External Research Report

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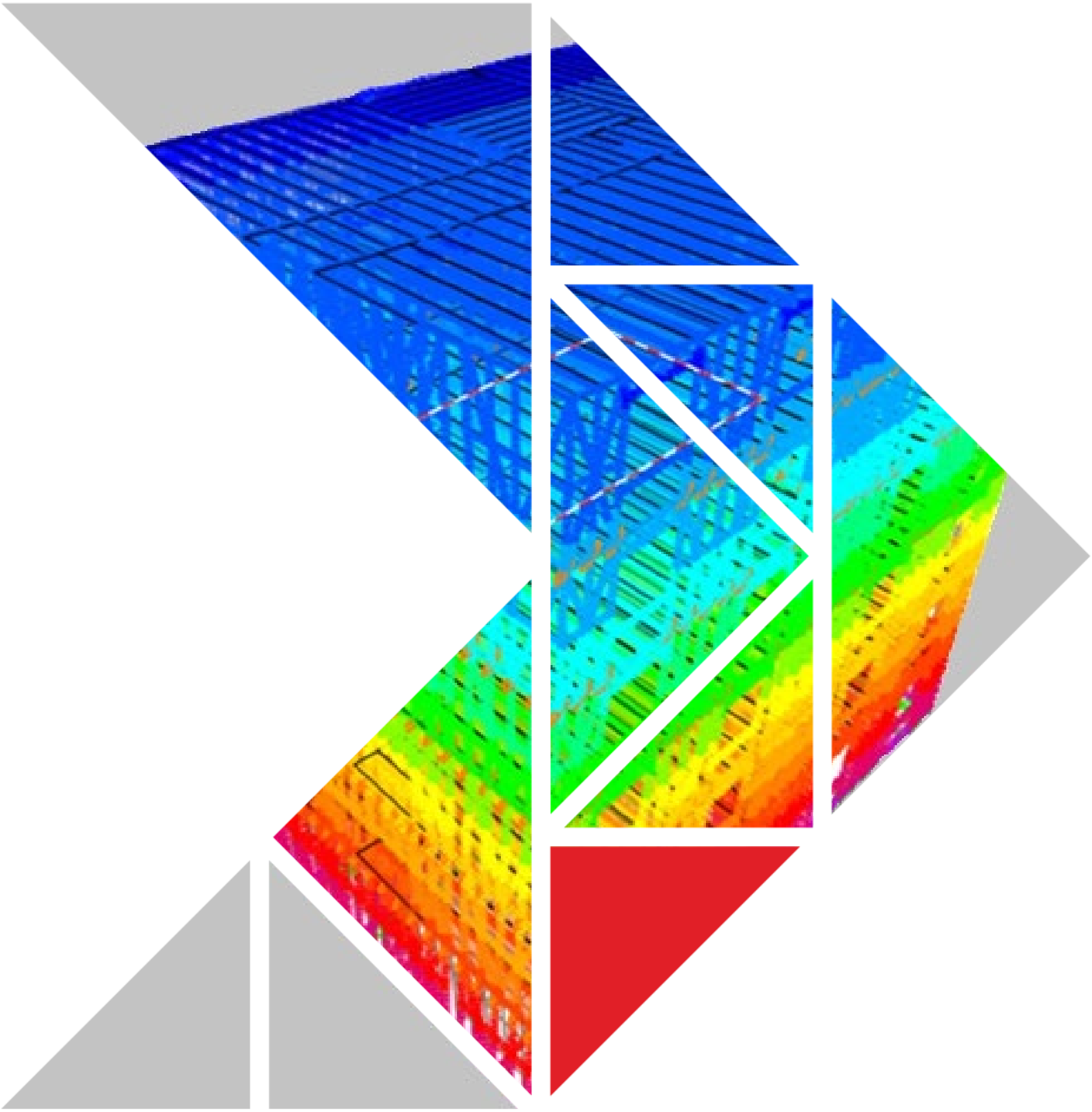
# Specific Design for Multi-storey Light Steel Framed Buildings

Jing Cao, Stephen Hicks and Nandor Mago

Project LR0477

HERA, funded by the Building Research Levy



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# Specific Design for Multi-storey Light Steel Framed Buildings

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# Executive summary

*This report was prepared by Dr Jing Cao of the New Zealand Heavy Engineering Research Association (HERA), which is the main deliverable for 2015/2016 HERA Building Research Levy Investment Programme/BRANZ Project No. LR0477 - 'Specific design for multi-storey light steel framed buildings'.*

*This research project was co-funded by BRANZ and NZ National Association of Steel Framed Housing INC. (NASH). The project aims to initiate a comprehensive study for the construction feasibility of light steel framed (LSF) multi-storey residential building structures in New Zealