GL F

CONCRETE COLUMN DESIGN - RECTANGLEDesign Actions

Axial	$N^* =$	351 kN
Shear	$V^* =$	87 kN
Flexure	$M^* =$	99 kNm

Materials Properties

Concrete strength	$f'_c =$	45 MPa
Vertical bars yield stress	$f_y =$	540 MPa
Spiral yield stress	$f_{yt} =$	324 MPa

Column Dimensions

Width	$b =$	400 mm
Height	$h =$	400 mm
Cover		30 mm
Effective depth	$d =$	342 mm

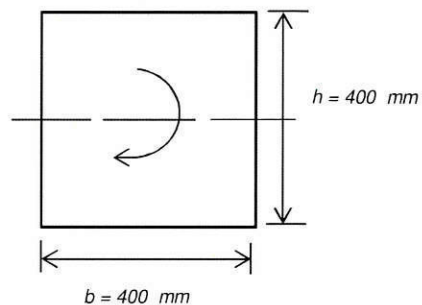


Figure: Column showing dimensions and direction of bending (not to scale)

Strength in Flexure

From chart	540	/	45	/	0.70
use	500		40		

$$M/bh^2 = 1.55$$

$$N/bh = 2.19$$

$$p = 0.5\%$$

Bar area required	$A_{s \text{ required}} =$	1280.00 mm ²	
Number of vertical bars		4	
Bar diameter	$d_b =$	25 mm	
Bar area provided	$A_{s \text{ provided}} =$	1963.50 mm ²	$\geq 1280.00 \text{ mm}^2$

NBS >100%

Strength in Shear

Tie diameter	$d_s =$	6 mm
Tie spacing	$s =$	125 mm
Tie area	$A_v =$	56.55 mm ²

Concrete shear strength

$$p_w = 0.7\%$$

$$v_b = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$$

$$= 0.94 \text{ MPa}$$

$$k_a = 0.85$$

$$k_n = (1 + 3N^*/A_g f'_c)$$

$$= 1.15$$

$$v_c = k_a k_n v_b$$

$$= 0.92 \text{ MPa}$$

Shear reinforcement strength

$$v_s = A_v f_{yt} / sb$$

$$= 0.37 \text{ MPa}$$

10.3.10.4.2

Nominal shear strength

$$v_n = v_c + v_s$$

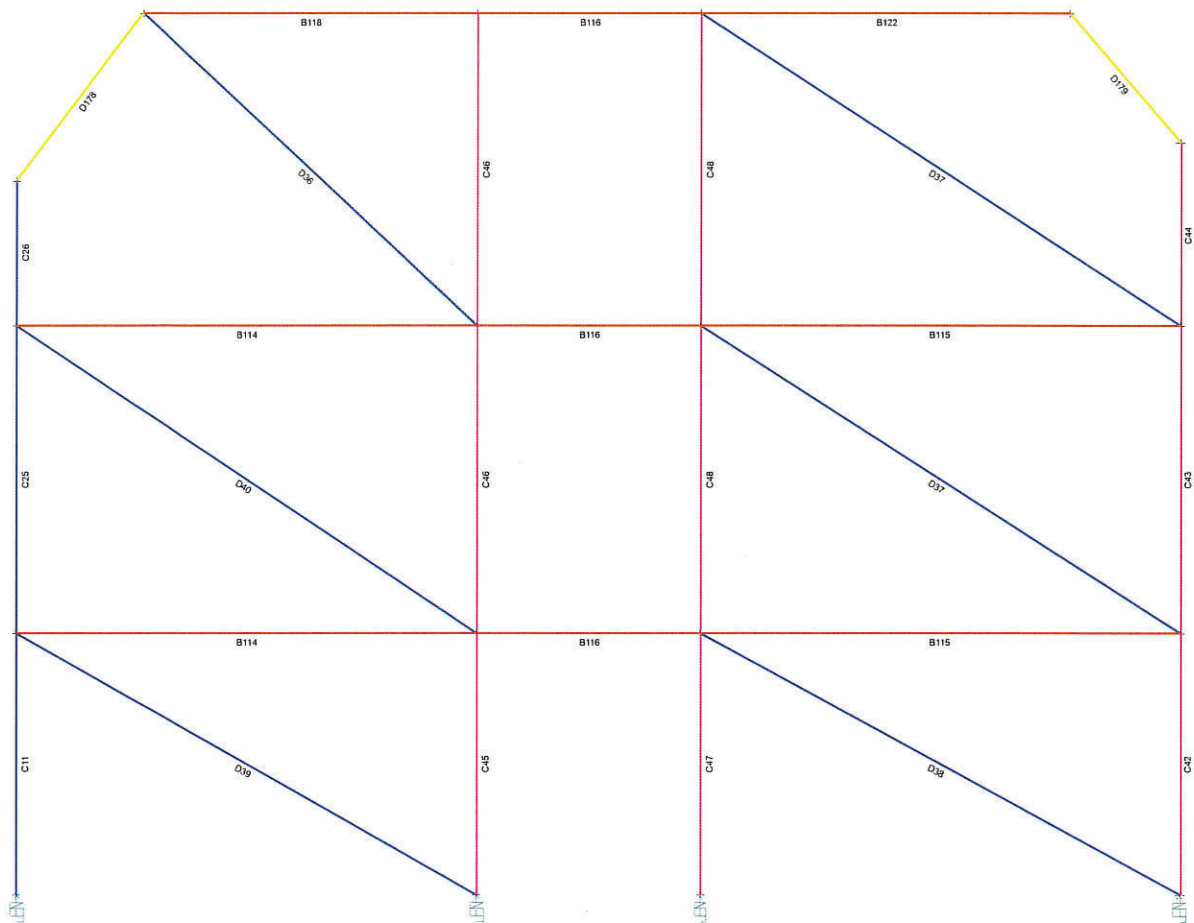
$$= 1.28 \text{ MPa}$$

$$\phi V_n = \phi v_n b d$$

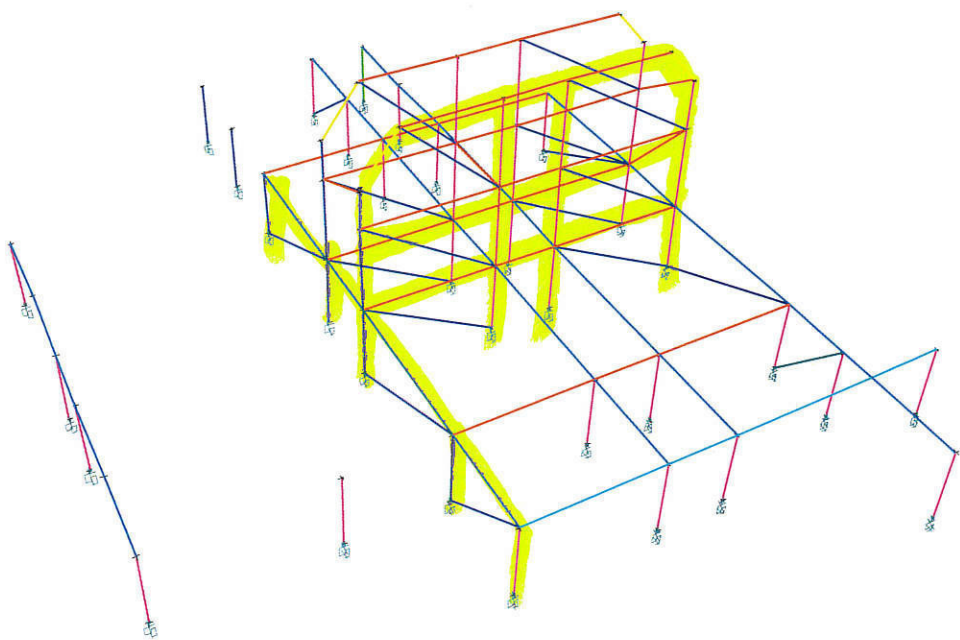
$$= 175.30 \text{ kN} \geq 87 \text{ kN} \quad \text{OK}$$

NBS >100%

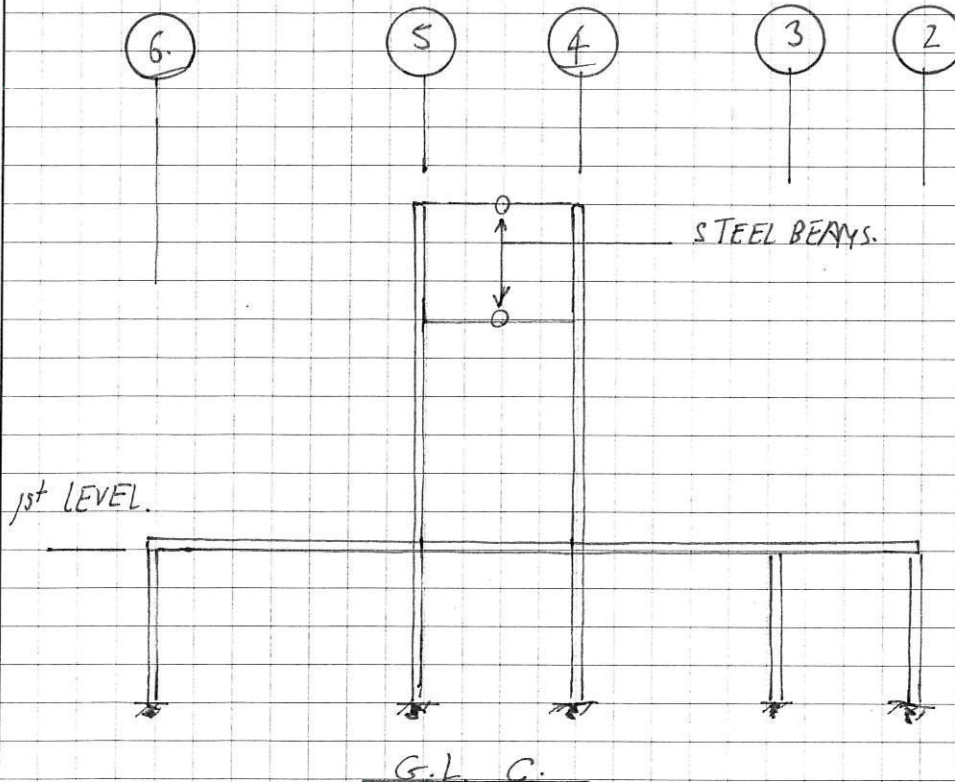
RC FRAME WITH EQUIVALENT STRUTS FOR MASONRY BLOCK INFILL



EXPOSED CONCRETE ELEMENTS IN STRUCTURE



RC FRAME CHECK.

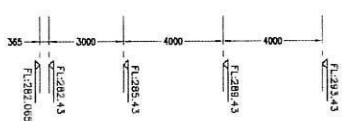
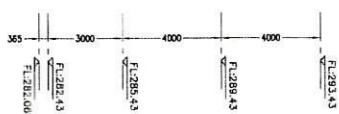


NOTE:

RC FRAME
REFERENCE GLS
AS PER AS
BUILT PLANS.

<u>BEAMS</u>	<u>M* (kNm)</u>	<u>V* (kN)</u>	
. 1 st LVL.	152	78.	
<u>COLUMNS.</u>	<u>M* (kNm)</u>	<u>V* (kN)</u>	<u>N* (kN)</u>
. 2	30.8	12	57.5
. 3	186	65	289
. 4	CHECKED PREVIOUSLY } SEE PG. 1		
. 5	CHECKED PREVIOUSLY }		
. 6.	48	26.	287

NOTE:
CRITICAL
COMBOS
OF
ACTIONS
FROM
ETABS.



SECTIONS

[illegible]

Score	As Shown @ 'A'
Fee Number	W.(8000)B129\Structure\B129-S(10)2000
drawing number	B129 - S(10)2102
rev	1

SIGMA
ENGINEERS • ARCHITECTS • PLANNERS

Sigma Consultants Limited
115 Waterloo Street
PO Box 553, Kowloon New Kowloon
Phone 07-347 3456, Fax 07-347 3465

Name:	Museum South Wing
Beam Description:	Concrete Frame GL C - 1st level beam

CONCRETE BEAM - STRENGTH CHECK

Design Actions

Flexure	$M^* =$	152 kNm
Shear	$V^* =$	78 kN

Materials Properties

Concrete strength	$f'_c =$	45 MPa
Steel yield stress	$f_y =$	540 MPa
Stirrup yield stress	$f_{yt} =$	324 MPa

Beam Parameters

Height	$h =$	500 mm
Width	$b =$	600 mm
Cover		30 mm
Effective depth	$d =$	450 mm

Strength in Flexure

Number of tension bars	2	2		
Bar diameter	$d_b =$	16 mm	25 mm	
Bar area	$A_s =$	1383.87 mm ²	A_{smin}	838.53 mm ² OK
Depth of compression block	$a = A_s f_y / 0.85 f'_c b$			
		32.56 mm		
Flexure capacity	$\phi M_n = \phi A_s f_y (d - (a/2))$			
		324.11 kNm	$\geq$	152 kNm OK
				NBS >100%

Strength in Shear

Stirrups diameter	$d_v =$	8 mm	x	2
Stirrups spacing	$s =$	225 mm		
Stirrups area	$A_v =$	100.53 mm ²		
Concrete shear strength	$v_c = \text{less of } [(0.07 + 10 p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$			
		0.81 MPa		
	$k_a =$	1		
	$k_d =$	0.97		
	$v_c = k_d k_a v_b$			
		0.79 MPa		
Shear reinforcement strength	$v_s = A_v f_{yt} / sb$			
		0.24 MPa		
Nominal shear strength	$v_n = v_c + v_s$			
		1.03 MPa		
	$\phi V_n = \phi v_n b d$			
		278.39 kN	$\geq$	78 kN OK
				NBS >100%

Name: Rotorua Museum South Wing
Column Description: Concrete Frame GL C - column GL 2

CONCRETE COLUMN DESIGN - RECTANGLE

Design Actions

Axial $N^* = 57.5$ kN
Shear $V^* = 12$ kN
Flexure $M^* = 31$ kNm

Materials Properties

Concrete strength $f'_c = 45$ MPa
Vertical bars yield stress $f_y = 540$ MPa
Spiral yield stress $f_{yt} = 324$ MPa

Column Dimensions

Width $b = 400$ mm
Height $h = 400$ mm
Cover 30 mm
Effective depth $d = 342$ mm

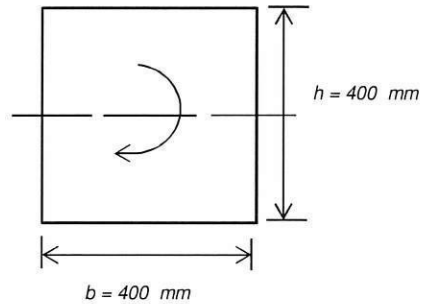


Figure: Column showing dimensions and direction of bending (not to scale)

Strength in Flexure

From chart	540	/	45	/	0.70	$M/bh^2 =$	0.48
use	500		40		0.7	$N/bh =$	0.36
						$p =$	0.3 %

Bar area required $A_{s \text{ required}} = 1280.00 \text{ mm}^2$
Number of vertical bars 4
Bar diameter $d_b = 25$ mm
Bar area provided $A_{s \text{ provided}} = 1963.50 \text{ mm}^2 \geq 1280.00 \text{ mm}^2$

NBS >100%

Strength in Shear

Tie diameter $d_s = 6$ mm
Tie spacing $s = 125$ mm
Tie area $A_v = 113.10 \text{ mm}^2$
 $\times 2$

Concrete shear strength

$p_w = 0.23$ %
 $v_b = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$
 $= 0.62$ MPa
 $k_a = 0.85$
 $k_n = (1 + 3N^*/A_g f'_c)$
 $= 1.02$

Shear reinforcement strength

$v_c = k_a k_n v_b$
 $= 0.54$ MPa
 $v_s = A_v f_{yt}/sb$
 $= 0.73$ MPa
10.3.10.4.2

Nominal shear strength

$v_n = v_c + v_s$
 $= 1.28$ MPa
 $\Phi V_n = \Phi v_n b d$
 $= 174.54 \text{ kN} \geq 12 \text{ kN}$ OK

NBS >100%

Name: Rotorua Museum South Wing
Column Description: Concrete Frame GL C - column GL 3

CONCRETE COLUMN DESIGN - RECTANGLE

Design Actions

Axial	$N^* = 289$ kN
Shear	$V^* = 65$ kN
Flexure	$M^* = 186$ kNm

Materials Properties

Concrete strength	$f'_c = 45$ MPa
Vertical bars yield stress	$f_y = 540$ MPa
Spiral yield stress	$f_{yt} = 324$ MPa

Column Dimensions

Width	$b = 600$ mm
Height	$h = 600$ mm
Cover	30 mm
Effective depth	$d = 540$ mm

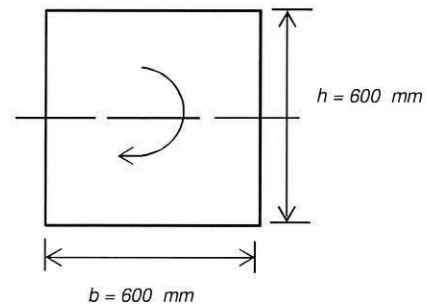


Figure: Column showing dimensions and direction of bending (not to scale)

Strength in Flexure

From chart	540	/	45	/	0.78	$M/bh^2 = 0.86$
use	500		40		0.8	$N/bh = 0.80$
						$p = 0.5\%$

Bar area required	$A_{s \text{ required}} = 2880.00$ mm ²	
Number of vertical bars	8	
Bar diameter	$d_b = 25$ mm	
Bar area provided	$A_{s \text{ provided}} = 3926.99$ mm ²	≥ 2880.00 mm ²

NBS >100%

Strength in Shear

Tie diameter	$d_s = 10$ mm	$\times 2$
Tie spacing	$s = 200$ mm	
Tie area	$A_v = 314.16$ mm ²	

Concrete shear strength

$p_w = 0.45\%$
 $v_b = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$

$= 0.77$ MPa

$k_a = 0.85$

$k_n = (1 + 3N^*/A_g f'_c)$

$= 1.05$

$v_c = k_a k_n v_b$

$= 0.69$ MPa

Shear reinforcement strength

$v_s = A_v f_{yt} / sb$ 10.3.10.4.2

$= 0.85$ MPa

Nominal shear strength

$v_n = v_c + v_s$

$= 1.54$ MPa

$\Phi V_n = \Phi v_n b d$

$= 498.65$ kN ≥ 65 kN OK

NBS >100%

Name:	Rotorua Museum South Wing
Column Description:	Concrete Frame GL C - column GL 6

CONCRETE COLUMN DESIGN - RECTANGLE

Design Actions

Axial	$N^* =$	287 kN
Shear	$V^* =$	26 kN
Flexure	$M^* =$	48 kNm

Materials Properties

Concrete strength	$f'_c =$	45 MPa
Vertical bars yield stress	$f_y =$	540 MPa
Spiral yield stress	$f_{yt} =$	324 MPa

Column Dimensions

Width	$b =$	600 mm
Height	$h =$	600 mm
Cover		30 mm
Effective depth	$d =$	540 mm

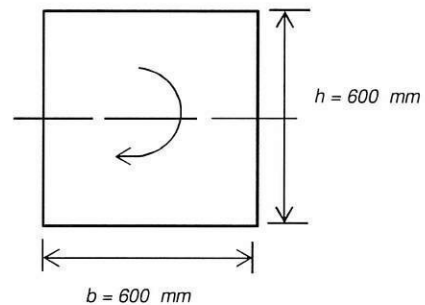


Figure: Column showing dimensions and direction of bending (not to scale)

Strength in Flexure

From chart	540	/	45	/	0.78	$M/bh^2 =$	0.22
use	500		40		0.8	$N/bh =$	0.80
						$p =$	0.2 %

Bar area required	$A_{s \text{ required}} =$	2880.00 mm ²	
Number of vertical bars		8	
Bar diameter	$d_b =$	25 mm	
Bar area provided	$A_{s \text{ provided}} =$	3926.99 mm ²	$\geq 2880.00 \text{ mm}^2$

NBS >100%

Strength in Shear

Tie diameter	$d_s =$	10 mm	$\times 2$
Tie spacing	$s =$	200 mm	
Tie area	$A_v =$	314.16 mm ²	

Concrete shear strength

$p_w = 0.45 \%$
 $v_b = \text{less of } [(0.07 + 10p_w)(f'_c)^{0.5}] \text{ or } [0.2(f'_c)^{0.5}] \text{ but not less than } 0.08(f'_c)^{0.5}$
 $= 0.77 \text{ MPa}$
 $k_a = 0.85$
 $k_n = (1 + 3N^*/A_g f'_c)$
 $= 1.05$

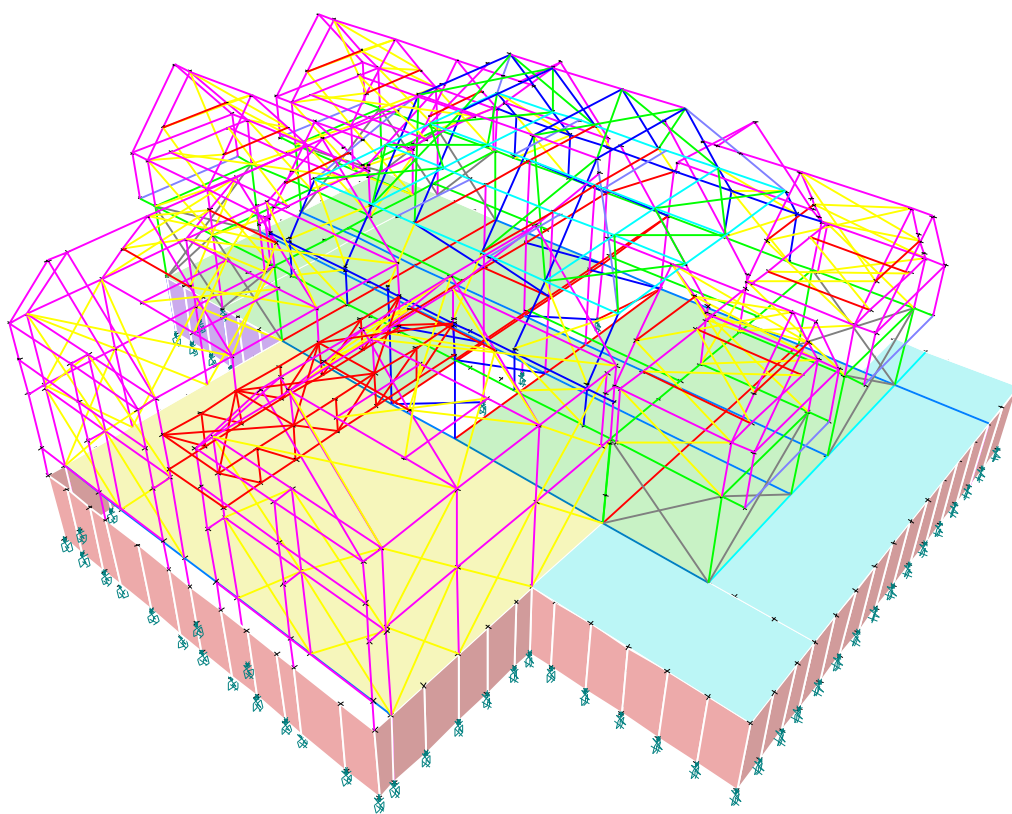
$v_c = k_a k_n v_b$
 $= 0.69 \text{ MPa}$

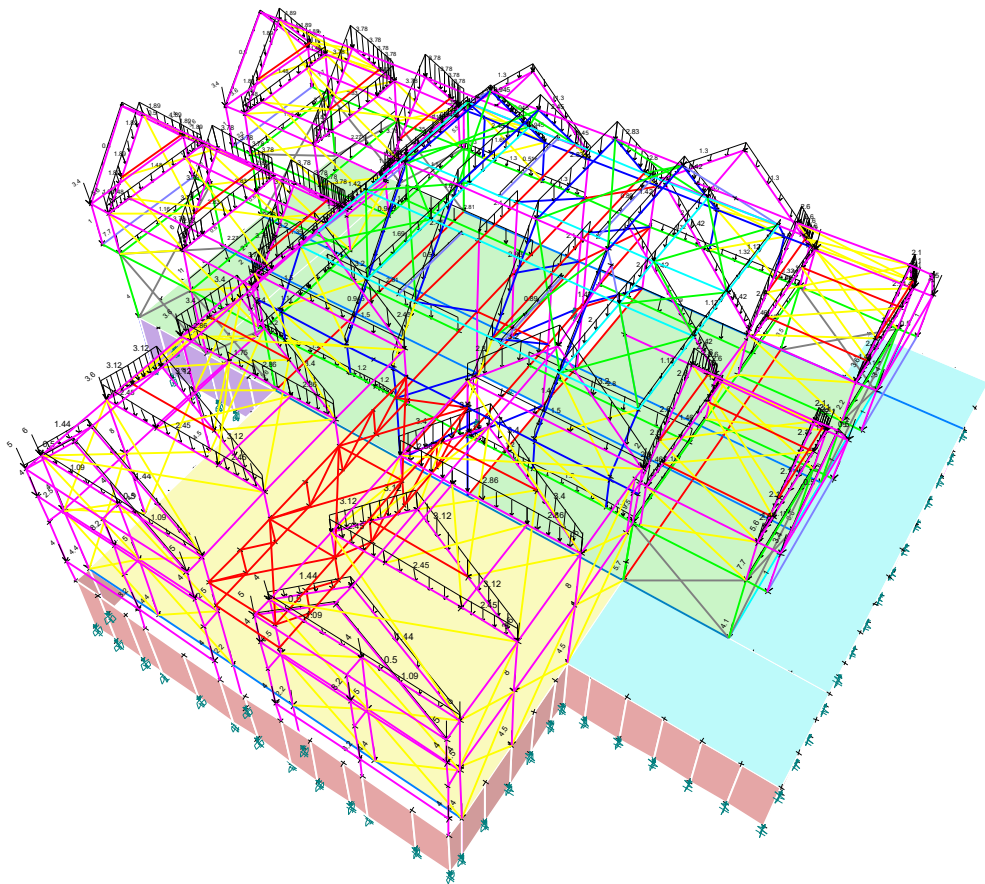
Shear reinforcement strength $v_s = A_v f_{yt}/sb$ 10.3.10.4.2
 $= 0.85 \text{ MPa}$

Nominal shear strength $v_n = v_c + v_s$
 $= 1.54 \text{ MPa}$

$\Phi V_n = \Phi v_n b d$
 $= 498.57 \text{ kN} \geq 26 \text{ kN} \quad \text{OK}$

NBS >100%





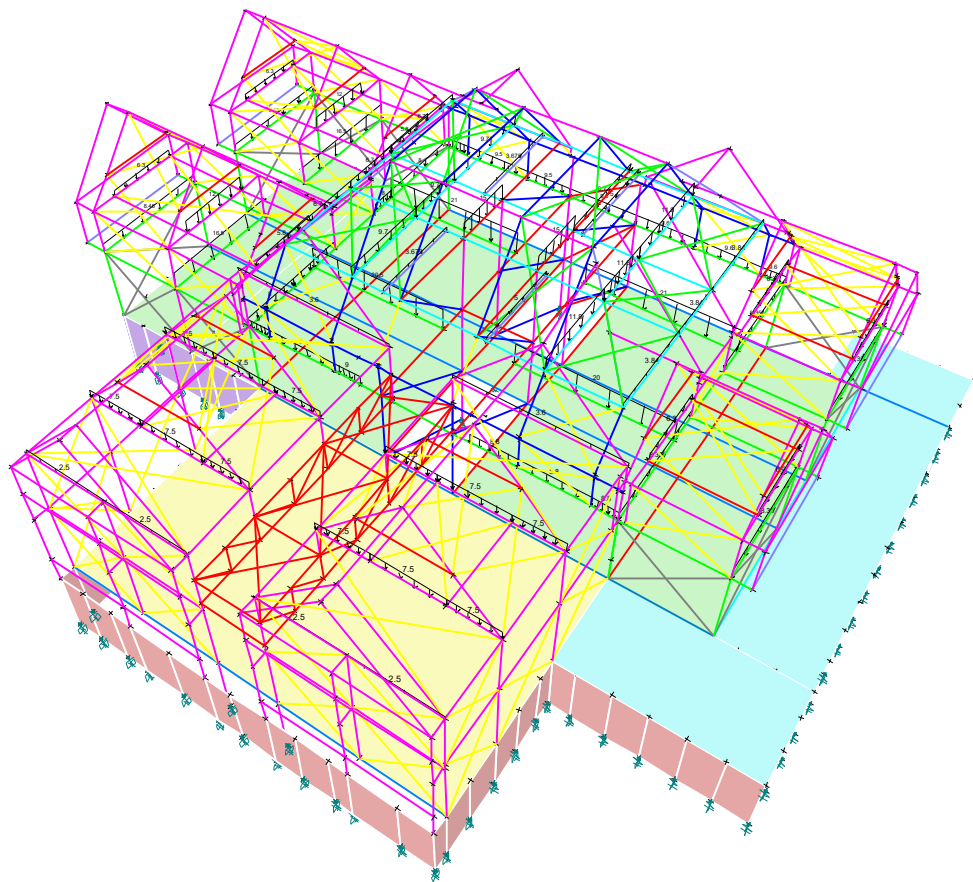


TABLE: Brace Forces

Story	Brace	Unique Name	Load Case/Combo	Station	P	V2	V3	T	M2	M3	Element
				m	kN	kN	kN	kN-m	kN-m	kN-m	
Level 3	D170	439	G+Ex+0.3Q-NL Max	0	113.3021	0.0984	-0.0444	0.00001795	-0.0007	0.0057	439
Level 3	D170	439	G+Ex+0.3Q-NL Max	1.277	113.3196	0.1237	-0.0444	0.00001795	-0.0019	-0.0083	439
Level 3	D170	439	G+Ex+0.3Q-NL Max	2.554	113.337	0.1489	-0.0444	0.00001795	0.0102	0.0324	439
Level 3	D171	440	G+Ex+0.3Q-NL Max	0	119.0302	0.1446	-0.0295	0.0003	0.0043	-0.0289	440
* Level 3	D171 <i>Ø20 Bar.</i>	440	G+Ex+0.3Q-NL Max	1.277	119.0476	0.1698	-0.0295	0.0003	0.0008	0.0414	440
Level 3	D171	440	G+Ex+0.3Q-NL Max	2.554	119.065	0.1951	-0.0295	0.0003	-0.0066	-0.1476	440
Level 3	D176	463	G+Ex+0.3Q-NL Max	0	114.2886	0.1285	0.043	0.0004	-0.0037	0.0046	463
Level 3	D176	463	G+Ex+0.3Q-NL Max	1.277	114.3061	0.1538	0.043	0.0004	0.0057	-0.0161	463
Level 3	D176	463	G+Ex+0.3Q-NL Max	2.554	114.3235	0.179	0.043	0.0004	-0.0197	0.0669	463

Story	Beam	Unique Name	Load Case/Combo	Station	P	V2	V3	T	M2	M3	Element
				m	kN	kN	kN	kN-m	kN-m	kN-m	
Level 3	B569	531	G+Ex+0.3Q-NL Max	0	150.3308	0.2558	0.1264	0	0	0	531-1
Level 3	B569	531	G+Ex+0.3Q-NL Max	0.4443	150.3308	0.2627	0.1264	0	-4.3E-06	-0.002	531-1
Level 3	B569	531	G+Ex+0.3Q-NL Max	0.8886	150.3308	0.2695	0.1264	0	-7.9E-06	-0.0057	531-1
Level 3	B569	531	G+Ex+0.3Q-NL Max	1.3328	150.3308	0.2763	0.1264	0	-0.00001	-0.0095	531-1
Level 3	B569	531	G+Ex+0.3Q-NL Max	1.7771	150.3308	0.2832	0.1264	0	-9.9E-06	-0.012	531-1
Level 3	B569	531	G+Ex+0.3Q-NL Max	2.2214	150.3308	0.29	0.1264	0	-7E-06	-0.0119	531-1
Level 3	B569	531	G+Ex+0.3Q-NL Max	2.6657	150.3308	0.2968	0.1264	0	0	-0.0076	531-1
Level 3	B569	531	G+Ex+0.3Q-NL Max	3.11	150.3308	0.3037	0.1264	0	1.07E-05	0.0023	531-1
Level 3	B569	531	G+Ex+0.3Q-NL Max	3.11	150.3308	0.3636	0.1263	0.0001	-1.5E-05	0.0026	531-2
Level 3	B569	531	G+Ex+0.3Q-NL Max	3.5542	150.3308	0.3705	0.1263	0.0001	5.37E-07	-0.0076	531-2
* Level 3	B569 <i>R8/16</i>	531	G+Ex+0.3Q-NL Max	3.9985	150.3308	0.3773	0.1263	0.0001	9.9E-06	-0.0121	531-2
Level 3	B569	531	G+Ex+0.3Q-NL Max	4.4428	150.3308	0.3841	0.1263	0.0001	1.41E-05	-0.0123	531-2
Level 3	B569	531	G+Ex+0.3Q-NL Max	4.8871	150.3308	0.3909	0.1263	0.0001	1.42E-05	-0.0098	531-2
Level 3	B569	531	G+Ex+0.3Q-NL Max	5.3314	150.3308	0.3978	0.1263	0.0001	1.12E-05	-0.0059	531-2
Level 3	B569	531	G+Ex+0.3Q-NL Max	5.7756	150.3308	0.4046	0.1263	0.0001	6.1E-06	-0.0022	531-2
Level 3	B569	531	G+Ex+0.3Q-NL Max	6.2199	150.3308	0.4114	0.1263	0.0001	0	0	531-2
Level 3	B571	728	G+Ex+0.3Q-NL Max	0	128.2691	0.1446	-0.2767	0	0	0	728-1
Level 3	B571	728	G+Ex+0.3Q-NL Max	0.4626	128.2691	0.1517	-0.2767	0	0	-0.0023	728-1

Level 3	B571	728 G+Ex+0.3Q-NL Max	0.9251	128.2691	0.1588	-0.2767	0	-5.9E-07	-0.0064	728-1
Level 3	B571	728 G+Ex+0.3Q-NL Max	1.3877	128.2691	0.1659	-0.2767	0	-7.5E-07	-0.0106	728-1
Level 3	B571	728 G+Ex+0.3Q-NL Max	1.8503	128.2691	0.173	-0.2767	0	-7.5E-07	-0.0133	728-1
Level 3	B571	728 G+Ex+0.3Q-NL Max	2.3128	128.2691	0.1802	-0.2767	0	-5.3E-07	-0.0131	728-1
Level 3	B571	728 G+Ex+0.3Q-NL Max	2.7754	128.2691	0.1873	-0.2767	0	0	-0.0082	728-1
Level 3	B571	728 G+Ex+0.3Q-NL Max	3.238	128.2691	0.1944	-0.2767	0	8.22E-07	0.0029	728-1
Level 3	B571	728 G+Ex+0.3Q-NL Max	3.238	128.2691	0.2568	-0.2767	-3.915E-05	2.92E-06	0.0025	728-2
Level 3	B571	728 G+Ex+0.3Q-NL Max	3.7005	128.2691	0.2639	-0.2767	-3.915E-05	0	-0.0082	728-2
Level 3	B571	728 G+Ex+0.3Q-NL Max	4.1631	128.2691	0.271	-0.2767	-3.915E-05	-1.9E-06	-0.0128	728-2
Level 3	B571	728 G+Ex+0.3Q-NL Max	4.6257	128.2691	0.2781	-0.2767	-3.915E-05	-2.7E-06	-0.013	728-2
Level 3	B571	728 G+Ex+0.3Q-NL Max	5.0882	128.2691	0.2852	-0.2767	-3.915E-05	-2.7E-06	-0.0102	728-2
Level 3	B571	728 G+Ex+0.3Q-NL Max	5.5508	128.2691	0.2923	-0.2767	-3.915E-05	-2.2E-06	-0.0061	728-2
Level 3	B571	728 G+Ex+0.3Q-NL Max	6.0134	128.2691	0.2995	-0.2767	-3.915E-05	-1.2E-06	-0.0022	728-2
Level 3	B571	728 G+Ex+0.3Q-NL Max	6.4759	128.2691	0.3066	-0.2767	-3.915E-05	0	0	728-2

Story	Brace	Unique Name	Load Case/Combo	Station	P	V2	V3	T	M2	M3	Element
				m	kN	kN	kN	kN-m	kN-m	kN-m	
Level 3	D146	308 G+Ex+0.3Q-NL Max		0	168.1922	-0.407	0.4929	0	0	0	308-1
Level 3	D146	308 G+Ex+0.3Q-NL Max		1.7609	168.2164	-0.3724	0.4929	0	-0.0008	0.0013	308-1
Level 3	D146	308 G+Ex+0.3Q-NL Max		1.7609	168.2485	-0.3349	0.4949	-0.0007	0.0012	0.001	308-2
Level 3	D146	308 G+Ex+0.3Q-NL Max		3.5219	168.2728	-0.3002	0.4949	-0.0007	0	0	308-2
Level 3	D151	332 G+Ex+0.3Q-NL Max		0	123.4605	-0.2191	-0.1119	0	0	0	332-1
Level 3	D151	332 G+Ex+0.3Q-NL Max		2.4285	123.4985	-0.1749	-0.1119	0	-0.0002	0.0015	332-1
Level 3	D151	332 G+Ex+0.3Q-NL Max		2.4285	123.5474	-0.1291	-0.1109	-0.0001	0.0005	0.0011	332-2
Level 3	D151	332 G+Ex+0.3Q-NL Max		4.8571	123.5855	-0.0849	-0.1109	-0.0001	0	0	332-2
Level 3	D153	273 G+Ex+0.3Q-NL Max		0	117.9476	-0.2938	0.1957	0	0	0	273-1
Level 3	D153	273 G+Ex+0.3Q-NL Max		2.4285	117.9857	-0.2496	0.1957	0	0.0003	0.0017	273-1
Level 3	D153	273 G+Ex+0.3Q-NL Max		2.4285	118.0344	-0.2038	0.1944	0.00002074	-0.0007	0.001	273-2
Level 3	D153	273 G+Ex+0.3Q-NL Max		4.8571	118.0725	-0.1596	0.1944	0.00002074	0	0	273-2
Level 3	D237	271 G+Ex+0.3Q-NL Max		0	147.8228	-0.3115	-0.369	0	0	0	271-1
Level 3	D237	271 G+Ex+0.3Q-NL Max		1.7609	147.8471	-0.2769	-0.369	0	0.0012	0.0014	271-1
Level 3	D237	271 G+Ex+0.3Q-NL Max		1.7609	147.8793	-0.2394	-0.3733	0.0005	-0.0021	0.0011	271-2
Level 3	D237	271 G+Ex+0.3Q-NL Max		3.5219	147.9036	-0.2047	-0.3733	0.0005	0	0	271-2

Level 2	D330		275 G+Ex+0.3Q-NL Max	0	193.8318	-0.6114	0.0494	0	0	0	275-1
Level 2	D330		275 G+Ex+0.3Q-NL Max	2.8846	193.8792	-0.5609	0.0494	0	-0.0001	0.0011	275-1
Level 2	D330		275 G+Ex+0.3Q-NL Max	2.8846	193.9393	-0.5096	0.0485	-0.0007	-0.0002	0.0006	275-2
Level 2	D330		275 G+Ex+0.3Q-NL Max	5.7693	193.9867	-0.4591	0.0485	-0.0007	0	0	275-2
Level 2	D332		277 G+Ex+0.3Q-NL Max	0	168.1244	-0.6458	0.1546	0	0	0	277-1
Level 2	D332		277 G+Ex+0.3Q-NL Max	2.7684	168.1719	-0.5992	0.1546	0	0.0003	0.0012	277-1
Level 2	D332		277 G+Ex+0.3Q-NL Max	2.7684	168.2311	-0.5528	0.1549	0.0003	-0.0002	0.0003	277-2
Level 2	D332		277 G+Ex+0.3Q-NL Max	5.5369	168.2785	-0.5062	0.1549	0.0003	0	0	277-2
Level 2	D334		279 G+Ex+0.3Q-NL Max	0	157.1988	-0.6948	0.1517	0	0	0	279-1
Level 2	D334		279 G+Ex+0.3Q-NL Max	2.5214	157.2462	-0.6571	0.1517	0	0.0002	0.0007	279-1
Level 2	D334		279 G+Ex+0.3Q-NL Max	2.5214	157.3027	-0.6216	0.1532	-0.0001	0.0002	0.0002	279-2
Level 2	D334		279 G+Ex+0.3Q-NL Max	5.0429	157.3501	-0.5839	0.1532	-0.0001	0	0	279-2
Level 2	D340		325 G+Ex+0.3Q-NL Max	0	225.1216	-1.288	-0.2213	0	0	0	325-1
Level 2	D340		325 G+Ex+0.3Q-NL Max	2.5214	225.1691	-1.2503	-0.2213	0	-0.0001	0.0006	325-1
* Level 2	D340	<i>RB20.</i>	325 G+Ex+0.3Q-NL Max	2.5214	225.2255	-1.2148	-0.2226	0.0001	-0.0003	-0.0001	325-2
Level 2	D340		325 G+Ex+0.3Q-NL Max	5.0429	225.2729	-1.1771	-0.2226	0.0001	0	0	325-2

Story	Brace	Unique Name	Load Case/Combo	Station	P	V2	V3	T	M2	M3	Element
				m	kN	kN	kN	kN-m	kN-m	kN-m	
Level 2	D322		207 G+Ex+0.3Q-NL Max	0	189.9615	-0.508	-0.0549	0	0	0	207-1
Level 2	D322		207 G+Ex+0.3Q-NL Max	3.5584	190.0356	-0.3969	-0.0549	0	0.0002	0.0052	207-1
A Level 2	D322	<i>RB25.</i>	207 G+Ex+0.3Q-NL Max	3.5584	190.135	-0.2754	-0.0553	0.0027	-0.0003	0.005	207-2
Level 2	D322		207 G+Ex+0.3Q-NL Max	7.1168	190.2091	-0.1643	-0.0553	0.0027	0	0	207-2
Level 2	D324		209 G+Ex+0.3Q-NL Max	0	152.8174	-0.3914	0.0138	0	0	0	209-1
Level 2	D324		209 G+Ex+0.3Q-NL Max	3.6694	152.8915	-0.2753	0.0138	0	0.0005	0.0064	209-1
Level 2	D324		209 G+Ex+0.3Q-NL Max	3.6694	152.9915	-0.1474	0.0137	0.0006	-0.0006	0.0062	209-2
Level 2	D324		209 G+Ex+0.3Q-NL Max	7.3387	153.0656	-0.0313	0.0137	0.0006	0	0	209-2
Level 2	D326		241 G+Ex+0.3Q-NL Max	0	122.1795	-0.3397	0.0448	0	0	0	241-1
Level 2	D326		241 G+Ex+0.3Q-NL Max	3.5584	122.2536	-0.2286	0.0448	0	-0.0003	0.0068	241-1
Level 2	D326		241 G+Ex+0.3Q-NL Max	3.5584	122.3528	-0.1073	0.0449	-0.0016	0.0004	0.0066	241-2
Level 2	D326		241 G+Ex+0.3Q-NL Max	7.1168	122.427	0.0038	0.0449	-0.0016	0	0	241-2
Level 2	D328		243 G+Ex+0.3Q-NL Max	0	114.033	-0.2643	0.0144	0	0	0	243-1
Level 2	D328		243 G+Ex+0.3Q-NL Max	3.6694	114.1072	-0.1482	0.0144	0	-0.0009	0.0075	243-1

TABLE: Steel Column Forces

Story	Column	Unique Name	Load Case/Combo	Station	P	V2	V3	T	M2	M3	Element
				m	kN	kN	kN	kN-m	kN-m	kN-m	
Level 3	C104	38 G+Ey+0.3Q-NL Max		0	-6.0247	-0.7195	1.9677	0.0886	0.7827	0.3148	38
Level 3	C104	38 G+Ey+0.3Q-NL Max		0.725	-5.9514	-0.7195	1.9677	0.0886	-0.6487	0.8356	38
Level 3	C104	38 G+Ey+0.3Q-NL Max		1.45	-5.8782	-0.7195	1.9677	0.0886	-2.0792	1.3552	38
Level 3	C104	38 G+Ex+0.3Q-NL Max		0	0.2484	-2.6712	1.2952	0.6943	1.1344	-5.0843	38
Level 3	C104	38 G+Ex+0.3Q-NL Max		0.725	0.4342	-2.6712	1.2952	0.6943	0.1957	-3.1454	38
Level 3	C104	38 G+Ex+0.3Q-NL Max		1.45	0.6201	-2.6712	1.2952	0.6943	-0.7376	-1.2067	38
Level 3	C114	3 G+Ey+0.3Q-NL Max		0	-22.0708	-2.1683	10.4792	0.2752	6.9538	-1.6862	3
Level 3	C114	3 G+Ey+0.3Q-NL Max		0.675	-22.0026	-2.1683	10.4792	0.2752	-0.1663	-0.2232	3
Level 3	C114	3 G+Ey+0.3Q-NL Max		1.35	-21.9344	-2.1683	10.4792	0.2752	-7.2857	1.2408	3
Level 3	C114	3 G+Ex+0.3Q-NL Max		0	-13.6597	40.3422	6.8721	4.3765	0.5925	31.5338	3
Level 3	C114	3 G+Ex+0.3Q-NL Max		0.675	-13.4867	40.3422	6.8721	4.3765	-4.0487	4.217	3
Level 3	C114	3 G+Ex+0.3Q-NL Max		1.35	-13.3137	40.3422	6.8721	4.3765	-8.6261	-23.088	3
Level 3	C115	7 G+Ey+0.3Q-NL Max		0	-7.1707	-2.5935	5.3607	0.3693	6.9322	-1.5782	7
Level 3	C115	7 G+Ey+0.3Q-NL Max		0.675	-7.1025	-2.5935	5.3607	0.3693	3.2985	0.1719	7
Level 3	C115	7 G+Ey+0.3Q-NL Max		1.35	-7.0343	-2.5935	5.3607	0.3693	-0.3398	1.9218	7
Level 3	C115	7 G+Ex+0.3Q-NL Max		0	-14.022	52.5536	-5.7301	-4.6401	-0.1041	40.2163	7
Level 3	C115	7 G+Ex+0.3Q-NL Max		0.675	-13.8489	52.5536	-5.7301	-4.6401	3.7592	4.6327	7
Level 3	C115	7 G+Ex+0.3Q-NL Max		1.35	-13.6759	52.5536	-5.7301	-4.6401	7.6618	-30.9384	7
Level 3	C118	122 G+Ey+0.3Q-NL Max		0	-20.9714	4.0183	11.9528	0.1827	7.9793	2.6395	122
Level 3	C118	122 G+Ey+0.3Q-NL Max		0.675	-20.9032	4.0183	11.9528	0.1827	-0.1405	-0.0775	122
Level 3	C118	122 G+Ey+0.3Q-NL Max		1.35	-20.835	4.0183	11.9528	0.1827	-8.2598	-2.7942	122
Level 3	C118	122 G+Ex+0.3Q-NL Max		0	-60.7278	60.0397	9.3875	3.0366	0.8707	39.4441	122
Level 3	C118	122 G+Ex+0.3Q-NL Max		0.675	-60.5548	60.0397	9.3875	3.0366	-5.4931	-1.5254	122
Level 3	C118	122 G+Ex+0.3Q-NL Max		1.35	-60.3818	60.0397	9.3875	3.0366	-11.7113	-42.4392	122
Level 3	C119	125 G+Ey+0.3Q-NL Max		0	-7.403	1.2971	7.4145	0.113	8.6325	0.6549	125
Level 3	C119	125 G+Ey+0.3Q-NL Max		0.675	-7.3348	1.2971	7.4145	0.113	3.6081	-0.2211	125
Level 3	C119	125 G+Ey+0.3Q-NL Max		1.35	-7.2666	1.2971	7.4145	0.113	-1.4215	-1.0969	125
Level 3	C119	125 G+Ex+0.3Q-NL Max		0	-62.0486	73.9347	-9.5418	-3.3845	-1.4657	49.7758	125
Level 3	C119	125 G+Ex+0.3Q-NL Max		0.675	-61.8756	73.9347	-9.5418	-3.3845	4.9872	-0.6869	125
Level 3	C119	125 G+Ex+0.3Q-NL Max		1.35	-61.7026	73.9347	-9.5418	-3.3845	11.446	-51.1098	125

Level 3	C120	136 G+Ey+0.3Q-NL Max	0	-2.4736	0.2103	2.7066	0.5215	0.9881	0.1609	136-1
Level 3	C120	136 G+Ey+0.3Q-NL Max	0.19	-2.4544	0.2103	2.7066	0.5215	0.4733	0.121	136-1
Level 3	C120	136 G+Ey+0.3Q-NL Max	0.19	-26.7236	6.8473	26.6677	-2.0504	19.4301	5.13	136-2
Level 3	C120	136 G+Ey+0.3Q-NL Max	0.675	-26.6746	6.8473	26.6677	-2.0504	6.4543	1.8042	136-2
Level 3	C120	136 G+Ey+0.3Q-NL Max	1.35	-26.6064	6.8473	26.6677	-2.0504	-11.6198	-2.8289	136-2
Level 3	C120	136 G+Ex+0.3Q-NL Max	0	10.8681	3.5556	0.7963	-0.0597	0.1913	-0.5575	136-1
Level 3	C120	136 G+Ex+0.3Q-NL Max	0.19	10.9168	3.5556	0.7963	-0.0597	0.0398	-1.2284	136-1
Level 3	C120	136 G+Ex+0.3Q-NL Max	0.19	-47.4321	76.103	20.0687	-0.8613	9.9907	64.3708	136-2
Level 3	C120	136 G+Ex+0.3Q-NL Max	0.675	-47.3078	76.103	20.0687	-0.8613	0.2389	27.2573	136-2
Level 3	C120	136 G+Ex+0.3Q-NL Max	1.35	-47.1348	76.103	20.0687	-0.8613	-13.2851	-24.4867	136-2
Level 3	C121	138 G+Ey+0.3Q-NL Max	0	-36.8624	2.1799	64.6527	0.2931	10.6662	-0.0163	138-1
Level 3	C121	138 G+Ey+0.3Q-NL Max	0.22	-36.8402	2.1799	64.6527	0.2931	-3.5698	-0.4946	138-1
Level 3	C121	138 G+Ey+0.3Q-NL Max	0.22	-35.6999	-4.9771	64.0129	1.7922	-3.8336	0.7733	138-2
Level 3	C121	138 G+Ey+0.3Q-NL Max	0.2943	-35.6924	-4.9771	64.0129	1.7922	-8.5927	1.1436	138-2
Level 3	C121	138 G+Ey+0.3Q-NL Max	0.2943	-3.7118	0.8706	5.0311	-0.2864	3.313	0.9036	138-3
Level 3	C121	138 G+Ey+0.3Q-NL Max	0.8343	-3.6573	0.8706	5.0311	-0.2864	0.5934	0.4336	138-3
Level 3	C121	138 G+Ey+0.3Q-NL Max	1.57	-3.5829	0.8706	5.0311	-0.2864	-3.1113	-0.207	138-3
Level 3	C121	138 G+Ey+0.3Q-NL Max	1.57	-3.5829	0.8706	5.0311	-0.2864	-3.1113	-0.207	138-4
Level 3	C121	138 G+Ey+0.3Q-NL Max	1.6687	-3.573	0.8706	5.0311	-0.2864	-3.6081	-0.2929	138-4
Level 3	C121	138 G+Ex+0.3Q-NL Max	0	-51.4489	163.4721	-5.1116	2.0979	-1.3746	0.37	138-1
Level 3	C121	138 G+Ex+0.3Q-NL Max	0.22	-51.3925	163.4721	-5.1116	2.0979	-0.2203	-35.5075	138-1
Level 3	C121	138 G+Ex+0.3Q-NL Max	0.22	-40.9047	-60.2251	-5.5988	3.209	-0.3071	-21.8062	138-2
Level 3	C121	138 G+Ex+0.3Q-NL Max	0.2943	-40.8856	-60.2251	-5.5988	3.209	0.146	-17.3405	138-2
Level 3	C121	138 G+Ex+0.3Q-NL Max	0.2943	-60.0388	-36.3944	5.2133	-1.0383	3.3299	-19.1531	138-3
Level 3	C121	138 G+Ex+0.3Q-NL Max	0.8343	-59.9004	-36.3944	5.2133	-1.0383	0.5121	0.4721	138-3
Level 3	C121	138 G+Ex+0.3Q-NL Max	1.57	-59.7118	-36.3944	5.2133	-1.0383	-3.3075	27.1768	138-3
Level 3	C121	138 G+Ex+0.3Q-NL Max	1.57	-59.7118	-36.3944	5.2133	-1.0383	-3.3075	27.1768	138-4
Level 3	C121	138 G+Ex+0.3Q-NL Max	1.6687	-59.6866	-36.3944	5.2133	-1.0383	-3.8171	30.7436	138-4
Level 3	C122	139 G+Ey+0.3Q-NL Max	0	-1.3808	2.2799	13.6744	-0.9406	15.5796	1.368	139
Level 3	C122	139 G+Ey+0.3Q-NL Max	0.675	-1.3126	2.2799	13.6744	-0.9406	6.3469	-0.1711	139
Level 3	C122	139 G+Ey+0.3Q-NL Max	1.35	-1.2444	2.2799	13.6744	-0.9406	-2.8874	-1.7101	139
Level 3	C122	139 G+Ex+0.3Q-NL Max	0	-49.3123	56.5039	-22.2837	-0.3759	-13.6712	48.7738	139
Level 3	C122	139 G+Ex+0.3Q-NL Max	0.675	-49.1393	56.5039	-22.2837	-0.3759	1.4316	10.2401	139

Level 3	C122	139 G+Ex+0.3Q-NL Max	1.35	-48.9663	56.5039	-22.2837	-0.3759	16.5489	-28.3796	139
Level 3	C123	66 G+Ey+0.3Q-NL Max	0	-5.3684	3.8463	1.3993	1.0139	2.3679	5.5876	66
Level 3	C123	66 G+Ey+0.3Q-NL Max	1.095	-5.2577	3.8463	1.3993	1.0139	0.8269	1.3668	66
Level 3	C123	66 G+Ey+0.3Q-NL Max	2.19	-5.1471	3.8463	1.3993	1.0139	-0.7164	-2.8577	66
Level 3	C123	66 G+Ex+0.3Q-NL Max	0	-13.0288	19.8905	-2.1738	0.4512	-2.2133	28.5117	66
Level 3	C123	66 G+Ex+0.3Q-NL Max	1.095	-12.7481	19.8905	-2.1738	0.4512	0.1671	6.62	66
Level 3	C123	66 G+Ex+0.3Q-NL Max	2.19	-12.4675	19.8905	-2.1738	0.4512	2.5487	-15.3138	66
Level 3	C124	70 G+Ey+0.3Q-NL Max	0	16.7367	-1.9004	2.4037	0.7122	3.5896	-0.4412	70
Level 3	C124	70 G+Ey+0.3Q-NL Max	1.095	16.8473	-1.9004	2.4037	0.7122	0.9841	1.6269	70
Level 3	C124	70 G+Ey+0.3Q-NL Max	2.19	16.958	-1.9004	2.4037	0.7122	-1.6128	3.7093	70
Level 3	C124	70 G+Ex+0.3Q-NL Max	0	-21.0922	0.8842	-0.7876	1.3859	-0.9854	-0.2401	70
Level 3	C124	70 G+Ex+0.3Q-NL Max	1.095	-20.8116	0.8842	-0.7876	1.3859	-0.1221	-1.3229	70
Level 3	C124	70 G+Ex+0.3Q-NL Max	2.19	-20.5309	0.8842	-0.7876	1.3859	0.7601	-2.3893	70
Level 3	C125	76 G+Ey+0.3Q-NL Max	0	9.5797	5.1542	1.8478	0.2541	2.4452	6.8078	76
Level 3	C125	76 G+Ey+0.3Q-NL Max	1.095	9.6904	5.1542	1.8478	0.2541	0.4392	1.184	76
Level 3	C125	76 G+Ey+0.3Q-NL Max	2.19	9.801	5.1542	1.8478	0.2541	-1.5646	-4.4339	76
Level 3	C125	76 G+Ex+0.3Q-NL Max	0	8.4373	20.309	-1.9189	-0.3029	-2.1615	26.9472	76
Level 3	C125	76 G+Ex+0.3Q-NL Max	1.095	8.718	20.309	-1.9189	-0.3029	-0.0598	4.7882	76
Level 3	C125	76 G+Ex+0.3Q-NL Max	2.19	8.9986	20.309	-1.9189	-0.3029	2.0464	-17.3476	76
Level 3	C126	78 G+Ey+0.3Q-NL Max	0	-30.6798	-4.0885	3.9065	1.1391	6.7068	-4.7818	78
Level 3	C126	78 G+Ey+0.3Q-NL Max	1.095	-30.5692	-4.0885	3.9065	1.1391	2.3913	-0.3019	78
Level 3	C126	78 G+Ey+0.3Q-NL Max	2.19	-30.4586	-4.0885	3.9065	1.1391	-1.9619	4.1827	78
Level 3	C126	78 G+Ex+0.3Q-NL Max	0	-30.8491	2.0612	0.3487	-1.3026	0.9214	6.337	78
Level 3	C126	78 G+Ex+0.3Q-NL Max	1.095	-30.5685	2.0612	0.3487	-1.3026	0.5595	3.8547	78
Level 3	C126	78 G+Ex+0.3Q-NL Max	2.19	-30.2878	2.0612	0.3487	-1.3026	0.2115	1.313	78
Level 3	C127	80 G+Ey+0.3Q-NL Max	0	-42.6559	-3.7755	1.4997	0.1701	1.0068	-4.5279	80
Level 3	C127	80 G+Ey+0.3Q-NL Max	1.095	-42.5453	-3.7755	1.4997	0.1701	-0.725	-0.3548	80
Level 3	C127	80 G+Ey+0.3Q-NL Max	2.19	-42.4347	-3.7755	1.4997	0.1701	-2.4409	3.826	80
Level 3	C127	80 G+Ex+0.3Q-NL Max	0	-6.2033	32.8128	2.4662	-0.557	1.9677	46.6029	80
Level 3	C127	80 G+Ex+0.3Q-NL Max	1.095	-5.9226	32.8128	2.4662	-0.557	-0.7206	10.5993	80
Level 3	C127	80 G+Ex+0.3Q-NL Max	2.19	-5.642	32.8128	2.4662	-0.557	-3.3747	-25.4225	80
Level 3	C128	86 G+Ey+0.3Q-NL Max	0	-2.3634	-1.907	-1.0846	-0.0976	-1.0907	-2.2999	86
Level 3	C128	86 G+Ey+0.3Q-NL Max	1.095	-2.2528	-1.907	-1.0846	-0.0976	0.0929	-0.2099	86

Level 3	C128	86 G+Ey+0.3Q-NL Max	2.19	-2.1422	-1.907	-1.0846	-0.0976	1.2763	1.8803	86
Level 3	C128	86 G+Ex+0.3Q-NL Max	0	14.4511	28.7142	1.8536	1.2031	2.1262	37.8103	86
Level 3	C128	86 G+Ex+0.3Q-NL Max	1.095	14.7318	28.7142	1.8536	1.2031	0.0891	6.5493	86
Level 3	C128	86 G+Ex+0.3Q-NL Max	2.19	15.0125	28.7142	1.8536	1.2031	-1.9435	-24.6523	86
Level 3	C129	89 G+Ey+0.3Q-NL Max	0	-62.9337	-1.1272	1.6495	0.3708	2.9905	-0.3018	89
Level 3	C129	89 G+Ey+0.3Q-NL Max	1.095	-62.8231	-1.1272	1.6495	0.3708	1.0835	0.9402	89
Level 3	C129	89 G+Ey+0.3Q-NL Max	2.19	-62.7125	-1.1272	1.6495	0.3708	-0.8586	2.1518	89
Level 3	C129	89 G+Ex+0.3Q-NL Max	0	-4.4602	0.1568	1.1037	-0.1472	0.9969	-0.4095	89
Level 3	C129	89 G+Ex+0.3Q-NL Max	1.095	-4.1795	0.1568	1.1037	-0.1472	-0.2074	-0.6023	89
Level 3	C129	89 G+Ex+0.3Q-NL Max	2.19	-3.8988	0.1568	1.1037	-0.1472	-1.4005	-0.7918	89
Level 3	C130	109 G+Ey+0.3Q-NL Max	0	-5.8968	-6.1429	5.7261	-1.3211	4.0294	-5.8176	109-1
Level 3	C130	109 G+Ey+0.3Q-NL Max	1.51	-5.7443	-6.1429	5.7261	-1.3211	-4.6289	3.4588	109-1
Level 3	C130	109 G+Ey+0.3Q-NL Max	1.57	-5.7382	-6.1429	5.7261	-1.3211	-4.9729	3.8275	109-1
Level 3	C130	109 G+Ey+0.3Q-NL Max	1.57	-5.7382	-6.1429	5.7261	-1.3211	-4.9729	3.8275	109-2
Level 3	C130	109 G+Ey+0.3Q-NL Max	1.67	-5.7281	-6.1429	5.7261	-1.3211	-5.5459	4.4416	109-2
Level 3	C130	109 G+Ey+0.3Q-NL Max	1.67	30.9125	11.4644	38.5395	3.0677	22.939	4.4609	109-3
Level 3	C130	109 G+Ey+0.3Q-NL Max	2.34	30.9802	11.4644	38.5395	3.0677	-2.825	-3.2056	109-3
Level 3	C130	109 G+Ey+0.3Q-NL Max	2.34	-19.2673	-6.5181	34.4782	0.339	13.3461	-3.7143	109-4
Level 3	C130	109 G+Ey+0.3Q-NL Max	3.02	-19.1986	-6.5181	34.4782	0.339	-10.1564	0.716	109-4
Level 3	C130	109 G+Ex+0.3Q-NL Max	0	-40.9966	-1.7218	6.0231	0.0223	4.5575	-4.554	109-1
Level 3	C130	109 G+Ex+0.3Q-NL Max	1.51	-40.6096	-1.7218	6.0231	0.0223	-4.5081	-2.2947	109-1
Level 3	C130	109 G+Ex+0.3Q-NL Max	1.57	-40.5942	-1.7218	6.0231	0.0223	-4.8667	-2.202	109-1
Level 3	C130	109 G+Ex+0.3Q-NL Max	1.57	-40.5942	-1.7218	6.0231	0.0223	-4.8667	-2.202	109-2
Level 3	C130	109 G+Ex+0.3Q-NL Max	1.67	-40.5686	-1.7218	6.0231	0.0223	-5.4614	-2.0454	109-2
Level 3	C130	109 G+Ex+0.3Q-NL Max	1.67	-20.589	9.7596	-23.5032	-0.8927	-9.0702	-2.1632	109-3
Level 3	C130	109 G+Ex+0.3Q-NL Max	2.34	-20.4173	9.7596	-23.5032	-0.8927	6.7751	-8.7575	109-3
Level 3	C130	109 G+Ex+0.3Q-NL Max	2.34	14.1248	-61.7615	10.6177	2.3281	-0.4375	-31.6677	109-4
Level 3	C130	109 G+Ex+0.3Q-NL Max	3.02	14.2991	-61.7615	10.6177	2.3281	-7.6636	10.3388	109-4
Level 3	C131	110 G+Ey+0.3Q-NL Max	0	-13.9461	5.8825	0.0259	0.4485	-0.0964	7.4649	110
Level 3	C131	110 G+Ey+0.3Q-NL Max	1.095	-13.8355	5.8825	0.0259	0.4485	-0.1747	0.9945	110
Level 3	C131	110 G+Ey+0.3Q-NL Max	2.19	-13.7249	5.8825	0.0259	0.4485	-0.2519	-5.4831	110
Level 3	C131	110 G+Ex+0.3Q-NL Max	0	-21.6293	22.1033	0.8277	-0.3762	0.7924	28.6952	110
Level 3	C131	110 G+Ex+0.3Q-NL Max	1.095	-21.3487	22.1033	0.8277	-0.3762	-0.1423	4.2941	110

Level 3	C131	110 G+Ex+0.3Q-NL Max	2.19	-21.068	22.1033	0.8277	-0.3762	-1.0724	-20.1528	110
Level 3	C132	143 G+Ey+0.3Q-NL Max	0	4.8778	-5.723	1.5849	-0.2296	2.0509	-7.5771	143
Level 3	C132	143 G+Ey+0.3Q-NL Max	1.095	4.9884	-5.723	1.5849	-0.2296	0.323	-1.3225	143
Level 3	C132	143 G+Ey+0.3Q-NL Max	2.19	5.099	-5.723	1.5849	-0.2296	-1.4041	4.9287	143
Level 3	C132	143 G+Ex+0.3Q-NL Max	0	-14.0544	18.1439	1.4997	-1.1591	1.9773	23.5801	143
Level 3	C132	143 G+Ex+0.3Q-NL Max	1.095	-13.7738	18.1439	1.4997	-1.1591	0.3361	3.6036	143
Level 3	C132	143 G+Ex+0.3Q-NL Max	2.19	-13.4931	18.1439	1.4997	-1.1591	-1.2419	-16.3159	143
Level 3	C133	128 G+Ey+0.3Q-NL Max	0	2.2596	-1.0431	-3.8681	-0.116	-4.5596	-1.549	128
Level 3	C133	128 G+Ey+0.3Q-NL Max	1.095	2.3702	-1.0431	-3.8681	-0.116	-0.3226	-0.4085	128
Level 3	C133	128 G+Ey+0.3Q-NL Max	2.19	2.4808	-1.0431	-3.8681	-0.116	3.9141	0.7315	128
Level 3	C133	128 G+Ex+0.3Q-NL Max	0	-27.4556	30.2325	-4.2605	1.0558	-4.6682	39.5111	128
Level 3	C133	128 G+Ex+0.3Q-NL Max	1.095	-27.175	30.2325	-4.2605	1.0558	0.0699	6.0662	128
Level 3	C133	128 G+Ex+0.3Q-NL Max	2.19	-26.8943	30.2325	-4.2605	1.0558	4.8245	-27.4532	128
Level 3	C134	152 G+Ey+0.3Q-NL Max	0	-5.7255	3.1162	-0.0231	0.0779	0.2273	3.8704	152
Level 3	C134	152 G+Ey+0.3Q-NL Max	1.095	-5.6149	3.1162	-0.0231	0.0779	0.2452	0.4513	152
Level 3	C134	152 G+Ey+0.3Q-NL Max	2.19	-5.5042	3.1162	-0.0231	0.0779	0.2623	-2.9691	152
Level 3	C134	152 G+Ex+0.3Q-NL Max	0	-19.3377	22.6139	-3.639	1.3554	-4.3591	29.4853	152
Level 3	C134	152 G+Ex+0.3Q-NL Max	1.095	-19.0571	22.6139	-3.639	1.3554	-0.3731	4.5236	152
Level 3	C134	152 G+Ex+0.3Q-NL Max	2.19	-18.7764	22.6139	-3.639	1.3554	3.6565	-20.4615	152
Level 3	C135	172 G+Ey+0.3Q-NL Max	0	-36.9457	-0.6365	-1.9505	-0.2123	-3.3602	-1.3852	172
Level 3	C135	172 G+Ey+0.3Q-NL Max	1.095	-36.8351	-0.6365	-1.9505	-0.2123	-1.2575	-0.6606	172
Level 3	C135	172 G+Ey+0.3Q-NL Max	2.19	-36.7244	-0.6365	-1.9505	-0.2123	0.8691	0.0765	172
Level 3	C135	172 G+Ex+0.3Q-NL Max	0	-96.5959	35.0795	1.9202	0.13	0.9686	46.986	172
Level 3	C135	172 G+Ex+0.3Q-NL Max	1.095	-96.3153	35.0795	1.9202	0.13	-0.911	7.2726	172
Level 3	C135	172 G+Ex+0.3Q-NL Max	2.19	-96.0346	35.0795	1.9202	0.13	-2.7383	-32.8004	172
Level 3	C136	176 G+Ey+0.3Q-NL Max	0	-32.5624	4.6354	2.2981	-0.2687	2.2746	5.5965	176
Level 3	C136	176 G+Ey+0.3Q-NL Max	1.095	-32.4518	4.6354	2.2981	-0.2687	-0.2912	0.4781	176
Level 3	C136	176 G+Ey+0.3Q-NL Max	2.19	-32.3412	4.6354	2.2981	-0.2687	-2.8522	-4.6484	176
Level 3	C136	176 G+Ex+0.3Q-NL Max	0	-55.5787	31.2553	-1.3149	0.4341	-1.8972	41.5385	176
Level 3	C136	176 G+Ex+0.3Q-NL Max	1.095	-55.298	31.2553	-1.3149	0.4341	-0.4565	6.6829	176
Level 3	C136	176 G+Ex+0.3Q-NL Max	2.19	-55.0173	31.2553	-1.3149	0.4341	1.0951	-28.3324	176
Level 3	C157	212 G+Ey+0.3Q-NL Max	0	-7.691	5.9555	-0.2464	0.1636	-0.5704	7.4602	212
Level 3	C157	212 G+Ey+0.3Q-NL Max	1.095	-7.5804	5.9555	-0.2464	0.1636	-0.3282	0.9244	212

Level 3	C157	212 G+Ey+0.3Q-NL Max	2.19	-7.4697	5.9555	-0.2464	0.1636	-0.0848	-5.615	212
Level 3	C157	212 G+Ex+0.3Q-NL Max	0	-78.5017	24.5774	-2.5476	0.0623	-2.1988	32.8176	212
Level 3	C157	212 G+Ex+0.3Q-NL Max	1.095	-78.221	24.5774	-2.5476	0.0623	0.5064	5.1721	212
Level 3	C157	212 G+Ex+0.3Q-NL Max	2.19	-77.9404	24.5774	-2.5476	0.0623	3.1967	-22.6788	212
Level 3	C158	216 G+Ey+0.3Q-NL Max	0	-7.0824	-4.4255	1.2297	-0.9581	1.9598	-6.4258	216
Level 3	C158	216 G+Ey+0.3Q-NL Max	1.095	-6.9717	-4.4255	1.2297	-0.9581	0.6034	-1.5653	216
Level 3	C158	216 G+Ey+0.3Q-NL Max	2.19	-6.8611	-4.4255	1.2297	-0.9581	-0.7551	3.3007	216
Level 3	C158	216 G+Ex+0.3Q-NL Max	0	-51.2478	23.4643	0.9317	-0.7417	1.2742	31.3302	216
Level 3	C158	216 G+Ex+0.3Q-NL Max	1.095	-50.9672	23.4643	0.9317	-0.7417	0.2568	5.2217	216
Level 3	C158	216 G+Ex+0.3Q-NL Max	2.19	-50.6865	23.4643	0.9317	-0.7417	-0.6499	-20.9292	216
Level 3	C159	164 G+Ey+0.3Q-NL Max	0	-36.4163	-4.1241	2.9392	-0.0381	2.5309	-5.1513	164-1
Level 3	C159	164 G+Ey+0.3Q-NL Max	1.095	-36.3056	-4.1241	2.9392	-0.0381	-0.7404	-0.6274	164-1
Level 3	C159	164 G+Ey+0.3Q-NL Max	1.67	-36.2475	-4.1241	2.9392	-0.0381	-2.4584	1.758	164-1
Level 3	C159	164 G+Ey+0.3Q-NL Max	1.67	-60.0929	-5.5179	30.5832	0.2959	15.8214	1.7458	164-2
Level 3	C159	164 G+Ey+0.3Q-NL Max	2.19	-60.0404	-5.5179	30.5832	0.2959	-0.1575	4.6235	164-2
Level 3	C159	164 G+Ex+0.3Q-NL Max	0	-33.2795	5.0066	-4.1327	-1.6144	-3.1831	0.3341	164-1
Level 3	C159	164 G+Ex+0.3Q-NL Max	1.095	-32.9988	5.0066	-4.1327	-1.6144	1.367	-5.3519	164-1
Level 3	C159	164 G+Ex+0.3Q-NL Max	1.67	-32.8514	5.0066	-4.1327	-1.6144	3.781	-8.2914	164-1
Level 3	C159	164 G+Ex+0.3Q-NL Max	1.67	-18.1847	-11.2136	5.5964	7.201	1.037	-8.4605	164-2
Level 3	C159	164 G+Ex+0.3Q-NL Max	2.19	-18.0514	-11.2136	5.5964	7.201	-1.8618	-2.6547	164-2
Level 3	C160	166 G+Ey+0.3Q-NL Max	0	4.6603	-2.8993	3.3987	-0.0106	4.5888	-4.2328	166-1
Level 3	C160	166 G+Ey+0.3Q-NL Max	1.095	4.7709	-2.8993	3.3987	-0.0106	0.8831	-1.058	166-1
Level 3	C160	166 G+Ey+0.3Q-NL Max	2.02	4.8644	-2.8993	3.3987	-0.0106	-2.2452	1.6216	166-1
Level 3	C160	166 G+Ey+0.3Q-NL Max	2.02	7.7207	-11.9393	3.3781	1.673	-2.1108	0.7486	166-2
Level 3	C160	166 G+Ey+0.3Q-NL Max	2.19	7.7379	-11.9393	3.3781	1.673	-2.6808	2.7778	166-2
Level 3	C160	166 G+Ex+0.3Q-NL Max	0	-41.1399	18.2066	-0.8394	0.7164	-5.6688	22.635	166-1
Level 3	C160	166 G+Ex+0.3Q-NL Max	1.095	-40.8592	18.2066	-0.8394	0.7164	-4.8518	2.511	166-1
Level 3	C160	166 G+Ex+0.3Q-NL Max	2.02	-40.6221	18.2066	-0.8394	0.7164	-4.0824	-14.548	166-1
Level 3	C160	166 G+Ex+0.3Q-NL Max	2.02	-59.1789	11.5883	-5.8089	-7.2365	-5.1299	9.5139	166-2
Level 3	C160	166 G+Ex+0.3Q-NL Max	2.19	-59.1353	11.5883	-5.8089	-7.2365	-4.1337	7.4999	166-2
Level 3	C169	188 G+Ey+0.3Q-NL Max	0	-6.9925	3.8692	4.8056	-0.1527	5.5484	4.5667	188
Level 3	C169	188 G+Ey+0.3Q-NL Max	1.043	-6.8871	3.8692	4.8056	-0.1527	0.5263	0.5334	188
Level 3	C169	188 G+Ey+0.3Q-NL Max	2.086	-6.7818	3.8692	4.8056	-0.1527	-4.4974	-3.5016	188

Level 3	C169	188 G+Ex+0.3Q-NL Max	0	-60.3703	12.3232	-3.5834	-1.468	-3.9723	16.3162	188
Level 3	C169	188 G+Ex+0.3Q-NL Max	1.043	-60.103	12.3232	-3.5834	-1.468	-0.2345	3.0815	188
Level 3	C169	188 G+Ex+0.3Q-NL Max	2.086	-59.8356	12.3232	-3.5834	-1.468	3.5444	-10.2093	188
Level 3	C170	282 G+Ey+0.3Q-NL Max	0	0.0403	0.8063	-2.2217	-0.6741	0.3259	0.2551	282-1
Level 3	C170	282 G+Ey+0.3Q-NL Max	1.095	0.151	0.8063	-2.2217	-0.6741	2.7586	-0.6278	282-1
Level 3	C170	282 G+Ey+0.3Q-NL Max	2.02	0.2444	0.8063	-2.2217	-0.6741	4.8138	-1.3736	282-1
Level 3	C170	282 G+Ey+0.3Q-NL Max	2.02	0.1045	-7.5762	-2.0284	0.2817	4.8801	-1.5701	282-2
Level 3	C170	282 G+Ey+0.3Q-NL Max	2.19	0.1217	-7.5762	-2.0284	0.2817	5.2249	-0.2822	282-2
Level 3	C170	282 G+Ex+0.3Q-NL Max	0	-13.734	17.2951	-5.0376	0.4553	-4.8808	21.0081	282-1
Level 3	C170	282 G+Ex+0.3Q-NL Max	1.095	-13.4533	17.2951	-5.0376	0.4553	0.6801	1.9922	282-1
Level 3	C170	282 G+Ex+0.3Q-NL Max	2.02	-13.2162	17.2951	-5.0376	0.4553	5.3775	-14.0678	282-1
Level 3	C170	282 G+Ex+0.3Q-NL Max	2.02	-33.4817	23.6156	-2.4421	5.8372	5.691	12.5493	282-2
Level 3	C170	282 G+Ex+0.3Q-NL Max	2.19	-33.4381	23.6156	-2.4421	5.8372	6.115	8.5044	282-2
Level 3	C171	284 G+Ey+0.3Q-NL Max	0	-45.6538	4.3903	6.4624	0.5068	7.3603	5.7922	284
Level 3	C171	284 G+Ey+0.3Q-NL Max	1.043	-45.5484	4.3903	6.4624	0.5068	0.5586	1.1943	284
Level 3	C171	284 G+Ey+0.3Q-NL Max	2.086	-45.443	4.3903	6.4624	0.5068	-6.2551	-3.4291	284
Level 3	C171	284 G+Ex+0.3Q-NL Max	0	-59.4555	12.1961	1.8966	1.3946	2.0271	15.3429	284
Level 3	C171	284 G+Ex+0.3Q-NL Max	1.043	-59.1882	12.1961	1.8966	1.3946	0.0613	2.2002	284
Level 3	C171	284 G+Ex+0.3Q-NL Max	2.086	-58.9208	12.1961	1.8966	1.3946	-1.8664	-10.9737	284
Level 3	C172	329 G+Ey+0.3Q-NL Max	0	-5.3393	-2.1738	-2.3692	0.1649	-0.6286	-2.1362	329-1
Level 3	C172	329 G+Ey+0.3Q-NL Max	1.51	-5.1868	-2.1738	-2.3692	0.1649	2.9379	1.149	329-1
Level 3	C172	329 G+Ey+0.3Q-NL Max	2.34	-5.1029	-2.1738	-2.3692	0.1649	4.8947	2.9541	329-1
Level 3	C172	329 G+Ey+0.3Q-NL Max	2.34	-1.8467	2.6283	9.0136	-0.4615	6.5966	1.4148	329-2
Level 3	C172	329 G+Ey+0.3Q-NL Max	3.02	-1.778	2.6283	9.0136	-0.4615	0.4625	-0.3731	329-2
Level 3	C172	329 G+Ex+0.3Q-NL Max	0	-104.0422	14.2807	-0.772	0.392	-0.6215	17.3857	329-1
Level 3	C172	329 G+Ex+0.3Q-NL Max	1.51	-103.6552	14.2807	-0.772	0.392	0.5988	-4.8898	329-1
Level 3	C172	329 G+Ex+0.3Q-NL Max	2.34	-103.4424	14.2807	-0.772	0.392	1.2621	-17.1164	329-1
Level 3	C172	329 G+Ex+0.3Q-NL Max	2.34	-120.1879	-27.3952	-2.846	0.1531	1.1205	-14.6941	329-2
Level 3	C172	329 G+Ex+0.3Q-NL Max	3.02	-120.0136	-27.3952	-2.846	0.1531	3.0274	3.9155	329-2
Level 3	C173	104 G+Ey+0.3Q-NL Max	0	1.2659	0.1139	20.7396	-0.8285	12.5865	-0.1335	104
Level 3	C173	104 G+Ey+0.3Q-NL Max	0.34	1.3002	0.1139	20.7396	-0.8285	5.5366	-0.172	104
Level 3	C173	104 G+Ey+0.3Q-NL Max	0.68	1.3346	0.1139	20.7396	-0.8285	-1.513	-0.2105	104
Level 3	C173	104 G+Ex+0.3Q-NL Max	0	-7.1358	-42.4092	-17.7092	-0.8249	-3.485	-20.8217	104

Level 3	C173	104 G+Ex+0.3Q-NL Max	0.34	-7.0486	-42.4092	-17.7092	-0.8249	2.5364	-6.4041	104
Level 3	C173	104 G+Ex+0.3Q-NL Max	0.68	-6.9615	-42.4092	-17.7092	-0.8249	8.5794	8.0249	104
Level 3	C174	168 G+Ey+0.3Q-NL Max	0	-7.7753	-0.0608	-2.5086	0.2824	-0.7045	-0.0686	168-1
Level 3	C174	168 G+Ey+0.3Q-NL Max	1.51	-7.6228	-0.0608	-2.5086	0.2824	3.0669	0.0215	168-1
Level 3	C174	168 G+Ey+0.3Q-NL Max	2.34	-7.5389	-0.0608	-2.5086	0.2824	5.1344	0.0709	168-1
Level 3	C174	168 G+Ey+0.3Q-NL Max	2.34	-11.3206	-1.5276	10.719	0.6088	5.2341	-0.5325	168-2
Level 3	C174	168 G+Ey+0.3Q-NL Max	3.02	-11.2519	-1.5276	10.719	0.6088	-2.0844	0.5052	168-2
Level 3	C174	168 G+Ex+0.3Q-NL Max	0	-111.4883	15.5623	1.8756	-0.0776	0.7463	18.6291	168-1
Level 3	C174	168 G+Ex+0.3Q-NL Max	1.51	-111.1012	15.5623	1.8756	-0.0776	-2.0685	-5.7537	168-1
Level 3	C174	168 G+Ex+0.3Q-NL Max	2.34	-110.8885	15.5623	1.8756	-0.0776	-3.5605	-19.1402	168-1
Level 3	C174	168 G+Ex+0.3Q-NL Max	2.34	-132.6479	-38.5054	-2.7775	0.9886	-4.5344	-19.0111	168-2
Level 3	C174	168 G+Ex+0.3Q-NL Max	3.02	-132.4736	-38.5054	-2.7775	0.9886	-2.4681	7.1764	168-2
Level 3	C175	319 G+Ey+0.3Q-NL Max	0	-23.7114	1.1963	2.6891	-0.6178	5.0198	0.7288	319
Level 3	C175	319 G+Ey+0.3Q-NL Max	1.095	-23.6008	1.1963	2.6891	-0.6178	2.0753	-0.5826	319
Level 3	C175	319 G+Ey+0.3Q-NL Max	2.19	-23.4902	1.1963	2.6891	-0.6178	-0.8945	-1.8868	319
Level 3	C175	319 G+Ex+0.3Q-NL Max	0	-34.2931	17.4549	0.3056	-2.0654	3.3384	24.6994	319
Level 3	C175	319 G+Ex+0.3Q-NL Max	1.095	-34.0124	17.4549	0.3056	-2.0654	3.1214	5.3417	319
Level 3	C175	319 G+Ex+0.3Q-NL Max	2.19	-33.7317	17.4549	0.3056	-2.0654	2.8542	-14.1091	319
Level 3	C176	336 G+Ey+0.3Q-NL Max	0	-26.1244	4.9886	1.8944	-1.186	3.8171	6.0681	336
Level 3	C176	336 G+Ey+0.3Q-NL Max	1.095	-26.0137	4.9886	1.8944	-1.186	1.7181	0.5979	336
Level 3	C176	336 G+Ey+0.3Q-NL Max	2.19	-25.9031	4.9886	1.8944	-1.186	-0.404	-4.8803	336
Level 3	C176	336 G+Ex+0.3Q-NL Max	0	-60.2747	26.2583	-1.9889	-0.9738	-1.8889	35.8545	336
Level 3	C176	336 G+Ex+0.3Q-NL Max	1.095	-59.9941	26.2583	-1.9889	-0.9738	0.3066	6.7645	336
Level 3	C176	336 G+Ex+0.3Q-NL Max	2.19	-59.7134	26.2583	-1.9889	-0.9738	2.5713	-22.5215	336
Level 3	C177	368 G+Ey+0.3Q-NL Max	0	-49.7429	10.036	26.5663	-0.015	33.108	0.0393	368
Level 3	C177	368 G+Ey+0.3Q-NL Max	1.043	-49.448	10.036	26.5663	-0.015	5.3413	-10.4652	368
Level 3	C177	368 G+Ey+0.3Q-NL Max	2.086	-49.1531	10.036	26.5663	-0.015	-22.4615	-20.9456	368
Level 3	C177	368 G+Ex+0.3Q-NL Max	0	-22.6171	3.661	-12.3864	0.0525	-13.2122	0.1892	368
Level 3	C177	368 G+Ex+0.3Q-NL Max	1.043	-21.8689	3.661	-12.3864	0.0525	-0.2918	-3.8295	368
Level 3	C177	368 G+Ex+0.3Q-NL Max	2.086	-21.1207	3.661	-12.3864	0.0525	12.67	-7.8441	368
Level 3	C178	369 G+Ey+0.3Q-NL Max	0	-49.9098	-12.4906	49.1811	-0.003	42.9112	-0.0238	369-1
Level 3	C178	369 G+Ey+0.3Q-NL Max	0.93	-49.6469	-12.4906	49.1811	-0.003	-2.8813	11.6252	369-1
Level 3	C178	369 G+Ey+0.3Q-NL Max	1.67	-49.4376	-12.4906	49.1811	-0.003	-39.3246	20.882	369-1

Level 3	C178	369 G+Ey+0.3Q-NL Max	1.67	-58.6765	-24.0994	2.9116	1.3603	2.4014	20.8882	369-2
Level 3	C178	369 G+Ey+0.3Q-NL Max	1.86	-58.6228	-24.0994	2.9116	1.3603	1.8491	25.4675	369-2
Level 3	C178	369 G+Ex+0.3Q-NL Max	0	-22.939	-14.6716	25.0011	0.0845	21.4463	0.2341	369-1
Level 3	C178	369 G+Ex+0.3Q-NL Max	0.93	-22.2718	-14.6716	25.0011	0.0845	-1.7921	13.6884	369-1
Level 3	C178	369 G+Ex+0.3Q-NL Max	1.67	-21.7409	-14.6716	25.0011	0.0845	-20.2091	24.3878	369-1
Level 3	C178	369 G+Ex+0.3Q-NL Max	1.67	-40.2834	25.3772	-0.6944	-0.998	-1.4191	24.5633	369-2
Level 3	C178	369 G+Ex+0.3Q-NL Max	1.86	-40.1471	25.3772	-0.6944	-0.998	-1.2803	19.6845	369-2
Level 3	C179	371 G+Ey+0.3Q-NL Max	0	12.6061	-2.3889	19.532	-0.0131	24.1652	-0.0534	371
Level 3	C179	371 G+Ey+0.3Q-NL Max	1.043	12.901	-2.3889	19.532	-0.0131	3.8086	2.4319	371
Level 3	C179	371 G+Ey+0.3Q-NL Max	2.086	13.1959	-2.3889	19.532	-0.0131	-16.5413	4.9187	371
Level 3	C179	371 G+Ex+0.3Q-NL Max	0	-32.5147	-2.2623	2.7259	-0.0888	1.2859	0.2701	371
Level 3	C179	371 G+Ex+0.3Q-NL Max	1.043	-31.7664	-2.2623	2.7259	-0.0888	-1.5545	2.3609	371
Level 3	C179	371 G+Ex+0.3Q-NL Max	2.086	-31.0182	-2.2623	2.7259	-0.0888	-4.3645	4.4487	371
Level 3	C180	372 G+Ey+0.3Q-NL Max	0	19.9652	2.5662	37.7468	-0.0013	33.7512	0.0689	372-1
Level 3	C180	372 G+Ey+0.3Q-NL Max	0.93	20.2282	2.5662	37.7468	-0.0013	-1.3307	-2.3016	372-1
Level 3	C180	372 G+Ey+0.3Q-NL Max	1.6685	20.437	2.5662	37.7468	-0.0013	-29.1865	-4.185	372-1
Level 3	C180	372 G+Ey+0.3Q-NL Max	1.6685	33.0325	20.8521	62.8857	1.0045	14.1272	-4.1647	372-2
Level 3	C180	372 G+Ey+0.3Q-NL Max	1.67	33.0329	20.8521	62.8857	1.0045	14.0344	-4.1954	372-2
Level 3	C180	372 G+Ey+0.3Q-NL Max	1.67	34.1392	24.2962	66.7049	1.0391	14.0344	-4.1954	372-3
Level 3	C180	372 G+Ey+0.3Q-NL Max	1.86	34.1929	24.2962	66.7049	1.0391	1.3644	-8.8063	372-3
Level 3	C180	372 G+Ex+0.3Q-NL Max	0	-25.3337	-26.9989	-45.3527	-0.1181	-38.6727	0.3196	372-1
Level 3	C180	372 G+Ex+0.3Q-NL Max	0.93	-24.6666	-26.9989	-45.3527	-0.1181	3.5096	25.2238	372-1
Level 3	C180	372 G+Ex+0.3Q-NL Max	1.6685	-24.1368	-26.9989	-45.3527	-0.1181	37.0939	44.9874	372-1
Level 3	C180	372 G+Ex+0.3Q-NL Max	1.6685	-34.3713	40.4462	16.4359	1.3632	5.1448	45.2091	372-2
Level 3	C180	372 G+Ex+0.3Q-NL Max	1.67	-34.3702	40.4462	16.4359	1.3632	5.1204	45.1489	372-2
Level 3	C180	372 G+Ex+0.3Q-NL Max	1.67	-34.3702	47.2497	17.4411	1.4101	5.1204	45.1489	372-3
Level 3	C180	372 G+Ex+0.3Q-NL Max	1.86	-34.2339	47.2497	17.4411	1.4101	1.7966	36.1111	372-3
Level 3	C185	382 G+Ey+0.3Q-NL Max	0	-15.141	-0.2387	-0.0906	-0.1559	-0.0819	-0.3972	382
Level 3	C185	382 G+Ey+0.3Q-NL Max	0.6625	-15.0946	-0.2387	-0.0906	-0.1559	-0.0462	-0.2433	382
Level 3	C185	382 G+Ey+0.3Q-NL Max	1.325	-15.0481	-0.2387	-0.0906	-0.1559	-0.0102	-0.0879	382
Level 3	C185	382 G+Ex+0.3Q-NL Max	0	-9.1231	-4.1726	-0.3165	0.5105	-0.0173	1.4079	382
Level 3	C185	382 G+Ex+0.3Q-NL Max	0.6625	-9.0053	-4.1726	-0.3165	0.5105	0.2025	4.1691	382
Level 3	C185	382 G+Ex+0.3Q-NL Max	1.325	-8.8875	-4.1726	-0.3165	0.5105	0.4275	6.9155	382

Level 3	C186	383 G+Ey+0.3Q-NL Max	0	-16.5422	0.8432	-0.1347	0.1202	0.2046	0.9868	383
Level 3	C186	383 G+Ey+0.3Q-NL Max	0.6625	-16.4957	0.8432	-0.1347	0.1202	0.2662	0.4304	383
Level 3	C186	383 G+Ey+0.3Q-NL Max	1.325	-16.4493	0.8432	-0.1347	0.1202	0.3261	-0.1289	383
Level 3	C186	383 G+Ex+0.3Q-NL Max	0	-70.528	-6.0938	-0.3442	0.2283	0.061	1.4822	383
Level 3	C186	383 G+Ex+0.3Q-NL Max	0.6625	-70.4102	-6.0938	-0.3442	0.2283	0.2812	5.5331	383
Level 3	C186	383 G+Ex+0.3Q-NL Max	1.325	-70.2924	-6.0938	-0.3442	0.2283	0.4976	9.4314	383
Level 3	C187	393 G+Ey+0.3Q-NL Max	0	-15.3387	4.0089	-0.0765	-0.3245	-0.0278	2.8245	393
Level 3	C187	393 G+Ey+0.3Q-NL Max	0.6625	-15.2922	4.0089	-0.0765	-0.3245	0.0031	0.1706	393
Level 3	C187	393 G+Ey+0.3Q-NL Max	1.325	-15.2458	4.0089	-0.0765	-0.3245	0.0341	-2.4843	393
Level 3	C187	393 G+Ex+0.3Q-NL Max	0	-71.4436	19.3049	0.0196	-0.21	0.0832	13.0198	393
Level 3	C187	393 G+Ex+0.3Q-NL Max	0.6625	-71.3258	19.3049	0.0196	-0.21	0.0557	0.1357	393
Level 3	C187	393 G+Ex+0.3Q-NL Max	1.325	-71.208	19.3049	0.0196	-0.21	0.0266	-12.7436	393
Level 3	C188	416 G+Ey+0.3Q-NL Max	0	-12.0629	-3.1258	0.324	-0.0998	0.1167	-2.1126	416
Level 3	C188	416 G+Ey+0.3Q-NL Max	0.6625	-12.0165	-3.1258	0.324	-0.0998	-0.1196	-0.0454	416
Level 3	C188	416 G+Ey+0.3Q-NL Max	1.325	-11.9701	-3.1258	0.324	-0.0998	-0.3553	2.0221	416
Level 3	C188	416 G+Ex+0.3Q-NL Max	0	0.0723	1.7783	-0.465	-0.0078	-0.3472	-0.2697	416
Level 3	C188	416 G+Ex+0.3Q-NL Max	0.6625	0.1901	1.7783	-0.465	-0.0078	-0.039	-1.447	416
Level 3	C188	416 G+Ex+0.3Q-NL Max	1.325	0.3079	1.7783	-0.465	-0.0078	0.2705	-2.6229	416
Level 3	C189	431 G+Ey+0.3Q-NL Max	0	-0.3509	0.7819	-0.13	0.0526	-0.0571	0.541	431
Level 3	C189	431 G+Ey+0.3Q-NL Max	0.6625	-0.3044	0.7819	-0.13	0.0526	0.0286	0.0229	431
Level 3	C189	431 G+Ey+0.3Q-NL Max	1.325	-0.258	0.7819	-0.13	0.0526	0.1143	-0.4951	431
Level 3	C189	431 G+Ex+0.3Q-NL Max	0	-6.245	11.3439	0.085	-0.0518	0.1449	6.3924	431
Level 3	C189	431 G+Ex+0.3Q-NL Max	0.6625	-6.1272	11.3439	0.085	-0.0518	0.0864	-1.1326	431
Level 3	C189	431 G+Ex+0.3Q-NL Max	1.325	-6.0094	11.3439	0.085	-0.0518	0.0278	-8.6515	431
Level 3	C190	453 G+Ey+0.3Q-NL Max	0	-10.4515	2.6954	0.119	-0.2547	0.137	1.9022	453
Level 3	C190	453 G+Ey+0.3Q-NL Max	0.6625	-10.4051	2.6954	0.119	-0.2547	0.0447	0.1165	453
Level 3	C190	453 G+Ey+0.3Q-NL Max	1.325	-10.3587	2.6954	0.119	-0.2547	-0.0479	-1.6697	453
Level 3	C190	453 G+Ex+0.3Q-NL Max	0	-68.4173	21.7323	0.1611	0.1626	0.0385	14.0764	453
Level 3	C190	453 G+Ex+0.3Q-NL Max	0.6625	-68.2995	21.7323	0.1611	0.1626	-0.0682	-0.4042	453
Level 3	C190	453 G+Ex+0.3Q-NL Max	1.325	-68.1817	21.7323	0.1611	0.1626	-0.1731	-14.8582	453
Level 3	C191	455 G+Ey+0.3Q-NL Max	0	-11.0229	-2.4961	0.357	-0.1125	0.1804	-1.7815	455
Level 3	C191	455 G+Ey+0.3Q-NL Max	0.6625	-10.9764	-2.4961	0.357	-0.1125	-0.0751	-0.1306	455
Level 3	C191	455 G+Ey+0.3Q-NL Max	1.325	-10.93	-2.4961	0.357	-0.1125	-0.3303	1.5209	455

Level 3	C191	455 G+Ex+0.3Q-NL Max	0	-0.5815	1.735	0.5044	0.1148	0.3843	-0.706	455
Level 3	C191	455 G+Ex+0.3Q-NL Max	0.6625	-0.4637	1.735	0.5044	0.1148	0.0498	-1.8561	455
Level 3	C191	455 G+Ex+0.3Q-NL Max	1.325	-0.3459	1.735	0.5044	0.1148	-0.2841	-2.9989	455
Level 3	C192	458 G+Ey+0.3Q-NL Max	0	-0.3264	-0.1588	-0.1384	0.0519	-0.0369	-0.0962	458
Level 3	C192	458 G+Ey+0.3Q-NL Max	0.6625	-0.2799	-0.1588	-0.1384	0.0519	0.0544	0.009	458
Level 3	C192	458 G+Ey+0.3Q-NL Max	1.325	-0.2335	-0.1588	-0.1384	0.0519	0.1457	0.1142	458
Level 3	C192	458 G+Ex+0.3Q-NL Max	0	-5.2259	11.791	-0.0502	0.0722	-0.1076	6.2244	458
Level 3	C192	458 G+Ex+0.3Q-NL Max	0.6625	-5.1081	11.791	-0.0502	0.0722	-0.0747	-1.5961	458
Level 3	C192	458 G+Ex+0.3Q-NL Max	1.325	-4.9903	11.791	-0.0502	0.0722	-0.0417	-9.3926	458
Level 3	C193	466 G+Ey+0.3Q-NL Max	0	-11.8847	-0.5734	-0.0547	-0.1407	-0.0691	-0.6144	466
Level 3	C193	466 G+Ey+0.3Q-NL Max	0.6625	-11.8383	-0.5734	-0.0547	-0.1407	-0.0513	-0.2374	466
Level 3	C193	466 G+Ey+0.3Q-NL Max	1.325	-11.7918	-0.5734	-0.0547	-0.1407	-0.0332	0.1407	466
Level 3	C193	466 G+Ex+0.3Q-NL Max	0	-10.0216	-7.9852	0.2409	-0.535	0.0588	-0.2348	466
Level 3	C193	466 G+Ex+0.3Q-NL Max	0.6625	-9.9038	-7.9852	0.2409	-0.535	-0.0929	5.0525	466
Level 3	C193	466 G+Ex+0.3Q-NL Max	1.325	-9.786	-7.9852	0.2409	-0.535	-0.2398	10.3292	466
Level 3	C194	467 G+Ey+0.3Q-NL Max	0	-11.6639	0.8582	-0.4494	0.1069	0.1385	0.719	467
Level 3	C194	467 G+Ey+0.3Q-NL Max	0.6625	-11.6175	0.8582	-0.4494	0.1069	0.418	0.1497	467
Level 3	C194	467 G+Ey+0.3Q-NL Max	1.325	-11.5711	0.8582	-0.4494	0.1069	0.6955	-0.4202	467
Level 3	C194	467 G+Ex+0.3Q-NL Max	0	-71.1304	-9.7053	0.5075	-0.3348	0.0232	0.3597	467
Level 3	C194	467 G+Ex+0.3Q-NL Max	0.6625	-71.0126	-9.7053	0.5075	-0.3348	-0.3076	6.8323	467
Level 3	C194	467 G+Ex+0.3Q-NL Max	1.325	-70.8948	-9.7053	0.5075	-0.3348	-0.6278	13.1226	467
Level 3	C199	392 G+Ey+0.3Q-NL Max	0	6.7104	-0.2295	-3.8014	0.2623	-1.6466	-0.2154	392-1
Level 3	C199	392 G+Ey+0.3Q-NL Max	0.22	6.7326	-0.2295	-3.8014	0.2623	-0.808	-0.1651	392-1
Level 3	C199	392 G+Ey+0.3Q-NL Max	0.22	6.9383	-0.2938	-1.2403	0.2752	-1.378	-0.2251	392-2
Level 3	C199	392 G+Ey+0.3Q-NL Max	0.785	6.9954	-0.2938	-1.2403	0.2752	-0.6719	-0.0598	392-2
Level 3	C199	392 G+Ey+0.3Q-NL Max	1.57	7.0747	-0.2938	-1.2403	0.2752	0.3084	0.1699	392-2
Level 3	C199	392 G+Ex+0.3Q-NL Max	0	4.4864	10.4934	1.0315	0.251	0.3702	1.3802	392-1
Level 3	C199	392 G+Ex+0.3Q-NL Max	0.22	4.5428	10.4934	1.0315	0.251	0.1431	-0.9258	392-1
Level 3	C199	392 G+Ex+0.3Q-NL Max	0.22	5.3011	0.9292	0.3366	0.25	0.2959	0.2236	392-2
Level 3	C199	392 G+Ex+0.3Q-NL Max	0.785	5.4459	0.9292	0.3366	0.25	0.1054	-0.2938	392-2
Level 3	C199	392 G+Ex+0.3Q-NL Max	1.57	5.6471	0.9292	0.3366	0.25	-0.1569	-1.0028	392-2
Level 3	C200	415 G+Ey+0.3Q-NL Max	0	-7.966	1.6713	4.7541	-0.7487	5.7253	0.3654	415
Level 3	C200	415 G+Ey+0.3Q-NL Max	1.095	-7.8554	1.6713	4.7541	-0.7487	0.5081	-1.4654	415

Level 3	C200	415 G+Ey+0.3Q-NL Max	2.19	-7.7447	1.6713	4.7541	-0.7487	-4.7111	-3.2903	415
Level 3	C200	415 G+Ex+0.3Q-NL Max	0	-30.7355	5.4153	-2.5409	-0.7519	-2.9217	1.4298	415
Level 3	C200	415 G+Ex+0.3Q-NL Max	1.095	-30.4548	5.4153	-2.5409	-0.7519	-0.1399	-4.7536	415
Level 3	C200	415 G+Ex+0.3Q-NL Max	2.19	-30.1742	5.4153	-2.5409	-0.7519	2.7028	-10.8569	415
Level 3	C201	493 G+Ey+0.3Q-NL Max	0	-21.0376	1.5898	5.5186	-0.1004	6.4807	0.4809	493
Level 3	C201	493 G+Ey+0.3Q-NL Max	1.095	-20.927	1.5898	5.5186	-0.1004	0.4089	-1.2811	493
Level 3	C201	493 G+Ey+0.3Q-NL Max	2.19	-20.8164	1.5898	5.5186	-0.1004	-5.6673	-3.0293	493
Level 3	C201	493 G+Ex+0.3Q-NL Max	0	-30.9516	6.3164	1.0224	1.7593	1.0785	1.4642	493
Level 3	C201	493 G+Ex+0.3Q-NL Max	1.095	-30.6709	6.3164	1.0224	1.7593	-0.0342	-5.7287	493
Level 3	C201	493 G+Ex+0.3Q-NL Max	2.19	-30.3903	6.3164	1.0224	1.7593	-1.0596	-12.827	493
Level 3	C202	504 G+Ey+0.3Q-NL Max	0	-9.4479	1.5428	9.5025	1.6639	0.5275	0.5765	504
Level 3	C202	504 G+Ey+0.3Q-NL Max	0.1564	-9.4321	1.5428	9.5025	1.6639	-0.9604	0.3324	504
Level 3	C202	504 G+Ey+0.3Q-NL Max	0.3129	-9.4163	1.5428	9.5025	1.6639	-2.4482	0.0883	504
Level 3	C202	504 G+Ex+0.3Q-NL Max	0	-8.2233	10.5269	14.5312	1.9442	4.4033	2.7942	504
Level 3	C202	504 G+Ex+0.3Q-NL Max	0.1564	-8.1832	10.5269	14.5312	1.9442	2.1292	1.1328	504
Level 3	C202	504 G+Ex+0.3Q-NL Max	0.3129	-8.1431	10.5269	14.5312	1.9442	-0.145	-0.5287	504
Level 3	C203	519 G+Ey+0.3Q-NL Max	0	2.3266	-0.8306	-7.6693	0.6707	-4.7342	-0.4289	519
Level 3	C203	519 G+Ey+0.3Q-NL Max	0.1557	2.3424	-0.8306	-7.6693	0.6707	-3.5402	-0.3002	519
Level 3	C203	519 G+Ey+0.3Q-NL Max	0.3113	2.3581	-0.8306	-7.6693	0.6707	-2.3462	-0.1714	519
Level 3	C203	519 G+Ex+0.3Q-NL Max	0	-8.1242	9.7795	-11.9512	-1.1353	-3.3807	2.8302	519
Level 3	C203	519 G+Ex+0.3Q-NL Max	0.1557	-8.0843	9.7795	-11.9512	-1.1353	-1.5197	1.2934	519
Level 3	C203	519 G+Ex+0.3Q-NL Max	0.3113	-8.0444	9.7795	-11.9512	-1.1353	0.3413	-0.2436	519
Level 3	C204	602 G+Ey+0.3Q-NL Max	0	-17.6743	-6.544	0.1328	-0.5238	-0.0644	-8.3317	602
Level 3	C204	602 G+Ey+0.3Q-NL Max	1.095	-17.5637	-6.544	0.1328	-0.5238	-0.2693	-1.1223	602
Level 3	C204	602 G+Ey+0.3Q-NL Max	2.19	-17.453	-6.544	0.1328	-0.5238	-0.4718	6.0972	602
Level 3	C204	602 G+Ex+0.3Q-NL Max	0	5.8229	15.9171	3.0228	-1.2036	3.5263	21.5955	602
Level 3	C204	602 G+Ex+0.3Q-NL Max	1.095	6.1036	15.9171	3.0228	-1.2036	0.2392	4.2124	602
Level 3	C204	602 G+Ex+0.3Q-NL Max	2.19	6.3843	15.9171	3.0228	-1.2036	-3.0425	-13.0741	602
Level 3	C205	603 G+Ey+0.3Q-NL Max	0	4.6141	2.1837	-3.6317	0.0395	-4.3973	3.0607	603
Level 3	C205	603 G+Ey+0.3Q-NL Max	1.095	4.7247	2.1837	-3.6317	0.0395	-0.4189	0.6749	603
Level 3	C205	603 G+Ey+0.3Q-NL Max	2.19	4.8354	2.1837	-3.6317	0.0395	3.5584	-1.7093	603
Level 3	C205	603 G+Ex+0.3Q-NL Max	0	-0.5138	20.4789	-1.1393	1.6652	-1.104	27.5061	603
Level 3	C205	603 G+Ex+0.3Q-NL Max	1.095	-0.2331	20.4789	-1.1393	1.6652	0.1444	5.0793	603

Level 3	C205	603 G+Ex+0.3Q-NL Max	2.19	0.0476	20.4789	-1.1393	1.6652	1.457	-17.3276	603
Level 3	C206	604 G+Ey+0.3Q-NL Max	0	-33.1703	1.6008	-2.357	0.1485	-3.7725	2.8034	604
Level 3	C206	604 G+Ey+0.3Q-NL Max	1.095	-33.0597	1.6008	-2.357	0.1485	-1.2116	1.0145	604
Level 3	C206	604 G+Ey+0.3Q-NL Max	2.19	-32.9491	1.6008	-2.357	0.1485	1.37	-0.7916	604
Level 3	C206	604 G+Ex+0.3Q-NL Max	0	-16.1249	24.339	-0.0165	0.0121	-0.5209	34.8356	604
Level 3	C206	604 G+Ex+0.3Q-NL Max	1.095	-15.8442	24.339	-0.0165	0.0121	-0.4457	8.0106	604
Level 3	C206	604 G+Ex+0.3Q-NL Max	2.19	-15.5635	24.339	-0.0165	0.0121	-0.3208	-18.8552	604
Level 3	C207	606 G+Ey+0.3Q-NL Max	0	-8.2456	-6.913	-0.462	-0.2109	-0.8464	-8.74	606
Level 3	C207	606 G+Ey+0.3Q-NL Max	1.095	-8.135	-6.913	-0.462	-0.2109	-0.3682	-1.152	606
Level 3	C207	606 G+Ey+0.3Q-NL Max	2.19	-8.0244	-6.913	-0.462	-0.2109	0.1116	6.4409	606
Level 3	C207	606 G+Ex+0.3Q-NL Max	0	-30.2348	16.6091	1.5388	-0.2753	2.7611	24.7665	606
Level 3	C207	606 G+Ex+0.3Q-NL Max	1.095	-29.9541	16.6091	1.5388	-0.2753	0.9716	6.3518	606
Level 3	C207	606 G+Ex+0.3Q-NL Max	2.19	-29.6734	16.6091	1.5388	-0.2753	-0.811	-12.0782	606
Level 3	C208	608 G+Ey+0.3Q-NL Max	0	14.1	1.8298	2.9351	-0.3411	3.8242	2.6656	608-1
Level 3	C208	608 G+Ey+0.3Q-NL Max	1.095	14.2106	1.8298	2.9351	-0.3411	0.655	0.6563	608-1
Level 3	C208	608 G+Ey+0.3Q-NL Max	2.02	14.3041	1.8298	2.9351	-0.3411	-2.0175	-1.0368	608-1
Level 3	C208	608 G+Ey+0.3Q-NL Max	2.02	14.0355	7.6643	2.9633	-2.1129	-2.1513	-1.4362	608-2
Level 3	C208	608 G+Ey+0.3Q-NL Max	2.19	14.0527	7.6643	2.9633	-2.1129	-2.6481	-2.7395	608-2
Level 3	C208	608 G+Ex+0.3Q-NL Max	0	-24.6521	10.5705	7.3957	1.364	4.7522	20.8862	608-1
Level 3	C208	608 G+Ex+0.3Q-NL Max	1.095	-24.3714	10.5705	7.3957	1.364	-3.4626	9.2264	608-1
Level 3	C208	608 G+Ex+0.3Q-NL Max	2.02	-24.1343	10.5705	7.3957	1.364	-10.339	-0.7043	608-1
Level 3	C208	608 G+Ex+0.3Q-NL Max	2.02	79.7777	138.455	12.7536	-4.9482	-9.2941	29.8778	608-2
Level 3	C208	608 G+Ex+0.3Q-NL Max	2.19	79.8213	138.455	12.7536	-4.9482	-11.4339	6.4705	608-2
Level 3	C209	609 G+Ey+0.3Q-NL Max	0	-2.5018	0.4429	-3.6074	0.3392	-1.2078	1.37	609-1
Level 3	C209	609 G+Ey+0.3Q-NL Max	1.095	-2.3912	0.4429	-3.6074	0.3392	2.7433	0.8845	609-1
Level 3	C209	609 G+Ey+0.3Q-NL Max	2.02	-2.2977	0.4429	-3.6074	0.3392	6.0789	0.4737	609-1
Level 3	C209	609 G+Ey+0.3Q-NL Max	2.02	0.2795	11.8169	-3.8019	-0.0663	6.0144	1.575	609-2
Level 3	C209	609 G+Ey+0.3Q-NL Max	2.19	0.2967	11.8169	-3.8019	-0.0663	6.6608	-0.4338	609-2
Level 3	C209	609 G+Ex+0.3Q-NL Max	0	-44.9267	17.4999	-6.4907	-0.9174	-5.8733	30.1601	609-1
Level 3	C209	609 G+Ex+0.3Q-NL Max	1.095	-44.646	17.4999	-6.4907	-0.9174	1.4301	10.8226	609-1
Level 3	C209	609 G+Ex+0.3Q-NL Max	2.02	-44.4089	17.4999	-6.4907	-0.9174	7.6121	-5.7083	609-1
Level 3	C209	609 G+Ex+0.3Q-NL Max	2.02	72.8209	149.1937	-9.5783	1.2413	7.3004	27.2999	609-2
Level 3	C209	609 G+Ex+0.3Q-NL Max	2.19	72.8644	149.1937	-9.5783	1.2413	8.9127	2.0634	609-2

Level 3	C210	610 G+Ey+0.3Q-NL Max	0	-23.9532	-0.7035	3.1122	0.454	4.9589	0.0832	610
Level 3	C210	610 G+Ey+0.3Q-NL Max	1.095	-23.8426	-0.7035	3.1122	0.454	1.5539	0.8504	610
Level 3	C210	610 G+Ey+0.3Q-NL Max	2.19	-23.732	-0.7035	3.1122	0.454	-1.8702	1.6071	610
Level 3	C210	610 G+Ex+0.3Q-NL Max	0	-9.9344	15.2739	-2.2255	0.1262	-1.2144	26.2642	610
Level 3	C210	610 G+Ex+0.3Q-NL Max	1.095	-9.6537	15.2739	-2.2255	0.1262	1.2641	9.4952	610
Level 3	C210	610 G+Ex+0.3Q-NL Max	2.19	-9.373	15.2739	-2.2255	0.1262	3.8217	-7.3098	610
Level 3	C211	625 G+Ey+0.3Q-NL Max	0	17.4533	-1.3871	19.3553	1.3488	6.3364	-2.1744	625
Level 3	C211	625 G+Ey+0.3Q-NL Max	0.155	17.469	-1.3871	19.3553	1.3488	3.3443	-1.961	625
Level 3	C211	625 G+Ey+0.3Q-NL Max	0.31	17.4846	-1.3871	19.3553	1.3488	0.3528	-1.748	625
Level 3	C211	625 G+Ex+0.3Q-NL Max	0	50.409	20.2213	22.458	-9.9849	-11.6157	6.4826	625
Level 3	C211	625 G+Ex+0.3Q-NL Max	0.155	50.4488	20.2213	22.458	-9.9849	-15.0998	3.4204	625
Level 3	C211	625 G+Ex+0.3Q-NL Max	0.31	50.4885	20.2213	22.458	-9.9849	-18.5918	0.3599	625
Level 3	C212	629 G+Ey+0.3Q-NL Max	0	3.7919	-0.258	10.9993	-0.1278	14.0913	-0.4677	629
Level 3	C212	629 G+Ey+0.3Q-NL Max	0.155	3.8075	-0.258	10.9993	-0.1278	12.3882	-0.4274	629
Level 3	C212	629 G+Ey+0.3Q-NL Max	0.31	3.8232	-0.258	10.9993	-0.1278	10.6857	-0.3871	629
Level 3	C212	629 G+Ex+0.3Q-NL Max	0	53.1382	17.7451	-26.1011	10.1512	14.0516	5.0261	629
Level 3	C212	629 G+Ex+0.3Q-NL Max	0.155	53.1779	17.7451	-26.1011	10.1512	18.1071	2.3515	629
Level 3	C212	629 G+Ex+0.3Q-NL Max	0.31	53.2176	17.7451	-26.1011	10.1512	22.1726	-0.3217	629
Level 3	C213	576 G+Ey+0.3Q-NL Max	0	-9.5909	-0.8859	4.4691	0.0719	0.5099	-1.2278	576
Level 3	C213	576 G+Ey+0.3Q-NL Max	0.8025	-9.5099	-0.8859	4.4691	0.0719	-3.1037	-0.5191	576
Level 3	C213	576 G+Ey+0.3Q-NL Max	1.605	-9.4288	-0.8859	4.4691	0.0719	-6.7092	0.1909	576
Level 3	C213	576 G+Ex+0.3Q-NL Max	0	-8.3173	9.4322	-0.7307	-0.2131	-1.3503	10.2127	576
Level 3	C213	576 G+Ex+0.3Q-NL Max	0.8025	-8.1116	9.4322	-0.7307	-0.2131	-0.7651	2.5921	576
Level 3	C213	576 G+Ex+0.3Q-NL Max	1.605	-7.9059	9.4322	-0.7307	-0.2131	-0.1782	-5.0343	576
Level 3	C214	360 G+Ey+0.3Q-NL Max	0	16.3933	-0.6321	14.9196	0.1631	1.7801	1.1117	360
Level 3	C214	360 G+Ey+0.3Q-NL Max	0.155	16.409	-0.6321	14.9196	0.1631	-0.5247	1.2098	360
Level 3	C214	360 G+Ey+0.3Q-NL Max	0.31	16.4246	-0.6321	14.9196	0.1631	-2.8297	1.3081	360
Level 3	C214	360 G+Ex+0.3Q-NL Max	0	-33.876	27.8644	-25.5056	-13.6415	-4.2987	18.7263	360
Level 3	C214	360 G+Ex+0.3Q-NL Max	0.155	-33.8363	27.8644	-25.5056	-13.6415	-0.3375	14.3769	360
Level 3	C214	360 G+Ex+0.3Q-NL Max	0.31	-33.7965	27.8644	-25.5056	-13.6415	3.6299	10.0225	360
Level 3	C215	361 G+Ey+0.3Q-NL Max	0	4.9476	0.1978	7.6003	0.3229	11.0695	-0.1192	361
Level 3	C215	361 G+Ey+0.3Q-NL Max	0.155	4.9633	0.1978	7.6003	0.3229	9.8937	-0.1499	361
Level 3	C215	361 G+Ey+0.3Q-NL Max	0.31	4.9789	0.1978	7.6003	0.3229	8.7184	-0.1806	361

Level 3	C215	361 G+Ex+0.3Q-NL Max	0	11.8383	20.8561	-1.8942	9.4312	9.2133	12.6244	361
Level 3	C215	361 G+Ex+0.3Q-NL Max	0.155	11.8781	20.8561	-1.8942	9.4312	9.5127	9.4035	361
Level 3	C215	361 G+Ex+0.3Q-NL Max	0.31	11.9178	20.8561	-1.8942	9.4312	9.8199	6.1837	361
Level 3	C216	670 G+Ey+0.3Q-NL Max	0	8.1299	2.3046	14.8755	-0.0104	17.9793	0.0433	670
Level 3	C216	670 G+Ey+0.3Q-NL Max	1.043	8.4248	2.3046	14.8755	-0.0104	2.4756	-2.3613	670
Level 3	C216	670 G+Ey+0.3Q-NL Max	2.086	8.7197	2.3046	14.8755	-0.0104	-13.0252	-4.7669	670
Level 3	C216	670 G+Ex+0.3Q-NL Max	0	-22.0226	15.2476	-15.3373	-0.0409	-19.8113	0.309	670
Level 3	C216	670 G+Ex+0.3Q-NL Max	1.043	-21.2744	15.2476	-15.3373	-0.0409	-3.8194	-15.747	670
Level 3	C216	670 G+Ex+0.3Q-NL Max	2.086	-20.5262	15.2476	-15.3373	-0.0409	12.2637	-31.786	670
Level 3	C217	675 G+Ey+0.3Q-NL Max	0	1.3398	-2.0174	18.3091	0.0011	15.8593	-0.0583	675-1
Level 3	C217	675 G+Ey+0.3Q-NL Max	0.93	1.6027	-2.0174	18.3091	0.0011	-1.1663	1.8174	675-1
Level 3	C217	675 G+Ey+0.3Q-NL Max	1.67	1.812	-2.0174	18.3091	0.0011	-14.7135	3.31	675-1
Level 3	C217	675 G+Ey+0.3Q-NL Max	1.67	19.2101	1.8331	60.5529	0.5789	12.2492	3.3186	675-2
Level 3	C217	675 G+Ey+0.3Q-NL Max	1.86	19.2638	1.8331	60.5529	0.5789	0.7479	2.9695	675-2
Level 3	C217	675 G+Ex+0.3Q-NL Max	0	-28.0917	-5.413	-10.3411	-0.0911	-9.1073	0.0089	675-1
Level 3	C217	675 G+Ex+0.3Q-NL Max	0.93	-27.4245	-5.413	-10.3411	-0.0911	0.5215	4.8747	675-1
Level 3	C217	675 G+Ex+0.3Q-NL Max	1.67	-26.8937	-5.413	-10.3411	-0.0911	8.2737	8.7444	675-1
Level 3	C217	675 G+Ex+0.3Q-NL Max	1.67	-38.9557	3.5637	-0.5589	0.5118	0.4863	8.8715	675-2
Level 3	C217	675 G+Ex+0.3Q-NL Max	1.86	-38.8194	3.5637	-0.5589	0.5118	0.5915	8.1712	675-2
Level 3	C218	673 G+Ey+0.3Q-NL Max	0	-63.1365	11.626	23.5291	-0.0103	29.1004	0.1536	673
Level 3	C218	673 G+Ey+0.3Q-NL Max	1.043	-62.8416	11.626	23.5291	-0.0103	4.4887	-12.0561	673
Level 3	C218	673 G+Ey+0.3Q-NL Max	2.086	-62.5467	11.626	23.5291	-0.0103	-20.1614	-24.2305	673
Level 3	C218	673 G+Ex+0.3Q-NL Max	0	-2.8811	6.8759	9.4316	0.0464	12.3066	0.2198	673
Level 3	C218	673 G+Ex+0.3Q-NL Max	1.043	-2.1329	6.8759	9.4316	0.0464	2.4703	-6.9379	673
Level 3	C218	673 G+Ex+0.3Q-NL Max	2.086	-1.3846	6.8759	9.4316	0.0464	-7.3313	-14.094	673
Level 3	C219	674 G+Ey+0.3Q-NL Max	0	-67.8908	-14.4349	39.9954	-0.0061	34.0917	-0.1533	674-1
Level 3	C219	674 G+Ey+0.3Q-NL Max	0.93	-67.6278	-14.4349	39.9954	-0.0061	-3.1828	13.3327	674-1
Level 3	C219	674 G+Ey+0.3Q-NL Max	1.67	-67.4186	-14.4349	39.9954	-0.0061	-32.8451	24.0443	674-1
Level 3	C219	674 G+Ey+0.3Q-NL Max	1.67	-72.8499	-39.9404	-0.0102	1.1541	1.6767	24.0193	674-2
Level 3	C219	674 G+Ey+0.3Q-NL Max	1.86	-72.7962	-39.9404	-0.0102	1.1541	1.6772	31.6118	674-2
Level 3	C219	674 G+Ex+0.3Q-NL Max	0	-69.8531	-22.8659	2.2626	0.0783	2.3818	-0.1209	674-1
Level 3	C219	674 G+Ex+0.3Q-NL Max	0.93	-69.1859	-22.8659	2.2626	0.0783	0.2768	20.7484	674-1
Level 3	C219	674 G+Ex+0.3Q-NL Max	1.67	-68.6551	-22.8659	2.2626	0.0783	-1.3139	37.3239	674-1

Level 3	C219	674 G+Ex+0.3Q-NL Max	1.67	-95.7997	-50.6409	2.5057	0.5686	1.5935	37.3927	674-2
Level 3	C219	674 G+Ex+0.3Q-NL Max	1.86	-95.6634	-50.6409	2.5057	0.5686	1.1163	46.8889	674-2
Level 3	C220	283 G+Ey+0.3Q-NL Max	0	-12.9341	-1.4061	4.8407	-0.008	0.7106	-2.3043	283
Level 3	C220	283 G+Ey+0.3Q-NL Max	0.8025	-12.853	-1.4061	4.8407	-0.008	-3.2122	-1.184	283
Level 3	C220	283 G+Ey+0.3Q-NL Max	1.605	-12.7719	-1.4061	4.8407	-0.008	-7.1234	-0.0596	283
Level 3	C220	283 G+Ex+0.3Q-NL Max	0	-10.4446	8.5413	0.9783	0.1356	1.2843	9.0565	283
Level 3	C220	283 G+Ex+0.3Q-NL Max	0.8025	-10.2389	8.5413	0.9783	0.1356	0.4989	2.1478	283
Level 3	C220	283 G+Ex+0.3Q-NL Max	1.605	-10.0332	8.5413	0.9783	0.1356	-0.288	-4.7669	283
Level 3	C221	333 G+Ey+0.3Q-NL Max	0	-9.2956	-1.2845	1.6773	-0.0617	0.4809	0.4109	333
Level 3	C221	333 G+Ey+0.3Q-NL Max	0.725	-9.2224	-1.2845	1.6773	-0.0617	-0.7423	1.3394	333
Level 3	C221	333 G+Ey+0.3Q-NL Max	1.45	-9.1491	-1.2845	1.6773	-0.0617	-1.9639	2.265	333
Level 3	C221	333 G+Ex+0.3Q-NL Max	0	-1.8824	-3.1823	-0.6754	-0.5231	-0.6732	-4.8917	333
Level 3	C221	333 G+Ex+0.3Q-NL Max	0.725	-1.6966	-3.1823	-0.6754	-0.5231	-0.1836	-2.5919	333
Level 3	C221	333 G+Ex+0.3Q-NL Max	1.45	-1.5107	-3.1823	-0.6754	-0.5231	0.3085	-0.2911	333
Level 3	C3	471 G+Ey+0.3Q-NL Max	0	-0.3437	0.0301	-0.6659	0.0144	-1.7521	-0.0212	471
Level 3	C3	471 G+Ey+0.3Q-NL Max	0.725	-0.2704	0.0301	-0.6659	0.0144	-1.2695	-0.043	471
Level 3	C3	471 G+Ey+0.3Q-NL Max	1.45	-0.1972	0.0301	-0.6659	0.0144	-0.7868	-0.0649	471
Level 3	C3	471 G+Ex+0.3Q-NL Max	0	13.8651	-0.0283	0.2289	1.3068	1.5568	-1.8772	471
Level 3	C3	471 G+Ex+0.3Q-NL Max	0.725	14.0509	-0.0283	0.2289	1.3068	1.39	-1.8131	471
Level 3	C3	471 G+Ex+0.3Q-NL Max	1.45	14.2367	-0.0283	0.2289	1.3068	1.2346	-1.7547	471
Level 3	C6	802 G+Ey+0.3Q-NL Max	0	-25.3126	-2.0199	0.3479	-0.2488	-1.4059	0.1598	802
Level 3	C6	802 G+Ey+0.3Q-NL Max	0.725	-25.2393	-2.0199	0.3479	-0.2488	-1.6808	1.6234	802
Level 3	C6	802 G+Ey+0.3Q-NL Max	1.45	-25.1661	-2.0199	0.3479	-0.2488	-1.9462	3.0778	802
Level 3	C6	802 G+Ex+0.3Q-NL Max	0	24.6164	-1.6299	0.0842	-1.9897	-0.8023	-5.245	802
Level 3	C6	802 G+Ex+0.3Q-NL Max	0.725	24.8022	-1.6299	0.0842	-1.9897	-0.8607	-3.9583	802
Level 3	C6	802 G+Ex+0.3Q-NL Max	1.45	24.988	-1.6299	0.0842	-1.9897	-0.9168	-2.6905	802
Level 3	C9	805 G+Ey+0.3Q-NL Max	0	4.1223	0.6117	-0.2213	0.1508	-1.4003	0.0247	805
Level 3	C9	805 G+Ey+0.3Q-NL Max	0.725	4.1955	0.6117	-0.2213	0.1508	-1.2361	-0.4177	805
Level 3	C9	805 G+Ey+0.3Q-NL Max	1.45	4.2688	0.6117	-0.2213	0.1508	-1.0731	-0.8605	805
Level 3	C9	805 G+Ex+0.3Q-NL Max	0	35.3469	-0.1082	0.0264	2.0817	0.7648	-5.3791	805
Level 3	C9	805 G+Ex+0.3Q-NL Max	0.725	35.5327	-0.1082	0.0264	2.0817	0.7446	-5.1168	805
Level 3	C9	805 G+Ex+0.3Q-NL Max	1.45	35.7186	-0.1082	0.0264	2.0817	0.7329	-4.8957	805
Level 3	C12	808 G+Ey+0.3Q-NL Max	0	-14.7986	-1.0844	-0.0195	-0.208	-1.9219	0.0532	808

Level 3	C12	808 G+Ey+0.3Q-NL Max	0.725	-14.7253	-1.0844	-0.0195	-0.208	-1.9219	0.8398	808
Level 3	C12	808 G+Ey+0.3Q-NL Max	1.45	-14.6521	-1.0844	-0.0195	-0.208	-1.9155	1.6237	808
Level 3	C12	808 G+Ex+0.3Q-NL Max	0	13.5877	0.1287	0.1215	-1.193	-1.5022	-2.1875	808
Level 3	C12	808 G+Ex+0.3Q-NL Max	0.725	13.7736	0.1287	0.1215	-1.193	-1.5883	-2.2346	808
Level 3	C12	808 G+Ex+0.3Q-NL Max	1.45	13.9594	0.1287	0.1215	-1.193	-1.6761	-2.2886	808
Level 3	C16	12 G+Ey+0.3Q-NL Max	0	-13.4497	-0.1584	16.3899	0.4939	4.051	-0.0908	1-Dec
Level 3	C16	12 G+Ey+0.3Q-NL Max	0.185	-13.431	-0.1584	16.3899	0.4939	1.0119	-0.0615	1-Dec
Level 3	C16	12 G+Ey+0.3Q-NL Max	0.185	-6.1225	-0.0918	0.0085	-0.0235	-1.2144	-0.0946	2-Dec
Level 3	C16	12 G+Ey+0.3Q-NL Max	1.6025	-5.9793	-0.0918	0.0085	-0.0235	-1.2464	0.0356	2-Dec
Level 3	C16	12 G+Ey+0.3Q-NL Max	3.205	-5.8174	-0.0918	0.0085	-0.0235	-1.2753	0.1825	2-Dec
Level 3	C16	12 G+Ex+0.3Q-NL Max	0	-47.7407	6.5136	-7.7035	0.2149	-3.3688	-14.2929	1-Dec
Level 3	C16	12 G+Ex+0.3Q-NL Max	0.185	-47.6933	6.5136	-7.7035	0.2149	-1.9318	-15.5196	1-Dec
Level 3	C16	12 G+Ex+0.3Q-NL Max	0.185	-60.204	2.84	-1.5465	0.341	-1.2929	4.744	2-Dec
Level 3	C16	12 G+Ex+0.3Q-NL Max	1.6025	-59.8406	2.84	-1.5465	0.341	0.9442	0.4266	2-Dec
Level 3	C16	12 G+Ex+0.3Q-NL Max	3.205	-59.4299	2.84	-1.5465	0.341	3.4106	-4.4408	2-Dec
Level 3	C18	25 G+Ey+0.3Q-NL Max	0	-45.4592	0.1452	14.0755	0.7027	3.1009	-0.6164	25-1
Level 3	C18	25 G+Ey+0.3Q-NL Max	0.405	-45.4183	0.1452	14.0755	0.7027	-2.6521	-0.6943	25-1
Level 3	C18	25 G+Ey+0.3Q-NL Max	0.405	-48.7915	-0.2186	7.8618	0.0499	4.2974	-1.493	25-2
Level 3	C18	25 G+Ey+0.3Q-NL Max	1.6025	-48.6705	-0.2186	7.8618	0.0499	-5.2875	-1.2651	25-2
Level 3	C18	25 G+Ey+0.3Q-NL Max	1.855	-48.645	-0.2186	7.8618	0.0499	-7.305	-1.2138	25-2
Level 3	C18	25 G+Ey+0.3Q-NL Max	1.855	-36.6535	-7.1325	-0.4117	-0.0156	-2.5953	-4.1346	25-3
Level 3	C18	25 G+Ey+0.3Q-NL Max	3.205	-36.5171	-7.1325	-0.4117	-0.0156	-2.0901	5.5038	25-3
Level 3	C18	25 G+Ex+0.3Q-NL Max	0	-43.6508	-22.2531	7.5628	-3.8761	2.2088	-11.5231	25-1
Level 3	C18	25 G+Ex+0.3Q-NL Max	0.405	-43.547	-22.2531	7.5628	-3.8761	-0.84	-2.5264	25-1
Level 3	C18	25 G+Ex+0.3Q-NL Max	0.405	-41.622	-17.8626	0.3005	-0.9356	-0.3536	-5.0214	25-2
Level 3	C18	25 G+Ex+0.3Q-NL Max	1.6025	-41.315	-17.8626	0.3005	-0.9356	-0.672	16.2557	25-2
Level 3	C18	25 G+Ex+0.3Q-NL Max	1.855	-41.2503	-17.8626	0.3005	-0.9356	-0.7359	20.7265	25-2
Level 3	C18	25 G+Ex+0.3Q-NL Max	1.855	-45.7446	39.7551	0.7273	0.521	-0.7404	28.9167	25-3
Level 3	C18	25 G+Ex+0.3Q-NL Max	3.205	-45.3986	39.7551	0.7273	0.521	-1.6437	-25.3493	25-3
Level 3	C20	27 G+Ey+0.3Q-NL Max	0	-28.8751	-1.2507	1.9873	-0.0695	2.854	-1.8147	27
Level 3	C20	27 G+Ey+0.3Q-NL Max	1.6025	-28.7132	-1.2507	1.9873	-0.0695	-0.4305	0.1648	27
Level 3	C20	27 G+Ey+0.3Q-NL Max	3.205	-28.5513	-1.2507	1.9873	-0.0695	-3.7015	2.1391	27
Level 3	C20	27 G+Ex+0.3Q-NL Max	0	-12.7429	1.4979	-0.5025	-0.4223	-0.8119	2.384	27

Level 3	C20	27 G+Ex+0.3Q-NL Max	1.6025	-12.3321	1.4979	-0.5025	-0.4223	-0.0008	-0.1433	27
Level 3	C20	27 G+Ex+0.3Q-NL Max	3.205	-11.9214	1.4979	-0.5025	-0.4223	0.8103	-2.6346	27
Level 3	C22	815 G+Ey+0.3Q-NL Max	0	-31.3442	-0.8039	5.28	0.4846	0.8535	1.9458	815-1
Level 3	C22	815 G+Ey+0.3Q-NL Max	0.405	-31.3032	-0.8039	5.28	0.4846	-1.3164	2.2696	815-1
Level 3	C22	815 G+Ey+0.3Q-NL Max	0.405	-24.526	0.3485	8.815	0.0625	5.4285	0.3546	815-2
Level 3	C22	815 G+Ey+0.3Q-NL Max	1.6025	-24.405	0.3485	8.815	0.0625	-5.2108	-0.0741	815-2
Level 3	C22	815 G+Ey+0.3Q-NL Max	1.855	-24.3795	0.3485	8.815	0.0625	-7.4529	-0.1646	815-2
Level 3	C22	815 G+Ey+0.3Q-NL Max	1.855	-8.7165	-1.7368	-1.695	0.3253	-2.5929	-1.6086	815-3
Level 3	C22	815 G+Ey+0.3Q-NL Max	3.205	-8.5801	-1.7368	-1.695	0.3253	-0.3187	0.7344	815-3
Level 3	C22	815 G+Ex+0.3Q-NL Max	0	-49.6833	-23.3424	-6.7067	3.6149	-1.8414	-13.1268	815-1
Level 3	C22	815 G+Ex+0.3Q-NL Max	0.405	-49.5795	-23.3424	-6.7067	3.6149	0.8962	-3.7098	815-1
Level 3	C22	815 G+Ex+0.3Q-NL Max	0.405	-46.995	-23.2209	0.5342	0.9454	0.8166	-6.7931	815-2
Level 3	C22	815 G+Ex+0.3Q-NL Max	1.6025	-46.688	-23.2209	0.5342	0.9454	0.2112	20.8816	815-2
Level 3	C22	815 G+Ex+0.3Q-NL Max	1.855	-46.6233	-23.2209	0.5342	0.9454	0.091	26.6946	815-2
Level 3	C22	815 G+Ex+0.3Q-NL Max	1.855	-51.3926	52.0304	-1.1324	-0.214	0.2504	37.8547	815-3
Level 3	C22	815 G+Ex+0.3Q-NL Max	3.205	-51.0466	52.0304	-1.1324	-0.214	1.8003	-33.228	815-3
Level 3	C24	817 G+Ey+0.3Q-NL Max	0	-35.5044	0.4299	21.3601	1.8951	5.8249	0.3642	817-1
Level 3	C24	817 G+Ey+0.3Q-NL Max	0.185	-35.4857	0.4299	21.3601	1.8951	1.8536	0.2828	817-1
Level 3	C24	817 G+Ey+0.3Q-NL Max	0.185	-44.7614	-0.6656	0.8892	-0.2343	-0.4184	-0.9959	817-2
Level 3	C24	817 G+Ey+0.3Q-NL Max	1.6025	-44.6182	-0.6656	0.8892	-0.2343	-1.8478	-0.057	817-2
Level 3	C24	817 G+Ey+0.3Q-NL Max	3.205	-44.4563	-0.6656	0.8892	-0.2343	-3.3794	1.0041	817-2
Level 3	C24	817 G+Ex+0.3Q-NL Max	0	-57.2142	10.4406	8.7169	0.6855	4.0051	-20.2341	817-1
Level 3	C24	817 G+Ex+0.3Q-NL Max	0.185	-57.1668	10.4406	8.7169	0.6855	2.3945	-22.2009	817-1
Level 3	C24	817 G+Ex+0.3Q-NL Max	0.185	-67.4762	3.2585	1.8263	-0.2922	1.5332	5.3204	817-2
Level 3	C24	817 G+Ex+0.3Q-NL Max	1.6025	-67.1129	3.2585	1.8263	-0.2922	-1.1237	0.315	817-2
Level 3	C24	817 G+Ex+0.3Q-NL Max	3.205	-66.7021	3.2585	1.8263	-0.2922	-4.0408	-5.3263	817-2
Level 3	C28	46 G+Ey+0.3Q-NL Max	0	-10.2533	-0.3906	-3.523	-0.3244	-5.6186	-0.4923	46
Level 3	C28	46 G+Ey+0.3Q-NL Max	1.51	-10.1007	-0.3906	-3.523	-0.3244	-0.3273	0.0985	46
Level 3	C28	46 G+Ey+0.3Q-NL Max	3.02	-9.9482	-0.3906	-3.523	-0.3244	4.9673	0.6883	46
Level 3	C28	46 G+Ex+0.3Q-NL Max	0	-82.4437	1.5657	-2.0621	-1.6378	1.2343	2.9473	46
Level 3	C28	46 G+Ex+0.3Q-NL Max	1.51	-82.0567	1.5657	-2.0621	-1.6378	4.3819	0.1465	46
Level 3	C28	46 G+Ex+0.3Q-NL Max	3.02	-81.6696	1.5657	-2.0621	-1.6378	7.1879	-2.6522	46
Level 3	C30	53 G+Ey+0.3Q-NL Max	0	-30.2193	0.463	-1.6984	-0.7941	-6.3757	0.6549	53

Level 3	C30	53 G+Ey+0.3Q-NL Max	1.51	-30.0667	0.463	-1.6984	-0.7941	-3.9102	-0.0494	53
Level 3	C30	53 G+Ey+0.3Q-NL Max	3.02	-29.9142	0.463	-1.6984	-0.7941	-1.3296	-0.7523	53
Level 3	C30	53 G+Ex+0.3Q-NL Max	0	-94.0586	1.8989	2.5058	1.2798	-0.8806	3.1365	53
Level 3	C30	53 G+Ex+0.3Q-NL Max	1.51	-93.6716	1.8989	2.5058	1.2798	-4.7348	-0.3343	53
Level 3	C30	53 G+Ex+0.3Q-NL Max	3.02	-93.2846	1.8989	2.5058	1.2798	-8.1457	-3.7663	53
Level 3	C32	828 G+Ey+0.3Q-NL Max	0	-10.2745	0.1323	-3.5293	0.3941	-5.404	0.0216	828
Level 3	C32	828 G+Ey+0.3Q-NL Max	1.51	-10.122	0.1323	-3.5293	0.3941	-0.1063	-0.1783	828
Level 3	C32	828 G+Ey+0.3Q-NL Max	3.02	-9.9694	0.1323	-3.5293	0.3941	5.1925	-0.3765	828
Level 3	C32	828 G+Ex+0.3Q-NL Max	0	-61.2178	4.8233	-2.4892	-1.8426	1.0977	6.2815	828
Level 3	C32	828 G+Ex+0.3Q-NL Max	1.51	-60.8307	4.8233	-2.4892	-1.8426	4.9318	-1.3755	828
Level 3	C32	828 G+Ex+0.3Q-NL Max	3.02	-60.4437	4.8233	-2.4892	-1.8426	8.4749	-8.9289	828
Level 3	C34	838 G+Ey+0.3Q-NL Max	0	-24.5411	0.2929	-2.1598	0.5855	-7.061	0.4695	838
Level 3	C34	838 G+Ey+0.3Q-NL Max	1.51	-24.3886	0.2929	-2.1598	0.5855	-3.8744	0.0223	838
Level 3	C34	838 G+Ey+0.3Q-NL Max	3.02	-24.236	0.2929	-2.1598	0.5855	-0.5953	-0.4254	838
Level 3	C34	838 G+Ex+0.3Q-NL Max	0	-63.1696	4.4057	1.6375	1.2732	-2.7928	5.1465	838
Level 3	C34	838 G+Ex+0.3Q-NL Max	1.51	-62.7825	4.4057	1.6375	1.2732	-5.2584	-1.9649	838
Level 3	C34	838 G+Ex+0.3Q-NL Max	3.02	-62.3955	4.4057	1.6375	1.2732	-7.392	-8.9516	838
Level 3	C36	419 G+Ey+0.3Q-NL Max	0	0.104	0.064	3.4529	-0.0679	-0.7544	0.1941	419
Level 3	C36	419 G+Ey+0.3Q-NL Max	0.71	0.1758	0.064	3.4529	-0.0679	-3.2055	0.1486	419
Level 3	C36	419 G+Ey+0.3Q-NL Max	1.42	0.2475	0.064	3.4529	-0.0679	-5.6567	0.1032	419
Level 3	C36	419 G+Ex+0.3Q-NL Max	0	8.3895	2.656	-3.8474	-1.3028	-2.7533	3.3541	419
Level 3	C36	419 G+Ex+0.3Q-NL Max	0.71	8.5714	2.656	-3.8474	-1.3028	-0.0072	1.4891	419
Level 3	C36	419 G+Ex+0.3Q-NL Max	1.42	8.7534	2.656	-3.8474	-1.3028	2.7388	-0.3731	419
Level 3	C37	680 G+Ey+0.3Q-NL Max	0	4.407	0.7227	3.1262	-0.1299	-0.2335	1.2008	680
Level 3	C37	680 G+Ey+0.3Q-NL Max	0.8025	4.488	0.7227	3.1262	-0.1299	-2.7296	0.6212	680
Level 3	C37	680 G+Ey+0.3Q-NL Max	1.605	4.5691	0.7227	3.1262	-0.1299	-5.2291	0.0424	680
Level 3	C37	680 G+Ex+0.3Q-NL Max	0	30.3411	12.0595	-2.1636	-1.9597	-2.5408	15.4376	680
Level 3	C37	680 G+Ex+0.3Q-NL Max	0.8025	30.5468	12.0595	-2.1636	-1.9597	-0.8052	5.9115	680
Level 3	C37	680 G+Ex+0.3Q-NL Max	1.605	30.7525	12.0595	-2.1636	-1.9597	0.9236	-3.5616	680
Level 3	C39	740 G+Ey+0.3Q-NL Max	0	-29.727	-1.9321	3.5635	-0.025	0.0964	-3.0724	740
Level 3	C39	740 G+Ey+0.3Q-NL Max	0.8025	-29.6459	-1.9321	3.5635	-0.025	-2.8516	-1.535	740
Level 3	C39	740 G+Ey+0.3Q-NL Max	1.605	-29.5649	-1.9321	3.5635	-0.025	-5.7761	0.0151	740
Level 3	C39	740 G+Ex+0.3Q-NL Max	0	19.3591	10.5997	2.5295	1.8843	2.6325	13.203	740

Level 3	C39	740 G+Ex+0.3Q-NL Max	0.8025	19.5648	10.5997	2.5295	1.8843	0.6075	4.7802	740
Level 3	C39	740 G+Ex+0.3Q-NL Max	1.605	19.7705	10.5997	2.5295	1.8843	-1.4143	-3.6153	740
Level 3	C41	59 G+Ey+0.3Q-NL Max	0	-35.1008	-0.8176	2.0752	0.0583	3.0455	-1.1896	59
Level 3	C41	59 G+Ey+0.3Q-NL Max	1.6025	-34.9389	-0.8176	2.0752	0.0583	-0.4033	0.1083	59
Level 3	C41	59 G+Ey+0.3Q-NL Max	3.205	-34.777	-0.8176	2.0752	0.0583	-3.8367	1.402	59
Level 3	C41	59 G+Ex+0.3Q-NL Max	0	-14.8643	2.0485	0.802	0.4946	1.2617	3.3018	59
Level 3	C41	59 G+Ex+0.3Q-NL Max	1.6025	-14.4535	2.0485	0.802	0.4946	-0.0246	-0.1575	59
Level 3	C41	59 G+Ex+0.3Q-NL Max	3.205	-14.0428	2.0485	0.802	0.4946	-1.3063	-3.5868	59
Level 3	C8	801 G+Ey+0.3Q-NL Max	0	-19.1459	-1.0291	4.6624	-0.1204	0.4458	-1.4794	801
Level 3	C8	801 G+Ey+0.3Q-NL Max	0.71	-19.0742	-1.0291	4.6624	-0.1204	-2.9156	-0.7512	801
Level 3	C8	801 G+Ey+0.3Q-NL Max	1.42	-19.0024	-1.0291	4.6624	-0.1204	-6.2649	-0.0198	801
Level 3	C8	801 G+Ex+0.3Q-NL Max	0	7.8042	2.5701	4.3619	1.1869	2.8846	3.1279	801
Level 3	C8	801 G+Ex+0.3Q-NL Max	0.71	7.9862	2.5701	4.3619	1.1869	-0.1831	1.3263	801
Level 3	C8	801 G+Ex+0.3Q-NL Max	1.42	8.1682	2.5701	4.3619	1.1869	-3.2512	-0.4729	801
Level 2	C51	108 G+Ey+0.3Q-NL Max	0	-155.1414	51.8835	4.2543	-0.0044	5.1903	111.9941	108
Level 2	C51	108 G+Ey+0.3Q-NL Max	1.821	-154.4563	51.8835	4.2543	-0.0044	-2.6067	16.9447	108
Level 2	C51	108 G+Ey+0.3Q-NL Max	3.642	-153.7712	51.8835	4.2543	-0.0044	-10.315	-78.2942	108
Level 2	C51	108 G+Ex+0.3Q-NL Max	0	-417.1579	12.8359	-46.9909	-0.0612	-123.0942	27.7768	108
Level 2	C51	108 G+Ex+0.3Q-NL Max	1.821	-415.4198	12.8359	-46.9909	-0.0612	-32.619	4.4672	108
Level 2	C51	108 G+Ex+0.3Q-NL Max	3.642	-413.6817	12.8359	-46.9909	-0.0612	60.868	-18.711	108
Level 2	C137	287 G+Ey+0.3Q-NL Max	0	-147.1582	10.44	19.169	-0.0015	38.1567	13.6728	287
Level 2	C137	287 G+Ey+0.3Q-NL Max	1.821	-146.4731	10.44	19.169	-0.0015	2.7689	-5.3916	287
Level 2	C137	287 G+Ey+0.3Q-NL Max	3.642	-145.788	10.44	19.169	-0.0015	-32.7084	-24.3989	287
Level 2	C137	287 G+Ex+0.3Q-NL Max	0	-239.9501	146.3884	-0.5562	-0.0377	-2.8205	310.246	287
Level 2	C137	287 G+Ex+0.3Q-NL Max	1.821	-238.212	146.3884	-0.5562	-0.0377	-1.6966	40.2755	287
Level 2	C137	287 G+Ex+0.3Q-NL Max	3.642	-236.474	146.3884	-0.5562	-0.0377	-0.4069	-230.2387	287
Level 2	C140	183 G+Ey+0.3Q-NL Max	0	-60.5641	-4.0936	40.8448	0.0188	84.2142	-12.6919	183
Level 2	C140	183 G+Ey+0.3Q-NL Max	1.821	-59.8791	-4.0936	40.8448	0.0188	9.362	-5.2117	183
Level 2	C140	183 G+Ey+0.3Q-NL Max	3.642	-59.194	-4.0936	40.8448	0.0188	-65.6142	2.291	183
Level 2	C140	183 G+Ex+0.3Q-NL Max	0	-344.3229	72.7827	20.5243	0.0337	35.2413	189.2851	183
Level 2	C140	183 G+Ex+0.3Q-NL Max	1.821	-342.5849	72.7827	20.5243	0.0337	-2.5835	54.5116	183
Level 2	C140	183 G+Ex+0.3Q-NL Max	3.642	-340.8468	72.7827	20.5243	0.0337	-39.9859	-81.4648	183
Level 2	C141	219 G+Ey+0.3Q-NL Max	0	-33.0056	8.4687	27.2844	0.0212	65.2181	21.1699	219

Level 2	C141	219 G+Ey+0.3Q-NL Max	1.821	-32.3205	8.4687	27.2844	0.0212	15.3257	5.7226	219
Level 2	C141	219 G+Ey+0.3Q-NL Max	3.642	-31.6354	8.4687	27.2844	0.0212	-34.6763	-9.7381	219
Level 2	C141	219 G+Ex+0.3Q-NL Max	0	-248.3618	54.7136	-10.794	-0.0122	-15.689	141.4101	219
Level 2	C141	219 G+Ex+0.3Q-NL Max	1.821	-246.6237	54.7136	-10.794	-0.0122	4.3352	40.7033	219
Level 2	C141	219 G+Ex+0.3Q-NL Max	3.642	-244.8856	54.7136	-10.794	-0.0122	24.2256	-60.729	219
Level 2	C142	607 G+Ey+0.3Q-NL Max	0	-41.6185	-9.1665	26.7698	-0.0228	63.6466	-23.0786	607
Level 2	C142	607 G+Ey+0.3Q-NL Max	1.821	-40.9334	-9.1665	26.7698	-0.0228	14.6428	-6.3489	607
Level 2	C142	607 G+Ey+0.3Q-NL Max	3.642	-40.2483	-9.1665	26.7698	-0.0228	-34.4936	10.3997	607
Level 2	C142	607 G+Ex+0.3Q-NL Max	0	-16.9659	42.0842	-13.9354	-0.0225	-16.3102	111.7791	607
Level 2	C142	607 G+Ex+0.3Q-NL Max	1.821	-15.2278	42.0842	-13.9354	-0.0225	9.0883	35.1237	607
Level 2	C142	607 G+Ex+0.3Q-NL Max	3.642	-13.4897	42.0842	-13.9354	-0.0225	34.4991	-41.4594	607
Level 2	C144	605 G+Ey+0.3Q-NL Max	0	-53.4584	4.9921	42.6325	-0.0196	88.0475	15.0286	605
Level 2	C144	605 G+Ey+0.3Q-NL Max	1.821	-52.7733	4.9921	42.6325	-0.0196	10.009	5.9114	605
Level 2	C144	605 G+Ey+0.3Q-NL Max	3.642	-52.0882	4.9921	42.6325	-0.0196	-68.1465	-3.2284	605
Level 2	C144	605 G+Ex+0.3Q-NL Max	0	-3.5626	57.1704	13.4261	0.0517	15.4777	150.0852	605
Level 2	C144	605 G+Ex+0.3Q-NL Max	1.821	-1.8245	57.1704	13.4261	0.0517	-8.9721	45.9672	605
Level 2	C144	605 G+Ex+0.3Q-NL Max	3.642	-0.0864	57.1704	13.4261	0.0517	-33.1138	-58.096	605
Level 2	C148	160 G+Ey+0.3Q-NL Max	0	-66.6022	9.7208	-16.6964	0.0117	-37.415	12.2467	160-1
Level 2	C148	160 G+Ey+0.3Q-NL Max	1.35	-66.0943	9.7208	-16.6964	0.0117	-14.7303	-0.8913	160-1
Level 2	C148	160 G+Ey+0.3Q-NL Max	1.35	-66.0943	9.7208	-16.6964	0.0117	-14.7303	-0.8913	160-2
Level 2	C148	160 G+Ey+0.3Q-NL Max	1.8825	-65.894	9.7208	-16.6964	0.0117	-5.7366	-6.073	160-2
Level 2	C148	160 G+Ey+0.3Q-NL Max	3.765	-65.1857	9.7208	-16.6964	0.0117	26.0217	-24.3649	160-2
Level 2	C148	160 G+Ex+0.3Q-NL Max	0	-179.5508	-55.6977	4.5742	-0.0044	9.2412	-170.0854	160-1
Level 2	C148	160 G+Ex+0.3Q-NL Max	1.35	-178.2623	-55.6977	4.5742	-0.0044	3.0162	-93.9361	160-1
Level 2	C148	160 G+Ex+0.3Q-NL Max	1.35	-178.2623	-55.6977	4.5742	-0.0044	3.0162	-93.9361	160-2
Level 2	C148	160 G+Ex+0.3Q-NL Max	1.8825	-177.754	-55.6977	4.5742	-0.0044	0.5349	-63.6448	160-2
Level 2	C148	160 G+Ex+0.3Q-NL Max	3.765	-175.9573	-55.6977	4.5742	-0.0044	-8.1184	43.5837	160-2
Level 2	C149	245 G+Ey+0.3Q-NL Max	0	-85.2486	15.2216	16.7114	-0.015	34.5891	17.4333	245
Level 2	C149	245 G+Ey+0.3Q-NL Max	1.821	-84.5635	15.2216	16.7114	-0.015	3.9054	-10.3236	245
Level 2	C149	245 G+Ey+0.3Q-NL Max	3.642	-83.8784	15.2216	16.7114	-0.015	-26.8513	-38.0174	245
Level 2	C149	245 G+Ex+0.3Q-NL Max	0	-223.0321	103.3149	-10.0042	-0.0376	-21.4267	224.1534	245
Level 2	C149	245 G+Ex+0.3Q-NL Max	1.821	-221.294	103.3149	-10.0042	-0.0376	-3.259	33.8687	245
Level 2	C149	245 G+Ex+0.3Q-NL Max	3.642	-219.5559	103.3149	-10.0042	-0.0376	15.7239	-156.9194	245

Level 2	C150	56 G+Ey+0.3Q-NL Max	0	40.9481	-4.9222	-18.6914	0.0212	-39.9657	-13.9969	56
Level 2	C150	56 G+Ey+0.3Q-NL Max	1.821	41.6332	-4.9222	-18.6914	0.0212	-6.0805	-5.0672	56
Level 2	C150	56 G+Ey+0.3Q-NL Max	3.642	42.3183	-4.9222	-18.6914	0.0212	27.7485	3.8472	56
Level 2	C150	56 G+Ex+0.3Q-NL Max	0	-12.1891	-37.9928	5.8482	-0.0147	10.5166	-94.2342	56
Level 2	C150	56 G+Ex+0.3Q-NL Max	1.821	-10.4511	-37.9928	5.8482	-0.0147	-0.1373	-24.9901	56
Level 2	C150	56 G+Ex+0.3Q-NL Max	3.642	-8.713	-37.9928	5.8482	-0.0147	-10.7184	44.2807	56
Level 2	C155	77 G+Ey+0.3Q-NL Max	0	-83.6386	-0.6965	3.6956	0.2463	7.4684	-0.96	77
Level 2	C155	77 G+Ey+0.3Q-NL Max	1.821	-83.4546	-0.6965	3.6956	0.2463	0.3931	0.3465	77
Level 2	C155	77 G+Ey+0.3Q-NL Max	3.642	-83.2707	-0.6965	3.6956	0.2463	-6.7287	1.6128	77
Level 2	C155	77 G+Ex+0.3Q-NL Max	0	-77.1541	11.6066	1.1474	0.7445	2.1844	27.2361	77
Level 2	C155	77 G+Ex+0.3Q-NL Max	1.821	-76.6874	11.6066	1.1474	0.7445	0.0894	4.9157	77
Level 2	C155	77 G+Ex+0.3Q-NL Max	3.642	-76.2206	11.6066	1.1474	0.7445	-1.9892	-17.9192	77
Level 2	C156	69 G+Ey+0.3Q-NL Max	0	-150.1608	36.2759	2.8888	0.0178	5.8396	90.2069	69
Level 2	C156	69 G+Ey+0.3Q-NL Max	1.821	-149.4757	36.2759	2.8888	0.0178	0.4955	23.6674	69
Level 2	C156	69 G+Ey+0.3Q-NL Max	3.642	-148.7907	36.2759	2.8888	0.0178	-4.8649	-43.1282	69
Level 2	C156	69 G+Ex+0.3Q-NL Max	0	14.4964	16.2144	-34.2539	0.0335	-76.5235	32.4753	69
Level 2	C156	69 G+Ex+0.3Q-NL Max	1.821	16.2345	16.2144	-34.2539	0.0335	-14.2617	2.9503	69
Level 2	C156	69 G+Ex+0.3Q-NL Max	3.642	17.9725	16.2144	-34.2539	0.0335	47.9697	-26.4884	69
Level 2	C161	36 G+Ey+0.3Q-NL Max	0	-21.812	-0.6859	5.3545	0.0771	5.7689	-0.9378	36
Level 2	C161	36 G+Ey+0.3Q-NL Max	0.6	-21.7514	-0.6859	5.3545	0.0771	2.5471	-0.5249	36
Level 2	C161	36 G+Ey+0.3Q-NL Max	1.2	-21.6907	-0.6859	5.3545	0.0771	-0.6833	-0.1102	36
Level 2	C161	36 G+Ex+0.3Q-NL Max	0	8.682	-1.723	1.4683	-1.4332	1.6631	-0.4431	36
Level 2	C161	36 G+Ex+0.3Q-NL Max	0.6	8.8358	-1.723	1.4683	-1.4332	0.7823	0.6115	36
Level 2	C161	36 G+Ex+0.3Q-NL Max	1.2	8.9896	-1.723	1.4683	-1.4332	-0.0645	1.667	36
Level 2	C163	105 G+Ey+0.3Q-NL Max	0	-66.6022	9.7208	-16.6964	0.0117	-37.415	12.2467	105-1
Level 2	C163	105 G+Ey+0.3Q-NL Max	1.35	-66.0943	9.7208	-16.6964	0.0117	-14.7303	-0.8913	105-1
Level 2	C163	105 G+Ey+0.3Q-NL Max	1.35	-66.0943	9.7208	-16.6964	0.0117	-14.7303	-0.8913	105-2
Level 2	C163	105 G+Ey+0.3Q-NL Max	1.8825	-65.894	9.7208	-16.6964	0.0117	-5.7366	-6.073	105-2
Level 2	C163	105 G+Ey+0.3Q-NL Max	3.765	-65.1857	9.7208	-16.6964	0.0117	26.0217	-24.3649	105-2
Level 2	C163	105 G+Ex+0.3Q-NL Max	0	-179.5508	-55.6977	4.5742	-0.0044	9.2412	-170.0854	105-1
Level 2	C163	105 G+Ex+0.3Q-NL Max	1.35	-178.2623	-55.6977	4.5742	-0.0044	3.0162	-93.9361	105-1
Level 2	C163	105 G+Ex+0.3Q-NL Max	1.35	-178.2623	-55.6977	4.5742	-0.0044	3.0162	-93.9361	105-2
Level 2	C163	105 G+Ex+0.3Q-NL Max	1.8825	-177.754	-55.6977	4.5742	-0.0044	0.5349	-63.6448	105-2

Level 2	C163	105	G+Ex+0.3Q-NL Max	3.765	-175.9573	-55.6977	4.5742	-0.0044	-8.1184	43.5837	105-2
Level 2	C164	186	G+Ey+0.3Q-NL Max	0	-129.0162	6.217	13.4959	-0.0181	30.2614	14.2607	186
Level 2	C164	186	G+Ey+0.3Q-NL Max	1.821	-128.3312	6.217	13.4959	-0.0181	5.3208	2.8654	186
Level 2	C164	186	G+Ey+0.3Q-NL Max	3.642	-127.6461	6.217	13.4959	-0.0181	-19.7706	-8.5566	186
Level 2	C164	186	G+Ex+0.3Q-NL Max	0	-239.4795	61.0328	-7.0538	0.05	-13.2281	152.887	186
Level 2	C164	186	G+Ex+0.3Q-NL Max	1.821	-237.7415	61.0328	-7.0538	0.05	-0.18	40.4462	186
Level 2	C164	186	G+Ex+0.3Q-NL Max	3.642	-236.0034	61.0328	-7.0538	0.05	12.9734	-72.6587	186
Level 2	C165	221	G+Ey+0.3Q-NL Max	0	23.7438	-7.2272	14.1336	-0.0217	30.6104	-21.7211	221
Level 2	C165	221	G+Ey+0.3Q-NL Max	1.821	24.4288	-7.2272	14.1336	-0.0217	4.9426	-8.5808	221
Level 2	C165	221	G+Ey+0.3Q-NL Max	3.642	25.1139	-7.2272	14.1336	-0.0217	-20.6983	4.5441	221
Level 2	C165	221	G+Ex+0.3Q-NL Max	0	-190.2994	44.572	8.1713	-0.0204	20.0066	108.2389	221
Level 2	C165	221	G+Ex+0.3Q-NL Max	1.821	-188.5613	44.572	8.1713	-0.0204	5.2458	26.357	221
Level 2	C165	221	G+Ex+0.3Q-NL Max	3.642	-186.8232	44.572	8.1713	-0.0204	-9.7354	-55.8843	221
Level 2	C166	341	G+Ey+0.3Q-NL Max	0	-69.7509	0.9912	2.8541	-0.2309	5.8557	1.5171	341
Level 2	C166	341	G+Ey+0.3Q-NL Max	1.821	-69.5669	0.9912	2.8541	-0.2309	0.4304	-0.342	341
Level 2	C166	341	G+Ey+0.3Q-NL Max	3.642	-69.3829	0.9912	2.8541	-0.2309	-5.0372	-2.1678	341
Level 2	C166	341	G+Ex+0.3Q-NL Max	0	-112.294	15.8176	-0.7097	0.695	-1.4952	31.5724	341
Level 2	C166	341	G+Ex+0.3Q-NL Max	1.821	-111.8273	15.8176	-0.7097	0.695	-0.1228	0.5705	341
Level 2	C166	341	G+Ex+0.3Q-NL Max	3.642	-111.3605	15.8176	-0.7097	0.695	1.3281	-30.5172	341
Level 2	C168	575	G+Ey+0.3Q-NL Max	0	-17.8149	-0.7655	4.993	0.0067	8.3515	-0.2171	575
Level 2	C168	575	G+Ey+0.3Q-NL Max	1.1325	-17.7005	-0.7655	4.993	0.0067	2.6385	0.6551	575
Level 2	C168	575	G+Ey+0.3Q-NL Max	2.265	-17.586	-0.7655	4.993	0.0067	-3.1004	1.5208	575
Level 2	C168	575	G+Ex+0.3Q-NL Max	0	18.1195	0.2895	2.1212	-1.608	2.7227	2.2823	575
Level 2	C168	575	G+Ex+0.3Q-NL Max	1.1325	18.4098	0.2895	2.1212	-1.608	0.3352	2.0754	575
Level 2	C168	575	G+Ex+0.3Q-NL Max	2.265	18.7001	0.2895	2.1212	-1.608	-1.9307	2.0182	575
Level 2	C1	427	G+Ey+0.3Q-NL Max	0	2.0786	-0.181	2.8336	-0.4903	4.7304	-0.3592	427
Level 2	C1	427	G+Ey+0.3Q-NL Max	0.6	2.1392	-0.181	2.8336	-0.4903	3.0311	-0.2505	427
Level 2	C1	427	G+Ey+0.3Q-NL Max	1.2	2.1998	-0.181	2.8336	-0.4903	1.3327	-0.142	427
Level 2	C1	427	G+Ex+0.3Q-NL Max	0	45.6762	9.3402	-3.6581	-0.4099	-2.5432	17.2652	427
Level 2	C1	427	G+Ex+0.3Q-NL Max	0.6	45.83	9.3402	-3.6581	-0.4099	-0.3524	11.7343	427
Level 2	C1	427	G+Ex+0.3Q-NL Max	1.2	45.9838	9.3402	-3.6581	-0.4099	1.8359	6.2872	427
Level 2	C4	800	G+Ey+0.3Q-NL Max	0	-47.8762	-0.6605	3.2962	0.0081	5.1002	-0.2833	800
Level 2	C4	800	G+Ey+0.3Q-NL Max	0.6	-47.8156	-0.6605	3.2962	0.0081	3.1043	0.124	800

Level 2	C4	800 G+Ey+0.3Q-NL Max	1.2	-47.755	-0.6605	3.2962	0.0081	1.0854	0.5304	800
Level 2	C4	800 G+Ex+0.3Q-NL Max	0	-1.7719	-8.5308	2.4502	0.9576	1.3086	-15.3279	800
Level 2	C4	800 G+Ex+0.3Q-NL Max	0.6	-1.6181	-8.5308	2.4502	0.9576	-0.1617	-10.2109	800
Level 2	C4	800 G+Ex+0.3Q-NL Max	1.2	-1.4643	-8.5308	2.4502	0.9576	-1.6319	-5.0914	800
Level 2	C7	803 G+Ey+0.3Q-NL Max	0	10.0547	0.2906	2.994	0.1306	4.9645	0.449	803
Level 2	C7	803 G+Ey+0.3Q-NL Max	0.6	10.1153	0.2906	2.994	0.1306	3.1719	0.2745	803
Level 2	C7	803 G+Ey+0.3Q-NL Max	1.2	10.1759	0.2906	2.994	0.1306	1.3843	0.1004	803
Level 2	C7	803 G+Ex+0.3Q-NL Max	0	11.0877	-8.7359	-2.3294	-1.1791	-0.9312	-15.1841	803
Level 2	C7	803 G+Ex+0.3Q-NL Max	0.6	11.2415	-8.7359	-2.3294	-1.1791	0.4653	-9.9311	803
Level 2	C7	803 G+Ex+0.3Q-NL Max	1.2	11.3953	-8.7359	-2.3294	-1.1791	1.8627	-4.6954	803
Level 2	C10	806 G+Ey+0.3Q-NL Max	0	-30.4858	-0.2597	3.0479	-0.6408	4.5122	-0.2422	806
Level 2	C10	806 G+Ey+0.3Q-NL Max	0.6	-30.4252	-0.2597	3.0479	-0.6408	2.6723	-0.0854	806
Level 2	C10	806 G+Ey+0.3Q-NL Max	1.2	-30.3646	-0.2597	3.0479	-0.6408	0.8197	0.0717	806
Level 2	C10	806 G+Ex+0.3Q-NL Max	0	60.3471	13.2049	4.5338	0.9312	3.5038	24.502	806
Level 2	C10	806 G+Ex+0.3Q-NL Max	0.6	60.5009	13.2049	4.5338	0.9312	0.7887	16.7058	806
Level 2	C10	806 G+Ex+0.3Q-NL Max	1.2	60.6546	13.2049	4.5338	0.9312	-1.919	9.0671	806
Level 2	C13	811 G+Ey+0.3Q-NL Max	0	-31.431	-0.3846	5.9629	0.1367	6.2014	0.0153	811
Level 2	C13	811 G+Ey+0.3Q-NL Max	0.6	-31.3704	-0.3846	5.9629	0.1367	2.61	0.2539	811
Level 2	C13	811 G+Ey+0.3Q-NL Max	1.2	-31.3098	-0.3846	5.9629	0.1367	-0.9941	0.4912	811
Level 2	C13	811 G+Ex+0.3Q-NL Max	0	-0.8938	-2.7306	-0.9838	1.2145	-1.0794	-2.8688	811
Level 2	C13	811 G+Ex+0.3Q-NL Max	0.6	-0.74	-2.7306	-0.9838	1.2145	-0.4891	-1.2319	811
Level 2	C13	811 G+Ex+0.3Q-NL Max	1.2	-0.5862	-2.7306	-0.9838	1.2145	0.1353	0.4051	811
Level 2	C14	812 G+Ey+0.3Q-NL Max	0	-27.7464	-0.7249	5.0217	-0.05	8.534	0.4673	812
Level 2	C14	812 G+Ey+0.3Q-NL Max	1.1325	-27.632	-0.7249	5.0217	-0.05	2.7548	1.2908	812
Level 2	C14	812 G+Ey+0.3Q-NL Max	2.265	-27.5176	-0.7249	5.0217	-0.05	-3.0665	2.0946	812
Level 2	C14	812 G+Ex+0.3Q-NL Max	0	8.6065	-0.77	-1.3514	1.3212	-1.5825	1.3397	812
Level 2	C14	812 G+Ex+0.3Q-NL Max	1.1325	8.8968	-0.77	-1.3514	1.3212	-0.0564	2.2774	812
Level 2	C14	812 G+Ex+0.3Q-NL Max	2.265	9.187	-0.77	-1.3514	1.3212	1.5941	3.3616	812
Level 2	C15	6 G+Ey+0.3Q-NL Max	0	20.6894	-0.1763	2.2573	0.2289	5.4886	-0.3782	6
Level 2	C15	6 G+Ey+0.3Q-NL Max	1.8075	20.872	-0.1763	2.2573	0.2289	1.4853	-0.0603	6
Level 2	C15	6 G+Ey+0.3Q-NL Max	3.615	21.0547	-0.1763	2.2573	0.2289	-2.474	0.2558	6
Level 2	C15	6 G+Ex+0.3Q-NL Max	0	-72.3453	7.6003	-0.5852	-0.3492	-1.7032	16.911	6
Level 2	C15	6 G+Ex+0.3Q-NL Max	1.8075	-71.882	7.6003	-0.5852	-0.3492	-0.6947	2.4679	6

Level 2	C15	6 G+Ex+0.3Q-NL Max	3.615	-71.4187	7.6003	-0.5852	-0.3492	0.4343	-12.1854	6
Level 2	C17	15 G+Ey+0.3Q-NL Max	0	-93.643	-1.559	2.2119	0.0161	6.2738	-2.3461	15
Level 2	C17	15 G+Ey+0.3Q-NL Max	1.8075	-93.4604	-1.559	2.2119	0.0161	1.9842	0.5642	15
Level 2	C17	15 G+Ey+0.3Q-NL Max	3.615	-93.2778	-1.559	2.2119	0.0161	-2.5611	3.402	15
Level 2	C17	15 G+Ex+0.3Q-NL Max	0	-39.3174	1.6792	0.2678	0.8123	0.8383	4.4134	15
Level 2	C17	15 G+Ex+0.3Q-NL Max	1.8075	-38.8541	1.6792	0.2678	0.8123	0.3592	1.2198	15
Level 2	C17	15 G+Ex+0.3Q-NL Max	3.615	-38.3908	1.6792	0.2678	0.8123	-0.1223	-2.0362	15
Level 2	C21	150 G+Ey+0.3Q-NL Max	0	0.4184	-0.1739	2.5706	0.0949	6.3394	-0.3576	150
Level 2	C21	150 G+Ey+0.3Q-NL Max	1.8075	0.601	-0.1739	2.5706	0.0949	1.6951	-0.0433	150
Level 2	C21	150 G+Ey+0.3Q-NL Max	3.615	0.7836	-0.1739	2.5706	0.0949	-2.9477	0.2709	150
Level 2	C21	150 G+Ex+0.3Q-NL Max	0	-42.6748	2.0947	-0.1287	-1.049	-0.4193	5.333	150
Level 2	C21	150 G+Ex+0.3Q-NL Max	1.8075	-42.2115	2.0947	-0.1287	-1.049	-0.2026	1.3424	150
Level 2	C21	150 G+Ex+0.3Q-NL Max	3.615	-41.7482	2.0947	-0.1287	-1.049	0.0606	-2.6926	150
Level 2	C23	816 G+Ey+0.3Q-NL Max	0	-93.833	-0.1511	1.9076	0.2572	5.5925	-0.1043	816
Level 2	C23	816 G+Ey+0.3Q-NL Max	1.8075	-93.6504	-0.1511	1.9076	0.2572	1.8535	0.1738	816
Level 2	C23	816 G+Ey+0.3Q-NL Max	3.615	-93.4678	-0.1511	1.9076	0.2572	-2.1249	0.4295	816
Level 2	C23	816 G+Ex+0.3Q-NL Max	0	-90.1277	10.7792	1.0176	0.0746	2.8071	24.1021	816
Level 2	C23	816 G+Ex+0.3Q-NL Max	1.8075	-89.6644	10.7792	1.0176	0.0746	1.0187	3.4131	816
Level 2	C23	816 G+Ex+0.3Q-NL Max	3.615	-89.2011	10.7792	1.0176	0.0746	-0.8508	-17.6631	816
Level 2	C27	43 G+Ey+0.3Q-NL Max	0	-13.3512	-0.1778	3.4699	0.562	8.1684	-0.3822	43
Level 2	C27	43 G+Ey+0.3Q-NL Max	1.9	-13.1593	-0.1778	3.4699	0.562	1.4872	-0.0438	43
Level 2	C27	43 G+Ey+0.3Q-NL Max	3.8	-12.9673	-0.1778	3.4699	0.562	-5.2244	0.2954	43
Level 2	C27	43 G+Ex+0.3Q-NL Max	0	-215.4162	6.0855	-0.5859	-0.5783	-1.9902	15.7404	43
Level 2	C27	43 G+Ex+0.3Q-NL Max	1.9	-214.9292	6.0855	-0.5859	-0.5783	-0.4586	1.9906	43
Level 2	C27	43 G+Ex+0.3Q-NL Max	3.8	-214.4422	6.0855	-0.5859	-0.5783	1.2184	-12.3701	43
Level 2	C29	47 G+Ey+0.3Q-NL Max	0	-35.19	0.1318	4.0919	1.0572	10.0057	0.2598	47
Level 2	C29	47 G+Ey+0.3Q-NL Max	1.9	-34.998	0.1318	4.0919	1.0572	1.9437	0.0059	47
Level 2	C29	47 G+Ey+0.3Q-NL Max	3.8	-34.8061	0.1318	4.0919	1.0572	-6.2232	-0.2483	47
Level 2	C29	47 G+Ex+0.3Q-NL Max	0	-279.7526	8.2458	0.5273	0.5725	2.2092	22.3661	47
Level 2	C29	47 G+Ex+0.3Q-NL Max	1.9	-279.2656	8.2458	0.5273	0.5725	0.7106	2.7988	47
Level 2	C29	47 G+Ex+0.3Q-NL Max	3.8	-278.7786	8.2458	0.5273	0.5725	-1.0761	-17.8872	47
Level 2	C31	827 G+Ey+0.3Q-NL Max	0	-14.7978	-0.1636	4.035	-0.5916	9.8609	-0.3666	827
Level 2	C31	827 G+Ey+0.3Q-NL Max	1.9	-14.6059	-0.1636	4.035	-0.5916	2.1046	-0.0553	827

Level 2	C31	827 G+Ey+0.3Q-NL Max	3.8	-14.4139	-0.1636	4.035	-0.5916	-5.6995	0.2571	827
Level 2	C31	827 G+Ex+0.3Q-NL Max	0	-109.2517	6.7549	-1.2726	0.1556	-3.8399	15.856	827
Level 2	C31	827 G+Ex+0.3Q-NL Max	1.9	-108.7647	6.7549	-1.2726	0.1556	-1.2108	1.92	827
Level 2	C31	827 G+Ex+0.3Q-NL Max	3.8	-108.2777	6.7549	-1.2726	0.1556	1.6337	-12.3203	827
Level 2	C33	837 G+Ey+0.3Q-NL Max	0	-25.1908	0.0773	4.8096	-0.829	11.3436	0.1779	837
Level 2	C33	837 G+Ey+0.3Q-NL Max	1.9	-24.9989	0.0773	4.8096	-0.829	1.9821	0.0292	837
Level 2	C33	837 G+Ey+0.3Q-NL Max	3.8	-24.8069	0.0773	4.8096	-0.829	-7.4561	-0.1206	837
Level 2	C33	837 G+Ex+0.3Q-NL Max	0	-167.9052	9.0689	1.621	0.0095	4.3462	22.4311	837
Level 2	C33	837 G+Ex+0.3Q-NL Max	1.9	-167.4182	9.0689	1.621	0.0095	0.8204	2.8755	837
Level 2	C33	837 G+Ex+0.3Q-NL Max	3.8	-166.9312	9.0689	1.621	0.0095	-2.9109	-17.3922	837
Level 2	C35	414 G+Ey+0.3Q-NL Max	0	0.9888	-0.0163	3.5753	-0.3667	6.4833	-0.0324	414
Level 2	C35	414 G+Ey+0.3Q-NL Max	1.225	1.1125	-0.0163	3.5753	-0.3667	2.1077	-0.0125	414
Level 2	C35	414 G+Ey+0.3Q-NL Max	2.45	1.2363	-0.0163	3.5753	-0.3667	-2.2664	0.0074	414
Level 2	C35	414 G+Ex+0.3Q-NL Max	0	50.9113	8.1915	1.5059	0.8184	1.4408	6.5022	414
Level 2	C35	414 G+Ex+0.3Q-NL Max	1.225	51.2253	8.1915	1.5059	0.8184	-0.3852	-3.0184	414
Level 2	C35	414 G+Ex+0.3Q-NL Max	2.45	51.5393	8.1915	1.5059	0.8184	-2.1525	-12.6393	414
Level 2	C2	65 G+Ey+0.3Q-NL Max	0	-27.4894	-1.5977	3.2132	0.0166	7.0306	-2.4379	65
Level 2	C2	65 G+Ey+0.3Q-NL Max	1.8075	-27.3068	-1.5977	3.2132	0.0166	1.1167	0.4798	65
Level 2	C2	65 G+Ey+0.3Q-NL Max	3.615	-27.1242	-1.5977	3.2132	0.0166	-4.84	3.3792	65
Level 2	C2	65 G+Ex+0.3Q-NL Max	0	-13.8077	5.696	-0.3487	0.6147	-0.8223	13.7535	65
Level 2	C2	65 G+Ex+0.3Q-NL Max	1.8075	-13.3444	5.696	-0.3487	0.6147	-0.1855	3.3314	65
Level 2	C2	65 G+Ex+0.3Q-NL Max	3.615	-12.8811	5.696	-0.3487	0.6147	0.459	-7.0614	65
Level 2	C19	68 G+Ey+0.3Q-NL Max	0	9.0966	0.2628	3.866	0.2034	6.4704	0.1873	68
Level 2	C19	68 G+Ey+0.3Q-NL Max	1.1325	9.211	0.2628	3.866	0.2034	2.1236	-0.1094	68
Level 2	C19	68 G+Ey+0.3Q-NL Max	2.265	9.3254	0.2628	3.866	0.2034	-2.2123	-0.4066	68
Level 2	C19	68 G+Ex+0.3Q-NL Max	0	15.1865	-9.5194	2.7809	-0.9137	3.4024	-5.8103	68
Level 2	C19	68 G+Ex+0.3Q-NL Max	1.1325	15.4768	-9.5194	2.7809	-0.9137	0.2681	4.9583	68
Level 2	C19	68 G+Ex+0.3Q-NL Max	2.265	15.7671	-9.5194	2.7809	-0.9137	-2.75	15.8117	68
Level 2	C38	738 G+Ey+0.3Q-NL Max	0	-42.9699	-0.4849	3.4956	0.1091	6.4453	0.632	738
Level 2	C38	738 G+Ey+0.3Q-NL Max	1.1325	-42.8555	-0.4849	3.4956	0.1091	2.3427	1.1841	738
Level 2	C38	738 G+Ey+0.3Q-NL Max	2.265	-42.7411	-0.4849	3.4956	0.1091	-1.8153	1.7082	738
Level 2	C38	738 G+Ex+0.3Q-NL Max	0	2.5238	-9.3428	-2.3461	0.7358	-2.6551	-5.9028	738
Level 2	C38	738 G+Ex+0.3Q-NL Max	1.1325	2.8141	-9.3428	-2.3461	0.7358	-0.0003	4.7131	738

Level 2	C38	738 G+Ex+0.3Q-NL Max	2.265	3.1044	-9.3428	-2.3461	0.7358	2.7756	15.389	738
Level 2	C40	57 G+Ey+0.3Q-NL Max	0	-40.502	-0.5075	3.0754	-0.0846	6.8165	-0.6487	57
Level 2	C40	57 G+Ey+0.3Q-NL Max	1.8075	-40.3194	-0.5075	3.0754	-0.0846	1.1056	0.2803	57
Level 2	C40	57 G+Ey+0.3Q-NL Max	3.615	-40.1368	-0.5075	3.0754	-0.0846	-4.6676	1.1935	57
Level 2	C40	57 G+Ex+0.3Q-NL Max	0	-19.4274	6.933	0.7108	-0.9424	1.6005	16.733	57
Level 2	C40	57 G+Ex+0.3Q-NL Max	1.8075	-18.9641	6.933	0.7108	-0.9424	0.3216	3.9906	57
Level 2	C40	57 G+Ex+0.3Q-NL Max	3.615	-18.5008	6.933	0.7108	-0.9424	-0.9659	-8.7724	57
Level 2	C5	749 G+Ey+0.3Q-NL Max	0	-25.9999	-0.1523	2.5373	-0.1339	5.4769	0.1912	749
Level 2	C5	749 G+Ey+0.3Q-NL Max	1.225	-25.8762	-0.1523	2.5373	-0.1339	2.2832	0.3777	749
Level 2	C5	749 G+Ey+0.3Q-NL Max	2.45	-25.7524	-0.1523	2.5373	-0.1339	-0.9487	0.5578	749
Level 2	C5	749 G+Ex+0.3Q-NL Max	0	65.9021	11.9759	-1.2294	-0.8525	-0.9067	9.2446	749
Level 2	C5	749 G+Ex+0.3Q-NL Max	1.225	66.2161	11.9759	-1.2294	-0.8525	0.5929	-4.5131	749
Level 2	C5	749 G+Ex+0.3Q-NL Max	2.45	66.53	11.9759	-1.2294	-0.8525	2.1847	-18.4643	749

TABLE: Concrete Beam Forces

Story	Beam	Unique Name	Load Case/Combo	Station	P	V2	V3	T	M2	M3	Element
				m	kN	kN	kN	kN-m	kN-m	kN-m	
Level 3	B92	764	G+Ey+0.3Q-NL Max	0.2	7.6697	-9.9744	-7.4697	3.531	39.1693	-8.255	764
Level 3	B92	764	G+Ey+0.3Q-NL Max	0.697	7.6697	-7.9293	-7.4697	3.531	42.8787	-3.8059	764
Level 3	B92	764	G+Ey+0.3Q-NL Max	1.194	7.6697	-5.8842	-7.4697	3.531	46.5893	-0.3734	764
Level 3	B92	764	G+Ey+0.3Q-NL Max	1.691	7.6697	-3.839	-7.4697	3.531	50.3014	2.0427	764
Level 3	B92	764	G+Ey+0.3Q-NL Max	2.188	7.6697	-1.7939	-7.4697	3.531	54.0151	3.4423	764
Level 3	B92	764	G+Ey+0.3Q-NL Max	2.685	7.6697	0.2512	-7.4697	3.531	57.7303	3.8256	764
Level 3	B92	764	G+Ex+0.3Q-NL Max	0.2	97.56	127.8552	-2.3371	-1.234	2.8166	170.1589	764
Level 3	B92	764	G+Ex+0.3Q-NL Max	0.697	97.56	133.0438	-2.3371	-1.234	4.0019	105.3831	764
Level 3	B92	764	G+Ex+0.3Q-NL Max	1.194	97.56	138.2325	-2.3371	-1.234	5.1889	38.0692	764
Level 3	B92	764	G+Ex+0.3Q-NL Max	1.691	97.56	143.4212	-2.3371	-1.234	6.3778	-31.7106	764
Level 3	B92	764	G+Ex+0.3Q-NL Max	2.188	97.56	148.6099	-2.3371	-1.234	7.5692	-103.9765	764
Level 3	B92	764	G+Ex+0.3Q-NL Max	2.685	97.56	153.7986	-2.3371	-1.234	8.7635	-178.8617	764
Level 3	B116	761	G+Ey+0.3Q-NL Max	0.2	-8.2757	5.8137	-5.6658	4.6657	39.6784	12.0844	761
Level 3	B116	761	G+Ey+0.3Q-NL Max	0.697	-8.2757	7.8589	-5.6658	4.6657	42.4976	8.6862	761
Level 3	B116	761	G+Ey+0.3Q-NL Max	1.194	-8.2757	9.904	-5.6658	4.6657	45.3153	4.2713	761
Level 3	B116	761	G+Ey+0.3Q-NL Max	1.691	-8.2757	11.9491	-5.6658	4.6657	48.1316	-1.1601	761
Level 3	B116	761	G+Ey+0.3Q-NL Max	2.188	-8.2757	13.9943	-5.6658	4.6657	50.9463	-7.6079	761
Level 3	B116	761	G+Ey+0.3Q-NL Max	2.685	-8.2757	16.0394	-5.6658	4.6657	53.7593	-15.0719	761
Level 3	B116	761	G+Ex+0.3Q-NL Max	0.2	104.7279	130.3951	11.1476	1.8923	2.5569	173.6835	761
Level 3	B116	761	G+Ex+0.3Q-NL Max	0.697	104.7279	135.5838	11.1476	1.8923	-2.9584	107.6488	761
Level 3	B116	761	G+Ex+0.3Q-NL Max	1.194	104.7279	140.7725	11.1476	1.8923	-8.4656	39.0785	761
Level 3	B116	761	G+Ex+0.3Q-NL Max	1.691	104.7279	145.9612	11.1476	1.8923	-13.9763	-31.9366	761
Level 3	B116	761	G+Ex+0.3Q-NL Max	2.188	104.7279	151.1499	11.1476	1.8923	-19.4928	-105.3119	761
Level 3	B116	761	G+Ex+0.3Q-NL Max	2.685	104.7279	156.3385	11.1476	1.8923	-25.0175	-181.3101	761
Level 3	B118	760	G+Ey+0.3Q-NL Max	0	-13.4682	-5.7905	-14.4902	-6.132	-9.7286	-4.6746	760
Level 3	B118	760	G+Ey+0.3Q-NL Max	0.4561	-13.4682	-5.1001	-14.4902	-6.132	-3.1035	-2.1897	760
Level 3	B118	760	G+Ey+0.3Q-NL Max	0.9122	-13.4682	-4.4098	-14.4902	-6.132	3.5218	-0.0197	760
Level 3	B118	760	G+Ey+0.3Q-NL Max	1.3683	-13.4682	-3.7195	-14.4902	-6.132	10.1469	1.8355	760
Level 3	B118	760	G+Ey+0.3Q-NL Max	1.8244	-13.4682	-3.0291	-14.4902	-6.132	16.7715	3.3757	760
Level 3	B118	760	G+Ey+0.3Q-NL Max	2.2806	-13.4682	-2.3388	-14.4902	-6.132	23.3954	4.6009	760

Level 3	B118	760 G+Ey+0.3Q-NL Max	2.7367	-13.4682	-1.6484	-14.4902	-6.132	30.0183	5.5112	760
Level 3	B118	760 G+Ey+0.3Q-NL Max	3.1928	-13.4682	-0.9581	-14.4902	-6.132	36.6398	6.1063	760
Level 3	B118	760 G+Ey+0.3Q-NL Max	3.6489	-13.4682	-0.2677	-14.4902	-6.132	43.2596	6.3863	760
Level 3	B118	760 G+Ey+0.3Q-NL Max	4.105	-13.4682	0.4226	-14.4902	-6.132	49.8775	6.3511	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	0	142.7814	-33.1965	-0.0318	1.5891	5.5051	-42.2565	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	0.4561	142.7814	-31.445	-0.0318	1.5891	5.5164	-27.5737	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	0.9122	142.7814	-29.6935	-0.0318	1.5891	5.5302	-13.7014	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	1.3683	142.7814	-27.9421	-0.0318	1.5891	5.5467	-0.6343	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	1.8244	142.7814	-26.1906	-0.0318	1.5891	5.5659	11.6327	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	2.2806	142.7814	-24.4391	-0.0318	1.5891	5.6171	23.1051	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	2.7367	142.7814	-22.6877	-0.0318	1.5891	5.6881	33.7879	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	3.1928	142.7814	-20.9362	-0.0318	1.5891	5.7618	43.6866	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	3.6489	142.7814	-19.1847	-0.0318	1.5891	5.8381	52.8063	760
Level 3	B118	760 G+Ex+0.3Q-NL Max	4.105	142.7814	-17.4333	-0.0318	1.5891	5.9172	61.1524	760
Level 3	B122	762 G+Ey+0.3Q-NL Max	0.2	-14.7475	-8.2116	18.2578	2.511	61.8201	-13.2655	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	0.6542	-14.7475	-7.5241	18.2578	2.511	53.5164	-9.6914	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	1.1085	-14.7475	-6.8366	18.2578	2.511	45.2102	-6.4291	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	1.5627	-14.7475	-6.1491	18.2578	2.511	36.9018	-3.4789	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	2.017	-14.7475	-5.4616	18.2578	2.511	28.5915	-0.8407	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	2.4712	-14.7475	-4.774	18.2578	2.511	20.2799	1.4853	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	2.9254	-14.7475	-4.0865	18.2578	2.511	11.9673	3.499	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	3.3797	-14.7475	-3.399	18.2578	2.511	3.654	5.2003	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	3.8339	-14.7475	-2.7115	18.2578	2.511	-4.6594	6.5891	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	4.2881	-14.7475	-2.024	18.2578	2.511	-12.9725	7.6653	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	4.7424	-14.7475	-1.3365	18.2578	2.511	-21.2851	8.4287	762-1
Level 3	B122	762 G+Ey+0.3Q-NL Max	4.7424	-14.7475	-1.3365	18.2578	2.511	-21.2851	8.4287	762-2
Level 3	B122	762 G+Ey+0.3Q-NL Max	4.775	-14.7475	-1.2871	18.2578	2.511	-21.882	8.4715	762-2
Level 3	B122	762 G+Ex+0.3Q-NL Max	0.2	347.535	-36.2588	-19.4707	9.8493	-22.1391	-79.3376	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	0.6542	347.535	-34.5145	-19.4707	9.8493	-13.3522	-63.3635	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	1.1085	347.535	-32.7702	-19.4707	9.8493	-4.5808	-48.2524	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	1.5627	347.535	-31.026	-19.4707	9.8493	4.1853	-33.9899	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	2.017	347.535	-29.2817	-19.4707	9.8493	12.9562	-20.5617	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	2.4712	347.535	-27.5374	-19.4707	9.8493	21.7422	-7.9534	762-1

Level 3	B122	762 G+Ex+0.3Q-NL Max	2.9254	347.535	-25.7931	-19.4707	9.8493	30.5782	3.8491	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	3.3797	347.535	-24.0489	-19.4707	9.8493	39.4529	14.8603	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	3.8339	347.535	-22.3046	-19.4707	9.8493	48.3787	25.0944	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	4.2881	347.535	-20.5603	-19.4707	9.8493	57.3601	34.5658	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	4.7424	347.535	-18.816	-19.4707	9.8493	66.4074	43.2887	762-1
Level 3	B122	762 G+Ex+0.3Q-NL Max	4.7424	347.535	-18.816	-19.4707	9.8493	66.4074	43.2887	762-2
Level 3	B122	762 G+Ex+0.3Q-NL Max	4.775	347.535	-18.6908	-19.4707	9.8493	67.0599	43.8867	762-2
Level 3	B279	763 G+Ey+0.3Q-NL Max	0	9.2873	-1.2019	-13.9696	-4.6922	-8.102	2.4034	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	0.4561	9.2873	-0.5116	-13.9696	-4.6922	-1.7415	2.7944	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	0.9122	9.2873	0.1787	-13.9696	-4.6922	4.619	2.8707	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	1.3683	9.2873	0.8691	-13.9696	-4.6922	10.9796	2.6321	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	1.8244	9.2873	1.5594	-13.9696	-4.6922	17.3405	2.0787	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	2.2806	9.2873	2.2498	-13.9696	-4.6922	23.702	1.2105	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	2.7367	9.2873	2.9401	-13.9696	-4.6922	30.0642	0.0274	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	3.1928	9.2873	3.6305	-13.9696	-4.6922	36.4273	-1.4706	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	3.6489	9.2873	4.3208	-13.9696	-4.6922	42.7916	-3.2835	763
Level 3	B279	763 G+Ey+0.3Q-NL Max	4.105	9.2873	5.0112	-13.9696	-4.6922	49.1572	-5.4114	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	0	156.3435	-33.714	4.6829	-0.1613	14.231	-44.6394	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	0.4561	156.3435	-31.9626	4.6829	-0.1613	12.0844	-29.7485	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	0.9122	156.3435	-30.2111	4.6829	-0.1613	9.9442	-15.6707	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	1.3683	156.3435	-28.4596	4.6829	-0.1613	7.8092	-2.3999	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	1.8244	156.3435	-26.7082	4.6829	-0.1613	5.689	10.0698	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	2.2806	156.3435	-24.9567	4.6829	-0.1613	3.6019	21.7444	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	2.7367	156.3435	-23.2052	4.6829	-0.1613	1.5166	32.6301	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	3.1928	156.3435	-21.4538	4.6829	-0.1613	-0.5679	42.7327	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	3.6489	156.3435	-19.7023	4.6829	-0.1613	-2.6527	52.0583	763
Level 3	B279	763 G+Ex+0.3Q-NL Max	4.105	156.3435	-17.9508	4.6829	-0.1613	-4.7389	60.6129	763
Level 3	B284	765 G+Ey+0.3Q-NL Max	0.2	37.8021	-6.6455	18.4574	2.8016	60.9986	-3.8296	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	0.6542	37.8021	-5.5981	18.4574	2.8016	52.6417	-1.0484	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	1.1085	37.8021	-4.5508	18.4574	2.8016	44.2914	1.2571	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	1.5627	37.8021	-3.5034	18.4574	2.8016	35.9467	3.0869	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	2.017	37.8021	-2.456	18.4574	2.8016	27.6064	4.4412	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	2.4712	37.8021	-1.4086	18.4574	2.8016	19.2697	5.32	765

Level 3	B284	765 G+Ey+0.3Q-NL Max	2.9254	37.8021	-0.3612	18.4574	2.8016	10.9353	5.7235	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	3.3797	37.8021	0.6861	18.4574	2.8016	2.6024	5.6517	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	3.8339	37.8021	1.7335	18.4574	2.8016	-5.7303	5.1047	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	4.2881	37.8021	2.7809	18.4574	2.8016	-14.0637	4.0827	765
Level 3	B284	765 G+Ey+0.3Q-NL Max	4.7424	37.8021	3.8283	18.4574	2.8016	-22.3988	2.5856	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	0.2	342.0479	-40.1213	5.059	-10.4236	-3.3968	-80.5176	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	0.6542	342.0479	-37.464	5.059	-10.4236	-5.643	-62.9927	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	1.1085	342.0479	-34.8067	5.059	-10.4236	-7.8955	-46.7427	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	1.5627	342.0479	-32.1494	5.059	-10.4236	-10.1569	-31.7537	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	2.017	342.0479	-29.4921	5.059	-10.4236	-12.4299	-18.0119	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	2.4712	342.0479	-26.8348	5.059	-10.4236	-14.7106	-5.5036	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	2.9254	342.0479	-24.1776	5.059	-10.4236	-16.979	5.7853	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	3.3797	342.0479	-21.5203	5.059	-10.4236	-19.2619	15.8684	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	3.8339	342.0479	-18.863	5.059	-10.4236	-21.5667	24.7597	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	4.2881	342.0479	-16.2057	5.059	-10.4236	-23.8959	32.473	765
Level 3	B284	765 G+Ex+0.3Q-NL Max	4.7424	342.0479	-13.5484	5.059	-10.4236	-26.2522	39.0221	765
Level 2	B90	402 G+Ey+0.3Q-NL Max	0.2	15.0922	-15.1009	-23.8751	22.0825	14.9392	-7.521	402-1
Level 2	B90	402 G+Ey+0.3Q-NL Max	0.6133	15.0922	-14.4753	-23.8751	22.0825	24.811	-1.4089	402-1
Level 2	B90	402 G+Ey+0.3Q-NL Max	1.0267	15.0922	-13.8497	-23.8751	22.0825	34.6838	4.4444	402-1
Level 2	B90	402 G+Ey+0.3Q-NL Max	1.44	15.0922	-13.2241	-23.8751	22.0825	44.5581	10.0394	402-1
Level 2	B90	402 G+Ey+0.3Q-NL Max	1.44	15.0929	1.3423	19.2609	22.0825	44.5581	10.0225	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	1.8945	15.0929	2.0302	19.2609	22.0825	35.8127	9.2563	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	2.349	15.0929	2.7181	19.2609	22.0825	27.0691	8.1781	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	2.8035	15.0929	3.406	19.2609	22.0825	18.3269	6.7876	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	3.258	15.0929	4.0939	19.2609	22.0825	9.5855	5.0848	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	3.7125	15.0929	4.7818	19.2609	22.0825	0.8447	3.0695	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	4.167	15.0929	5.4697	19.2609	22.0825	-7.8961	0.7417	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	4.6215	15.0929	6.1576	19.2609	22.0825	-16.6373	-1.8989	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	5.076	15.0929	6.8455	19.2609	22.0825	-25.3794	-4.8522	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	5.5305	15.0929	7.5334	19.2609	22.0825	-34.1227	-8.1184	402-2
Level 2	B90	402 G+Ey+0.3Q-NL Max	5.985	15.0929	8.2214	19.2609	22.0825	-42.8677	-11.6977	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	0.2	481.6347	-39.5316	-3.9239	1.2323	1.3854	-37.9565	402-1
Level 2	B90	402 G+Ex+0.3Q-NL Max	0.6133	481.6347	-37.9444	-3.9239	1.2323	3.0594	-22.1525	402-1

Level 2	B90	402 G+Ex+0.3Q-NL Max	1.0267	481.6347	-36.3572	-3.9239	1.2323	4.7376	-7.0342	402-1
Level 2	B90	402 G+Ex+0.3Q-NL Max	1.44	481.6347	-34.77	-3.9239	1.2323	6.4219	7.4185	402-1
Level 2	B90	402 G+Ex+0.3Q-NL Max	1.44	428.2167	2.243	10.458	1.2323	6.4219	7.3744	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	1.8945	428.2167	3.9883	10.458	1.2323	1.7568	5.734	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	2.349	428.2167	5.7335	10.458	1.2323	-2.9057	3.3135	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	2.8035	428.2167	7.4788	10.458	1.2323	-7.5722	0.1052	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	3.258	428.2167	9.2241	10.458	1.2323	-12.2495	-3.8522	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	3.7125	428.2167	10.9694	10.458	1.2323	-16.9442	-8.6113	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	4.167	428.2167	12.7147	10.458	1.2323	-21.6631	-14.1809	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	4.6215	428.2167	14.4599	10.458	1.2323	-26.4128	-20.5688	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	5.076	428.2167	16.2052	10.458	1.2323	-31.2001	-27.7824	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	5.5305	428.2167	17.9505	10.458	1.2323	-36.0316	-35.8294	402-2
Level 2	B90	402 G+Ex+0.3Q-NL Max	5.985	428.2167	19.6958	10.458	1.2323	-40.914	-44.7174	402-2
Level 2	B91	403 G+Ey+0.3Q-NL Max	0.3	12.7091	-6.937	-21.9461	-9.3553	-43.6426	-8.6155	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	0.7644	12.7091	-6.2341	-21.9461	-9.3553	-33.457	-5.5565	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	1.2289	12.7091	-5.5311	-21.9461	-9.3553	-23.273	-2.8242	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	1.6933	12.7091	-4.8281	-21.9461	-9.3553	-13.09	-0.4185	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	2.1578	12.7091	-4.1252	-21.9461	-9.3553	-2.9075	1.6606	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	2.6222	12.7091	-3.4222	-21.9461	-9.3553	7.2748	3.4133	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	3.0867	12.7091	-2.7193	-21.9461	-9.3553	17.4574	4.8396	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	3.5511	12.7091	-2.0163	-21.9461	-9.3553	27.6408	5.9396	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	4.0156	12.7091	-1.3133	-21.9461	-9.3553	37.8254	6.7133	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	4.48	12.7091	-0.6104	-21.9461	-9.3553	48.0117	7.161	403-1
Level 2	B91	403 G+Ey+0.3Q-NL Max	4.48	12.7099	13.3813	20.2693	-9.3553	48.0117	7.1815	403-2
Level 2	B91	403 G+Ey+0.3Q-NL Max	4.8933	12.7099	14.0069	20.2693	-9.3553	39.6298	1.5224	403-2
Level 2	B91	403 G+Ey+0.3Q-NL Max	5.3067	12.7099	14.6324	20.2693	-9.3553	31.2492	-4.3952	403-2
Level 2	B91	403 G+Ey+0.3Q-NL Max	5.72	12.7099	15.258	20.2693	-9.3553	22.8698	-10.5716	403-2
Level 2	B91	403 G+Ex+0.3Q-NL Max	0.3	259.6719	-11.9446	5.7282	-1.3317	16.3928	16.7312	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	0.7644	259.6719	-10.1611	5.7282	-1.3317	13.7057	21.5932	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	1.2289	259.6719	-8.3776	5.7282	-1.3317	11.031	25.6471	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	1.6933	259.6719	-6.5942	5.7282	-1.3317	8.3661	28.8944	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	2.1578	259.6719	-4.8107	5.7282	-1.3317	5.7089	31.3369	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	2.6222	259.6719	-3.0272	5.7282	-1.3317	3.109	32.9763	403-1

Level 2	B91	403 G+Ex+0.3Q-NL Max	3.0867	259.6719	-1.2438	5.7282	-1.3317	0.5323	33.8143	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	3.5511	259.6719	0.5397	5.7282	-1.3317	-2.0439	33.8895	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	4.0156	259.6719	2.3232	5.7282	-1.3317	-4.622	33.1792	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	4.48	259.6719	4.1066	5.7282	-1.3317	-7.2042	31.6729	403-1
Level 2	B91	403 G+Ex+0.3Q-NL Max	4.48	208.0234	39.7142	-10.2198	-1.3317	-7.2042	31.6756	403-2
Level 2	B91	403 G+Ex+0.3Q-NL Max	4.8933	208.0234	41.3014	-10.2198	-1.3317	-2.8577	14.9542	403-2
Level 2	B91	403 G+Ex+0.3Q-NL Max	5.3067	208.0234	42.8886	-10.2198	-1.3317	1.4872	-2.4148	403-2
Level 2	B91	403 G+Ex+0.3Q-NL Max	5.72	208.0234	44.4758	-10.2198	-1.3317	5.8329	-20.4413	403-2
Level 2	B92	406 G+Ey+0.3Q-NL Max	0.2	7.3029	-8.2355	0.6207	-21.3337	13.8865	-11.2183	406
Level 2	B92	406 G+Ey+0.3Q-NL Max	0.697	7.3029	-7.4833	0.6207	-21.3337	13.5779	-7.3121	406
Level 2	B92	406 G+Ey+0.3Q-NL Max	1.194	7.3029	-6.7311	0.6207	-21.3337	13.2696	-3.7799	406
Level 2	B92	406 G+Ey+0.3Q-NL Max	1.691	7.3029	-5.9788	0.6207	-21.3337	12.9618	-0.6217	406
Level 2	B92	406 G+Ey+0.3Q-NL Max	2.188	7.3029	-5.2266	0.6207	-21.3337	12.6543	2.1626	406
Level 2	B92	406 G+Ey+0.3Q-NL Max	2.685	7.3029	-4.4744	0.6207	-21.3337	12.3472	4.5732	406
Level 2	B92	406 G+Ex+0.3Q-NL Max	0.2	-147.5659	179.411	3.4316	0.1387	9.6276	218.3287	406
Level 2	B92	406 G+Ex+0.3Q-NL Max	0.697	-147.5659	181.3195	3.4316	0.1387	7.9163	128.5931	406
Level 2	B92	406 G+Ex+0.3Q-NL Max	1.194	-147.5659	183.2279	3.4316	0.1387	6.2004	37.8338	406
Level 2	B92	406 G+Ex+0.3Q-NL Max	1.691	-147.5659	185.1364	3.4316	0.1387	4.4808	-53.7434	406
Level 2	B92	406 G+Ex+0.3Q-NL Max	2.188	-147.5659	187.0449	3.4316	0.1387	2.7586	-146.0177	406
Level 2	B92	406 G+Ex+0.3Q-NL Max	2.685	-147.5659	188.9534	3.4316	0.1387	1.0348	-239.1521	406
Level 2	B116	475 G+Ey+0.3Q-NL Max	0.2	21.6543	9.1433	-4.6989	-21.4696	2.1632	10.29	475
Level 2	B116	475 G+Ey+0.3Q-NL Max	0.697	21.6543	9.8955	-4.6989	-21.4696	4.4976	5.5609	475
Level 2	B116	475 G+Ey+0.3Q-NL Max	1.194	21.6543	10.6477	-4.6989	-21.4696	6.8323	0.4585	475
Level 2	B116	475 G+Ey+0.3Q-NL Max	1.691	21.6543	11.4	-4.6989	-21.4696	9.1676	-5.0179	475
Level 2	B116	475 G+Ey+0.3Q-NL Max	2.188	21.6543	12.1522	-4.6989	-21.4696	11.5036	-10.8685	475
Level 2	B116	475 G+Ey+0.3Q-NL Max	2.685	21.6543	12.9044	-4.6989	-21.4696	13.8407	-17.094	475
Level 2	B116	475 G+Ex+0.3Q-NL Max	0.2	-144.4067	182.0935	1.1711	1.0253	0.8384	222.1087	475
Level 2	B116	475 G+Ex+0.3Q-NL Max	0.697	-144.4067	184.002	1.1711	1.0253	0.245	131.0409	475
Level 2	B116	475 G+Ex+0.3Q-NL Max	1.194	-144.4067	185.9104	1.1711	1.0253	-0.3485	38.9496	475
Level 2	B116	475 G+Ex+0.3Q-NL Max	1.691	-144.4067	187.8189	1.1711	1.0253	-0.9418	-53.9118	475
Level 2	B116	475 G+Ex+0.3Q-NL Max	2.188	-144.4067	189.7274	1.1711	1.0253	-1.5346	-147.3302	475
Level 2	B116	475 G+Ex+0.3Q-NL Max	2.685	-144.4067	191.6359	1.1711	1.0253	-2.1265	-241.6104	475
Level 2	B194	758 G+Ey+0.3Q-NL Max	0.2	12.5411	118.7365	7.4975	0.0859	12.1623	187.3469	758

Level 2	B194	758 G+Ey+0.3Q-NL Max	0.6414	12.5411	119.4047	7.4975	0.0859	8.8523	134.777	758
Level 2	B194	758 G+Ey+0.3Q-NL Max	1.0829	12.5411	120.0728	7.4975	0.0859	5.5428	81.9175	758
Level 2	B194	758 G+Ey+0.3Q-NL Max	1.5243	12.5411	120.7409	7.4975	0.0859	2.2334	28.7663	758
Level 2	B194	758 G+Ey+0.3Q-NL Max	1.9657	12.5411	121.409	7.4975	0.0859	-1.0758	-24.6787	758
Level 2	B194	758 G+Ey+0.3Q-NL Max	2.4071	12.5411	122.0771	7.4975	0.0859	-4.3851	-78.4197	758
Level 2	B194	758 G+Ey+0.3Q-NL Max	2.8486	12.5411	122.7453	7.4975	0.0859	-7.6946	-132.4587	758
Level 2	B194	758 G+Ey+0.3Q-NL Max	3.29	12.5411	123.4134	7.4975	0.0859	-11.0044	-186.7978	758
Level 2	B194	758 G+Ex+0.3Q-NL Max	0.2	17.7169	-3.0737	-3.2611	0.2791	-2.5892	4.5733	758
Level 2	B194	758 G+Ex+0.3Q-NL Max	0.6414	17.7169	-1.3787	-3.2611	0.2791	-1.1497	5.5563	758
Level 2	B194	758 G+Ex+0.3Q-NL Max	1.0829	17.7169	0.3164	-3.2611	0.2791	0.2898	5.7913	758
Level 2	B194	758 G+Ex+0.3Q-NL Max	1.5243	17.7169	2.0115	-3.2611	0.2791	1.7293	5.2784	758
Level 2	B194	758 G+Ex+0.3Q-NL Max	1.9657	17.7169	3.7066	-3.2611	0.2791	3.5921	4.1109	758
Level 2	B194	758 G+Ex+0.3Q-NL Max	2.4071	17.7169	5.4017	-3.2611	0.2791	5.8145	2.2693	758
Level 2	B194	758 G+Ex+0.3Q-NL Max	2.8486	17.7169	7.0968	-3.2611	0.2791	8.0372	-0.3205	758
Level 2	B194	758 G+Ex+0.3Q-NL Max	3.29	17.7169	8.7919	-3.2611	0.2791	10.2604	-3.6586	758
Level 2	B114	957 G+Ey+0.3Q-NL Max	0.3	16.3137	-10.4635	-22.1995	-8.3047	-40.3463	-17.2281	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	0.7644	16.3137	-9.7606	-22.1995	-8.3047	-30.0458	-12.5323	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	1.2289	16.3137	-9.0576	-22.1995	-8.3047	-19.7471	-8.1637	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	1.6933	16.3137	-8.3546	-22.1995	-8.3047	-9.4494	-4.1221	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	2.1578	16.3137	-7.6517	-22.1995	-8.3047	0.8477	-0.4072	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	2.6222	16.3137	-6.9487	-22.1995	-8.3047	11.1448	2.9811	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	3.0867	16.3137	-6.2458	-22.1995	-8.3047	21.4426	6.043	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	3.5511	16.3137	-5.5428	-22.1995	-8.3047	31.7416	8.7787	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	4.0156	16.3137	-4.8399	-22.1995	-8.3047	42.0424	11.1884	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	4.48	16.3137	-4.1369	-22.1995	-8.3047	52.3456	13.2723	957-1
Level 2	B114	957 G+Ey+0.3Q-NL Max	4.48	16.312	9.3927	33.3625	-8.3047	52.3456	13.2806	957-2
Level 2	B114	957 G+Ey+0.3Q-NL Max	4.8933	16.312	10.0183	33.3625	-8.3047	38.5518	9.2691	957-2
Level 2	B114	957 G+Ey+0.3Q-NL Max	5.3067	16.312	10.6439	33.3625	-8.3047	24.7598	4.9994	957-2
Level 2	B114	957 G+Ey+0.3Q-NL Max	5.72	16.312	11.2695	33.3625	-8.3047	10.9688	0.4714	957-2
Level 2	B114	957 G+Ex+0.3Q-NL Max	0.3	279.1419	-11.3685	-2.4952	1.1119	0.4657	18.8396	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	0.7644	279.1419	-9.585	-2.4952	1.1119	1.5952	23.4017	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	1.2289	279.1419	-7.8015	-2.4952	1.1119	2.7263	27.159	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	1.6933	279.1419	-6.0181	-2.4952	1.1119	3.8601	30.1132	957-1

Level 2	B114	957 G+Ex+0.3Q-NL Max	2.1578	279.1419	-4.2346	-2.4952	1.1119	4.9976	32.2657	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	2.6222	279.1419	-2.4511	-2.4952	1.1119	6.1399	33.6181	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	3.0867	279.1419	-0.6677	-2.4952	1.1119	7.363	34.172	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	3.5511	279.1419	1.1158	-2.4952	1.1119	8.6101	34.0152	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	4.0156	279.1419	2.8993	-2.4952	1.1119	9.8654	33.091	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	4.48	279.1419	4.6827	-2.4952	1.1119	11.1302	31.373	957-1
Level 2	B114	957 G+Ex+0.3Q-NL Max	4.48	230.626	39.0215	15.0095	1.1119	11.1302	31.3969	957-2
Level 2	B114	957 G+Ex+0.3Q-NL Max	4.8933	230.626	40.6087	15.0095	1.1119	5.0467	15.0133	957-2
Level 2	B114	957 G+Ex+0.3Q-NL Max	5.3067	230.626	42.1959	15.0095	1.1119	-1.0336	-2.017	957-2
Level 2	B114	957 G+Ex+0.3Q-NL Max	5.72	230.626	43.7831	15.0095	1.1119	-7.1146	-19.7048	957-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	0.2	19.6016	-17.682	-29.9381	20.7589	14.5832	-17.3113	950-1
Level 2	B115	950 G+Ey+0.3Q-NL Max	0.6133	19.6016	-17.0564	-29.9381	20.7589	26.9604	-10.1332	950-1
Level 2	B115	950 G+Ey+0.3Q-NL Max	1.0267	19.6016	-16.4308	-29.9381	20.7589	39.339	-3.2142	950-1
Level 2	B115	950 G+Ey+0.3Q-NL Max	1.44	19.6016	-15.8052	-29.9381	20.7589	51.7198	3.4461	950-1
Level 2	B115	950 G+Ey+0.3Q-NL Max	1.44	19.6002	-2.0686	20.1215	20.7589	51.7198	3.436	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	1.8945	19.6002	-1.3807	20.1215	20.7589	42.5848	4.2181	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	2.349	19.6002	-0.6928	20.1215	20.7589	33.4526	4.688	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	2.8035	19.6002	-0.0049	20.1215	20.7589	24.3226	4.8455	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	3.258	19.6002	0.683	20.1215	20.7589	15.1942	4.6906	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	3.7125	19.6002	1.3709	20.1215	20.7589	6.0667	4.2233	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	4.167	19.6002	2.0589	20.1215	20.7589	-3.0604	3.4436	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	4.6215	19.6002	2.7468	20.1215	20.7589	-12.1876	2.3513	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	5.076	19.6002	3.4347	20.1215	20.7589	-21.3157	0.9465	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	5.5305	19.6002	4.1226	20.1215	20.7589	-30.4451	-0.7709	950-2
Level 2	B115	950 G+Ey+0.3Q-NL Max	5.985	19.6002	4.8105	20.1215	20.7589	-39.5765	-2.801	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	0.2	510.4061	-36.7094	16.638	-1.436	-0.4752	-34.9935	950-1
Level 2	B115	950 G+Ex+0.3Q-NL Max	0.6133	510.4061	-35.1222	16.638	-1.436	-7.3264	-20.365	950-1
Level 2	B115	950 G+Ex+0.3Q-NL Max	1.0267	510.4061	-33.535	16.638	-1.436	-14.1878	-6.4214	950-1
Level 2	B115	950 G+Ex+0.3Q-NL Max	1.44	510.4061	-31.9478	16.638	-1.436	-21.0691	6.8569	950-1
Level 2	B115	950 G+Ex+0.3Q-NL Max	1.44	461.1307	2.74	-15.4552	-1.436	-21.0691	6.7846	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	1.8945	461.1307	4.4853	-15.4552	-1.436	-14.0536	4.9069	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	2.349	461.1307	6.2306	-15.4552	-1.436	-7.0596	2.2489	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	2.8035	461.1307	7.9759	-15.4552	-1.436	-0.0766	-1.198	950-2

Level 2	B115	950 G+Ex+0.3Q-NL Max	3.258	461.1307	9.7211	-15.4552	-1.436	6.9064	-5.4397	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	3.7125	461.1307	11.4664	-15.4552	-1.436	13.9	-10.4689	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	4.167	461.1307	13.2117	-15.4552	-1.436	20.9149	-16.3129	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	4.6215	461.1307	14.957	-15.4552	-1.436	27.962	-22.9805	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	5.076	461.1307	16.7023	-15.4552	-1.436	35.0518	-30.4803	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	5.5305	461.1307	18.4475	-15.4552	-1.436	42.1952	-38.8208	950-2
Level 2	B115	950 G+Ex+0.3Q-NL Max	5.985	461.1307	20.1928	-15.4552	-1.436	49.4029	-48.0108	950-2
Level 1	B17	725 G+Ey+0.3Q-NL Max	0.3	87.6403	-9.8241	0.0341	-0.0136	0.3327	38.2944	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	0.7782	87.6403	-4.3575	0.0341	-0.0136	0.3153	41.6853	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	1.2564	87.6403	1.1091	0.0341	-0.0136	0.298	42.469	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	1.7346	87.6403	6.5757	0.0341	-0.0136	0.2807	40.644	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	2.2129	87.6403	12.0424	0.0341	-0.0136	0.2635	36.2087	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	2.6911	87.6403	17.509	0.0341	-0.0136	0.2462	29.1617	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	3.1693	87.6403	22.9756	0.0341	-0.0136	0.229	19.5015	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	3.6475	87.6403	28.4422	0.0341	-0.0136	0.2118	7.2265	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	4.1257	87.6403	33.9088	0.0341	-0.0136	0.1946	-7.6647	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	4.6039	87.6403	39.3755	0.0341	-0.0136	0.1774	-25.1735	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	5.0821	87.6403	44.8421	0.0341	-0.0136	0.1603	-45.3016	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	5.5604	87.6403	50.3087	0.0341	-0.0136	0.1431	-68.0503	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	6.0386	87.6403	55.7753	0.0341	-0.0136	0.126	-93.4213	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	6.5168	87.6403	61.2419	0.0341	-0.0136	0.1089	-121.4159	725
Level 1	B17	725 G+Ey+0.3Q-NL Max	6.995	87.6403	66.7086	0.0341	-0.0136	0.0918	-152.0357	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	0.3	-587.0227	-81.8427	1.6371	0.3621	-2.6969	-32.3781	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	0.7782	-587.0227	-67.9734	1.6371	0.3621	-3.5606	3.4219	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	1.2564	-587.0227	-54.1041	1.6371	0.3621	-4.4223	32.5462	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	1.7346	-587.0227	-40.2348	1.6371	0.3621	-5.2817	55.0004	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	2.2129	-587.0227	-26.3655	1.6371	0.3621	-6.1383	70.7969	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	2.6911	-587.0227	-12.4962	1.6371	0.3621	-6.9918	79.9672	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	3.1693	-587.0227	1.3731	1.6371	0.3621	-7.8416	82.4833	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	3.6475	-587.0227	15.2424	1.6371	0.3621	-8.6873	78.3508	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	4.1257	-587.0227	29.1117	1.6371	0.3621	-9.5285	67.5753	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	4.6039	-587.0227	42.981	1.6371	0.3621	-10.3648	50.1624	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	5.0821	-587.0227	56.8504	1.6371	0.3621	-10.7196	26.1177	725

Level 1	B17	725 G+Ex+0.3Q-NL Max	5.5604	-587.0227	70.7197	1.6371	0.3621	-10.8845	-4.5532	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	6.0386	-587.0227	84.589	1.6371	0.3621	-11.0438	-41.8448	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	6.5168	-587.0227	98.4583	1.6371	0.3621	-11.1975	-85.7515	725
Level 1	B17	725 G+Ex+0.3Q-NL Max	6.995	-587.0227	112.3276	1.6371	0.3621	-11.3454	-136.2676	725
Level 1	B44	161 G+Ey+0.3Q-NL Max	0.2	-39.7123	-11.0012	-0.2459	-1.6558	-1.1116	-7.36	161-1
Level 1	B44	161 G+Ey+0.3Q-NL Max	0.475	-39.7123	-10.3769	-0.2459	-1.6558	-1.0438	-4.4181	161-1
Level 1	B44	161 G+Ey+0.3Q-NL Max	0.75	-39.7123	-9.7526	-0.2459	-1.6558	-0.976	-1.6479	161-1
Level 1	B44	161 G+Ey+0.3Q-NL Max	0.75	-39.0458	-9.9835	-0.4583	-1.8052	-0.9303	-1.5565	161-2
Level 1	B44	161 G+Ey+0.3Q-NL Max	1.125	-39.0458	-9.1321	-0.4583	-1.8052	-0.7582	2.031	161-2
Level 1	B44	161 G+Ey+0.3Q-NL Max	1.5	-39.0458	-8.2807	-0.4583	-1.8052	-0.5861	5.2991	161-2
Level 1	B44	161 G+Ey+0.3Q-NL Max	1.5	-37.2251	-6.8922	-0.3416	-2.4228	-0.5411	5.3521	161-3
Level 1	B44	161 G+Ey+0.3Q-NL Max	1.875	-37.2251	-6.0408	-0.3416	-2.4228	-0.4126	7.78	161-3
Level 1	B44	161 G+Ey+0.3Q-NL Max	2.25	-37.2251	-5.1894	-0.3416	-2.4228	-0.2842	9.8884	161-3
Level 1	B44	161 G+Ey+0.3Q-NL Max	2.25	-34.4285	-3.2084	-0.0506	-3.4466	-0.1035	9.9154	161-4
Level 1	B44	161 G+Ey+0.3Q-NL Max	2.625	-34.4285	-2.357	-0.0506	-3.4466	-0.0841	10.9612	161-4
Level 1	B44	161 G+Ey+0.3Q-NL Max	3	-34.4285	-1.5056	-0.0506	-3.4466	-0.0648	11.6875	161-4
Level 1	B44	161 G+Ey+0.3Q-NL Max	3	-31.5402	0.6593	0.0721	-4.7202	0.2531	11.689	161-5
Level 1	B44	161 G+Ey+0.3Q-NL Max	3.375	-31.5402	1.5106	0.0721	-4.7202	0.2264	11.2838	161-5
Level 1	B44	161 G+Ey+0.3Q-NL Max	3.75	-31.5402	2.362	0.0721	-4.7202	0.1996	10.559	161-5
Level 1	B44	161 G+Ey+0.3Q-NL Max	3.75	-28.8932	4.5943	-0.0762	-6.1823	0.5115	10.5344	161-6
Level 1	B44	161 G+Ey+0.3Q-NL Max	4.125	-28.8932	5.4456	-0.0762	-6.1823	0.5404	8.653	161-6
Level 1	B44	161 G+Ey+0.3Q-NL Max	4.5	-28.8932	6.297	-0.0762	-6.1823	0.5692	6.4522	161-6
Level 1	B44	161 G+Ey+0.3Q-NL Max	4.5	-27.1432	8.62	-0.2977	-7.8614	0.7649	6.4011	161-7
Level 1	B44	161 G+Ey+0.3Q-NL Max	4.875	-27.1432	9.4714	-0.2977	-7.8614	0.8767	3.0097	161-7
Level 1	B44	161 G+Ey+0.3Q-NL Max	5.25	-27.1432	10.3227	-0.2977	-7.8614	0.9885	-0.701	161-7
Level 1	B44	161 G+Ey+0.3Q-NL Max	5.25	-27.0939	12.7629	-0.236	-9.7438	1.1096	-0.7812	161-8
Level 1	B44	161 G+Ey+0.3Q-NL Max	5.72	-27.0939	13.8299	-0.236	-9.7438	1.2207	-7.0297	161-8
Level 1	B44	161 G+Ex+0.3Q-NL Max	0.2	-27.3707	-14.4662	0.0872	5.9711	0.8352	37.5826	161-1
Level 1	B44	161 G+Ex+0.3Q-NL Max	0.475	-27.3707	-12.8822	0.0872	5.9711	0.81	41.3536	161-1
Level 1	B44	161 G+Ex+0.3Q-NL Max	0.75	-27.3707	-11.2982	0.0872	5.9711	0.7848	44.6885	161-1
Level 1	B44	161 G+Ex+0.3Q-NL Max	0.75	-14.6432	-14.8705	0.4731	6.9766	0.9012	44.8656	161-2
Level 1	B44	161 G+Ex+0.3Q-NL Max	1.125	-14.6432	-12.7105	0.4731	6.9766	0.7228	50.0447	161-2
Level 1	B44	161 G+Ex+0.3Q-NL Max	1.5	-14.6432	-10.5505	0.4731	6.9766	0.5443	54.4131	161-2

Level 1	B44	161 G+Ex+0.3Q-NL Max	1.5	-0.8972	-8.4653	0.3578	7.1019	0.6515	54.4659	161-3
Level 1	B44	161 G+Ex+0.3Q-NL Max	1.875	-0.8972	-6.3053	0.3578	7.1019	0.5173	57.2356	161-3
Level 1	B44	161 G+Ex+0.3Q-NL Max	2.25	-0.8972	-4.1453	0.3578	7.1019	0.383	59.1953	161-3
Level 1	B44	161 G+Ex+0.3Q-NL Max	2.25	13.4767	-0.1829	0.5098	6.37	0.373	59.1921	161-4
Level 1	B44	161 G+Ex+0.3Q-NL Max	2.625	13.4767	1.9771	0.5098	6.37	0.3751	58.8538	161-4
Level 1	B44	161 G+Ex+0.3Q-NL Max	3	13.4767	4.1371	0.5098	6.37	0.3772	57.7561	161-4
Level 1	B44	161 G+Ex+0.3Q-NL Max	3	24.3774	8.593	-0.0759	5.2529	0.9161	57.7042	161-5
Level 1	B44	161 G+Ex+0.3Q-NL Max	3.375	24.3774	10.753	-0.0759	5.2529	0.9457	54.1479	161-5
Level 1	B44	161 G+Ex+0.3Q-NL Max	3.75	24.3774	12.913	-0.0759	5.2529	0.9754	49.7825	161-5
Level 1	B44	161 G+Ex+0.3Q-NL Max	3.75	41.263	17.5341	-0.5963	3.9587	1.6503	49.6812	161-6
Level 1	B44	161 G+Ex+0.3Q-NL Max	4.125	41.263	19.6941	-0.5963	3.9587	2.1184	42.7798	161-6
Level 1	B44	161 G+Ex+0.3Q-NL Max	4.5	41.263	21.8541	-0.5963	3.9587	2.5866	35.0695	161-6
Level 1	B44	161 G+Ex+0.3Q-NL Max	4.5	46.3691	26.7331	-0.1306	2.4994	2.7037	34.9203	161-7
Level 1	B44	161 G+Ex+0.3Q-NL Max	4.875	46.3691	28.8931	-0.1306	2.4994	3.4196	24.5743	161-7
Level 1	B44	161 G+Ex+0.3Q-NL Max	5.25	46.3691	31.0531	-0.1306	2.4994	4.1358	13.4191	161-7
Level 1	B44	161 G+Ex+0.3Q-NL Max	5.25	52.2372	36.3255	0.0959	0.9979	4.1771	13.217	161-8
Level 1	B44	161 G+Ex+0.3Q-NL Max	5.72	52.2372	39.0327	0.0959	0.9979	4.5839	-4.3826	161-8
Level 1	B48	421 G+Ey+0.3Q-NL Max	0.3	-22.0085	-5.6884	0.0767	4.4609	0.3064	-5.9901	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	0.7927	-22.0085	-4.7562	0.0767	4.4609	0.2689	-3.4169	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	1.2855	-22.0085	-3.824	0.0767	4.4609	0.2313	-1.303	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	1.7782	-22.0085	-2.8918	0.0767	4.4609	0.1937	0.3517	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	2.2709	-22.0085	-1.9596	0.0767	4.4609	0.1561	1.5471	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	2.7636	-22.0085	-1.0274	0.0767	4.4609	0.1185	2.2832	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	3.2564	-22.0085	-0.0952	0.0767	4.4609	0.0809	2.56	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	3.7491	-22.0085	0.837	0.0767	4.4609	0.0432	2.3775	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	4.2418	-22.0085	1.7692	0.0767	4.4609	0.0056	1.7356	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	4.7345	-22.0085	2.7014	0.0767	4.4609	-0.032	0.6344	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	5.2273	-22.0085	3.6336	0.0767	4.4609	-0.0696	-0.9261	421
Level 1	B48	421 G+Ey+0.3Q-NL Max	5.72	-22.0085	4.5658	0.0767	4.4609	-0.1073	-2.9461	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	0.3	156.5815	9.5053	-1.8763	-2.2138	-7.3593	84.699	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	0.7927	156.5815	11.8704	-1.8763	-2.2138	-6.4188	79.3564	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	1.2855	156.5815	14.2355	-1.8763	-2.2138	-5.4811	72.8717	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	1.7782	156.5815	16.6005	-1.8763	-2.2138	-4.5457	65.2419	421

Level 1	B48	421 G+Ex+0.3Q-NL Max	2.2709	156.5815	18.9656	-1.8763	-2.2138	-3.6123	56.4639	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	2.7636	156.5815	21.3307	-1.8763	-2.2138	-2.6805	46.5346	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	3.2564	156.5815	23.6958	-1.8763	-2.2138	-1.7499	35.451	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	3.7491	156.5815	26.0609	-1.8763	-2.2138	-0.4843	23.2522	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	4.2418	156.5815	28.426	-1.8763	-2.2138	0.8927	9.9253	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	4.7345	156.5815	30.7911	-1.8763	-2.2138	2.2702	-4.5647	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	5.2273	156.5815	33.1562	-1.8763	-2.2138	3.6487	-20.2214	421
Level 1	B48	421 G+Ex+0.3Q-NL Max	5.72	156.5815	35.5213	-1.8763	-2.2138	5.029	-37.0481	421
Level 1	B90	405 G+Ey+0.3Q-NL Max	0.2	32.4754	-3.5926	0.2389	0.7276	1.3881	-1.2171	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	0.6821	32.4754	-2.8629	0.2389	0.7276	1.2727	0.3396	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	1.1642	32.4754	-2.1333	0.2389	0.7276	1.1574	1.5448	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	1.6463	32.4754	-1.4036	0.2389	0.7276	1.0423	2.3985	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	2.1283	32.4754	-0.674	0.2389	0.7276	0.9273	2.9007	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	2.6104	32.4754	0.0557	0.2389	0.7276	0.8124	3.0512	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	3.0925	32.4754	0.7854	0.2389	0.7276	0.6976	2.8501	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	3.5746	32.4754	1.515	0.2389	0.7276	0.5829	2.2972	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	4.0567	32.4754	2.2447	0.2389	0.7276	0.4683	1.3927	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	4.5388	32.4754	2.9743	0.2389	0.7276	0.3537	0.1363	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	5.0208	32.4754	3.704	0.2389	0.7276	0.2392	-1.4719	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	5.5029	32.4754	4.4336	0.2389	0.7276	0.1247	-3.432	405
Level 1	B90	405 G+Ey+0.3Q-NL Max	5.985	32.4754	5.1633	0.2389	0.7276	0.0102	-5.744	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	0.2	214.4782	-16.2444	0.4212	-2.4113	-0.6358	-37.5597	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	0.6821	214.4782	-14.3932	0.4212	-2.4113	-0.8283	-30.2218	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	1.1642	214.4782	-12.542	0.4212	-2.4113	-1.0214	-23.7941	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	1.6463	214.4782	-10.6908	0.4212	-2.4113	-1.2152	-18.275	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	2.1283	214.4782	-8.8396	0.4212	-2.4113	-1.1073	-13.6627	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	2.6104	214.4782	-6.9884	0.4212	-2.4113	-0.1259	-9.9557	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	3.0925	214.4782	-5.1372	0.4212	-2.4113	0.8555	-7.1521	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	3.5746	214.4782	-3.286	0.4212	-2.4113	1.8375	-5.2504	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	4.0567	214.4782	-1.4348	0.4212	-2.4113	2.8209	-4.2489	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	4.5388	214.4782	0.4164	0.4212	-2.4113	3.8067	-4.146	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	5.0208	214.4782	2.2676	0.4212	-2.4113	4.7955	-4.9399	405
Level 1	B90	405 G+Ex+0.3Q-NL Max	5.5029	214.4782	4.1188	0.4212	-2.4113	5.7881	-6.6289	405

Level 1	B90	405 G+Ex+0.3Q-NL Max	5.985	214.4782	5.97	0.4212	-2.4113	6.7854	-9.2115	405
Level 1	B91	404 G+Ey+0.3Q-NL Max	0.3	33.2439	-2.899	0.0446	-0.2794	0.2999	0.1534	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	0.7927	33.2439	-2.1532	0.0446	-0.2794	0.2777	1.3987	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	1.2855	33.2439	-1.4075	0.0446	-0.2794	0.2555	2.2769	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	1.7782	33.2439	-0.6617	0.0446	-0.2794	0.2333	2.788	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	2.2709	33.2439	0.0841	0.0446	-0.2794	0.2112	2.9318	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	2.7636	33.2439	0.8298	0.0446	-0.2794	0.1891	2.7083	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	3.2564	33.2439	1.5756	0.0446	-0.2794	0.167	2.1175	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	3.7491	33.2439	2.3213	0.0446	-0.2794	0.145	1.1591	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	4.2418	33.2439	3.0671	0.0446	-0.2794	0.1229	-0.1668	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	4.7345	33.2439	3.8129	0.0446	-0.2794	0.1009	-1.8602	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	5.2273	33.2439	4.5586	0.0446	-0.2794	0.0789	-3.9214	404
Level 1	B91	404 G+Ey+0.3Q-NL Max	5.72	33.2439	5.3044	0.0446	-0.2794	0.0569	-6.3503	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	0.3	147.6583	-15.6601	-0.2186	-0.204	-0.3627	-8.7095	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	0.7927	147.6583	-13.768	-0.2186	-0.204	-0.2519	-1.5695	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	1.2855	147.6583	-11.8759	-0.2186	-0.204	-0.1412	4.6392	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	1.7782	147.6583	-9.9838	-0.2186	-0.204	-0.0306	9.918	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	2.2709	147.6583	-8.0918	-0.2186	-0.204	0.4443	14.2685	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	2.7636	147.6583	-6.1997	-0.2186	-0.204	1.2783	17.692	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	3.2564	147.6583	-4.3076	-0.2186	-0.204	2.113	20.19	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	3.7491	147.6583	-2.4155	-0.2186	-0.204	2.9489	21.7639	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	4.2418	147.6583	-0.5235	-0.2186	-0.204	3.7865	22.4152	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	4.7345	147.6583	1.3686	-0.2186	-0.204	4.6261	22.1453	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	5.2273	147.6583	3.2607	-0.2186	-0.204	5.4683	20.9556	404
Level 1	B91	404 G+Ex+0.3Q-NL Max	5.72	147.6583	5.1527	-0.2186	-0.204	6.3136	18.8476	404
Level 1	B92	407 G+Ey+0.3Q-NL Max	0.2	27.3203	-3.9192	1.2186	3.1461	0.9698	-3.5613	407
Level 1	B92	407 G+Ey+0.3Q-NL Max	0.697	27.3203	-3.167	1.2186	3.1461	0.3642	-1.8001	407
Level 1	B92	407 G+Ey+0.3Q-NL Max	1.194	27.3203	-2.4148	1.2186	3.1461	-0.2413	-0.413	407
Level 1	B92	407 G+Ey+0.3Q-NL Max	1.691	27.3203	-1.6625	1.2186	3.1461	-0.8469	0.6001	407
Level 1	B92	407 G+Ey+0.3Q-NL Max	2.188	27.3203	-0.9103	1.2186	3.1461	-1.4525	1.2394	407
Level 1	B92	407 G+Ey+0.3Q-NL Max	2.685	27.3203	-0.1581	1.2186	3.1461	-2.0583	1.505	407
Level 1	B92	407 G+Ex+0.3Q-NL Max	0.2	-33.522	154.5066	-3.0484	3.1828	-2.6691	195.9193	407
Level 1	B92	407 G+Ex+0.3Q-NL Max	0.697	-33.522	156.4151	-3.0484	3.1828	-1.1552	118.6358	407

Level 1	B92	407 G+Ex+0.3Q-NL Max	1.194	-33.522	158.3236	-3.0484	3.1828	0.3589	40.3881	407
Level 1	B92	407 G+Ex+0.3Q-NL Max	1.691	-33.522	160.2321	-3.0484	3.1828	1.873	-38.5635	407
Level 1	B92	407 G+Ex+0.3Q-NL Max	2.188	-33.522	162.1405	-3.0484	3.1828	5.6564	-118.2122	407
Level 1	B92	407 G+Ex+0.3Q-NL Max	2.685	-33.522	164.049	-3.0484	3.1828	10.5539	-198.7871	407
Level 1	B116	476 G+Ey+0.3Q-NL Max	0.2	-30.053	7.1422	0.3236	2.0802	0.5351	10.4428	476
Level 1	B116	476 G+Ey+0.3Q-NL Max	0.697	-30.053	7.8944	0.3236	2.0802	0.3742	6.7042	476
Level 1	B116	476 G+Ey+0.3Q-NL Max	1.194	-30.053	8.6466	0.3236	2.0802	0.2134	2.5909	476
Level 1	B116	476 G+Ey+0.3Q-NL Max	1.691	-30.053	9.3989	0.3236	2.0802	0.0525	-1.8964	476
Level 1	B116	476 G+Ey+0.3Q-NL Max	2.188	-30.053	10.1511	0.3236	2.0802	-0.1084	-6.7574	476
Level 1	B116	476 G+Ey+0.3Q-NL Max	2.685	-30.053	10.9033	0.3236	2.0802	-0.2693	-11.9914	476
Level 1	B116	476 G+Ex+0.3Q-NL Max	0.2	-0.4447	155.3362	7.9198	-2.4998	14.3627	197.2213	476
Level 1	B116	476 G+Ex+0.3Q-NL Max	0.697	-0.4447	157.2447	7.9198	-2.4998	10.4265	119.5447	476
Level 1	B116	476 G+Ex+0.3Q-NL Max	1.194	-0.4447	159.1532	7.9198	-2.4998	6.4904	40.9194	476
Level 1	B116	476 G+Ex+0.3Q-NL Max	1.691	-0.4447	161.0616	7.9198	-2.4998	2.5542	-38.3632	476
Level 1	B116	476 G+Ex+0.3Q-NL Max	2.188	-0.4447	162.9701	7.9198	-2.4998	-0.1429	-118.199	476
Level 1	B116	476 G+Ex+0.3Q-NL Max	2.685	-0.4447	164.8786	7.9198	-2.4998	-0.7782	-198.9784	476
Level 1	B186	855 G+Ey+0.3Q-NL Max	0.2	0.3021	32.9187	-1.55	-0.4846	-1.7852	45.7373	855
Level 1	B186	855 G+Ey+0.3Q-NL Max	0.6414	0.3021	34.7674	-1.55	-0.4846	-1.101	30.7979	855
Level 1	B186	855 G+Ey+0.3Q-NL Max	1.0829	0.3021	36.6161	-1.55	-0.4846	-0.4168	15.0425	855
Level 1	B186	855 G+Ey+0.3Q-NL Max	1.5243	0.3021	38.4648	-1.55	-0.4846	0.2674	-1.529	855
Level 1	B186	855 G+Ey+0.3Q-NL Max	1.9657	0.3021	40.3135	-1.55	-0.4846	0.9516	-18.9165	855
Level 1	B186	855 G+Ey+0.3Q-NL Max	2.4071	0.3021	42.1622	-1.55	-0.4846	1.6358	-37.1201	855
Level 1	B186	855 G+Ey+0.3Q-NL Max	2.8486	0.3021	44.0109	-1.55	-0.4846	2.32	-56.1398	855
Level 1	B186	855 G+Ey+0.3Q-NL Max	3.29	0.3021	45.8596	-1.55	-0.4846	3.0042	-75.9757	855
Level 1	B186	855 G+Ex+0.3Q-NL Max	0.2	250.2744	-18.1695	-3.0341	-0.0198	-7.94	-42.614	855
Level 1	B186	855 G+Ex+0.3Q-NL Max	0.6414	250.2744	-13.4792	-3.0341	-0.0198	-6.5925	-35.5763	855
Level 1	B186	855 G+Ex+0.3Q-NL Max	1.0829	250.2744	-8.7889	-3.0341	-0.0198	-5.249	-30.6226	855
Level 1	B186	855 G+Ex+0.3Q-NL Max	1.5243	250.2744	-4.0986	-3.0341	-0.0198	-3.9087	-27.7524	855
Level 1	B186	855 G+Ex+0.3Q-NL Max	1.9657	250.2744	0.5917	-3.0341	-0.0198	-2.5236	-26.5764	855
Level 1	B186	855 G+Ex+0.3Q-NL Max	2.4071	250.2744	5.282	-3.0341	-0.0198	0.0216	-27.2655	855
Level 1	B186	855 G+Ex+0.3Q-NL Max	2.8486	250.2744	9.9723	-3.0341	-0.0198	2.5668	-30.0371	855
Level 1	B186	855 G+Ex+0.3Q-NL Max	3.29	250.2744	14.6626	-3.0341	-0.0198	5.1135	-34.8909	855
Level 1	B194	911 G+Ey+0.3Q-NL Max	0.2	5.7231	38.3738	-1.5036	-0.2603	-2.413	56.6151	911

Level 1	B194	911 G+Ey+0.3Q-NL Max	0.6414	5.7231	40.2225	-1.5036	-0.2603	-1.7493	39.2658	911
Level 1	B194	911 G+Ey+0.3Q-NL Max	1.0829	5.7231	42.0712	-1.5036	-0.2603	-1.0856	21.1008	911
Level 1	B194	911 G+Ey+0.3Q-NL Max	1.5243	5.7231	43.9199	-1.5036	-0.2603	-0.422	2.12	911
Level 1	B194	911 G+Ey+0.3Q-NL Max	1.9657	5.7231	45.7686	-1.5036	-0.2603	0.2417	-17.677	911
Level 1	B194	911 G+Ey+0.3Q-NL Max	2.4071	5.7231	47.6173	-1.5036	-0.2603	0.9053	-38.2902	911
Level 1	B194	911 G+Ey+0.3Q-NL Max	2.8486	5.7231	49.466	-1.5036	-0.2603	1.569	-59.7198	911
Level 1	B194	911 G+Ey+0.3Q-NL Max	3.29	5.7231	51.3147	-1.5036	-0.2603	2.2327	-81.966	911
Level 1	B194	911 G+Ex+0.3Q-NL Max	0.2	-217.2346	-17.2235	5.9996	0.2397	2.5196	-27.9046	911
Level 1	B194	911 G+Ex+0.3Q-NL Max	0.6414	-217.2346	-12.5332	5.9996	0.2397	-0.1368	-21.3692	911
Level 1	B194	911 G+Ex+0.3Q-NL Max	1.0829	-217.2346	-7.8429	5.9996	0.2397	-2.7932	-16.897	911
Level 1	B194	911 G+Ex+0.3Q-NL Max	1.5243	-217.2346	-3.1526	5.9996	0.2397	-5.448	-14.4882	911
Level 1	B194	911 G+Ex+0.3Q-NL Max	1.9657	-217.2346	1.5378	5.9996	0.2397	-4.7198	-14.1208	911
Level 1	B194	911 G+Ex+0.3Q-NL Max	2.4071	-217.2346	6.2281	5.9996	0.2397	-1.3657	-15.6704	911
Level 1	B194	911 G+Ex+0.3Q-NL Max	2.8486	-217.2346	10.9184	5.9996	0.2397	1.9892	-19.284	911
Level 1	B194	911 G+Ex+0.3Q-NL Max	3.29	-217.2346	15.6087	5.9996	0.2397	5.343	-24.9616	911
Level 1	B34	231 G+Ey+0.3Q-NL Max	0.195	35.512	-8.0908	-0.1369	10.3822	0.542	3.4771	231-2
Level 1	B34	231 G+Ey+0.3Q-NL Max	0.57	35.512	-7.2394	-0.1369	10.3822	0.5934	6.3531	231-2
Level 1	B34	231 G+Ey+0.3Q-NL Max	0.945	35.512	-6.388	-0.1369	10.3822	0.6448	8.91	231-2
Level 1	B34	231 G+Ey+0.3Q-NL Max	0.945	36.2203	-3.9572	0.0643	8.4447	0.7911	8.9422	231-3
Level 1	B34	231 G+Ey+0.3Q-NL Max	1.32	36.2203	-3.1059	0.0643	8.4447	0.7671	10.2686	231-3
Level 1	B34	231 G+Ey+0.3Q-NL Max	1.695	36.2203	-2.2545	0.0643	8.4447	0.7431	11.2759	231-3
Level 1	B34	231 G+Ey+0.3Q-NL Max	1.695	37.5577	0.0672	0.3187	6.682	1.0359	11.284	231-4
Level 1	B34	231 G+Ey+0.3Q-NL Max	2.07	37.5577	0.9186	0.3187	6.682	0.9166	11.1018	231-4
Level 1	B34	231 G+Ey+0.3Q-NL Max	2.445	37.5577	1.7699	0.3187	6.682	0.7974	10.6007	231-4
Level 1	B34	231 G+Ey+0.3Q-NL Max	2.445	38.6069	4.1043	0.3573	4.9926	1.1854	10.5848	231-5
Level 1	B34	231 G+Ey+0.3Q-NL Max	2.82	38.6069	4.9556	0.3573	4.9926	1.0518	8.8894	231-5
Level 1	B34	231 G+Ey+0.3Q-NL Max	3.195	38.6069	5.807	0.3573	4.9926	0.9182	6.8749	231-5
Level 1	B34	231 G+Ey+0.3Q-NL Max	3.195	38.9397	8.1903	0.1031	3.332	1.2359	6.8354	231-6
Level 1	B34	231 G+Ey+0.3Q-NL Max	3.5775	38.9397	9.0587	0.1031	3.332	1.197	3.5404	231-6
Level 1	B34	231 G+Ey+0.3Q-NL Max	3.96	38.9397	9.9271	0.1031	3.332	1.1581	-0.0866	231-6
Level 1	B34	231 G+Ey+0.3Q-NL Max	3.96	38.0568	12.2577	-0.2871	1.7503	1.2632	-0.151	231-7
Level 1	B34	231 G+Ey+0.3Q-NL Max	4.3425	38.0568	13.1261	-0.2871	1.7503	1.3736	-5.0018	231-7
Level 1	B34	231 G+Ey+0.3Q-NL Max	4.725	38.0568	13.9945	-0.2871	1.7503	1.4841	-10.1848	231-7

Level 1	B34	231 G+Ey+0.3Q-NL Max	4.725	35.6179	15.9019	-0.4254	0.418	1.4116	-10.279	231-8
Level 1	B34	231 G+Ey+0.3Q-NL Max	5.09	35.6179	16.7305	-0.4254	0.418	1.5675	-16.2313	231-8
Level 1	B34	231 G+Ey+0.3Q-NL Max	5.455	35.6179	17.5592	-0.4254	0.418	1.7236	-22.4864	231-8
Level 1	B34	231 G+Ey+0.3Q-NL Max	5.455	31.4295	18.568	-0.1581	-0.5994	1.6634	-22.613	231-9
Level 1	B34	231 G+Ey+0.3Q-NL Max	5.82	31.4295	19.3967	-0.1581	-0.5994	1.7218	-29.5395	231-9
Level 1	B34	231 G+Ey+0.3Q-NL Max	6.185	31.4295	20.2254	-0.1581	-0.5994	1.7804	-36.7691	231-9
Level 1	B34	231 G+Ex+0.3Q-NL Max	0.195	-153.3525	-23.358	0.9217	20.6281	0.7054	-14.873	231-2
Level 1	B34	231 G+Ex+0.3Q-NL Max	0.57	-153.3525	-21.198	0.9217	20.6281	0.3486	-6.5196	231-2
Level 1	B34	231 G+Ex+0.3Q-NL Max	0.945	-153.3525	-19.038	0.9217	20.6281	-0.0082	1.0244	231-2
Level 1	B34	231 G+Ex+0.3Q-NL Max	0.945	-145.9278	-14.2426	0.2254	18.0387	-0.5688	1.1355	231-3
Level 1	B34	231 G+Ex+0.3Q-NL Max	1.32	-145.9278	-12.0826	0.2254	18.0387	-0.6641	6.071	231-3
Level 1	B34	231 G+Ex+0.3Q-NL Max	1.695	-145.9278	-9.9226	0.2254	18.0387	-0.7591	10.1959	231-3
Level 1	B34	231 G+Ex+0.3Q-NL Max	1.695	-146.8797	-5.0851	-1.1859	15.9359	-2.0936	10.238	231-4
Level 1	B34	231 G+Ex+0.3Q-NL Max	2.07	-146.8797	-2.9251	-1.1859	15.9359	-1.6087	11.7376	231-4
Level 1	B34	231 G+Ex+0.3Q-NL Max	2.445	-146.8797	-0.7651	-1.1859	15.9359	-1.1234	12.4261	231-4
Level 1	B34	231 G+Ex+0.3Q-NL Max	2.445	-137.9636	4.1292	-0.8224	14.0746	-2.6934	12.4044	231-5
Level 1	B34	231 G+Ex+0.3Q-NL Max	2.82	-137.9636	6.2892	-0.8224	14.0746	-2.3918	10.6036	231-5
Level 1	B34	231 G+Ex+0.3Q-NL Max	3.195	-137.9636	8.4492	-0.8224	14.0746	-1.813	8.4027	231-5
Level 1	B34	231 G+Ex+0.3Q-NL Max	3.195	-136.0101	13.4272	-0.1776	12.3983	-2.2241	8.3297	231-6
Level 1	B34	231 G+Ex+0.3Q-NL Max	3.5775	-136.0101	15.6304	-0.1776	12.3983	-2.1622	3.3561	231-6
Level 1	B34	231 G+Ex+0.3Q-NL Max	3.96	-136.0101	17.8336	-0.1776	12.3983	-2.0997	-2.4605	231-6
Level 1	B34	231 G+Ex+0.3Q-NL Max	3.96	-124.9366	22.7202	1.1007	11.0316	-1.8788	-2.5906	231-7
Level 1	B34	231 G+Ex+0.3Q-NL Max	4.3425	-124.9366	24.9234	1.1007	11.0316	-2.0129	-11.0973	231-7
Level 1	B34	231 G+Ex+0.3Q-NL Max	4.725	-124.9366	27.1266	1.1007	11.0316	-2.1467	-20.4455	231-7
Level 1	B34	231 G+Ex+0.3Q-NL Max	4.725	-119.8224	31.207	1.8662	10.3095	-1.768	-20.6291	231-8
Level 1	B34	231 G+Ex+0.3Q-NL Max	5.09	-119.8224	33.3094	1.8662	10.3095	-1.8361	-31.7942	231-8
Level 1	B34	231 G+Ex+0.3Q-NL Max	5.455	-119.8224	35.4118	1.8662	10.3095	-1.9038	-43.7239	231-8
Level 1	B34	231 G+Ex+0.3Q-NL Max	5.455	-111.5122	37.6431	0.7951	10.5661	-1.6846	-43.9481	231-9
Level 1	B34	231 G+Ex+0.3Q-NL Max	5.82	-111.5122	39.7455	0.7951	10.5661	-1.645	-57.4259	231-9
Level 1	B34	231 G+Ex+0.3Q-NL Max	6.185	-111.5122	41.8479	0.7951	10.5661	-1.6051	-71.6666	231-9
Level 1	B266	724 G+Ey+0.3Q-NL Max	0.3	14.723	0.3939	0.0708	-0.1136	1.0677	104.0527	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	0.7858	14.723	5.9469	0.0708	-0.1136	1.0332	102.508	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	1.2715	14.723	11.4998	0.0708	-0.1136	0.9987	98.268	724

Level 1	B266	724 G+Ey+0.3Q-NL Max	1.7573	14.723	17.0528	0.0708	-0.1136	0.9643	91.3326	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	2.2431	14.723	22.6058	0.0708	-0.1136	0.9298	81.7013	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	2.7288	14.723	28.1588	0.0708	-0.1136	0.8954	69.3738	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	3.2146	14.723	33.7118	0.0708	-0.1136	0.8609	54.3498	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	3.7004	14.723	39.2648	0.0708	-0.1136	0.8265	36.6289	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	4.1862	14.723	44.8177	0.0708	-0.1136	0.7921	16.2109	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	4.6719	14.723	50.3707	0.0708	-0.1136	0.7577	-6.9047	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	5.1577	14.723	55.9237	0.0708	-0.1136	0.7233	-32.7182	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	5.6435	14.723	61.4767	0.0708	-0.1136	0.6889	-61.2299	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	6.1292	14.723	67.0297	0.0708	-0.1136	0.6546	-92.4401	724
Level 1	B266	724 G+Ey+0.3Q-NL Max	6.615	14.723	72.5827	0.0708	-0.1136	0.6202	-126.3492	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	0.3	-532.8007	-140.3641	-0.5324	-18.5446	-11.9813	-223.8515	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	0.7858	-532.8007	-126.2757	-0.5324	-18.5446	-11.6932	-158.9256	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	1.2715	-532.8007	-112.1873	-0.5324	-18.5446	-11.3996	-100.7623	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	1.7573	-532.8007	-98.0989	-0.5324	-18.5446	-11.1004	-49.3789	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	2.2431	-532.8007	-84.0104	-0.5324	-18.5446	-10.796	-4.7924	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	2.7288	-532.8007	-69.922	-0.5324	-18.5446	-9.6883	32.9798	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	3.2146	-532.8007	-55.8336	-0.5324	-18.5446	-8.5465	63.9205	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	3.7004	-532.8007	-41.7452	-0.5324	-18.5446	-7.4005	88.0126	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	4.1862	-532.8007	-27.6568	-0.5324	-18.5446	-6.2508	105.2387	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	4.6719	-532.8007	-13.5684	-0.5324	-18.5446	-5.098	115.5817	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	5.1577	-532.8007	0.52	-0.5324	-18.5446	-3.9427	119.0243	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	5.6435	-532.8007	14.6084	-0.5324	-18.5446	-2.7854	115.5494	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	6.1292	-532.8007	28.6969	-0.5324	-18.5446	-1.6267	105.1397	724
Level 1	B266	724 G+Ex+0.3Q-NL Max	6.615	-532.8007	42.7853	-0.5324	-18.5446	-0.4672	87.778	724
Level 1	B267	726 G+Ey+0.3Q-NL Max	0.2	23.048	-13.29	0.3924	-12.0078	3.0832	2.847	726-1
Level 1	B267	726 G+Ey+0.3Q-NL Max	0.485	23.048	-11.1385	0.3924	-12.0078	2.9714	6.3266	726-1
Level 1	B267	726 G+Ey+0.3Q-NL Max	0.485	23.2721	-9.2777	0.7947	-10.3413	2.1057	6.4013	726-2
Level 1	B267	726 G+Ey+0.3Q-NL Max	0.86	23.2721	-6.4467	0.7947	-10.3413	1.8077	9.3478	726-2
Level 1	B267	726 G+Ey+0.3Q-NL Max	1.235	23.2721	-3.6157	0.7947	-10.3413	1.5097	11.2329	726-2
Level 1	B267	726 G+Ey+0.3Q-NL Max	1.235	26.2078	-1.4532	0.6789	-8.5892	0.5192	11.2486	726-3
Level 1	B267	726 G+Ey+0.3Q-NL Max	1.61	26.2078	1.3778	0.6789	-8.5892	0.2647	11.2611	726-3
Level 1	B267	726 G+Ey+0.3Q-NL Max	1.985	26.2078	4.2088	0.6789	-8.5892	0.0101	10.2122	726-3

Level 1	B267	726 G+Ey+0.3Q-NL Max	1.985	30.0413	6.3148	0.6953	-6.9468	-0.9923	10.182	726-4
Level 1	B267	726 G+Ey+0.3Q-NL Max	2.36	30.0413	9.1458	0.6953	-6.9468	-1.253	7.2818	726-4
Level 1	B267	726 G+Ey+0.3Q-NL Max	2.735	30.0413	11.9769	0.6953	-6.9468	-1.5137	3.3201	726-4
Level 1	B267	726 G+Ey+0.3Q-NL Max	2.735	33.6471	14.2144	0.8628	-5.2241	-2.4658	3.244	726-5
Level 1	B267	726 G+Ey+0.3Q-NL Max	3.11	33.6471	17.0455	0.8628	-5.2241	-2.7894	-2.6185	726-5
Level 1	B267	726 G+Ey+0.3Q-NL Max	3.485	33.6471	19.8765	0.8628	-5.2241	-3.113	-9.5426	726-5
Level 1	B267	726 G+Ey+0.3Q-NL Max	3.485	36.6857	23.2898	0.9822	-2.9351	-4.0548	-9.6329	726-6
Level 1	B267	726 G+Ey+0.3Q-NL Max	3.835	36.6857	25.9321	0.9822	-2.9351	-4.3987	-18.2483	726-6
Level 1	B267	726 G+Ey+0.3Q-NL Max	4.185	36.6857	28.5744	0.9822	-2.9351	-4.7427	-27.7889	726-6
Level 1	B267	726 G+Ex+0.3Q-NL Max	0.2	-199.648	-78.0112	-0.6062	-9.5708	3.1703	-77.4181	726-1
Level 1	B267	726 G+Ex+0.3Q-NL Max	0.485	-199.648	-72.5524	-0.6062	-9.5708	3.3358	-55.9491	726-1
Level 1	B267	726 G+Ex+0.3Q-NL Max	0.485	-189.6509	-65.8378	-0.5027	-2.1085	5.0449	-55.4247	726-2
Level 1	B267	726 G+Ex+0.3Q-NL Max	0.86	-189.6509	-58.6553	-0.5027	-2.1085	5.2235	-32.0587	726-2
Level 1	B267	726 G+Ex+0.3Q-NL Max	1.235	-189.6509	-51.4727	-0.5027	-2.1085	5.4016	-11.3813	726-2
Level 1	B267	726 G+Ex+0.3Q-NL Max	1.235	-191.392	-43.8435	-0.2196	6.1359	7.3932	-11.0685	726-3
Level 1	B267	726 G+Ex+0.3Q-NL Max	1.61	-191.392	-36.661	-0.2196	6.1359	7.4646	4.0559	726-3
Level 1	B267	726 G+Ex+0.3Q-NL Max	1.985	-191.392	-29.4784	-0.2196	6.1359	7.5351	16.4863	726-3
Level 1	B267	726 G+Ex+0.3Q-NL Max	1.985	-197.5935	-22.5232	-1.8751	13.8622	9.0691	16.669	726-4
Level 1	B267	726 G+Ex+0.3Q-NL Max	2.36	-197.5935	-15.3406	-1.8751	13.8622	10.516	23.8071	726-4
Level 1	B267	726 G+Ex+0.3Q-NL Max	2.735	-197.5935	-8.1581	-1.8751	13.8622	12.1974	28.4056	726-4
Level 1	B267	726 G+Ex+0.3Q-NL Max	2.735	-209.5176	-1.4171	-2.7235	21.4943	17.8053	28.4442	726-5
Level 1	B267	726 G+Ex+0.3Q-NL Max	3.11	-209.5176	5.7655	-2.7235	21.4943	20.0835	27.8153	726-5
Level 1	B267	726 G+Ex+0.3Q-NL Max	3.485	-209.5176	12.948	-2.7235	21.4943	22.3595	24.4886	726-5
Level 1	B267	726 G+Ex+0.3Q-NL Max	3.485	-224.9399	22.0467	-1.5781	31.0575	27.8831	24.4161	726-6
Level 1	B267	726 G+Ex+0.3Q-NL Max	3.835	-224.9399	28.7504	-1.5781	31.0575	30.0654	15.6984	726-6
Level 1	B267	726 G+Ex+0.3Q-NL Max	4.185	-224.9399	35.4542	-1.5781	31.0575	32.2445	4.6322	726-6
Level 1	B268	727 G+Ey+0.3Q-NL Max	0.3	-50.2665	61.9721	0.4718	0.052	0.7954	94.3718	727
Level 1	B268	727 G+Ey+0.3Q-NL Max	0.7817	-50.2665	64.7532	0.4718	0.052	0.5685	63.8641	727
Level 1	B268	727 G+Ey+0.3Q-NL Max	1.2633	-50.2665	67.5342	0.4718	0.052	0.3415	32.0107	727
Level 1	B268	727 G+Ey+0.3Q-NL Max	1.745	-50.2665	70.3153	0.4718	0.052	0.1144	-1.1852	727
Level 1	B268	727 G+Ey+0.3Q-NL Max	2.2267	-50.2665	73.0964	0.4718	0.052	-0.1127	-35.7202	727
Level 1	B268	727 G+Ey+0.3Q-NL Max	2.7083	-50.2665	75.8775	0.4718	0.052	-0.3397	-71.591	727
Level 1	B268	727 G+Ey+0.3Q-NL Max	3.19	-50.2665	78.6586	0.4718	0.052	-0.5667	-108.7946	727

Level 1	B268	727 G+Ex+0.3Q-NL Max	0.3	-966.1583	-15.1869	1.8759	-0.5634	-0.2571	-20.1554	727
Level 1	B268	727 G+Ex+0.3Q-NL Max	0.7817	-966.1583	-8.1311	1.8759	-0.5634	-1.1816	-14.717	727
Level 1	B268	727 G+Ex+0.3Q-NL Max	1.2633	-966.1583	-1.0752	1.8759	-0.5634	-2.1028	-12.649	727
Level 1	B268	727 G+Ex+0.3Q-NL Max	1.745	-966.1583	5.9806	1.8759	-0.5634	-3.0179	-13.9428	727
Level 1	B268	727 G+Ex+0.3Q-NL Max	2.2267	-966.1583	13.0365	1.8759	-0.5634	-2.1335	-18.155	727
Level 1	B268	727 G+Ex+0.3Q-NL Max	2.7083	-966.1583	20.0923	1.8759	-0.5634	-1.197	-25.7217	727
Level 1	B268	727 G+Ex+0.3Q-NL Max	3.19	-966.1583	27.1482	1.8759	-0.5634	-0.257	-36.6382	727
Level 1	B20	859 G+Ey+0.3Q-NL Max	0.2	7.8954	-3.6758	0.3999	-1.1722	0.6005	37.093	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	0.6539	7.8954	0.3636	0.3999	-1.1722	0.419	37.8434	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	1.1078	7.8954	4.403	0.3999	-1.1722	0.2374	36.7609	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	1.5617	7.8954	8.4424	0.3999	-1.1722	0.0559	33.8455	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	2.0156	7.8954	12.4817	0.3999	-1.1722	-0.1256	29.097	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	2.4694	7.8954	16.5211	0.3999	-1.1722	-0.3071	22.5154	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	2.9233	7.8954	20.5605	0.3999	-1.1722	-0.4886	14.1006	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	3.3772	7.8954	24.5998	0.3999	-1.1722	-0.6702	3.8525	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	3.8311	7.8954	28.6392	0.3999	-1.1722	-0.8517	-8.229	859
Level 1	B20	859 G+Ey+0.3Q-NL Max	4.285	7.8954	32.6786	0.3999	-1.1722	-1.0333	-22.144	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	0.2	-19.4126	-30.6342	3.9155	-2.6597	7.4038	-12.0133	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	0.6539	-19.4126	-20.3859	3.9155	-2.6597	5.6242	-0.4387	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	1.1078	-19.4126	-10.1377	3.9155	-2.6597	3.844	6.4839	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	1.5617	-19.4126	0.1106	3.9155	-2.6597	2.0636	8.7548	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	2.0156	-19.4126	10.3588	3.9155	-2.6597	0.2831	6.3744	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	2.4694	-19.4126	20.6071	3.9155	-2.6597	-1.4975	-0.6569	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	2.9233	-19.4126	30.8553	3.9155	-2.6597	-2.596	-12.3389	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	3.3772	-19.4126	41.1036	3.9155	-2.6597	-3.5011	-28.6712	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	3.8311	-19.4126	51.3518	3.9155	-2.6597	-4.406	-49.6117	859
Level 1	B20	859 G+Ex+0.3Q-NL Max	4.285	-19.4126	61.6001	3.9155	-2.6597	-5.3106	-75.1978	859
Level 1	B93	913 G+Ey+0.3Q-NL Max	0.2	7.3239	-21.2991	0.119	-1.0497	0.4091	-30.7126	913
Level 1	B93	913 G+Ey+0.3Q-NL Max	0.6609	7.3239	-17.1975	0.119	-1.0497	0.3542	-21.8408	913
Level 1	B93	913 G+Ey+0.3Q-NL Max	1.1218	7.3239	-13.096	0.119	-1.0497	0.2993	-14.8594	913
Level 1	B93	913 G+Ey+0.3Q-NL Max	1.5826	7.3239	-8.9944	0.119	-1.0497	0.2444	-9.7686	913
Level 1	B93	913 G+Ey+0.3Q-NL Max	2.0435	7.3239	-4.8929	0.119	-1.0497	0.1896	-6.5683	913
Level 1	B93	913 G+Ey+0.3Q-NL Max	2.5044	7.3239	-0.7913	0.119	-1.0497	0.1347	-5.2585	913

Level 1	B93	913 G+Ey+0.3Q-NL Max	2.9653	7.3239	3.3102	0.119	-1.0497	0.0798	-5.8391	913
Level 1	B93	913 G+Ey+0.3Q-NL Max	3.4261	7.3239	7.4118	0.119	-1.0497	0.025	-8.3101	913
Level 1	B93	913 G+Ey+0.3Q-NL Max	3.887	7.3239	11.5133	0.119	-1.0497	-0.0299	-12.6714	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	0.2	-177.9469	-81.93	-2.0807	11.4226	-8.7805	-102.1231	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	0.6609	-177.9469	-71.5241	-2.0807	11.4226	-7.8139	-66.7549	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	1.1218	-177.9469	-61.1181	-2.0807	11.4226	-6.8435	-36.1636	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	1.5826	-177.9469	-50.7121	-2.0807	11.4226	-5.2364	-10.355	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	2.0435	-177.9469	-40.3061	-2.0807	11.4226	-2.986	10.7844	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	2.5044	-177.9469	-29.9001	-2.0807	11.4226	-0.734	27.2658	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	2.9653	-177.9469	-19.4941	-2.0807	11.4226	1.5184	38.9465	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	3.4261	-177.9469	-9.0881	-2.0807	11.4226	3.77	45.8201	913
Level 1	B93	913 G+Ex+0.3Q-NL Max	3.887	-177.9469	1.3179	-2.0807	11.4226	6.0196	47.88	913
Level 1	B105	914 G+Ey+0.3Q-NL Max	0.2	11.4145	-5.5612	0.2889	0.2802	0.6337	-2.9304	914
Level 1	B105	914 G+Ey+0.3Q-NL Max	0.6875	11.4145	-1.2227	0.2889	0.2802	0.4928	-1.2772	914
Level 1	B105	914 G+Ey+0.3Q-NL Max	1.175	11.4145	3.1158	0.2889	0.2802	0.352	-1.739	914
Level 1	B105	914 G+Ey+0.3Q-NL Max	1.6625	11.4145	7.4543	0.2889	0.2802	0.2112	-4.316	914
Level 1	B105	914 G+Ey+0.3Q-NL Max	2.15	11.4145	11.7928	0.2889	0.2802	0.0704	-9.0082	914
Level 1	B105	914 G+Ey+0.3Q-NL Max	2.6375	11.4145	16.1313	0.2889	0.2802	-0.0704	-15.8157	914
Level 1	B105	914 G+Ey+0.3Q-NL Max	3.125	11.4145	20.4698	0.2889	0.2802	-0.2112	-24.7388	914
Level 1	B105	914 G+Ey+0.3Q-NL Max	3.6125	11.4145	24.8082	0.2889	0.2802	-0.352	-35.7775	914
Level 1	B105	914 G+Ey+0.3Q-NL Max	4.1	11.4145	29.1467	0.2889	0.2802	-0.4928	-48.9319	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	0.2	-9.5643	-24.0613	1.2054	-1.6604	7.3742	31.6682	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	0.6875	-9.5643	-13.0542	1.2054	-1.6604	6.7878	40.7132	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	1.175	-9.5643	-2.047	1.2054	-1.6604	6.2011	44.3908	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	1.6625	-9.5643	8.9601	1.2054	-1.6604	5.6143	42.7014	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	2.15	-9.5643	19.9673	1.2054	-1.6604	5.0273	35.6452	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	2.6375	-9.5643	30.9744	1.2054	-1.6604	4.4402	23.2225	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	3.125	-9.5643	41.9816	1.2054	-1.6604	3.9991	5.4336	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	3.6125	-9.5643	52.9887	1.2054	-1.6604	4.5234	-17.7213	914
Level 1	B105	914 G+Ex+0.3Q-NL Max	4.1	-9.5643	63.9959	1.2054	-1.6604	5.0474	-46.2418	914
Level 1	B108	617 G+Ey+0.3Q-NL Max	0.2	-6.3744	-3.949	-0.8047	1.2992	-0.9778	36.0743	617
Level 1	B108	617 G+Ey+0.3Q-NL Max	0.6539	-6.3744	0.1861	-0.8047	1.2992	-0.6126	36.9293	617
Level 1	B108	617 G+Ey+0.3Q-NL Max	1.1078	-6.3744	4.3212	-0.8047	1.2992	-0.2473	35.9069	617

Level 1	B108	617 G+Ey+0.3Q-NL Max	1.5617	-6.3744	8.4563	-0.8047	1.2992	0.118	33.0073	617
Level 1	B108	617 G+Ey+0.3Q-NL Max	2.0156	-6.3744	12.5914	-0.8047	1.2992	0.4832	28.2305	617
Level 1	B108	617 G+Ey+0.3Q-NL Max	2.4694	-6.3744	16.7265	-0.8047	1.2992	0.8485	21.5766	617
Level 1	B108	617 G+Ey+0.3Q-NL Max	2.9233	-6.3744	20.8616	-0.8047	1.2992	1.2137	13.0457	617
Level 1	B108	617 G+Ey+0.3Q-NL Max	3.3772	-6.3744	24.9967	-0.8047	1.2992	1.579	2.6378	617
Level 1	B108	617 G+Ey+0.3Q-NL Max	3.8311	-6.3744	29.1318	-0.8047	1.2992	1.9442	-9.647	617
Level 1	B108	617 G+Ey+0.3Q-NL Max	4.285	-6.3744	33.2669	-0.8047	1.2992	2.3093	-23.8086	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	0.2	116.3977	-42.9073	4.6394	-1.4569	7.8028	-35.2324	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	0.6539	116.3977	-32.4161	4.6394	-1.4569	5.7081	-18.1236	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	1.1078	116.3977	-21.925	4.6394	-1.4569	3.6151	-5.7782	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	1.5617	116.3977	-11.4339	4.6394	-1.4569	1.5232	1.8033	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	2.0156	116.3977	-0.9428	4.6394	-1.4569	-0.3539	4.6206	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	2.4694	116.3977	9.5483	4.6394	-1.4569	-0.9963	2.6733	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	2.9233	116.3977	20.0394	4.6394	-1.4569	-1.639	-3.9008	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	3.3772	116.3977	30.5306	4.6394	-1.4569	-2.2822	-15.1154	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	3.8311	116.3977	41.0217	4.6394	-1.4569	-2.9261	-31.0954	617
Level 1	B108	617 G+Ex+0.3Q-NL Max	4.285	116.3977	51.5128	4.6394	-1.4569	-3.5708	-51.8413	617
Level 1	B109	857 G+Ey+0.3Q-NL Max	0.2	7.0873	-14.4289	-0.7629	0.2687	-1.2807	-19.6968	857
Level 1	B109	857 G+Ey+0.3Q-NL Max	0.6609	7.0873	-10.2302	-0.7629	0.2687	-0.929	-14.0134	857
Level 1	B109	857 G+Ey+0.3Q-NL Max	1.1218	7.0873	-6.0314	-0.7629	0.2687	-0.5774	-10.2653	857
Level 1	B109	857 G+Ey+0.3Q-NL Max	1.5826	7.0873	-1.8327	-0.7629	0.2687	-0.2258	-8.4524	857
Level 1	B109	857 G+Ey+0.3Q-NL Max	2.0435	7.0873	2.3661	-0.7629	0.2687	0.1257	-8.5748	857
Level 1	B109	857 G+Ey+0.3Q-NL Max	2.5044	7.0873	6.5648	-0.7629	0.2687	0.4773	-10.6325	857
Level 1	B109	857 G+Ey+0.3Q-NL Max	2.9653	7.0873	10.7636	-0.7629	0.2687	0.8289	-14.6255	857
Level 1	B109	857 G+Ey+0.3Q-NL Max	3.4261	7.0873	14.9623	-0.7629	0.2687	1.1805	-20.5538	857
Level 1	B109	857 G+Ey+0.3Q-NL Max	3.887	7.0873	19.1611	-0.7629	0.2687	1.5322	-28.4174	857
Level 1	B109	857 G+Ex+0.3Q-NL Max	0.2	-3.8963	-43.595	-0.7104	9.5356	2.3023	-38.3357	857
Level 1	B109	857 G+Ex+0.3Q-NL Max	0.6609	-3.8963	-32.9424	-0.7104	9.5356	2.6304	-20.6992	857
Level 1	B109	857 G+Ex+0.3Q-NL Max	1.1218	-3.8963	-22.2898	-0.7104	9.5356	2.9584	-7.9721	857
Level 1	B109	857 G+Ex+0.3Q-NL Max	1.5826	-3.8963	-11.6372	-0.7104	9.5356	3.2863	-0.1543	857
Level 1	B109	857 G+Ex+0.3Q-NL Max	2.0435	-3.8963	-0.9847	-0.7104	9.5356	3.6142	2.7541	857
Level 1	B109	857 G+Ex+0.3Q-NL Max	2.5044	-3.8963	9.6679	-0.7104	9.5356	3.9421	0.753	857
Level 1	B109	857 G+Ex+0.3Q-NL Max	2.9653	-3.8963	20.3205	-0.7104	9.5356	4.2699	-6.1552	857

Level 1	B109	857 G+Ex+0.3Q-NL Max	3.4261	-3.8963	30.9731	-0.7104	9.5356	5.1174	-17.8563	857
Level 1	B109	857 G+Ex+0.3Q-NL Max	3.887	-3.8963	41.6257	-0.7104	9.5356	6.6873	-34.4597	857
Level 1	B110	858 G+Ey+0.3Q-NL Max	0.2	16.1671	-20.8648	0.1111	0.4221	0.058	-22.084	858
Level 1	B110	858 G+Ey+0.3Q-NL Max	0.65	16.1671	-16.7651	0.1111	0.4221	0.0082	-13.6188	858
Level 1	B110	858 G+Ey+0.3Q-NL Max	1.1	16.1671	-12.6654	0.1111	0.4221	-0.0416	-6.9987	858
Level 1	B110	858 G+Ey+0.3Q-NL Max	1.55	16.1671	-8.5657	0.1111	0.4221	-0.0915	-2.2237	858
Level 1	B110	858 G+Ey+0.3Q-NL Max	2	16.1671	-4.4661	0.1111	0.4221	-0.1413	0.7062	858
Level 1	B110	858 G+Ey+0.3Q-NL Max	2.45	16.1671	-0.3664	0.1111	0.4221	-0.1912	1.7912	858
Level 1	B110	858 G+Ey+0.3Q-NL Max	2.9	16.1671	3.7333	0.1111	0.4221	-0.241	1.0311	858
Level 1	B110	858 G+Ey+0.3Q-NL Max	3.35	16.1671	7.8329	0.1111	0.4221	-0.2909	-1.5739	858
Level 1	B110	858 G+Ey+0.3Q-NL Max	3.8	16.1671	11.9326	0.1111	0.4221	-0.3407	-6.0238	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	0.2	-22.128	-63.2694	0.565	-1.1712	-2.6337	-51.5662	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	0.65	-22.128	-52.8682	0.565	-1.1712	-2.8867	-25.4325	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	1.1	-22.128	-42.4669	0.565	-1.1712	-2.9948	-3.9788	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	1.55	-22.128	-32.0657	0.565	-1.1712	-1.7798	12.9121	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	2	-22.128	-21.6645	0.565	-1.1712	-0.5647	25.2785	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	2.45	-22.128	-11.2632	0.565	-1.1712	0.6504	32.9641	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	2.9	-22.128	-0.862	0.565	-1.1712	1.8655	35.9685	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	3.35	-22.128	9.5392	0.565	-1.1712	3.0804	34.2915	858
Level 1	B110	858 G+Ex+0.3Q-NL Max	3.8	-22.128	19.9404	0.565	-1.1712	4.2952	27.9326	858
Level 1	B112	842 G+Ey+0.3Q-NL Max	0.2	29.4413	-17.7554	-0.2948	0.0751	-1.7226	-2.4014	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	0.6925	29.4413	-13.2686	-0.2948	0.0751	-1.577	5.242	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	1.185	29.4413	-8.7817	-0.2948	0.0751	-1.4315	10.6771	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	1.6775	29.4413	-4.2948	-0.2948	0.0751	-1.2862	13.9034	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	2.17	29.4413	0.192	-0.2948	0.0751	-1.141	14.9206	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	2.6625	29.4413	4.6789	-0.2948	0.0751	-0.9959	13.7283	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	3.155	29.4413	9.1658	-0.2948	0.0751	-0.8509	10.3261	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	3.6475	29.4413	13.6526	-0.2948	0.0751	-0.7059	4.7136	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	4.14	29.4413	18.1395	-0.2948	0.0751	-0.5611	-3.1095	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	4.6325	29.4413	22.6263	-0.2948	0.0751	-0.4162	-13.1438	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	5.125	29.4413	27.1132	-0.2948	0.0751	-0.2715	-25.3895	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	5.6175	29.4413	31.6001	-0.2948	0.0751	-0.1267	-39.8472	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	6.11	29.4413	36.0869	-0.2948	0.0751	0.018	-56.517	842

Level 1	B112	842 G+Ey+0.3Q-NL Max	6.6025	29.4413	40.5738	-0.2948	0.0751	0.1628	-75.3996	842
Level 1	B112	842 G+Ey+0.3Q-NL Max	7.095	29.4413	45.0607	-0.2948	0.0751	0.3075	-96.4952	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	0.2	34.9156	-78.3936	1.6989	4.3191	6.3633	-67.2536	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	0.6925	34.9156	-67.01	1.6989	4.3191	5.5276	-31.4514	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	1.185	34.9156	-55.6264	1.6989	4.3191	4.6921	-1.2543	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	1.6775	34.9156	-44.2428	1.6989	4.3191	3.8568	23.3377	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	2.17	34.9156	-32.8593	1.6989	4.3191	3.0218	42.3447	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	2.6625	34.9156	-21.4757	1.6989	4.3191	2.1869	55.7586	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	3.155	34.9156	-10.0921	1.6989	4.3191	1.3522	63.5667	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	3.6475	34.9156	1.2914	1.6989	4.3191	0.5175	65.7689	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	4.14	34.9156	12.675	1.6989	4.3191	-0.3172	62.3652	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	4.6325	34.9156	24.0586	1.6989	4.3191	-1.1518	53.3555	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	5.125	34.9156	35.4421	1.6989	4.3191	-1.6211	38.7399	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	5.6175	34.9156	46.8257	1.6989	4.3191	-2.0298	18.5183	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	6.11	34.9156	58.2093	1.6989	4.3191	-2.4386	-7.3093	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	6.6025	34.9156	69.5928	1.6989	4.3191	-2.8477	-38.7429	842
Level 1	B112	842 G+Ex+0.3Q-NL Max	7.095	34.9156	80.9764	1.6989	4.3191	-3.2572	-75.7825	842
Level 1	B113	856 G+Ey+0.3Q-NL Max	0.2	-30.4757	-14.7021	-0.1598	0.2026	-0.3424	44.6934	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	0.6654	-30.4757	-10.4626	-0.1598	0.2026	-0.2681	50.5611	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	1.1307	-30.4757	-6.223	-0.1598	0.2026	-0.1936	54.4522	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	1.5961	-30.4757	-1.9834	-0.1598	0.2026	-0.1192	56.367	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	2.0614	-30.4757	2.2562	-0.1598	0.2026	-0.0448	56.306	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	2.5268	-30.4757	6.4958	-0.1598	0.2026	0.0297	54.2695	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	2.9921	-30.4757	10.7353	-0.1598	0.2026	0.1041	50.2579	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	3.4575	-30.4757	14.9749	-0.1598	0.2026	0.1785	44.2717	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	3.9229	-30.4757	19.2145	-0.1598	0.2026	0.2529	36.311	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	4.3882	-30.4757	23.4541	-0.1598	0.2026	0.3273	26.3765	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	4.8536	-30.4757	27.6937	-0.1598	0.2026	0.4017	14.4683	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	5.3189	-30.4757	31.9332	-0.1598	0.2026	0.476	0.5869	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	5.7843	-30.4757	36.1728	-0.1598	0.2026	0.5503	-15.2673	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	6.2496	-30.4757	40.4124	-0.1598	0.2026	0.6246	-33.0939	856
Level 1	B113	856 G+Ey+0.3Q-NL Max	6.715	-30.4757	44.652	-0.1598	0.2026	0.6988	-52.8926	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	0.2	-4.4789	-82.5389	-0.485	-4.5172	-4.5046	-88.8591	856

Level 1	B113	856 G+Ex+0.3Q-NL Max	0.6654	-4.4789	-71.7827	-0.485	-4.5172	-4.2788	-52.9477	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	1.1307	-4.4789	-61.0265	-0.485	-4.5172	-4.053	-22.0413	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	1.5961	-4.4789	-50.2704	-0.485	-4.5172	-3.8271	3.8598	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	2.0614	-4.4789	-39.5142	-0.485	-4.5172	-3.4597	24.7556	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	2.5268	-4.4789	-28.758	-0.485	-4.5172	-2.7387	40.6458	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	2.9921	-4.4789	-18.0018	-0.485	-4.5172	-2.0175	51.5303	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	3.4575	-4.4789	-7.2456	-0.485	-4.5172	-1.2962	57.4091	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	3.9229	-4.4789	3.5106	-0.485	-4.5172	-0.5748	58.2819	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	4.3882	-4.4789	14.2668	-0.485	-4.5172	0.1467	54.1486	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	4.8536	-4.4789	25.023	-0.485	-4.5172	0.8681	45.0091	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	5.3189	-4.4789	35.7792	-0.485	-4.5172	1.5895	30.8632	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	5.7843	-4.4789	46.5354	-0.485	-4.5172	2.3108	11.7368	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	6.2496	-4.4789	57.2916	-0.485	-4.5172	3.0319	-12.3481	856
Level 1	B113	856 G+Ex+0.3Q-NL Max	6.715	-4.4789	68.0477	-0.485	-4.5172	3.7529	-41.4387	856
Level 1	B142	470 G+Ey+0.3Q-NL Max	0.2	10.2131	-3.3835	-0.3968	-0.5359	1.0226	-0.5863	470
Level 1	B142	470 G+Ey+0.3Q-NL Max	0.697	10.2131	-2.4432	-0.3968	-0.5359	1.2198	0.8616	470
Level 1	B142	470 G+Ey+0.3Q-NL Max	1.194	10.2131	-1.5029	-0.3968	-0.5359	1.4169	1.8422	470
Level 1	B142	470 G+Ey+0.3Q-NL Max	1.691	10.2131	-0.5626	-0.3968	-0.5359	1.6142	2.3555	470
Level 1	B142	470 G+Ey+0.3Q-NL Max	2.188	10.2131	0.3777	-0.3968	-0.5359	1.8114	2.4015	470
Level 1	B142	470 G+Ey+0.3Q-NL Max	2.685	10.2131	1.318	-0.3968	-0.5359	2.0087	1.9802	470
Level 1	B142	470 G+Ex+0.3Q-NL Max	0.2	87.2446	7.916	-1.5638	1.3848	-2.9854	14.2381	470
Level 1	B142	470 G+Ex+0.3Q-NL Max	0.697	87.2446	10.3016	-1.5638	1.3848	-2.2046	9.7471	470
Level 1	B142	470 G+Ex+0.3Q-NL Max	1.194	87.2446	12.6872	-1.5638	1.3848	-0.8189	4.0722	470
Level 1	B142	470 G+Ex+0.3Q-NL Max	1.691	87.2446	15.0728	-1.5638	1.3848	2.7642	-2.7879	470
Level 1	B142	470 G+Ex+0.3Q-NL Max	2.188	87.2446	17.4584	-1.5638	1.3848	6.3481	-10.8345	470
Level 1	B142	470 G+Ex+0.3Q-NL Max	2.685	87.2446	19.844	-1.5638	1.3848	9.9337	-20.0687	470
Level 1	B143	481 G+Ey+0.3Q-NL Max	0.2	4.8825	-1.7819	0.6854	-2.8054	1.0444	4.7256	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	0.6821	4.8825	-0.8698	0.6854	-2.8054	0.7141	5.3649	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	1.1642	4.8825	0.0422	0.6854	-2.8054	0.3838	5.5646	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	1.6463	4.8825	0.9543	0.6854	-2.8054	0.0535	5.3247	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	2.1283	4.8825	1.8664	0.6854	-2.8054	-0.2768	4.6451	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	2.6104	4.8825	2.7785	0.6854	-2.8054	-0.6071	3.5259	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	3.0925	4.8825	3.6905	0.6854	-2.8054	-0.9375	1.9669	481

Level 1	B143	481 G+Ey+0.3Q-NL Max	3.5746	4.8825	4.6026	0.6854	-2.8054	-1.2678	-0.0317	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	4.0567	4.8825	5.5147	0.6854	-2.8054	-1.5981	-2.4701	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	4.5388	4.8825	6.4267	0.6854	-2.8054	-1.9285	-5.3482	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	5.0208	4.8825	7.3388	0.6854	-2.8054	-2.2589	-8.666	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	5.5029	4.8825	8.2509	0.6854	-2.8054	-2.5894	-12.4236	481
Level 1	B143	481 G+Ey+0.3Q-NL Max	5.985	4.8825	9.1629	0.6854	-2.8054	-2.9198	-16.621	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	0.2	-22.2436	14.4505	-1.5787	-8.8026	-1.5878	31.3929	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	0.6821	-22.2436	16.7645	-1.5787	-8.8026	-0.8274	23.8641	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	1.1642	-22.2436	19.0785	-1.5787	-8.8026	-0.067	15.2181	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	1.6463	-22.2436	21.3925	-1.5787	-8.8026	0.6935	5.4556	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	2.1283	-22.2436	23.7065	-1.5787	-8.8026	1.4539	-5.4226	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	2.6104	-22.2436	26.0205	-1.5787	-8.8026	2.2142	-17.4158	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	3.0925	-22.2436	28.3345	-1.5787	-8.8026	2.9744	-30.4811	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	3.5746	-22.2436	30.6485	-1.5787	-8.8026	3.7343	-44.6005	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	4.0567	-22.2436	32.9625	-1.5787	-8.8026	4.4941	-59.8332	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	4.5388	-22.2436	35.2765	-1.5787	-8.8026	5.4547	-76.1786	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	5.0208	-22.2436	37.5905	-1.5787	-8.8026	6.6861	-93.6363	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	5.5029	-22.2436	39.9045	-1.5787	-8.8026	7.917	-112.2055	481
Level 1	B143	481 G+Ex+0.3Q-NL Max	5.985	-22.2436	42.2185	-1.5787	-8.8026	9.1471	-131.8858	481
Level 1	B149	302 G+Ey+0.3Q-NL Max	0.2	-5.8969	-0.0994	0.2189	0.4088	0.9852	4.3878	302
Level 1	B149	302 G+Ey+0.3Q-NL Max	0.697	-5.8969	0.8409	0.2189	0.4088	0.8764	4.2036	302
Level 1	B149	302 G+Ey+0.3Q-NL Max	1.194	-5.8969	1.7811	0.2189	0.4088	0.7676	3.552	302
Level 1	B149	302 G+Ey+0.3Q-NL Max	1.691	-5.8969	2.7214	0.2189	0.4088	0.6588	2.4331	302
Level 1	B149	302 G+Ey+0.3Q-NL Max	2.188	-5.8969	3.6617	0.2189	0.4088	0.55	0.8468	302
Level 1	B149	302 G+Ey+0.3Q-NL Max	2.685	-5.8969	4.602	0.2189	0.4088	0.4411	-1.2068	302
Level 1	B149	302 G+Ex+0.3Q-NL Max	0.2	249.0947	17.5081	8.4341	2.3098	3.9919	25.0116	302
Level 1	B149	302 G+Ex+0.3Q-NL Max	0.697	249.0947	19.8937	8.4341	2.3098	-0.2022	15.9679	302
Level 1	B149	302 G+Ex+0.3Q-NL Max	1.194	249.0947	22.2793	8.4341	2.3098	-2.4108	5.7465	302
Level 1	B149	302 G+Ex+0.3Q-NL Max	1.691	249.0947	24.6649	8.4341	2.3098	-3.4505	-5.6584	302
Level 1	B149	302 G+Ex+0.3Q-NL Max	2.188	249.0947	27.0505	8.4341	2.3098	-4.4928	-18.2526	302
Level 1	B149	302 G+Ex+0.3Q-NL Max	2.685	249.0947	29.4361	8.4341	2.3098	-5.5388	-32.0419	302
Level 1	B46	163 G+Ey+0.3Q-NL Max	0.2	-3.1039	-14.796	0.0158	-2.0038	0.0612	0.1988	163
Level 1	B46	163 G+Ey+0.3Q-NL Max	0.6925	-3.1039	-10.6747	0.0158	-2.0038	0.0534	6.4715	163

Level 1	B46	163 G+Ey+0.3Q-NL Max	1.185	-3.1039	-6.5535	0.0158	-2.0038	0.0457	10.7145	163
Level 1	B46	163 G+Ey+0.3Q-NL Max	1.6775	-3.1039	-2.4323	0.0158	-2.0038	0.0379	12.9277	163
Level 1	B46	163 G+Ey+0.3Q-NL Max	2.17	-3.1039	1.6889	0.0158	-2.0038	0.0302	13.1112	163
Level 1	B46	163 G+Ey+0.3Q-NL Max	2.6625	-3.1039	5.8102	0.0158	-2.0038	0.0225	11.2649	163
Level 1	B46	163 G+Ey+0.3Q-NL Max	3.155	-3.1039	9.9314	0.0158	-2.0038	0.0147	7.3889	163
Level 1	B46	163 G+Ey+0.3Q-NL Max	3.6475	-3.1039	14.0526	0.0158	-2.0038	0.007	1.4831	163
Level 1	B46	163 G+Ex+0.3Q-NL Max	0.2	68.7207	-70.9141	0.1574	10.8752	-0.6505	-56.3277	163
Level 1	B46	163 G+Ex+0.3Q-NL Max	0.6925	68.7207	-60.4582	0.1574	10.8752	-0.7231	-24.0119	163
Level 1	B46	163 G+Ex+0.3Q-NL Max	1.185	68.7207	-50.0023	0.1574	10.8752	-0.7958	3.1515	163
Level 1	B46	163 G+Ex+0.3Q-NL Max	1.6775	68.7207	-39.5464	0.1574	10.8752	-0.8687	25.1649	163
Level 1	B46	163 G+Ex+0.3Q-NL Max	2.17	68.7207	-29.0905	0.1574	10.8752	-0.9417	42.0304	163
Level 1	B46	163 G+Ex+0.3Q-NL Max	2.6625	68.7207	-18.6345	0.1574	10.8752	-1.015	53.7505	163
Level 1	B46	163 G+Ex+0.3Q-NL Max	3.155	68.7207	-8.1786	0.1574	10.8752	-1.0885	60.3273	163
Level 1	B46	163 G+Ex+0.3Q-NL Max	3.6475	68.7207	2.2773	0.1574	10.8752	-1.1622	61.7632	163
Level 1	B50	201 G+Ey+0.3Q-NL Max	0	-21.3031	-11.9802	0.0082	0.4342	-0.0143	8.5303	201
Level 1	B50	201 G+Ey+0.3Q-NL Max	0.4925	-21.3031	-7.859	0.0082	0.4342	-0.0182	13.4168	201
Level 1	B50	201 G+Ey+0.3Q-NL Max	0.985	-21.3031	-3.7377	0.0082	0.4342	-0.0221	16.273	201
Level 1	B50	201 G+Ey+0.3Q-NL Max	1.4775	-21.3031	0.3835	0.0082	0.4342	-0.026	17.0988	201
Level 1	B50	201 G+Ey+0.3Q-NL Max	1.97	-21.3031	4.5047	0.0082	0.4342	-0.0298	15.8944	201
Level 1	B50	201 G+Ey+0.3Q-NL Max	2.4625	-21.3031	8.6259	0.0082	0.4342	-0.0337	12.6598	201
Level 1	B50	201 G+Ey+0.3Q-NL Max	2.955	-21.3031	12.7472	0.0082	0.4342	-0.0376	7.395	201
Level 1	B50	201 G+Ey+0.3Q-NL Max	3.4475	-21.3031	16.8684	0.0082	0.4342	-0.0415	0.1002	201
Level 1	B50	201 G+Ex+0.3Q-NL Max	0	72.8083	-5.5459	0.2675	-2.776	-0.8878	60.687	201
Level 1	B50	201 G+Ex+0.3Q-NL Max	0.4925	72.8083	4.91	0.2675	-2.776	-1.0158	60.8567	201
Level 1	B50	201 G+Ex+0.3Q-NL Max	0.985	72.8083	15.3659	0.2675	-2.776	-1.144	56.1322	201
Level 1	B50	201 G+Ex+0.3Q-NL Max	1.4775	72.8083	25.8219	0.2675	-2.776	-1.2724	46.2656	201
Level 1	B50	201 G+Ex+0.3Q-NL Max	1.97	72.8083	36.2778	0.2675	-2.776	-1.4012	31.2547	201
Level 1	B50	201 G+Ex+0.3Q-NL Max	2.4625	72.8083	46.7337	0.2675	-2.776	-1.5302	11.0972	201
Level 1	B50	201 G+Ex+0.3Q-NL Max	2.955	72.8083	57.1896	0.2675	-2.776	-1.6596	-14.2094	201
Level 1	B50	201 G+Ex+0.3Q-NL Max	3.4475	72.8083	67.6455	0.2675	-2.776	-1.7894	-44.6673	201
Level 1	B59	203 G+Ey+0.3Q-NL Max	0.2	-3.7817	18.6802	0.0457	0.2458	-0.0293	23.9401	203
Level 1	B59	203 G+Ey+0.3Q-NL Max	0.695	-3.7817	22.8223	0.0457	0.2458	-0.0519	13.6676	203
Level 1	B59	203 G+Ey+0.3Q-NL Max	1.19	-3.7817	26.9645	0.0457	0.2458	-0.0745	1.3447	203

Level 1	B59	203 G+Ey+0.3Q-NL Max	1.685	-3.7817	31.1066	0.0457	0.2458	-0.0971	-13.0286	203
Level 1	B59	203 G+Ey+0.3Q-NL Max	2.18	-3.7817	35.2488	0.0457	0.2458	-0.1197	-29.4521	203
Level 1	B59	203 G+Ey+0.3Q-NL Max	2.675	-3.7817	39.3909	0.0457	0.2458	-0.1423	-47.9258	203
Level 1	B59	203 G+Ex+0.3Q-NL Max	0.2	74.9052	-27.9984	0.3267	0.5687	-1.4067	-40.0195	203
Level 1	B59	203 G+Ex+0.3Q-NL Max	0.695	74.9052	-17.4894	0.3267	0.5687	-1.5671	-28.7534	203
Level 1	B59	203 G+Ex+0.3Q-NL Max	1.19	74.9052	-6.9804	0.3267	0.5687	-1.7278	-22.6936	203
Level 1	B59	203 G+Ex+0.3Q-NL Max	1.685	74.9052	3.5286	0.3267	0.5687	-1.842	-21.7482	203
Level 1	B59	203 G+Ex+0.3Q-NL Max	2.18	74.9052	14.0376	0.3267	0.5687	-1.7506	-25.8561	203
Level 1	B59	203 G+Ex+0.3Q-NL Max	2.675	74.9052	24.5466	0.3267	0.5687	-1.6596	-35.1702	203
Level 1	B74	224 G+Ey+0.3Q-NL Max	0.2	-19.0061	-25.3819	0.0197	-0.6582	-0.1149	-30.6964	224
Level 1	B74	224 G+Ey+0.3Q-NL Max	0.6456	-19.0061	-21.6529	0.0197	-0.6582	-0.1235	-20.2158	224
Level 1	B74	224 G+Ey+0.3Q-NL Max	1.0913	-19.0061	-17.9239	0.0197	-0.6582	-0.1321	-11.3963	224
Level 1	B74	224 G+Ey+0.3Q-NL Max	1.5369	-19.0061	-14.195	0.0197	-0.6582	-0.1407	-4.2381	224
Level 1	B74	224 G+Ey+0.3Q-NL Max	1.9825	-19.0061	-10.466	0.0197	-0.6582	-0.1494	1.2586	224
Level 1	B74	224 G+Ey+0.3Q-NL Max	2.4281	-19.0061	-6.737	0.0197	-0.6582	-0.158	5.0937	224
Level 1	B74	224 G+Ey+0.3Q-NL Max	2.8738	-19.0061	-3.008	0.0197	-0.6582	-0.1666	7.267	224
Level 1	B74	224 G+Ey+0.3Q-NL Max	3.3194	-19.0061	0.721	0.0197	-0.6582	-0.1751	7.7784	224
Level 1	B74	224 G+Ey+0.3Q-NL Max	3.765	-19.0061	4.4499	0.0197	-0.6582	-0.1837	6.6277	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	0.2	73.3357	-71.2158	0.1363	4.0682	-1.9907	-50.6968	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	0.6456	73.3357	-61.755	0.1363	4.0682	-1.9904	-21.0837	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	1.0913	73.3357	-52.2943	0.1363	4.0682	-1.9228	4.3115	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	1.5369	73.3357	-42.8335	0.1363	4.0682	-1.8555	25.4905	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	1.9825	73.3357	-33.3728	0.1363	4.0682	-1.7885	42.4553	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	2.4281	73.3357	-23.912	0.1363	4.0682	-1.7219	55.2074	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	2.8738	73.3357	-14.4513	0.1363	4.0682	-1.6556	63.7488	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	3.3194	73.3357	-4.9905	0.1363	4.0682	-1.5895	68.1024	224
Level 1	B74	224 G+Ex+0.3Q-NL Max	3.765	73.3357	4.4702	0.1363	4.0682	-1.5237	68.4735	224
Level 1	B86	225 G+Ey+0.3Q-NL Max	0	-30.9371	-6.0201	0.0189	-0.0094	-0.182	13.4515	225
Level 1	B86	225 G+Ey+0.3Q-NL Max	0.4456	-30.9371	-2.2911	0.0189	-0.0094	-0.1901	15.3046	225
Level 1	B86	225 G+Ey+0.3Q-NL Max	0.8913	-30.9371	1.4379	0.0189	-0.0094	-0.1982	15.495	225
Level 1	B86	225 G+Ey+0.3Q-NL Max	1.3369	-30.9371	5.1669	0.0189	-0.0094	-0.2062	14.023	225
Level 1	B86	225 G+Ey+0.3Q-NL Max	1.7825	-30.9371	8.8959	0.0189	-0.0094	-0.2143	10.8887	225
Level 1	B86	225 G+Ey+0.3Q-NL Max	2.2281	-30.9371	12.6248	0.0189	-0.0094	-0.2223	6.0924	225

Level 1	B86	225 G+Ey+0.3Q-NL Max	2.6738	-30.9371	16.3538	0.0189	-0.0094	-0.2303	-0.3657	225
Level 1	B86	225 G+Ey+0.3Q-NL Max	3.1194	-30.9371	20.0828	0.0189	-0.0094	-0.2383	-8.4854	225
Level 1	B86	225 G+Ey+0.3Q-NL Max	3.565	-30.9371	23.8118	0.0189	-0.0094	-0.2463	-18.2665	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	0	65.9305	-1.4322	0.0957	-12.6648	-1.8125	70.3184	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	0.4456	65.9305	8.0286	0.0957	-12.6648	-1.7922	69.1097	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	0.8913	65.9305	17.4893	0.0957	-12.6648	-1.7723	63.6935	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	1.3369	65.9305	26.9501	0.0957	-12.6648	-1.7526	54.0681	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	1.7825	65.9305	36.4108	0.0957	-12.6648	-1.7332	40.2315	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	2.2281	65.9305	45.8716	0.0957	-12.6648	-1.714	22.1819	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	2.6738	65.9305	55.3323	0.0957	-12.6648	-1.6951	-0.0824	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	3.1194	65.9305	64.7931	0.0957	-12.6648	-1.6765	-26.5633	225
Level 1	B86	225 G+Ex+0.3Q-NL Max	3.565	65.9305	74.2538	0.0957	-12.6648	-1.6582	-57.2627	225
Level 1	B41	230 G+Ey+0.3Q-NL Max	0.08	-34.1253	-8.3858	0.4047	3.0282	1.0454	8.5364	230-2
Level 1	B41	230 G+Ey+0.3Q-NL Max	0.455	-34.1253	-7.5345	0.4047	3.0282	0.8936	11.5224	230-2
Level 1	B41	230 G+Ey+0.3Q-NL Max	0.83	-34.1253	-6.6831	0.4047	3.0282	0.7418	14.1889	230-2
Level 1	B41	230 G+Ey+0.3Q-NL Max	0.83	-33.2877	-4.4591	0.3193	1.0989	0.4665	14.2281	230-3
Level 1	B41	230 G+Ey+0.3Q-NL Max	1.205	-33.2877	-3.6077	0.3193	1.0989	0.3467	15.741	230-3
Level 1	B41	230 G+Ey+0.3Q-NL Max	1.58	-33.2877	-2.7563	0.3193	1.0989	0.2269	16.9343	230-3
Level 1	B41	230 G+Ey+0.3Q-NL Max	1.58	-33.5265	-0.5897	0.4213	-0.7426	-0.0391	16.9442	230-4
Level 1	B41	230 G+Ey+0.3Q-NL Max	1.955	-33.5265	0.2617	0.4213	-0.7426	-0.1972	17.0053	230-4
Level 1	B41	230 G+Ey+0.3Q-NL Max	2.33	-33.5265	1.1131	0.4213	-0.7426	-0.3553	16.7467	230-4
Level 1	B41	230 G+Ey+0.3Q-NL Max	2.33	-33.9212	3.058	0.3137	-2.4754	-0.5957	16.7284	230-5
Level 1	B41	230 G+Ey+0.3Q-NL Max	2.685	-33.9212	3.8639	0.3137	-2.4754	-0.7071	15.4986	230-5
Level 1	B41	230 G+Ex+0.3Q-NL Max	0.08	-1.9963	94.6732	-2.9807	4.1063	-5.7961	144.9699	230-2
Level 1	B41	230 G+Ex+0.3Q-NL Max	0.455	-1.9963	96.8332	-2.9807	4.1063	-4.6784	109.302	230-2
Level 1	B41	230 G+Ex+0.3Q-NL Max	0.83	-1.9963	98.9932	-2.9807	4.1063	-3.5608	72.8238	230-2
Level 1	B41	230 G+Ex+0.3Q-NL Max	0.83	20.4932	102.2845	-2.6144	2.8321	-1.6278	72.2101	230-3
Level 1	B41	230 G+Ex+0.3Q-NL Max	1.205	20.4932	104.4445	-2.6144	2.8321	-0.6466	33.6996	230-3
Level 1	B41	230 G+Ex+0.3Q-NL Max	1.58	20.4932	106.6045	-2.6144	2.8321	0.3345	-5.6205	230-3
Level 1	B41	230 G+Ex+0.3Q-NL Max	1.58	50.8134	111.7875	-3.1588	0.4961	3.6701	-6.2996	230-4
Level 1	B41	230 G+Ex+0.3Q-NL Max	1.955	50.8134	113.9475	-3.1588	0.4961	6.1819	-48.361	230-4
Level 1	B41	230 G+Ex+0.3Q-NL Max	2.33	50.8134	116.1075	-3.1588	0.4961	8.6941	-91.2339	230-4
Level 1	B41	230 G+Ex+0.3Q-NL Max	2.33	63.2707	121.6829	-2.3067	-2.5955	12.6318	-92.1051	230-5

Level 1	B41	230 G+Ex+0.3Q-NL Max	2.685	63.2707	123.7277	-2.3067	-2.5955	14.3973	-135.4233	230-5
Level 1	B42	248 G+Ey+0.3Q-NL Max	0	16.4503	-25.7558	0.106	2.2054	-0.4387	-50.3138	248-1
Level 1	B42	248 G+Ey+0.3Q-NL Max	0.375	16.4503	-24.9045	0.106	2.2054	-0.478	-40.8148	248-1
Level 1	B42	248 G+Ey+0.3Q-NL Max	0.75	16.4503	-24.0531	0.106	2.2054	-0.5173	-31.6355	248-1
Level 1	B42	248 G+Ey+0.3Q-NL Max	0.75	4.7503	-19.2737	-0.1536	2.0138	0.5925	-30.7171	248-2
Level 1	B42	248 G+Ey+0.3Q-NL Max	1.0833	4.7503	-18.517	-0.1536	2.0138	0.6438	-24.4188	248-2
Level 1	B42	248 G+Ey+0.3Q-NL Max	1.0833	18.7401	-17.9296	0.505	1.9741	0.9452	-23.2314	248-3
Level 1	B42	248 G+Ey+0.3Q-NL Max	1.5	18.7401	-16.9836	0.505	1.9741	0.7354	-15.9589	248-3
Level 1	B42	248 G+Ey+0.3Q-NL Max	1.5	4.5633	-16.5543	0.7952	1.754	0.5881	-15.2899	248-4
Level 1	B42	248 G+Ey+0.3Q-NL Max	1.8333	4.5633	-15.7975	0.7952	1.754	0.3231	-9.8982	248-4
Level 1	B42	248 G+Ey+0.3Q-NL Max	2.1667	4.5633	-15.0407	0.7952	1.754	0.0582	-4.7587	248-4
Level 1	B42	248 G+Ey+0.3Q-NL Max	2.1667	21.1934	-8.7794	0.243	1.7051	0.1791	-3.976	248-5
Level 1	B42	248 G+Ey+0.3Q-NL Max	2.375	21.1934	-8.3064	0.243	1.7051	0.1288	-2.1971	248-5
Level 1	B42	248 G+Ey+0.3Q-NL Max	2.375	5.2687	-11.2634	2.7679	1.5233	0.5568	-1.6384	248-6
Level 1	B42	248 G+Ey+0.3Q-NL Max	2.7125	5.2687	-10.4971	2.7679	1.5233	-0.3772	2.0333	248-6
Level 1	B42	248 G+Ey+0.3Q-NL Max	3.05	5.2687	-9.7309	2.7679	1.5233	-1.3112	5.4465	248-6
Level 1	B42	248 G+Ex+0.3Q-NL Max	0	-27.6804	6.653	17.6439	-19.1272	17.2816	44.5949	248-1
Level 1	B42	248 G+Ex+0.3Q-NL Max	0.375	-27.6804	8.813	17.6439	-19.1272	10.6646	41.7026	248-1
Level 1	B42	248 G+Ex+0.3Q-NL Max	0.75	-27.6804	10.973	17.6439	-19.1272	4.0463	37.998	248-1
Level 1	B42	248 G+Ex+0.3Q-NL Max	0.75	0.5529	11.124	1.3855	-19.1355	-1.9127	37.5316	248-2
Level 1	B42	248 G+Ex+0.3Q-NL Max	1.0833	0.5529	13.044	1.3855	-19.1355	-2.0871	33.5054	248-2
Level 1	B42	248 G+Ex+0.3Q-NL Max	1.0833	-31.0271	14.4782	-0.7983	-19.2849	-2.228	32.7059	248-3
Level 1	B42	248 G+Ex+0.3Q-NL Max	1.5	-31.0271	16.8782	-0.7983	-19.2849	-1.7774	26.1745	248-3
Level 1	B42	248 G+Ex+0.3Q-NL Max	1.5	-0.7018	21.6345	-1.8203	-19.3519	-1.3835	25.4315	248-4
Level 1	B42	248 G+Ex+0.3Q-NL Max	1.8333	-0.7018	23.5545	-1.8203	-19.3519	-0.4942	17.8999	248-4
Level 1	B42	248 G+Ex+0.3Q-NL Max	2.1667	-0.7018	25.4745	-1.8203	-19.3519	0.3951	9.7282	248-4
Level 1	B42	248 G+Ex+0.3Q-NL Max	2.1667	-37.6008	18.4837	0.8193	-19.2321	0.7632	8.1185	248-5
Level 1	B42	248 G+Ex+0.3Q-NL Max	2.375	-37.6008	19.6837	0.8193	-19.2321	0.592	4.1422	248-5
Level 1	B42	248 G+Ex+0.3Q-NL Max	2.375	10.6028	32.0779	21.9243	-19.1337	-0.0285	2.6583	248-6
Level 1	B42	248 G+Ex+0.3Q-NL Max	2.7125	10.6028	34.0219	21.9243	-19.1337	11.6001	-8.3859	248-6
Level 1	B42	248 G+Ex+0.3Q-NL Max	3.05	10.6028	35.9659	21.9243	-19.1337	23.2288	-19.6124	248-6
Level 1	B164	254 G+Ey+0.3Q-NL Max	0.015	3.1294	0.7676	-1.0852	-0.7935	-2.7537	13.0602	254-2
Level 1	B164	254 G+Ey+0.3Q-NL Max	0.4843	3.1294	3.9654	-1.0852	-0.7935	-2.2444	11.9495	254-2

Level 1	B164	254 G+Ey+0.3Q-NL Max	0.9535	3.1294	7.1631	-1.0852	-0.7935	-1.7352	9.3383	254-2
Level 1	B164	254 G+Ey+0.3Q-NL Max	1.4228	3.1294	10.3608	-1.0852	-0.7935	-1.226	5.2265	254-2
Level 1	B164	254 G+Ey+0.3Q-NL Max	1.8921	3.1294	13.5586	-1.0852	-0.7935	-0.7168	-0.3858	254-2
Level 1	B164	254 G+Ey+0.3Q-NL Max	2.3613	3.1294	16.7563	-1.0852	-0.7935	-0.2076	-7.4987	254-2
Level 1	B164	254 G+Ey+0.3Q-NL Max	2.8306	3.1294	19.954	-1.0852	-0.7935	0.3016	-16.1123	254-2
Level 1	B164	254 G+Ex+0.3Q-NL Max	0.015	31.0975	-100.3627	4.6051	27.9259	9.1917	-195.5013	254-2
Level 1	B164	254 G+Ex+0.3Q-NL Max	0.4843	31.0975	-92.2498	4.6051	27.9259	7.0343	-150.3036	254-2
Level 1	B164	254 G+Ex+0.3Q-NL Max	0.9535	31.0975	-84.1368	4.6051	27.9259	4.8776	-108.9214	254-2
Level 1	B164	254 G+Ex+0.3Q-NL Max	1.4228	31.0975	-76.0239	4.6051	27.9259	2.7356	-71.3526	254-2
Level 1	B164	254 G+Ex+0.3Q-NL Max	1.8921	31.0975	-67.9109	4.6051	27.9259	1.4722	-36.6864	254-2
Level 1	B164	254 G+Ex+0.3Q-NL Max	2.3613	31.0975	-59.798	4.6051	27.9259	0.2088	-2.7782	254-2
Level 1	B164	254 G+Ex+0.3Q-NL Max	2.8306	31.0975	-51.6851	4.6051	27.9259	-1.0546	27.3228	254-2
Level 1	B117	58 G+Ey+0.3Q-NL Max	0.2	3.5929	0.0845	0.4615	-1.2328	0.0361	9.3491	58-1
Level 1	B117	58 G+Ey+0.3Q-NL Max	0.475	3.5929	0.6048	0.4615	-1.2328	-0.0907	9.2543	58-1
Level 1	B117	58 G+Ey+0.3Q-NL Max	0.75	3.5929	1.1251	0.4615	-1.2328	-0.2176	9.0164	58-1
Level 1	B117	58 G+Ey+0.3Q-NL Max	0.75	7.2418	3.9278	-1.5474	-1.1323	-1.0385	8.9871	58-2
Level 1	B117	58 G+Ey+0.3Q-NL Max	1.125	7.2418	4.6372	-1.5474	-1.1323	-0.4581	7.3812	58-2
Level 1	B117	58 G+Ey+0.3Q-NL Max	1.5	7.2418	5.3467	-1.5474	-1.1323	0.1223	5.5093	58-2
Level 1	B117	58 G+Ey+0.3Q-NL Max	1.5	9.6281	9.1127	-1.759	-0.9957	-0.8859	5.429	58-3
Level 1	B117	58 G+Ey+0.3Q-NL Max	1.875	9.6281	9.8222	-1.759	-0.9957	-0.2261	1.8789	58-3
Level 1	B117	58 G+Ey+0.3Q-NL Max	2.25	9.6281	10.5316	-1.759	-0.9957	0.4337	-1.9372	58-3
Level 1	B117	58 G+Ey+0.3Q-NL Max	2.25	11.6949	14.4324	-2.1399	-0.91	-1.0597	-2.0773	58-4
Level 1	B117	58 G+Ey+0.3Q-NL Max	2.625	11.6949	15.1419	-2.1399	-0.91	-0.257	-7.6223	58-4
Level 1	B117	58 G+Ey+0.3Q-NL Max	3	11.6949	15.8513	-2.1399	-0.91	0.5457	-13.4334	58-4
Level 1	B117	58 G+Ey+0.3Q-NL Max	3	12.9027	19.1868	-5.7234	-0.9697	-0.857	-13.6203	58-5
Level 1	B117	58 G+Ey+0.3Q-NL Max	3.3383	12.9027	19.827	-5.7234	-0.9697	1.0797	-20.2202	58-5
Level 1	B117	58 G+Ey+0.3Q-NL Max	3.6767	12.9027	20.4671	-5.7234	-0.9697	3.0163	-27.0369	58-5
Level 1	B117	58 G+Ey+0.3Q-NL Max	4.015	12.9027	21.1072	-5.7234	-0.9697	4.953	-34.0705	58-5
Level 1	B117	58 G+Ex+0.3Q-NL Max	0.2	-11.8271	-44.5862	72.6558	-2.9439	43.6578	-21.3499	58-1
Level 1	B117	58 G+Ex+0.3Q-NL Max	0.475	-11.8271	-43.2662	72.6558	-2.9439	23.677	-9.2701	58-1
Level 1	B117	58 G+Ex+0.3Q-NL Max	0.75	-11.8271	-41.9462	72.6558	-2.9439	3.6959	2.4467	58-1
Level 1	B117	58 G+Ex+0.3Q-NL Max	0.75	-10.1796	-39.4243	9.5751	-2.4168	7.4699	2.956	58-2
Level 1	B117	58 G+Ex+0.3Q-NL Max	1.125	-10.1796	-37.6243	9.5751	-2.4168	5.3611	17.4028	58-2

Level 1	B117	58 G+Ex+0.3Q-NL Max	1.5	-10.1796	-35.8243	9.5751	-2.4168	3.252	31.1742	58-2
Level 1	B117	58 G+Ex+0.3Q-NL Max	1.5	-4.9667	-28.9427	9.8003	-1.2615	5.1291	31.5432	58-3
Level 1	B117	58 G+Ex+0.3Q-NL Max	1.875	-4.9667	-27.1427	9.8003	-1.2615	1.4538	42.0778	58-3
Level 1	B117	58 G+Ex+0.3Q-NL Max	2.25	-4.9667	-25.3427	9.8003	-1.2615	-2.2215	52.2502	58-3
Level 1	B117	58 G+Ex+0.3Q-NL Max	2.25	9.0155	-18.0216	9.4323	0.3271	3.427	52.5017	58-4
Level 1	B117	58 G+Ex+0.3Q-NL Max	2.625	9.0155	-16.2216	9.4323	0.3271	1.0566	59.2692	58-4
Level 1	B117	58 G+Ex+0.3Q-NL Max	3	9.0155	-14.4216	9.4323	0.3271	-0.9544	65.3623	58-4
Level 1	B117	58 G+Ex+0.3Q-NL Max	3	34.0092	-10.2269	29.809	2.2939	4.7613	65.4185	58-5
Level 1	B117	58 G+Ex+0.3Q-NL Max	3.3383	34.0092	-8.6029	29.809	2.2939	-3.3974	68.9304	58-5
Level 1	B117	58 G+Ex+0.3Q-NL Max	3.6767	34.0092	-6.9789	29.809	2.2939	-7.0208	71.8949	58-5
Level 1	B117	58 G+Ex+0.3Q-NL Max	4.015	34.0092	-5.3549	29.809	2.2939	-10.6441	74.3124	58-5
Level 1	B167	255 G+Ey+0.3Q-NL Max	0	-8.8442	-16.2424	-0.5763	6.7103	-4.1966	-7.1356	255-1
Level 1	B167	255 G+Ey+0.3Q-NL Max	0.3636	-8.8442	-13.7647	-0.5763	6.7103	-3.9873	-1.6797	255-1
Level 1	B167	255 G+Ey+0.3Q-NL Max	0.7272	-8.8442	-11.287	-0.5763	6.7103	-3.7779	2.8754	255-1
Level 1	B167	255 G+Ey+0.3Q-NL Max	0.7272	-13.3155	-11.2318	-0.1862	6.3406	-3.2388	2.9776	255-2
Level 1	B167	255 G+Ey+0.3Q-NL Max	0.9908	-13.3155	-9.4356	-0.1862	6.3406	-3.1899	5.7024	255-2
Level 1	B167	255 G+Ey+0.3Q-NL Max	1.2544	-13.3155	-7.6393	-0.1862	6.3406	-3.1409	7.9535	255-2
Level 1	B167	255 G+Ex+0.3Q-NL Max	0	37.6844	223.4125	2.5063	12.8076	15.4315	121.3769	255-1
Level 1	B167	255 G+Ex+0.3Q-NL Max	0.3636	37.6844	229.6986	2.5063	12.8076	14.5204	41.6502	255-1
Level 1	B167	255 G+Ex+0.3Q-NL Max	0.7272	37.6844	235.9848	2.5063	12.8076	13.6103	-40.3604	255-1
Level 1	B167	255 G+Ex+0.3Q-NL Max	0.7272	33.3406	241.8194	1.3303	11.4131	11.4929	-42.1592	255-2
Level 1	B167	255 G+Ex+0.3Q-NL Max	0.9908	33.3406	246.3767	1.3303	11.4131	11.1434	-104.5597	255-2
Level 1	B167	255 G+Ex+0.3Q-NL Max	1.2544	33.3406	250.9341	1.3303	11.4131	10.7943	-168.1635	255-2
Level 1	B163	249 G+Ey+0.3Q-NL Max	0.3	-11.6935	-10.1949	-0.1795	5.9438	-0.723	-18.5603	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	0.7927	-11.6935	-9.2627	-0.1795	5.9438	-0.6346	-13.7663	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	1.2855	-11.6935	-8.3305	-0.1795	5.9438	-0.5461	-9.4314	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	1.7782	-11.6935	-7.3983	-0.1795	5.9438	-0.4576	-5.5556	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	2.2709	-11.6935	-6.4661	-0.1795	5.9438	-0.3691	-2.139	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	2.7636	-11.6935	-5.5338	-0.1795	5.9438	-0.2806	0.8185	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	3.2564	-11.6935	-4.6016	-0.1795	5.9438	-0.1921	3.3166	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	3.7491	-11.6935	-3.6694	-0.1795	5.9438	-0.1036	5.3554	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	4.2418	-11.6935	-2.7372	-0.1795	5.9438	-0.015	6.9349	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	4.7345	-11.6935	-1.805	-0.1795	5.9438	0.0735	8.0548	249

Level 1	B163	249 G+Ey+0.3Q-NL Max	5.2273	-11.6935	-0.8728	-0.1795	5.9438	0.162	8.7153	249
Level 1	B163	249 G+Ey+0.3Q-NL Max	5.72	-11.6935	0.0594	-0.1795	5.9438	0.2506	8.9161	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	0.3	379.3618	3.5848	3.179	-3.556	12.5973	51.1027	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	0.7927	379.3618	5.9499	3.179	-3.556	10.9821	48.6856	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	1.2855	379.3618	8.315	3.179	-3.556	9.3798	45.1413	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	1.7782	379.3618	10.6801	3.179	-3.556	7.7886	40.4641	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	2.2709	379.3618	13.0452	3.179	-3.556	6.2068	34.6482	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	2.7636	379.3618	15.4103	3.179	-3.556	4.6322	27.6878	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	3.2564	379.3618	17.7754	3.179	-3.556	3.0633	19.5771	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	3.7491	379.3618	20.1405	3.179	-3.556	1.4979	10.3414	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	4.2418	379.3618	22.5056	3.179	-3.556	0.0704	-0.0153	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	4.7345	379.3618	24.8707	3.179	-3.556	-1.1259	-11.5397	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	5.2273	379.3618	27.2357	3.179	-3.556	-2.3235	-24.2378	249
Level 1	B163	249 G+Ex+0.3Q-NL Max	5.72	379.3618	29.6008	3.179	-3.556	-3.5237	-38.1155	249
Level 1	B168	303 G+Ey+0.3Q-NL Max	0.2	10.3841	-3.8411	0.307	-5.4027	0.8503	-0.8981	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	0.6821	10.3841	-2.9291	0.307	-5.4027	0.7024	0.734	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	1.1642	10.3841	-2.017	0.307	-5.4027	0.5545	1.9265	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	1.6463	10.3841	-1.1049	0.307	-5.4027	0.4067	2.6793	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	2.1283	10.3841	-0.1929	0.307	-5.4027	0.2588	2.9925	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	2.6104	10.3841	0.7192	0.307	-5.4027	0.1109	2.866	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	3.0925	10.3841	1.6313	0.307	-5.4027	-0.0369	2.2998	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	3.5746	10.3841	2.5433	0.307	-5.4027	-0.1848	1.2939	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	4.0567	10.3841	3.4554	0.307	-5.4027	-0.3326	-0.1517	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	4.5388	10.3841	4.3675	0.307	-5.4027	-0.4805	-2.0371	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	5.0208	10.3841	5.2795	0.307	-5.4027	-0.6284	-4.3622	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	5.5029	10.3841	6.1916	0.307	-5.4027	-0.7763	-7.1271	303
Level 1	B168	303 G+Ey+0.3Q-NL Max	5.985	10.3841	7.1037	0.307	-5.4027	-0.9242	-10.3317	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	0.2	82.7634	20.1788	1.6723	-2.2629	7.1523	28.6218	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	0.6821	82.7634	22.4928	1.6723	-2.2629	6.3369	18.3485	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	1.1642	82.7634	24.8068	1.6723	-2.2629	5.5229	6.9633	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	1.6463	82.7634	27.1208	1.6723	-2.2629	4.7102	-5.5362	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	2.1283	82.7634	29.4348	1.6723	-2.2629	3.8987	-19.1525	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	2.6104	82.7634	31.7488	1.6723	-2.2629	3.088	-33.8879	303

Level 1	B168	303 G+Ex+0.3Q-NL Max	3.0925	82.7634	34.0628	1.6723	-2.2629	2.2781	-49.7451	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	3.5746	82.7634	36.3768	1.6723	-2.2629	1.4687	-66.5691	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	4.0567	82.7634	38.6908	1.6723	-2.2629	0.6597	-84.4036	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	4.5388	82.7634	41.0048	1.6723	-2.2629	-0.1492	-103.3677	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	5.0208	82.7634	43.3188	1.6723	-2.2629	-0.9582	-123.4642	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	5.5029	82.7634	45.6328	1.6723	-2.2629	-1.3057	-144.6956	303
Level 1	B168	303 G+Ex+0.3Q-NL Max	5.985	82.7634	47.9468	1.6723	-2.2629	-1.601	-167.0644	303
Level 1	B76	909 G+Ey+0.3Q-NL Max	0.2	-26.9335	-20.0269	-6.5025	0.9398	-10.4923	-34.2107	909
Level 1	B76	909 G+Ey+0.3Q-NL Max	0.6414	-26.9335	-19.1917	-6.5025	0.9398	-7.6217	-25.545	909
Level 1	B76	909 G+Ey+0.3Q-NL Max	1.0829	-26.9335	-18.3566	-6.5025	0.9398	-4.7506	-17.2467	909
Level 1	B76	909 G+Ey+0.3Q-NL Max	1.5243	-26.9335	-17.5214	-6.5025	0.9398	-1.8792	-9.3164	909
Level 1	B76	909 G+Ey+0.3Q-NL Max	1.9657	-26.9335	-16.6863	-6.5025	0.9398	0.9924	-1.7543	909
Level 1	B76	909 G+Ey+0.3Q-NL Max	2.4071	-26.9335	-15.8511	-6.5025	0.9398	3.8638	5.4392	909
Level 1	B76	909 G+Ey+0.3Q-NL Max	2.8486	-26.9335	-15.016	-6.5025	0.9398	6.735	12.2639	909
Level 1	B76	909 G+Ey+0.3Q-NL Max	3.29	-26.9335	-14.1808	-6.5025	0.9398	9.6058	18.7194	909
Level 1	B76	909 G+Ex+0.3Q-NL Max	0.2	1094.5334	-10.6349	13.8357	0.8412	16.0456	-14.8503	909
Level 1	B76	909 G+Ex+0.3Q-NL Max	0.6414	1094.5334	-8.5161	13.8357	0.8412	9.9529	-10.5199	909
Level 1	B76	909 G+Ex+0.3Q-NL Max	1.0829	1094.5334	-6.3972	13.8357	0.8412	3.8865	-7.1419	909
Level 1	B76	909 G+Ex+0.3Q-NL Max	1.5243	1094.5334	-4.2784	13.8357	0.8412	-2.1695	-4.7136	909
Level 1	B76	909 G+Ex+0.3Q-NL Max	1.9657	1094.5334	-2.1595	13.8357	0.8412	-1.8163	-3.1876	909
Level 1	B76	909 G+Ex+0.3Q-NL Max	2.4071	1094.5334	-0.0407	13.8357	0.8412	3.4931	-1.8738	909
Level 1	B76	909 G+Ex+0.3Q-NL Max	2.8486	1094.5334	2.0782	13.8357	0.8412	8.8121	-1.5011	909
Level 1	B76	909 G+Ex+0.3Q-NL Max	3.29	1094.5334	4.1971	13.8357	0.8412	14.1553	-2.0655	909
Level 1	B190	908 G+Ey+0.3Q-NL Max	0.2	80.7013	-8.097	-0.1599	-0.8089	0.282	18.1748	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	0.6925	80.7013	-4.7409	-0.1599	-0.8089	0.3594	21.3377	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	1.185	80.7013	-1.3849	-0.1599	-0.8089	0.4369	22.8535	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	1.6775	80.7013	1.9712	-0.1599	-0.8089	0.5145	22.7211	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	2.17	80.7013	5.3272	-0.1599	-0.8089	0.5922	20.9392	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	2.6625	80.7013	8.6833	-0.1599	-0.8089	0.6701	17.5065	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	3.155	80.7013	12.0394	-0.1599	-0.8089	0.7482	12.4219	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	3.6475	80.7013	15.3954	-0.1599	-0.8089	0.8264	5.6842	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	4.14	80.7013	18.7515	-0.1599	-0.8089	0.9049	-2.7079	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	4.6325	80.7013	22.1075	-0.1599	-0.8089	0.9836	-12.7556	908

Level 1	B190	908 G+Ey+0.3Q-NL Max	5.125	80.7013	25.4636	-0.1599	-0.8089	1.0625	-24.4602	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	5.6175	80.7013	28.8196	-0.1599	-0.8089	1.1417	-37.8227	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	6.11	80.7013	32.1757	-0.1599	-0.8089	1.2212	-52.8446	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	6.6025	80.7013	35.5317	-0.1599	-0.8089	1.301	-69.5269	908
Level 1	B190	908 G+Ey+0.3Q-NL Max	7.095	80.7013	38.8878	-0.1599	-0.8089	1.3811	-87.8709	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	0.2	377.9791	-69.1526	1.9544	-1.243	2.4363	-72.6751	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	0.6925	377.9791	-60.638	1.9544	-1.243	1.5338	-40.9189	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	1.185	377.9791	-52.1234	1.9544	-1.243	0.6331	-13.359	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	1.6775	377.9791	-43.6087	1.9544	-1.243	-0.2667	10.008	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	2.17	377.9791	-35.0941	1.9544	-1.243	-1.1669	29.1852	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	2.6625	377.9791	-26.5795	1.9544	-1.243	-1.3338	44.1757	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	3.155	377.9791	-18.0649	1.9544	-1.243	-1.1485	54.983	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	3.6475	377.9791	-9.5503	1.9544	-1.243	-0.9645	61.61	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	4.14	377.9791	-1.0357	1.9544	-1.243	-0.7816	64.0601	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	4.6325	377.9791	7.4789	1.9544	-1.243	-0.5996	62.3364	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	5.125	377.9791	15.9935	1.9544	-1.243	-0.4182	56.4421	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	5.6175	377.9791	24.5081	1.9544	-1.243	-0.2373	46.3805	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	6.11	377.9791	33.0227	1.9544	-1.243	-0.0566	32.1547	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	6.6025	377.9791	41.5373	1.9544	-1.243	0.124	13.7679	908
Level 1	B190	908 G+Ex+0.3Q-NL Max	7.095	377.9791	50.052	1.9544	-1.243	0.3047	-8.6363	908
Level 1	B193	910 G+Ey+0.3Q-NL Max	0.2	-55.4228	0.1492	-0.2274	0.2533	-0.8435	62.7947	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	0.6654	-55.4228	3.3203	-0.2274	0.2533	-0.7381	62.002	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	1.1307	-55.4228	6.4913	-0.2274	0.2533	-0.6326	59.7262	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	1.5961	-55.4228	9.6624	-0.2274	0.2533	-0.527	55.9683	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	2.0614	-55.4228	12.8335	-0.2274	0.2533	-0.4214	50.7294	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	2.5268	-55.4228	16.0046	-0.2274	0.2533	-0.3156	44.0105	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	2.9921	-55.4228	19.1757	-0.2274	0.2533	-0.2098	35.8126	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	3.4575	-55.4228	22.3468	-0.2274	0.2533	-0.104	26.1367	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	3.9229	-55.4228	25.5179	-0.2274	0.2533	0.0018	14.9839	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	4.3882	-55.4228	28.689	-0.2274	0.2533	0.1076	2.3552	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	4.8536	-55.4228	31.8601	-0.2274	0.2533	0.2134	-11.7483	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	5.3189	-55.4228	35.0312	-0.2274	0.2533	0.3192	-27.3258	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	5.7843	-55.4228	38.2023	-0.2274	0.2533	0.4249	-44.376	910

Level 1	B193	910 G+Ey+0.3Q-NL Max	6.2496	-55.4228	41.3734	-0.2274	0.2533	0.5306	-62.898	910
Level 1	B193	910 G+Ey+0.3Q-NL Max	6.715	-55.4228	44.5445	-0.2274	0.2533	0.6362	-82.8908	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	0.2	544.9664	-43.4945	-0.2414	10.5088	1.7477	-16.5362	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	0.6654	544.9664	-35.4491	-0.2414	10.5088	1.7929	1.8866	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	1.1307	544.9664	-27.4038	-0.2414	10.5088	1.8407	16.5967	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	1.5961	544.9664	-19.3584	-0.2414	10.5088	1.891	27.589	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	2.0614	544.9664	-11.3131	-0.2414	10.5088	1.9439	34.8582	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	2.5268	544.9664	-3.2677	-0.2414	10.5088	1.9996	38.5009	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	2.9921	544.9664	4.7776	-0.2414	10.5088	2.0582	38.6541	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	3.4575	544.9664	12.823	-0.2414	10.5088	2.1196	35.0693	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	3.9229	544.9664	20.8683	-0.2414	10.5088	2.1841	27.7412	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	4.3882	544.9664	28.9137	-0.2414	10.5088	2.2517	16.6644	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	4.8536	544.9664	36.959	-0.2414	10.5088	2.3225	1.8336	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	5.3189	544.9664	45.0044	-0.2414	10.5088	3.0621	-16.7566	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	5.7843	544.9664	53.0497	-0.2414	10.5088	4.2669	-39.1113	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	6.2496	544.9664	61.0951	-0.2414	10.5088	5.4782	-65.2361	910
Level 1	B193	910 G+Ex+0.3Q-NL Max	6.715	544.9664	69.1404	-0.2414	10.5088	6.6978	-95.1362	910
Level 1	B119	873 G+Ey+0.3Q-NL Max	0.2	12.2037	-14.5562	-0.0533	-0.4123	-0.0214	3.0872	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	0.6925	12.2037	-10.1733	-0.0533	-0.4123	0.0048	9.1786	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	1.185	12.2037	-5.7903	-0.0533	-0.4123	0.031	13.1121	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	1.6775	12.2037	-1.4073	-0.0533	-0.4123	0.0571	14.8875	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	2.17	12.2037	2.9757	-0.0533	-0.4123	0.0833	14.5045	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	2.6625	12.2037	7.3587	-0.0533	-0.4123	0.1095	11.963	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	3.155	12.2037	11.7417	-0.0533	-0.4123	0.1356	7.2628	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	3.6475	12.2037	16.1247	-0.0533	-0.4123	0.1618	0.4038	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	4.14	12.2037	20.5077	-0.0533	-0.4123	0.188	-8.6144	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	4.6325	12.2037	24.8907	-0.0533	-0.4123	0.2142	-19.7919	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	5.125	12.2037	29.2737	-0.0533	-0.4123	0.2404	-33.1288	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	5.6175	12.2037	33.6567	-0.0533	-0.4123	0.2666	-48.6254	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	6.11	12.2037	38.0397	-0.0533	-0.4123	0.2928	-66.2819	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	6.6025	12.2037	42.4227	-0.0533	-0.4123	0.3191	-86.0985	873
Level 1	B119	873 G+Ey+0.3Q-NL Max	7.095	12.2037	46.8056	-0.0533	-0.4123	0.3453	-108.0753	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	0.2	-23.4817	-86.9968	1.9685	4.329	6.3609	-103.6827	873

Level 1	B119	873 G+Ex+0.3Q-NL Max	0.6925	-23.4817	-75.8768	1.9685	4.329	5.3897	-63.5705	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	1.185	-23.4817	-64.7568	1.9685	4.329	4.4181	-28.9342	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	1.6775	-23.4817	-53.6367	1.9685	4.329	3.4462	0.226	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	2.17	-23.4817	-42.5167	1.9685	4.329	2.474	23.9099	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	2.6625	-23.4817	-31.3966	1.9685	4.329	1.5017	42.1172	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	3.155	-23.4817	-20.2766	1.9685	4.329	1.1272	54.8477	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	3.6475	-23.4817	-9.1566	1.9685	4.329	0.8247	62.1485	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	4.14	-23.4817	1.9635	1.9685	4.329	0.5222	64.0119	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	4.6325	-23.4817	13.0835	1.9685	4.329	0.2197	60.3976	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	5.125	-23.4817	24.2036	1.9685	4.329	-0.0829	51.3055	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	5.6175	-23.4817	35.3236	1.9685	4.329	-0.3855	36.7352	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	6.11	-23.4817	46.4436	1.9685	4.329	-0.6881	16.6865	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	6.6025	-23.4817	57.5637	1.9685	4.329	-0.9905	-8.8409	873
Level 1	B119	873 G+Ex+0.3Q-NL Max	7.095	-23.4817	68.6837	1.9685	4.329	-1.2929	-39.8473	873
Level 1	B134	912 G+Ey+0.3Q-NL Max	0.2	-20.8204	-9.8766	0.1117	0.8077	0.3139	60.9756	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	0.6654	-20.8204	-5.7351	0.1117	0.8077	0.2619	64.6174	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	1.1307	-20.8204	-1.5937	0.1117	0.8077	0.21	66.3288	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	1.5961	-20.8204	2.5478	0.1117	0.8077	0.158	66.1104	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	2.0614	-20.8204	6.6892	0.1117	0.8077	0.1061	63.9623	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	2.5268	-20.8204	10.8306	0.1117	0.8077	0.0541	59.8849	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	2.9921	-20.8204	14.9721	0.1117	0.8077	0.0021	53.8786	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	3.4575	-20.8204	19.1135	0.1117	0.8077	-0.0499	45.9436	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	3.9229	-20.8204	23.2549	0.1117	0.8077	-0.1018	36.0804	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	4.3882	-20.8204	27.3964	0.1117	0.8077	-0.1538	24.2892	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	4.8536	-20.8204	31.5378	0.1117	0.8077	-0.2058	10.5704	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	5.3189	-20.8204	35.6792	0.1117	0.8077	-0.2577	-5.0758	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	5.7843	-20.8204	39.8207	0.1117	0.8077	-0.3097	-22.6489	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	6.2496	-20.8204	43.9621	0.1117	0.8077	-0.3616	-42.1486	912
Level 1	B134	912 G+Ey+0.3Q-NL Max	6.715	-20.8204	48.1035	0.1117	0.8077	-0.4135	-63.5747	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	0.2	-114.2718	-66.4754	-1.109	-4.8772	-1.5549	-45.0914	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	0.6654	-114.2718	-55.9682	-1.109	-4.8772	-1.0251	-16.5985	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	1.1307	-114.2718	-45.461	-1.109	-4.8772	-0.4949	6.9991	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	1.5961	-114.2718	-34.9538	-1.109	-4.8772	0.0355	25.7021	912

Level 1	B134	912 G+Ex+0.3Q-NL Max	2.0614	-114.2718	-24.4466	-1.109	-4.8772	0.5659	39.5112	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	2.5268	-114.2718	-13.9395	-1.109	-4.8772	1.096	48.4271	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	2.9921	-114.2718	-3.4323	-1.109	-4.8772	1.6258	52.4506	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	3.4575	-114.2718	7.0749	-1.109	-4.8772	2.1551	51.5823	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	3.9229	-114.2718	17.5821	-1.109	-4.8772	2.6836	45.8231	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	4.3882	-114.2718	28.0893	-1.109	-4.8772	3.2112	35.1735	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	4.8536	-114.2718	38.5965	-1.109	-4.8772	3.9869	19.6459	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	5.3189	-114.2718	49.1037	-1.109	-4.8772	5.1965	-0.7471	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	5.7843	-114.2718	59.6109	-1.109	-4.8772	6.4044	-26.0283	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	6.2496	-114.2718	70.118	-1.109	-4.8772	7.6103	-56.1971	912
Level 1	B134	912 G+Ex+0.3Q-NL Max	6.715	-114.2718	80.6252	-1.109	-4.8772	8.8138	-91.2529	912
Level 1	B114	469 G+Ey+0.3Q-NL Max	0.3	-5.7354	-7.2882	-0.0855	-1.489	-0.1437	-11.3449	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	0.7927	-5.7354	-6.5424	-0.0855	-1.489	-0.1015	-7.9373	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	1.2855	-5.7354	-5.7967	-0.0855	-1.489	-0.0593	-4.8971	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	1.7782	-5.7354	-5.0509	-0.0855	-1.489	-0.0172	-2.2242	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	2.2709	-5.7354	-4.3051	-0.0855	-1.489	0.025	0.0813	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	2.7636	-5.7354	-3.5594	-0.0855	-1.489	0.0672	2.0194	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	3.2564	-5.7354	-2.8136	-0.0855	-1.489	0.1094	3.5901	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	3.7491	-5.7354	-2.0678	-0.0855	-1.489	0.1515	4.7932	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	4.2418	-5.7354	-1.3221	-0.0855	-1.489	0.1937	5.6288	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	4.7345	-5.7354	-0.5763	-0.0855	-1.489	0.2359	6.0969	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	5.2273	-5.7354	0.1695	-0.0855	-1.489	0.278	6.1973	469
Level 1	B114	469 G+Ey+0.3Q-NL Max	5.72	-5.7354	0.9152	-0.0855	-1.489	0.3202	5.9302	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	0.3	147.492	-16.7153	2.7892	0.1893	5.8779	-12.1177	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	0.7927	147.492	-14.8232	2.7892	0.1893	4.5013	-4.4609	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	1.2855	147.492	-12.9311	2.7892	0.1893	3.127	2.2822	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	1.7782	147.492	-11.0391	2.7892	0.1893	1.7543	8.1119	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	2.2709	147.492	-9.147	2.7892	0.1893	0.8386	13.012	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	2.7636	147.492	-7.2549	2.7892	0.1893	0.2674	16.984	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	3.2564	147.492	-5.3629	2.7892	0.1893	-0.3037	20.0296	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	3.7491	147.492	-3.4708	2.7892	0.1893	-0.8749	22.1504	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	4.2418	147.492	-1.5787	2.7892	0.1893	-1.4466	23.3479	469
Level 1	B114	469 G+Ex+0.3Q-NL Max	4.7345	147.492	0.3134	2.7892	0.1893	-2.0192	23.6238	469

Level 1	B114	469	G+Ex+0.3Q-NL Max	5.2273	147.492	2.2054	2.7892	0.1893	-2.5929	22.9796	469
Level 1	B114	469	G+Ex+0.3Q-NL Max	5.72	147.492	4.0975	2.7892	0.1893	-3.1681	21.417	469
Level 1	B115	473	G+Ey+0.3Q-NL Max	0.2	-23.6678	-6.7796	0.2165	1.9071	0.8504	-11.1863	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	0.6821	-23.6678	-6.0499	0.2165	1.9071	0.746	-8.0938	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	1.1642	-23.6678	-5.3203	0.2165	1.9071	0.6415	-5.3525	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	1.6463	-23.6678	-4.5906	0.2165	1.9071	0.537	-2.9625	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	2.1283	-23.6678	-3.861	0.2165	1.9071	0.4324	-0.9239	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	2.6104	-23.6678	-3.1313	0.2165	1.9071	0.3277	0.7631	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	3.0925	-23.6678	-2.4017	0.2165	1.9071	0.2231	2.0985	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	3.5746	-23.6678	-1.672	0.2165	1.9071	0.1184	3.0822	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	4.0567	-23.6678	-0.9424	0.2165	1.9071	0.0137	3.7141	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	4.5388	-23.6678	-0.2127	0.2165	1.9071	-0.091	3.994	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	5.0208	-23.6678	0.517	0.2165	1.9071	-0.1957	3.9219	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	5.5029	-23.6678	1.2466	0.2165	1.9071	-0.3004	3.4976	473
Level 1	B115	473	G+Ey+0.3Q-NL Max	5.985	-23.6678	1.9763	0.2165	1.9071	-0.405	2.7211	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	0.2	197.6439	-15.7289	2.5633	2.8767	4.6935	-36.5748	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	0.6821	197.6439	-13.8777	2.5633	2.8767	3.4586	-29.4861	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	1.1642	197.6439	-12.0265	2.5633	2.8767	2.2263	-23.3079	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	1.6463	197.6439	-10.1753	2.5633	2.8767	0.9956	-18.0385	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	2.1283	197.6439	-8.3241	2.5633	2.8767	0.5194	-13.6581	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	2.6104	197.6439	-6.4729	2.5633	2.8767	0.5302	-10.1702	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	3.0925	197.6439	-4.6217	2.5633	2.8767	0.5412	-7.585	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	3.5746	197.6439	-2.7705	2.5633	2.8767	0.5527	-5.9011	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	4.0567	197.6439	-0.9193	2.5633	2.8767	0.5645	-5.1171	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	4.5388	197.6439	0.9319	2.5633	2.8767	0.5766	-5.2317	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	5.0208	197.6439	2.7831	2.5633	2.8767	0.5892	-6.2435	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	5.5029	197.6439	4.6343	2.5633	2.8767	0.6021	-8.151	473
Level 1	B115	473	G+Ex+0.3Q-NL Max	5.985	197.6439	6.4855	2.5633	2.8767	0.6154	-10.953	473

TABLE: Concrete Column Forces

Story	Column	Unique Name	Load Case/Combo	Station	P	V2	V3	T	M2	M3	Element
				m	kN	kN	kN	kN-m	kN-m	kN-m	
Level 3	C26	922 G+Ey+0.3Q-NL Max		0	-55.4532	-17.5639	-122.0694	35.8614	-192.6398	-14.2509	922-1
Level 3	C26	922 G+Ey+0.3Q-NL Max		0.93	-52.2861	-17.5639	-122.0694	35.8614	-79.1852	2.0866	922-1
Level 3	C26	922 G+Ey+0.3Q-NL Max		1.6685	-49.7713	-17.5639	-122.0694	35.8614	10.9102	15.0592	922-1
Level 3	C26	922 G+Ey+0.3Q-NL Max		1.6685	-45.522	-22.9658	48.9653	73.6965	71.5608	15.051	922-2
Level 3	C26	922 G+Ey+0.3Q-NL Max		1.86	-44.8697	-22.9658	48.9653	73.6965	62.1708	19.4505	922-2
Level 3	C26	922 G+Ex+0.3Q-NL Max		0	130.7324	165.3781	-26.2171	-44.791	-8.3378	82.0867	922-1
Level 3	C26	922 G+Ex+0.3Q-NL Max		0.93	138.7676	165.3781	-26.2171	-44.791	16.0441	-70.7072	922-1
Level 3	C26	922 G+Ex+0.3Q-NL Max		1.6685	145.1479	165.3781	-26.2171	-44.791	35.6828	-191.3094	922-1
Level 3	C26	922 G+Ex+0.3Q-NL Max		1.6685	239.6498	35.5628	14.0477	16.0035	20.2182	-191.7875	922-2
Level 3	C26	922 G+Ex+0.3Q-NL Max		1.86	241.3048	35.5628	14.0477	16.0035	17.5312	-198.3209	922-2
Level 3	C44	925 G+Ey+0.3Q-NL Max		0	-7.3828	5.6587	3.3698	-11.1858	3.1635	5.6006	925
Level 3	C44	925 G+Ey+0.3Q-NL Max		1.17	-5.612	5.6587	3.3698	-11.1858	-0.7878	-1.0204	925
Level 3	C44	925 G+Ey+0.3Q-NL Max		2.34	-3.8411	5.6587	3.3698	-11.1858	-4.7391	-7.6412	925
Level 3	C44	925 G+Ex+0.3Q-NL Max		0	-187.3474	69.1589	14.7918	-28.1481	1.5568	48.9127	925
Level 3	C44	925 G+Ex+0.3Q-NL Max		1.17	-182.8546	69.1589	14.7918	-28.1481	-15.744	-32.5329	925
Level 3	C44	925 G+Ex+0.3Q-NL Max		2.34	-178.3618	69.1589	14.7918	-28.1481	-32.9515	-113.8477	925
Level 3	C46	928 G+Ey+0.3Q-NL Max		0	-35.531	4.0652	23.8827	10.5698	37.0394	9.3345	928
Level 3	C46	928 G+Ey+0.3Q-NL Max		1.8	-32.8066	4.0652	23.8827	10.5698	-6.1346	2.0175	928
Level 3	C46	928 G+Ey+0.3Q-NL Max		3.6	-30.0822	4.0652	23.8827	10.5698	-49.2982	-5.3028	928
Level 3	C46	928 G+Ex+0.3Q-NL Max		0	111.6448	65.6877	1.6022	-1.7451	5.6321	126.9618	928
Level 3	C46	928 G+Ex+0.3Q-NL Max		1.8	118.5568	65.6877	1.6022	-1.7451	2.7321	9.1134	928
Level 3	C46	928 G+Ex+0.3Q-NL Max		3.6	125.4688	65.6877	1.6022	-1.7451	-0.0113	-108.2291	928
Level 3	C48	931 G+Ey+0.3Q-NL Max		0	-64.4348	1.2266	1.2745	-9.0957	-34.7242	1.4862	931
Level 3	C48	931 G+Ey+0.3Q-NL Max		1.8	-61.7104	1.2266	1.2745	-9.0957	-37.4294	-0.7249	931
Level 3	C48	931 G+Ey+0.3Q-NL Max		3.6	-58.986	1.2266	1.2745	-9.0957	-40.0151	-2.9338	931
Level 3	C48	931 G+Ex+0.3Q-NL Max		0	-61.581	58.0623	4.6318	3.5306	10.7601	105.8281	931
Level 3	C48	931 G+Ex+0.3Q-NL Max		1.8	-54.669	58.0623	4.6318	3.5306	2.5282	1.1379	931
Level 3	C48	931 G+Ex+0.3Q-NL Max		3.6	-47.757	58.0623	4.6318	3.5306	-5.5848	-102.9119	931
Level 3	C52	934 G+Ey+0.3Q-NL Max		0	103.022	-7.0101	-116.5221	40.1079	-179.7427	-26.6466	934-1
Level 3	C52	934 G+Ey+0.3Q-NL Max		0.22	103.7712	-7.0101	-116.5221	40.1079	-154.0728	-25.1077	934-1

Level 3	C52	934 G+Ey+0.3Q-NL Max	0.22	105.4828	-28.1043	-119.7751	42.0792	-153.6478	-22.7089	934-2
Level 3	C52	934 G+Ey+0.3Q-NL Max	0.93	107.9007	-28.1043	-119.7751	42.0792	-68.5052	-2.7684	934-2
Level 3	C52	934 G+Ey+0.3Q-NL Max	1.57	110.0802	-28.1043	-119.7751	42.0792	8.2329	15.2057	934-2
Level 3	C52	934 G+Ey+0.3Q-NL Max	1.57	109.9983	-27.3741	-116.6572	42.0792	8.653	15.3041	934-3
Level 3	C52	934 G+Ey+0.3Q-NL Max	1.67	110.3389	-27.3741	-116.6572	42.0792	20.3316	18.0396	934-3
Level 3	C52	934 G+Ey+0.3Q-NL Max	1.67	-38.2268	6.1767	79.6275	79.7469	106.9416	19.7576	934-4
Level 3	C52	934 G+Ey+0.3Q-NL Max	1.86	-37.5798	6.1767	79.6275	79.7469	91.8033	18.5852	934-4
Level 3	C52	934 G+Ex+0.3Q-NL Max	0	68.4975	321.0426	31.5843	38.376	38.378	66.1969	934-1
Level 3	C52	934 G+Ex+0.3Q-NL Max	0.22	70.3983	321.0426	31.5843	38.376	31.4273	-4.3936	934-1
Level 3	C52	934 G+Ex+0.3Q-NL Max	0.22	78.3766	88.1325	32.351	38.2298	31.1322	5.6881	934-2
Level 3	C52	934 G+Ex+0.3Q-NL Max	0.93	84.511	88.1325	32.351	38.2298	8.1568	-56.5067	934-2
Level 3	C52	934 G+Ex+0.3Q-NL Max	1.57	90.0406	88.1325	32.351	38.2298	-12.4574	-111.9844	934-2
Level 3	C52	934 G+Ex+0.3Q-NL Max	1.57	89.8327	85.8464	31.5096	38.2298	-12.5681	-112.2883	934-3
Level 3	C52	934 G+Ex+0.3Q-NL Max	1.67	90.6967	85.8464	31.5096	38.2298	-15.6437	-120.7309	934-3
Level 3	C52	934 G+Ex+0.3Q-NL Max	1.67	166.7382	104.2102	23.428	-9.1323	17.9368	-111.5772	934-4
Level 3	C52	934 G+Ex+0.3Q-NL Max	1.86	168.3798	104.2102	23.428	-9.1323	13.4823	-131.3037	934-4
Level 3	C55	937 G+Ey+0.3Q-NL Max	0	10.256	12.8558	20.9238	-14.3125	27.2826	13.0217	937
Level 3	C55	937 G+Ey+0.3Q-NL Max	1.17	12.0269	12.8558	20.9238	-14.3125	2.8211	-2.0195	937
Level 3	C55	937 G+Ey+0.3Q-NL Max	2.34	13.7977	12.8558	20.9238	-14.3125	-21.6396	-17.0613	937
Level 3	C55	937 G+Ex+0.3Q-NL Max	0	-159.1955	59.4776	-27.2237	12.5425	-14.0282	40.9183	937
Level 3	C55	937 G+Ex+0.3Q-NL Max	1.17	-154.7027	59.4776	-27.2237	12.5425	17.8737	-28.9207	937
Level 3	C55	937 G+Ex+0.3Q-NL Max	2.34	-150.2099	59.4776	-27.2237	12.5425	49.8003	-98.6605	937
Level 3	C57	940 G+Ey+0.3Q-NL Max	0	-0.8235	-1.4362	23.1113	10.4002	33.9801	-1.8532	940
Level 3	C57	940 G+Ey+0.3Q-NL Max	1.8	1.9009	-1.4362	23.1113	10.4002	-7.6075	0.7315	940
Level 3	C57	940 G+Ey+0.3Q-NL Max	3.6	4.6253	-1.4362	23.1113	10.4002	-49.1961	3.3162	940
Level 3	C57	940 G+Ex+0.3Q-NL Max	0	111.9769	63.9715	1.4147	-0.7345	1.3424	123.7036	940
Level 3	C57	940 G+Ex+0.3Q-NL Max	1.8	118.8889	63.9715	1.4147	-0.7345	-1.1995	8.9358	940
Level 3	C57	940 G+Ex+0.3Q-NL Max	3.6	125.8009	63.9715	1.4147	-0.7345	-3.6101	-105.5122	940
Level 3	C59	943 G+Ey+0.3Q-NL Max	0	10.6234	-4.739	3.9408	-7.5437	-29.9126	-10.0528	943
Level 3	C59	943 G+Ey+0.3Q-NL Max	1.8	13.3478	-4.739	3.9408	-7.5437	-36.9119	-1.5252	943
Level 3	C59	943 G+Ey+0.3Q-NL Max	3.6	16.0722	-4.739	3.9408	-7.5437	-43.9374	7.0014	943
Level 3	C59	943 G+Ex+0.3Q-NL Max	0	-84.1484	55.4304	-0.8741	-1.082	-1.8543	100.7596	943
Level 3	C59	943 G+Ex+0.3Q-NL Max	1.8	-77.2364	55.4304	-0.8741	-1.082	-0.1972	0.7427	943

Level 3	C59	943 G+Ex+0.3Q-NL Max	3.6	-70.3244	55.4304	-0.8741	-1.082	1.6164	-98.9861	943
Level 2	C25	921 G+Ey+0.3Q-NL Max	0	-275.8519	-4.6742	208.1009	52.9155	461.3475	-12.3846	921
Level 2	C25	921 G+Ey+0.3Q-NL Max	1.775	-269.8072	-4.6742	208.1009	52.9155	90.9695	-4.0707	921
Level 2	C25	921 G+Ey+0.3Q-NL Max	3.55	-263.7624	-4.6742	208.1009	52.9155	-279.6532	4.2541	921
Level 2	C25	921 G+Ex+0.3Q-NL Max	0	437.1916	8.2367	-35.3829	8.6152	-83.6558	95.8348	921
Level 2	C25	921 G+Ex+0.3Q-NL Max	1.775	452.5276	8.2367	-35.3829	8.6152	-20.8576	82.646	921
Level 2	C25	921 G+Ex+0.3Q-NL Max	3.55	467.8636	8.2367	-35.3829	8.6152	43.0134	69.8329	921
Level 2	C43	924 G+Ey+0.3Q-NL Max	0	-80.1963	-0.7085	34.0073	-13.8381	74.1583	-0.9836	924
Level 2	C43	924 G+Ey+0.3Q-NL Max	1.775	-77.5098	-0.7085	34.0073	-13.8381	13.5668	0.2773	924
Level 2	C43	924 G+Ey+0.3Q-NL Max	3.55	-74.8233	-0.7085	34.0073	-13.8381	-47.0776	1.5372	924
Level 2	C43	924 G+Ex+0.3Q-NL Max	0	-436.2646	6.0496	-9.2317	-11.8943	-17.3054	24.1933	924
Level 2	C43	924 G+Ex+0.3Q-NL Max	1.775	-429.4486	6.0496	-9.2317	-11.8943	-0.723	11.9466	924
Level 2	C43	924 G+Ex+0.3Q-NL Max	3.55	-422.6326	6.0496	-9.2317	-11.8943	16.5373	-0.3649	924
Level 2	C46	927 G+Ey+0.3Q-NL Max	0	-167.0508	1.91	93.215	1.1378	209.5561	2.8664	927
Level 2	C46	927 G+Ey+0.3Q-NL Max	1.775	-164.3643	1.91	93.215	1.1378	43.0687	-0.5158	927
Level 2	C46	927 G+Ey+0.3Q-NL Max	3.55	-161.6777	1.91	93.215	1.1378	-123.7759	-3.8938	927
Level 2	C46	927 G+Ex+0.3Q-NL Max	0	-29.9564	81.5495	-2.2257	-2.4258	-9.0939	162.0824	927
Level 2	C46	927 G+Ex+0.3Q-NL Max	1.775	-23.1404	81.5495	-2.2257	-2.4258	-5.1455	17.2533	927
Level 2	C46	927 G+Ex+0.3Q-NL Max	3.55	-16.3244	81.5495	-2.2257	-2.4258	-0.8237	-127.1723	927
Level 2	C48	930 G+Ey+0.3Q-NL Max	0	-101.0021	-0.826	63.1464	-2.9087	174.0464	-0.6166	930
Level 2	C48	930 G+Ey+0.3Q-NL Max	1.775	-98.3155	-0.826	63.1464	-2.9087	61.4164	0.8583	930
Level 2	C48	930 G+Ey+0.3Q-NL Max	3.55	-95.629	-0.826	63.1464	-2.9087	-51.518	2.3288	930
Level 2	C48	930 G+Ex+0.3Q-NL Max	0	167.2573	71.4152	-11.0101	-1.5186	-30.1559	147.6536	930
Level 2	C48	930 G+Ex+0.3Q-NL Max	1.775	174.0733	71.4152	-11.0101	-1.5186	-10.6189	21.4628	930
Level 2	C48	930 G+Ex+0.3Q-NL Max	3.55	180.8893	71.4152	-11.0101	-1.5186	8.8249	-103.9464	930
Level 2	C50	933 G+Ey+0.3Q-NL Max	0	76.4315	3.2242	214.6561	45.8009	476.7393	-3.4267	933
Level 2	C50	933 G+Ey+0.3Q-NL Max	1.775	82.4763	3.2242	214.6561	45.8009	96.0211	-9.1532	933
Level 2	C50	933 G+Ey+0.3Q-NL Max	3.55	88.521	3.2242	214.6561	45.8009	-284.6173	-14.8873	933
Level 2	C50	933 G+Ex+0.3Q-NL Max	0	493.4852	9.5888	24.0906	23.9984	68.9524	88.264	933
Level 2	C50	933 G+Ex+0.3Q-NL Max	1.775	508.8212	9.5888	24.0906	23.9984	25.9447	72.8627	933
Level 2	C50	933 G+Ex+0.3Q-NL Max	3.55	524.1572	9.5888	24.0906	23.9984	-15.7523	57.8339	933
Level 2	C54	936 G+Ey+0.3Q-NL Max	0	346.1888	-0.0045	37.9273	-10.8238	81.4836	-0.2146	936
Level 2	C54	936 G+Ey+0.3Q-NL Max	1.775	348.8754	-0.0045	37.9273	-10.8238	15.1295	-0.2492	936

Level 2	C54	936 G+Ey+0.3Q-NL Max	3.55	351.5619	-0.0045	37.9273	-10.8238	-50.9564	-0.2882	936
Level 2	C54	936 G+Ex+0.3Q-NL Max	0	-356.4046	8.0854	4.5619	14.0418	10.5767	26.7668	936
Level 2	C54	936 G+Ex+0.3Q-NL Max	1.775	-349.5886	8.0854	4.5619	14.0418	2.6195	11.2025	936
Level 2	C54	936 G+Ex+0.3Q-NL Max	3.55	-342.7726	8.0854	4.5619	14.0418	-5.3839	-4.2877	936
Level 2	C57	939 G+Ey+0.3Q-NL Max	0	88.4391	0.6542	99.1131	1.5429	224.8847	0.0828	939
Level 2	C57	939 G+Ey+0.3Q-NL Max	1.775	91.1257	0.6542	99.1131	1.5429	49.5163	-1.0855	939
Level 2	C57	939 G+Ey+0.3Q-NL Max	3.55	93.8122	0.6542	99.1131	1.5429	-125.6226	-2.2588	939
Level 2	C57	939 G+Ex+0.3Q-NL Max	0	-19.7074	81.1596	5.388	2.2969	17.1983	161.1209	939
Level 2	C57	939 G+Ex+0.3Q-NL Max	1.775	-12.8914	81.1596	5.388	2.2969	7.639	17.0203	939
Level 2	C57	939 G+Ex+0.3Q-NL Max	3.55	-6.0754	81.1596	5.388	2.2969	-1.6038	-126.6924	939
Level 2	C59	942 G+Ey+0.3Q-NL Max	0	-2.2583	-2.7843	65.084	-5.4828	183.7416	-5.0417	942
Level 2	C59	942 G+Ey+0.3Q-NL Max	1.775	0.4283	-2.7843	65.084	-5.4828	68.2212	-0.0996	942
Level 2	C59	942 G+Ey+0.3Q-NL Max	3.55	3.1148	-2.7843	65.084	-5.4828	-47.2966	4.8425	942
Level 2	C59	942 G+Ex+0.3Q-NL Max	0	129.3093	70.2595	6.3759	-1.3173	22.3244	145.469	942
Level 2	C59	942 G+Ex+0.3Q-NL Max	1.775	136.1253	70.2595	6.3759	-1.3173	10.9242	21.1867	942
Level 2	C59	942 G+Ex+0.3Q-NL Max	3.55	142.9413	70.2595	6.3759	-1.3173	-0.4003	-102.5833	942
Level 1	C222	305 G+Ey+0.3Q-NL Max	0	-24.8735	0.3644	13.868	-0.2795	21.9005	1.1856	305
Level 1	C222	305 G+Ey+0.3Q-NL Max	1.4325	-19.9951	0.3644	13.868	-0.2795	2.0274	0.664	305
Level 1	C222	305 G+Ey+0.3Q-NL Max	2.865	-15.1168	0.3644	13.868	-0.2795	-17.846	0.1423	305
Level 1	C222	305 G+Ex+0.3Q-NL Max	0	-286.5729	25.9766	24.0883	13.1152	38.2335	48.672	305
Level 1	C222	305 G+Ex+0.3Q-NL Max	1.4325	-274.1961	25.9766	24.0883	13.1152	3.9018	11.1858	305
Level 1	C222	305 G+Ex+0.3Q-NL Max	2.865	-261.8193	25.9766	24.0883	13.1152	-28.4996	-24.3956	305
Level 1	C223	334 G+Ey+0.3Q-NL Max	0	-77.458	-0.7948	9.6939	0	0	0	334
Level 1	C223	334 G+Ey+0.3Q-NL Max	1.4325	-75.2898	-0.7948	9.6939	0	-13.9418	1.1426	334
Level 1	C223	334 G+Ey+0.3Q-NL Max	2.865	-73.1217	-0.7948	9.6939	0	-27.8492	2.2824	334
Level 1	C223	334 G+Ex+0.3Q-NL Max	0	-194.9234	16.619	-1.541	0	0	0	334
Level 1	C223	334 G+Ex+0.3Q-NL Max	1.4325	-189.4226	16.619	-1.541	0	2.6502	-24.0582	334
Level 1	C223	334 G+Ex+0.3Q-NL Max	2.865	-183.9218	16.619	-1.541	0	5.2839	-47.9671	334
Level 1	C224	347 G+Ey+0.3Q-NL Max	0	-75.4972	0.1187	9.9151	0	0	0	347
Level 1	C224	347 G+Ey+0.3Q-NL Max	1.4325	-73.329	0.1187	9.9151	0	-14.2575	-0.1684	347
Level 1	C224	347 G+Ey+0.3Q-NL Max	2.865	-71.1609	0.1187	9.9151	0	-28.4806	-0.3363	347
Level 1	C224	347 G+Ex+0.3Q-NL Max	0	-141.2271	16.6371	1.057	0	0	0.000001242	347
Level 1	C224	347 G+Ex+0.3Q-NL Max	1.4325	-135.7263	16.6371	1.057	0	-1.1887	-23.8522	347

Level 1	C224	347	G+Ex+0.3Q-NL Max	2.865	-130.2255	16.6371	1.057	0	-2.372	-47.5973	347
Level 1	C225	352	G+Ey+0.3Q-NL Max	0	-19.5293	-0.4386	2.8666	-0.1575	4.4061	-0.036	352
Level 1	C225	352	G+Ey+0.3Q-NL Max	1.4325	-17.3611	-0.4386	2.8666	-0.1575	0.2942	0.5929	352
Level 1	C225	352	G+Ey+0.3Q-NL Max	2.865	-15.193	-0.4386	2.8666	-0.1575	-3.8178	1.2215	352
Level 1	C225	352	G+Ex+0.3Q-NL Max	0	-226.976	-32.1905	0.686	1.886	-0.7209	-3.4911	352
Level 1	C225	352	G+Ex+0.3Q-NL Max	1.4325	-221.4752	-32.1905	0.686	1.886	-1.7093	42.9004	352
Level 1	C225	352	G+Ex+0.3Q-NL Max	2.865	-215.9744	-32.1905	0.686	1.886	-2.0735	89.0215	352
Level 1	C226	353	G+Ey+0.3Q-NL Max	0	-42.5883	0.019	4.1998	-2.4188	0.3907	-0.183	353
Level 1	C226	353	G+Ey+0.3Q-NL Max	1.4325	-40.4201	0.019	4.1998	-2.4188	-5.6445	-0.2094	353
Level 1	C226	353	G+Ey+0.3Q-NL Max	2.865	-38.252	0.019	4.1998	-2.4188	-11.6722	-0.2354	353
Level 1	C226	353	G+Ex+0.3Q-NL Max	0	41.4107	4.4179	19.5904	3.2475	3.039	8.3008	353
Level 1	C226	353	G+Ex+0.3Q-NL Max	1.4325	46.9115	4.4179	19.5904	3.2475	-24.3762	2.0135	353
Level 1	C226	353	G+Ex+0.3Q-NL Max	2.865	52.4123	4.4179	19.5904	3.2475	-51.7559	-3.8673	353
Level 1	C227	359	G+Ey+0.3Q-NL Max	0	-15.8367	0.7647	2.8899	-0.0728	0.3392	1.2967	359
Level 1	C227	359	G+Ey+0.3Q-NL Max	1.4325	-13.6686	0.7647	2.8899	-0.0728	-3.8071	0.2016	359
Level 1	C227	359	G+Ey+0.3Q-NL Max	2.865	-11.5004	0.7647	2.8899	-0.0728	-7.9517	-0.8935	359
Level 1	C227	359	G+Ex+0.3Q-NL Max	0	-27.1921	4.3868	-5.3194	3.3783	-0.7711	7.146	359
Level 1	C227	359	G+Ex+0.3Q-NL Max	1.4325	-21.6913	4.3868	-5.3194	3.3783	7.1916	0.8423	359
Level 1	C227	359	G+Ex+0.3Q-NL Max	2.865	-16.1905	4.3868	-5.3194	3.3783	15.1488	-5.462	359
Level 1	C242	508	G+Ey+0.3Q-NL Max	0	-38.7051	0.1665	-7.0229	-0.0609	-1.4506	0.2601	508
Level 1	C242	508	G+Ey+0.3Q-NL Max	1.4325	-36.5369	0.1665	-7.0229	-0.0609	8.6031	0.0223	508
Level 1	C242	508	G+Ey+0.3Q-NL Max	2.865	-34.3687	0.1665	-7.0229	-0.0609	18.6466	-0.2156	508
Level 1	C242	508	G+Ex+0.3Q-NL Max	0	-39.186	1.8983	5.8749	0.1629	1.1523	3.7436	508
Level 1	C242	508	G+Ex+0.3Q-NL Max	1.4325	-33.6852	1.8983	5.8749	0.1629	-7.1276	1.0056	508
Level 1	C242	508	G+Ex+0.3Q-NL Max	2.865	-28.1844	1.8983	5.8749	0.1629	-15.3998	-1.151	508
Level 1	C254	556	G+Ey+0.3Q-NL Max	0	-69.0719	-0.702	-4.1384	0	0	0	556
Level 1	C254	556	G+Ey+0.3Q-NL Max	1.3825	-66.9794	-0.702	-4.1384	0	5.7057	0.9683	556
Level 1	C254	556	G+Ey+0.3Q-NL Max	2.765	-64.887	-0.702	-4.1384	0	11.3997	1.9347	556
Level 1	C254	556	G+Ex+0.3Q-NL Max	0	-243.7959	7.9746	0.5799	0	0	0	556
Level 1	C254	556	G+Ex+0.3Q-NL Max	1.3825	-238.4871	7.9746	0.5799	0	-0.4782	-11.227	556
Level 1	C254	556	G+Ex+0.3Q-NL Max	2.765	-233.1783	7.9746	0.5799	0	-0.9528	-22.3721	556
Level 1	C297	557	G+Ey+0.3Q-NL Max	0	-63.0744	0.5434	7.0734	0	0	0	557
Level 1	C297	557	G+Ey+0.3Q-NL Max	1.4325	-60.9063	0.5434	7.0734	0	-10.1718	-0.7829	557

Level 1	C297	557 G+Ey+0.3Q-NL Max	2.865	-58.7381	0.5434	7.0734	0	-20.3233	-1.5643	557
Level 1	C297	557 G+Ex+0.3Q-NL Max	0	-196.1399	15.6057	-8.8377	0	0	0	557
Level 1	C297	557 G+Ex+0.3Q-NL Max	1.4325	-190.6391	15.6057	-8.8377	0	13.1019	-22.6414	557
Level 1	C297	557 G+Ex+0.3Q-NL Max	2.865	-185.1383	15.6057	-8.8377	0	26.122	-45.1414	557
Level 1	C299	510 G+Ey+0.3Q-NL Max	0	-67.7975	2.5297	-3.9185	0	0	0	510
Level 1	C299	510 G+Ey+0.3Q-NL Max	1.3825	-65.705	2.5297	-3.9185	0	5.4017	-3.5064	510
Level 1	C299	510 G+Ey+0.3Q-NL Max	2.765	-63.6126	2.5297	-3.9185	0	10.7926	-7.0059	510
Level 1	C299	510 G+Ex+0.3Q-NL Max	0	-174.0487	9.0319	-0.2442	0	0	7.841E-07	510
Level 1	C299	510 G+Ex+0.3Q-NL Max	1.3825	-168.7399	9.0319	-0.2442	0	0.7979	-12.1738	510
Level 1	C299	510 G+Ex+0.3Q-NL Max	2.765	-163.4311	9.0319	-0.2442	0	1.5917	-24.2841	510
Level 1	C301	511 G+Ey+0.3Q-NL Max	0	-62.0905	1.1496	6.5929	0	0	0	511
Level 1	C301	511 G+Ey+0.3Q-NL Max	1.4325	-59.9224	1.1496	6.5929	0	-9.4814	-1.6527	511
Level 1	C301	511 G+Ey+0.3Q-NL Max	2.865	-57.7542	1.1496	6.5929	0	-18.9441	-3.3023	511
Level 1	C301	511 G+Ex+0.3Q-NL Max	0	-155.3358	15.491	-8.9229	0	6.973E-07	0	511
Level 1	C301	511 G+Ex+0.3Q-NL Max	1.4325	-149.835	15.491	-8.9229	0	13.542	-22.2734	511
Level 1	C301	511 G+Ex+0.3Q-NL Max	2.865	-144.3342	15.491	-8.9229	0	27.0176	-44.437	511
Level 1	C302	558 G+Ey+0.3Q-NL Max	0	-48.0205	-0.045	1.7688	0	0	0	558
Level 1	C302	558 G+Ey+0.3Q-NL Max	1.4325	-45.8524	-0.045	1.7688	0	-2.5543	0.0654	558
Level 1	C302	558 G+Ey+0.3Q-NL Max	2.865	-43.6842	-0.045	1.7688	0	-5.1048	0.1306	558
Level 1	C302	558 G+Ex+0.3Q-NL Max	0	-125.4527	3.1085	-6.2683	0	0	0	558
Level 1	C302	558 G+Ex+0.3Q-NL Max	1.4325	-119.9519	3.1085	-6.2683	0	9.5279	-4.5714	558
Level 1	C302	558 G+Ex+0.3Q-NL Max	2.865	-114.4511	3.1085	-6.2683	0	19.0184	-9.125	558
Level 1	C303	559 G+Ey+0.3Q-NL Max	0	-76.9255	-22.0702	0.5644	-0.5114	0.928	-0.4704	559
Level 1	C303	559 G+Ey+0.3Q-NL Max	1.4325	-71.5052	-22.0702	0.5644	-0.5114	0.1209	31.1208	559
Level 1	C303	559 G+Ey+0.3Q-NL Max	2.865	-66.0848	-22.0702	0.5644	-0.5114	-0.6863	62.7074	559
Level 1	C303	559 G+Ex+0.3Q-NL Max	0	-60.8683	-8.3584	-6.4522	11.696	-11.7223	0.0255	559
Level 1	C303	559 G+Ex+0.3Q-NL Max	1.4325	-47.1163	-8.3584	-6.4522	11.696	-2.4555	13.0412	559
Level 1	C303	559 G+Ex+0.3Q-NL Max	2.865	-33.3643	-8.3584	-6.4522	11.696	8.2927	26.0656	559
Level 1	C304	700 G+Ey+0.3Q-NL Max	0	5.0768	-0.6921	-2.8539	-3.3929	-0.672	-1.1246	700
Level 1	C304	700 G+Ey+0.3Q-NL Max	1.4325	7.2449	-0.6921	-2.8539	-3.3929	3.4182	-0.1324	700
Level 1	C304	700 G+Ey+0.3Q-NL Max	2.865	9.4131	-0.6921	-2.8539	-3.3929	7.5093	0.8599	700
Level 1	C304	700 G+Ex+0.3Q-NL Max	0	13.9743	3.6716	-18.6383	1.7005	-2.8925	6.7683	700
Level 1	C304	700 G+Ex+0.3Q-NL Max	1.4325	19.4751	3.6716	-18.6383	1.7005	24.4891	1.5275	700

Level 1	C304	700 G+Ex+0.3Q-NL Max	2.865	24.9759	3.6716	-18.6383	1.7005	51.967	-3.3677	700
Level 1	C305	706 G+Ey+0.3Q-NL Max	0	-100.3971	0.7485	7.3172	0	0	0	706
Level 1	C305	706 G+Ey+0.3Q-NL Max	1.4325	-98.2289	0.7485	7.3172	0	-10.5414	-1.0816	706
Level 1	C305	706 G+Ey+0.3Q-NL Max	2.865	-96.0608	0.7485	7.3172	0	-21.0487	-2.1597	706
Level 1	C305	706 G+Ex+0.3Q-NL Max	0	-156.5227	-2.4088	3.9666	0	0.000001193	0	706
Level 1	C305	706 G+Ex+0.3Q-NL Max	1.4325	-151.0219	-2.4088	3.9666	0	-4.6051	3.4354	706
Level 1	C305	706 G+Ex+0.3Q-NL Max	2.865	-145.5211	-2.4088	3.9666	0	-9.1875	6.8538	706
Level 1	C306	711 G+Ey+0.3Q-NL Max	0	-22.3219	0.3742	4.0664	0	0	0	711
Level 1	C306	711 G+Ey+0.3Q-NL Max	1.4325	-20.1537	0.3742	4.0664	0	-5.8348	-0.5373	711
Level 1	C306	711 G+Ey+0.3Q-NL Max	2.865	-17.9855	0.3742	4.0664	0	-11.6657	-1.0743	711
Level 1	C306	711 G+Ex+0.3Q-NL Max	0	-160.0466	-2.726	-7.0151	0	8.532E-07	0	711
Level 1	C306	711 G+Ex+0.3Q-NL Max	1.4325	-154.5458	-2.726	-7.0151	0	11.1854	3.8065	711
Level 1	C306	711 G+Ex+0.3Q-NL Max	2.865	-149.045	-2.726	-7.0151	0	22.3139	7.5937	711
Level 1	C307	715 G+Ey+0.3Q-NL Max	0	-58.4186	4.5099	0.4737	0	0	0	715
Level 1	C307	715 G+Ey+0.3Q-NL Max	1.4325	-53.5403	4.5099	0.4737	0	-0.6972	-6.4656	715
Level 1	C307	715 G+Ey+0.3Q-NL Max	2.865	-48.6619	4.5099	0.4737	0	-1.3942	-12.929	715
Level 1	C307	715 G+Ex+0.3Q-NL Max	0	-289.3649	-64.974	-10.0308	0	0	0.000001823	715
Level 1	C307	715 G+Ex+0.3Q-NL Max	1.4325	-276.9881	-64.974	-10.0308	0	14.8186	93.3102	715
Level 1	C307	715 G+Ex+0.3Q-NL Max	2.865	-264.6113	-64.974	-10.0308	0	29.6106	186.4535	715
Level 1	C308	716 G+Ey+0.3Q-NL Max	0	36.1773	0.3094	1.4574	0	0	0	716
Level 1	C308	716 G+Ey+0.3Q-NL Max	1.4325	38.3454	0.3094	1.4574	0	-2.0739	-0.4405	716
Level 1	C308	716 G+Ey+0.3Q-NL Max	2.865	40.5136	0.3094	1.4574	0	-4.1504	-0.8815	716
Level 1	C308	716 G+Ex+0.3Q-NL Max	0	-294.8379	-16.3811	-25.819	0	0.00004904	0.00003058	716
Level 1	C308	716 G+Ex+0.3Q-NL Max	1.4325	-289.3371	-16.3811	-25.819	0	40.2216	23.3744	716
Level 1	C308	716 G+Ex+0.3Q-NL Max	2.865	-283.8363	-16.3811	-25.819	0	80.0615	46.5197	716
Level 1	C309	719 G+Ey+0.3Q-NL Max	0	22.2108	-2.6805	0.8652	0.0397	1.3896	-0.4111	719
Level 1	C309	719 G+Ey+0.3Q-NL Max	1.3825	24.3033	-2.6805	0.8652	0.0397	0.2017	3.2943	719
Level 1	C309	719 G+Ey+0.3Q-NL Max	2.765	26.3957	-2.6805	0.8652	0.0397	-0.9862	7.0022	719
Level 1	C309	719 G+Ex+0.3Q-NL Max	0	-56.6984	-11.861	-0.9822	-0.8848	-0.8973	-2.0267	719
Level 1	C309	719 G+Ex+0.3Q-NL Max	1.3825	-51.3896	-11.861	-0.9822	-0.8848	0.4591	14.4253	719
Level 1	C309	719 G+Ex+0.3Q-NL Max	2.765	-46.0808	-11.861	-0.9822	-0.8848	1.9673	30.8543	719
Level 1	C310	720 G+Ey+0.3Q-NL Max	0	17.2089	0.8127	0.1598	-0.1473	0.6045	0.0857	720
Level 1	C310	720 G+Ey+0.3Q-NL Max	1.4325	19.3771	0.8223	0.1598	-0.1473	0.3737	-1.0788	720

Level 1	C310	720 G+Ey+0.3Q-NL Max	2.8651	21.5453	0.832	0.1598	-0.1473	0.143	-2.2579	720
Level 1	C310	720 G+Ex+0.3Q-NL Max	0	-107.0237	2.9085	-1.0788	-2.0992	-2.8236	0.2156	720
Level 1	C310	720 G+Ex+0.3Q-NL Max	1.4325	-101.5228	2.933	-1.0788	-2.0992	-1.205	-2.5789	720
Level 1	C310	720 G+Ex+0.3Q-NL Max	2.8651	-96.022	2.9575	-1.0788	-2.0992	0.7087	-5.3503	720
Level 1	C311	722 G+Ey+0.3Q-NL Max	0	-36.2871	-1.795	1.144	-0.0172	2.1699	-2.8288	722
Level 1	C311	722 G+Ey+0.3Q-NL Max	1.6825	-33.7406	-1.795	1.144	-0.0172	0.2321	0.1878	722
Level 1	C311	722 G+Ey+0.3Q-NL Max	3.365	-31.1941	-1.795	1.144	-0.0172	-1.7061	3.2042	722
Level 1	C311	722 G+Ex+0.3Q-NL Max	0	-54.8023	4.0349	-7.7287	4.8892	-12.1937	6.8108	722
Level 1	C311	722 G+Ex+0.3Q-NL Max	1.6825	-48.3415	4.0349	-7.7287	4.8892	0.8046	-0.0339	722
Level 1	C311	722 G+Ex+0.3Q-NL Max	3.365	-41.8807	4.0349	-7.7287	4.8892	14.5586	-6.3476	722
Level 1	C312	736 G+Ey+0.3Q-NL Max	0	-4.3151	-2.0003	0.847	-0.9054	1.4715	-0.1998	736
Level 1	C312	736 G+Ey+0.3Q-NL Max	1.3825	-2.2226	-2.0003	0.847	-0.9054	0.3001	2.5656	736
Level 1	C312	736 G+Ey+0.3Q-NL Max	2.765	-0.1301	-2.0003	0.847	-0.9054	-0.8713	5.3308	736
Level 1	C312	736 G+Ex+0.3Q-NL Max	0	-36.273	7.6324	-1.9707	1.821	-3.6281	0.3495	736
Level 1	C312	736 G+Ex+0.3Q-NL Max	1.3825	-30.9642	7.6324	-1.9707	1.821	-0.8789	-9.8376	736
Level 1	C312	736 G+Ex+0.3Q-NL Max	2.765	-25.6554	7.6324	-1.9707	1.821	2.4088	-19.983	736
Level 1	C313	737 G+Ey+0.3Q-NL Max	0	3.0828	0.4295	2.5796	-0.5626	0.2865	0.7398	737
Level 1	C313	737 G+Ey+0.3Q-NL Max	1.4325	5.2509	0.4295	2.5796	-0.5626	-3.4066	0.1244	737
Level 1	C313	737 G+Ey+0.3Q-NL Max	2.865	7.4191	0.4295	2.5796	-0.5626	-7.1003	-0.4909	737
Level 1	C313	737 G+Ex+0.3Q-NL Max	0	-50.5779	1.4872	-8.2749	2.604	-0.1434	2.4917	737
Level 1	C313	737 G+Ex+0.3Q-NL Max	1.4325	-45.0771	1.4872	-8.2749	2.604	12.3298	0.3386	737
Level 1	C313	737 G+Ex+0.3Q-NL Max	2.865	-39.5763	1.4872	-8.2749	2.604	24.8024	-1.0282	737
Level 1	C314	756 G+Ey+0.3Q-NL Max	0	-41.6527	10.1952	20.8778	2.2066	35.8561	17.5622	756
Level 1	C314	756 G+Ey+0.3Q-NL Max	1.6825	-31.4666	10.1952	20.8778	2.2066	0.7163	0.4105	756
Level 1	C314	756 G+Ey+0.3Q-NL Max	3.365	-21.2804	10.1952	20.8778	2.2066	-34.4236	-16.7413	756
Level 1	C314	756 G+Ex+0.3Q-NL Max	0	-59.4772	43.4795	30.2841	-1.9173	52.1893	77.649	756
Level 1	C314	756 G+Ex+0.3Q-NL Max	1.6825	-33.634	43.4795	30.2841	-1.9173	1.2669	4.5417	756
Level 1	C314	756 G+Ex+0.3Q-NL Max	3.365	-7.7908	43.4795	30.2841	-1.9173	-40.9975	-66.9144	756
Level 1	C315	757 G+Ey+0.3Q-NL Max	0	-138.2004	9.0638	1.1623	1.2817	10.5992	14.0352	757
Level 1	C315	757 G+Ey+0.3Q-NL Max	1.6825	-128.0143	9.0638	1.1623	1.2817	8.5922	-1.2056	757
Level 1	C315	757 G+Ey+0.3Q-NL Max	3.365	-117.8281	9.0638	1.1623	1.2817	6.5819	-16.446	757
Level 1	C315	757 G+Ex+0.3Q-NL Max	0	36.2692	7.4893	5.751	19.7646	9.3801	18.5782	757
Level 1	C315	757 G+Ex+0.3Q-NL Max	1.6825	62.1124	7.4893	5.751	19.7646	-0.0913	6.4678	757

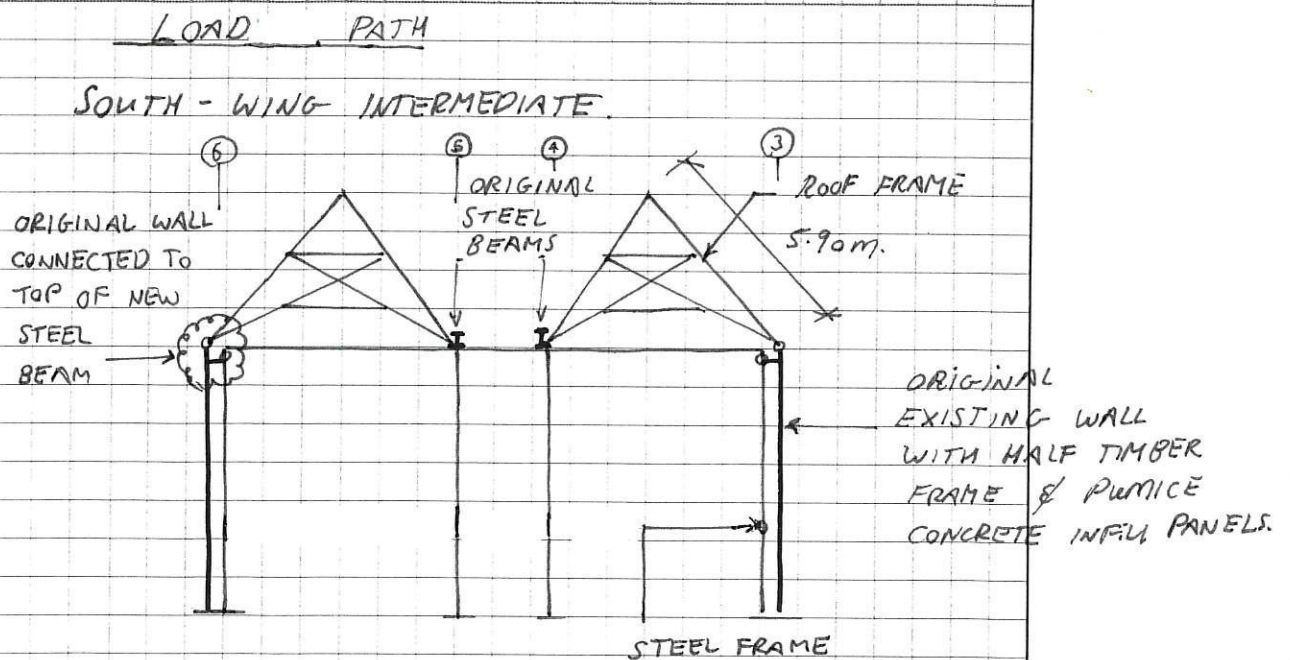
Level 1	C315	757 G+Ex+0.3Q-NL Max	3.365	87.9556	7.4893	5.751	19.7646	-0.4914	5.1843	757
Level 1	C11	920 G+Ey+0.3Q-NL Max	0	-190.9992	-0.2895	-67.3364	0	-6.907E-07	0	920
Level 1	C11	920 G+Ey+0.3Q-NL Max	1.4325	-186.1209	-0.2895	-67.3364	0	96.4789	0.4181	920
Level 1	C11	920 G+Ey+0.3Q-NL Max	2.865	-181.2425	-0.2895	-67.3364	0	192.8414	0.8356	920
Level 1	C11	920 G+Ex+0.3Q-NL Max	0	225.7923	-26.9972	-40.7747	0	0.000001832	0.000001275	920
Level 1	C11	920 G+Ex+0.3Q-NL Max	1.4325	238.1691	-26.9972	-40.7747	0	58.428	40.5065	920
Level 1	C11	920 G+Ex+0.3Q-NL Max	2.865	250.5459	-26.9972	-40.7747	0	116.9475	81.0761	920
Level 1	C42	923 G+Ey+0.3Q-NL Max	0	-275.9778	-0.1871	-10.4394	0	-0.000003122	0	923
Level 1	C42	923 G+Ey+0.3Q-NL Max	1.4325	-273.8096	-0.1871	-10.4394	0	14.9621	0.281	923
Level 1	C42	923 G+Ey+0.3Q-NL Max	2.865	-271.6415	-0.1871	-10.4394	0	29.7896	0.5595	923
Level 1	C42	923 G+Ex+0.3Q-NL Max	0	-834.8715	-7.16	-1.567	0	0.00000338	0.000007912	923
Level 1	C42	923 G+Ex+0.3Q-NL Max	1.4325	-829.3707	-7.16	-1.567	0	4.1046	9.4497	923
Level 1	C42	923 G+Ex+0.3Q-NL Max	2.865	-823.8699	-7.16	-1.567	0	8.0943	18.6347	923
Level 1	C45	926 G+Ey+0.3Q-NL Max	0	-228.9581	0.6539	-16.3655	0	-8.876E-07	0	926
Level 1	C45	926 G+Ey+0.3Q-NL Max	1.4325	-226.7899	0.6539	-16.3655	0	23.4841	-0.9377	926
Level 1	C45	926 G+Ey+0.3Q-NL Max	2.865	-224.6218	0.6539	-16.3655	0	46.7931	-1.8683	926
Level 1	C45	926 G+Ex+0.3Q-NL Max	0	-476.7915	14.4682	-6.8538	0	0	0.000002742	926
Level 1	C45	926 G+Ex+0.3Q-NL Max	1.4325	-471.2907	14.4682	-6.8538	0	10.403	-21.3614	926
Level 1	C45	926 G+Ex+0.3Q-NL Max	2.865	-465.7899	14.4682	-6.8538	0	20.642	-42.3861	926
Level 1	C47	929 G+Ey+0.3Q-NL Max	0	-186.282	0.467	-14.1448	0	-7.447E-07	0	929
Level 1	C47	929 G+Ey+0.3Q-NL Max	1.4325	-184.1139	0.467	-14.1448	0	20.281	-0.6671	929
Level 1	C47	929 G+Ey+0.3Q-NL Max	2.865	-181.9457	0.467	-14.1448	0	40.4393	-1.3301	929
Level 1	C47	929 G+Ex+0.3Q-NL Max	0	-64.0439	14.9935	-9.166	0	0.000003116	0	929
Level 1	C47	929 G+Ex+0.3Q-NL Max	1.4325	-58.5431	14.9935	-9.166	0	13.7359	-21.0646	929
Level 1	C47	929 G+Ex+0.3Q-NL Max	2.865	-53.0423	14.9935	-9.166	0	27.4424	-42.084	929
Level 1	C49	932 G+Ey+0.3Q-NL Max	0	100.4367	0.7858	-56.9456	0	0	0	932
Level 1	C49	932 G+Ey+0.3Q-NL Max	1.4325	105.3151	0.7858	-56.9456	0	81.5725	-1.1252	932
Level 1	C49	932 G+Ey+0.3Q-NL Max	2.865	110.1934	0.7858	-56.9456	0	163.2014	-2.2512	932
Level 1	C49	932 G+Ex+0.3Q-NL Max	0	360.5014	-29.0306	23.2065	0	0	0.000002797	932
Level 1	C49	932 G+Ex+0.3Q-NL Max	1.4325	372.8782	-29.0306	23.2065	0	-33.0122	42.9756	932
Level 1	C49	932 G+Ex+0.3Q-NL Max	2.865	385.255	-29.0306	23.2065	0	-66.1044	86.0552	932
Level 1	C53	935 G+Ey+0.3Q-NL Max	0	272.3112	1.566	-7.2656	0	0.000002195	0	935
Level 1	C53	935 G+Ey+0.3Q-NL Max	1.4325	274.4794	1.566	-7.2656	0	10.4326	-2.2165	935

Level 1	C53	935 G+Ey+0.3Q-NL Max	2.865	276.6475	1.566	-7.2656	0	20.9599	-4.4531	935
Level 1	C53	935 G+Ex+0.3Q-NL Max	0	-892.3931	-6.3676	-1.4923	0	9.749E-07	0.000001769	935
Level 1	C53	935 G+Ex+0.3Q-NL Max	1.4325	-886.8923	-6.3676	-1.4923	0	4.1844	8.0715	935
Level 1	C53	935 G+Ex+0.3Q-NL Max	2.865	-881.3915	-6.3676	-1.4923	0	8.2474	15.9085	935
Level 1	C56	938 G+Ey+0.3Q-NL Max	0	60.589	0.842	-11.761	0	0	0	938
Level 1	C56	938 G+Ey+0.3Q-NL Max	1.4325	62.7571	0.842	-11.761	0	16.8465	-1.2032	938
Level 1	C56	938 G+Ey+0.3Q-NL Max	2.865	64.9253	0.842	-11.761	0	33.7282	-2.4089	938
Level 1	C56	938 G+Ex+0.3Q-NL Max	0	-484.4073	14.8478	2.8399	0	0	0	938
Level 1	C56	938 G+Ex+0.3Q-NL Max	1.4325	-478.9065	14.8478	2.8399	0	-3.643	-22.0595	938
Level 1	C56	938 G+Ex+0.3Q-NL Max	2.865	-473.4057	14.8478	2.8399	0	-7.2287	-43.7698	938
Level 1	C58	941 G+Ey+0.3Q-NL Max	0	18.7707	0.633	-8.383	0	6.139E-07	0	941
Level 1	C58	941 G+Ey+0.3Q-NL Max	1.4325	20.9388	0.633	-8.383	0	12.0109	-0.9058	941
Level 1	C58	941 G+Ey+0.3Q-NL Max	2.865	23.107	0.633	-8.383	0	24.0302	-1.8123	941
Level 1	C58	941 G+Ex+0.3Q-NL Max	0	-105.8642	14.974	5.3695	0	0	0	941
Level 1	C58	941 G+Ex+0.3Q-NL Max	1.4325	-100.3634	14.974	5.3695	0	-7.0198	-21.2929	941
Level 1	C58	941 G+Ex+0.3Q-NL Max	2.865	-94.8626	14.974	5.3695	0	-14.0163	-42.516	941

INTERMEDIATE SOUTH WING - TARAWERA GALLERY

SOUTH-INTERMEDIATE WING (TARAWERA GALLERY)

- ORIGINAL SECTION FROM 1906, MODIFIED IN 1967 & STRENGTHENED IN 2012.
- ONE-STOREY SECTION WITH ORIGINAL BASEMENT LEVEL.
- BASEMENT - ORIGINAL PUMICE UNREINFORCED COLUMNS & ARCHED FLOOR SLAB.
 - SHALLOW FOOTINGS FOR STEEL POSTS FROM 2012 STRENGTHENING WORKS.
- GROUND FLOOR - ORIGINAL PUMICE CONCRETE FLOOR WITH ADDITIONAL 100 mm REINFORCED CONCRETE TOPPING (FROM 2012).
- ROOF - ORIGINAL 1906 TIMBER FRAME ROOF TRUSSES WITH HEAVY CLAY TILES.
- OUTER WALLS - EXISTING ORIGINAL WALLS
- GRAVITY SUPPORTING SYSTEM:
 - SEE NEXT PAGE.
- LATERAL LOAD RESISTING SYSTEM:
 - IN BOTH DIRECTIONS - STEEL BRACED FRAMES.

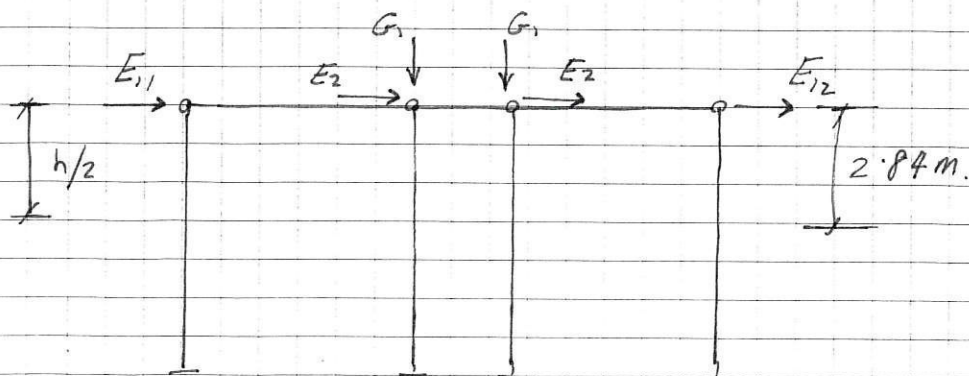


- LOAD PATH:

ROOF LOADS TRANSFERRED TO ORIGINAL OUTER WALLS & TO ORIGINAL STEEL BEAMS.

ORIGINAL OUTER WALLS ARE CONNECTED TO NEW STEEL FRAME @ EACH EXISTING WALL STUD AT THE TOP. (STUDS SPACED @ 0.70m).

- FORCES ON STEEL FRAME.



E_1 - HORIZ. SEISMIC LOADS FROM ROOF MASS & CEILING & HALF THE HEIGHT OF OUTER WALLS & INNER WALL.

E_2 - HORIZ. SEISMIC LOADS FROM ROOF MASS, & CEILING & HALF THE HEIGHT OF INNER WALL.

G_1 = DEAD LOADS FOR ROOF, CEILING.

MASS APPLIED - TO ETABS MODEL.

- TO OUTER EAVE BEAM FOR E_{11} (GL 3):

$$\text{Roof Load} = 0.90 \text{ kPa} \times 5.1 \text{ m} = 4.59 \text{ kN/m}$$

$$\text{MASS} = 4.59 \text{ kN/m} \times 10^3 / 9.81$$

$$= 468 \text{ Kg/m.}$$

$$\text{OUTER WALL LOAD} = 0.70 \text{ kPa} \times 2.84 \text{ m} = 1.99 \text{ kN/m.}$$

$$\text{MASS} = 1.99 \text{ kN/m} \times 10^3 / 9.81$$

$$= 203 \text{ Kg/m}$$

$$\text{CEILING LOAD} = 0.30 \text{ kPa} \times 2.50 \text{ m} = 0.75 \text{ kN/m}$$

$$\text{MASS} = 0.75 \text{ kN/m} \times 10^3 / 9.81$$

$$= 76.50 \text{ Kg/m}$$

$$\text{TOTAL MASS} = 468 + 203 + 76.50 = \underline{748 \text{ Kg/m.}}$$

- TO OUTER EAVE BEAM FOR E_{12} (GL. 6):

$$\text{Roof Load} = 0.90 \text{ kPa} \times 5.9 \text{ m} = 5.31 \text{ kN/m}$$

$$\text{MASS} = 5.31 \text{ kN/m} \times 10^3 / 9.81 = 541 \text{ kg/m}$$

$$\text{OUTER WALL MASS} = 76.50 \text{ Kg/m}$$

$$\text{CEILING MASS} = 203 \text{ Kg/m}$$

$$\text{TOTAL MASS} = 541 + 76.50 + 203 = \underline{821 \text{ kg/m}}$$

- To OUTER FRAMES

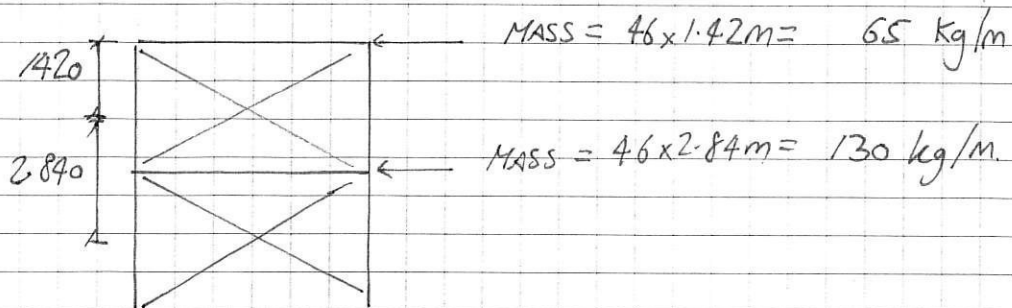
- INTERNAL WALL LOAD = 0.45 kPa

$$\text{MASS} = 0.45 \times 1000 / 9.81$$

$$= 46 \text{ Kg/m}^2$$

ADDITIONAL

- APPLY MASS @ FOLLOWING POINTS.



CAPACITY CHECK:

- CAPACITY CHECK OF STEEL MEMBERS & BRACING ELEMENTS HAS BEEN UNDERTAKEN USING MEMDES, ETABS SECTION DESIGN CHECK & HAND CALCULATIONS.

SUMMARY OF CHECK:

- 1) - THE CENTRAL COLUMNS ON GRIDLINE J HAVE BEEN CHECKED FOR:
 - THE 100mm THICK FLOOR TOPPING OF CONCRETE HAS BEEN CAST AROUND THE COLUMN. THERE IS NO GAP BETWEEN COLUMN & CONCRETE. THEREFORE CONCRETE TOPPING ACTS AS A STRUT BETWEEN COLUMN, PROVIDING SUPPORT AGAINST BENDING IN THE COLUMNS WEAK AXIS.
 - RESULTS OF CHECK $\rightarrow$ COLUMNS 100% NBS.
- 2) - DIAGONAL CROSS BRACES $\rightarrow$ 100% NBS.
- 3) - CENTRAL TRUSS - TOP CHORD BEAMS $\rightarrow$ 28% NBS.
 - $\therefore$ BENDING FAILURE ACROSS WEAK AXIS.
 - $\therefore$ NO RESTRAINT.
 - DEFLECTION ACROSS $\rightarrow$ 18% NBS

- 4) - Original existing outer rib walls have been checked for critical out-of-plane capacity $\rightarrow$ 55% NBS.

NOTE:

SEE PAGE 28/29.
FOR PHOTOS
OF TOPPING
AROUND COLUMN.

NOTE

SEE PAGES
27A & 27B
for capacity
check.

CONNECTION

CHECKED BETWEEN STEEL FRAME & EXISTING WALL. SEE PAGE 27

pg. 27.

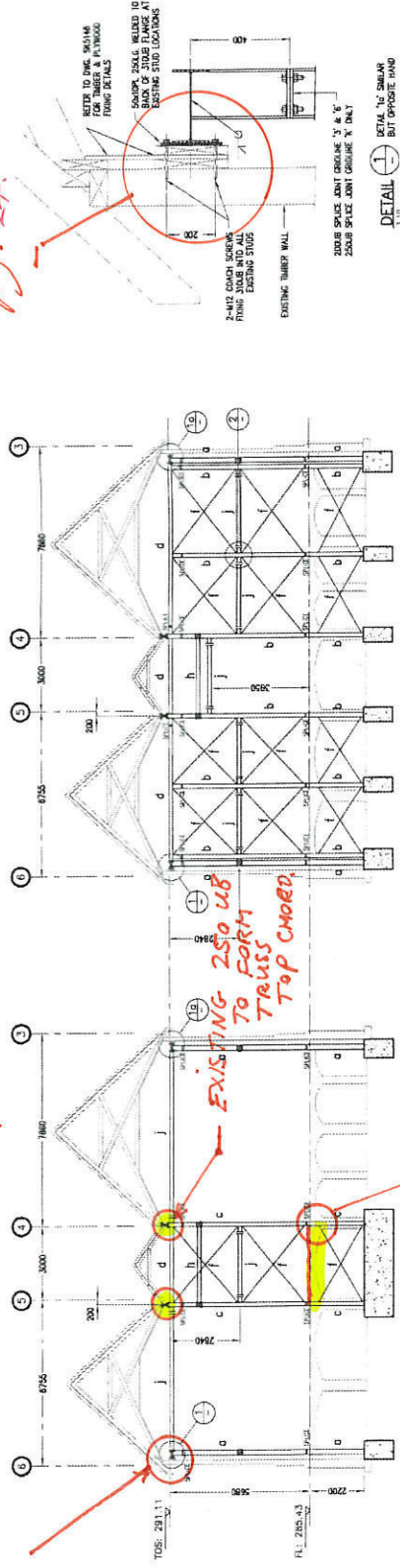
PIM/BC

KEY:

0	1	2	3	4	5	6	7	8	9
10	11	12	13	14	15	16	17	18	19

a	100UC-15
b	100UC-23
c	150x150x6 S/S
d	150x150x6 S/S
e	40x40x5 ANGLE
f	200x200x8
g	200x200x8
h	200x200x8
i	200x200x8
j	200x200x8
k	200x200x8
l	200x200x8
m	200x200x8
n	200x200x8

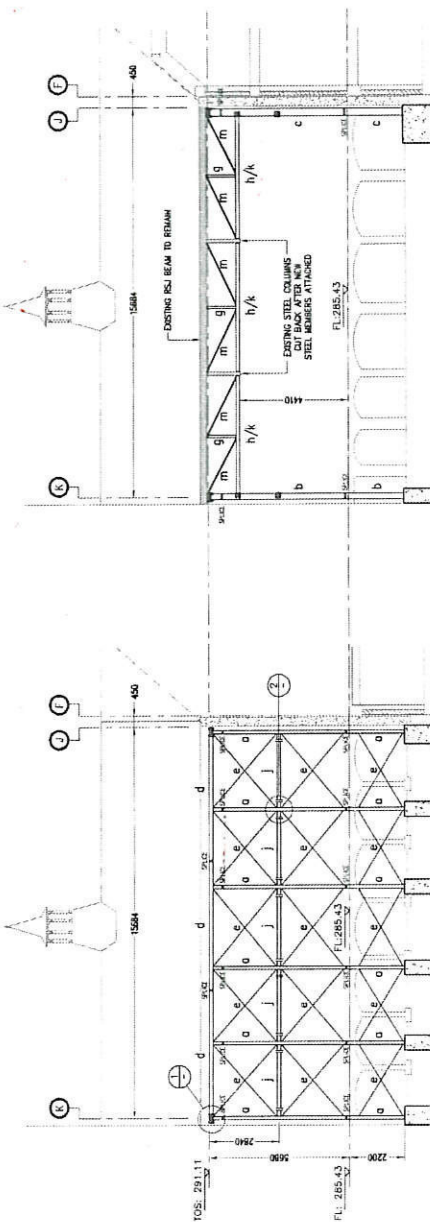
CONTRACTOR SHALL SITE CHECK & VERIFY ALL RELEVANT EXISTING & PROPOSED DIMENSIONS. ALL DIMENSIONS TO CENTRE OF COLUMNS UNLESS NOTED OTHERWISE.



GRIDLINE 'K' (LOOKING NORTH)

(i) FLOOR SLAB PROVIDES STRUT ACTION BETWEEN COLUMNS.

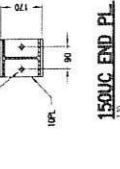
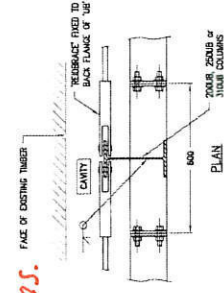
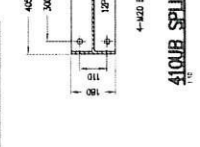
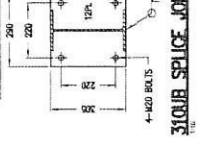
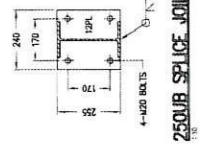
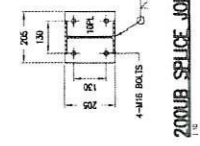
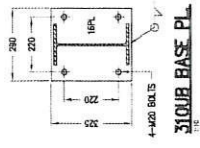
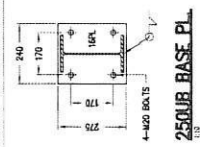
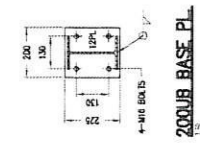
GRIDLINE 'J' (LOOKING NORTH)



GRIDLINE '6' (GRIDLINE '5' SIMILAR) (LOOKING EAST)

GRIDLINE '4' & '5' (LOOKING EAST)

ALLOW FOR 30 GROUT UNDER BASE PLATES



NO.	DATE	BY	CHK.	REVISION/DESCRIPTION
1	15/11/18	GRIDLINE 'X' WHITE		
2	15/11/18	FOR CONSTRUCTION		
3	15/11/18	FOR CONSTRUCTION		

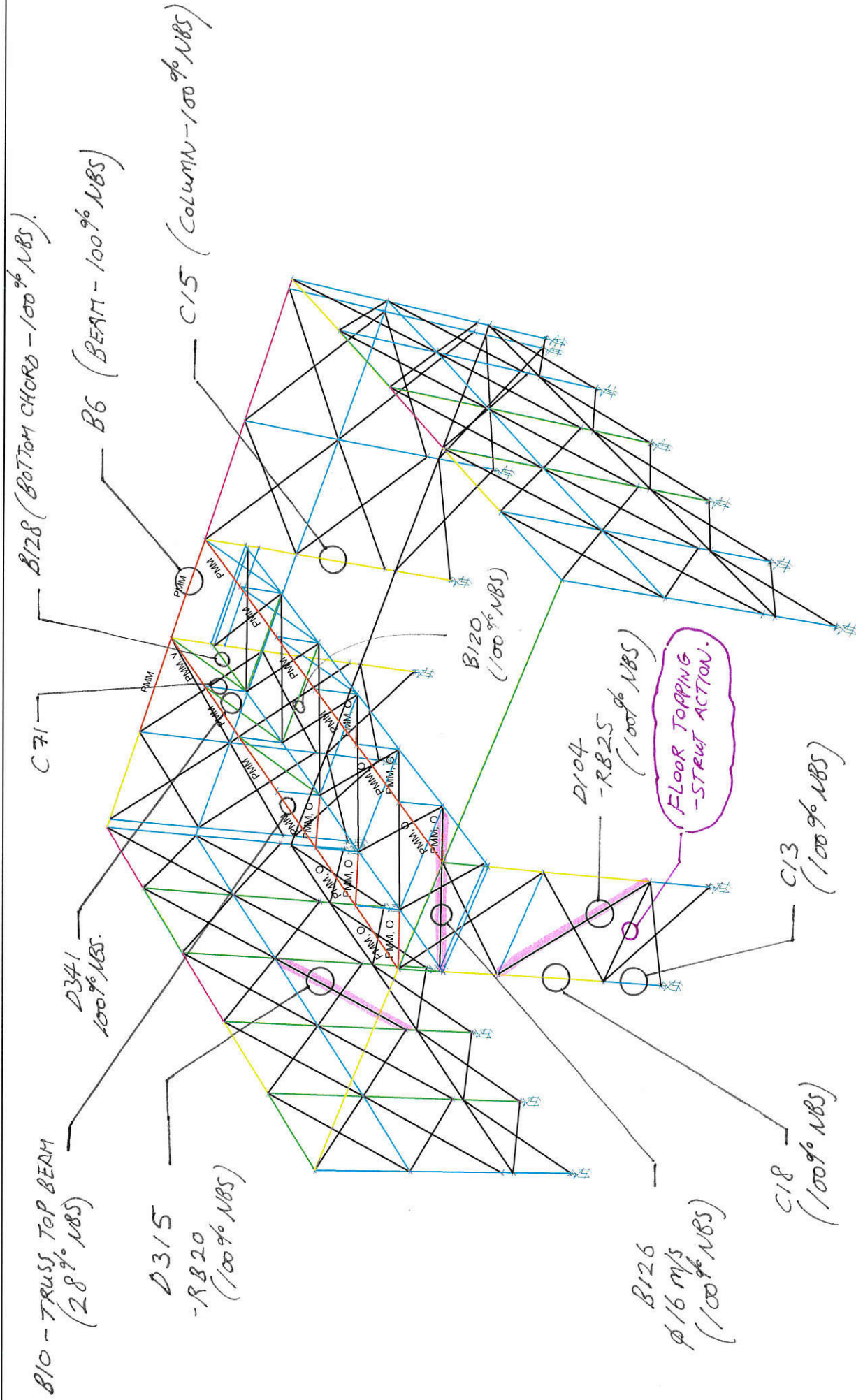
ROTORUA TRUST GALLERY CENTENNIAL DEVELOPMENT

SOUTH WING EXTENSION

STRUCTURAL STEEL ELEVATIONS TO EXISTING TARAWERA GALLERY

Scale	As Shown @ 1:1
File Number	W\8000\8129\Structure\8129-S(10)3000
Drawing Number	8129 - S(10)3600
Rev	D

SIGMA CONSULTANTS LIMITED
100/102 Commercial Street
PO Box 237 3456, Tel 07-347 3456



COLUMN C13

$$NBS = 100\%$$

Pg. 8

MemDes Calculations @ 11:19:00 21-07-2017 by CO

Project : J000949 - South Inter. Wing
Description : Column C13

Section : 310UB40 Grade 300+

Major Axis Bending

$$\text{Design Action } M_x^* = 43.4 \text{ kNm}$$

$$\text{User provided value for } a_m = 1.82$$

$$a_s = 0.88$$

$$a_m a_s \geq 1.0, \Rightarrow \text{Segment Fully Restrained}$$

$$M_{bx} = M_{sx} = 202.56 \text{ kNm}$$

$$\begin{aligned} \text{Major axis capacity Ratio} &= M_x^* / f M_{bx} \\ &= 0.24, \quad \text{--- OK ---} \end{aligned}$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 0.1 \text{ kNm}$$

$$M_{by} = M_{sy} = 44.48 \text{ kNm}$$

$$\begin{aligned} \text{Minor axis capacity ratio} &= M_y^* / f M_{by} \\ &= 0.00, \quad \text{--- OK ---} \end{aligned}$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 24.0 \text{ kN}$$

$$\text{Nominal Shear Yield capacity } V_w = 356.0 \text{ kN}$$

$$a_v = 2.43 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 356.0 \text{ kN}$$

$$\begin{aligned} \text{Shear capacity ratio} &= V_x^* / f V_u \\ &= 0.07, \quad \text{--- OK ---} \end{aligned}$$

Axial Calculations

$$\begin{aligned} \text{Design Action } N_d &= 31.8 \text{ kN [Comp]}, \quad L_{eAx} = 1.84 \text{ m}, \quad L_{eAy} = 1.84 \text{ m} \\ &= 1587.2 \text{ kN} \end{aligned}$$

$$\text{Major axis buckling : Minor axis buckling : Minimum Capac. } N_{cmin} = 1342.3$$

$$\begin{aligned} \text{Axial buckling capac. Ratio} &= N_d / f N_{cmin} \\ &= 0.026, \quad \text{--- OK ---} \end{aligned}$$

Combined Actions Checks

Clause 8.3.3/4 :

$$\begin{aligned} M_{ry} &= M_{sy} (1 - (N^* / f N_s)^2) * 1.19, \leq M_{sy} \text{ [Alt. Prov. OK]} \\ &= 44.5 \end{aligned}$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, $\Psi = 1.422$

$$\begin{aligned} &= (M_x^* / f M_{rx})^{\Psi} + (M_y^* / f M_{ry})^{\Psi} \\ &= 0.130, \quad \text{--- OK ---} \end{aligned}$$

Clause 8.4.2.2 : Major : $M_{ix} = 198.0$

$$\begin{aligned} \text{Load / Capacity Ratio} &= M_m^* / f M_i \\ &= 0.244 \quad \text{--- OK ---} \end{aligned}$$

NOTE:

CALCULATIONS SHOW
NBS > 100%, THIS would
BE EVEN GREATER
using f_y probable and $\phi = 1.0$.

Clause 8.4.2.2 : Minor : $M_{iy} = 43.3$

$$\text{Load / Capacity Ratio} = M_m^* / f M_i$$

$$= 0.003 \quad \text{--- OK ---}$$

Clause 8.4.5.1 :

$$\text{Load / Capacity Ratio} = [M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$$

$$= 0.139, \quad \text{--- OK ---}$$

NBS > 100%

===== SUMMARY =====

**** U.L.S. Capacity Check Passed, Load Cap. Ratio = 0.24 --- OK ---

=====

MemDes v 2.1 : Calculations for New Zealand Steel

Project : J000949 - South Inter. Wing at 11:19:00 a.m. on 21/07/2017

Description : Column C13 by CO Powered By Steltech (<http://www.steltech.co.nz>)

COLUMN €18.

$$NBS = 100\%$$

Pg. 10

MemDes Calculations @ 11:13:05 21-07-2017 by CO

Project : J000949 - South Inter. Wing
Description : Column C26

Section : 310UB40 Grade 300+

Major Axis Bending

$$\text{Design Action } M_x^* = 125.0 \text{ kNm}$$

$$\text{User provided value for } a_m = 1.40$$

$$a_s = 0.70$$

$$a_m \ a_s < 1.0, \Rightarrow \text{Segment NOT Fully Restrained}$$

$$M_{bx} = 1.40 * 0.70 * 202.6 = 198.5$$

$$\begin{aligned} \text{Major axis capacity Ratio} &= M_x^* / f M_{bx} \\ &= 0.70, \quad \text{--- OK ---} \end{aligned}$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 0.1 \text{ kNm}$$

$$M_{by} = M_{sy} = 44.48 \text{ kNm}$$

$$\begin{aligned} \text{Minor axis capacity ratio} &= M_y^* / f M_{by} \\ &= 0.00, \quad \text{--- OK ---} \end{aligned}$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 24.0 \text{ kN}$$

$$\text{Nominal Shear Yield capacity } V_w = 356.0 \text{ kN}$$

$$a_v = 2.43 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 356.0 \text{ kN}$$

$$\begin{aligned} \text{Shear capacity ratio} &= V_x^* / f V_u \\ &= 0.07, \quad \text{--- OK ---} \end{aligned}$$

Axial Calculations

$$\begin{aligned} \text{Design Action } N_d &= 36.1 \text{ kN [Comp]}, \text{ LeAxx} = 3.20 \text{ m}, \text{ LeAxy} = 3.20 \text{ m} \\ &= 1587.2 \text{ kN} \end{aligned}$$

Major axis buckling : Minor axis buckling : Minimum Capac. $N_{cmin} = 943.2$

$$\begin{aligned} \text{Axial buckling capac. Ratio} &= N_d / f N_{cmin} \\ &= 0.043, \quad \text{--- OK ---} \end{aligned}$$

Combined Actions Checks

Clause 8.3.3/4 :

$$\begin{aligned} M_{ry} &= M_{sy} (1 - (N^* / f N_s)^2) * 1.19, \leq M_{sy} \text{ [Alt. Prov. OK]} \\ &= 44.5 \end{aligned}$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, $\Psi = 1.425$

$$\begin{aligned} &= (M_x^* / f M_{rx})^{\Psi} + (M_y^* / f M_{ry})^{\Psi} \\ &= 0.584, \quad \text{--- OK ---} \end{aligned}$$

Clause 8.4.2.2 : Major : $M_{ix} = 197.2$

$$\begin{aligned} \text{Load / Capacity Ratio} &= M_m^* / f M_i \\ &= 0.704 \quad \text{--- OK ---} \end{aligned}$$

NOTE:

CALCULATIONS SHOW
 $NBS > 100\%$. THIS WOULD BE
EVEN GREATER USING
 f_y probable and $\phi = 1.0$

Clause 8.4.2.2 : Minor : $M_{iy} = 42.6$

$$\text{Load / Capacity Ratio} = M_m^* / f M_i$$

$$= 0.003 \quad \text{---- OK ----}$$

Clause 8.4.4.1 :

$$M_{ox} = M_{bx} (1 - N^* / f N_{cy}) \leq M_{rx}$$

$$= 190.1$$

$$\text{Load / Capacity Ratio} = M_x^* / f M_{ox}$$

$$= 0.731, \quad \text{---- OK ----}$$

Clause 8.4.5.1 :

$$\text{Load / Capacity Ratio} = [M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$$

$$= 0.645, \quad \text{---- OK ----}$$

NBS > 100%

===== SUMMARY =====

**** U.L.S. Capacity Check Passed, Load Cap. Ratio = 0.73 ---- OK ----

=====

MemDes v 2.1 : Calculations for New Zealand Steel

Project : J000949 - South Inter. Wing at 11:13:05 a.m. on 21/07/2017

Description : Column C26-Segment 1 by CO **Powered By Steltech**

(<http://www.steltech.co.nz>)

COLUMN C15.

$$NBS = 100\%$$

NOTE. CALCULATIONS-
AMENDED.

$$\phi = 1.0$$

$f_{y,prob.}$

MemDes Calculations @ 16:09:50 20-07-2017 by CO

Project : J000949 - South Inter. Wing

Description : Column C15

Section : 250UB37 Grade 300+

$$d = 256 \text{ mm} \quad b = 146 \text{ mm} \quad t_f = 10.9 \text{ mm} \quad t_w = 6.4 \text{ mm}$$

$$\text{Area} = 4750 \text{ mm}^2 \quad f_{yf} = 320 \text{ MPa} \quad f_{yw} = 320 \text{ MPa} \quad f_u = 440 \text{ MPa}$$

Member Effective Length Calcs

$$\text{Eff. Len } L_e = 5.04 * 1.06 * 1.00 * 0.85 = 4.55 \text{ m}$$

Major Axis Bending

$$\text{Design Action } M_x^* = 97.0 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sx} = f_{yf} Z_{ex} = 155.52 \text{ kNm}$$

$$\text{User provided value for } a_m = 1.50$$

Reference Buckling Moment Calculation : M_0

$$M_0 = 107.6 \text{ kNm} \quad (\text{Eqn } 5.6.1.1(4))$$

$$a_s = 0.49$$

$$a_m \quad a_s < 1.0, \Rightarrow \text{Segment NOT Fully Restrained}$$

$$M_{bx} = 1.50 * 0.49 * 155.5 = 113.5$$

$$\text{Major axis capacity Ratio} = M_x^* / f M_{bx} = 0.95, \quad \text{--- OK ---}$$

$$M_{sx} = 155.52 * 1.15 = 178.8 \text{ kNm.}$$

$$M_{bx} = 113.5 * 1.15 = 130 \text{ kNm.}$$

$$\text{RATIO} = 97/130 = 0.75$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 0.9 \text{ kNm}$$

$$\text{Section Bending Capacity } M_{sy} = 37.12 \text{ kNm}$$

$$M_{by} = M_{sy} = 37.12 \text{ kNm}$$

$$\text{Minor axis capacity ratio} = M_y^* / f M_{by} = 0.03, \quad \text{--- OK ---}$$

$$M_{sy} = 37.12 * 1.15 = 42.7 \text{ kNm.}$$

$$\text{RATIO} = 0.9 / 1(42.7) = 0.021.$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 17.0 \text{ kN}$$

$$\text{Nominal Shear Yield capacity } V_w = 314.6 \text{ kN}$$

$$a_v = 3.92 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 314.6 \text{ kN}$$

$$\text{Shear capacity ratio} = V_x^* / f V_u = 0.06, \quad \text{--- OK ---}$$

Axial Calculations

$$\text{Design Action } N_d = 56.0 \text{ kN [Comp]}, \quad L_{eAx} = 5.04 \text{ m}, \quad L_{eAy} = 5.04 \text{ m}$$

$$\text{Sect. Compression Capacity } N_s = k_f A_n f_{y,comb} = 1520.0 \text{ kN}$$

$$\text{Major axis buckling : } a_c = 0.8469$$

$$a_{cx} < 1.0 \Rightarrow N_{cx} = a_{cx} N_s = 1287.3$$

$$\text{Minor axis buckling : } a_c = 0.2481$$

$$a_{cy} < 1.0 \Rightarrow N_{cy} = a_{cy} N_s = 377.1$$

$$\text{Minimum Capac. } N_{cmin} = 377.1$$

$$\text{Axial buckling capac. Ratio} = N_d / f N_{cmin}$$

$$N_s = 1520 * 1.15 = 1,750 \text{ kN}$$

$$N_{cx} = 1480.4 \text{ kN.}$$

$$N_{cy} = N_{cmin} = 377.1 * 1.15 = 433.6 \text{ kN.}$$

$$= 0.165,$$

---- OK ----

$$\text{Ratio} = 0.13$$

Combined Actions Checks

Significant Axial Load test (Cl. 8.1.4(a)) NOT Satisfied **** NOK ****

Significant Axial Load test (Cl. 8.1.4(b)) NOT Satisfied **** NOK ****

+ Check Alternative Provisions, (Clause 8.1.5)

Major axis : Flg : Actual = 7.2, Allowable = 10

Web : Actual = 41.4, Allowable = 82 ---- OK ----

Minor axis : Flg : Actual = 7.2, Allowable = 10

Web : Actual = 41.4, Allowable = 1000 ---- OK ----

Alt. Prov. Cl 8.1.5 (a)-(c) OK for Minor axis, OK for Major axis actions

Clause 8.3.2/4 :

$$M_{rx} = M_{sx} (1 - N^* / f N_s) * 1.18, \leq M_{sx} \text{ [Alt. Prov. OK]}$$

$$= 155.5$$

$$M_{rx} = 178.8 \left(1 - \frac{56}{1750}\right) \times 1.18$$

$$= 204 \text{ kNm}$$

Clause 8.3.3/4 :

$$M_{ry} = M_{sy} (1 - (N^* / f N_s)^2) * 1.19, \leq M_{sy} \text{ [Alt. Prov. OK]}$$

$$= 37.1$$

$$M_{ry} = 42.7 \left(1 - \left(\frac{56}{1750}\right)^2\right) \times 1.19$$

$$= 50.7$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, $\Psi = 1.441$

$$= (M_x^* / f M_{rx})^{\Psi} + (M_y^* / f M_{ry})^{\Psi}$$

$$= 0.595,$$

---- OK ----

Clause 8.4.2.2 : Major : $M_{ix} = M_{sx} (1 - N^* / f N_{cx}) \leq M_{rx}$

$$= 148.0$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

$$\text{Load / Capacity Ratio} = M_m^* / f M_i$$

$$= 0.728$$

---- OK ----

Clause 8.4.2.2 : Minor : $M_{iy} = M_{sy} (1 - N^* / f N_{cy}) \leq M_{ry}$

$$= 31.0$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

$$\text{Load / Capacity Ratio} = M_m^* / f M_i$$

$$= 0.032$$

---- OK ----

Clause 8.4.4.1 : User provided value for a_m , hence unable to calculate b_m <<<<

>>> => Cannot Access Alternative Design Provisions <<<<

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

$$M_{ox} = M_{bx} (1 - N^* / f N_{cy}) \leq M_{rx}$$

$$= 94.7$$

$$\text{Load / Capacity Ratio} = M_x^* / f M_{ox}$$

$$= 1.138,$$

**** FAIL ****

$$M_{ox} = 130 \left(1 - \frac{56}{433.6}\right)$$

$$= 113 \text{ kNm.}$$

$$\text{Ratio} = 97 / 113 = 0.86 < 1 \therefore \text{ok.}$$

Clause 8.4.5.1 :

$$\text{Load / Capacity Ratio} = [M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$$

$$= 1.206,$$

**** FAIL ****

$$\text{Ratio} = \left(\frac{97}{113}\right)^{1.4} = 0.81 < 1$$

===== SUMMARY =====

**** U.L.S. Capacity Check FAILED, Load Cap. Ratio = 1.21 *** FAIL ***

=====

MemDes v 2.1 : Calculations for New Zealand Steel

$$\boxed{\text{NBS} > 100\%}$$

BEAM B6.

$$NBS = 100\%$$

MemDes Calculations @ 15:50:38 20-07-2017 by CO

Project : J000949 - South Inter. Wing
Description : B6 Eave Beam

Section : 310UB32 Grade 300+

Major Axis Bending

$$\text{Design Action } M_x^* = 122.0 \text{ kNm}$$

$$\text{User provided value for } a_m = 1.10$$

$$a_s = 0.68$$

$$a_m \ a_s < 1.0, \Rightarrow \text{Segment NOT Fully Restrained}$$

$$M_{bx} = 1.10 * 0.68 * 149.4 = 111.1$$

$$\text{Major axis capacity Ratio} = M_x^* / f M_{bx} = 1.22, \quad \text{**** FAIL ****}$$

Minor Axis Bending

$$\text{Design Action } M_y^* = 0.2 \text{ kNm}$$

$$M_{by} = M_{sy} = 27.81 \text{ kNm}$$

$$\text{Minor axis capacity ratio} = M_y^* / f M_{by} = 0.01, \quad \text{--- OK ---}$$

Shear Calculations (Unstiffened Web)

$$\text{Design Action } V_x^* = 8.0 \text{ kN}$$

$$\text{Nominal Shear Yield capacity } V_w = 314.7 \text{ kN}$$

$$a_v = 2.00 \geq 1.0 \Rightarrow \text{full web shear capacity}$$

$$V_u = V_w = 314.7 \text{ kN}$$

$$\text{Shear capacity ratio} = V_x^* / f V_{vm} = 0.04, \quad \text{--- OK ---}$$

Axial Calculations

$$\text{Design Action } N_d = 26.0 \text{ kN [Comp]}, \text{ LeAxx} = 3.00 \text{ m}, \text{ LeAxy} = 3.00 \text{ m}$$

$$= 1194.6 \text{ kN}$$

$$\text{Major axis buckling : Minor axis buckling : Minimum Capac. } N_{cmin} = 656.7$$

$$\text{Axial buckling capac. Ratio} = N_d / f N_{cmin} = 0.044, \quad \text{--- OK ---}$$

Combined Actions Checks

Clause 8.3.3/4 :

$$M_{ry} = M_{sy} (1 - (N^* / f N_s)) \leq M_{sy} \text{ [Alt. Prov. NOK]}$$

$$= 27.1$$

$$\text{Clause 8.3.4 : Capac. Ratio} = [N_d / N_s + M_x^* / M_{sx} + M_y^* / M_{sy}] / f = 0.939, \quad \text{--- OK ---}$$

$$\text{Clause 8.4.2.2 : Major : } M_{ix} = 145.7$$

$$\text{Load / Capacity Ratio} = M_m^* / f M_i = 0.931, \quad \text{--- OK ---}$$

$$\text{Clause 8.4.2.2 : Minor : } M_{iy} = 26.6$$

NOTE: CALCULATIONS
AMENDED.

$$\phi = 1.0$$

f_y probable.

$$M_{bx} = 111.1 \times 1.15 = 127.8 \text{ kNm.}$$

$$\begin{aligned} \therefore M_x^* / \phi M_{bx} &= 122 / (1) 127.8 \\ &= 0.95 < 1 \quad \therefore \text{Pass.} \end{aligned}$$

$$M_{by} / M_{sy} = 31.98 \text{ kNm.}$$

$$\begin{aligned} N_{cmin} &= 656.7 \times 1.15 \\ &= 755 \text{ kN.} \end{aligned}$$

$$\text{RATIO} = 0.034$$

$$\begin{aligned} \eta_{ry} &= 31.98 (1 - 26 / 656.7) \\ &= 31.98 \end{aligned}$$

$$\begin{aligned} \text{RATIO} &= \frac{26}{656.7} + \frac{122}{171.8} + \frac{0.2}{27.81} \\ &= 0.75 < 1 \end{aligned}$$

$$M_{ix} = 145.7 \times 1.15 = 167.6 \text{ kNm.}$$

$$M_{iy} = 26.6 \times 1.15 = 30.59 \text{ kNm}$$

$$\text{Load / Capacity Ratio} = M_m^* / f M_i$$

$$= 0.008 \quad \text{--- OK ---}$$

Clause 8.4.4.1 :

$$M_{ox} = M_{bx} (1 - N^* / f N_{cy}) \leq M_{rx}$$

$$= 106.2$$

$$\text{Load / Capacity Ratio} = M_x^* / f M_{ox}$$

$$= 1.276, \quad \text{**** FAIL ****}$$

Clause 8.4.5.1 :

$$\text{Load / Capacity Ratio} = [M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi_i M_{iy})^{1.4}$$

$$= 1.408, \quad \text{**** FAIL ****}$$

===== SUMMARY =====

**** U.L.S. Capacity Check FAILED, Load Cap. Ratio = 1.41 **** FAIL ****

=====

$$\text{Ratio} = 0.22 / 1.0 (30.59)$$

$$= 0.0065 \quad \therefore \text{ok.}$$

$$M_{ox} = 123.4 \text{ kN}$$

$$\text{Ratio} = 122 / (1.0 \times 123.4)$$

$$= 0.98 < 1$$

$$\text{Ratio} = (122 / 123.4)^{1.4} + (0.2 / 30.59)^{1.4}$$

$$= 0.98 < 1$$

$\therefore \text{NBS} > 100\%$

MemDes v 2.1 : Calculations for New Zealand Steel

Project : J000949 - South Inter. Wing at 3:50:38 p.m. on 20/07/2017

Description : B6 Eave Beam

by CO

Powered By Steltech (<http://www.steltech.co.nz>)

$$NBS = 100\%$$

MemDes Calculations @ 15:24:22 20-07-2017 by CO

Project : J000949 - South Inter. Wing
Description : Truss vertical member (MEMBER C71).

Section : 100UC14 Grade 300+

Major Axis Bending

Design Action $M_x^* = 12.0$ kNm

$$a_m = 2.50$$

$$a_s = 0.93$$

$a_m a_s \geq 1.0$, $\Rightarrow$ Segment Fully Restrained

$$M_{bx} = M_{sx} = 23.81 \text{ kNm}$$

$$\begin{aligned} \text{Major axis capacity Ratio} &= M_x^* / f M_{bx} \\ &= 0.56, \quad \text{---- OK ----} \end{aligned}$$

Minor Axis Bending

Design Action $M_y^* = 1.0$ kNm

$$M_{by} = M_{sy} = 11.01 \text{ kNm}$$

$$\begin{aligned} \text{Minor axis capacity ratio} &= M_y^* / f M_{by} \\ &= 0.10, \quad \text{---- OK ----} \end{aligned}$$

Shear Calculations (Unstiffened Web)

Design Action $V_x^* = 19.0$ kN

Nominal Shear Yield capacity $V_w = 93.1$ kN

$a_v = 19.06 \geq 1.0 \Rightarrow$ full web shear capacity

$$V_u = V_w = 93.1 \text{ kN}$$

$$\begin{aligned} \text{Shear capacity ratio} &= V_x^* / f V_u \\ &= 0.23, \quad \text{---- OK ----} \end{aligned}$$

Axial Calculations

Design Action $N_d = 57.6$ kN [Comp], $Le_{Axx} = 1.00$ m, $Le_{Axy} = 1.00$ m
 $= 604.8$ kN

Major axis buckling : Minor axis buckling : Minimum Capac. $N_{cmin} = 531.2$

$$\begin{aligned} \text{Axial buckling capac. Ratio} &= N_d / f N_{cmin} \\ &= 0.120, \quad \text{---- OK ----} \end{aligned}$$

Combined Actions Checks

Clause 8.3.3/4 :

$$\begin{aligned} M_{ry} &= M_{sy} (1 - (N^* / f N_s)^2) * 1.19, \leq M_{sy} [\text{Alt. Prov. OK}] \\ &= 11.0 \end{aligned}$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, $\Psi = 1.506$

$$\begin{aligned} &= (M_x^* / f M_{rx})^{\Psi} + (M_y^* / f M_{ry})^{\Psi} \\ &= 0.449, \quad \text{---- OK ----} \end{aligned}$$

Clause 8.4.2.2 : Major : $M_{ix} = 21.2$

$$\begin{aligned} \text{Load / Capacity Ratio} &= M_m^* / f M_i \\ &= 0.630 \quad \text{---- OK ----} \end{aligned}$$

NOTE:
CALCULATIONS SHOW
 $NBS > 100\%$. THIS WOULD
BE EVEN GREATER
USING f_y probable
and $\phi = 1.0$.

Clause 8.4.2.2 : Minor : $M_{iy} = 9.7$

$$\text{Load / Capacity Ratio} = M_m^* / f M_i$$

$$= 0.115 \quad \text{---- OK ----}$$

Clause 8.4.5.1 :

$$\text{Load / Capacity Ratio} = [M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi M_{iy})^{1.4}$$

$$= 0.572, \quad \text{---- OK ----}$$

NBS > 100%

===== SUMMARY =====

**** U.L.S. Capacity Check Passed, Load Cap. Ratio = 0.63 ---- OK ----

=====

MemDes v 2.1 : Calculations for New Zealand Steel

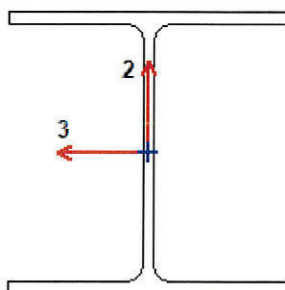
Project : J000949 - South Inter. Wing at 3:24:22 p.m. on 20/07/2017

Description : Truss vertical member by CO Powered By Steltech

(<http://www.steltech.co.nz>)

ETABS 2016 Steel Frame Design

NZS 3404:1997 Steel Section Check (Strength Summary)



TRUSS BOTTOM CHORD

Element Details

Level	Element	Unique Name	Location (mm)	Combo	Element Type	Section	Classification
Level 1.3	B128	210	2575	G+EQX+0.3Q	Braced Frame	150UC23.4	Non-Compact

Design Code Parameters

Φ_B	Φ_C	Φ_{TY}	Φ_{TF}	Φ_S
1	1	1	1	1

Section Properties

A (cm ²)	I ₃₃ (cm ⁴)	r ₃₃ (mm)	S ₃₃ (cm ³)	A _{v3} (cm ²)	Z ₃₃ (cm ³)	
29.8	1260	65	165.8	20.7	184	
J (cm ⁴)	I ₂₂ (cm ⁴)	r ₂₂ (mm)	S ₂₂ (cm ³)	A _{v2} (cm ²)	Z ₂₂ (cm ³)	I _w (cm ⁶)
5	398	36.5	52.4	9.3	80.2	20977.9

Material Properties

E (MPa)	f _y (MPa)	α
205000	345	NA

Demand/Capacity (D/C) Ratio (8.3.4a)

$$\text{D/C Ratio} = \frac{N^* / \Phi N_s + M^*_{sx} / \Phi M_{sx} + M^*_{sy}}{\Phi M_{sy}}$$

$$0.506 = 0.124 + 0.362 + 0.02$$

NBS > 100 %

Stress Check Forces and Moments (8.3.4a) (Combo G+EQX+0.3Q)

Location (mm)	N* (kN)	M* ₃₃ (kN-m)	M* ₂₂ (kN-m)	V* ₂ (kN)	V* ₃ (kN)
2575	-127.8453	-21.6209	-0.5052	10.8439	1.327

Basic Factors (8.3.4a)

Buckling Mode	K Factor	L Factor	L Length (mm)	KL/r
Major Bending	1	1	2575	39.6
Minor Bending	1	0.943	2429.4	66.475
Major Braced	1	1	2575	39.6
Minor Braced	1	0.943	2429.4	66.475
LTB	1.4	0.943	2429.4	93.065

Axial Force & Biaxial Moment Design Factors (8.3.4a)

	L Factor	Braced k_e	Sway k_e	Δ_b	Δ_s	C_m	β_m
Major Bending	1	1	1	1	1	0.483	0.291
Minor Bending	0.943	1	1	1.103	1	1	-1

	L_{ltb}	k_l	k_l	k_r	α_m	α_s
LTB	0.943	1	1.4	1	2.185	0.658

Axial Factors

Steel Type	K_f	K_t	α_a	α_b	α_c
Hot Rolled	1	1	19.507	0	0.694

Slenderness Factors

Slenderness	λ_e	λ_{ep}	λ_{ey}	λ_{ew}	λ_e / λ_{ey}	Compactness
Major Flange	13.129	9	16	90	0.821	Non-Compact
Major Web	23.225	82	180	180	0.129	Compact
Minor Flange	13.129	9	25	90	0.525	Non-Compact
Minor Web	23.225	30	45	180	0.516	Compact
Axial Flange	13.129		16		0.821	Compact
Axial Web	23.225		45		0.516	Compact

Effective Properties

Z_{eMajor} (cm³)	Z_{eMinor} (cm³)	$b - b_e$ (mm)	$d - d_e$ (mm)	A_{eff} (cm²)
173.3	71.8	0	0	29.8

Moments and Capacities

	M^* (kN-m)	M_s (kN-m)	M_r (kN-m)	M_i (kN-m)	N_c (kN)
Major Moment	21.6209	59.7738	52.3409	51.296	901.3883
Minor Moment	0.5052	24.7692	21.6891	20.331	713.4907

Flexural Capacities

	$M_{o,cr}$ (kN-m)	M_b (kN-m)	M_o (kN-m)	M_c (kN-m)	M_i (kN-m)
Major Moment	72.8679	59.7738	49.0634	49.0634	49.0634

Axial Capacities

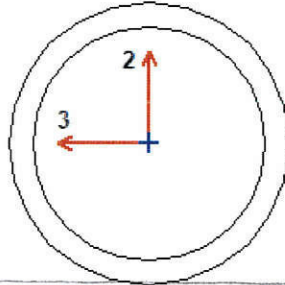
	N^* (kN)	N_s (kN)	N_c (kN)	N_t (kN)	N_{oz} (kN)
Axial	127.8453	1028.1	713.4907	1028.1	2004.0092

Shear Design

	V^* Force (kN)	V_v Capacity (kN)	Stress Ratio
Major Shear	10.8439	191.9304	0.056
Minor Shear	1.327	427.9104	0.003

ETABS 2016 Steel Frame Design

NZS 3404:1997 Steel Section Check (Strength Summary)



TRUSS BOTTOM HORIZONTAL MEMBERS

Element Details

Level	Element	Unique Name	Location (mm)	Combo	Element Type	Section	Classification
Level 1.3	B120	188	3000	G+EQY+0.3Q	Braced Frame	32NB SCH40	Compact

Design Code Parameters

Φ_B	Φ_C	Φ_{TY}	Φ_{TF}	Φ_S
1	1	1	1	1

Section Properties

A (cm ²)	I ₃₃ (cm ⁴)	r ₃₃ (mm)	S ₃₃ (cm ³)	A _{v3} (cm ²)	Z ₃₃ (cm ³)	
4.3	8.1	13.7	3.8	2.2	5.3	
J (cm ⁴)	I ₂₂ (cm ⁴)	r ₂₂ (mm)	S ₂₂ (cm ³)	A _{v2} (cm ²)	Z ₂₂ (cm ³)	I _w (cm ⁶)
16.2	8.1	13.7	3.8	2.2	5.3	

Material Properties

E (MPa)	f _y (MPa)	α
205000	345	NA

Demand/Capacity (D/C) Ratio (6.1b)

D/C Ratio = $N^* / \phi N_s$ or $N^* / \phi N_c$
0.549 = 0.549

NBS 100%

Stress Check Forces and Moments (6.1b) (Combo G+EQY+0.3Q)

Location (mm)	N* (kN)	M* ₃₃ (kN-m)	M* ₂₂ (kN-m)	V* ₂ (kN)	V* ₃ (kN)
3000	-9.5775	0	0	0	0

Basic Factors (6.1b)

Buckling Mode	K Factor	L Factor	L Length (mm)	KL/r
Major Bending	1	1	3000	218.897
Minor Bending	1	1	3000	218.897
Major Braced	1	1	3000	218.897
Minor Braced	1	1	3000	218.897
LTB	1.4	1	3000	306.456

Axial Force & Biaxial Moment Design Factors (6.1b)

	L Factor	Braced k_e	Sway k_e	Δ_b	Δ_s	C_m	β_m
Major Bending	1	1	1	2.107	1	1	-1
Minor Bending	1	1	1	2.107	1	1	-1

	L_{ltb}	k_t	k_l	k_r	α_m	α_s
LTB	1	1	1.4	1	1	0.943

Axial Factors

Steel Type	K_r	K_t	α_a	α_b	α_c
Hot Rolled	1	1	7.965	-1	0.117

Slenderness Factors

Slenderness	λ_e	λ_{ep}	λ_{ey}	λ_{ew}	Compactness
Bending Any	4.475	50	120	No limit	Compact
Axial Any	4.475		82		Compact

Effective Properties

$Z_{eMajor} (cm^3)$	$Z_{eMinor} (cm^3)$	$d - d_e (mm)$	$A_{eff} (cm^2)$
5.3	5.3	42.2	4.3

Moments and Capacities

	$M^* (kN-m)$	$M_s (kN-m)$	$M_r (kN-m)$	$M_t (kN-m)$	$N_c (kN)$
Major Moment	0	1.8352	1.7171	0.8278	17.4486
Minor Moment	0	1.8352	1.7171	0.8278	17.4486

Flexural Capacities

	$M_{o,cr} (kN-m)$	$M_b (kN-m)$	$M_o (kN-m)$	$M_c (kN-m)$	$M_t (kN-m)$
Major Moment	10.9052	1.7308	0.7808	0.7808	0.7808

Axial Capacities

	$N^* (kN)$	$N_s (kN)$	$N_c (kN)$	$N_t (kN)$	$N_{oz} (kN)$
Axial	9.5775	148.9383	17.4486	148.9383	34038.2864

Shear Design

	$V^* \text{ Force } (kN)$	$V_v \text{ Capacity } (kN)$	Stress Ratio
Major Shear	0	53.6178	0
Minor Shear	0	53.6178	0

TRUSS ANGLE SECTION D341. - 40x5 EA

- TENSION, $N_t^* = 102$ kN. LOAD CASE
G + EQy

$$\phi N_t = 1(A_g f_y)$$

$$= 375 \text{ mm}^2 \times 345 \text{ MPa} \times 10^{-3}$$

$$= 129 \text{ kN}$$

or

$$\phi N_t = 1(0.85)(K_{tc})(A_n)(f_u)$$

$$= 1(0.85)(0.85)(375 \text{ mm}^2) 440 \text{ MPa} \times 10^{-3}$$

$$= 119 \text{ kN.}$$

$$\therefore \phi N_t = 119 \text{ kN} > N_t^* = 102 \text{ kN.}$$

NBS

$$\therefore \text{NBS} > 100\%$$

$\therefore 40 \times 5 \text{ EA} \therefore \text{OKAY}$

REFERENCE

NZS 3404-1997
SECTION 7.1.

B10 - TRUSS TOP BEAM.

$$NBS = 28\%$$

NOTE:
CALCULATIONS
AMENDED FOR
 $\phi = 1.0$ &
 f_y (PROBABLE)

MemDes Calculations @ 14:14:35 02-08-2017 by CO

Project : J000949 - South Inter. Wing
Description : Truss Top Chord Beam

Section : 250UB31 Grade 300+

d = 252 mm b = 146 mm $t_f = 8.6$ mm $t_w = 6.1$ mm

Area = 4010 mm² $f_{yf} = 320$ MPa $f_{yw} = 320$ MPa $f_u = 440$ MPa

$I_{xx} = 44.50$ E⁶mm⁴ $S_x = 397.00$ E³mm³ $Z_x = 354.00$ E³mm³ $r_x = 105.00$ mm

$I_{yy} = 4.47$ E⁶mm⁴ $S_y = 94.20$ E³mm³ $Z_y = 61.20$ E³mm³ $r_y = 33.40$ mm

$I_w = 65.90$ E⁹mm⁶ $J = 89.30$ E³mm⁴ $k_f = 1.000$ Manufact. Type = HR

Compactness(x,y) = N, N

$Z_{ex} = 395.00$ E³mm³ $Z_{ey} = 91.40$ E³mm³

Member Effective Length Calcs

Torsional End Restraint Conds (TERC) are given as PP
=> Line3 of Tbl 5.6.3(1) => $k_t = 1.01$

Load Height is at Shear Centre

$$\Rightarrow k_l = 1.00$$

With Lat. Rotn Restraints at both ends

$$\Rightarrow k_r = 0.70$$

$$\text{Eff. Len } L_e = L * k_t * k_l * k_r = 15.50 * 1.01 * 1.00 * 0.70 = 10.97\text{m}$$

Major Axis Bending

Design Action $M_x^* = 21.0$ kNm

Section Bending Capacity $M_{sx} = f_{yf} Z_{ex} = 126.40$ kNm

$$M_{sx} = 145.36 \text{ kNm.}$$

$$a_m = 1.7 * M_m^* / [(M_2^*)^2 + (M_3^*)^2 + (M_4^*)^2]^{0.5} \quad [\text{Eq 5.6.1.1(2)}]$$

$$= 1.7 * 21.0 / [(-8.0)^2 + (-10.0)^2 + (-8.0)^2]^{0.5} = 2.364$$

Reference Buckling Moment Calculation : M_o

$$\text{Temp. variable } \Pi^2_{E_Le2} = \Pi^2 * E / L_e^2 = 3.142^2 * 205 \text{ E6} / 10.974^2 = 16.8 \text{ E06}$$

$$M_o = [(\Pi^2_{E_Le2} * I_y) * (G J + (\Pi^2_{E_Le2} * I_w))]^{0.5}$$

$$M_o = 24.9 \text{ kNm} \quad (\text{Eqtn 5.6.1.1(4)})$$

$$a_s = 0.6 * [(M_s/M_o)^2 + 3]^{0.5} - (M_s/M_o) = 0.17 \quad [(M_s/M_o) = 126.4 / 24.9 = 5.078]$$

a_m $a_s < 1.0$, => Segment NOT Fully Restrained

$$M_{bx} = 2.36 * 0.17 * 126.4 = 51.5$$

$$M_{bx} = 58.34 \text{ kNm.}$$

Major axis capacity Ratio = $M_x^* / f M_{bx}$

$$= 0.45, \quad \text{--- OK ---}$$

$$\text{RATIO} = 21 / 58.34 = 0.36 \quad \therefore \text{OK.}$$

Minor Axis Bending

Design Action $M_y^* = 65.0$ kNm

Section Bending Capacity $M_{sy} = 29.25$ kNm

$$M_{by} = M_{sy} = 29.25 \text{ kNm}$$

Minor axis capacity ratio = $M_y^* / f M_{by}$

$$= 2.47, \quad \text{**** FAIL ****}$$

$$M_{sy} = 33.64 \text{ kNm.}$$

$$M_{by} = 33.64 \text{ kNm.}$$

$$\text{RATIO} = 65 / 33.64 = 1.93 \quad \therefore \text{Not OK.}$$

Shear Calculations (Unstiffened Web)

Design Action $V_x^* = 9.0$ kN

$$V_w = 0.6 * F_{yw} * d * t_w = 0.6 * 320000 * 0.252 * 0.006$$

Nominal Shear Yield capacity $V_w = 295.1 \text{ kN}$

$a_v = 3.55 \geq 1.0 \Rightarrow$ full web shear capacity

$V_u = V_w = 295.1 \text{ kN}$

Mom-Shear Interaction Check : Moment ratio $\leq 0.75 \Rightarrow$ Clause 5.12.2 N/A

Shear capacity ratio $= V_x^* / f V_u$
 $= 0.03, \quad \text{---- OK ----}$

Axial Calculations

Design Action $N_d = 85.0 \text{ kN}$ [Comp], $Le_{Ax} = 2.58 \text{ m}$, $Le_{Ay} = 2.58 \text{ m}$

Sect. Compression Capacity $N_s = k_f A_n f_{ycomb}$
 $= 1.000 * 4.0.E-3 * 320$
 $= 1283.2 \text{ kN}$

$$N_s = 1475.7 \text{ kN.}$$

(where $A_n = A_g$, & f_y combined $= 320.0 \text{ MPa}$

Major axis buckling : $a_c = 0.9514$

$a_{cx} < 1.0 \Rightarrow N_{cx} = a_{cx} N_s = 1220.9$

Minor axis buckling : $a_c = 0.6296$

$a_{cy} < 1.0 \Rightarrow N_{cy} = a_{cy} N_s = 808.0$

Minimum Capac. $N_{cmin} = 808.0$

$$N_{cmin} = 929 \text{ kN.}$$

Axial buckling capac. Ratio $= N_d / f N_{cmin}$
 $= 0.117, \quad \text{---- OK ----}$

$$RATIO = 85/929 = 0.09 \therefore \text{ok.}$$

Combined Actions Checks

Cl 8.1.1.1 : Have axial load, in conjunction with flexure, $\Rightarrow$ check Cl 8.1.4

Sig. Axial Load Check (Cl. 8.1.4) : Combined Actions check IS required

[Is $N^* > 0.05 f N_s$? $85.0 > 0.05 * 0.9 * 1283.2$? : YES $\Rightarrow$ MUST DO CHECK

Loading FAILS Cl 8.1.4, $\Rightarrow$ Combined Actions Checks are required

+ Check Alternative Provisions, (Clause 8.1.5)

Cl.8.1.5(a) - Section Shape OK

Cl 8.1.5(b) : Plate element slenderness check

Major axis : Flg : Actual = 9.2, Allowable = 10

Web : Actual = 43.5, Allowable = 82 ---- OK ----

Minor axis : Flg : Actual = 9.2, Allowable = 10

Web : Actual = 43.5, Allowable = 1000 ---- OK ----

Alt. Prov. Cl 8.1.5 (a)-(c) OK for Minor axis, OK for Major axis actions

+ Beta_M values from user input :

Beta_M - Out-of-plane, major axis = -2.00 (Alpha-m values not given)

Beta_M - In-plane, major axis = -2.00 (no value given)

Beta_M - In-plane, minor axis = -2.00 (no value given)

Clause 8.3.2/4 :

$M_{rx} = M_{sx} (1 - N^* / f N_s) * 1.18, \leq M_{sx}$ [Alt. Prov. OK]
 $= 126.4 (1 - 85.0 / 0.90 / 1283) * 1.18 \leq M_{sx}$
 $= 126.4$

$$M_{rx} = 145.36 \left(1 - \frac{85}{1475.7} \right)^{1.18}$$

$$= 161.6 \text{ kNm.}$$

Clause 8.3.3/4 :

$M_{ry} = M_{sy} (1 - (N^* / f N_s)^2) * 1.19, \leq M_{sy}$ [Alt. Prov. OK]
 $= 29.2 * (1 - (85.0 / 0.90 / 1283)^2) * 1.19 \leq M_{sy}$
 $= 29.2$

$$M_{ry} = 33.64 \left[1 - \left(\frac{85}{1475} \right)^2 \right] * 1.19$$

$$= 39.9 \text{ kNm.}$$

Clause 8.3.4 : Capac. Ratio using ALTERNATIVE provisions, $\Psi = 1.474$

$= (M_x^* / f M_{rx})^{\Psi} + (M_y^* / f M_{ry})^{\Psi}$

$$RATIO = \left(\frac{21}{161.6} \right)^{1.47} + \left(\frac{65}{39.9} \right)^{1.47}$$

$$= 2.10 \therefore \text{Not ok.}$$

$$= [21.0/0.9/126.4]^{1.47} + [65.0/0.9/29.2]^{1.47}$$

$$= 3.872, \quad \text{**** FAIL ****}$$

$$\text{RATIO} = 2.10 \therefore \text{Not ok.}$$

Clause 8.4.2.2 : Major : $M_{ix} = M_{sx} (1 - N^* / f N_{cx}) \leq M_{rx}$

$$= 126.4 (1 - 85.0 / 0.9 / 1221) \leq 126.4$$

$$= 116.6$$

$$M_{ix} = 145.36 (1 - 85/929)$$

$$= 132 \text{ kNm}$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$

$$= 21.0 / (0.9 \cdot 116.6)$$

$$= 0.200$$

---- OK ----

$$\text{RATIO} = 21 / 132 = 0.16 \therefore \text{ok}$$

Clause 8.4.2.2 : Minor : $M_{iy} = M_{sy} (1 - N^* / f N_{cy}) \leq M_{ry}$

$$= 29.2 (1 - 85.0 / 0.9 / 808) \leq 29.2$$

$$= 25.8$$

$$M_{iy} = 33.64 (1 - 85/929)$$

$$= 30.56 \text{ kNm.}$$

>> Note : A b_m value would enable the more economical Alt. Prov. to be used <<

Load / Capacity Ratio = $M_m^* / f M_i$

$$= 65.0 / (0.9 \cdot 25.8)$$

$$= 2.796$$

**** FAIL ****

$$\text{RATIO} = 65 / 30.56 = 2.13 \therefore \text{FAIL.}$$

Clause 8.4.4.1 : Transverse Load Check : $kl = 1.0 \Rightarrow$ transverse load check NOT req'd

$$b_{mox} = -17.00 / 17.00 = -1.00$$

$$1 / a_{bc} = (0.5 - b_m/2) + [0.5 + b_m/2]^3 \cdot (0.4 - 0.23 \cdot N^* / f N_{cy})$$

$$= (0.5 - -0.50) + [0.5 + -0.50]^3 \cdot (0.4 - 0.23 \cdot 85.00 / 0.90 / 807.96)$$

$$a_{bc} = 1.00$$

$$N_{oz} = [G \cdot J + (p^2 \cdot E \cdot I_w / L_z^2)] / [(I_x + I_y) / A]$$

$$= [80 \cdot 0 + (p^2 \cdot 205 \cdot 0.07 / 2.58^2)] / [(44.50 + 4.47) / 4010.00]$$

$$= 2231.64$$

$$M_{bx0} = M_{bx} / a_m = 51.5 / 2.364 = 21.8$$

$$M_{bx0} = 58.34 / 2.36 = 24.7$$

$$M_{ox} = a_{bc} \cdot M_{bx0} \cdot [(1 - N^* / f N_{cy}) \cdot (1 - N^* / f N_{oz})]^{0.5} \leq M_{rx}$$

$$= 1.00 \cdot 21.79 \cdot [(1 - 85.00 / 0.90 / 807.96) \cdot (1 - 85.00 / 0.90 / 2231.64)]^{0.5} \leq 126.40$$

$$= 20.04$$

Load / Capacity Ratio = $M_x^* / f M_{ox}$

$$= 21.0 / (0.9 \cdot 20.0)$$

$$= 1.165$$

**** FAIL ****

$$M_{ox} = 26.50 \text{ kNm.}$$

$$\text{RATIO} = 21 / 26.50 = 0.80 \therefore \text{ok}$$

Clause 8.4.5.1 :

$$M_{cx} = \min(M_{ix}, M_{ox}) = \min(116.6, 20.0) = 20.0$$

Load / Capacity Ratio = $[M_x^* / f M_{cx}]^{1.4} + (M_y^* / \Phi_i M_{iy})^{1.4}$

$$= [21.0/0.9/20.0]^{1.4} + [65.0/0.9/25.8]^{1.4}$$

$$= 5.456, \quad \text{**** FAIL ****}$$

$$M_{cx} = 26.50 \text{ kNm.}$$

$$\text{RATIO} = \left(\frac{21}{26.50}\right)^{1.4} + \left(\frac{65}{30.56}\right)^{1.4}$$

===== SUMMARY =====

**** U.L.S. Capacity Check FAILED, Load Cap. Ratio = 5.46 *** FAIL ***

$$= 3.60 \therefore \text{FAIL.}$$

MemDes v 2.1 : Calculations for New Zealand Steel

Project : J000949 - South Inter. Wing at 2:14:35 p.m. on 2/08/2017

Description : Truss Top Chord Beam by CO Powered By Steltech

(<http://www.steltech.co.nz>)

$$NBS = \frac{1}{3.60} = 0.28$$

$$NBS = 28\%$$

REIDBAR DIAGONAL CHECK.

FROM ETAB RESULT OUTPUTS :

<u>TENSION MAX, N_t^* (kN)</u>	<u>TYPE</u>
(i) 159.8 kN	RB 25
(ii) 56.0 kN	RB 20
(iii) 16 kN.	$\phi 16$ M/S ROD.

CAPACITY CHECK.

(i) FOR RB 25 (MEMBER D104)

$$f_y = 500 \times 1.08 = 540 \text{ MPa.}$$

$$\phi = 1.0$$

$$\phi N_t = 1 (540) \frac{\pi 25^2}{4} = 265 \text{ kN}$$

$$\therefore \phi N_t = 265 \text{ kN} > N_t^* = 159.8 \text{ kN.}$$

NBS %

$$\boxed{NBS > 100\%}$$

(ii) FOR RB 20 (MEMBER D323)

$$\phi N_t = 1 (540) \frac{\pi 20^2}{4} = 169.6 \text{ kN.}$$

$$\therefore \phi N_t = 169.6 \text{ kN} > N_t^* = 56 \text{ kN.}$$

NBS %

$$\boxed{NBS > 100\%}$$

ASSUMPTIONS

ASSUMING
REIDBAR
USES FULL
NUT
ASSEMBLY.

(iii) FOR $\phi 16$ M/S ROD: (MEMBER B126)

$$f_y = 300 \times 1.08 = 324 \text{ MPa.}$$

$$\phi N_t = 1.0 (324) \frac{\pi 16^2}{4} = 65 \text{ KN.}$$

$$\therefore \phi N_t = 65 \text{ KN} > N^* = 16 \text{ KN.}$$

NBS %

$$\boxed{NBS > 100 \%}$$

//

- CHECK EXISTING TIMBER STUD TO
EAVE BEAM CONNECTION:

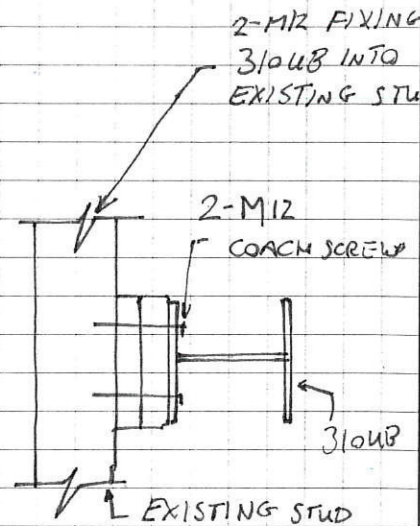
DESIGN FORCE:

ASSUMING STUDS @ 700mm CRS:

HORIZONTAL MASS FROM
ROOF & WALLS:

$$860 \text{ kg/m} \times 31 \text{ m} / 4 \text{ studs} \\ = 5.9 \text{ kN.}$$

$$N^* = 2.97 \text{ kN (Per COACHSCREW).}$$



2-M12 FIXING
310x8 INTO
EXISTING STUDS OF OUTER
WALL.

(i) SHEAR PERPENDICULAR TO GRAIN:

$$\text{lower of: } \begin{cases} Q_{kp} = 192 d^{1.5} = 7,981.3 \text{ N} \\ Q_{kp} = 6.45 b_e d = 6.45 (90)(12) \\ = 6966 \text{ N.} \end{cases}$$

$$\therefore Q_{kp} = 6.96 \text{ kN.}$$

$$\phi Q_n = \phi k_1 k_2 k_3 Q_{sk} \text{ (PER SCREW)} \\ = (1.0)(1.0)(1.0)(1.0) 6.96 \text{ kN} \\ = 6.96 \text{ kN.}$$

$$\phi Q_n = 6.96 \text{ kN} > N^* = 2.97 \text{ kN.} \therefore$$

(ii) WITHDRAWAL LOADS:

ASSUME J3 TIMBER: & 20mm PENETRATION INTO
EXISTING STUD.

$$\phi Q_n = 1.0(1.0)(1.0) (208 \text{ N/mm} \times 50 \text{ mm}) / 1000 = 10.40 \text{ kN}$$

$$\phi Q_n = 10.4 \text{ kN} > N^* = 2.97 \text{ kN.}$$

PHILOSOPHY:

- HORZ. LOAD FROM OUTER WALL IS RESISTED BY 310x8 BEAM
- LOAD TRANSFERRED BY CONNECTION ABOVE.

ASSUMPTIONS.

- STUDS @ 700 CRS.
- PACKERS 90mm THK.
- 50mm penetration of screw into stud.
- Totara - J3 timber.

> 100 NBS%

> 100 NBS%

- CHECK EXISTING ORIGINAL EXTERNAL NIB WALL

OUT-OF PLANE - NIB WALL

- AXIAL LOAD ON WALL, N^* :

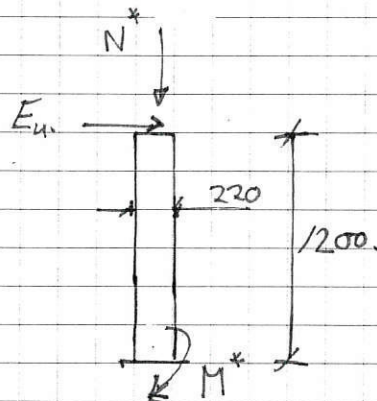
$$G_{\text{Roof}} = 8.44 \text{ kN/m}$$

$$G_{\text{Wall}} = 0.75 \text{ kPa} \times 4.48 \text{ m} \\ = 3.36 \text{ kN/m}$$

$$G_{\text{NIB}} = 1.2 \text{ m} \times 0.22 \times 15 \text{ kN/m}^3 \\ = 3.96 \text{ kN/m}$$

$$G_{\text{TOTAL}} = 15.75 \text{ kN/m}$$

$$N^* = 15.75 \text{ kN/m}$$



NOTE:

External original timber frame wall sits on a 1200mm high concrete nib.

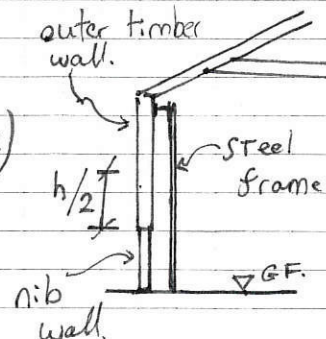
- SEISMIC LOAD - TOP OF NIB

FOR OUT-OF PLANE, HORIZONTAL LOAD FROM ROOF & HALF OF TIMBER WALL HEIGHT IS TRANSFERRED TO STEEL FRAME.

- (i) REMAINING HALF HEIGHT OF TIMBER WALL LOAD IS APPLIED AS A HORIZONTAL LOAD TO TOP OF NIB WALL.

$$C_d(T) = 0.65$$

$$E_u = 0.65 \times (0.75 \text{ kPa} \times 4.48 \text{ m} / 2) \\ = 1.09 \text{ kN/m}$$

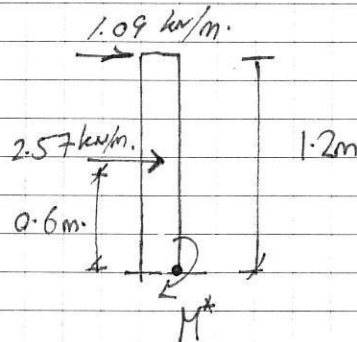


- (ii) NIB WALL SELF WEIGHT.

$$E_u = 0.65 \times (15 \text{ kN/m}^3 \times 0.22 \times 1.2 \text{ m}) \\ = 2.57 \text{ kN/m}$$

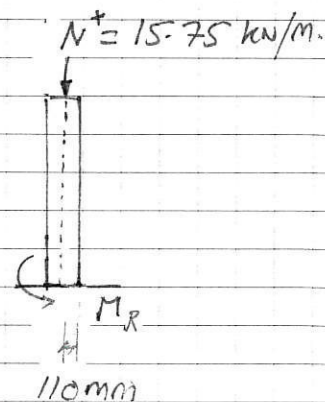
- OVERTURNING MOMENT, M^* :

$$M^* = (1.09 \text{ kN/m} \times 1.2\text{m}) + (2.57 \text{ kN/m} \times 1.2\text{m}/2) \\ = 2.85 \text{ kNm/m.}$$



RESTORING MOMENT; M_R^* :

$$M_R = (0.9 \times 15.75 \text{ kN/m}) \times 0.11\text{m} \\ = 1.56 \text{ kNm/m.}$$



$$M_R^* / M^* = \frac{1.56}{2.85} = 0.55$$

$\therefore$ NBS 55% FOR OUT OF PLANE OF CONCRETE NIB WALLS.

//

The following photos show the concrete topping cast around the columns on Gridline J.



Photo 1: Columns on Gridline J – Southern End of Intermediate South Wing



Photo 2: Concrete Topping Cast Around Column with no Gap – Concrete Acting as Strut Between Columns



Photo 3: Slab below topping has not been filled in with concrete. Only concrete topping above acts as restraint to columns.

DEFLECTION CHECK:

- DEFLECTION LIMIT $< 2.5\%$ (STOREY HEIGHT).
 $= 5680 \times 0.025 = 142 \text{ mm.}$

- FROM MODEL ANALYSIS:

1) - IN Y-DIRECTION (ACROSS).

(i) FOR TOP BEAMS OF TRUSS: (GRIDLINES 5 & 4)

$\Delta y = 550 \text{ mm.}$

$NBS = 100/550 = 18\% \text{ NBS.}$

(ii) FOR EAVE BEAMS ON EDGE (GRIDLINES 6 & 3)

$\Delta y = 140 \text{ mm.}$

$NBS = 142/140 = 100\% \text{ NBS.}$

2) - IN X-DIRECTION (ALONG).

(i) FOR EAVE BEAM/TOP OF CENTRAL COLUMN (G.L. J & K).

$\Delta x = 180 \text{ mm.}$

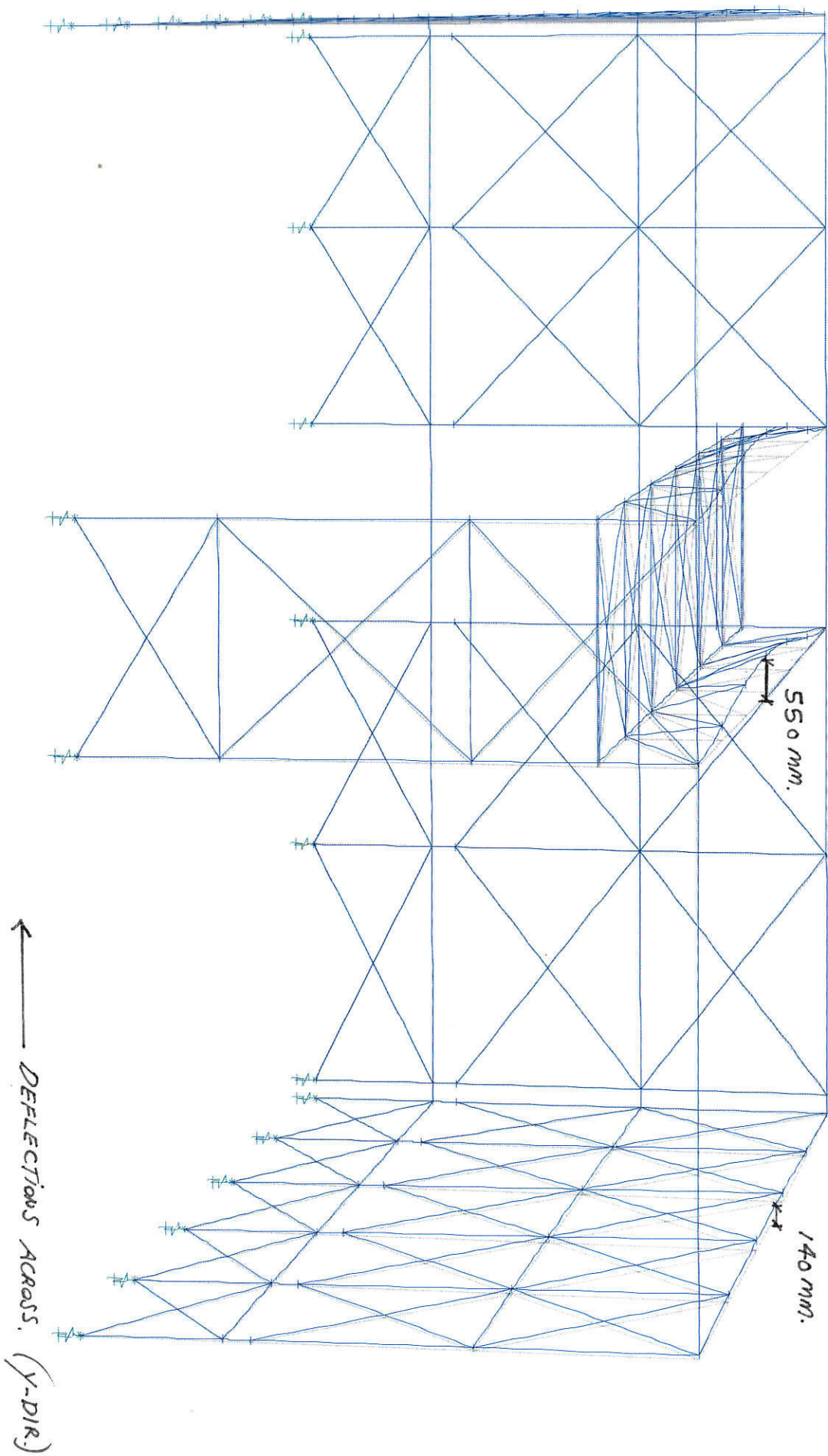
$NBS = 142/180 = 78\% \text{ NBS.}$

SEE PAGES 30 & 31 FOLLOWING, FOR
ETABS MODEL DEFLECTION OUTPUTS.

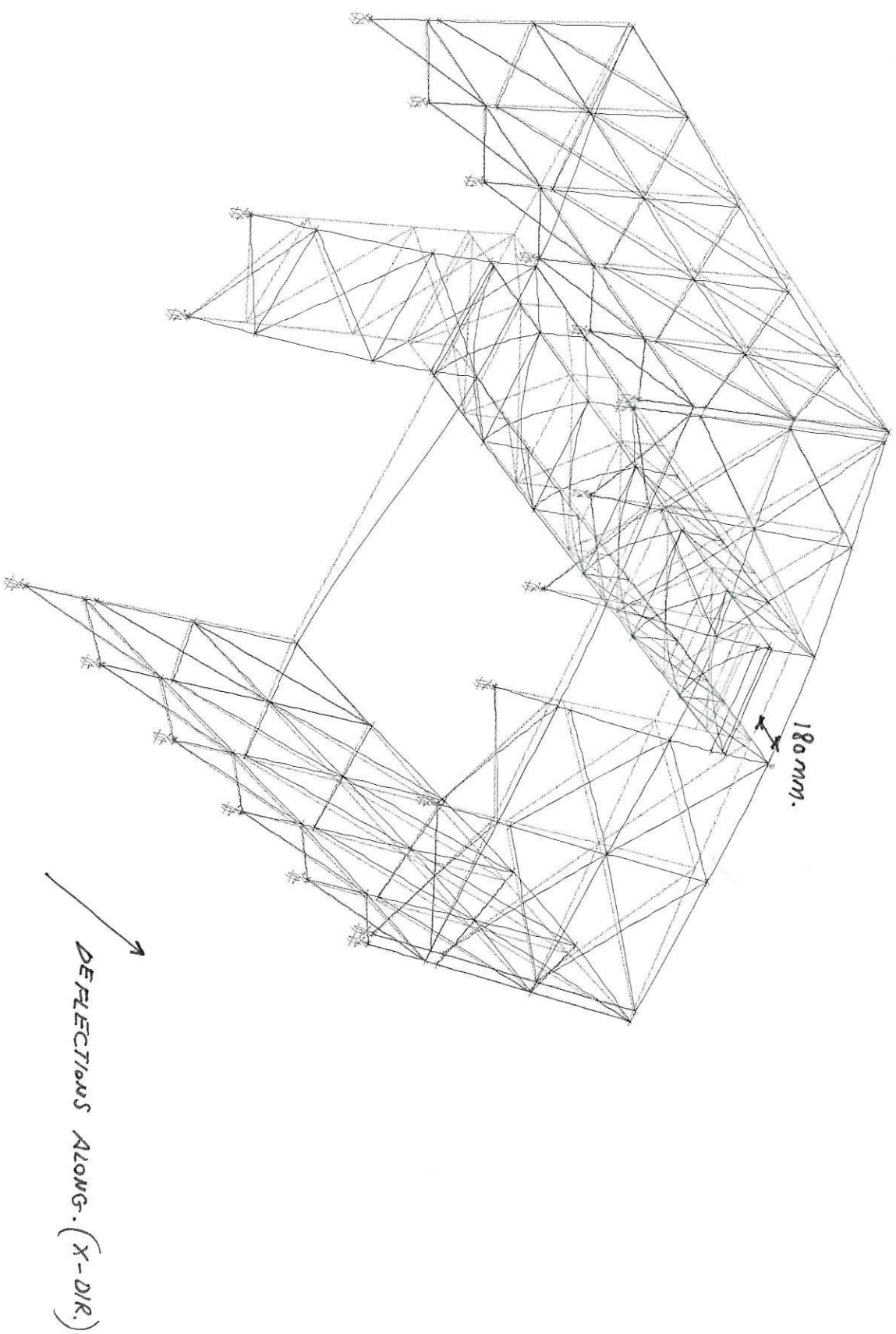
REFERENCE

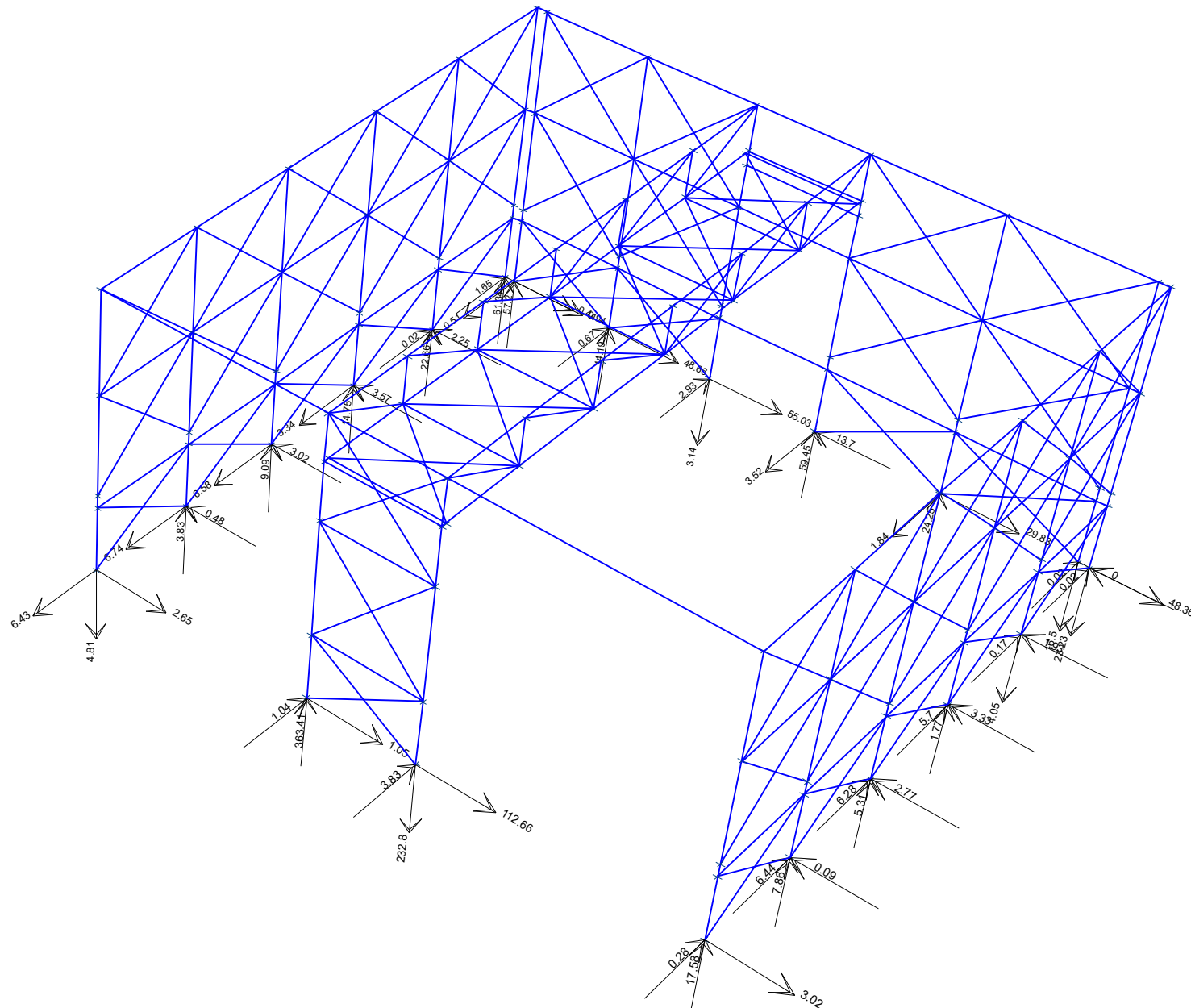
NZ1170.5.2004.
SECTION 7.5.

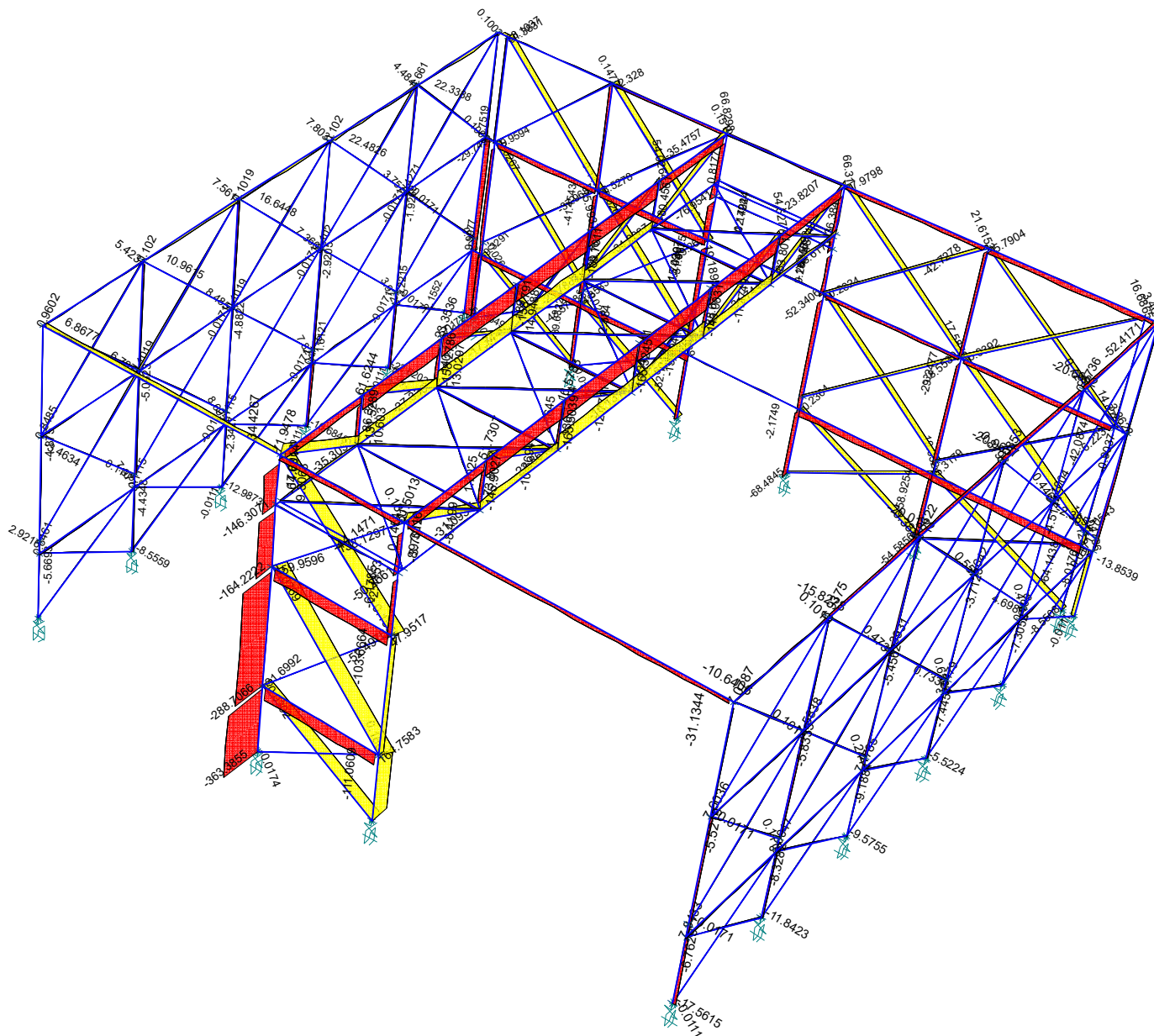
Fig. 31

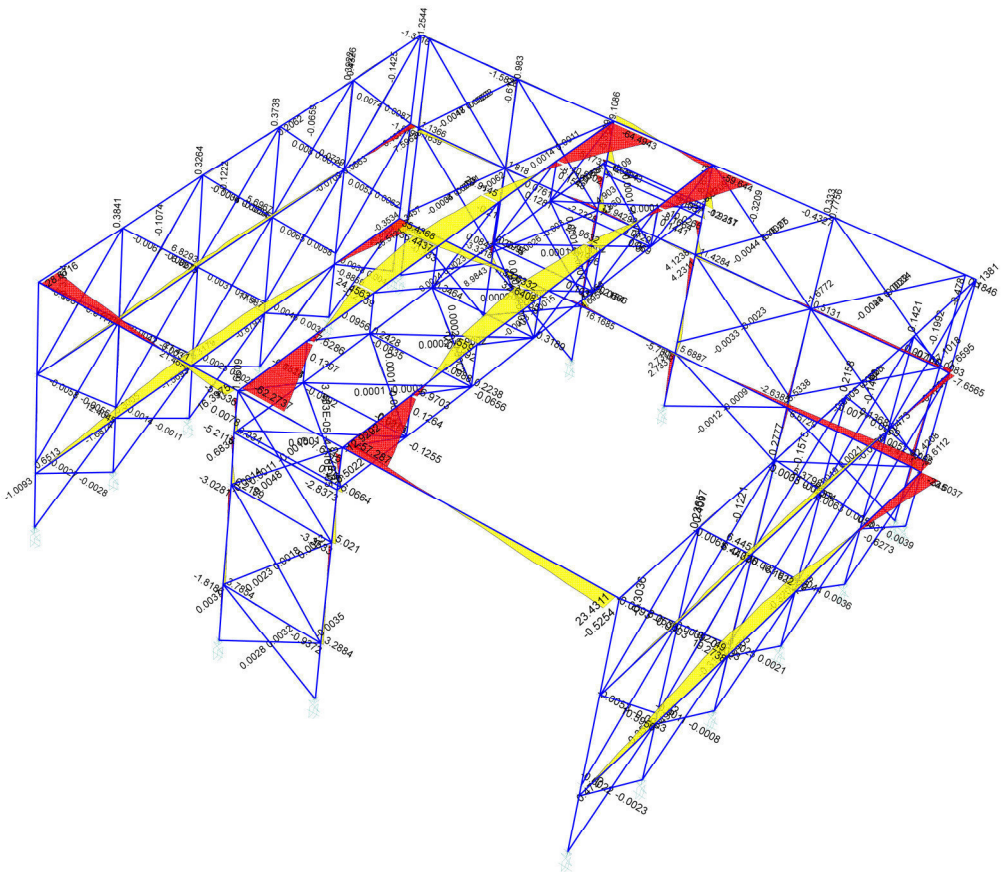


Pg. 32.



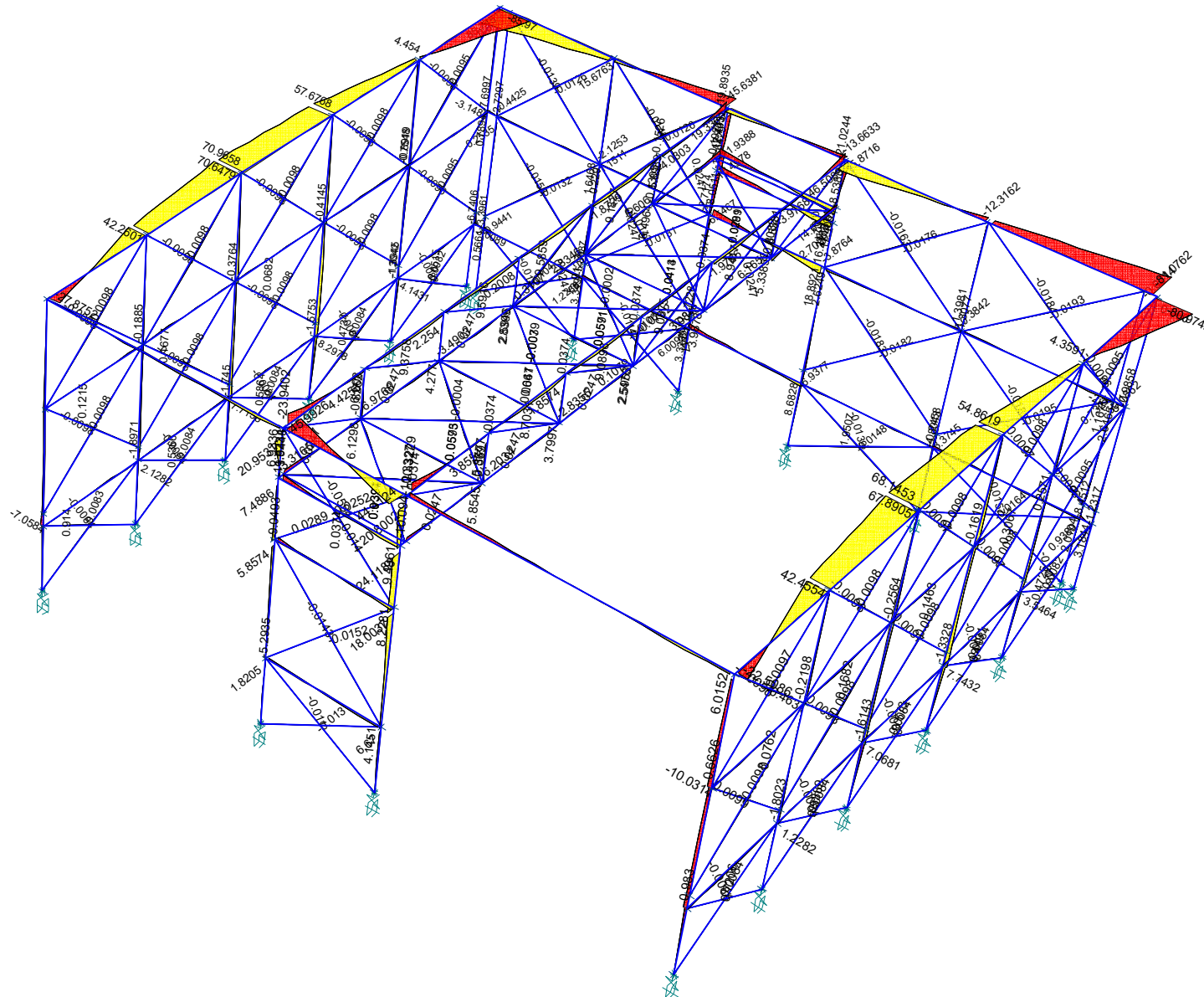


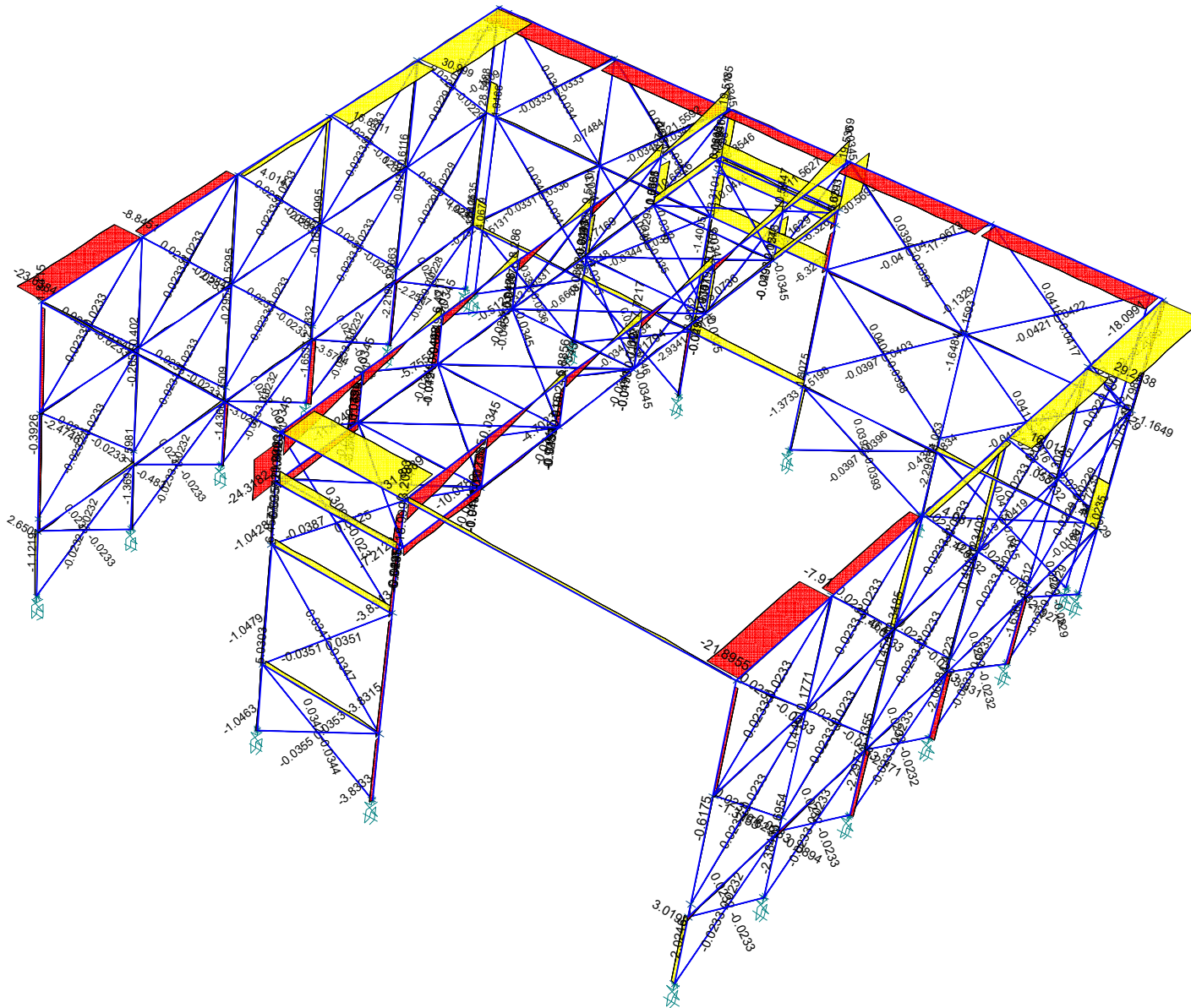


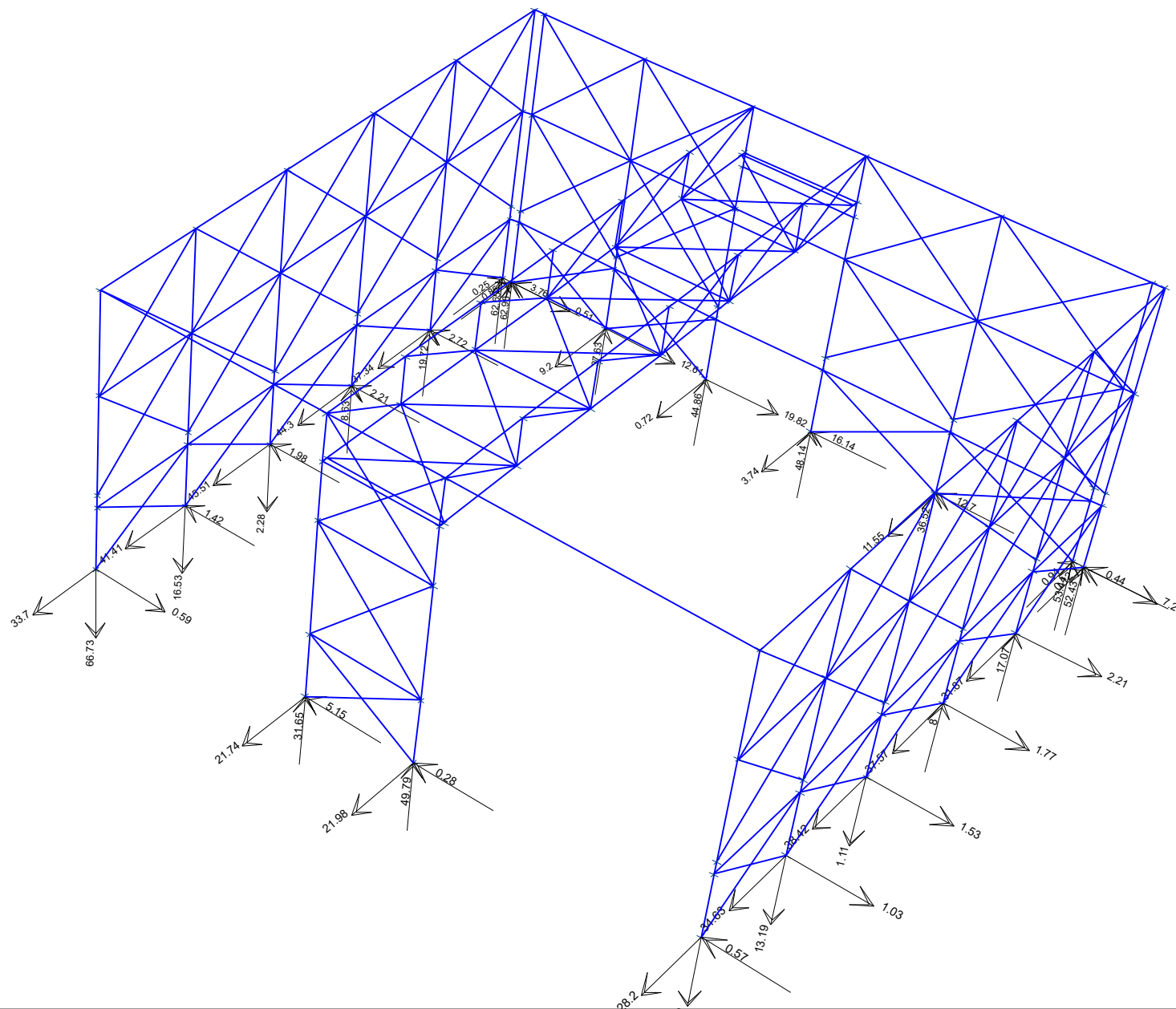


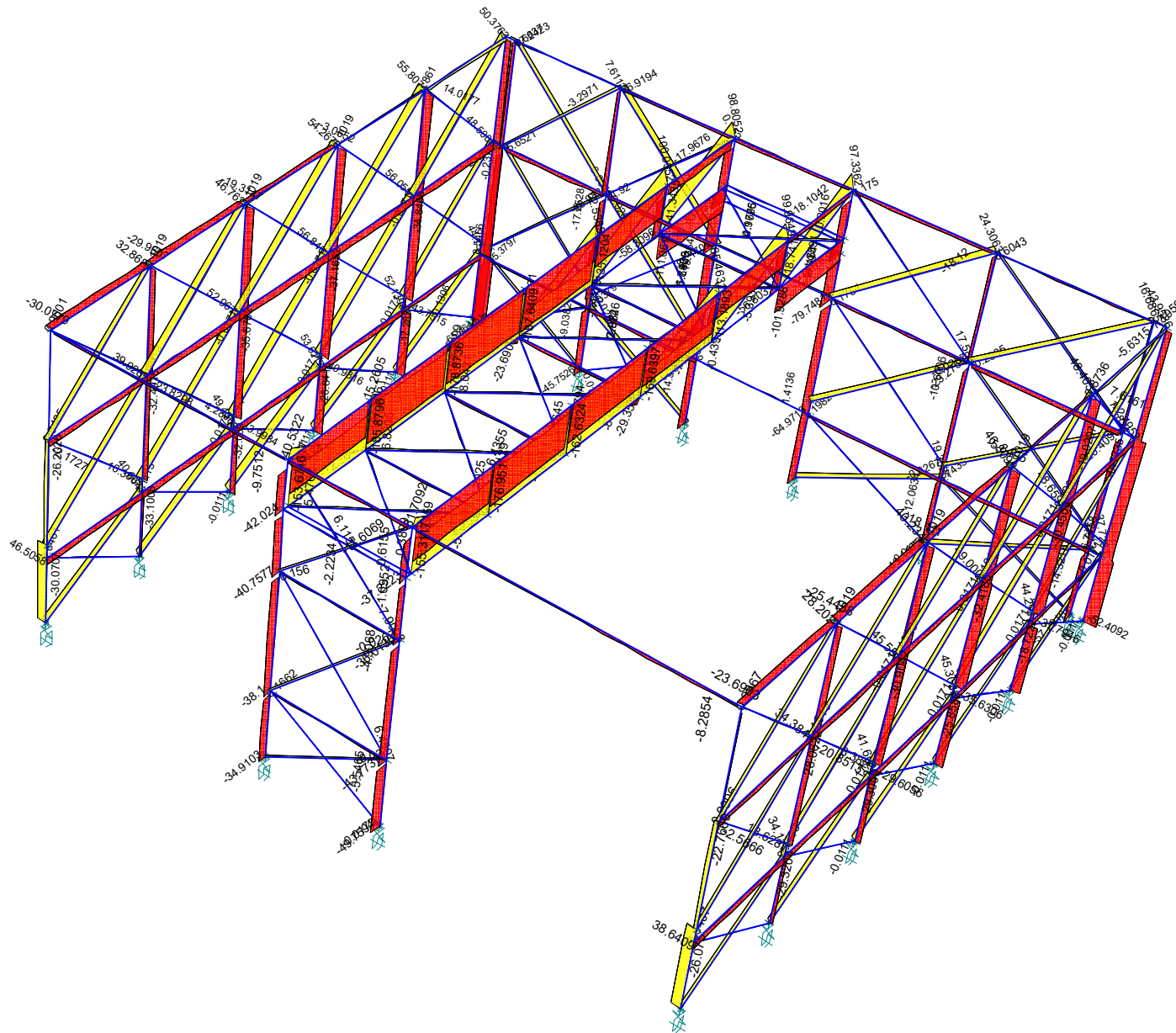
South Wing Intermediate - Copy.EDB

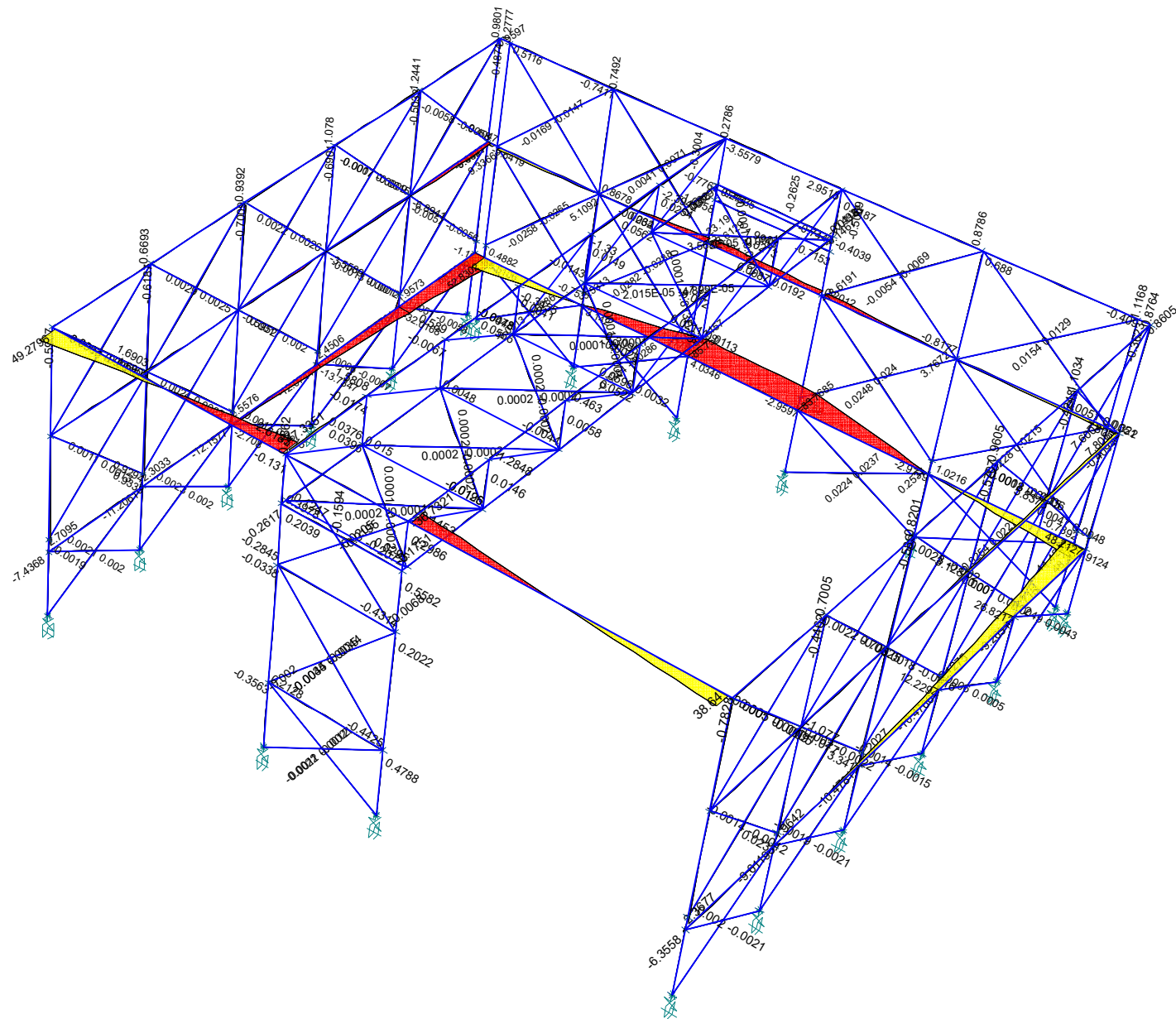
3-D View Moment 2-2 Diagram (G+EQY+0.3Q) [kN-m]

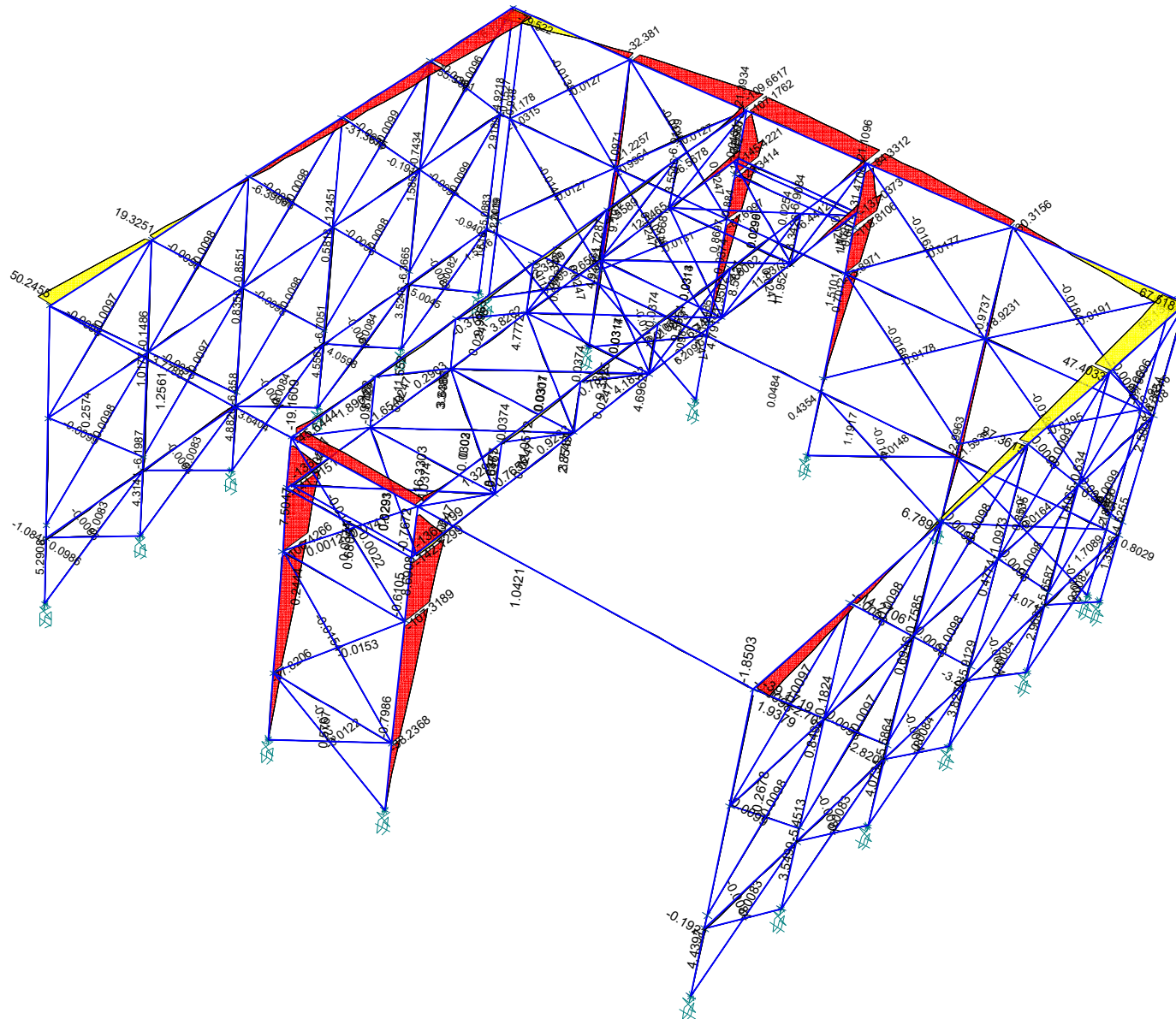


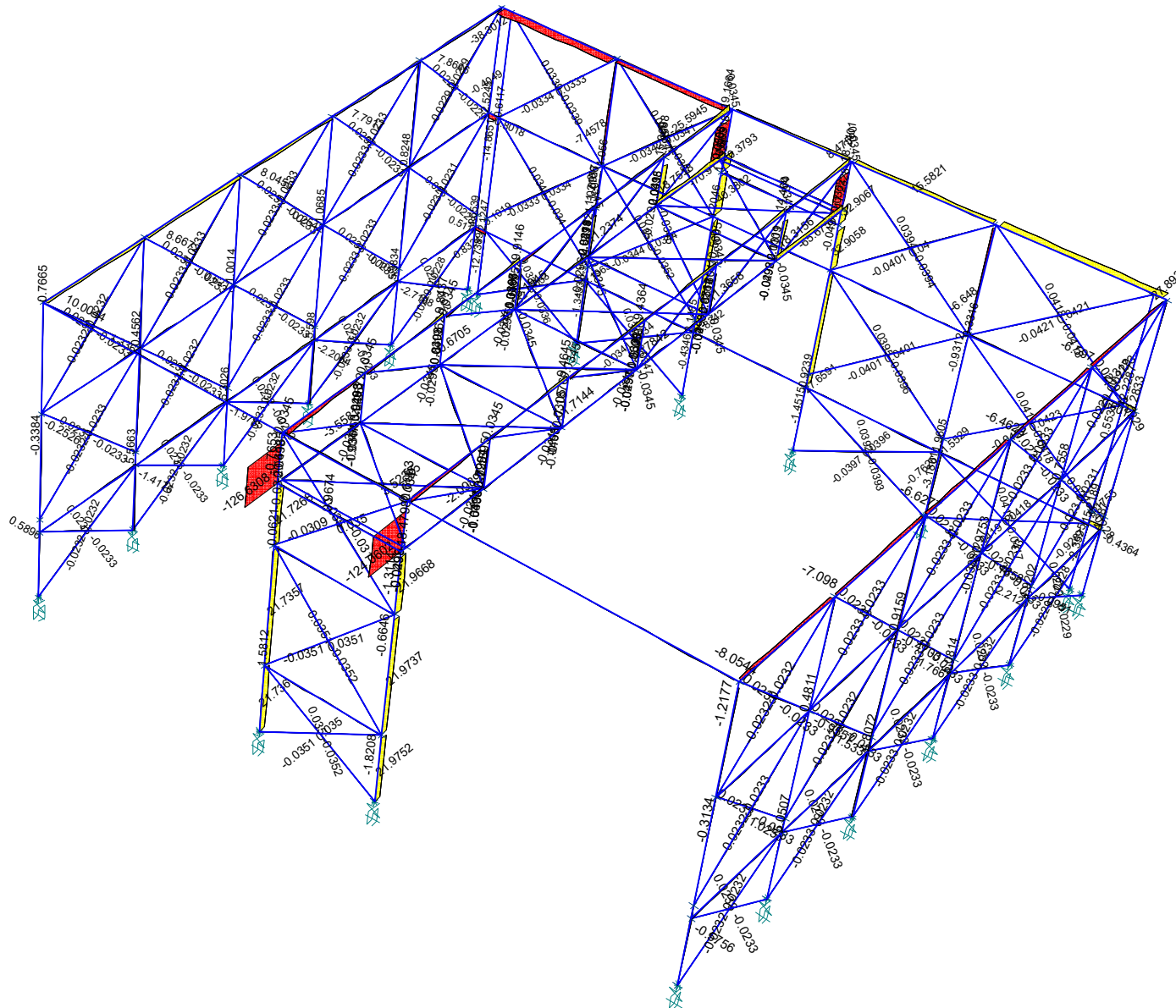












NORTH EXTENSION

The following pages show the calculation for the North Wing.

In both directions there are plywood in face loading that transfer the loads to SHS steel posts that transfer the loads to roof diaphragm. From here the loads are transfer to side Plywood in shear. SHS posts situated each end of plywood walls are taking the axial force only when plywood walls are analysed as shear walls. Plywood shear walls were calculated according with NZS3603.

Because the 2 steel structures are similar, only one was analysed.

Concrete structure was not included in the model, this structure has shear walls on both sides.

Calculation shows the building having 100%NBS.

Client: **Rotorua Lake council**
Project: **Rotorua museum**
Government Gardens, Rotorua
Subject: **Gravity Loads**

Ref: **J000949**
Date: **13-10-16**
BY: **AP**

Sheet No.:

5

Loads

Roof

Concrete tiles	0.530
Timber 20.6	0.092
Purlins 05 .4	0.034
Battens 05 1.2	0.011
Rockwool Insu.	0.002
Gib Board 13	0.120

Ceiling

Timber 20.6	0.092
90. Nogs & plates	0.067
Battens 05 1.2	0.011
Rockwool Insu.	0.002
Gib Board 13	0.120

$$0.79 / \cos 8 = \frac{0.790}{0.797} \text{ kPa}$$

$$\frac{0.292}{0.292} \text{ kPa}$$

External wall

Portland Plaster	0.290
HardieBacker	0.073
Battens 05 1.2	0.011
Timber 10.4	0.069
Rockwool Insu.	0.002
12mm plywood	0.120

$$\frac{0.565}{0.565} \text{ kPa}$$

Live loads

This page show the calculation for a single grid "3"

3.5width *7.15 length

Client: **Rotorua Lake council**
 Project: **Rotorua museum**
Government Gardens, Rotorua
 Subject: **EQ Static 1170.5**

Ref: **J000949**
 Date: **13-10-16**
 BY: **AP**

Seismic Loads to NZS 1170.5

Sheet No.: **23**

Ref: **Design** **Output**

Design working live **50 Years**
 Importance level 3
 Annual Probability of exceedance (inverse) Ultimate 1000
 Annual Probability of exceedance (inverse) Service 25

Element	Area/length	Load Kpa	Total kN
Roof	25.03	0.80	19.95
Ceiling	25.03	0.29	7.31
External wall	12.25	0.57	6.92
	0.00	0.00	0.00
	0.00	0.00	0.00
	0.00	0.00	0.00
	0.90	0.40	0.00

Live load reduction

Total floor area 25.0

$$.3 + \frac{3}{\sqrt{A}} = 0.900$$

But not less than .5

34.18 kN

3.5m height *3.5 bay width

Total building weight
 34.18 kN

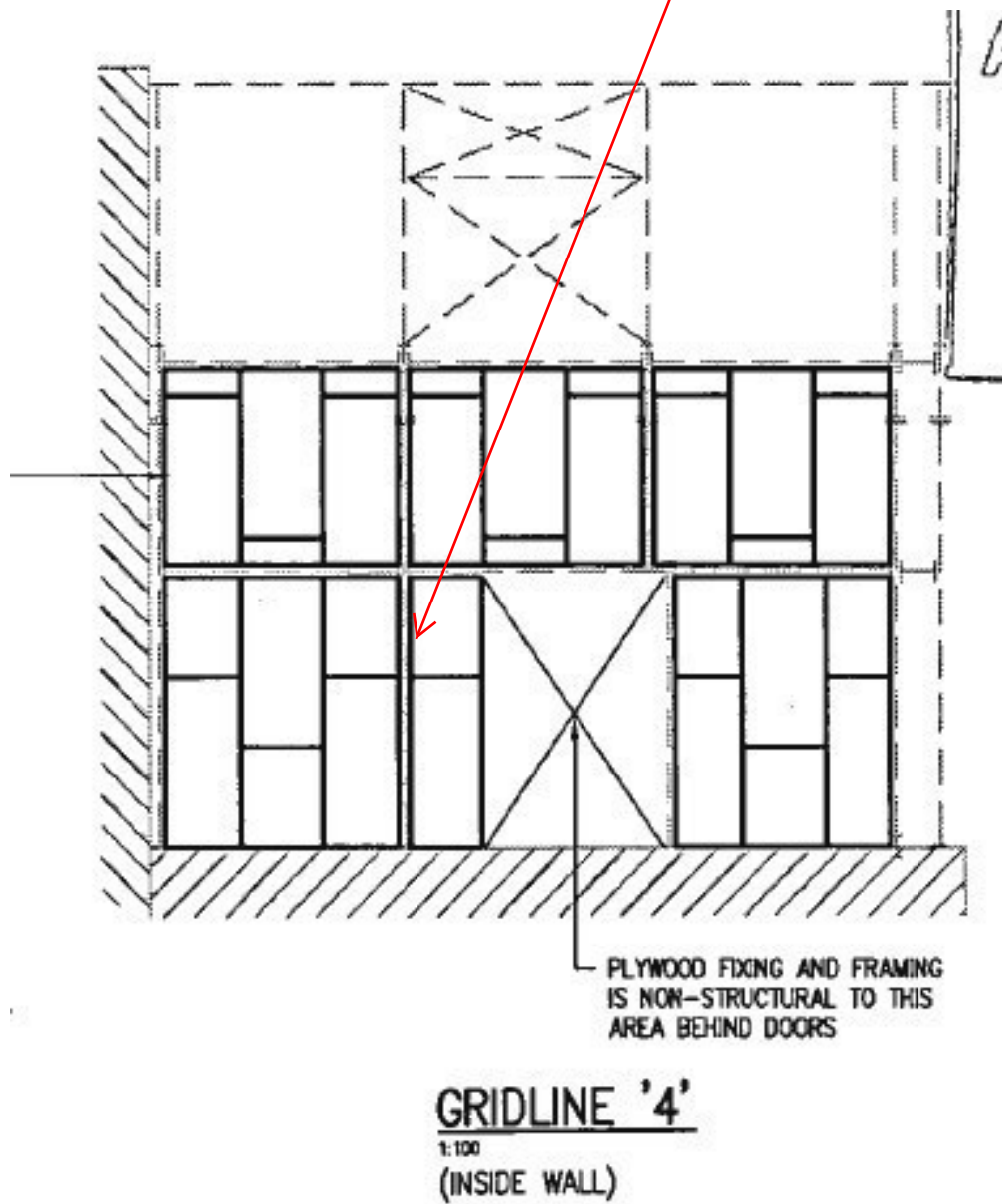
Client: **Rotorua Lake council**
 Project: **Rotorua museum**
Government Gardens, Rotorua
 Subject: **EQ Static 1170.5**

Ref: **J000949**
 Date: **13-10-16**
 BY: **AP**

Ref:		Design	Output
		Soil type	
		D. Deep or soft soil ▼	
		<u>Across the building</u>	
		Period of building across the building	0.40
		Does the seismic bracing have ductile capabilities but is designed as nominally ductile	☐
		Structural ductility factor (Ultimate)	$\mu = 1.25$
		Structural ductility factor (Service SLS1)	$\mu = 1.25$
		Hazard Factor Rotorua	$Z = 0.24$
		Return period factor	$R_u = 1.30$
		Return period factor	$R_s = 0.25$
		Structural Performance factor (Ultimate)	$S_p = 0.93$
		Structural Performance factor (Service)	$S_p = 0.70$
		Spectral Shape Factor (across)	$Ch(T) = 3.00$
		Near Fault factor	$N(T,D) = 1.0$ n/a
		Elastic site spectra (Ultimate)	$C(T) = 0.94$
		Elastic site spectra (Service)	$C(T) = 0.18$
		Ultimate	$k_\mu = 1.14$
		Service	$k_\mu = 1.14$
		<u>Ultimate</u>	
		Horizontal design action coefficients (Across)	$C_d(T1) = 0.76$ But not less than $0.030R_u$
		Ultimate force across the building	$C_d(T1) \times W_i = 25.89$ kN Total
		<u>Service</u>	
		Horizontal design action coefficients (Across)	$C_d(T1) = 0.11$
		Service force across the building	$C_d(T1) \times W_i = 3.77$ kN Total
		<u>Along the building</u>	
		Period of building along the building	0.40
		Does the seismic bracing have ductile capabilities but is designed as nominally ductile	☐
		Structural ductility factor (Ultimate)	$\mu = 1.25$
		Structural ductility factor (Service SLS1)	$\mu = 1.25$
		Structural Performance factor (Ultimate)	$S_p = 0.93$
		Spectral Shape Factor (across)	$Ch(T) = 3.00$
		Near Fault factor	$N(T,D) = 1.0$
		Elastic site spectra (Ultimate)	$C(T) = 0.94$
		Elastic site spectra (Service)	$C(T) = 0.18$
		Ultimate	$k_\mu = 1.14$
		Service	$k_\mu = 1.14$
		<u>Ultimate</u>	
		Horizontal design action coefficients (Across)	$C_d(T1) = 0.76$ But not less than $0.030R_u$
		Ultimate force along the building	$C_d(T1) \times W_i = 0.00$ kN Total
		<u>Service</u>	
		Horizontal design action coefficients (Across)	$C_d(T1) = 0.15$
		Service force across the building	$C_d(T1) \times W_i = 0.00$ kN Total

Next page show the calculation of the SHS posts

This posts is being analysed in face loading



Tributary length

Cd x wall weight

Client: **Rotorua Lake council**
 Project: **Rotorua museum**
Government Gardens, Rotorua
 Subject: **Steel SHS Wind Post UDL**

Ref: **J000949**
 Date: **13-10-16**
 BY: **AP**

LATERALLY UNRESTRAINED STEEL WIND POST/BEAM DESIGN TO NZS3404

Sheet No.:

Ref:	Design							Output	
T3.3(1)	Span				L	7.15 m			
	Effective Length				Le	7.15 m			
	Wind loads								
	Ultimate wind load	0.43	x	3.50	=	1.50 kN/m			
	Service wind load	0.06	x	3.50	=	0.22 kN/m			
	Strength reduction factor				Ø	0.9			
	Yield stress				fy	350 Mpa			
	Design Bending Moment								
					$W_u \times L^2 / 8 = M^*x$	9.58 kNm	9.58	kNm	
<u>Section properties</u>		Using steel section			150x150x6.0 SHS				
Section depth	D	150 mm	Section modulus		Ze	178.0 cm³			
Flange width	B	150 mm	Moment of inertia major		Ix	1130.0 cm^4			
Wall thickness	T	6.0 mm	Moment of inertia minor		Iy	1130.0 cm^4			
			Plastic modulus		Sx	178.0 cm³			
			Elastic modulus		Zx	150.0 cm³			
Ratios for local buckling			Radius of gyration		Ry	58.2 cm			
Flange	b-2t/t	23.0	Torsion Constant		J	18.4			
Web	b-2t/t	23.0	Warping Constant		Iw	0.0			
Section slenderness parameters			Youngs modulus		E	200000 MPa			
	λef	27.21	Flange Compact						
	λew	27.21	Web Compact						
	λs	27.21	Section Compact						
E5.6.1.1(3) E5.6.1.1(2)	Nominal Section Capacity		$Z_e \times f_y = M_{sx}$		62.30 kNm				
	Section Capacity		$M_s \times \varnothing =$		56.07 kNm				
	<u>Beam is laterally unrestrained</u>								
	Calculation of slenderness reduction factor								
	Reference Buckling Moment		Mo		802 kNm				
	Slenderness reduction factor		αs		0.994				
			αm		1.75				
	<u>Moment capacity</u>								
			Mbx		62.30 kNm				
			ØMbx		56.07 kNm				
			Moment capacity		56.07	kNm			
	<u>Deflection</u>						PASS		
			$\frac{5 \times W_s \times L^4 \times 10^8}{384 \times E \times I} = D$		3.28 mm	3.28 mm			
	Limiting deflection ratio		LR		500				
	Perm. deflection								
	L x 1000/LR				14.30 mm	14.30 mm			
						PASS			

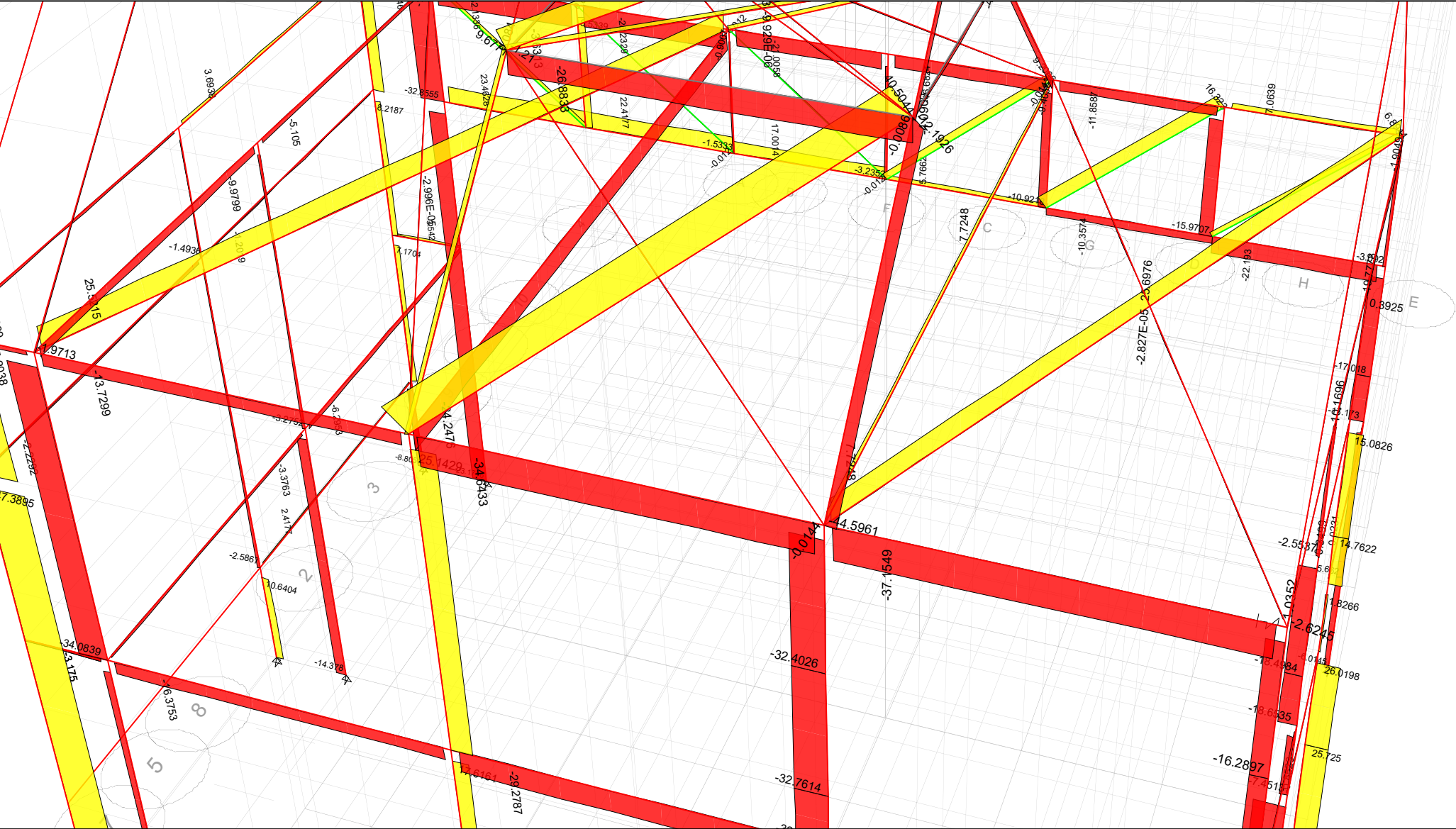
See axial force in ETABS model next page

Ref: **J000949**
Date: **13-10-16**
BY: **AP**

Tension capacity of a solid steel section NZS3404

Sheet No.:	10
------------	-----------

Ref:	Design				Output
	Axial load	Nt*	40	kN	
	Type of section used		Round		
	Strength reduction	φ	1		
	Correcton factor	Kte	1.0		
	Size of bar (dia or width) only select a stocked section	D	20	mm	
	Grade of steel	fy	290	Mpa	
	Tensile strength	fu	440	Mpa	
	Area of section	Ag	314.2	mm²	
	Nominal section capacity	Ag x fy =	Nt	91.1	kN
		or			
		0.85 x kte x An x fu =	Nt	117.5	kN
	Hence	Lesser of the above two	Nt	91.1	kN
			φNt	91.1	kN

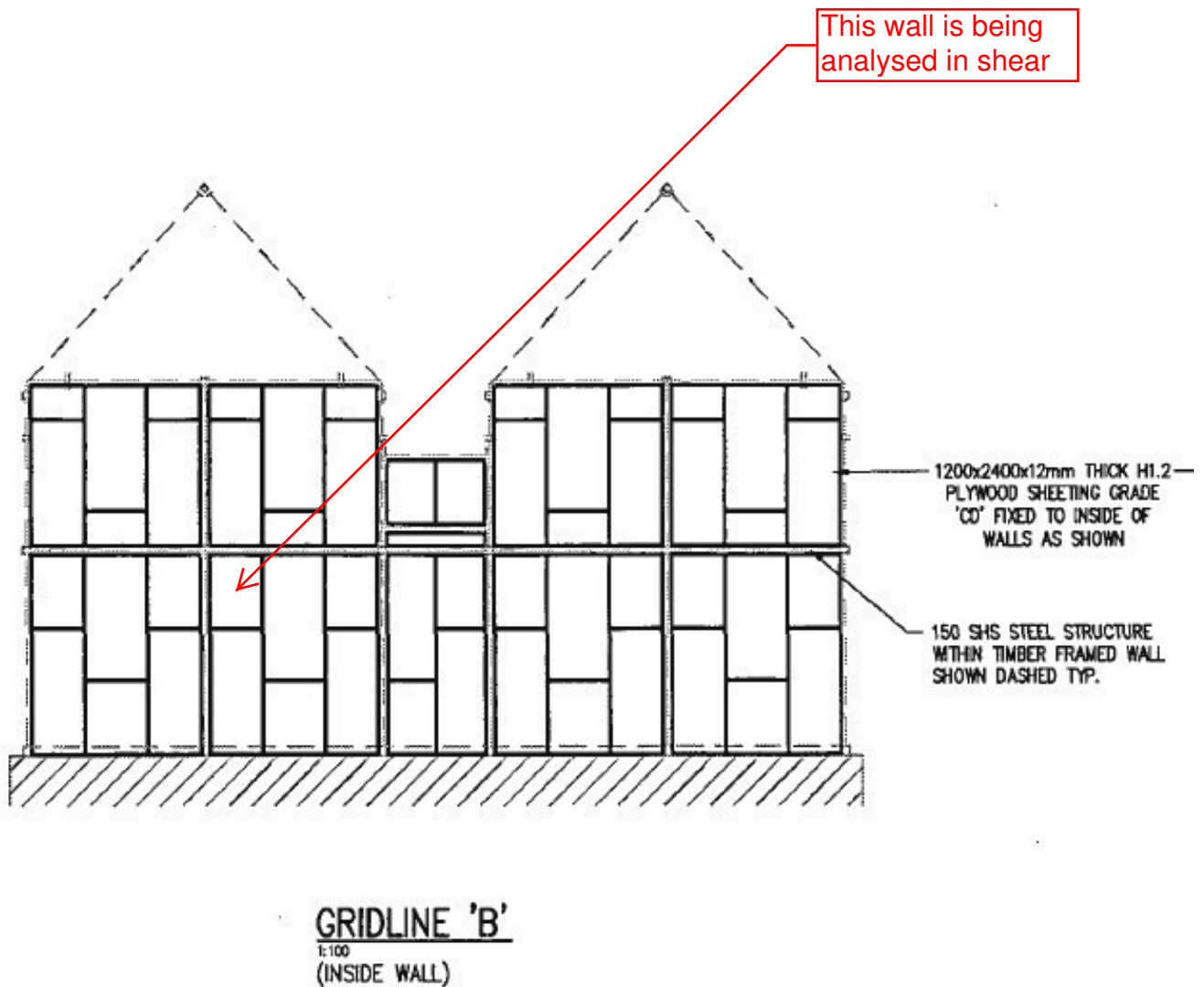


Model -north extension.EDB

3-D View Axial Force Diagram (G+EQ along) [kN]

N, mm, C

Next page show the calculation of the plywood shear wall



Client: **Rotorua Lake council**
 Project: **Rotorua museum**
Government Gardens, Rotorua
 Subject: **Timber Ply Shear wall grid B, C**

Ref: **J000949**
 Date: **13-10-16**
 BY: **AP**

Design of Plywood shear wall to NZS3603

Sheet No.: **10**

Ref:	Design	Output
	Force on top of wall	V* 38.8
	Ductility adopted for design	Mu 3.00
	Wall height	h 3.5 m
	Wall width	w 6.6 m
	Height/depth ratio	0.530
	If H/d is less than 1.0 then wall is long	
	<u>Design strength per nail</u>	
	Nail diameter	3.33
	Timber species	Radiata Pine
	Side plate k factor	Kp 1.4
	Number of nails used in connection	K50 1.3
	Duration of load	K1 1.0
	Strength reduction factor	φ 1
	Characteristic strength of nail in single shear	Qk 695 N
	Strength of nail in shear	φQn 1265 N
	<u>Stud Size</u>	
	Stud depth	D 140 mm
	Stud width	B 45 mm
	Stud spacing	S 600 mm
	Timber strength class	Radiata Pine / MSG8
	Characteristic compressive stress	fc 18.0 Mpa
	Characteristic tension stress	ft 6.0 Mpa
	Area	D x B = A 6300 mm ²
	Slenderness coefficient for lateral buckling	
	$\frac{\text{Lay}}{B}$	= S3 25.0
	Stability factor from table 2.8 x-x Axis	K8 0.460
	Duration of load	K1 1.0
	Parallel support	K4 1.0
	Strength reduction factor	Ø 1.0
	<u>Plywood Sheathing</u>	
	One side or both sides sheathed (1 or 2)	1 No.
	Thickness of ply	12.0 mm
	Layup of ply	2.4/2.4/2.4/2.4/2.4
	Total number of plies	5 No.
	Thickness of plies parallel to face grain	7.2 mm
	Plywood Grade	F8
NZS2269	Bending stress from table 4.1	fpb 22.5 Mpa
	Shear stress from table 4.1	fps 4.2 Mpa

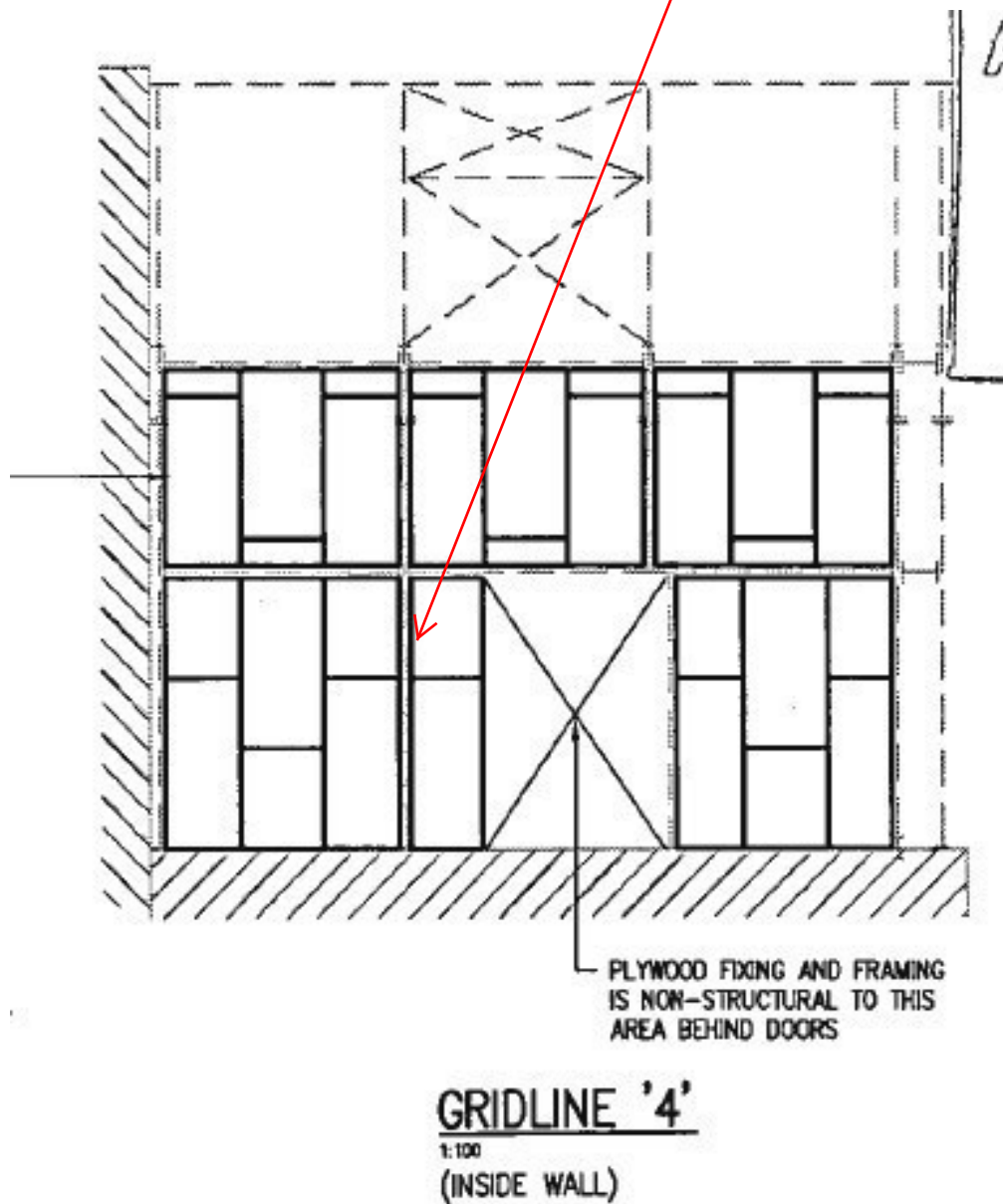
Client: **Rotorua Lake council**
 Project: **Rotorua museum**
Government Gardens, Rotorua
 Subject: **Timber Ply Shear wall grid B, C**

Ref: **J000949**
 Date: **13-10-16**
 BY: **AP**

Ref:		Design		Sheet No.:	11
				Output	
6.5.1.4		Load duration	K1 1.0		
		Stability buckling factor	K8 1.0		
		Moisture content	K14 1.0		
		Face grain orientation for shear	K15 1.0		
		Panel shear framing support	K18 1.0		
		<u>This is a long wall</u>			
		Overturning moment	M* 135.95 kNm		
		Leverarm within wall	6.56 m		
		Compression/Tension force on end studs	N* 8.7 kN Max		
		In long walls each stud takes a share of the compression force with the extreme stud taking the maximum load and other studs taking a reduced load based on a linear relationship.			
		Number of studs considered for compression/tension is:- 6			
		Other studs (kN)			
		7.13	5.55 3.96 2.38 0.79		
		<u>Nail design</u>			
		Last stud to ply forces	8.7 kN Max		
		This is the shear flow force			
		Length of studs	3.5 m		
		Strength of a single nail	1.265 kN		
		Spacing of nails	50 mm		
		Total strength of nails	90 kN		PASS
		Spcaing of internal nails	150 mm		
		Total strength of nails	30 kN		PASS
		Spacing of nails along top & bottom plates	75 mm		
		Total strength of nails	113 kN		PASS
		<u>Overstrength of nails is 2.0 From NZS3603</u>			
		<u>Plywood design</u>			
		Design shear force	V* 77.7 kN		
		Panel shear	$\frac{2}{3} K1.K8.K14.K18.Fps.t.d = Vni$	221.8 kN	
			ϕVni	221.8 kN	PASS
		<u>Stud design</u>			
		Buckling about the minor axis is prevented by the plwood, hence only major axis buckling will be used in design.			
		<u>Compression</u>			
		Nominal strength for buckling x-x axis	Nc* 17.4 kN		
		$K1 \times K8 \times fc \times A \times 10^{-3} = Nncx$		52.2 kN	
		Compressive strength x-x axis			
		$\phi \times Nncx = \phi Nncx$		52.2 kN	PASS
		<u>Tension</u>			
		Nominal strength	$K1 \times K4 \times ft \times A = Nnt$	37.8 kN	
		Tensile strength	$\phi \times Nnt = \phi Nnt$	37.8 kN	PASS

Next page show the calculation of the plywood shear wall

This wall is being analysed in shear, having SHS posts each end to take compression/tension forces



Total EQ force for
Mu=1.25 x 3
frames / 2 walls on
grid 4 having 3.6m
long

Client: **Rotorua Lake council**
Project: **Rotorua museum**
Government Gardens, Rotorua
Subject: **Timber Ply Shear wall grid 4**

Ref: **J000949**
Date: **13-10-16**
BY: **AP**

Design of Plywood shear wall to NZS3603

Sheet No.:

10

Ref:	Design	Output
	Force on top of wall	V* 38.8
	Ductility adopted for design	Mu 3.00
	Wall height	h 3.5 m
	Wall width	w 3.6 m
	Height/depth ratio	0.972
	If H/d is less than 1.0 then wall is long	
	<u>Design strength per nail</u>	
	Nail diameter	3.33
	Timber species	Radiata Pine
	Side plate k factor	Kp 1.4
	Number of nails used in connection	K50 1.3
	Duration of load	K1 1.0
	Strength reduction factor	φ 1
	Characteristic strength of nail in single shear	Qk 695 N
	Strength of nail in shear	φQn 1265 N
	<u>Stud Size</u>	
	Stud depth	D 140 mm
	Stud width	B 45 mm
	Stud spacing	S 600 mm
	Timber strength class	Radiata Pine / MSG8
	Characteristic compressive stress	fc 18.0 Mpa
	Characteristic tension stress	ft 6.0 Mpa
	Area	D x B = A 6300 mm ²
	Slenderness coefficient for lateral buckling	
	$\frac{Lay}{B}$	= S3 25.0
	Stability factor from table 2.8 x-x Axis	K8 0.460
	Duration of load	K1 1.0
	Parallel support	K4 1.0
	Strength reduction factor	Ø 1.0
	<u>Plywood Sheathing</u>	
	One side or both sides sheathed (1 or 2)	1 No.
	Thickness of ply	12.0 mm
	Layup of ply	2.4/2.4/2.4/2.4/2.4
	Total number of plies	5 No.
	Thickness of plies parallel to face grain	7.2 mm
	Plywood Grade	F8
NZS2269	Bending stress from table 4.1	fpb 22.5 Mpa
	Shear stress from table 4.1	fps 4.2 Mpa

Client: **Rotorua Lake council**
 Project: **Rotorua museum**
Government Gardens, Rotorua
 Subject: **Timber Ply Shear wall grid 4**

Ref: **J000949**
 Date: **13-10-16**
 BY: **AP**

Ref:		Design		Sheet No.:	11
				Output	
6.5.1.4	Load duration	K1	1.0		
	Stability buckling factor	K8	1.0		
	Moisture content	K14	1.0		
	Face grain orientation for shear	K15	1.0		
	Panel shear framing support	K18	1.0		
	<u>This is a long wall</u>				
	Overtuning moment	M*	135.95 kNm		
	Leverarm within wall		3.56 m		
	Compression/Tension force on end studs	N*	37.8 kN Max		
	In long walls each stud takes a share of the compression force with the extreme stud taking the maximum load and other studs taking a reduced load based on a linear relationship.				
	Other studs (kN)				
	<u>Nail design</u>				
	Last stud to ply forces		37.8 kN Max		
		This is the shear flow force			
	Length of studs		3.5 m		
	Strength of a single nail		1.265 kN		
	Spacing of nails		50 mm		
	Total strength of nails		90 kN		PASS
	Spcaing of internal nails		150 mm		
	Total strength of nails		30 kN		
	Spacing of nails along top & bottom plates		75 mm		
	Total strength of nails		62 kN		PASS
	<u>Overstrength of nails is 2.0 From NZS3603</u>				
	<u>Plywood design</u>				
	Design shear force	V*	77.7 kN		
	Panel shear	$\frac{2}{3} K1.K8.K14.K18.Fps.t.d$	= Vni 121.0 kN		
			ϕVni 121.0 kN		PASS
	<u>Stud design</u>				
	Buckling about the minor axis is prevented by the plwood, hence only major axis buckling will be used in design.				
	<u>Compression</u>				
	Nominal strength for buckling x-x axis	Nc*	75.5 kN		
		$K1 \times K8 \times fc \times A \times 10^{-3} = Nncx$	394.8 kN		
	Compressive strength x-x axis				
		$\phi \times Nncx = \phi Nncx$	394.8 kN		PASS
	<u>Tension</u>				
	Nominal strength	$K1 \times K4 \times ft \times A = Nnt$	394.8 kN		
	Tensile strength	$\phi \times Nnt = \phi Nnt$	394.8 kN		PASS

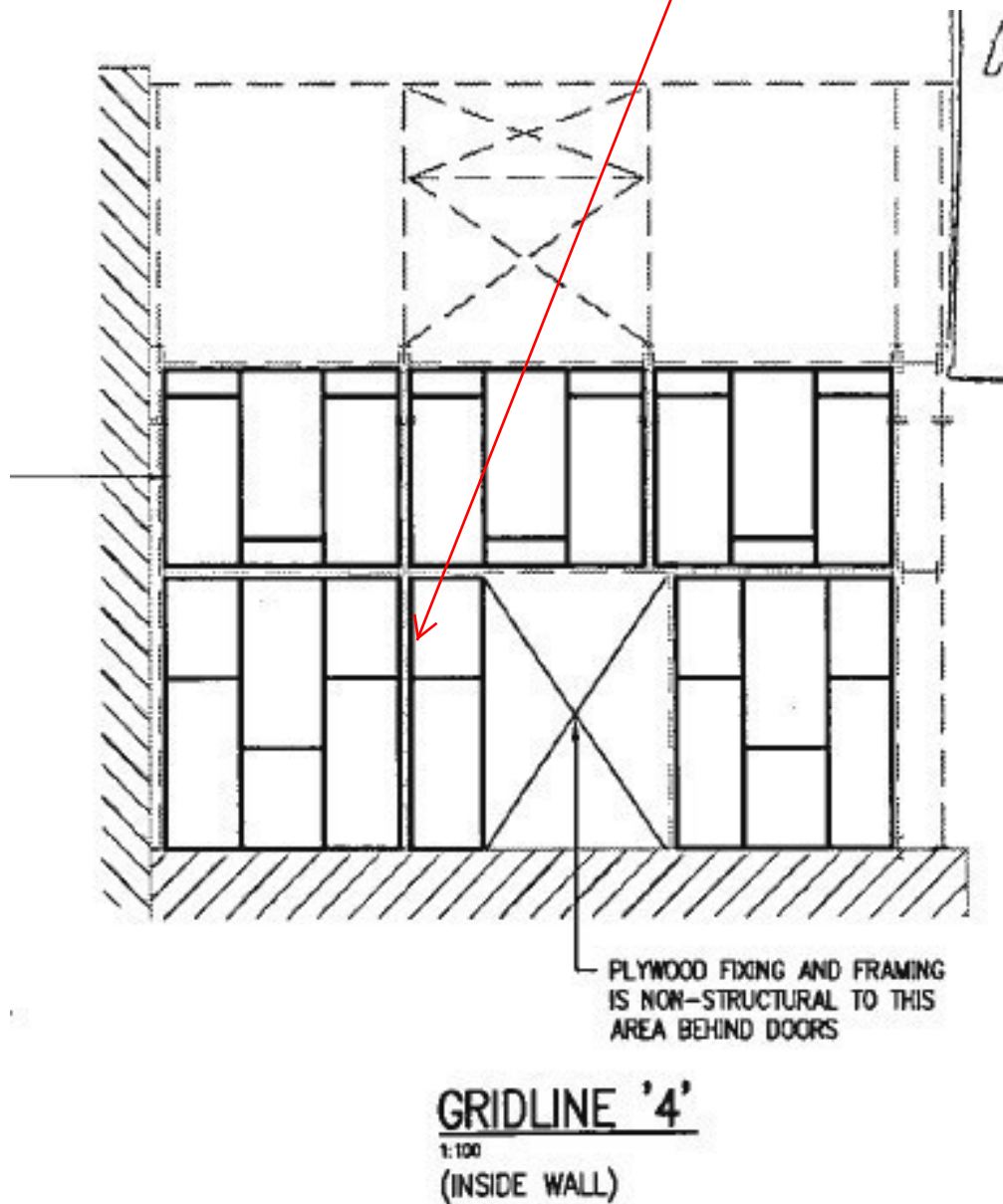
SHS strength

See Next page

See Next page

Next page show the calculation of the SHS posts in compression

This posts is being analysed in compression



See plywood shear
wall calculation

Client: **Rotorua Lake council**
 Project: **Rotorua museum**
Government Gardens, Rotorua
 Subject: **Steel Axial Load SHS with Calc**

Ref: **J000949**
 Date: **13-10-16**
 BY: **AP**

AXIAL CAPACITY OF A STEEL COLUMN DESIGN TO NZS3404

Sheet No.:

Ref:	Design	Output
	Dead load G 0.0 kN EQ load Q 75.5 kN Dead load factor DLF 1.0 Imposed load factor LLF 1.0 Axial load 75.5 kN Effective length x axis Lex 7.1 m Effective length y axis Ley 7.1 m Strength reduction factor Ø 1 Yield stress of side wall fy 350 Mpa	75.5 kN
T3.3(1)	Using steel section 150x150x6.0 SHS	PASS

Section properties

Section depth	D	150.0 mm	Form factor	kf	1.000
Section width	B	150.0 mm	Moment of inertia major	Ix	1130.0 cm ⁴
Wall thickness	T	6.0 mm	Moment of inertia minor	Iy	1130.0 cm ⁴
			Plastic modulus	Sy	178.0 cm ³
			Elastic modulus	Zy	150.0 cm ³
Ratios for local buckling			Radius of gyration	Rx	58.2 cm
Flange	b/t	23.0	Radius of gyration	Ry	58.2 cm
Web	b/t	23.0	Torsion Constant	J	18.4
Section slenderness parameters			Warping Constant	Iw	229.0
	lef	27.21	Youngs modulus	E	200000 MPa
	lew	27.21	Area of section		3330 mm ²

6.2.1	Section capacity	Ns	1165.5 kN
		ØNs	1165.5 kN
	<u>Member Capacity</u>		
6.6.3	Effective length ratios	$\left(\frac{Lex}{rx}\right)\sqrt{kf}\sqrt{\left(\frac{fy}{250}\right)}$ $\left(\frac{Ley}{ry}\right)\sqrt{kf}\sqrt{\left(\frac{fy}{250}\right)}$	Lnx 144.3 Lny 144.3
T. 6.3.3(1)	Compression member constant	Ln	144.3
T. 6.3.3(3)	Slenderness reduction factor	xb	-0.5
		xc	0.339
	Member capacity	0.339 x 1165.5 = ØNc	394.8 kN

**ATRIUM, INTERMEDIATE NORTH &
NORTH WING**

1.0 UNREINFORCED CONCRETE WALLS.

- Wall Descriptions

- (i). There are 4 unreinforced concrete walls across the Atrium & North wing (running east to west).

These walls are labelled 1-4 for reference in calculations.

(see wall layout on following page 3)

- Wall Height - 10.50m from G.F.
- WALL THICKNESS - From 500mm to 300mm (varies with height).
- WALL LENGTH - 14.50 m.
- WALLS CHECKED FOR in-plane shear, overturning & out-of-plane.

- (ii). Unreinforced concrete partition walls in both directions in Atrium. Height to mezzanine flr. only.

WALL 5 checked as critical case.
(see wall layout on following page 3).

- WALL Height - 4.50m from G.F TO MEZZ. FLR.
- WALL THICKNESS - assuming 200mm.
- WALL CHECKED FOR in-plane shear, overturning & out-of-plane.

- (iii). Unreinforced concrete NIB WALLS FOR external & internal "Half timber" & timber walls. (SEE Pg. 33 FOR NIB WALL LAYOUT)

- WALL height - 1.20m from G.F
- WALL THICKNESS - 220 mm.

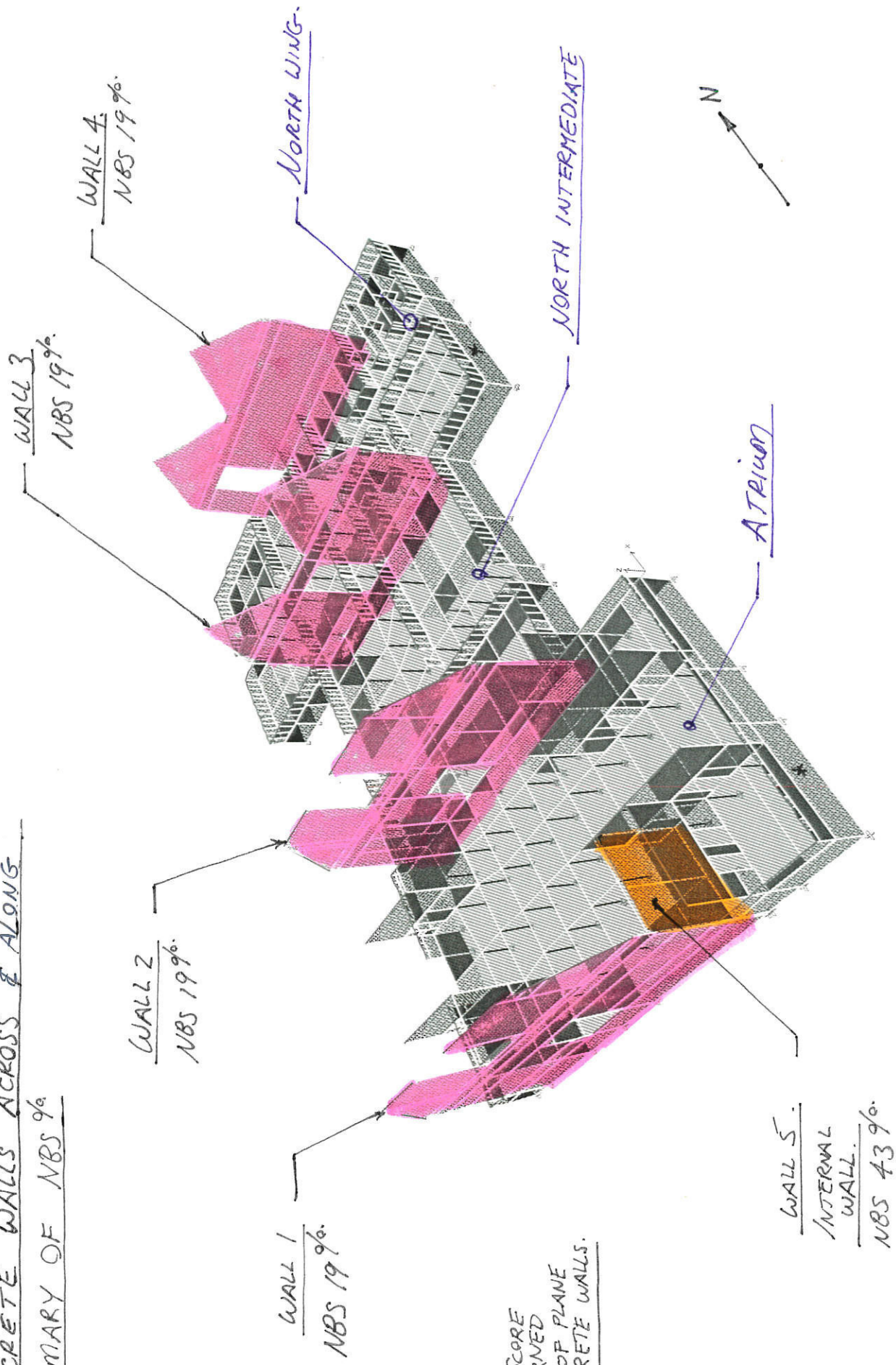
- Analysis Procedure

- using ETABS V.16.0, concrete walls, GF & BASEMENT PIERS/walls have been modelled as section Solids with the appropriate wall dimensions & concrete material parameters. (OBTAINED FROM OPUS Lab Tests).
- Due to insufficient ceiling diaphragm, roof, ceiling, mezzanine floors & upper timber wall loads have been applied to concrete walls using tributary area.
- Refer to Material weights & Atrium loads at back of Appendices.
- Ductility Factor used, $\mu = 1.25$.
- SEE following page for layout of checked walls, & Pg. 33 FOR NIB WALLS.
- IN-PLANE SHEAR & OVERTURNING DEMAND OBTAINED FROM ETABS Model.

- CAPACITY CHECK / NBS% SCORE

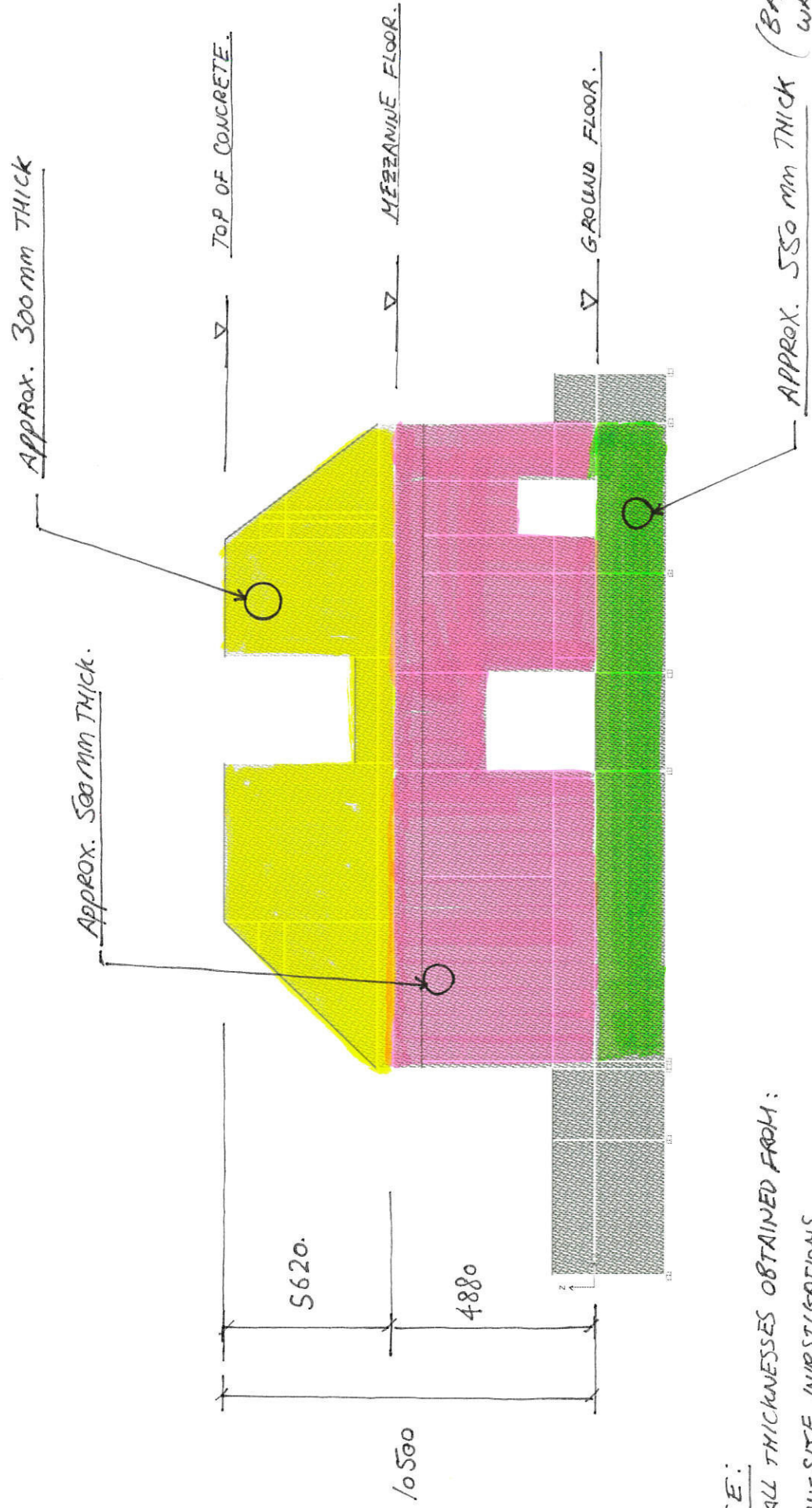
- SEE FOLLOWING PAGES.
- IN-PLANE SHEAR CHECKS BEGIN ON Pg. 6.
- Overturning checks " " Pg. 13
- OUT-OF-PLANE CHECKS " " Pg. 17.
- Nib wall checks " " Pg. 33.

CONCRETE WALLS ACROSS & ALONG
SUMMARY OF NBS %



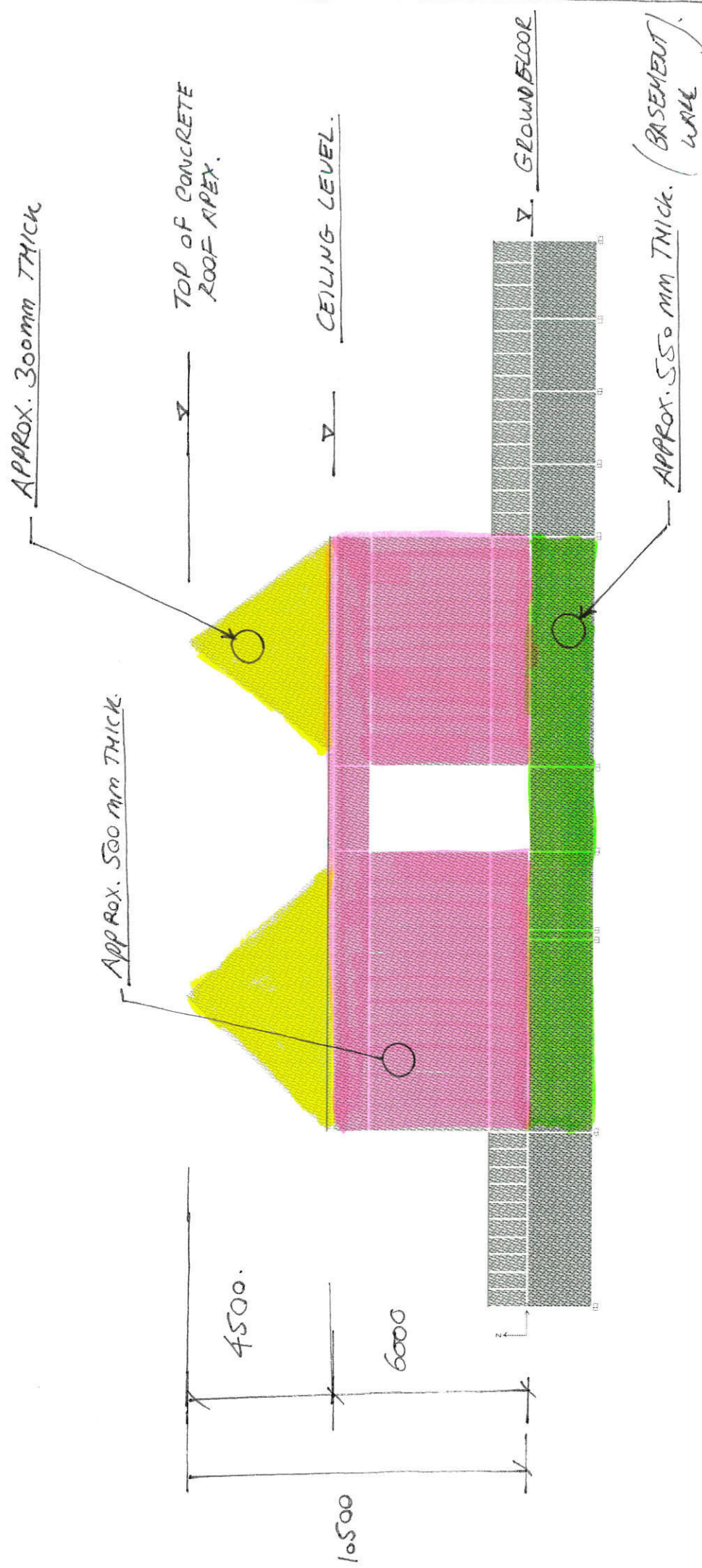
NOTE:
NBS % SCORE
IS GOVERNED
BY OUT-OF PLANE
OF CONCRETE WALLS.

CONCRETE WALLS 1 & 2 - ACROSS



NOTE:
 WALL THICKNESSES OBTAINED FROM:
 (i) ON-SITE INVESTIGATIONS.
 (ii) AS-BUILT DATA POINT CLOUD.

CONCRETE WALLS 3 & 4 ACROSS



CONCRETE WALLS - IN PLANE.

CHECKING IN PLANE SHEAR DEMAND & CAPACITY
FOR FULL HEIGHT CONCRETE WALLS ACROSS
BUILDING.

SHEAR DEMAND OBTAINED FROM ETABS SECTION CUTS
THROUGH WALL.

(1) WALL 1 - BETWEEN ATRIUM & SOUTH INTER. WING.

(i) - FOR 300mm THICK CONCRETE WALL SECTION:

- SHEAR IN-PLANE, $V^* = 1440 \text{ kN}$.

- CAPACITY, ϕV_c :

$$V_c = 0.17 \sqrt{f_c'} A_{cv}$$

$$= 0.17(2)(22.30 \times 0.8 \times 0.30)$$

$$= 1820 \text{ kN}$$

$$f_c' = 4 \text{ MPa}$$

$$L_w = 22.30 \text{ m. } (d = 17.85 \text{ m.})$$

$$t_w = 0.30 \text{ m.}$$

$$N^* = 670 \text{ kN.}$$

$$\phi = 1.0$$

or

$$V_c = 0.17 \left[\sqrt{f_c'} + \frac{N^*}{A_g} \right] A_{cv}$$

$$= 0.17 \left[\sqrt{4} + \frac{670 \times 10^3}{22.3 \times 0.3} \right] (22.3 \times 0.8 \times 0.30)$$

$$= 1910 \text{ kN.}$$

$$\therefore V_c = 1820 \text{ kN}$$

$$\therefore \phi V_c = 1.0(1820 \text{ kN}) > V^* = 1440 \text{ kN.}$$

$\therefore$ okay.

WALL THICKNESS

FROM AS-BUILT

• 550mm BASE

• 500mm to Mezz. FL.

• 300mm above Mezz.

to Roof level

REFERENCE:

NZ 3101.1:2006

CL. 11.3.10.3.4.

100% NBS

(ii) - FOR 550 mm THICK CONCRETE @ BASE OF WALL:

- SHEAR IN-PLANE, $V^* = 2608 \text{ kN}$

- CAPACITY, ϕV_c :

$$V_c = 0.17 \sqrt{f_c'} A_{cv}$$

$$= 0.17 \sqrt{4} (29.80 \times 0.8 \times 0.55)$$

$$= 4458 \text{ kN}$$

$$f_c' = 4 \text{ MPa}$$

$$L_w = 29.80 \text{ m } (d = 23.8 \text{ m})$$

$$t_w = 0.55 \text{ m}$$

$$N^* = 2325 \text{ kN}$$

$$\phi = 1.0$$

or

$$V_c = 0.17 \left[\sqrt{f_c'} + \frac{N}{A_g} \right] A_{cv}$$

$$= 0.17 \left[\sqrt{4} + \frac{2325 \times 10^3}{29.8 \times 0.55} \right] (29.80 \text{ m} \times 0.8 \times 0.55 \text{ m})$$

$$= 4774 \text{ kN}$$

$$\therefore V_c = 4458 \text{ kN} > V^* = 2608 \text{ kN}$$

$\therefore$ okay. $> 100\% \text{ NBS.}$

//

WALL 2 - BETWEEN ATRIUM & NORTH INTER. WING.

- SIMILAR AS WALL 1.

- BY INSPECTION, WALL 2 IN PLANE

SHEAR CAPACITY = 100% NBS.

(2) WALL 3 - BETWEEN NORTH WING & NORTH INTER. WING.

(i) - FOR 300mm THICK CONCRETE WALL SECTION:

- SHEAR IN-PLANE, $V^* = 480 \text{ kN}$

- CAPACITY, ϕV_c :

$$V_c = 0.17 \sqrt{f_c} A_{cv}$$

$$= 0.17 \sqrt{2} (16\text{m} \times 0.3\text{m})$$

$$= 1632 \text{ kN.}$$

$$f_c' = 4 \text{ MPa}$$

$$L_w = 20\text{m. } (d = 16\text{m})$$

$$t_w = 0.3\text{m.}$$

$$N^* = 404 \text{ kN}$$

$$\phi = 1.0$$

or

$$V_c = 0.17 \left[\sqrt{f_c'} + \frac{N^*}{A_g} \right] A_{cv}$$

$$= 0.17 \left[\sqrt{4} + \frac{404 \times 10^3}{20 \times 0.3} \right] (16 \times 0.3)$$

$$= 1098 \text{ kN.}$$

$$\therefore V_c = 1098 \text{ kN.}$$

$$\phi V_c = 1098 \text{ kN} > V^* = 480 \text{ kN.}$$

$\therefore$ okay

> 100% NBS

(ii) - FOR 550mm THK. CONCRETE @ BASE OF WALL:

- SHEAR IN-PLANE, $V^* = 1262 \text{ kN}$

- CAPACITY, ϕV_c :

$$V_c = 0.17 \sqrt{f'_c} (13.60 \times 0.55)$$

$$= 2543 \text{ kN}$$

$$f'_c = 4 \text{ MPa}$$

$$L_w = 17.0 \text{ m } (d = 13.60 \text{ m})$$

$$t_w = 0.55 \text{ m}$$

$$N^* = 1084 \text{ kN}$$

$$\phi = 1.0$$

or

$$V_c = 0.17 \left[\sqrt{f'_c} + \frac{1.20 \text{ MN}}{17.0 \times 0.55} \right] (13.60 \times 0.55)$$

$$= 2706 \text{ kN}$$

$$\therefore \phi V_c = 2543 \text{ kN} > V^* = 1262 \text{ kN}$$

$\therefore$ okay.

$> 100\% \text{ NBS.}$

WALL 4 - BETWEEN NORTH WING & NORTH EXTENSION.

- SIMILAR AS WALL 3.

- BY INSPECTION, WALL 4 IN PLANE

SHEAR CAPACITY = $100\% \text{ NBS.}$

(3) WALL 5. - INTERNAL CONCRETE WALL ACROSS
ATRIUM FOYER.

- FOR 200mm THICK CONCRETE WALL.
- SHEAR IN PLANE DEMAND, $V^* = 675 \text{ kN}$.
- CAPACITY ϕV_c :

$$V_c = 0.17 \sqrt{f_c'} (L_w \times t_w)$$

$$= 287 \text{ kN}$$

$$f_c' = 4 \text{ MPa}$$

$$L_w = 4.7 \text{ m } (d = 4.23 \text{ m})$$

$$t_w = 0.20 \text{ m}$$

$$N^* = 429 \text{ kN}$$

$$\phi = 1.0$$

$$V_c = 0.17 \left[\sqrt{f_c'} + \left(\frac{0.429}{4.70 \times 0.2} \right) \right] (4.23 \times 0.2)$$

$$= 287 \text{ kN}$$

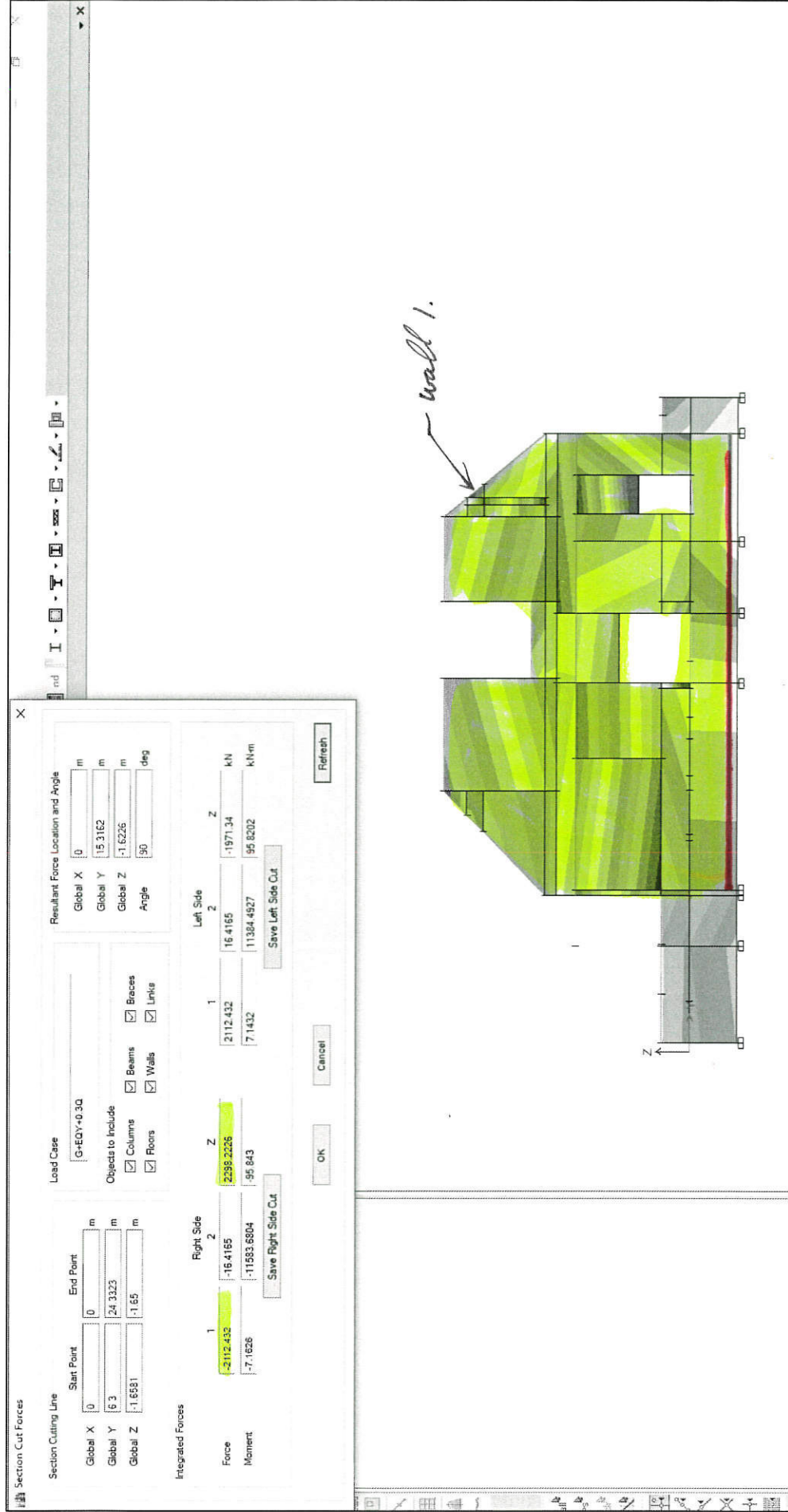
$$\therefore \phi V_c = 287 \text{ kN} < V^* = 675 \text{ kN}$$

$$\frac{\phi V_c}{V^*} = \frac{287}{675} = 0.43 = 43 \% \Rightarrow$$

43% NBS

//

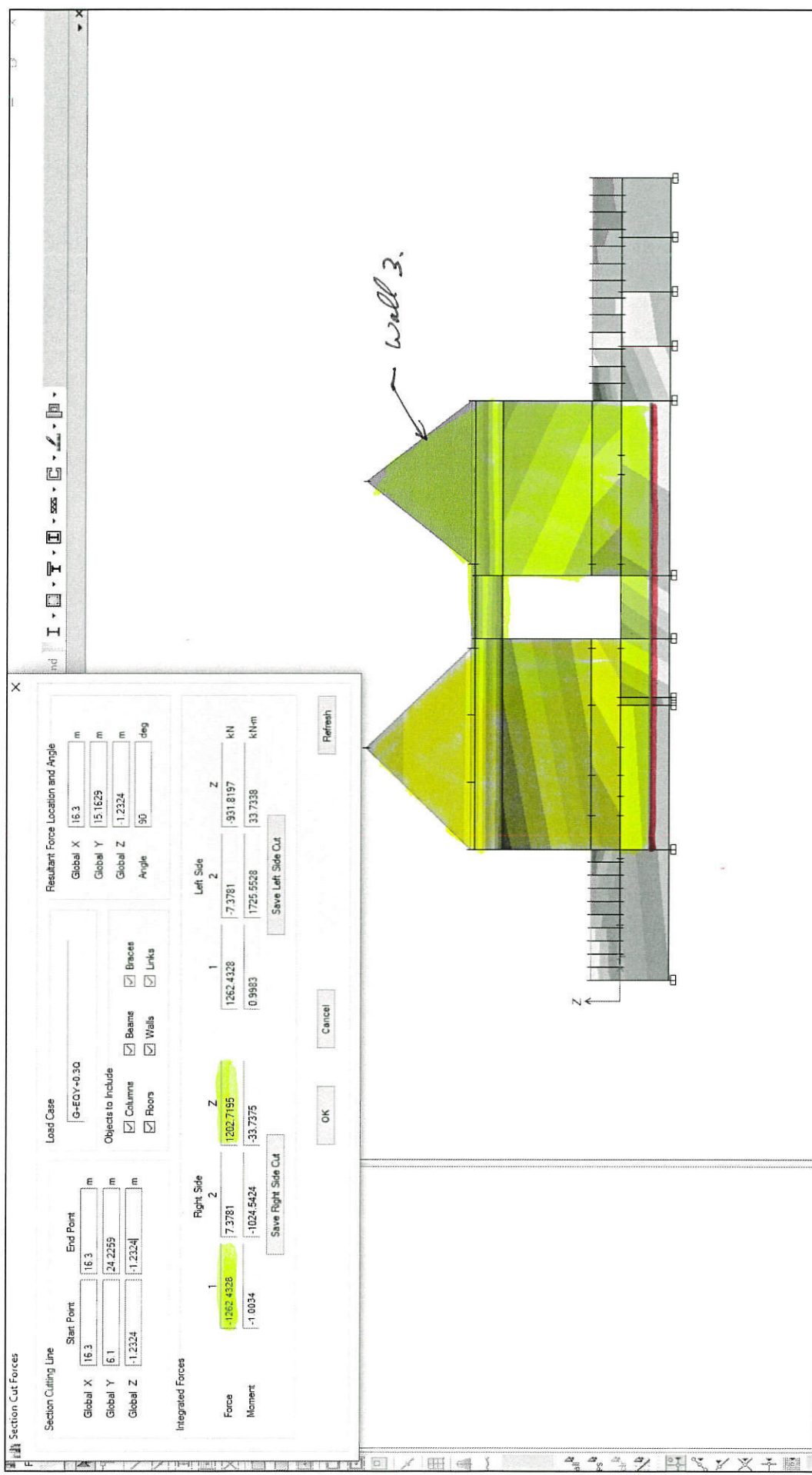
WALL 1 - IN PLANE SHEAR SECTION CUT.



ETABS SCREEN CAPTURE.

1/08/17.

WALL 3 - IN PLANE SHEAR SECTION CUT.



ETABS SCREEN CAPTURE.

1/08/17.

CONCRETE WALLS - OVERTURNING (IN PLANE)

- CHECKING OVERTURNING FOR FULL HEIGHT CONCRETE WALLS ACROSS BUILDING.
- OVERTURNING MOMENT OBTAINED FROM ETABS SECTION CUTS @ WALL BASE GROUND LEVEL.

(1) WALL 1 & 2

- OVERTURNING MOMENT, $M_o = 10125 \text{ kNm}$.
- TOTAL AXIAL LOAD = 1355 KN . (N^*)
- WALL LENGTH = 18 m
- FIND RESTORING MOMENT, M_R :

$$M_R = 0.9(N^*) \times \text{lever arm}$$

$$= 0.9(1355) \times 18/2$$

$$M_R = 10975 \text{ kNm} > M_o = 10125 \text{ kNm}$$

$\therefore$ okay.

$> 100\% \text{ NBS.}$

(2) WALL 3 & 4

- OVERTURNING MOMENT, $M_o = 3106 \text{ kNm}$.
- $N^* = 887.3 \text{ KN}$.
- $l_w = 18 \text{ m}$.

$$M_R = 0.9(887.3) \times 18 \text{ m} / 2$$

$$= 7187 \text{ kNm} > M_o = 3106 \text{ kNm}$$

$\therefore$ okay

$> 100\% \text{ NBS.}$

(3) WALL 5.

- OVERTURNING MOMENT, $M_o = 1690 \text{ kNm}$.

$$N^* = 429 \text{ kN}$$

$$L_w = 4.7 \text{ m}$$

$$M_R = (0.9 \times 429 \text{ kN}) \times 4.7 \text{ m} / 2$$

$$= 907 \text{ kNm} < M_o = 1690 \text{ kNm}$$

$$\frac{M_R}{M_o} = \frac{907}{1690} = 0.54 \Rightarrow$$

54% N85.

//

WALL 1 - SECTION CUT FOR OVERTURNING.

Section Cutting Line

Global X

0

m

Global Y

6.15

m

Global Z

0.01

m

Start Point

0

End Point

24.2614

Load Case

Gr-EDY+0.3Q

Objects to Include

☒ Columns

☒ Beams

☒ Floors

☒ Walls

☒ Braces

☒ Links

Resultant Force Location and Angle

Global X

0

m

Global Y

15.2057

m

Global Z

0.0401

m

Angle

50

deg

Integrated Forces

Right Side

1

2

Force

-2081.7074

-20.575

1355.4042

Moment

-10.4799

-10.125 1886

-147.6975

Left Side

1

2

Force

2081.7074

20.575

-1221.3182

Moment

10.437

10303.4658

147.6208

Save Right Side Cut

Save Left Side Cut

OK

Cancel

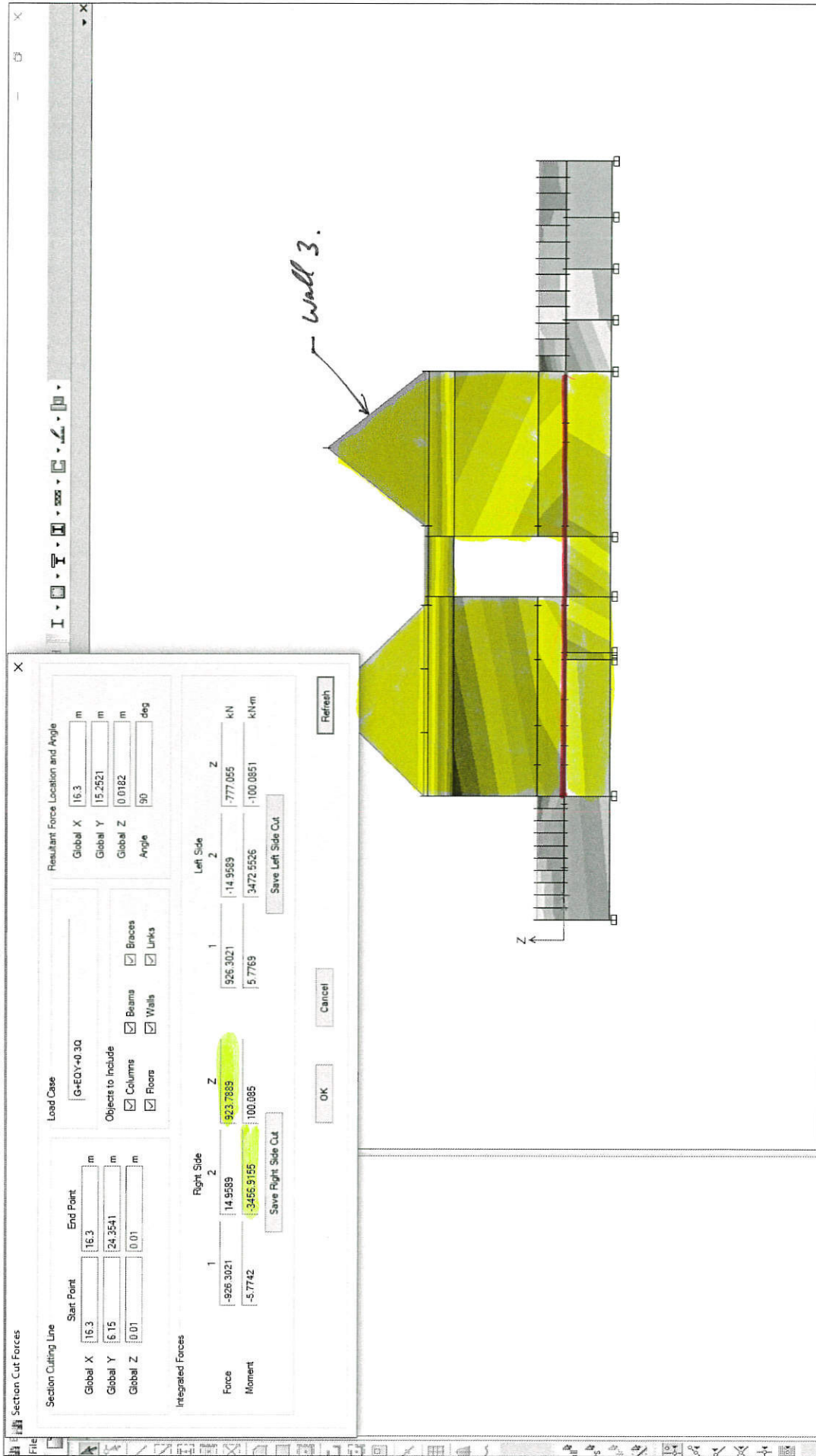
Refresh

ETABS SCREEN CAPTURE.

ETABS SCREEN CAPTURE.

1/8/2017

WALL 3-SECTION CUT FOR OVERTURNING



ETABS SCREEN CAPTURE. 1/8/2017.

WALL 5

- OUT-OF PLANE CHECK - CONCRETE WALLS IN ATRIUM FROM NORTH TO SOUTH. ADJACENT TO STAIRS - WALL 5

ASSESSMENT PHILOSOPHY:

- . Unreinforced concrete walls act as SIMPLY SUPPORTED. Mezzanine floor does provide restraint at wall top.
- . Check out of plane for 1m length for critical case.

WALL DESCRIPTION - WALL 5

WALL Height = 4.50 m.

t_{nom} (Thickness) = 0.20 m.

concrete density = 15 kN/m³

METHOD.

- . unreinforced concrete wall.
- . use Inelastic displacement-based analysis for NRM walls as vertical SPANNING WALLS in accordance with NZEE GUIDELINES - SECTION C8

ASSUMPTIONS

Wall Thickness,
 $t = 200mm$
_{nom}

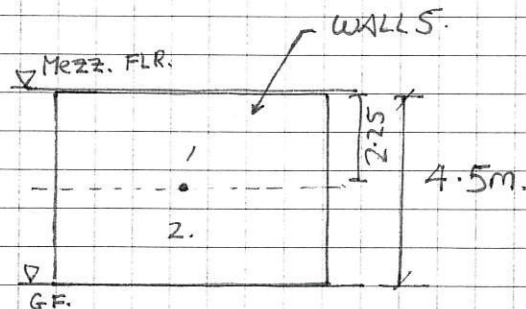
REFERENCE.

NZEE GUIDELINES
C8.8.5.2.

- OUT-OF PLANE CHECK FOR WALL 5.

STEP 1:

DIVIDE WALL
INTO TWO
PARTS. ASSUME
200MM THICK WALL.
[$t_{nom} = 200\text{mm}$]



STEP 2:

$$W_T, \text{ TOP PART WEIGHT} = 15 \text{ kN/m}^3 \times 0.2\text{m} \times 4.5\text{m}/2$$

$$= 6.75 \text{ kN/m.}$$

$$W_b, \text{ BOTTOM PART WEIGHT} = 6.75 \text{ kN/m.}$$

P , TOP STOREY WEIGHT:

$$\text{TIMBER WALL ABOVE} = 0.5 \text{ kPa} \times 10\text{m} = 5 \text{ kN/m.}$$

$$P = 5 \text{ kN/m.}$$

STEP 3:

$$L = t_{nom} (0.975 - 0.025 P/W)$$

$$= 200 (0.975 - 0.025 (5/13.5))$$

$$\therefore L = 193 \text{ mm}$$

STEP 4:

Boundary condition, $\rightarrow e_p = 0$ - CASE 1

$e_b = 0$ or $L/2$ - CASE 2

REFERENCE

NZEE GUIDELINES
SECTION C.8
C.8.8.5.2

REFERENCE
TABLE C8.12

STEP 5.

CALCULATE INSTABILITY DEFLECTION (Δ_i):

$$\Delta_i = \frac{bh}{2a}$$

CASE 1: $\Delta_i = \frac{1.97(4.5m)}{2(53.0)} = 0.084m = 84mm$

CASE 2: $\Delta_i = \frac{1.645(4.5m)}{2(53.0)} = 0.070m = 70mm$

where;

$$b = W_b e_b + W_t (e_o + e_b + e_t) + P(e_o + e_b + e_t + e_p) - \psi(W_b Y_b + W_t Y_t)$$

$$a = W_b Y_b + W_t (h - Y_t) + Ph.$$

check case 1: $e_p = 0, e_b = 0, e_t = 0.10, e_o = 0.10$

case 2: $e_p = 0, e_b = 0.10, e_t = 0.10, e_o = 0.10$

CASE 1:

$$b = 6.75(0) + 6.75(0.10 + 0 + 0.10) + 5(0.20) - 0.025((6.75 \times 1.125) + (6.75 \times 1.125))$$

$$= 0 + 1.35 + 1 - 0.38$$

$\therefore b = 1.97$

$$a = 6.75(1.125) + 6.75(3.375) + 5(4.5)$$

$$= 7.60 + 22.80 + 22.5$$

$\therefore a = 53.0$

CASE 2:

$$b = 6.75(0.1) + 6.75(0.20) + 5(0.20) - 0.025((6.75 \times 1.125) + 6.75 \times 1.125))$$

$$= 0.675 + 1.35 + 1 - 0.38$$

$$b = 1.645$$

$$a = 6.75(1.125) + 6.75(3.375) + 5(4.5)$$

$$= 53.0$$

STEP 6.

Max. usable deflection, Δ_m :

$$\Delta_m = 0.6 \Delta_i$$

$$= 0.6(8.4 \text{ mm}) = 5.04 \text{ mm.}$$

STEP 7:

CALCULATE PERIOD OF WALL.

$$T_p = 4.07 \sqrt{J/a}$$

$$J_b = \frac{1}{29} (15 \times 0.2 \times 1 \times 4.5) \left[\frac{0.193^2 + (4.5/2)^2}{12} \right]$$

$$= 0.29$$

$$J_t = J_b = 0.29$$

NOTE:

$$J_b = \frac{w}{29} \left(\frac{t^2 + (h/2)^2}{12} \right)$$

$$J_b = J_t$$

CASE 1:

$$I = I_{b0} + I_{t0} + \frac{1}{9} \left\{ W_b [e_b^2 + y_b^2] + W_t [(e_0 + e_b + e_t)^2 + y_t^2] + P [(e_0 + e_b + e_t + e_p)^2] \right\}$$

$$= 0.29 + 0.29 + \frac{1}{9.81} \left\{ 6.75 [0^2 + 1.125^2] + 6.75 [(0.10)^2 + (1.125)^2] + 5 [(0.20)^2] \right\}$$

$$= 0.68 \left\{ (8.54 + 8.61 + 0.2) \right\}$$

$$I = 11.80$$

$$\therefore T_p = 4.07 \sqrt{\frac{11.80}{53}}$$

$$\therefore T_p = 1.92$$

CASE 2:

$$I = 0.29 + 0.29 + \frac{1}{9.81} \left\{ 6.75 [0.10^2 + 1.125^2] + 6.75 [(0.3)^2 + 1.125^2] + 5 [(0.3)^2] \right\}$$

$$= 0.68 \left\{ (8.61 + 9.15 + 0.45) \right\}$$

$$I = 12.38$$

$$\therefore T_p = 1.96$$

STEP 8:

CALCULATE $C_p(T_p)$

$$C_i(T_p) = C_{hc}(T_p)$$

$$C_o = C_h(T) \cdot z = 1.33 \times 0.24 = 0.32$$

$$C_{hi} = 1 + h/6 = 1 + 4.5/6 = 1.75$$

$$C_i(T_p) = 1.32/T_p = 1.32/1.96 = 0.67$$

$$\therefore C_{hc}(T_p) = 0.67 = C_i(T_p)$$

$$\begin{aligned} C_p(T_p) &= C_o C_{hi} C_{hc}(T_p) \\ &= 0.32 (1.75) (0.67) \\ &= 0.375 \end{aligned}$$

STEP 9:

$$Y = \frac{(W_b y_b + W_t y_t) h}{2 J_g}$$

$$= \frac{[6.75(1.125) + 6.75(1.125)] 4.50}{2 (12.38) (9.81)}$$

$$Y = 0.28$$

STEP 10:

CALCULATE DISPLACEMENT RESPONSE:

$$\begin{aligned} D_{ph} &= \gamma (T_p / 2\pi)^2 C_p(T_p) R_p \cdot g \\ &= 0.28 (1.96 / 2\pi)^2 (0.375) (1.0) (9.81) \\ &= 0.10 \text{ m} = 100 \text{ mm} \end{aligned}$$

STEP 11

$$\begin{aligned} \% \text{NBS} &= 100 \times \Delta m / D_{ph} \\ &= 60 \times (\Delta_1 / D_{ph}) \\ &= 60 \times (70 / 100) \\ &= \underline{42 \% \text{ NBS}} \end{aligned}$$

42% NBS

//

WALL
1-4.

- OUT OF PLANE CHECK - CONCRETE WALLS ACROSS ATRIUM & NORTH WING FROM EAST TO WEST - WALLS 1-4.

ASSESSMENT PHILOSOPHY.

- Unreinforced concrete walls have partial restraint at top from roof.
- Assume wall acts in between simply supported from top to bottom and a cantilever wall.
- USE inelastic displacement - based analysis for URM walls in accordance with NZEE GUIDELINES - SECTION CP.
- Analysis for simply supported wall and also as a cantilever wall. Get the average NBS% results of the two cases.

REFERENCES

NZEE GUIDELINES
C.8.8.5.2.

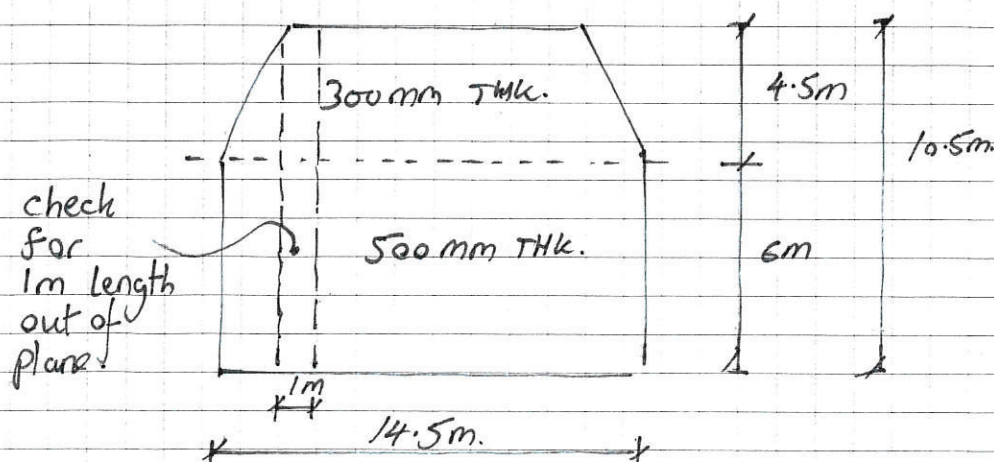
WALL DESCRIPTION - WALLS 1-4

- WALL HEIGHT = 10.50m.

THICKNESS = 500 mm (from G.F to 6m up wall).

= 300 mm (from 6m to 10.5m height).

concrete density = 15 kN/m³.



- LOAD ON CONCRETE WALL, P:

- PERMANENT LOADS:

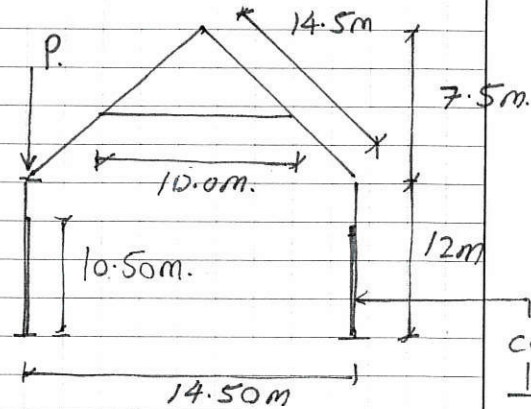
$$G_{\text{Roof main}} = 1.0 \text{ kPa} \times 14.5 \text{ m} \\ = 14.50 \text{ kN/m.}$$

$$G_{\text{side Roof}} = 1.0 \text{ kPa} \times 40 \text{ m}^2 / 18.15 \text{ m} \\ = 2.20 \text{ kN/m.}$$

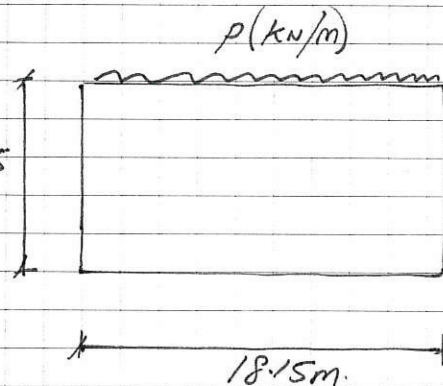
$$G_{\text{Ceiling}} = 0.35 \text{ kPa} \times 10 \text{ m} / 2 \\ = 1.75 \text{ kN/m.}$$

$$G_{\text{r.mber wall above}} = 0.90 \text{ kPa} \times 2 \text{ m} \\ = 1.80 \text{ kN/m.}$$

$$G_{\text{mezz Floor}} = 0.75 \text{ kPa} \times 1.50 \text{ m} \\ = 1.125 \text{ kN/m.}$$



concrete wall.
10.50m High.



IDEALISED
SHAPE.

- IMPOSED LOADS:

$$Q_{\text{Roof main}} = 0.25 \text{ kPa} \times 14.50 \text{ m} = 3.63 \text{ kN/m.}$$

$$Q_{\text{mezz FLR.}} = 3.0 \text{ kPa} \times 1.50 \text{ m} = 4.50 \text{ kN/m.}$$

- TOTAL P:

$$P = 14.50 + 2.20 + 1.75 + 1.80 + 1.125 + 3.63 + 4.50 \\ = 29.50 \text{ kN/m. (Includes G + Q)} \\ = 21.40 \text{ kN/m (Includes G only)}$$

- WEIGHT OF WALL, W :

$$- W = (15 \text{ kN/m}^3 \times 0.5 \text{ m} \times 6 \text{ m}) + (15 \times 0.3 \times 4.5 \text{ m})$$

$$= 65.30 \text{ kN.}$$

FOR SIMPLIFICATION, $t = 400 \text{ mm}$ (Average width)

$$- e_b = t/2 = 200 \text{ mm} = 0.2 \text{ m.}$$

$$- h = 10.50 \text{ m.}$$

$$- C(T) = 0.71 \times 1.3 \times 0.24$$

$$C(T) = 0.22$$

$$\text{FROM } T = 2.89$$

$$R = 1.3$$

$$\mu = 1.25$$

Type D Soil.

$$z = 0.24$$

$$S_p = 0.925$$

$$k\mu = 1.14.$$

$$\therefore C(T) = 0.22$$

$$I = \frac{w}{12g} (h^2 + t_{nom}^2) + \frac{w}{g} (y_b^2 + e_b^2) + \frac{p}{g} [h^2 + (e_b + e_p)^2]$$

$$= \frac{65.3}{12(9.81)} (10.50^2 + 0.4^2) + \frac{65.3}{9.81} (5.25^2 + 0.20^2)$$

$$+ \frac{21.40}{9.81} (10.50^2 + (0.20 + 0)^2)$$

$$= 61.25 + 183.73 + 240.60$$

$$\therefore I = 485.57$$

$$a = wy_b + Ph$$

$$= 65.3(5.25m) + (21.40 \times 10.50m)$$

$$\therefore a = 567.53$$

$$b = W e_b + P(e_b + e_p)$$

$$= 65.3(0.2m) + 21.40(0.2m)$$

$$\therefore b = 17.34$$

$$\Delta_i = \frac{bh}{a} = \frac{17.34(10.50)}{567.53}$$

$$\Delta_i = 0.32m = 320mm.$$

$$T_p = 3.1 \sqrt{I/a} = 3.1 \sqrt{\frac{485.57}{567.53}}$$

$$= 2.86 \text{ sec.}$$

$$w = 65.3 \text{ kN/m}$$

$$p = 21.40 \text{ kN/m.}$$

$$t_{nom} = 0.4m$$

$$e_b = 0.2m$$

$$\gamma = \frac{wh^2}{(2Jg)}$$

$$= \frac{65.3 (10.50)^2}{2 (485.57) (9.81)}$$

$$= \frac{7199.33}{9526.88}$$

$$\therefore \gamma = 0.75.$$

$$D_{ph} = \gamma \left(\frac{T_D}{2\pi} \right)^2 C(T) (R_D) g.$$

$$= 0.75 \left[\left(\frac{2.86}{2\pi} \right)^2 (0.22) (1) (9.81) \right]$$

$$D_{ph} = 0.335 \text{ mm}$$

$$\%NBS = \frac{30 \times \frac{\Delta i}{D_{ph}}}{0.335} = \frac{30 \times 0.320}{0.335} = 27\%$$

27% NBS

CONSIDER CONCRETE WALL AS A
CANTILEVER ABOVE MEZZAINE FLOOR. OUT OF
PLANE CAPACITY AS FOLLOWS:

- WEIGHT OF WALL

$$W = (15 \text{ kN/m}^3 \times 4.5 \times 0.30 \text{ m}) + (15 \text{ kN/m}^3 \times 1.0 \text{ m} \times 0.50 \text{ m})$$

$$= 27.75 \text{ kN/m.}$$

FOR SIMPLIFICATION, $t = 350 \text{ mm}$ (Average
THICKNESS)

- $e_b = t/2 = 0.175 \text{ m.}$ $-y_b = S/2 = 2.25 \text{ m.}$

- $h = 5 \text{ m}$ (ABOVE MEZZANINE FLOOR To
TOP OF CONCRETE WALL)

- $C(T) = C_n(T) \cdot Z \cdot R$

$T = 2.05$

$Z = 0.24$

$R = 1.3$

Type D Soil.

$C_n(T) = 1.07$

$\therefore C(T) = (1.07)(0.24)(1.3) = 0.333$

$$a = W_{yb} + P_h$$

$$= 27.75 (2.25m) + 20.25 \text{ kN/m} (5.0m)$$

$$\therefore a = 163.68$$

$$b = W_{eb} + P(e_b + e_p)$$

$$= 27.75 (0.175m) + 20.25 (0.175m)$$

$$\therefore b = 8.4$$

$$\Delta_i = \frac{bh}{a} = \frac{8.4 (5.0m)}{163.68}$$

$$= 0.26 \text{ m} = 260 \text{ mm}$$

$$I = \frac{W}{12g} (h^2 + t_{nom}^2) + \frac{W}{g} (y_b^2 + e_b^2) + \frac{P}{g} (h^2 + e_b^2)$$

$$= \frac{27.75}{12(9.81)} (5^2 + 0.35^2) + \frac{27.75}{9.81} (2.25^2 + 0.175^2)$$

$$+ \frac{20.25}{9.81} [5^2 + 0.175^2]$$

$$I = 5.9 + 14.41 + 51.67$$

$$\therefore I = 72$$

$$T_p = 3.1 \sqrt{I/g} = 3.1 \sqrt{72/163.68}$$

$$\therefore T_p = 2.05 \text{ sec.}$$

$$Y = \frac{wh^2}{2Jg}$$

$$= \frac{27.75(5)^2}{2(72)(9.81)}$$

$$= \frac{693.75}{1412.64}$$

$$\therefore Y = 0.50$$

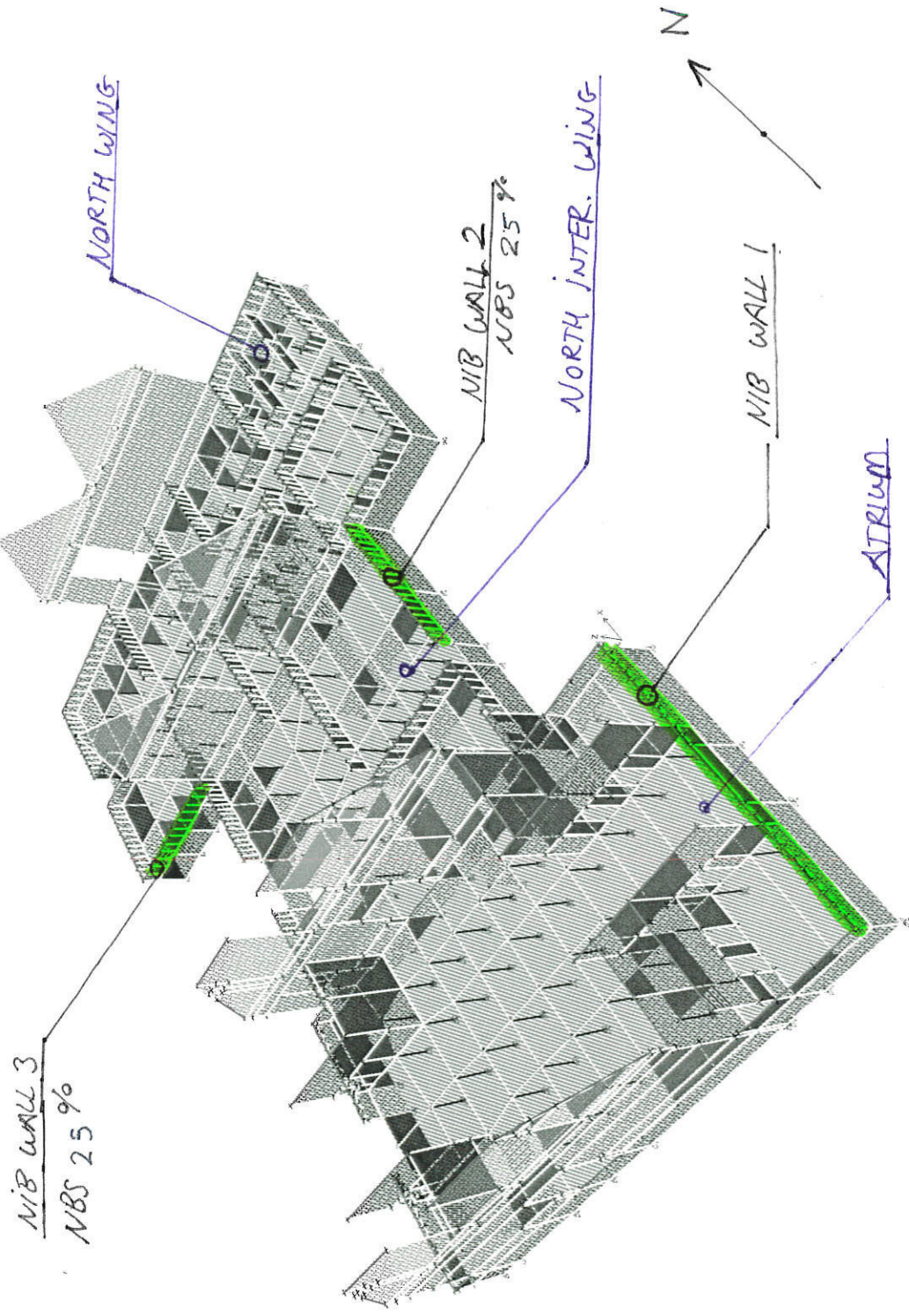
$$D_{ph} = Y \left(\frac{T_p}{2\pi} \right)^2 C(T) \cdot R_p \cdot g$$

$$= 0.50 \left[\frac{2.05}{2\pi} \right]^2 (0.333)(1.0)(9.81)$$

$$= 0.174m = 174mm$$

$$\% NBS = 30 \times \frac{\Delta i}{D_{ph}} = 30 \times \frac{0.260}{0.174} = 44\% NBS$$

CRITICAL NIB WALLS
SUMMARY OF NBS % SCORE



NOTE:
NBS % OF
CONCRETE
NIB WALLS
GOVERNED
BY OUT-OF
PLANE
OVERTURNING.

CONCRETE NIB WALLS - IN PLANE.

CHECKING IN PLANE SHEAR DEMAND & CAPACITY
FOR 1.5m HIGH CONCRETE NIB WALLS
THROUGHOUT.

WALL THICKNESS
≈ 220 mm.

(1) NIB WALL 1 - EAST WALL OF ATRIUM. (EXTERNAL)

- FOR 220 mm THICK CONCRETE NIB:

- SHEAR IN-PLANE, $V^* = 338 \text{ kN}$.

- CAPACITY, ϕV_c :

$$V_c = 0.17 \sqrt{f_c'} A_{cr}$$

$$= 0.17 \sqrt{4} (11.52 \times 0.22)$$

$$= 861 \text{ kN}$$

$$f_c' = 4 \text{ MPa}$$

$$L_w = 14.4 \text{ m } (d = 11.52 \text{ m})$$

$$t_w = 0.22 \text{ m}$$

$$N^* = 229 \text{ kN}$$

$$\phi = 1.0$$

or

$$V_c = 0.17 \left[\sqrt{f_c'} + \frac{N^*}{A_g} \right] A_{cr}$$

$$= 0.17 \left[\sqrt{4} + \frac{229 \times 10^3}{(14.4 \times 0.22)} \right] (11.52 \times 0.22)$$

$$= 892 \text{ kN}$$

$$\therefore \phi V_c = 1.0 (861 \text{ kN}) = 861 \text{ kN} > V^* = 338 \text{ kN}$$

$\therefore$ okay.

100% NBS

(2) NIB WALL 2 - EAST WALL OF NORTH INTER.

- FOR 220 mm THICK CONCRETE NIB:

- SHEAR IN PLANE, $V^* = 652 \text{ kN}$.

- CAPACITY, ϕV_c :

$$V_c = 0.17 \sqrt{f_c} (9.25 \text{ m} \times 0.22 \text{ m})$$

$$= 691 \text{ kN.}$$

$$f_c = 4 \text{ MPa}$$

$$L_w = 9.25 \text{ m}$$

$$d = 7.4 \text{ m}$$

$$t_w = 0.22 \text{ m.}$$

or

$$V_c = 0.17 \left[\sqrt{f_c} + \frac{227 \times 10^3}{9.25 \times 0.22} \right] (7.4 \times 0.22)$$

$$N^* = 227 \text{ kN}$$

$$\phi = 1.0$$

$$= 584 \text{ kN.}$$

$$\phi V_c = 584 \text{ kN} < V^* = 652 \text{ kN.}$$

$$\frac{\phi V_c}{V^*} = \frac{584}{652} = 0.90 \Rightarrow$$

90% NBS.

(3) NIB WALL 3 - SOUTH WALL OF NORTH WEST GALLERY.

- SHEAR DEMAND, $V^* = 565 \text{ kN}$.

- CAPACITY, ϕV_c :

$$V_c = 0.17 \sqrt{f_c'} (7.2 \text{ m} \times 0.22 \text{ m})$$

$$= 538 \text{ kN}.$$

$$f_c' = 4 \text{ MPa}$$

$$L_w = 9 \text{ m. } (d = 7.2 \text{ m})$$

$$t_w = 0.22 \text{ m}.$$

$$N^* = 667.5 \text{ kN}$$

$$\phi = 1.0.$$

or

$$V_c = 0.17 \left[\sqrt{f_c'} + \left(\frac{0.667}{9 \times 0.22} \right) \right] (7.2 \times 0.22)$$

$$= 629 \text{ kN}.$$

$$\therefore \phi V_c = 538 \text{ kN} < V^* = 565 \text{ kN}.$$

$$\frac{V^*}{\phi V_c} = 538 / 565 = 0.95 \Rightarrow$$

95% NBS.

CONCRETE NIB WALLS - OVERTURNING IN-PLANE

(1) NIB WALL 1:

OVERTURNING MOMENT $\Rightarrow M_o = 600 \text{ kNm}$

$N^* = 229 \text{ kN}$

$L_w = 14.4 \text{ m}$

RESTORING MOMENT $\Rightarrow M_R = 0.9(229) \times 14.4/2$
 $= 1484 \text{ kNm}$

$\therefore M_R/M_o = 1484/600 > 1$

100 % NBS.

(2) NIB WALL 2:

OVERTURNING MOMENT $\Rightarrow M_o = 682 \text{ kNm}$

$N^* = 226 \text{ kN}$

$L_w = 9.25 \text{ m}$

$M_R = 0.9(226)(9.5/2)$
 $= 966 \text{ kNm}$

$\therefore M_R/M_o = 966/682 > 1$

100 % NBS

(3) NIB WALL 3:

OVERTURNING MOMENT $\Rightarrow M_o = 2853 \text{ kNm}$

$N^* = 667.5 \text{ kN}$

$L_w = 9 \text{ m}$

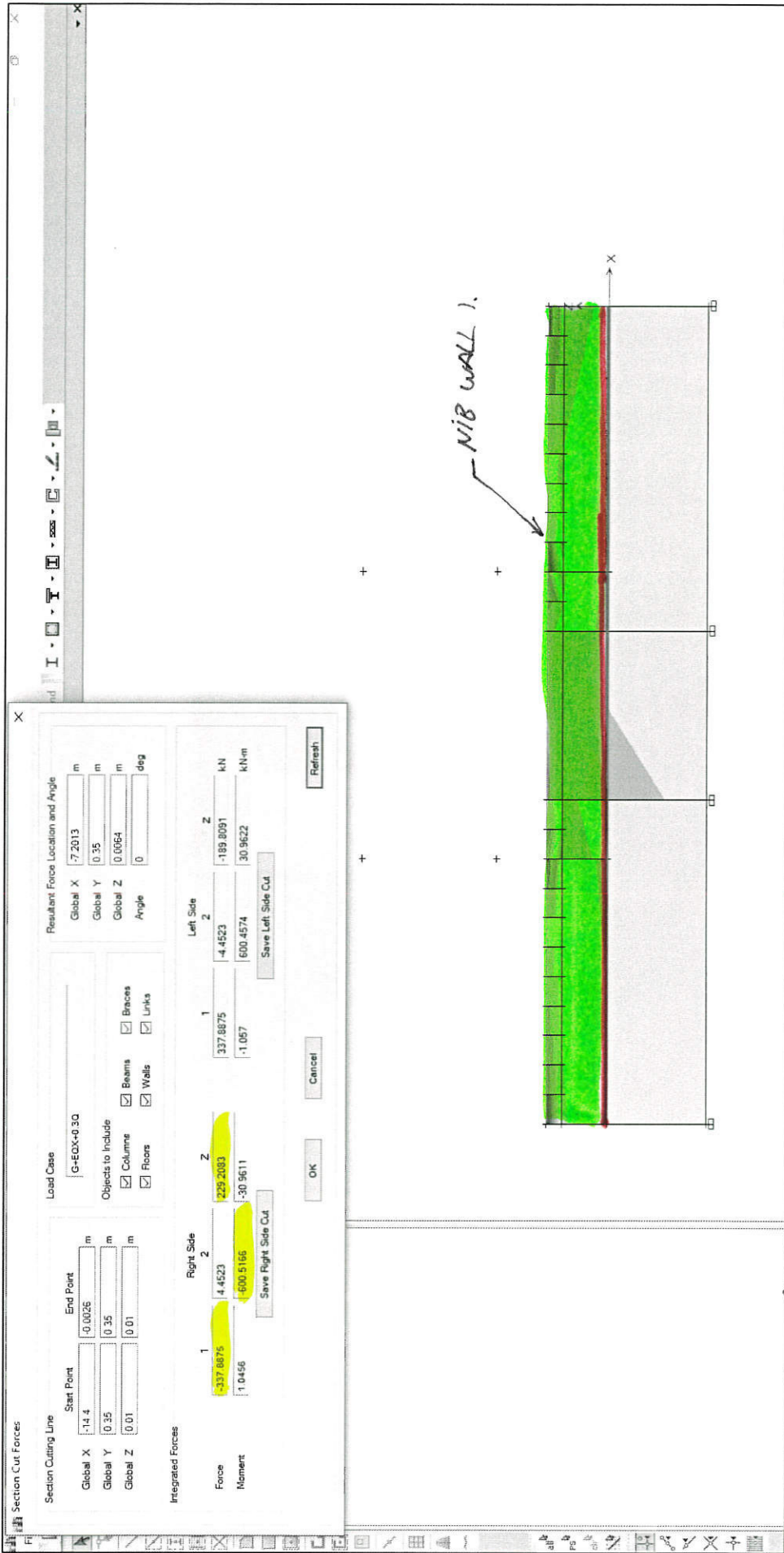
$M_R = 0.9 \times 667.5 \times 9/2$
 $= 2703 \text{ kNm}$

$\therefore M_R/M_o = \frac{2703.4}{2853}$

$= 0.95 \Rightarrow$

95 % NBS.

NIB WALL 1 - SECTION CUT.



1/8/17.

N18 WALL 2 - SECTION CUT.

Section Cutting Line

Global X

7.1

Start Point

16.3542

End Point

Global Y

6.15

Global Z

0.01

0.01

Load Case

G+EQX+0.3Q

Objects to Include

☒ Columns

☒ Beams

☒ Walls

☒ Floors

☒ Braces

☒ Links

Resultant Force Location and Angle

Global X

11.7271

Global Y

6.15

Global Z

-0.0049

Angle

0

deg

Integrated Forces

Force

50.6003

652.8247

42.417

226.7822

24.3758

Moment

50.6003

652.8247

42.417

226.7822

24.3758

Left Side

1

2

Force

652.8247

42.417

Moment

-50.5781

-24.27

Save Left Side Cut

Right Side

1

2

Force

50.6003

652.8247

Moment

50.6003

652.8247

Save Right Side Cut

OK

Cancel

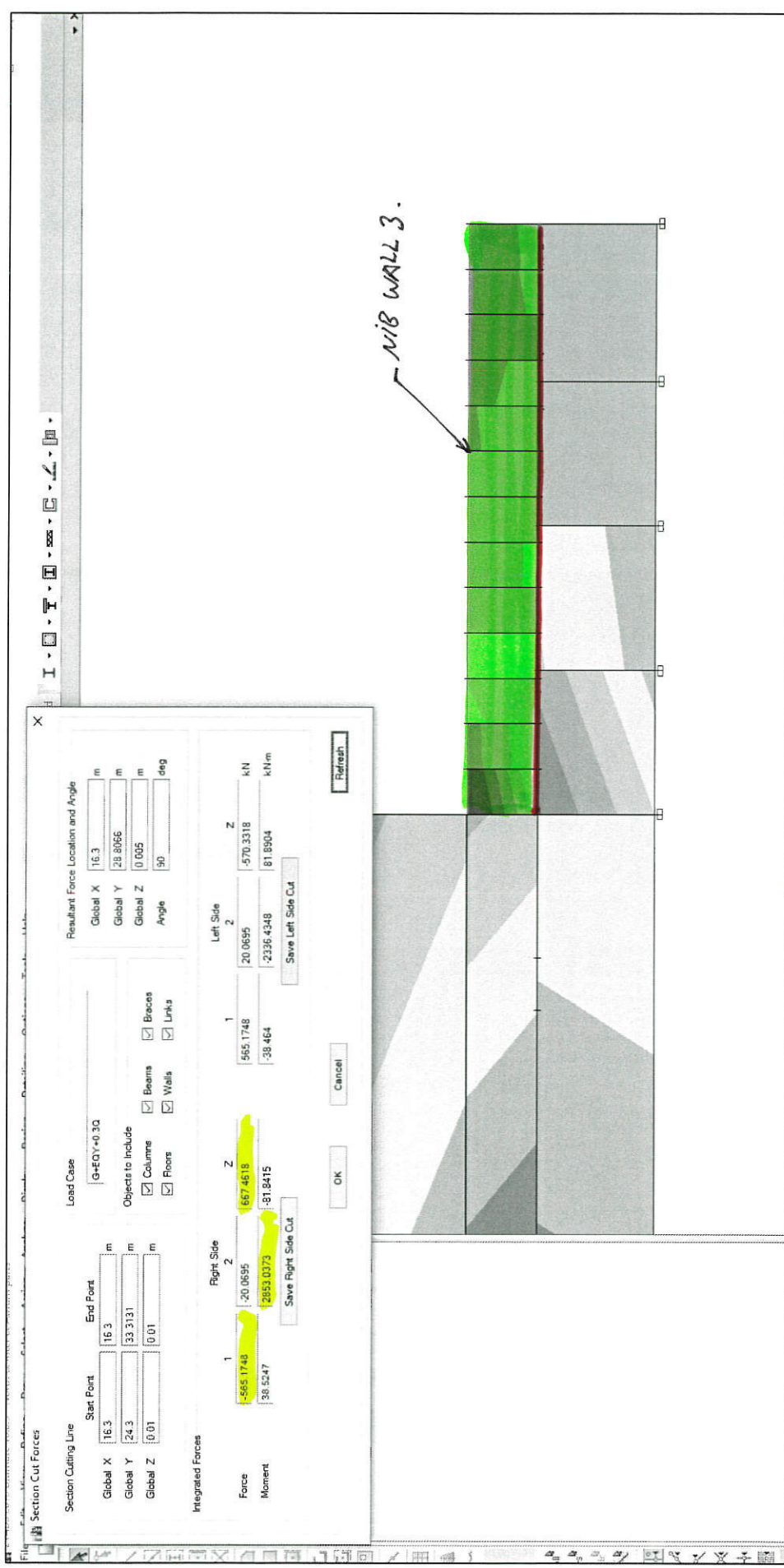
Refresh

N18 WALL 2.

1/8/2017

ETABS SCREEN CAPTURE

NIB WALL 3 - SECTION CUT.



ETABS SCREEN CAPTURE.

1/8/2017

NIB WALL - OUT OF PLANE CHECK. - NIB WALL 3.

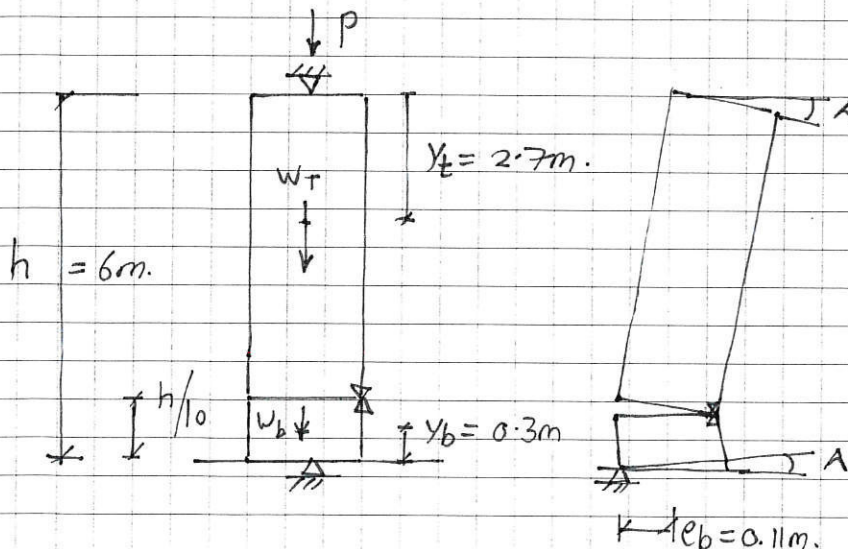
ASSESSMENT PHILOSOPHY.

- Unreinforced concrete nib wall with timber frame wall above.
- Analyse whole wall as vertically spanning from ground floor to roof.
- "Rocking" occurs at base of anchors where cracking may potentially occur. At mid-height of nib.

ASSUMPTION:
CRACK BELOW ANCHOR IN NIB WALL. Point of potential "Rocking"

REFERENCE

NZEE GUIDELINES
C8.8. 2.2



$$h = 6m$$

$$h/10 = 0.6m$$

$$y_t = 5.4m/2 = 2.7m$$

$$y_b = \frac{0.6m}{2} = 0.3m$$

$$P = 10.0 \text{ kN/m}$$

$$W_t = (0.90 \text{ kPa} \times 4.8m)$$

$$+ (15 \text{ kN/m}^3 \times 0.22 \times 0.6m)$$

$$\therefore W_t = 6.30 \text{ kN/m}$$

$$W_b = 15 \times 0.22 \times 0.6 = 1.98 \text{ kN/m}$$

DEFLECTION AT $h/10$ (mid height of nib wall where crack may occur), at which wall will be unstable.

$$\Delta_i = A \frac{h}{10} = \frac{bh}{10a}$$

C8.8.6.

- CALCULATE MASS MOMENTS OF INERTIA FOR Top Part (J_{to}) and bottom part (J_{bo}).

Top parting composed of :

- 0.6m concrete pumice rib wall (Top half) - 220mm wide.
- 4.8m half timber frame with 50mm thick pumice concrete panels between studs.
- concrete density , $\rho = 1550 \text{ kg/m}^3$

- For J_{to} : (Top)

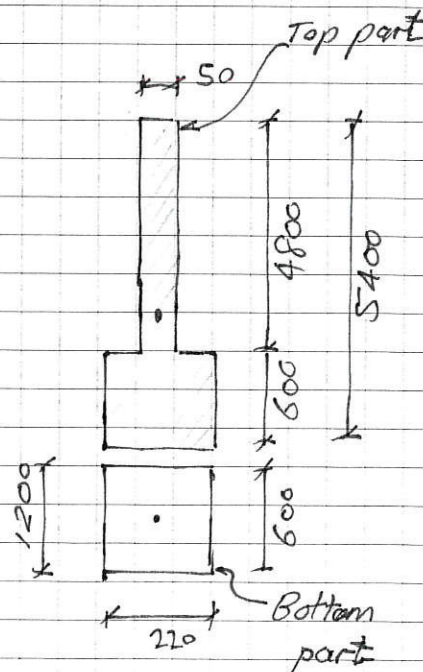
$$\begin{aligned} I_{yy} &= \rho (\bar{I}_{yy}) \\ &= 1550 \text{ kg/m}^3 (0.0005824 \text{ m}^4) \\ &= 0.90 \text{ kgm}^2 \end{aligned}$$

$$\begin{aligned} I_{xx} &= \rho (\bar{I}_{xx}) \\ &= 1550 (1.085 \text{ m}^2) \\ &= 1681.75 \text{ kgm}^2 \end{aligned}$$

$$\begin{aligned} \therefore J_{to} &= I_{xx} + I_{yy} \\ &= 1681.75 + 0.90 \\ &= 1682.65 \text{ kgm}^2 \end{aligned}$$

$$\therefore J_{to} = 1.68 \times 10^3 \text{ kgm}^2$$

[FOR FINDING I]



• For I_{bo} : (Bottom)

$$I_{xx} = \rho \left(\frac{h}{2} \right)^3 t / 12$$

$$= 1550 \left(\frac{0.6}{2} \right)^3 (0.22) / 12$$

$$\therefore I_{xx} = 0.77 \text{ kgm}^2$$

$$I_{yy} = 1550 (0.3) (0.22)^3 / 12$$

$$= 0.41 \text{ kgm}^2$$

$$\therefore I_{bo} = 0.77 + 0.41 = 1.18 \text{ kgm}^2 = 1.18 \times 10^{-3} \text{ kgm}^2 (\text{kg}^3)$$

$$a = W_b y_b + W_t (h - y_t) + P(h)$$

$$= 1.98(0.3) + 6.30(6 - 2.7) + 10.0(6)$$

$$\therefore a = \underline{81.40 \text{ kNm/m.}}$$

C.8.B.2

$$b = W_b e_b + W_t (e_o + e_b + e_t) + P(e_o + e_b + e_t + e_p)$$

$$- \psi (W_b y_b + W_t y_t)$$

$$= 1.98(0.11\text{m}) + 6.30(0.11 + 0.11 + 0.025)$$

$$+ 10(0.11 + 0.11 + 0.025 + 0)$$

$$- 0.025((1.98 \times 0.3) + (6.30 \times 2.7))$$

$$= 0.218 + 1.54 + 2.45 - 0.44$$

$$\therefore b = \underline{3.77 \text{ kNm/m.}}$$

C.8.B.3

$$\Delta_i = \frac{bh}{I_{oa}} = \frac{3.77 (6m)}{10 (81.40)}$$

$$\therefore \Delta_i = 0.289 m = \underline{28.9 mm.}$$

$$I = I_{bo} + I_{to} + \frac{1}{9} \left\{ W_b [e_b^2 + y_b^2] \right. \\ \left. + W_t [(e_o + e_b + e_t)^2 + y_t^2] \right. \\ \left. + P [(e_o + e_b + e_t + e_p)^2] \right\}$$

$$I = 0.00118 + 1.68 + \frac{1}{9.81} \left\{ 1.98 [0.11^2 + 0.3^2] \right. \\ \left. + 6.30 [(0.245)^2 + 2.7^2] \right. \\ \left. + 10 [0.245^2] \right\}$$

$$= 0.00118 + 1.68 + \frac{1}{9.81} \left\{ 0.202 + 46.30 + 0.60 \right\}$$

$$= 1.68 + \frac{1}{9.81} \left\{ 47 \right\}$$

$$\therefore I = \underline{6.47}$$

$$T_p = 4.07 \sqrt{I/a}$$

$$= 4.07 \sqrt{\frac{6.47}{81.40}}$$

$$\therefore T_p = \underline{1.15 \text{ Sec.}}$$

C.8.B.8.

C.8.B.18.

$$\gamma = \frac{(W_b y_b + W_t y_t) h}{10 J_g}$$

$$= \frac{[1.98(0.3) + 6.30(2.70)](6.)}{10(6.47)(9.81)} = \frac{105.62}{634}$$

$$\therefore \gamma = 0.17$$

- $C_p(T_p)$ calculation:

$$C_p = C_h(T) Z R = 1.12 \times 0.24 \times 1.30 = 0.35$$

$$C_{hi} = 1 + \frac{h}{6} = 1 + \frac{6}{6} = 2$$

$$C_i(T_p) = 2.0(0.5/T_p)^{0.75} = 2(0.5/1.15)^{0.75} = 1.07$$

$$C_p(T_p) = C_o \cdot C_{hi} \cdot C_i(T_p)$$

$$= 0.35(2)(1.07)$$

$$\therefore C_p(T_p) = 0.75$$

$$D_{ph} = \gamma \left(\frac{T_p}{2\pi} \right)^2 C_p(T_p) R_g \cdot g.$$

$$= 0.17 \left(\frac{1.22}{2\pi} \right)^2 (0.75) (1) 9.81$$

$$\therefore D_{ph} = 0.042 \text{ m} = 42 \text{ mm}$$

$$NBS \% = 60 \left(\Delta_i / D_{ph} \right) = 60 \left(\frac{28.25}{42} \right) = 40 \%$$

$$\therefore NBS \% = 40 \%$$

C.8B.21.

C8.8.5.2

- OUT-OF PLANE CHECK FOR CONCRETE NIB WALL.

- ASSESSMENT Philosophy.

Concrete nib wall with timber Frame wall above.

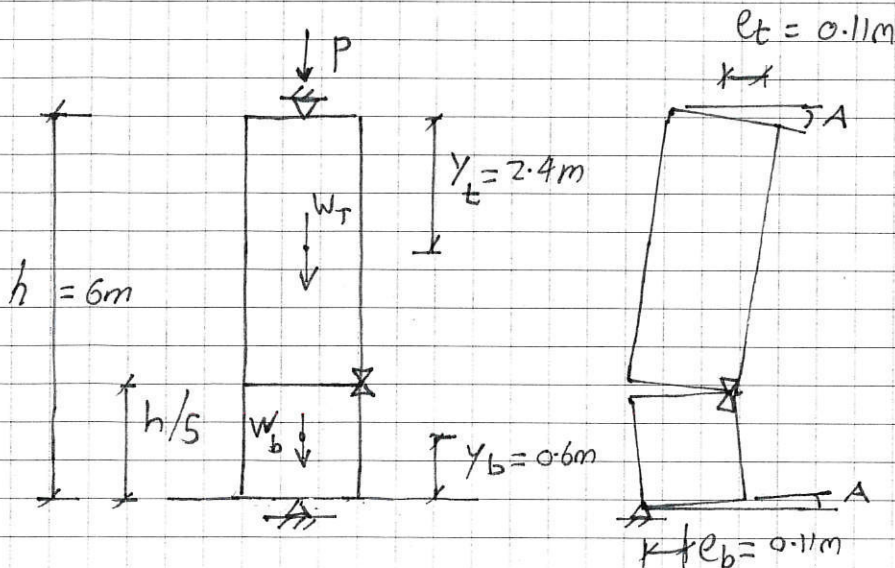
Analyse whole wall as vertically spanning from ground floor to roof.

"Rocking" occurs at interface of bottom of studs to nib wall top plate.

ASSUMPTION
"Rocking" at base of studs

REFERENCE

NZEE GUIDELINES
C8.8.2.2



$$h = 6m$$

$$h/5 = 1.2m$$

$$y_t = 2.4m$$

$$y_b = 0.6m$$

$$P = 10 \text{ kN/m}$$

$$W_t = 0.90 \text{ kPa} \times 4.8m = 4.32 \text{ kN/m}$$

$$W_b = 15 \text{ kN/m}^3 \times 0.22m \times 1.2m = 3.96 \text{ kN/m}$$

DEFLECTION AT $h/5$ (top of nib wall), at which wall will be unstable:

$$\Delta_i = \frac{A h}{S} = \frac{b h}{5a}$$

C8.8.6

- CALCULATE MASS MOMENTS OF INERTIA FOR top part (I_{t0}) and bottom part (I_{b0})

Top part composed of half timber frame with 50mm thick punice concrete panels between studs.

For simplification, top part is 50mm thick with concrete density, $\rho = 1550 \text{ kg/m}^3$.

For I_{t0} : (Top)

$$I_{yy} = \rho \left(\frac{h_1}{2} \right) t^3 / 12$$

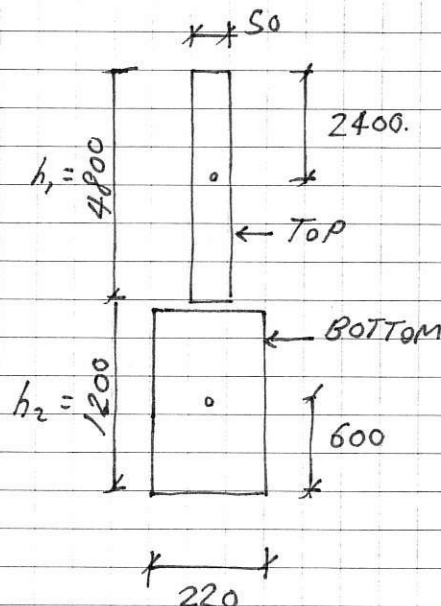
$$= 1550 (240) (0.05)^3 / 12$$

$$= 0.039 \text{ Kg m}^2$$

$$I_{xx} = \rho (t) \left(\frac{h_1}{2} \right)^3 / 12$$

$$= 1550 (0.05) (2.40)^3 / 12$$

$$= 89.28 \text{ Kg m}^2$$



$$\therefore I_{t0} = I_{xx} + I_{yy} = 89.32 \text{ Kg m}^2 = 0.0893 \text{ Kg m}^2 \times 10^3$$

For I_{b0} : (Bottom)

$$I_{yy} = 1550 (0.60) (0.22)^3 / 12$$

$$= 0.83 \text{ Kg m}^2$$

$$I_{xx} = 1550 (0.22) (0.60)^3 / 12$$

$$= 6.138 \text{ Kg m}^2$$

$$\therefore I_{b0} = 6.138 + 0.83 = 6.96 \text{ Kg m}^2 = 0.00696 \text{ Kg m}^2 \times 10^3$$

$$\therefore I_{to} = 0.0893 \times 10^3 \text{ Kg m}^2 \quad \left\{ \begin{array}{l} \text{For FINDING I} \\ \text{I}_{bo} = 0.00696 \times 10^3 \text{ Kg m}^2 \end{array} \right.$$

$$a = W_b y_b + W_t (h - y_t) + P(h)$$

$$= 3.96 (0.6m) + 4.32 (6 - 2.4) + 10 (6m)$$

$$\therefore a = \underline{77.90 \text{ kNm/m}}$$

C.8.B.2

$$b = W_b e_b + W_t (e_o + e_b + e_t) + P(e_o + e_b + e_t + e_p)$$

$$- \psi (W_b y_b + W_t y_t)$$

$$= 3.96 (0.11m) + 4.32 (6.11 + 0.11 + 0.025)$$

$$+ 10 (0.11 + 0.11 + 0.025)$$

$$- 0.025 (3.96 (0.6) + 4.32 (2.4))$$

$$= 3.94 - 0.319$$

$$\therefore b = \underline{3.63 \text{ kNm/m}}$$

C.8.B.3

$$\Delta_i = \frac{bh}{Sa} = \frac{3.63 (6m)}{5 (77.90)}$$

$$\therefore \Delta_i = 0.056 m = \underline{56 \text{ mm.}}$$

$$I = I_{bo} + I_{to} + \frac{1}{9} \left\{ W_b [e_b^2 + y_b^2] \right. \\ \left. + W_t [(e_o + e_b + e_t)^2 + y_t^2] \right. \\ \left. + p [(e_o + e_b + e_t + e_p)^2] \right\}$$

$$I = 0.00696 + 0.0893 + \frac{1}{9.81} \left\{ 3.96 [0.11^2 + 0.6^2] \right. \\ \left. + 4.32 [(0.11 + 0.11 + 0.025)^2 + 2.4^2] \right. \\ \left. + 10 [(0.11 + 0.11 + 0.025)^2] \right\}$$

$$= 0.09 + \frac{1}{9.81} \left\{ (1.473) + (25.14) + (0.60) \right\}$$

$$= 0.09 + \frac{1}{9.81} (27.22)$$

$$\therefore I = \underline{2.85}$$

$$T_p = 4.07 \sqrt{I/a}$$

$$= 4.07 \sqrt{2.85 / 77.90}$$

$$\therefore T_p = \underline{0.78 \text{ sec}}$$

C8.B.8.

C.8.B.18

$$\gamma = \frac{(W_{byb} + W_{tlt}) h}{S I_g}$$

$$= \frac{(3.96(0.6) + 4.32(2.4))}{5 (2.86) 9.81} \cdot 6 = \frac{76.46}{140.28}$$

$$\therefore \gamma = \underline{0.55}$$

- $C_p(T_p)$ CALCULATION:

$$C_o = C_h(T) \cdot Z \cdot R = 1.12 \times 0.24 \times 1.30 = 0.35$$

$$C_{hi} = 1 + h/6 = 1 + 6/6 = 2$$

$$C_i(T_p) = 2 \left(0.5 / T_p \right)^{0.75} = 2 \left(0.5 / 0.78 \right)^{0.75} = 1.43 = C_{hc}(T_p)$$

$$C_p(T_p) = C_o C_{hi} C_{hc}(T_p) \\ = 0.35(2)(1.43)$$

$$\therefore C_p(T_p) = \underline{1.0}$$

$$D_{ph} = \gamma (T_p / 2\pi)^2 C_p(T_p) \cdot R_p \cdot g$$

$$= 0.55 (0.78 / 2\pi)^2 (1.0) (1.0) (9.81)$$

$$\therefore D_{ph} = 0.083 \text{ m} = \underline{83 \text{ mm.}}$$

$$NBS \% = 60 (\Delta i / D_{ph}) = 60 \left(\frac{56}{83} \right) = \underline{40 \%}$$

$$\therefore NBS \% \approx 40 \%$$

C.8.B.21

C.8.8.5.2

- OUT-OF PLANE CHECK FOR NIB WALL

- Unreinforced 1200mm high x 220mm thick concrete nib wall with timber frame wall on top.
- use Inelastic displacement-based analysis for URM walls as cantilever wall.
- check out-of plane for 1m length for critical case.

STEP 1:

Pivot assumed at base of nib wall.

STEP 2:

- Weight of nib, $W^* = \overset{\text{PUMICE CONCRETE}}{15 \text{ kN/m}^3} \times 0.22\text{m} \times 1.20\text{m}$
 $\therefore W = 3.96 \text{ kN/m.}$

- VERTICAL FORCE ON NIB WALL, P :

$$P = \text{WALL} + \text{ROOF} + \text{CEILING}$$

$$= (0.75 \text{ kPa} \times 4.8\text{m}) + (0.90 \text{ kPa} \times 5.60\text{m}) \\ (+ 0.30 \times 4\text{m})$$

$$\therefore P = 8.44 \text{ kN/m.}$$

$$\begin{aligned} a &= W y_b + P h \\ &= 3.96(0.6\text{m}) + 8.44(1.20\text{m}) \\ a &= 12.50 \end{aligned}$$

$$\begin{aligned} b &= W e_b + P(e_b + e_p) \text{ where } e_p = 0 \\ &= 3.96(0.107) + 8.44(0.107) \quad e_b = t/2 \\ &= 1.32 \quad = 0.107 \text{ m} \end{aligned}$$

ANALYSIS APPROACH

DISPLACEMENT BASED.

REFERENCES:

NZEE GUIDELINES
SECTION C8.
C8B.3
C.8.8.5.2.

Note:

$$\begin{aligned} t_i &= 0.98 t_{nom} \\ &= 0.98(0.220) \\ &= 0.215\text{m} \end{aligned}$$

LIMITING DEFLECTION, Δ_i :

$$\Delta_i = \frac{bh}{a} = \frac{1.32(1.20)}{12.50}$$

$$\Delta_i = 0.125m = 126 \text{ mm.}$$

PERIOD, $T_p = 3.1 \sqrt{I/a}$.

$$I = \frac{W}{12g} (h^2 + t_{nom}^2) + \frac{W}{g} (y_b^2 + e_b^2) + \frac{P}{g} [h^2 + (e_b + e_p)^2]$$

$$I = \frac{3.96}{12(9.81)} (1.2^2 + 0.22^2) + \frac{3.96}{9.81} (0.6^2 + 0.107^2) + \frac{8.44}{9.81} [1.2^2 + 0.107^2]$$

$$= 0.05 + 0.15 + 1.25$$

$$I = 1.45$$

$$\therefore T_p = 3.1 \sqrt{\frac{1.45}{12.50}} = 1.06 \text{ sec.}$$

PARTICIPATION FACTOR:

$$Y = \frac{Wh^2}{2Ig}$$

$$= \frac{3.96 \times 1.2^2}{(2 \times 1.45 \times 9.81)}$$

$$= \frac{5.70}{28.45}$$

$$= 0.20$$

- CALCULATE $C(T)$

$$C(T) = C_n(T) Z R$$

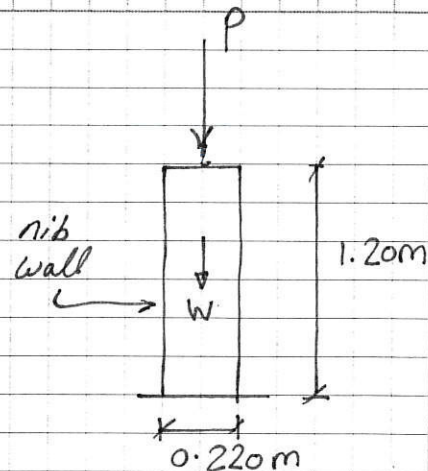
FOR $T = 1.06$

$$Z = 0.24$$

$$R = 1.3$$

SOIL TYPE D.

$$C_n(T) = 1.93$$



$$\therefore C(T) = 1.93(0.24)(1.3) = \underline{0.60}$$

$$- D_{ph} = \gamma \left(T_p / 2\pi \right)^2 C(T) R_q g$$

$$= 0.20 \left(\frac{1.06}{2\pi} \right)^2 (0.60)(1)(9.81)$$

$$\therefore D_{ph} = 0.0335 \text{ m} = 33.5 \text{ mm.}$$

$$\% \text{ NBS} = 30 \times \Delta i / D_{ph}$$

$$= 30 \times 0.126 / 0.0335 = \boxed{113 \% \text{ NBS.}}$$

← THIS CASE IS NOT CRITICAL.

VERTICALLY SPANNING WALL IS CRITICAL.

$\therefore$ NBS 40% GOVERNS. NIB WALL OUT-OF PLANE.

2. Relevant Probable strength and deformation capabilities for individual members.

2.1. Interior Walls

Refer table C9.2.

Timber Framed stud wall with wood lath and plaster - 1.5 kN/m per side. Wall specimen is 2.4 m high.

Wall components:

- Lath + plaster
- End studs - Stability
- M-T Joint - End studs
- Flexure to Bottom Plate
- Anchor strength

2.1.1. Interior Walls - Lath & Plaster

As per site survey

- 50x10mm (max thickness) Lath at 10mm (nominal) gap - both faces 15mm plaster over; single nail each stud.
- applied to both faces

- wall height (original walls)

-- Concrete nib - 1200-1500mm

-- Total Height - 6000mm

Hence Timber Part - 4.800mm high.

Probable Rating for 4800mm wall:

$$\frac{2.4}{4.8} \times (1.5 + 1.5) = \underline{1.5 \text{ kN/m}}$$

The following factors are considered:

- Lath member cross section - 50x10
This has inferior stiffness/strength when compared with studs - min 100x50mm.

- Lath is fixed with a single nail to studs at ends.

Hence after plaster spalling the contribution of lath to lateral strength/stiffness is negligible.

- Further, this confirms the rapid degradation of wall resistance after second cycle.

2.1.2. End Studs Stability/strength

Timber material:

$$\begin{array}{l} \text{Totara} - \quad f_b = 20 \text{ MPa} \\ \quad \quad \quad f_{cp} = 20.1 \text{ MPa} \\ \quad \quad \quad E_c = 6.5 \text{ GPa} \end{array} \left. \begin{array}{l} \\ \\ \end{array} \right\} \begin{array}{l} \text{Related} \\ \text{to Rimu} \\ \text{- Lab} \end{array}$$

$$f_t = 11.8 \text{ MPa}; p_{ct} = 10.9 \text{ MPa}$$

- Probable Compressive strength:

$$L_f = 4800 \text{ mm}$$

$$S_2 = K_{10} L/d = 4800/150 = 32$$

$$K_{852} = 0.31$$

$$S_3 = K_{10} L/d = 4800/100 = 48$$

$$K_{853} = 0.141$$

$$\phi = 1.0 \rightarrow \text{Probable strength}$$

$$K_1 = 0.8 \rightarrow \text{Short Term}$$

$$K_{10} = 1.0$$

Hence

$$\begin{aligned} \phi N_{ax} &= \phi K_1 K_{852} f_c A_p = \\ &= 1.0 \times 0.8 \times 0.31 \times 20 \times 100 \times 150 = \\ &= \underline{74.3 \text{ kN}} \end{aligned}$$

$$\begin{aligned} \phi N_{ay} &= \phi K_1 K_{853} f_c A_p = \\ &= 1.0 \times 0.8 \times 0.14 \times 20 \times 100 \times 150 = \\ &= \underline{33.9 \text{ kN}} \end{aligned}$$

- Check Bottom Plate - Bearing

Consider 50% Tenon, 50% Direct support.

$$\begin{aligned}\phi N_{bp} &= \phi K, f_p A_p = \\ &= 1.0 \times 0.8 \times 10.9 \times 0.5 \times (100 \times 150) \\ &= \underline{65.40 \text{ kN}}\end{aligned}$$

- Check Bearing - Post Section

$$\begin{aligned}\phi N_{bp} &= \phi K, f_c A_p = \\ &= 1.0 \times 0.8 \times 20 \times 100 \times 150 = \\ &= \underline{240 \text{ kN}}\end{aligned}$$

- Check Stud in tension

$$\begin{aligned}\phi N_{te} &= \phi K, f_t A_p = \\ &= 1.0 \times 0.8 \times 11.8 \times 100 \times 150 = \\ &= \underline{141.6 \text{ kN}}\end{aligned}$$

Table C9.2: Probable strength values for existing timber framed wall bracing systems (based on 2.4 m wall height)

Bracing type	Probable strength values
150 x 25 mm let-in brace at 45°	2.0 kN
150 x 25 mm let-in brace at 45° and sheet material* one face	2.5 kN
150 x 25 mm let-in brace at 45° and sheet material* both faces	3.7 kN
90 x 45 mm fitted brace both ways at 45°	2.0 kN
90 x 45 mm fitted brace both ways at 45° and sheet material* one face	2.5 kN
90 x 45 mm fitted brace both ways at 45° and sheet material* both faces	3.7 kN
90 x 45 mm dog leg brace (600 mm wall length)	0.75 kN
Timber framed stud walls with wood or metal lath and plaster	1.5 kN/m each side
Timber framed stud walls with diagonal braces and wood or metal lath and plaster	2.8 kN/m
Gypsum plasterboard one side, and fixed at 300 mm centres (no diagonal timber braces included)	1.0 kN/m
Gypsum plasterboard one side, and fixed at 150 mm centres (no diagonal timber braces included)	2.5 kN/m
Gypsum plasterboard two sides, and fixed at 300 mm centres (no diagonal timber braces included)	2.0 kN/m
Gypsum plasterboard two sides, and fixed at 150 mm centres (no diagonal timber braces included)	3.0 kN/m
Match lining on one or both faces (no diagonal timber braces included)	1.25 kN/m
3.2 mm tempered hardboard fixed with clouts at 200 mm centres	3.0 kN/m
Horizontal board sheathing	1.0 kN/m
Horizontally oriented corrugated steel sheets	2.0 kN/m
Vertically oriented corrugated steel sheets	1.50 kN/m
140 x 20 mm bevel back weatherboard	0.30 kN/m

Note:

*Sheet material is defined as having a density of not less than 450 kg/m³. It may be a wood-based material not less than 4.5 mm thick or a gypsum-based material not less than 8 mm thick, both fixed to framing members not closer than 10 mm from sheet edges.

When determining the probable wall bracing capacity using the values in Table C9.2 the capacity of each bracing element should be calculated by multiplying by the length of the bracing element and adjusting for height in accordance with the following equation:

$$\frac{2.4}{\text{element height in metres}}$$

This equation is applicable for framing with sheet bracing products attached (and therefore it is not applicable for bracing systems such as horizontal sarking). Elements less than 2.4 m in height should be rated as if they are 2.4 m high. Walls of varying height should have their bracing capacity adjusted using the average height.

2.1.3. Mortise & Tenon Joint - (MT) Joint

Refer to p. 2.06 for joint geometry

- Probable Tensile Strength

Refer original specifications

"All joints to be put together with thick zinc paint, bored for and secured with 2 pins split out of dry puriri through each tennon"

Consider paint acting as construction adhesive with nominal strength equal to 5% of tensile strength parallel to grains. This will be mobilised first.

$$\phi N_{tpr} = 1.0 \times 0.05 \times 11.8 \times (100 + 100 + 75 + 75) \times 100 \times 10^{-3} = \underline{20.6 \text{ kN}}$$

Pin capacity

$\phi 20$; $f_c = 3.8 \text{ MPa}$; 2 shear planes

$$\phi V_{pin} = 1.0 \times \pi \times 10^2 \times 2 \times 3.8 = \underline{2.4 \text{ kN}}$$

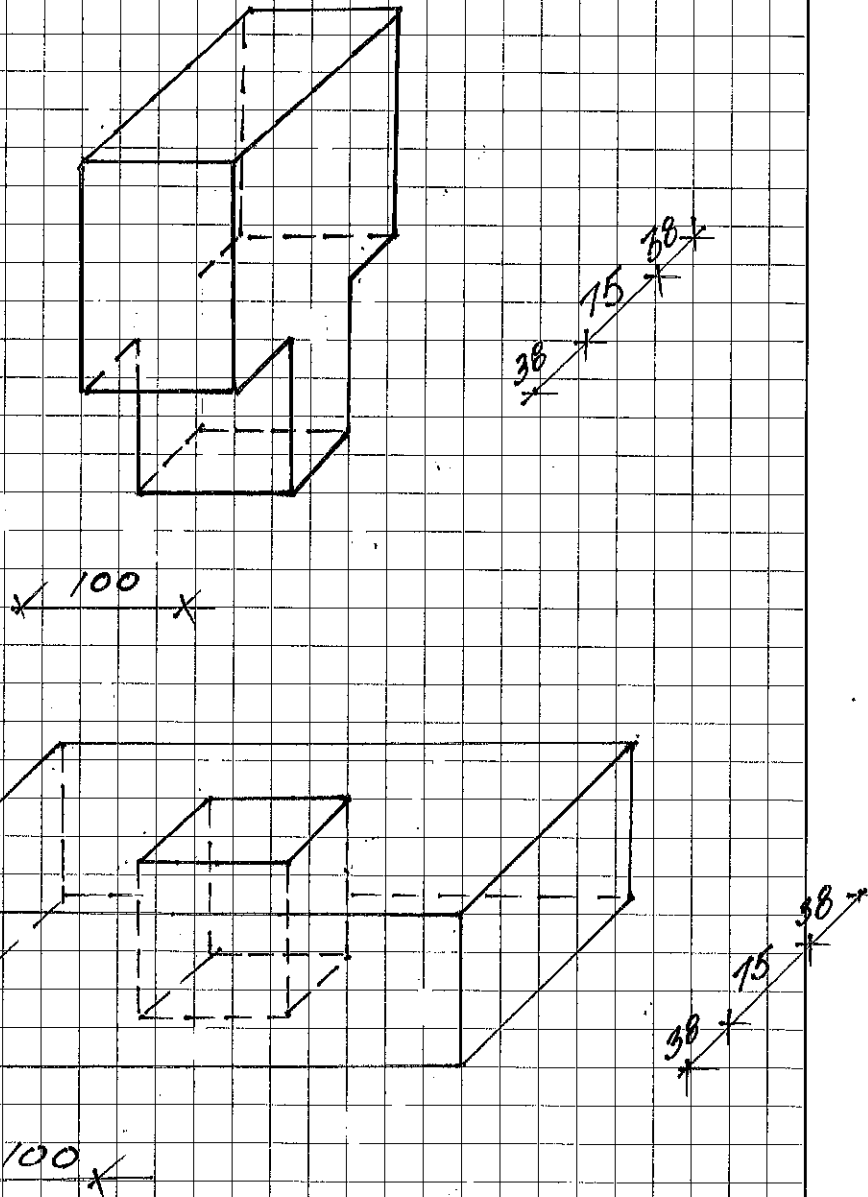
Total tensile strength is

$$\phi N_t = 20.6 + 2.4 = \underline{23 \text{ kN}}$$

- Probable Flexural Strength:

Tennon - 100×75 (Major Axis)

$$\phi M_n = 1.0 \times 0.8 \times 1.0 \times 1.0 \times 19.8 \times \frac{100^2 \times 75}{6} = \underline{1.98 \text{ kNm}}$$



Mortise & Tenon Joint
Interior Wall

Refer to p.2.08 - Corner joint geometry

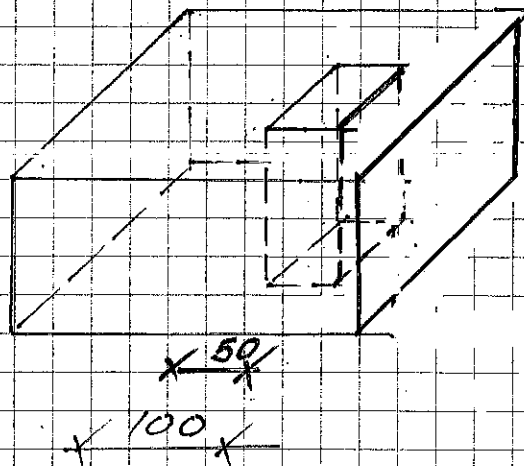
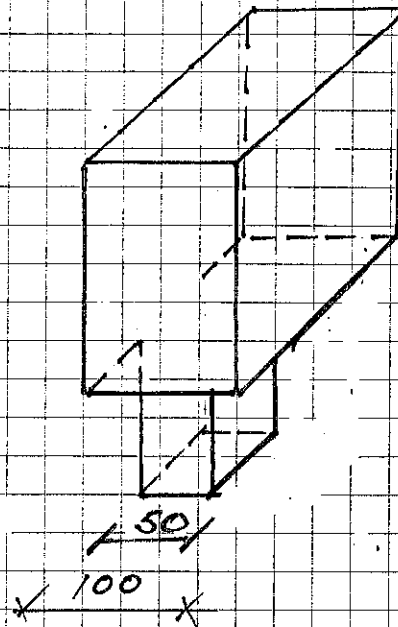
Probable tensile strength

$$\phi N_{tpr} = 1.0 \times 0.05 \times 11.8 \times (50 + 50 + 75 + 75) \times 100 \times 10^{-3} = 14.75 \text{ kN}$$

Pin Capacity $\phi V_{pin} = 2.4 \text{ kN}$

Total tensile strength is

$$\phi N_{tpr} = 14.75 + 2.4 = \underline{17.15 \text{ kN}}$$



Mortise & Tenon Joint
Interior Wall - corner

2.1.3. Flexure of Bottom Plate

$$\phi M_{pr} = 1.0 \times 0.8 \times 1.0 \times 1.0 \times 20 \times \frac{100^2 \times 150}{6}$$

$$\phi M_{pr} = 4 \text{ kNm}$$

2.1.4. Anchor Strength

Refer "Original Specifications"

Bolts for fixing down plates -

All horizontal and perpendicular walls where woodwork for timber framing or wood partitions is to be fixed to have $\frac{1}{2}$ " wrought iron bolts, with proper heads, nuts and washers and 6" x 2" x $\frac{1}{2}$ " washer built not less than 18" into concrete and spaced not more than 6ft apart and to project 1" more than the thickness of the woodwork to be fixed there to, and built in all necessary bolts for timbers of walls abutting on present walls to complete present design. The holding-down bolts for fixing wall plates on top of all cross walls to be $\frac{3}{4}$ " of the lengths shown or figured on the drawings and spaced not more 5' apart.

Internal walls

$\frac{1}{2}$ " at 1200 measured, say 250mm from wall corner

$$\phi T_n = 1.0 \times 250 \times 126 = 31 \text{ kN}$$

(Note this material is brittle)

2.1.5. Load Path

Take 3.6 x 4.8 m Wall

1. Lath & Plaster - Brittle - 5.4 kN

2. End Studs

$$T = C = 5.4 \times 4.8 / 3.6 = 7.2 \text{ kN}$$

$$\phi T_n = 141.6 \text{ kN} - \text{OK!}$$

$$\phi C_n = 33.9 \text{ kN} - \text{OK!}$$

3 M-T Joint

$$\phi T_n = 17.15 \text{ kN} - \text{OK!}$$

$$\phi C_n = 65.40 \text{ kN} - \text{OK!}$$

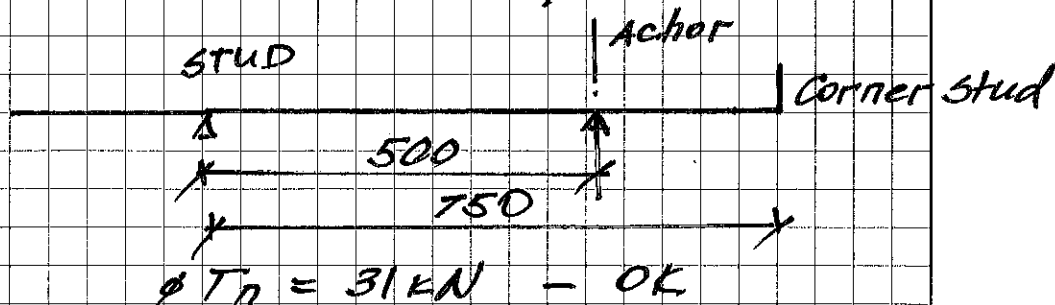
4. Bottom plate Flexure

$$M^* = 7.2 \times 0.25 = 1.8 \text{ kNm}$$

$$\phi M_n = 4.0 \text{ kNm}$$

5. Hold Down Bolt

$$T = 7.2 \times 0.75 / 0.5 = 10.8 \text{ kN}$$



Lath & Plaster Rating (15 kN/m)
governs the strength of wall

2.2. Exterior Wall - with diagonal
Brace and Infill.

Wall description

Bottom plate - 180x150

Studs @ 750 - 150x150

End Studs - 180x150

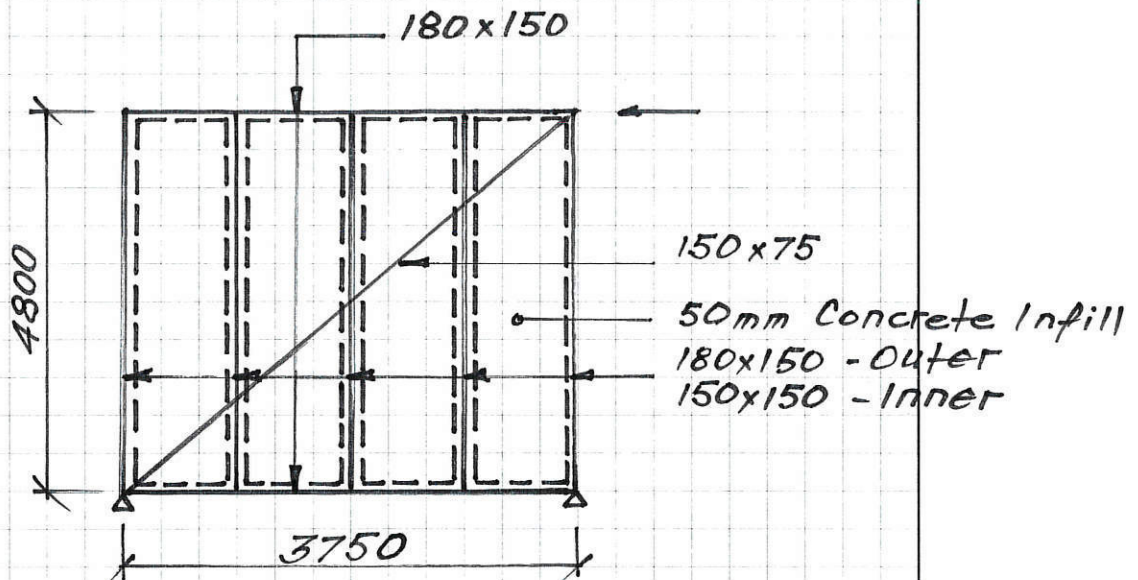
Diagonal Brace - 150 x 100

Infill - Central - 50mm Concrete

Wall Components: (Load Path)

- Infill / Diagonal Brace
- End studs
- M-T Joint
- Flexure to Bottom Plate
- Anchor strength

2.2.1. Exterior Wall - Infill/Diagonal Brace



There is no testing data for this wall construction type.

Bracing capacity determined from first principles.

Case 1. Concrete infill tight acting as compression strut in both directions.

Diagonal Brace complimentary in compression only

Case 2. Concrete infill with sizeable gaps. Left to right - diagonal brace. Right to Left - concrete infill; some horizontal displacement

2.2.2. Case 1: Concrete infill tight

Load path:

- Top chord
- M-T joints - Top Plate
- Strut - Concrete - 50mm
- M-T joints - Bottom Plate
- Bottom plate Flexure
- Anchor Strength
- End studs & Tension Compression

* Top Chord

Stability

- Timber material:

$$\text{Totara} - f_b = 20 \text{ MPa}$$

$$f_{cp} = 20.1 \text{ MPa}$$

$$f_d = 10.9 \text{ MPa}$$

$$f_{cl} = 11.8 \text{ MPa}$$

$$E_c = 6.5 \text{ MPa}$$

Related

to Rimu

- Lab Results

- Probable Compressive Strength:

$$L_f = 3750 \text{ mm}$$

$$S_2 = K_{10} L_f / d = 1.0 \times 750 / 180 = 4.2 \quad K_{82} = 0.833$$

$$S_3 = K_{10} L_y / B = 1.0 \times 3750 / 150 = 25 \quad K_{83} = 0.500$$

$$\phi = 1.0 \rightarrow \text{Probable Strength}$$

$$K_1 = 0.8 \rightarrow \text{Short Term}$$

$$K_{10} = 1.0$$

Hence

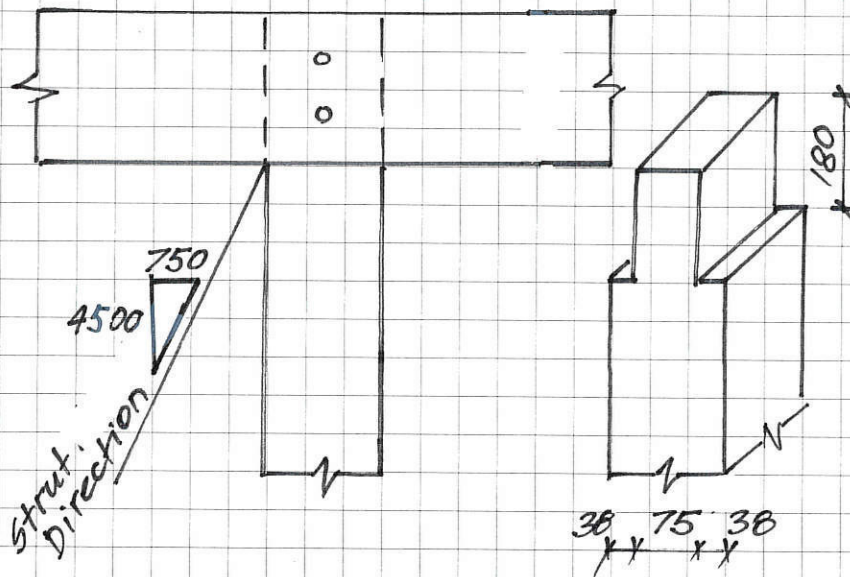
$$\phi N_{cx} = \phi K_1 K_{82} f_c A_p =$$

$$= 1.0 \times 0.8 \times 0.833 \times 20 \times 150 \times 180 =$$

$$= \underline{360 \text{ kN}}$$

$$\begin{aligned}\phi N_{cy} &= \phi k_1 k_{s3} f_c A_p = \\ &= 1.0 \times 0.8 \times 0.5 \times 20 \times 150 \times 180 = \\ &= \underline{216 \text{ kN}}\end{aligned}$$

* M-T Joints



Horizontal component:

Shear, Flexure, Tension - Tenon

$$\begin{aligned}\phi V_n &= 1.0 \times 0.8 \times 3.8 \times 75 \times 150 \times 10^{-3} = \\ &= \underline{34.2 \text{ kN}}\end{aligned}$$

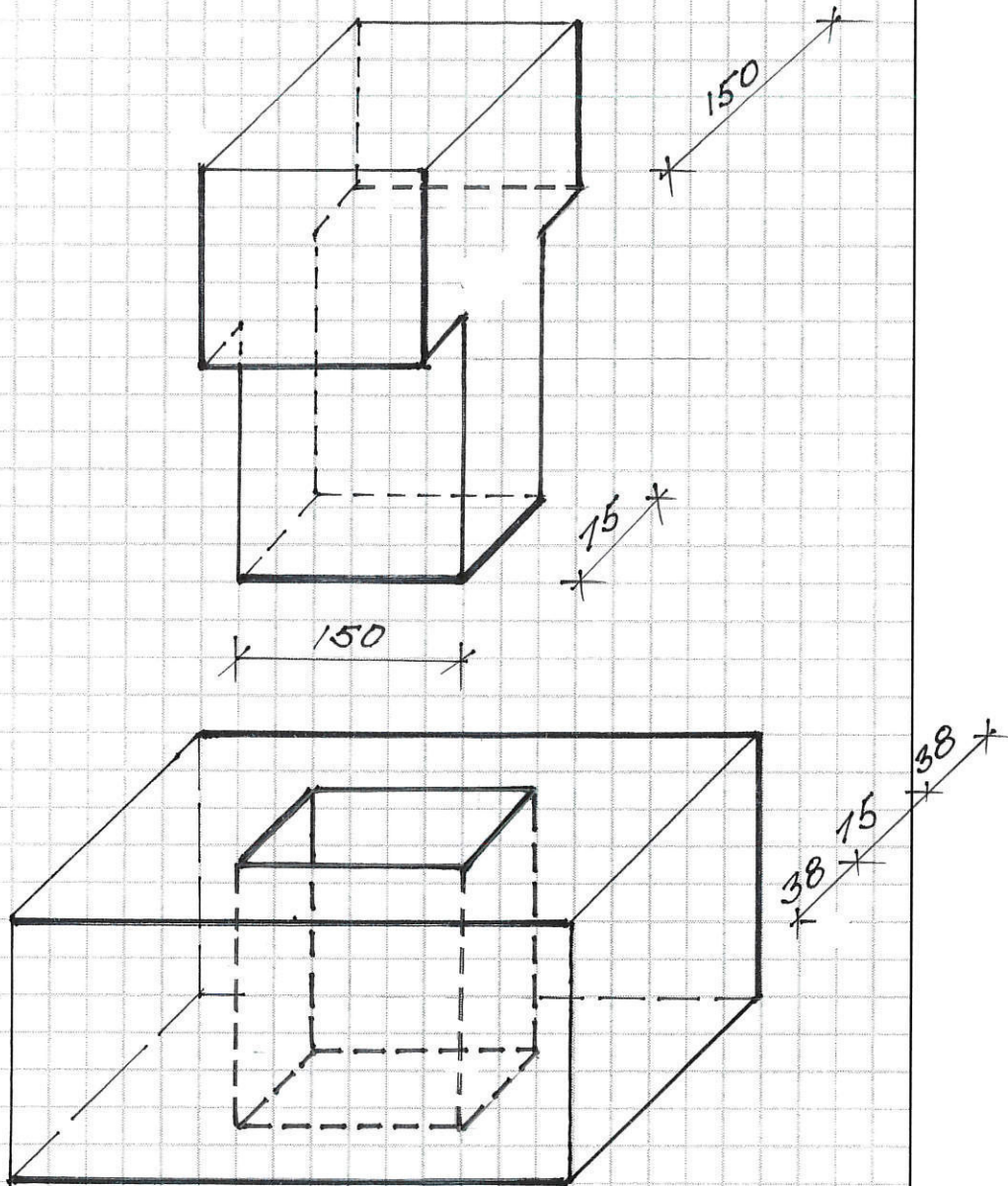
$$\begin{aligned}\phi M_n &= 1.0 \times 0.8 \times 1.0 \times 1.0 \times 20 \times \frac{150^2 \times 75}{6} \\ &= \underline{4.5 \text{ kN}}\end{aligned}$$

$$\begin{aligned}\phi T_n &= 1.0 \times 0.05 \times 11.8 \times (150 + 150 + 150) \times 150 \\ &= 39.8 + 4.8 = \underline{44.6 \text{ kN}}\end{aligned}$$

(2 pins - 4.8 kN - p. 2.05)

Weight of roof to top of wall

- 8 kN/m or 6 kN per Stud



To achieve equilibrium:

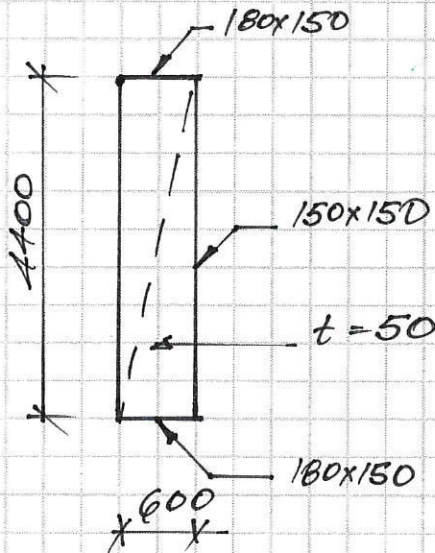
$$V_h \text{ is min of } \begin{cases} \text{Tension} - \frac{50.6}{6} = 8.4 \text{ kN} \\ \text{Shear} - 34.2 \text{ kN} \\ \text{Flexure} - 60 \text{ kN} \end{cases}$$

Tension capacity governs the horizontal capacity of the joint.

$$V_h = 8.5 \text{ kN} / 0.75 \text{ m} = \underline{11.3 \text{ kN/m}}$$

* Concrete Strut

Consider interior panels



Probable elastic in-plane stiffness

$$E_c = (6900 + 3320 \sqrt{f'_c})$$

Infill constructed from following concrete mix:

1 part Pumice - 1 part cent - 1 part cement

projected strength - 25 MPa

$$E_c = (6900 + 3320 \sqrt{25}) = 23.56 \text{ GPa}$$

Adopt for further calculation

$$E_c = 206 \text{ Pa};$$

Equivalent strut width

$$a = 0.18 (\lambda_1 h_{col})^{-0.25} r_{inf}$$

$$\lambda_1 = \left[\frac{E_m t \sin 2\theta}{4 E_f I_{bc} h_{inf}} \right]^{0.25}$$

$$E_m = E_c = 20000 \text{ MPa}$$

$$t = 50 \text{ mm}$$

$$\theta = \tan^{-1} \left[\frac{h_{inf}}{L_{inf}} \right] = \tan^{-1} \left[\frac{4500}{600} \right] = 82.4^\circ$$

$$E_f = 6500 \text{ MPa}$$

$$I_{bc} = \frac{1}{12} \times 150^3 \times 180 = 50.62 \times 10^6 \text{ mm}^4$$

$$h_{inf} = 4500 \text{ mm}$$

$$h_{col} = 4750 \text{ mm}$$

$$\lambda_1 = \left[\frac{20000 \times 50 \times \sin 164.8^\circ}{4 \times 6500 \times 50.62 \times 10^6 \times 4500} \right]^{0.25} = 2.58 \times 10^{-3}$$

Hence

$$a = 0.18 \times (2.58 \times 10^{-3} \times 4750)^{-0.25} \times 4540 = 0.18 \times 0.535 \times 4540 = 437 \text{ mm}$$

Probable strut strength:

$$N_{prob} = 50 \times 437 \times 25 = 546 \text{ kN}$$

Stability of concrete infill is assumed preserved by continuous support along studs.

Probable in-plane strength:

$$V_{in} = \min \begin{cases} 0.33 \sqrt{f'_m} t L_{inf} = 46.5 \text{ kN} \\ 0.83 t L_{inf} = 24.9 \text{ kN} \\ 0.41 t L_{inf} + 0.45 P = \underline{14.32 \text{ kN}} \end{cases}$$

$$f'_m = 25 \text{ MPa}$$

$$L_{inf} = 600 \text{ mm}$$

$$t = 50 \text{ mm}$$

$$P = 7.5 \times 0.6 = 4.5 \text{ kN}$$

$$\begin{aligned} V_{in} &= 0.33 \sqrt{25} \times 50 \times 600 = \\ &= 1.65 \times 50 \times 600 = \\ &= \underline{46.5 \text{ kN}} \end{aligned}$$

Probable Crushing strength

$$V_{cc} = K t f'_m$$

$$f'_m = 25 \text{ MPa}$$

$$t = 50 \text{ mm}$$

$$K = \text{Empirical - Recommended Value} = 250 \text{ mm}$$

$$V_{cc} = 250 \times 50 \times 25 = \underline{312.5 \text{ kN}}$$

Infill strength summary:

$$\text{Strut} = 546 \text{ kN} = \begin{matrix} 541 \text{ kN V} \\ 72 \text{ kN H} \end{matrix}$$

$$\begin{aligned} \text{Shear} &= 14.32 \text{ kN} = \text{H} \\ \text{Crushing} &= 312.5 \text{ kN} = \begin{matrix} 309 \text{ kN V} \\ 41.3 \text{ kN H} \end{matrix} \end{aligned}$$

Infill strength governed by shear strength -

Horizontal Component - 14.32 kN

Vertical Component - 107.4 kN

* M & T Joint Base

Refer P.2.17

$$\underline{V_h = 11.3 \text{ kN}}$$

* End Studs Stability - Compression side
Timber material

Totara - $f_b = 20 \text{ MPa}$

$$f_{cp} = 20.1 \text{ MPa}$$

$$E_t = 6.56 \text{ GPa}$$

$$f_t = 11.8 \text{ MPa}; f_{at} = 10.9 \text{ MPa}$$

- Probable Compressive Strength

$$L_f = 4800 \text{ mm}$$

$$S_2 = K_{10} L/d = 4800/150 = 32$$

$$K_{852} = 0.310$$

$$S_3 = K_{10} L/B = 4800/180 = 26.7$$

$$K_{853} = 0.441 \text{ (conservative estimate as infill restrains buckling in one direction)}$$

$\phi = 1.0 \rightarrow$ Probable Strength

$K_1 = 0.8 \rightarrow$ Short Term

$$K_{10} = 1.0$$

Hence:

$$\begin{aligned}\phi N_{ax} &= \phi k_1 k_{bs2} f_c A_p = \\ &= 1.0 \times 0.8 \times 0.31 \times 20 \times 150 \times 180 = \\ &= \underline{134 \text{ kN}}\end{aligned}$$

$$\begin{aligned}\phi N_{ay} &= \phi k_1 k_{bs3} f_c A_p = \\ &= 1.0 \times 0.8 \times 0.441 \times 20 \times 150 \times 180 = \\ &= \underline{190 \text{ kN}}\end{aligned}$$

- Check Bottom Plate - Bearing

Consider 50% Tenon, 50% Direct support

$$\begin{aligned}\phi N_{nbp} &= 1.0 \times 0.8 \times 10.9 \times 0.5 (150 \times 180) = \\ &= \phi k_1 f_p A_p = \\ &= \underline{118 \text{ kN}}\end{aligned}$$

- Check Bearing - Post section

$$\begin{aligned}\phi N_{nbe} &= \phi k_1 f_c A_p = \\ &= 1.0 \times 0.8 \times 20 \times 0.5 \times (150 \times 180) = \\ &= \underline{216 \text{ kN}}\end{aligned}$$

* Flexure of Bottom Plate

$$\phi M_{pr} = 1.0 \times 0.8 \times 1.0 \times 1.0 \times 20 \times \frac{180^2 \times 150}{6}$$

$$\phi M_{pr} = 12.96 \text{ kNm}$$

* Load Path

Take 3.75 x 4.8 m Wall

2 end Posts, 4 intermediate Posts

1. Top Chord

Total Lateral Capacity of wall

$$\phi V_n = 216 / 3.75 = \underline{57.6 \text{ kN/m}}$$

2. Top M-T Joints

5 engaged at a time - tension

$$\phi V_n = 8.5 \times 5 / 3.75 = \underline{11.33 \text{ kN/m}}$$

3. Concrete Strut

4 panels engaged at a time

$$\phi V_n = 4 \times 14.32 / 3.75 = \underline{15.27 \text{ kN/m}}$$

4. M-T Joints Bottom

5 engaged at a time - shear

$$\phi V_n = 5 \times 34.2 / 3.75 = \underline{45.6 \text{ kN/m}}$$

5. End Stud Stability

$$\phi V_n = 134 \times 4.8 / 3.75 = 171 \text{ kN}$$

6. Flexure of Bottom Plate

$$\begin{aligned} \phi V_n &= 12.96 / 0.25 \times 3.75 / 4.80 / 3.75 = \\ &= \underline{10.8 \text{ kN/m}} \end{aligned}$$

7. Anchor tensile capacity

$$\begin{aligned} \phi V_n &= 70.75 \times 0.75 / 0.5 \times 3.75 / 4.8 / 3.75 = \\ &= 22.10 \text{ kN/m} \end{aligned}$$

* Anchor Strength

Refer "Original specifications"

Bolts for Fixing down Perimeter Walls.

"The holding down bolts for fixing wall plates on top of all cross walls to be $3/4"$ ($\phi 19$) of the lengths shown or figured on the drawings and spaced not more than 3' apart"

Externall walls, inter-party walls

$3/4"$ (19mm) @ 900 mm max, say 250mm from wall corner.

(Bolt is made from wrought iron - hence Brittle material)

$$\phi T_n = 1.0 \times 250 \times 283 = \underline{70.75 \text{ kN}}$$

Overall Rating of Wall:
10.8 kN/m = 215 BUs

2.2.3. Concrete Infill With nominal
Gaps.

The timber frame will deform
until the gaps are closed.

In the initial stage the Bracing
capacity is governed by flexural
strength of M-T joint.

Given the small magnitude of
gaps, these are expected to close
and the collapse mechanism with
tight infill would be mobilised.

The differences between initial
and deformed shapes are
neglected.

2.2.4. Concrete Infill with diagonal
Brace with nominal gaps.

Diagonal Brace would be effective
in compression only.

The capacity in tension is limited
by the tensile strength of M-T
joint. Taking into account the
smaller section size (50x100)
it is anticipated that the
timber frame will deform and
concrete infill mobilised as
described in 2.2.2.

The differences between initial
and deformed shapes are neglected

Summary

Timber Wall Rating:

Interior Walls - 1.5 kN/m

Exterior Walls - 10.7 kN/m

Att. rium

1. Design Philosophy

This a 3 level structure.

Level 0 - Includes Basement and Ground Floor Slab. Constructed from mass pumice concrete

Level 1 - Includes Mezzanine Floor and 50% of walls below and under

Level 2 - Includes Roof and top 50% of walls above mezza. nine floor.

Design Loads

Lateral loads are governed by seismic actions.

The weights and respective inertia forces are depicted on p. 3.03

2. Seismic Demand

From 3d SAP Model total seismic weight is 2324 kN

The Base shear (at top of concrete walls) is 1301 kN

Vertical Distribution:

At mezzanine floor: $100\% = 1301 \text{ kN}$ (L1)

At roof level / Eaves $30\% = 390 \text{ kN}$ (L2)

SEISMIC MASS EXCL. CONCRETE

- Building weight for each of the following sections obtained from ETABS base reactions results from model.

NOTE:
Excludes weight of concrete elements.

(i) - NORTH WING.

$$G = 1724 \text{ kN}$$

$$0.3Q = 246 (0.3) = 74 \text{ kN}$$

$$E_u = 0.56(1724 + 74) = \boxed{1007.0 \text{ kN.}}$$

35% of TOTAL WEIGHT.

(ii) - NORTH INTER.

$$G = 883 \text{ kN}$$

$$0.3Q = 317 (0.3) = 95 \text{ kN}$$

$$E_u = 0.56(883 + 95) = \boxed{547.7 \text{ kN.}}$$

20% of TOTAL WEIGHT.

(iii) - ATRIUM.

$$G = 2084 \text{ kN}$$

$$0.3Q = 800 \text{ kN} (0.3) = 240 \text{ kN}$$

$$E_u = 0.56(2084 + 240) = \boxed{1306.0 \text{ kN.}}$$

45% of Total WEIGHT.

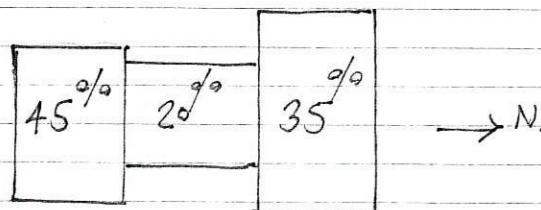
- TOTAL.

$$G = 4691 \text{ kN}$$

$$0.3Q = 1357 \text{ kN} (0.3) = 407 \text{ kN.}$$

$$E_u = 0.56(4691 + 407) = \underline{2854 \text{ kN.}}$$

- MASS PERCENTAGE BREAKDOWN.



3. Existing Structure Bracing Capacity

East - West

This is braced by 2 full height concrete walls along edges of the area. The wall capacities are covered elsewhere.

North - South

The structure is braced by perimeter timber framed walls (with infill) concrete walls across (Level 1 only) timber framed wall with lath.

Concrete wall capacity is covered elsewhere...

L1 - Mezzanine - East West

Exterior Walls

East Wall -

Net available length:

$$L_E = 1.75 + 1.75 + 1.75 + 1.75 = 7m$$

(9.8m)
Gross

West Wall -

Net available length:

$$L_W = 1.75 + 0.95 + 0.95 + 1.75 = 5.4m$$

(7.8m)
Gross

Interior Walls

$$L_{IE} = 4.6 + 4.6 + 4.6 = 13.8m$$

Total capacity

External Wall capacity:

$$E_{prov,E} = (7 + 5.4) \times \frac{4.8}{4.5} \times 10.9 = 144 kN \text{ (Net)}$$

201 kN (Gross)

Internal Wall Capacity:

$$E_{prov,i} = 13.8 \times \frac{4.8}{4.5} \times (1.5 \times Z) = \underline{44.16 \text{ kN (Net)}} \\ \underline{63.8 \text{ kN (Gross)}}$$

Total Capacity

$$E_{prov} = 144 + 44.2 = 188 \text{ kN (Net)}$$

$$201 + 63.8 = 264 \text{ kN (Gross)}$$

NBS% Rating - N-S

$$\text{Net: } \text{NBS\%} = 188/390 = 48\% \text{ Lower Band}$$

$$264/390 = 67\% \text{ Upper Band}$$

To account the contribution of stiff concrete walls compare the capacities of wall as cantilever and the displacement at wall top:

Calculations for concrete walls:

Rating of Concrete Wall (O-O-P):

$$\text{NBS\%} = 44\% \text{ (Same order)}$$

Maximum displacement at the top:

$$d_{max} = 500 \text{ mm} \gg$$

Hence Concrete Walls would not contribute

Summary Level 1:

North-South: 48% NBS

L1 - 6 Floor - North - South

* Exterior Walls

East Wall

Net Available Length

$$L_e = 1.75 + 2.40 + 2.40 + 1.75 = 8.3 \text{ m}$$

(Net)

$$11.3 \text{ m}$$

(Gross)

West Wall

Net Available Length

$$L_e = 1.75 + 3.0 + 3.0 + 1.75 = 9.5 \text{ m}$$

(Net)

$$12.5 \text{ m}$$

(Gross)

* Interior Walls

** Concrete (200 mm Thickness)

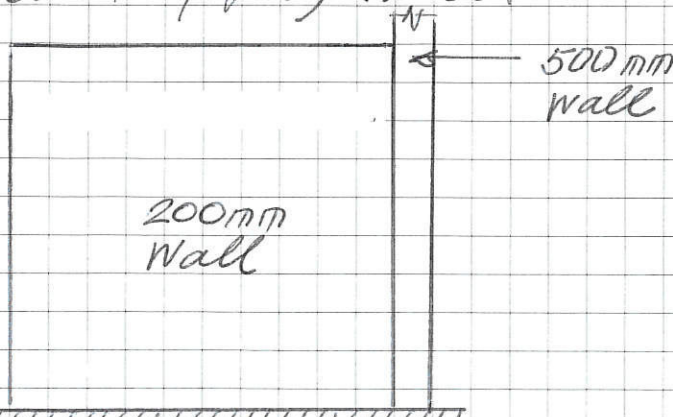
The following mechanism is considered

- 1 Large E-W Wall Leans on 200mm wall

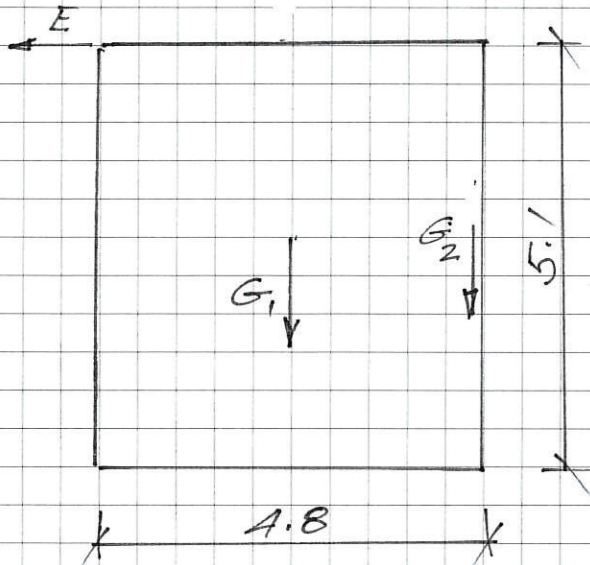
- 1 Large E-W Wall drags 200mm wall

Case 1 - E-W leans on 200mm Wall

overturning Capacity of 200mm (counterforce) wall.



Overturning Capacity



SW $G_1 = 0.2 \times 4.8 \times 5.1 \times 24 = 117.5 \text{ kN}$

$G_2 = \min \left\{ \begin{array}{l} \text{Shear capacity} \\ \text{Tributary weight} \\ \text{of 500 Wall} \end{array} \right.$

Shear Capacity

$$G_2' = 200 \times 5100 \times (0.17 \sqrt{4}) = 346 \text{ kN}$$

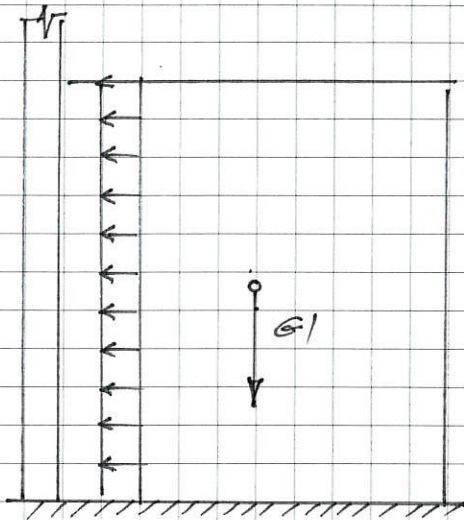
Tributary Weight

$$G_2'' = 4 \times 10 \times 0.5 \times 24 = 480 \text{ kN}$$

Hence $G_2 = 346 \text{ kN}$

$$E = 0.9 \times (117.5 \times 2.4 + 346 \times 4.8) / 5.1 = 342 \text{ kN} \text{ or } 71.25 \text{ kN/m}$$

Case 2 - E-W Wall drags 200mm Wall



$$G_1 = 117.5 \text{ kN}$$

$$M = 117.5 \times 2.4 =$$

$$= 282 \text{ kNm}$$

Tensile Concrete Strength

$$C_r = 0.10 \times 4 = 0.4 \text{ MPa}$$

(Range 5-10% f_c')
Probable 10% used

Max active moment (Based on interface)

$$M_{act} = 0.4 \times 200 \times 1000 \times 2650 = 212 \text{ kNm}$$

Min resistance without separation:

$$T = 212 / 5.1 = 42 \text{ kN} \quad (8.75 \text{ kN/m})$$

Summary Concrete Walls:

In each direction:

$$(4.8 + 4.8) \times 71.25 = 684 \text{ kN}$$

$$(4.8 + 4.8) \times 8.75 = \underline{84 \text{ kN}}$$

** Timber Walls with Lath

Neglect given the inferior rating

Total Capacity

$$(8.3 + 9.5) \times 10.8 + 684 + 84 = 960 \text{ kN}$$

Add Wall mass to timber part:

EW Walls - 1560

Concrete Walls - 470

$$2030 \text{ kN} \times 0.56 = 1136 \text{ kN}$$

$$\text{NBS\%} = \frac{960}{1301 + 1136} = 40\%$$

Overall rating of Atrium Building
is:

Top Part - 48%

Ground Floor - 40%

This rating reflect the estimate of lateral capacity for the atrium when considered as a system with no separation.

Individual check of concrete walls may produce higher results as roof load is spread uneven between the bracing elements.

Refer also to pp. 3.13 to 3.17 for foundation capacity assessment

Intermediate North Wing

1. Design Philosophy

This is a 2 level structure:

Level 0 - Includes Basement and Ground Floor Slab. Constructed from mass pumice concrete

Level 1 - Includes Roof and timber framed above concrete part

Design Loads

Lateral loads are governed by seismic action

The weights and respective inertia forces are depicted on p. 3.03

2. Seismic Demand

From 3d SAP Model total Seismic Weight is 978 kN.

The Base shear (at top of concrete walls) is 547 kN

3. Existing Structure Bracing Capacity

East - West

The ^{Building} is Braced by 2 full height concrete walls along edges of the area. The wall capacities are covered elsewhere. _{in plane}

North - South

The structure is Braced by perimeter timber framed walls (with infill) and timber framed walls with lath.

Exterior Walls

East Wall -

Net available length:

$$L_e = 6.7 \text{ m}$$

West Wall -

Net available length:

$$L_e = 11.8 \text{ m}$$

Interior Walls

Net available length:

$$L_e = 8.2 \text{ m}$$

Total Capacity:

$$E_{\text{prov}} = (6.7 + 11.8) \times 10.8 + 8.2 \times (1.5 + 1.5) \\ = 224.4 \text{ kN}$$

Hence NBS% - N-S direction

$$\text{NBS\%} = \frac{224.4}{547.0} = \underline{41.0\%}$$

Summary

North-South: 41% NBS.

North Wing

1. Design Philosophy

This a 2 level structure

Level 0 - Includes basement and Ground Floor Slab. Constructed from mass pumice concrete.

Level 1 - Includes Roof & Timber framed walls above concrete part

Design Loads

Lateral Loads are governed by seismic action

The weight and respective inertia forces are depicted on p.3.03

2. Seismic Demand

From 3D SAP Model total seismic weight is 1798 kN.

The Base shear (at top of concrete walls) is 1007 kN.

3 Existing Bracing Capacity.

East - West

The Building is Braced by 2 full height concrete walls along edges of the area. The wall capacities in-plane are covered elsewhere

North - South

The structure is Braced by perimeter timber framed walls (with infill) and timber framed walls with bath.

Exterior Walls

East Wall

Net Available Length:

$$L_e = 1.5 + 1.5 + 1.5 + 1.5 + 1.5 + 1.5 = 9.0m$$

West Wall

$$L_e = 1.5 + 1.5 + 1.5 + 1.0 + 1.0 = 6.5m$$

Interior Walls

Timber with Additional New overlay
- Equivalent to exterior walls

$$L_{e1} = 6 + 6 = 12m$$

$$L_{e2} = 6 + 6 = 12m$$

Timber

$$L_e = 6 + 6 + 6 + 4 + 3 + 2 + 4 = 31m$$

Total Capacity

$$E_{prov} = 15.5 \times 10.8 = 167.4$$

$$24.0 \times 10.8 = 259.0$$

$$31.0 \times 3.0 = 93.0$$

$$\underline{519.4 kN}$$

Hence NBS% - N-S Direction

$$NBS\% = \frac{519.4}{1007.0} = 51.6\%$$

Summary:

North-South: 51% NBS

Atrium - Foundation

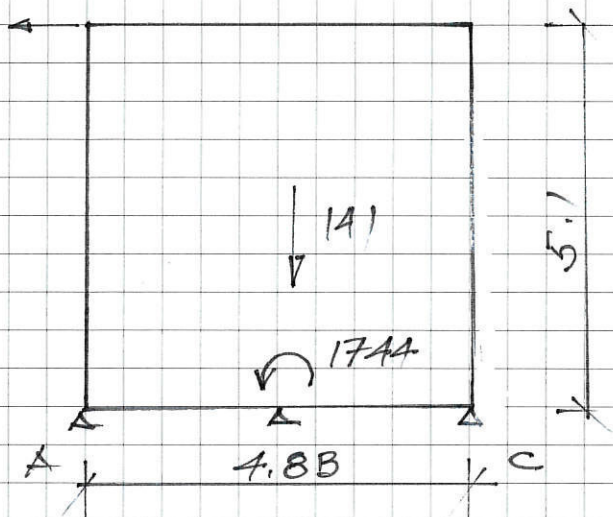
Check Interior edge of counter-force walls when perimeter wall is "leaning" towards the supporting wall.

From overturning:

$$E = 342 \text{ kN}$$

$$G = 117.5 \text{ kN}$$

P.3.06



Supported on 3 columns - evenly spaced

Consider $1.26 + E_u$

$$C = 117.5 \times 1.2 = 141 \text{ kN}$$

$$M = 342 \times 5.1 = 1744 \text{ kNm}$$

On Support A:

$$C = 0.25 \times 141 + 1744 / 5 =$$

$$= \underline{384 \text{ kN}}$$

Check Column

Mass Concrete, Short, Neglect
slenderness

Check Section Capacity

450x450 - $f_c' = 4 \text{ MPa}$

$$N_{prob} = 1.0 \times 450 \times 450 \times 4 =$$

$$= 810 \text{ kN} > 384 \text{ kN}$$

Check Footing

0.8x0.8m $A_f = 0.64 \text{ m}^2$

Geotechnical Data:

Refer Cheal Report

Relevant CPT locations:

J4, J5, J8, J10. - Datum 283.00 - Basement Level

* Weak soils to 1.8m depth

* Partial soil improvement carried
by Terrain Consultants - 2009

Footing Fails as clearly the
demand exceeds probable bearing
capacity of soils at the
above locations

Summary:

Soil bearing capacity failure:
 $NBS\% < 33\%$

NOTES:

1. All specifications are in metres unless noted otherwise.
2. Coordinate Datum: Bay of Plenty Control 2000, Molokai Vertical Datum 1953.
3. Aerial photo sourced from Google Earth.

Machine Drilled Borehole (CHEAL, 2017)

CPT (CHEAL, 2017)

Trail Pit (CHEAL, 2017)

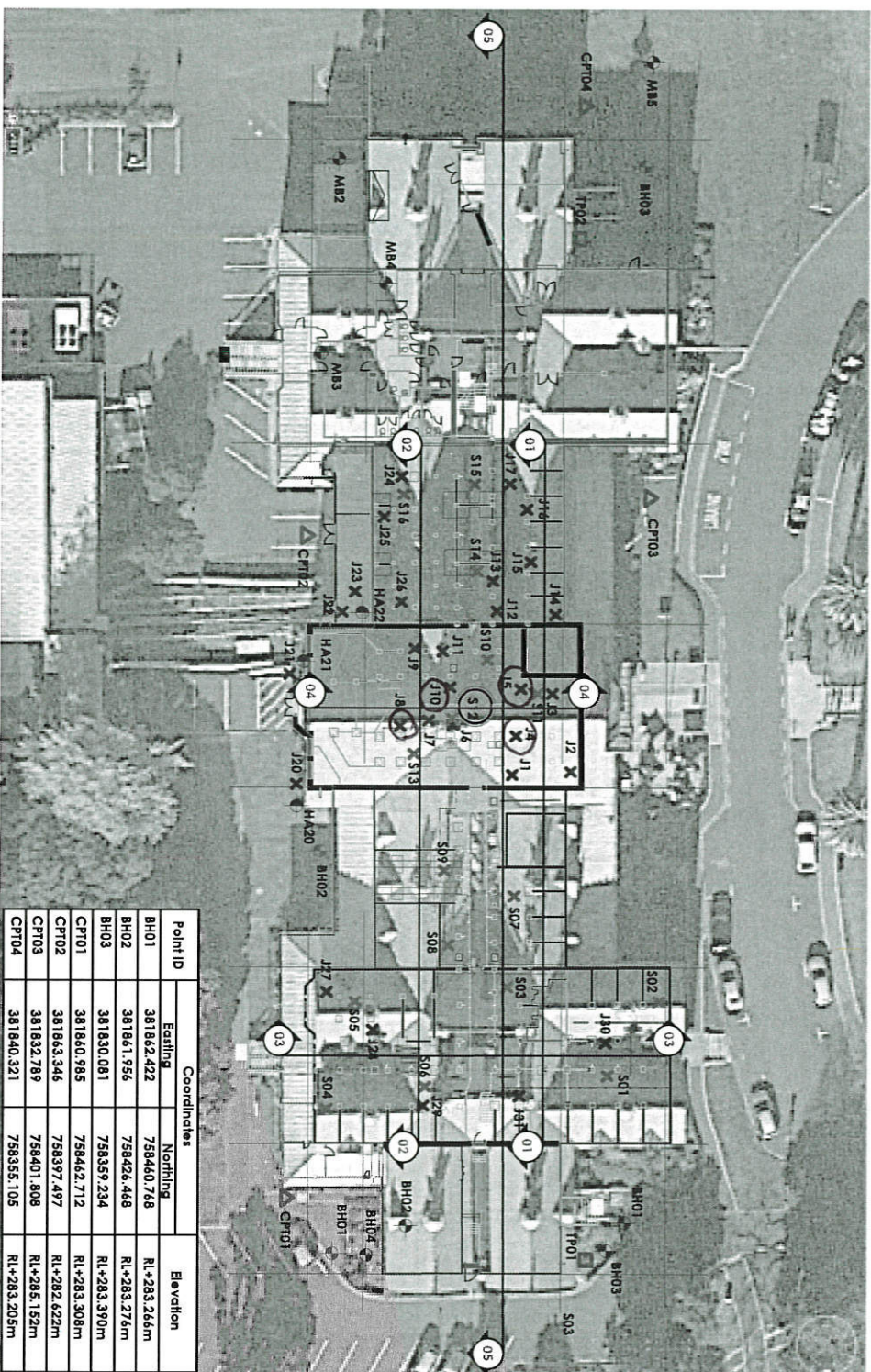
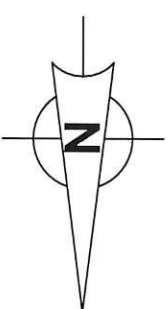
Scala Penetrometer Test (CHEAL, 2017)

Machine Drilled Borehole (TERRANE, 2007/2009)

Hand Auger (TERRANE, 2007/2009)

Scala Penetrometer Test (TERRANE, 2007/2009)

Machine Borehole and Push Tube (TERRANE, 2009)



Point ID	Coordinates		Elevation
	Easting	Northing	
BH01	381842.422	758440.768	RL+283.266m
BH02	381861.956	758426.468	RL+283.276m
BH03	381830.081	758397.234	RL+283.390m
CP01	381860.985	758442.712	RL+283.308m
CP02	381863.346	758397.487	RL+282.622m
CP03	381832.789	758401.808	RL+286.152m
CP04	381840.321	758355.105	RL+283.205m

Client Ref:

Rev	Date	By	Amendment	By	Check
A	11/05/2017	Paul Richardson	100	11/11/13	

Project File:

Rotorua Lakes Council
Museum, Government Gardens
Oruamata Drive, Rotorua

Drawing File:

Site Investigation Plan
with Historical Data up to 2009

Drawn:

Checked:

Approved:

Scale:

Plot to Scale:

For Information:

Scale:

Plot to Scale:

For Information:

Scale:

Plot to Scale:

For Information:

Scale:

Plot to Scale:

For Information:

16592-02

A

Terrane Scala Penetrometer Tests 2009

SCALA PENETROMETER TESTS										Job No: 3278
										Date: 7-Jul-09
Project: Southern Extension, Rotorua Museum										Test Numbers: J1 to J9
Location: Basement of Rotorua Museum										
Datum:										
Test Number	J1	J2	J3	J4	J5	J6	J7	J8	J9	
Depth below datum to start of test (m)	0.30	0.35	0.25	0.10	0.25	0.40	0.35	0.25	0.20	
mm Driven:										
50										
100				1						
150				2						
200				6					1	
250			2	2	2			2	2	
300	1		6	1	0			2	1	
350	2	8	13	0	2		1	2	1	
400	4	10	5	0	5	1	0	4	1	
450	3	15	3	1	1	0	0	0	0	
500	1	15	1	0	1	2	0	0	0	
550	0	10	0	0	1	1	0	1	0	
600	1	8	1	1	0	1	1	2	2	
650	0	3	0	1	0	0	0	1	1	
700	1	8	2	3	0	1	1	1	1	
750	1	3	2	1	1	0	0	1	1	
800	0	3	2	1	1	1	0	1	1	
850	1	1	1	2	0	1	1	2	1	
900	0	1	0	1	1	1	0	1	1	
950	1	1	1	2	1	1	1	1	1	
1000	1	2	0	2	1	1	0	1	2	
1050	1	2	1	2	1	4	1	2	2	
1100	0	1	2	2	1	2	1	2	1	
1150	2	2	1	2	1	2	1	2	2	
1200	2	1	1	3	1	1	0	1	1	
1250	4	2	1	2	1	1	1	2	1	
1300	4	1	3	1	2	1	0	1	0	
1350	1	1	1	1	1	0	0	1	0	
1400	0	0	1	0	1	0	0	0	1	
1450	0	0	0	0	1	0	1	1	0	
1500	0	1	1	1	1	2	1	0	1	
1550	0	1	1	1	0	1	1	0	1	
1600	0	2	1	2	1	3	2	1	1	
1650	1	2	1	2	0	3	1	1	2	
1700	3	3	3	1	2	2	2	1	1	
1750	2	2	3	2	5	2	3	0	2	
1800	4	2	9	10	7	4	5	1	2	
1850	6	4	10	8	7	4	7	8	2	
1900	9	5	11		7	5	4	5		
1950										
2000										
2050										
2100										
2150										
2200										
2250										
2300										
2350										
2400										
2450										
2500										
2550										
2600										
2650										
2700										
2750										
2800										
2850										

Test Method: NZS 4402:1988 Test 5.5.2 Dynamic Cone Penetrometer

Tested by:

Checked by:

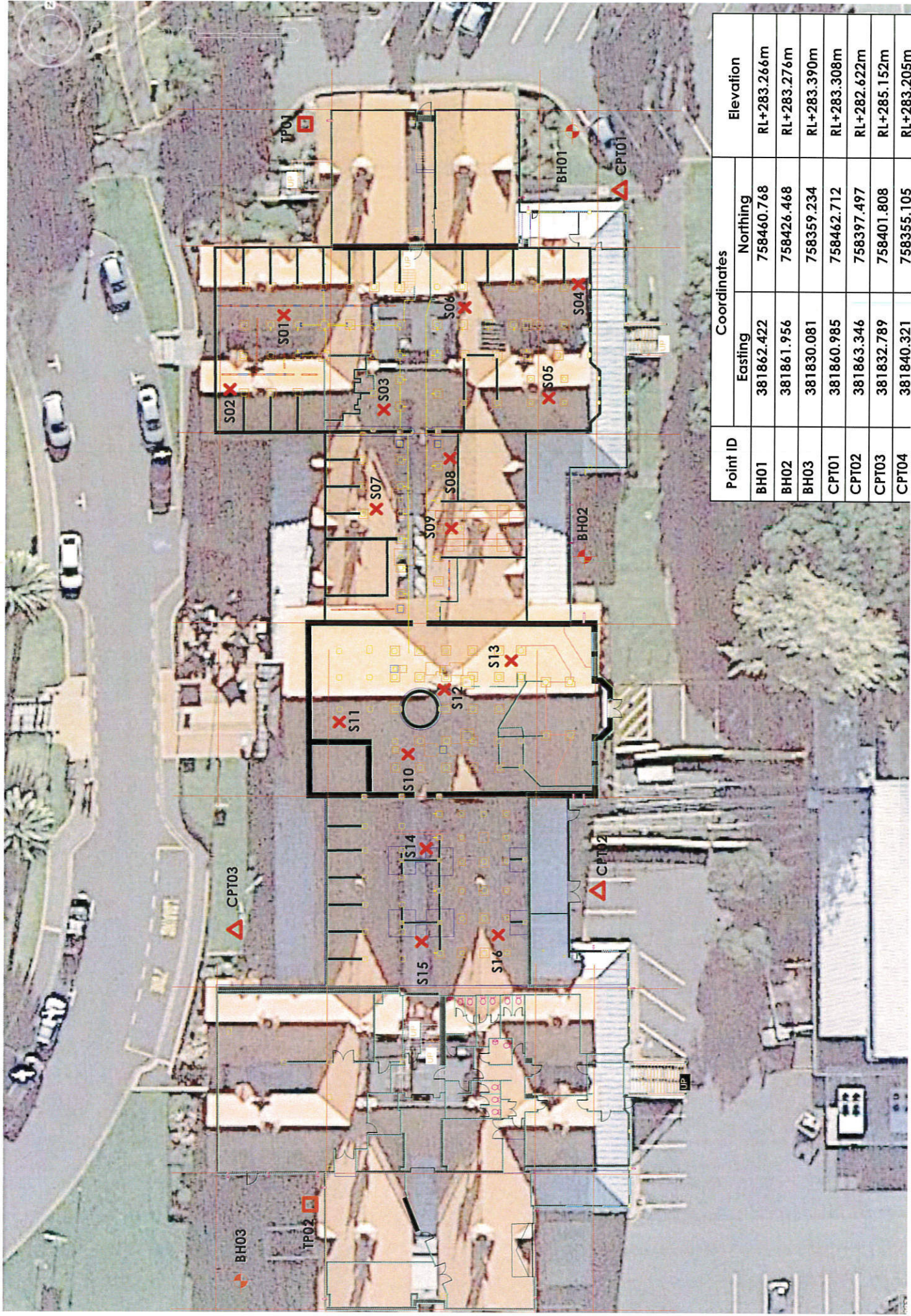
Terrane Scala Penetrometer Tests 2009

SCALA PENETROMETER TESTS		Job No: 3278 Date: 7-Jul-09						
Project: Southern Extension, Rotorua Museum Location: Basement of Rotorua Museum Datum:		Test Numbers: J10 to J17						
Test Number	J10	J11	J12	J13	J14	J15	J16	J17
Depth below datum to start of test (m)	0.35	0.35	0.55	0.35	0.10			
mm Driven:								
50	C	C	C	C		1	1	5
100	O	O	O	O	4	1	1	2
150	R	R	R	R	6	1	1	2
200	E	E	E	E	3	5	3	1
250	D	D	D	D	1	13	7	5
300					1	5	1	16
350	1	1		3	1	1	2	3
400	0	0		1	0	1	0	4
450	0	0		0	1	0	0	1
500	0	0		1	0	0	0	1
550	1	0	1	0	0	0	1	0
600	0	0	0	1	0	0	1	1
650	1	0	1	1	0	1	1	0
700	1	1	0	0	2	0	0	0
750	0	0	1	1	1	1	1	0
800	1	1	1	0	1	0	0	0
850	1	0	1	1	1	1	1	1
900	1	1	1	0	1	0	0	1
950	0	1	1	1	0	1	1	1
1000	1	0	1	0	1	0	2	0
1050	1	0	1	1	1	1	1	1
1100	0	0	0	0	0	0	1	2
1150	0	0	0	0	0	1	1	1
1200	0	0	0	0	1	1	1	1
1250	1	0	0	1	0	1	1	1
1300	0	0	0	0	0	1	1	2
1350	1	0	1	1	1	1	1	2
1400	0	0	0	0	0	0	0	0
1450	1	0	0	0	1	1	1	1
1500	1	0	0	1	0	0	0	0
1550	2	0	1	1	1	1	1	1
1600	5	2	2	1	1	1	1	0
1650	5	2	2	1	2	2	1	0
1700	9	11	9	3	3	2	2	0
1750	12	17	8	4	5	2	2	0
1800	14		8	5	5	2	3	0
1850			13	6	7	10	2	1
1900				7	5		1	0
1950								1
2000								0
2050								1
2100								3
2150								5
2200								4
2250								2
2300								3
2350								2
2400								1
2450								1
2500								2
2550								2
2600								3
2650								3
2700								3
2750								4
2800								4
2850								3

Test Method: NZS 4402:1988 Test 5.5.2 Dynamic Cone Penetrometer

Tested by:

Checked by:



Point ID	Coordinates		Elevation
	Eastings	Northing	
BH01	381862.422	758460.768	RL+283.266m
BH02	381861.956	758426.468	RL+283.276m
BH03	381830.081	758359.234	RL+283.390m
CPT01	381860.985	758462.712	RL+283.308m
CPT02	381863.346	758397.497	RL+282.622m
CPT03	381832.789	758401.808	RL+285.152m
CPT04	381840.321	758355.105	RL+283.205m

SCALA PENETROMETER TEST SHEET

CLIENT:	Rotorua Lakes Council	JOB REF:	16592
SITE ADDRESS:	Museum, Oruawhata Drive, Rotorua	DATE:	15/03/2017
JOB DESCRIPTION:	Site Investigation	TEST BY:	KD

DEPTH: Millimetres Below Ground Level (BGL)	TEST No. / Approximate surface RL								
	S01	S02	S03	S04	S05	S06	S07	S08	S09
0 - 100	3	1	4	2	2	3	2	3	3
100 - 200	3	1	2	4	3	5	4	3	3
200 - 300	6	1	1	12	17	4	3	3	2
300 - 400	5	5	5	5	19	9	2	16	4
400 - 500	3	2	4	6	23	10	2	40	6
500 - 600	18	3	2	9	17	20	3	24	8
600 - 700	6	5	3	4	14	4	4	15	2
700 - 800	5	2	5	2	5	3	5	14	5
800 - 900	6	5	6	5	7	7	4	11	4
900 - 1000	4	3	8	11	9	10	10	10	4
1000 - 1100	12	3	9	22	19	16	15	10	6
1100 - 1200	13	20	7	10	15	21	8	11	20
1200 - 1300	4	19	3	3	10	9	9	28	16
1300 - 1400	4	5	1	4	5	6	3	9	9
1400 - 1500	5	3	3	7	7	4	6	9	10
1500 - 1600	6	2	4	7	11	3	9	9	12
1600 - 1700	11	7	3	11	16	8	16	9	14
1700 - 1800	8	6	4	11	19	10	33	8	18
1800 - 1900	7	6	9	15	37	16	33	8	24
1900 - 2000	6	16	8	10	35	16	24	8	24
2000 - 2100	13	26	11	12		16	28	17	40
2100 - 2200	40	29	12	9		21	40	24	40
2200 - 2300	40	28	15	9		14			
2300 - 2400		11	15	7		10			
2400 - 2500		12	14	11		13			
2500 - 2600		15	16	14		11			
2600 - 2700		15	20	18		14			
2700 - 2800		21		14		14			
2800 - 2900		21		14		14			
2900 - 3000									
3000 - 3100									
3100 - 3200									
3200 - 3300									
3300 - 3400									
3400 - 3500									
3500 - 3600									
3600 - 3700									
3700 - 3800									
3800 - 3900									
3900 - 4000									

Notes:

Minimum Test Depth as per NZS 3604.....1.0m (1000mm) or 2x width of footing below bottom of footing

Blow count for Good Ground as per NZS 3604.....5 blows/100mm to a depth of 1.0m or 2x width of footing (whichever is the greater)

Blow count for Good Ground as per NZS 3604.....3 blows/100mm below the above depths

Blow count for 100kPa Allowable Bearing Pressure.....4 blows/100mm

SCALA PENETROMETER TEST SHEET

CLIENT:	Rotorua Lakes Council	JOB REF:	16592
SITE ADDRESS:	Museum, Oruawhata Drive, Rotorua	DATE:	15/03/2017
JOB DESCRIPTION:	Site Investigation	TEST BY:	KD

DEPTH: Millimetres Below Ground Level (BGL)	TEST No. / Approximate surface RL							
	S10	S11	S12	S13	S14	S15	S16	
0 - 100	10	1	2	1	4	4	10	
100 - 200	9	2	4	2	1	1	5	
200 - 300	1	17	3	7	2	3	28	
300 - 400	0	8	0	14	0	2	4	
400 - 500	1	5	2	8	1	1	32	
500 - 600	3	1	3	3	3	0	20	
600 - 700	3	4	3	2	40	1	7	
700 - 800	4	6	2	2	40	4	6	
800 - 900	9	4	4	4		5	7	
900 - 1000	4	5	3	5		3	6	
1000 - 1100	2	6	4	7		4	5	
1100 - 1200	3	6	5	12		1	5	
1200 - 1300	2	5	3	5		2	8	
1300 - 1400	3	2	8	1		1	7	
1400 - 1500	3	2	40	1		3	3	
1500 - 1600	3	3	40	2		2	4	
1600 - 1700	6	4		9		3	24	
1700 - 1800	7	8		13		4	25	
1800 - 1900	10	10		22		16	16	
1900 - 2000	15	15		35		29	20	
2000 - 2100	22	24		40		33	16	
2100 - 2200	20	30				21	37	
2200 - 2300	40	8				5		
2300 - 2400		5				3		
2400 - 2500		11				5		
2500 - 2600		11				5		
2600 - 2700		7				7		
2700 - 2800		6				7		
2800 - 2900		7				9		
2900 - 3000								
3000 - 3100								
3100 - 3200								
3200 - 3300								
3300 - 3400								
3400 - 3500								
3500 - 3600								
3600 - 3700								
3700 - 3800								
3800 - 3900								
3900 - 4000								

Notes:

Minimum Test Depth as per NZS 3604.....1.0m (1000mm) or 2x width of footing below bottom of footing
 Blow count for Good Ground as per NZS 3604.....5 blows/100mm to a depth of 1.0m or 2x width of footing (whichever is the greater)
 Blow count for Good Ground as per NZS 3604.....3 blows/100mm below the above depths
 Blow count for 100kPa Allowable Bearing Pressure.....4 blows/100mm

SUPPLEMENTARY – WEIGHTS & LOADS

SUPPLEMENTARY INFO.

WEIGHTS & LOADINGS

1. - Supplementary calculations of material weights and loadings for different building sections.
- These calculations are to support the rating of the building and used in the modelling of the different building sections in ETABS.
- Material weights of concrete and timber obtained from concrete core test results from Opus Lab report and timber species test by Scion/Prendos report.
- Dimensions of building obtained from As built plans & REVIT model and on-site measurements & observations.
- Historical specifications used to confirm site observations.

MATERIAL PROPERTIES.

(i) - PUMICE AGGREGATE CONCRETE :

· COMPRESSIVE STRENGTH, $f_c' = 4 \text{ MPa (min.)}$

· DENSITY, $\rho_c = 1500 \text{ kg/m}^3$

· MODULUS OF ELASTICITY; E :

$$E = \left[3320 \sqrt{f_c'} + 6900 \right] \left(\frac{\rho}{2300} \right)^{1.5}$$

$$= \left[3320 \sqrt{4} + 6900 \right] \left(\frac{1500}{2300} \right)^{1.5}$$

$$E = 7.10 \text{ GPa}$$

REFERENCES:

OPUS LAB,
CONCRETE CORE
TEST RESULTS.

NZS 3101:1:2006
CLAUSE 5.2.3 (b)

(ii) - RIMU TIMBER:

· USED FOR ROOF SARKING & CEILING JOISTS.

· BENDING STRENGTH, $f_b = 19 \text{ MPa.}$

density, $\rho = 590 \text{ kg/m}^3$

$$E = 9.5 \text{ GPa.}$$

REFERENCES:

PRENDOS
REPORT TEST
RESULTS &
NZ 3603:1993.

(iii) - TOTARA TIMBER;

· USED FOR WALL FRAMING:

· $f_b = 14 \text{ MPa (assumed)}$

$\rho = 480 \text{ kg/m}^3$

$$E = 6.4 \text{ GPa.}$$

(iv) - KAURI TIMBER: - FOR ROOF/TRUSS FRAMES

· $\rho = 560 \text{ kg/m}^3$

$$E = 9.1 \text{ GPa}$$

(i) ORIGINAL ROOF - WEIGHT

- HEAVY TILES WITH SARKING & TIMBER RAFTERS.
DOES NOT INCLUDE WEIGHT OF THE LARGE TRUSS FRAMES.

- ROOF CONFIGURATION:

→ RAFTERS:

- SIZE → 150 x 50 mm
- SPACING → 450 c/s.
- SPECIES → KAUARI, 560 kg/m³

→ SARKING: 25mm THK. RIMU, 590 kg/m³

- ROOF WEIGHT:

→ TILES: 0.57 kPa.

→ BITUMEN SHEET: 0.10 kPa.

→ SARKING: $0.025m \times 590/100 = 0.15$ kPa.

→ RAFTERS: $2 \times 0.15 \times 0.05 \times 560/100 = 0.084$ kPa.

- COMBINED WEIGHT, W:

$$W = 0.90 \text{ kPa.}$$

(ii) ORIGINAL FULL HEIGHT CONCRETE WALLS.

FROM CORE TESTS, THE AVERAGE

DENSITY FOR THE PUMICE CONCRETE IS:

$$\rightarrow \text{CONCRETE UNIT WEIGHT} = 15.5 \text{ kN/m}^3$$

(iii)

ORIGINAL OUTER WALL - WEIGHT.

- OUTER HALF TIMBERING FRAME WITH PUMICE CONCRETE INFILL PANELS, WITH LATH/PLASTER INTERNAL lining.
- WALL CONFIGURATION:

→ WALL STUDS:

- SPACING → 650/850 CTS.
- SIZE → 200 x 100 mm.
- SPECIES → TOTARA, 520 kg/m³

→ INFILL:

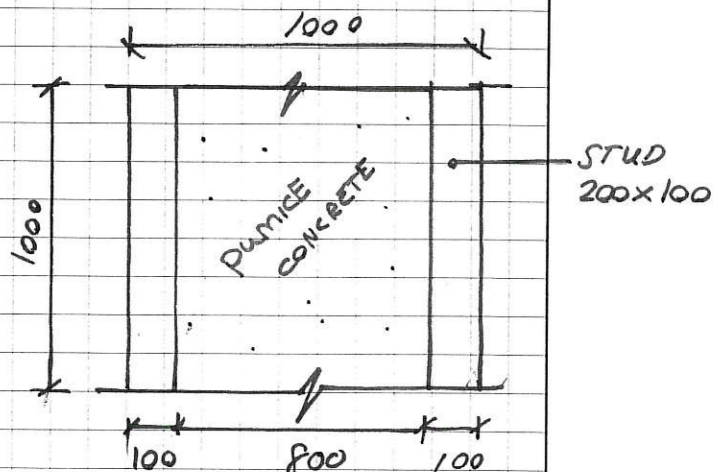
- TYPE → PUMICE CONCRETE
- THICKNESS → 40 mm.
- DENSITY → 1500 kg/m³

- CALCULATE 1 m² FRAME WEIGHT.

· PUMICE CONCRETE:

$$\rightarrow 1500 \text{ kg/m}^3 \times 0.04 \text{ m} = 60 \text{ kg/m}^2$$

$$\rightarrow 60 \text{ kg/m}^2 \times 0.8 \text{ m} \times 1 \text{ m} = 48 \text{ kg}$$



· TIMBER FRAME:

$$\rightarrow 520 \text{ kg/m}^3 \times 0.2 \text{ m} = 104 \text{ kg/m}^2$$

$$\rightarrow 104 \text{ kg/m}^2 \times (0.2 \text{ m} \times 1 \text{ m}) = 20.8 \text{ kg}$$

- COMBINED WEIGHT; W:

$$W = 48 \text{ kg} + 20.8 \text{ kg} / \text{m}^2 = 70 \text{ kg/m}^2$$

$$\therefore W = 0.70 \text{ kPa.}$$

- INTERNAL LINING OF OUTER WALLS.

LATH & PLASTER - LATHS 5MM THK.

TYPICAL weight = 0.25 kN/m^2 .

- Total weight of outer walls.

Outer WALL = 0.70 kPa

WALL LINING = 0.25 kPa

0.95 kPa.

//

ALSO WITH THE ADDITION OF 12MM PLASTERBOARD FROM RENOVATIONS:

PlasterBoard weight = 0.09 kPa

$\therefore$ COMBINED WEIGHT = $0.95 \text{ kPa} + 0.09 \text{ kPa}$

$= 1.04 \text{ kPa.}$

(iv)

INTERNAL WALLS - 1908 - WEIGHT

- INTERNAL ORIGINAL WALLS.

- Wall Configuration:

→ WALL STUDS:

SPACING → 450 c/s

SIZE → 150x50mm

SPECIES → TOTARA

→ LINING : LATH/PLASTER BOTH SIDES.

LATHS ARE 5mm THK.

- CALCULATE $1m^2$ FRAME WEIGHT:

. LATH/PLASTER

→ $2 \times 0.25 \text{ kPa}$.

. TIMBER STUDS.

→ $2 \text{ STUDS} \times 520 \text{ kg/m}^3 \times 0.15 \text{ m} \times 0.05 \text{ m} \times 10/1000$

= 0.078 kPa .

- COMBINED WEIGHT:

$$W^* = (2 \times 0.25 \text{ kPa}) + 0.078 \text{ kPa} = 0.578 \text{ kPa}.$$

$$\therefore W = 0.578 \text{ kPa}$$

- WITH ADDITIONAL PLASTERBOARD LINING FROM RENOVATIONS.

Assuming 12.5mm THK. Plasterboard → 0.09 kN/m^2

- COMBINED WEIGHT:

$$\begin{aligned} W^* &= 0.578 \text{ kPa} + 0.09 \text{ kPa} \\ &= 0.67 \text{ kPa} \end{aligned}$$

(v)

NORTH WING CEILING WEIGHT.

- CEILING FOR NORTH WING.
- CONFIGURATION:
 - CEILING JOISTS: 200 x 50 @ 450 cm.
 - ASSUME RIMU. 520 kg/m³
 - CEILING: LATH & PLASTER.
- CALCULATE 1m² CEILING WEIGHT:
- TRADITIONAL LATH + PLASTER CEILING = 0.5 kPa.
- 2 (JOISTS) x 5.20 x 0.2m x 0.05m x 1m
= 0.104 kPa.
- ∴ COMBINED WEIGHT = 0.5 + 0.10 = 0.60 kPa.

(vi)

NORTH GALLERY (INTER. WING).

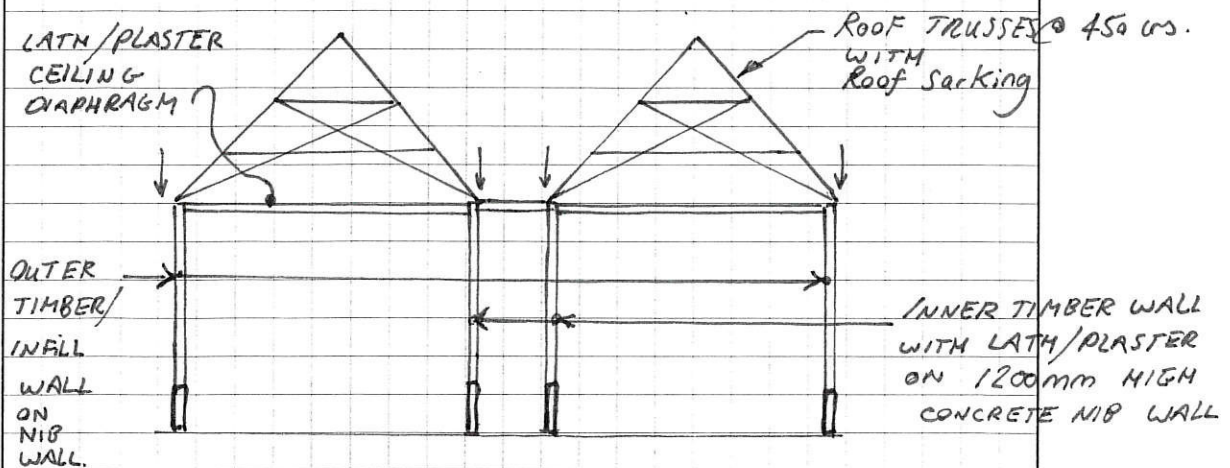
- FIRST FLOOR, G = 0.5 kPa
- G2 = 3.0 kPa.
- CEILING, G = 0.6 kPa.
- ROOF, G = 0.9 kPa. (AS BEFORE)

THIS SECTION
REFERS TO
THE CLASSROOM
OVER THE
NORTH GALLERY.

LOADING

NORTH WING.

(i) - EAST & WEST WING SECTIONS OF NORTH WING:



- LOAD PATH:

ROOF IS SUPPORTED BY ROOF TRUSSES WHICH IN TURN ARE SUPPORTED ON THE OUTER TIMBER/INFILL PANEL WALLS & THE INTERNAL TIMBER FRAME WALLS.

$$G, \text{ ROOF LOAD} = 0.90 \text{ kPa.}$$

- CEILING LOADS.

CEILING JOISTS SPAN TO SUPPORTING WALLS.

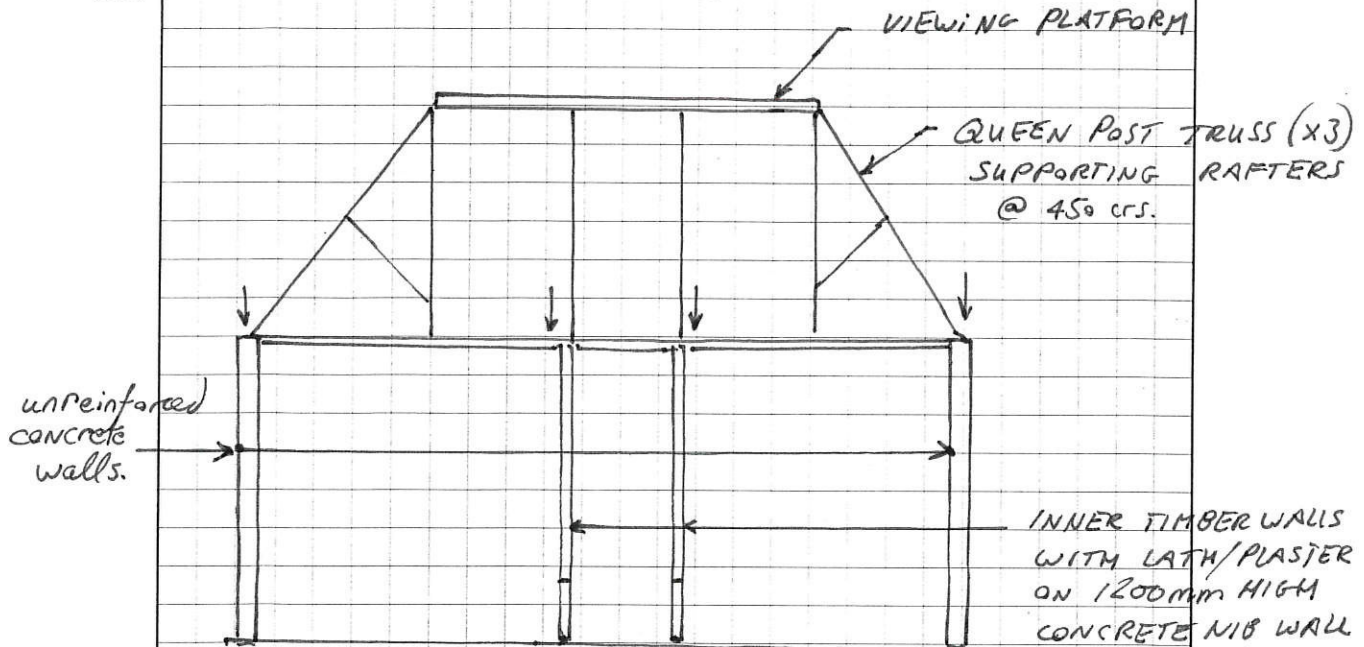
150 x 50 @ 450 CS.

FLEXIBLE DIAPHRAGM CREATED BY LATH/PLASTER LINING.

$$G, \text{ CEILING LOAD} = 0.60 \text{ kPa}$$

(11)

- CENTRAL NORTH WING:



- ROOF LOADS

ROOF IS SUPPORTED BY RAFTERS WHICH ARE SUPPORTED BY QUEEN POST TRUSSES. TRUSSES END SUPPORTS ARE THE UNREINFORCED CONCRETE WALLS AT THE SIDES. TRUSS INTERVAL SUPPORTS ARE THE INNER TIMBER WALLS IN THE GROUND FLR. BELOW.

$$G, \text{ ROOF LOAD} = 0.90 \text{ kPa}$$

NOTE: DOES NOT INCLUDE TRUSS SELF WEIGHT.

$$G, \text{ CEILING} = 0.60 \text{ kPa}$$

- VIEWING PLATFORM

$$G = 0.50 \text{ kPa}$$

$$Q = 4.0 \text{ kPa.}$$

LOADS.

ATRIUM SECTION.

(i)

- ROOF LOADS:

ROOF LOADS ARE GRAVITY RESISTED BY THE TRUSS FRAMES & THE CONCRETE/TIMBER FRAMED WALLS BELOW.

ROOF LOADS ARE APPLIED TO EACH TRUSS USING TRIBUTARY AREA.

$$G_{\text{ROOF LOADS}} = 0.90 \text{ kPa} \quad (\text{DOES NOT INCLUDE SELF WEIGHT OF TRUSSES})$$

(ii)

- CEILING LOADS:

CEILING JOISTS SPAN FROM TRUSS TO TRUSS.

CEILING SARKING IS 25mm THICK RIMU AND IS TONGUE & GROOVE CONNECTED & NAILED TO CEILING JOISTS.

CEILING FLOORING, 20mm THICK, IS ON TOP OF THE CEILING JOISTS.

G, CEILING LOADS:

$$\begin{aligned} - 25\text{mm RIMU SARKING} &= 0.025\text{m} \times 590 \text{ kg/m}^3 / 100 \\ &= 0.148 \text{ kPa.} \end{aligned}$$

$$\begin{aligned} - 20\text{mm CEILING BOARD} &= 0.020 \times 590 \text{ kg/m}^3 / 100 \\ &= 0.118 \text{ kPa.} \end{aligned}$$

$$\begin{aligned} - \text{CEILING JOISTS} &= 2 \times 0.15 \times 0.05 \times 590 / 100 \\ &= 0.089 \text{ kPa.} \end{aligned}$$

$$\text{Total Ceiling Load, } G = 0.35 \text{ kPa.}$$

(LOAD PATH)

- ROOF & CEILING LOADS APPLIED TO EACH TRUSS BY TRIBUTARY AREA.

TRUSS POINTS LOADS ACT ON SIDE WALLS OF TIMBER/CONCRETE.

(iii)

- MEZZANINE LOADS.

MEZZANINE FLOOR COMPOSED OF 400 X 45 @ 400 c/cs
FLOOR JOISTS (RIMU), WITH 20mm THK. FLOOR
BOARDS, TONGUE & GROOVE FITTED (RIMU).
FLOOR SOFFIT IS 25mm THK. (RIMU).

G, FLOOR LOADS:

$$\begin{aligned} - 25 \text{ mm RIMU. SOFFIT} &= 0.025 \times 590 \text{ kg/m}^3 / 100 \\ &= 0.1475 \text{ kPa} \end{aligned}$$

$$\begin{aligned} - 20 \text{ mm RIMU FLOOR} &= 0.020 \times 590 \text{ kg/m}^3 / 100 \\ &= 0.118 \text{ kPa.} \end{aligned}$$

$$\begin{aligned} - 400 \times 50 \text{ RIMU JOISTS} &= 2 \times 0.4 \times 0.05 \times 590 / 100 \\ &= 0.47 \text{ kPa.} \end{aligned}$$

$$\boxed{\text{TOTAL FLOOR LOAD, } G = 0.74 \text{ kPa.}}$$

$$\boxed{Q = 4.0 \text{ kPa.}}$$

(LOAD
PATH)

- MEZZANINE LOADS APPLIED ALONG WALLS
AT SUPPORTING HEIGHT.

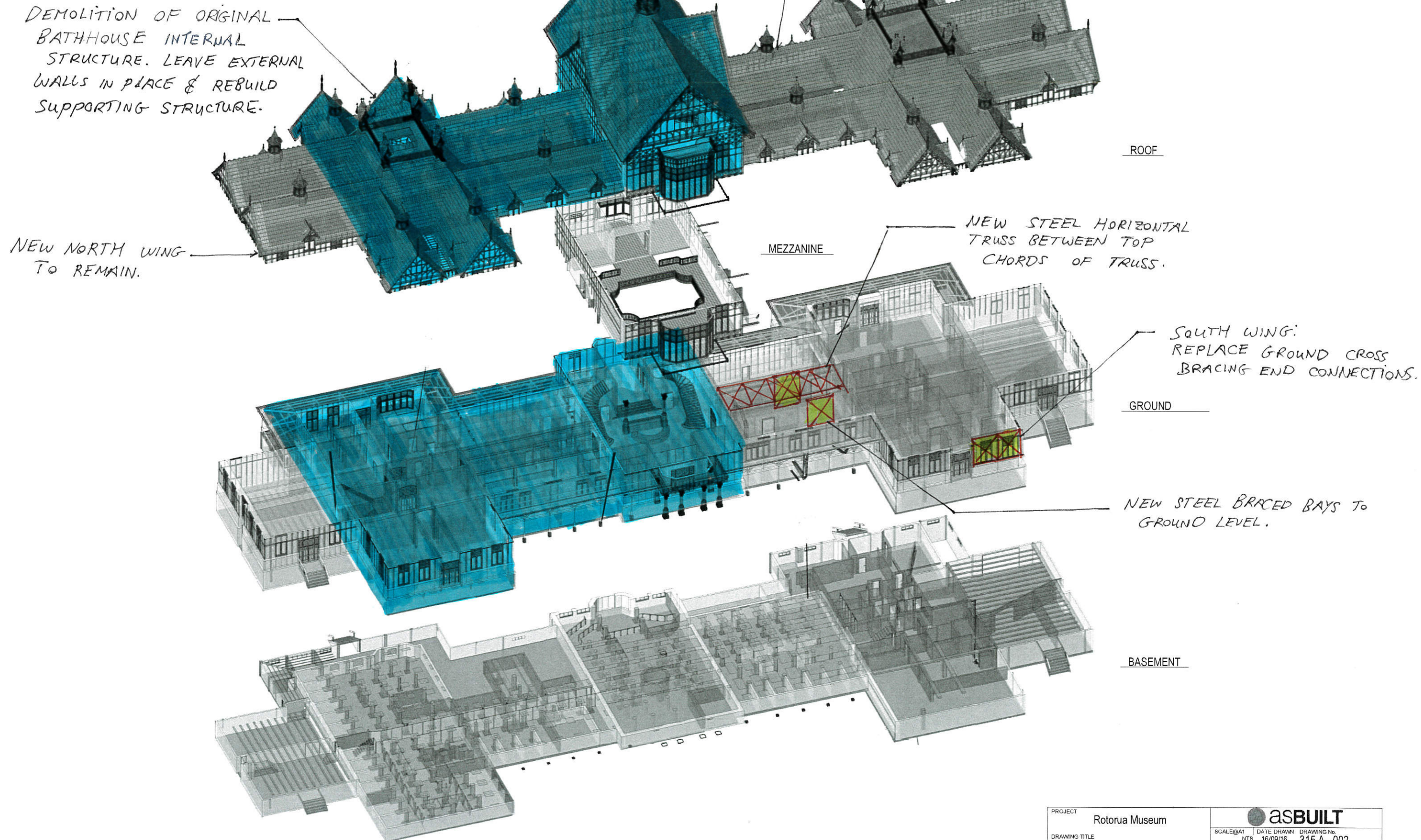
APPENDIX D

Rotorua Lakes Council Earthquake Prone Policy

APPENDIX E

Seismic Retrofit – Option 1

SEISMIC RETROFIT - OPTION 1



PROJECT	Rotorua Museum		
DRAWING TITLE	EXPLODED ISOMETRIC	DATE DRAWN	16/09/16
SCALE@A1	NTS	DRAWING No.	315.A-002
PO BOX 36460, Northcote, Auckland 0748 New Zealand T (64 9) 377 8450 www.asbuilt.co.nz			

APPENDIX F

Seismic Retrofit – Option 2

SEISMIC RETROFIT — OPTION 2

* REPLACE CORRODED ROOF CONNECTIONS AND DECAYED TIMBER THROUGHOUT

REPLACEMENT OF HEAVY ROOF WITH LIGHT WEIGHT EQUIVALENT.
(EXCLUDING NEW NORTH, SOUTH WINGS & TARAWERA GALLERY.)

INSTALL HORIZONTAL DIAPHRAGM TO DISTRIBUTE LOADS (TYPICAL ALL CRITICAL WALLS)

SELECTED BRACING WALLS THROUGHOUT TO BE UPGRADED.

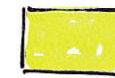
INSTALL CROSS BRACING IN ROOF SPACE ABOVE CEILING JOISTS TO CREATE DIAPHRAGM. TYPICAL THROUGHOUT ORIGINAL BATHHOUSE SECTION.

MEZZANINE

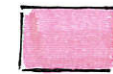
NEW STEEL HORIZONTAL TRUSS BETWEEN TOP CHORDS OF TRUSSES.

ROOF

KEY



CRITICAL CONCRETE WALLS TO BE REMOVED. REPLACE WITH STEEL FRAME AND TIMBER EQUIVALENT.



GROUND

CRITICAL CONCRETE NIB WALLS TO BE UPGRADED. (EXCLUDES NEW SOUTH WING)

NEW STEEL BRACED BAYS TO GROUND LEVEL. HIDDEN IN PARTITION WALLS.

SOUTH WING: REPLACE GROUND FLOOR CROSS BRACING END CONNECTIONS.

BASEMENT

INSTALLATION OF GLASS FIBRE OVERLAY TO BASEMENT SOFFIT.

PROJECT	Rotorua Museum		
DRAWING TITLE	EXPLODED ISOMETRIC		
SCALE@A1	DATE DRAWN	DRAWING No.	
NTS	16/09/16	315.A - 002	
PO BOX 36460, Northcote, Auckland 0748			
New Zealand T (64 9) 377 8450 www.asbuilt.co.nz			

APPENDIX G

Seismic Retrofit – Option 3

SEISMIC RETROFIT — OPTION 3

* REPLACE CORRODED ROOF CONNECTIONS
AND DECAYED TIMBER THROUGHOUT

INSTALL HORIZONTAL
DIAPHRAGM TO DISTRIBUTE
LOADS (TYPICAL ALL
CRITICAL WALLS)

SELECTED BRACING WALLS
THROUGHOUT TO BE
UPGRADED.

INSTALL CROSS
BRACING IN ROOF SPACE
ABOVE CEILING JOISTS
TO CREATE DIAPHRAGM.
TYPICAL THROUGHOUT
ORIGINAL BATHHOUSE
SECTION.

EXISTING ROOF REMAINS

MEZZANINE

NEW STEEL HORIZONTAL
TRUSS BETWEEN TOP
CHORDS OF TRUSSES.

ROOF

KEY



CRITICAL CONCRETE
WALLS TO BE
ROUTED OUT TO
ENABLE INSTALLATION
OF STEEL FRAME
LATTICE.



GROUND

CRITICAL CONCRETE
NIB WALLS TO BE
UPGRADED.
(EXCLUDES NEW
SOUTH WING)

NEW STEEL BRACED BAYS TO
GROUND LEVEL. HIDDEN IN
PARTITION WALLS.

SOUTH WING:
REPLACE GROUND FLOOR
CROSS BRACING END CONNECTIONS.

BASEMENT

INSTALLATION OF GLASS FIBRE
OVERLAY TO BASEMENT SOFFIT.

PROJECT	Rotorua Museum		
DRAWING TITLE	EXPLODED ISOMETRIC		
SCALE@A1	DATE DRAWN	DRAWING No.	
NTS	16/09/16	315.A - 002	
PO BOX 36460, Northcote, Auckland 0748			
New Zealand T (64 9) 377 8450 www.asbuilt.co.nz			

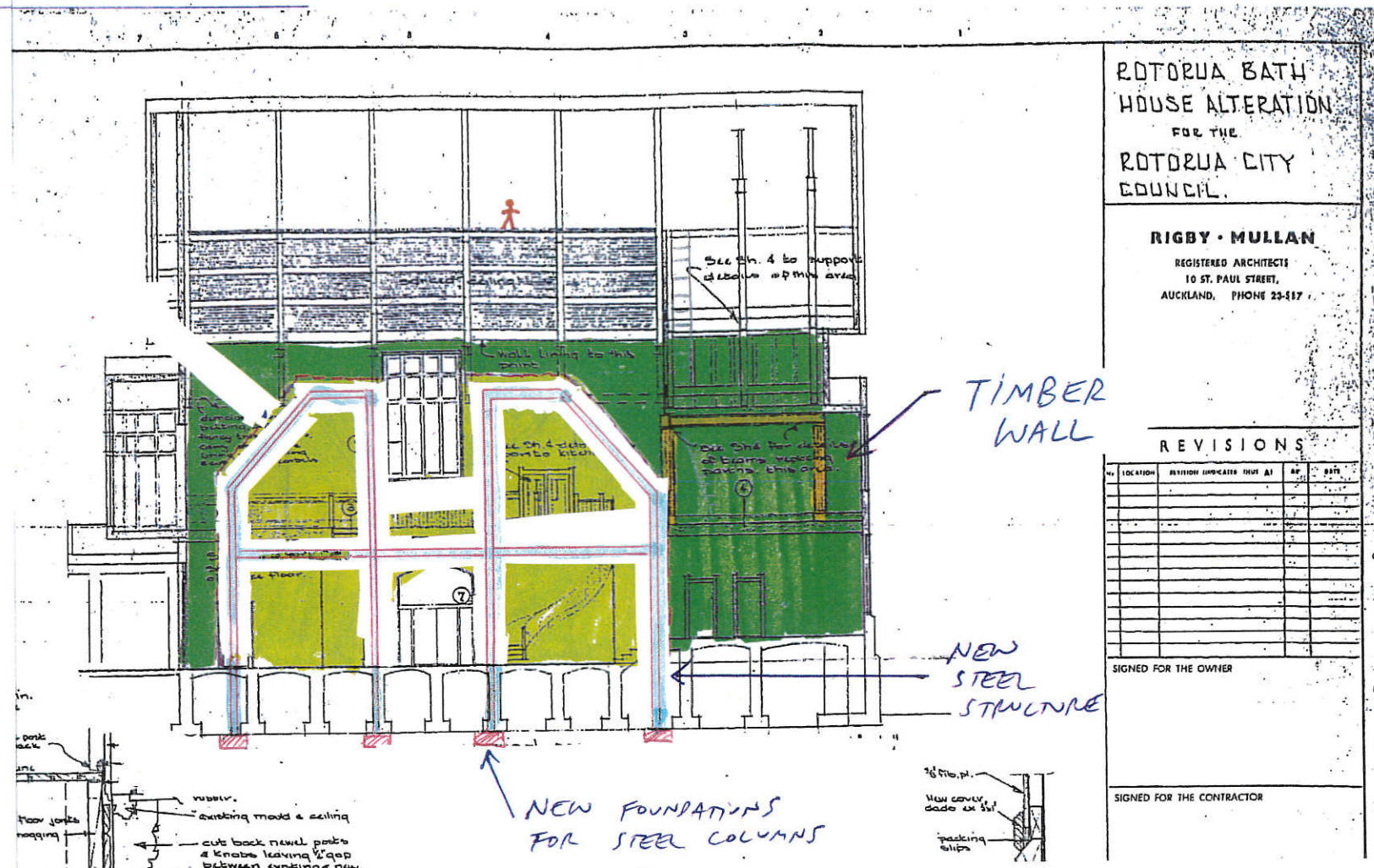
UNREINFORCED CONCRETE WALL

CUT OUT POCKET

INSTALL STEEL FRAME

EPOXY IN BOLTS

550



APPENDIX H

Seismic Retrofit – Option 4

SEISMIC RETROFIT — OPTION 4

* REPLACE CORRODED ROOF CONNECTIONS AND DECAYED TIMBER THROUGHOUT

REPLACEMENT OF HEAVY ROOF WITH LIGHT WEIGHT EQUIVALENT.
(EXCLUDING NEW NORTH, SOUTH WINGS & TARAWERA GALLERY.)

INSTALL HORIZONTAL DIAPHRAGM TO DISTRIBUTE LOADS (TYPICAL ALL CRITICAL WALLS)

SELECTED BRACING WALLS THROUGHOUT TO BE UPGRADED.

INSTALL CROSS BRACING IN ROOF SPACE ABOVE CEILING JOISTS TO CREATE DIAPHRAGM. TYPICAL THROUGHOUT ORIGINAL BATHHOUSE SECTION.

MEZZANINE

NEW STEEL HORIZONTAL TRUSS BETWEEN TOP CHORDS OF TRUSSES.

ROOF

KEY



CRITICAL CONCRETE WALLS TO BE ROUTED OUT TO ENABLE INSTALLATION OF STEEL FRAME LATTICE.



GROUND

CRITICAL CONCRETE NIB WALLS TO BE UPGRADED.
(EXCLUDES NEW SOUTH WING)

NEW STEEL BRACED BAYS TO GROUND LEVEL. HIDDEN IN PARTITION WALLS.

SOUTH WING: REPLACE GROUND FLOOR CROSS BRACING END CONNECTIONS.

BASEMENT

INSTALLATION OF GLASS FIBRE OVERLAY TO BASEMENT SOFFIT.

PROJECT	Rotorua Museum	asBUILT
SCALE@A1	DATE DRAWN 16/09/16	DRAWING No. 315.A-002
DRAWING TITLE	EXPLODED ISOMETRIC	PO BOX 36460, Northcote, Auckland 0748 New Zealand T (64 9) 377 8450 www.asbuilt.co.nz

A hand-drawn diagram of a wall section. The wall is represented by a thick green border. A rectangular cut-out is shown in the center of the wall. Inside this cut-out, a blue rectangular area represents the steel frame. A horizontal line with a small circle at its end, representing a bolt, passes through the steel frame and the wall. Labels with leader lines point to the wall, the cut-out, the steel frame, and the bolt. The width of the wall is indicated by a dimension line at the bottom labeled '550'. The top and bottom of the wall are labeled 'A'.

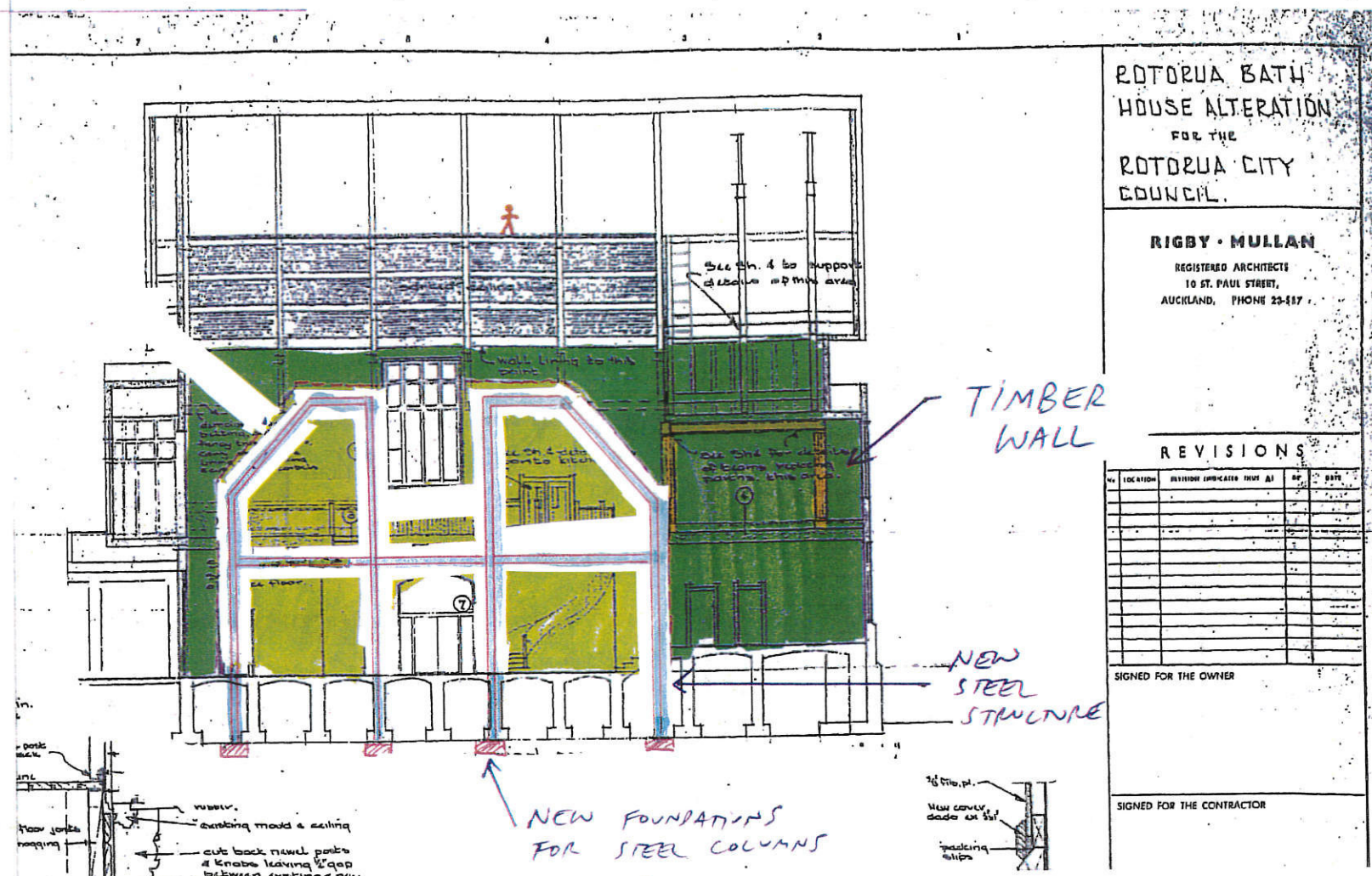
UNREINFORCED CONCRETE WALL

CUT OUT POCKET

INSTALL STEEL FRAME

EPOXY IN BOLTS

550



APPENDIX I

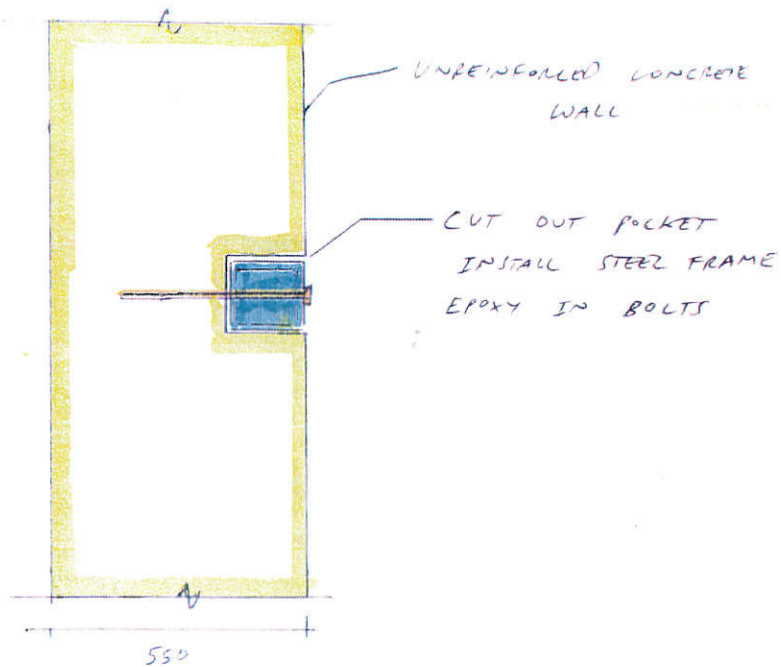
Conceptual Retrofit Details

Table: I.1 – Conceptual Retrofit Building Locations

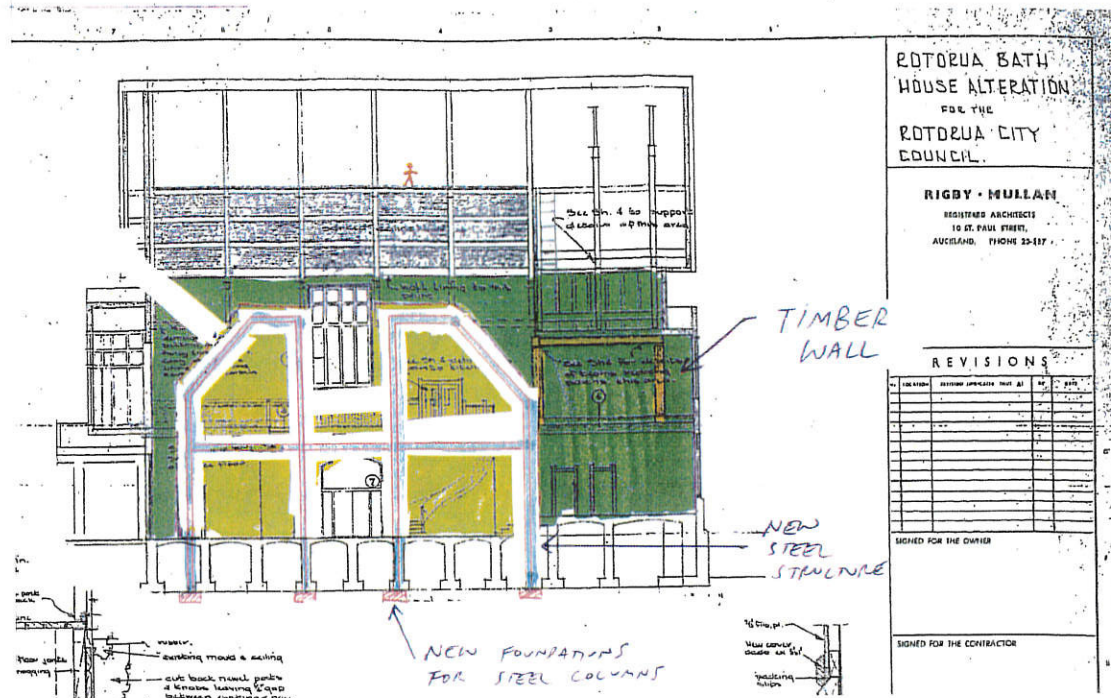
No.	Building Part	Nib Wall	Party Wall	Counter Force Wall	Box Section Brace	Exterior Timber Wall	Floor Diaphragm	Horizontal Truss Bracing	Replacement of Reid Brace Banana link
1	South Wing	N/A	N/A	N/A	N/A	N/A	N/A	N/A	South Wing – bottom bracing bays only
2	Intermediate South Wing (i.e. Tarawera Gallery)	East & west exterior walls	Concrete wall between Inter. South Wing & Atrium	N/A	N/A	N/A	N/A	Horizontal bracing for central trusses' top chords	N/A
3	Atrium	North & south exterior walls	Concrete wall between Atrium & Inter. North Wing	Concrete walls across Atrium connecting to party walls	Concrete party walls	East & west exterior walls	Mezzanine floor diaphragm – steel flat bracing or ply underlay	N/A	N/A
4	Intermediate North Wing	East & west exterior walls	Concrete wall between Inter. North Wing & North Wing	N/A	N/A	East & west exterior walls	N/A	N/A	N/A
5	North Wing	Exterior & interior walls throughout	Concrete wall between North Wing & North Extension	N/A	N/A	Exterior & interior walls throughout	N/A	N/A	N/A

(2). ATRIUM CONCEPTUAL RETROFIT - PARTY CONCRETE WALL WITH STEEL LATTICE FRAME

SECTION RETROFIT - OPTION 4



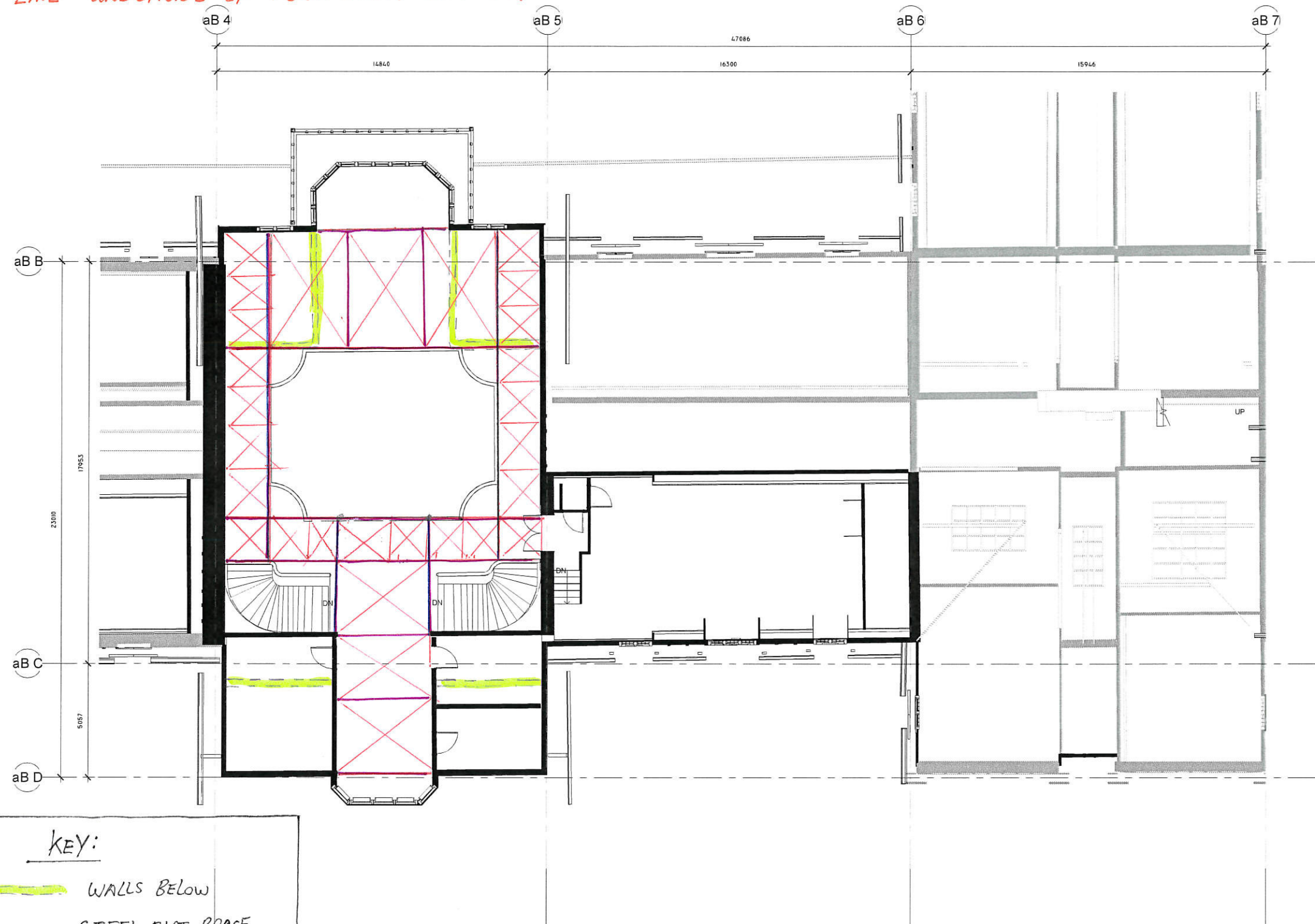
TYPICAL SECTION OF NEW STEEL POCKET



TYPICAL ELEVATION - UNREINFORCED WALL

(6) ATRIUM MEZZANINE FLOOR CONCEPTUAL RETROFIT

OPTION 1: STEEL FLAT BRACING (AS SHOWN ON PLAN BELOW)
OPTION 2: LINE UNDERSIDE OF FLOOR JOISTS WITH PLY.



KEY:

WALLS BELOW

STEEL FLAT BRACE

ISSUE	AMENDMENT	BY	DATE
5	100% VISIBLE ARCHITECTURE & STRUCTURE MODEL ISSUE	asB	02/11/2016
4	80% COMPLETE	asB	27/10/2016

CLIENT



MODELLED BY



PROJECT

Rotorua Museum

Government Gardens Oruawhata Dr, Rotorua 3046

DRAWING TITLE

MEZZANINE PLAN

SHEET STATUS

FOR INFORMATION

SCALE@A1

1 : 100

DATE DRAWN

07/10/2016

DRAWN

AW,SS

DRAWING No.

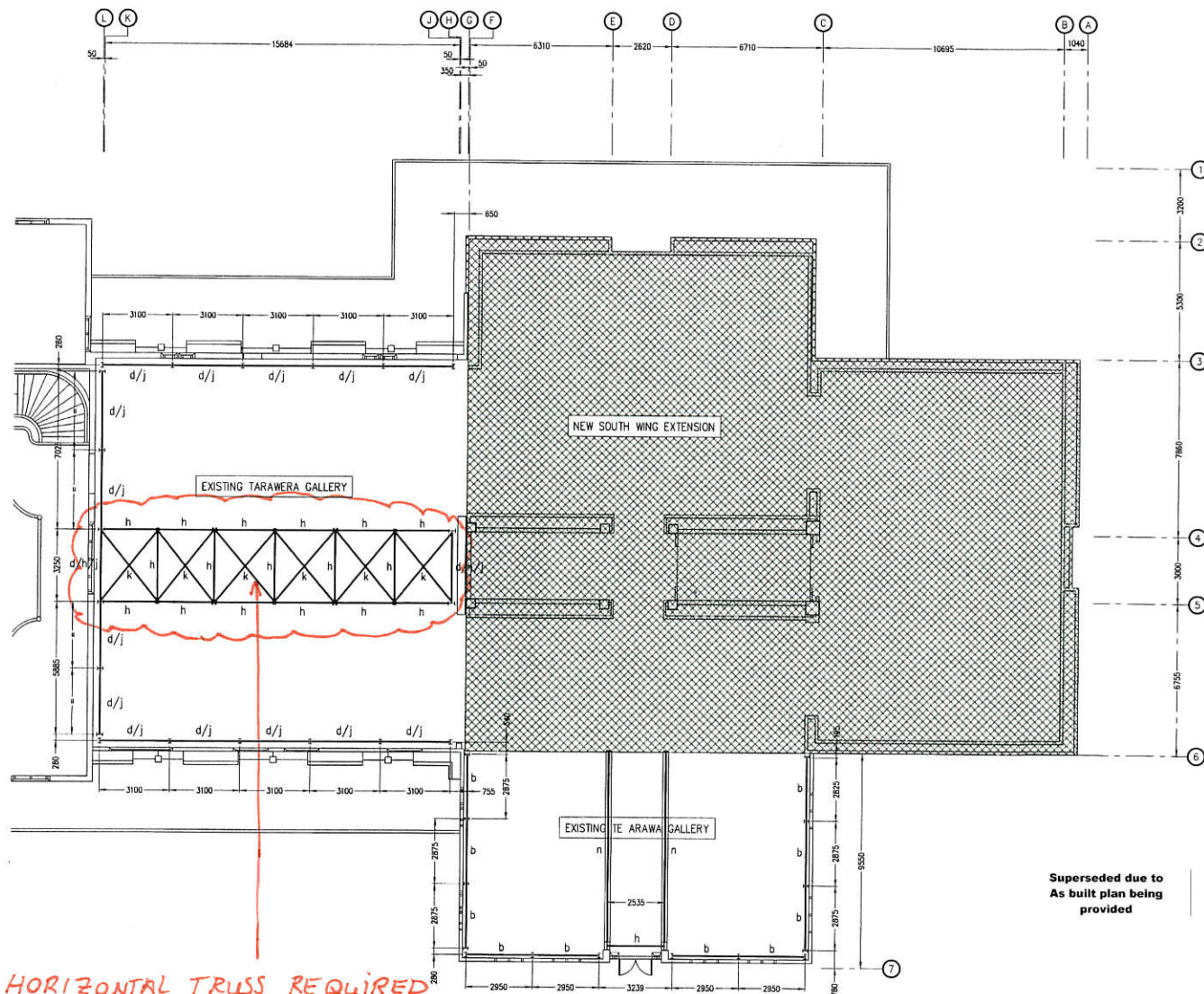
315.A - 113

REV No.

5

FILE PATH: d:\Revit Local Files\315.A - Rotorua Museum - ROTORUA COUNCIL_2015_tm\asbuilt.co.nz

(7) INTERMEDIATE SOUTH WING Conceptual Retrofit - HORIZONTAL TRUSS TO TRUSS TOP CHORDS



KEY:

a	200UB-25
b	250UB-37
c	310UB-40
d	410UB-54
e	R620 REDBRACE
f	R625 REDBRACE
g	100UC-15
h	150UC-23
j	150x150x6 SHS
k	#25 M/S ROD
m	40x40x5 ANGLE
n	360UB-57

CONTRACTOR SHALL SITE CHECK & VERIFY ALL RELEVANT EXISTING & PROPOSED DIMENSIONS.

ALL DIMENSIONS TO CENTRE OF COLUMNS UNLESS NOTED OTHERWISE.

Superseded due to
As built plan being
provided

NEW HORIZONTAL TRUSS REQUIRED
BETWEEN TRUSSES' TOP CHORDS.
USE EXISTING BOTTOM CHORD HORIZONTAL
TRUSS DETAILS.

WALL BRACING PLAN
1:30
(LEVEL '1')

PAGE 1/2.

no	date	issue/revision detail	by	chk
A	10/1/09	FOR SCHEDULING	WU	PF

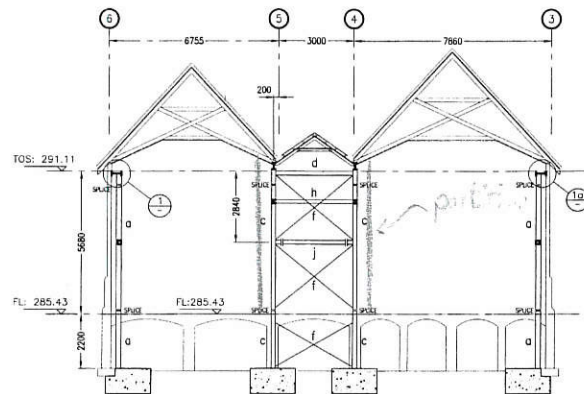
client
**ROTORUA TRUST GALLERY
CENTENNIAL DEVELOPMENT**

project
**SOUTH WING
EXTENSION**

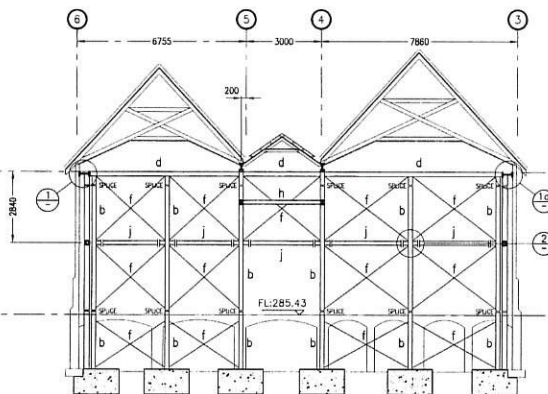
drawing title
**STRUCTURAL STEEL
STRENGTHENING TO
EXISTING GALLERIES**

Scale	As Shown @ 'A1'
File Number	W:\8000\8129\Structure\8129-S(10)3000
drawing number	8129 - S(10)3500
rev	A

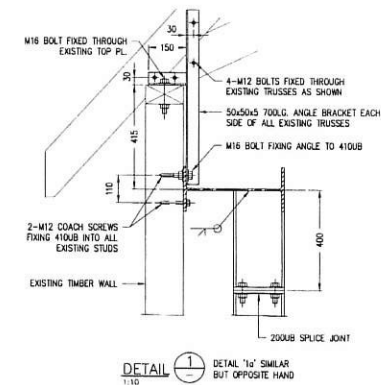
Σ SIGMA
ENGINEERS • ARCHITECTS • PLANNERS
Sigma Consultants Limited
115 Humeau Street
PO Box 553, Rotorua New Zealand
Phone 07-347 3456, Fax 07-347 3459



GRIDLINE 'J'
(LOOKING NORTH)



GRIDLINE 'K'
(LOOKING NORTH)



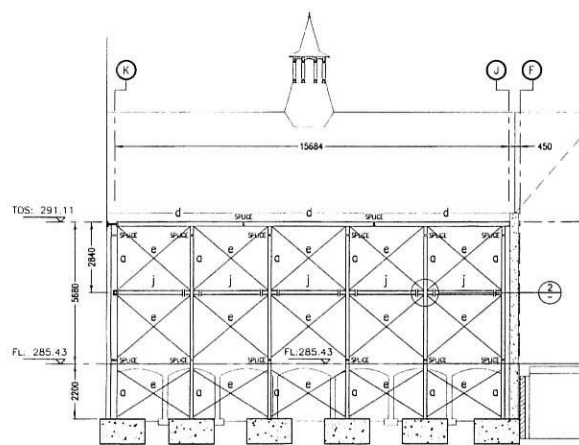
DETAIL 1
1:10

KEY:

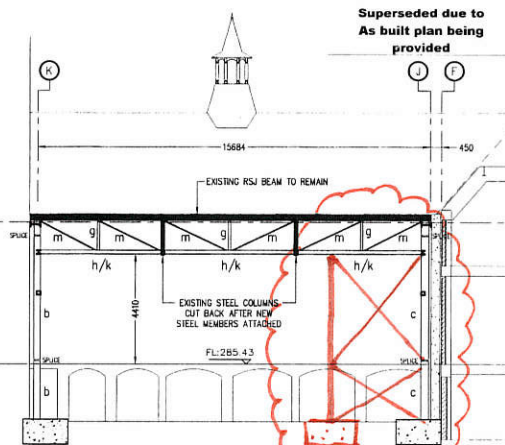
a	200UB-25
b	250UB-37
c	310UB-40
d	410UB-54
e	R825 REDBRACE
f	R825 REDBRACE
g	100UC-15
h	150UC-23
i	150x150x6 SHS
j	#25 M/S ROD
m	40x40x5 ANGLE
n	360UB-57

CONTRACTOR SHALL SITE CHECK & VERIFY ALL RELEVANT EXISTING & PROPOSED DIMENSIONS.

ALL DIMENSIONS TO CENTRE OF COLUMNS UNLESS NOTED OTHERWISE.

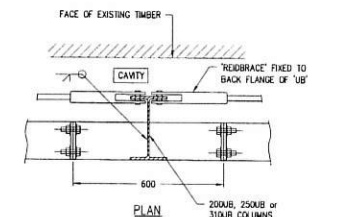


GRIDLINE '3' & '6'
(LOOKING EAST)

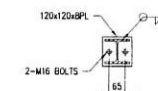


GRIDLINE '4' & '5'
(LOOKING EAST)

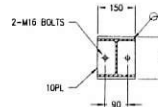
Superseded due to
As built plan being
provided



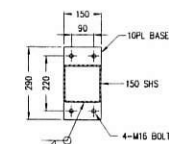
DETAIL 2
1:10



100UC END PL.
1:10



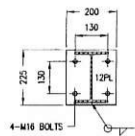
150UC END PL.
1:10



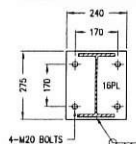
150 SHS SPLICE JOINT
1:10

NEW STEEL
BRACED BAY - WITHIN CENTRAL
PARTITIONS.

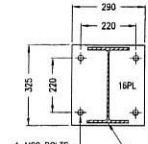
ALLOW FOR 30 GROUT UNDER BASE PLATES



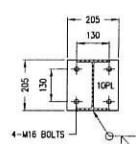
200UB BASE PL.
1:10



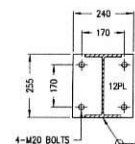
250UB BASE PL.
1:10



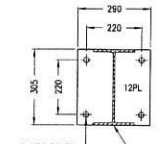
310UB BASE PL.
1:10



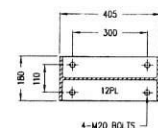
200UB SPLICE JOINT
1:10



250UB SPLICE JOINT
1:10



310UB SPLICE JOINT
1:10



410UB SPLICE JOINT
1:10

no	date	issue/revision detail	by	chk
A	30/1/09	FOR SCHEDULING	MJ	PF

client
ROTORUA TRUST GALLERY
CENTENNIAL DEVELOPMENT

project
SOUTH WING
EXTENSION

drawing title
STRUCTURAL STEEL ELEVATIONS
TO EXISTING TARAWERA GALLERY

Scale
As Shown @ 'A1'
File Number
W:\8000\8129\Structure\8129-S(10)3000
drawing number
8129 - S(10)3600
tee
A

SIGMA
ENGINEERS + ARCHITECTS + PLANNERS
Sigma Consultants Limited
115 Miramar Street
PO Box 553, Rotorua New Zealand
Phone 07-347 3456, Fax 07-347 3459

PAGE 2/2

(8). SOUTH WING CONCEPTUAL RETROFIT - REPLACING BRACING BANANA LINKS IN LOWER BRACING BAYS

PIM/BC

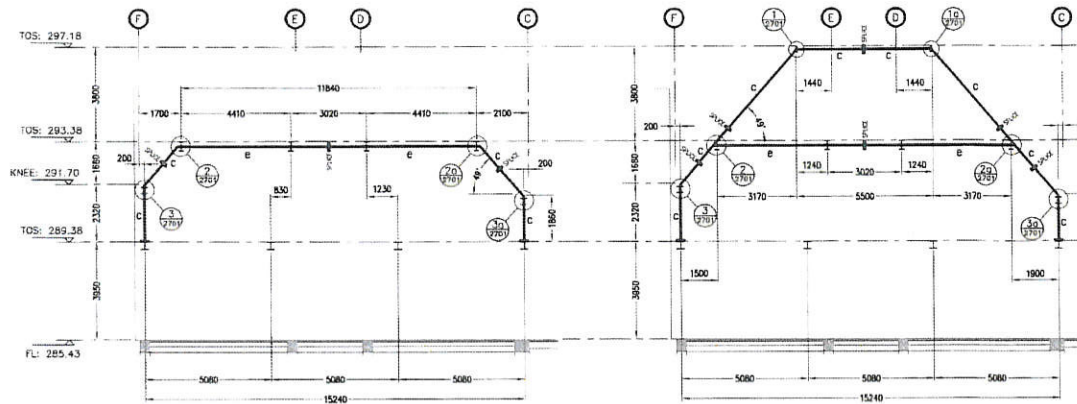
10 - 63686

KEY:

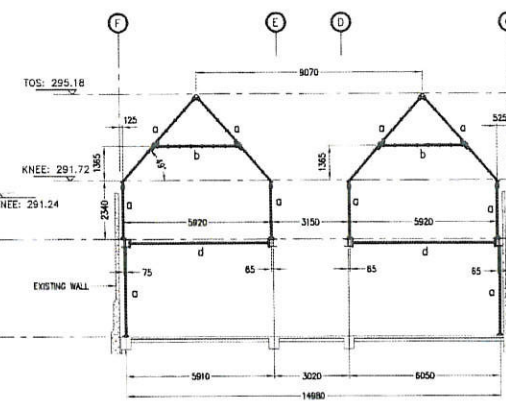
a	100x100x8 S15
b	125x125x5 S15
c	250UC-72
d	310UC-97
e	360UB-45
f	200 PFC
g	250 PFC
h	R825 ROD/BRACE
j	R816 ROD/BRACE
k	R825 ROD/BRACE
m	#20 M/S ROD

CONTRACTOR SHALL SITE CHECK & VERIFY ALL RELEVANT EXISTING & PROPOSED DIMENSIONS.

ALL DIMENSIONS TO CENTRE OF STEEL UNLESS NOTED OTHERWISE.



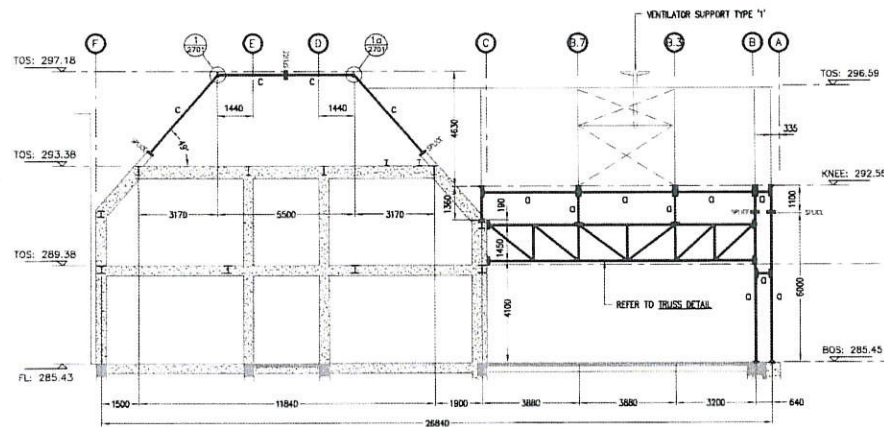
GRIDLINE '3.2' & '5.8'
(LOOKING EAST)



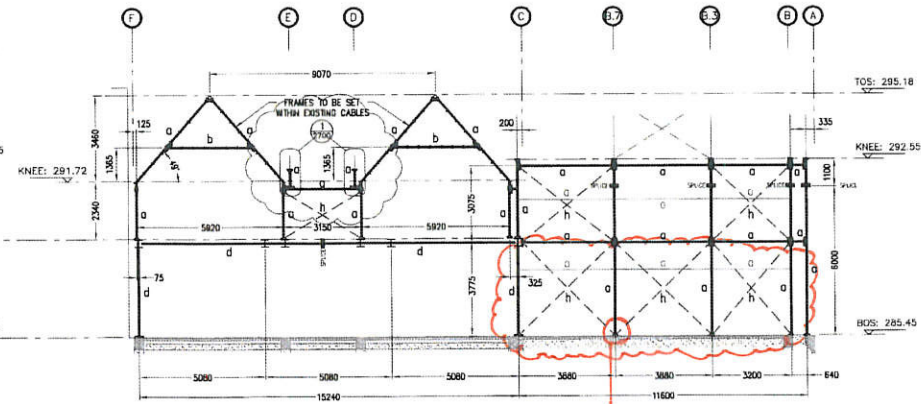
GRIDLINE '3.5' & '5.1'
(LOOKING EAST)

GRIDLINE '6.4'
(LOOKING EAST)

**AS BUILT
PLAN**



GRIDLINE '4' & '5'
(LOOKING EAST)



GRIDLINE '6'
(LOOKING EAST)

REPLACE REID BRACE BANANA LINK
DUCTILE END CONNECTION TO STEEL
FRAME.
FOR LOWER BRACING BAYS ONLY
THROUGHOUT SOUTH WING.

E 24/6/10	DELEG. AUTH'D	MJ	FF
C 18/10/08	FOR CONSTRUCTION	MJ	FF
C 16/5/08	FOR CONSTRUCTION	MJ	FF
B 17/7/09	FOR SCHEDULING	MJ	FF
A 12/12/08	FOR SCHEDULING	MJ	FF
no	date	issue/revision	checked

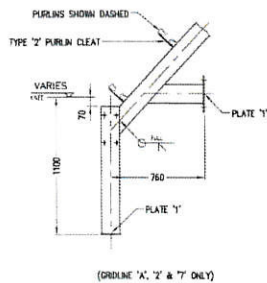
client
ROTORUA TRUST GALLERY
CENTENNIAL DEVELOPMENT

project
SOUTH WING
EXTENSION

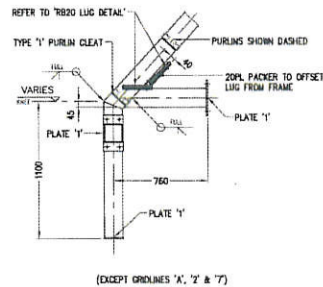
drawing title
STRUCTURAL STEEL
ELEVATIONS

Scale	As Shown @ 'A1'
File Number	W:\8000\8129\Structure\8129-5(10)2500
drawing number	8129 - S(10)2602
rev	E

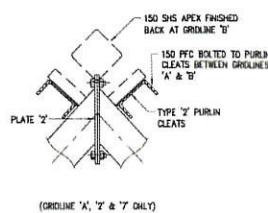
SIGMA
ENGINEERS - ARCHITECTS - PLANNERS
Sigma Consultants Limited
112 Herringway Street
PO Box 855, Rotorua, New Zealand
Phone 07 347 3436 Fax 07 347 3459



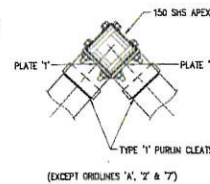
150 SHS KNEE DETAILS



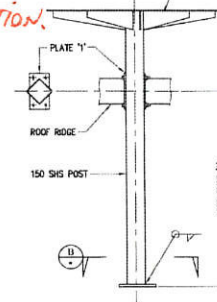
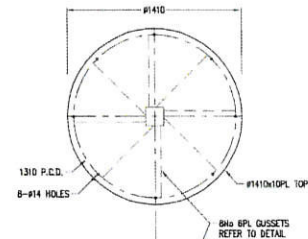
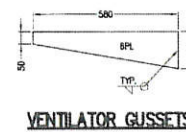
(EXCEPT ORDLINES 'A', 'Z' & '7')



(ORDLINE 'A', 'Z' & '7' ONLY)

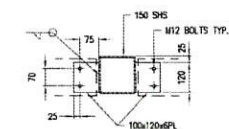


(EXCEPT ORDLINES 'A', 'Z' & '7')

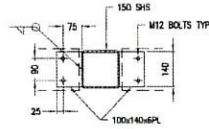


VENTILATOR SUPPORT

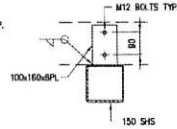
AS BUILT PLAN



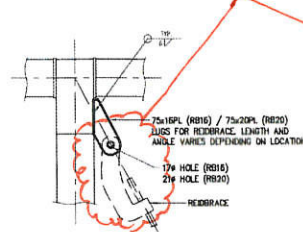
150 SHS CEILING JOIST CLEAT
(128 SINGLE CLEATS)



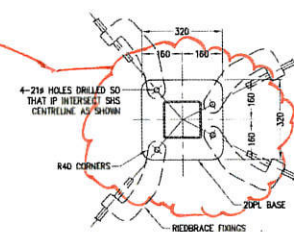
150 SHS PURLIN CLEATS



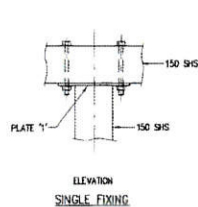
TYPE '2'



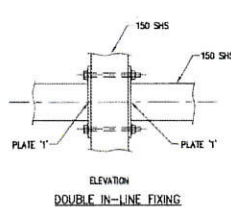
RB16 & RB20 LUG DETAIL



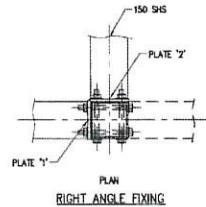
SECTION B



ELEVATION
SINGLE FIXING

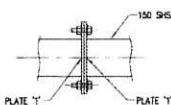


ELEVATION
DOUBLE IN-LINE FIXING



PLAN
RIGHT ANGLE FIXING

STD. 150 SHS JOINTS



150 SHS SPLICING JOINT

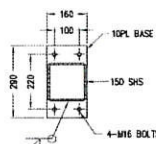


PLATE '1'

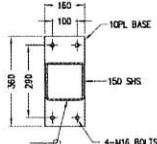


PLATE '2'

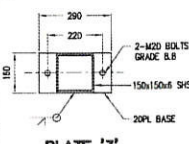
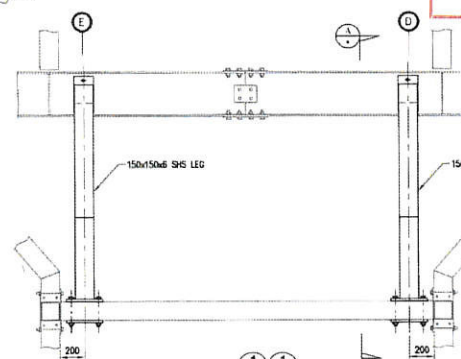
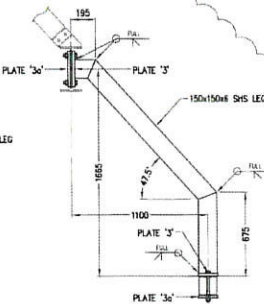


PLATE '3'
PLATE '3' SIMILAR EXCEPT 180L USED ONLY



DETAIL 1
260/260
(LOOKING WEST ORDLINE '3')
(LOOKING EAST ORDLINE '6')



SECTION A

Rev	Date	Issue/Revision	By	CHK
1	12/12/10	DESIGNS ADDED	MJ	PF
2	14/5/12	FOR CONSTRUCTION	MJ	PF
3	27/1/13	FOR SCHEDULING	MJ	PF
4	12/12/13	FOR SCHEDULING	MJ	PF
5	08/12/14	Issue/Revision	By	CHK

ROTORUA TRUST GALLERY
CENTENNIAL DEVELOPMENT

SOUTH WING
EXTENSION

STRUCTURAL STEEL
DETAILS

Scale	As Shown @ 'A1'
File Number	W:\8000\8129\Structure\8129-S(10)2500
Drawing Number	8129 - S(10)2700
Rev	D

SIGMA
ENGINEERS + ARCHITECTS + PLANNERS
Sigma Consultants Limited
112 Hume Road, New Zealand
Phone 07-347 3154 Fax 07-347 3455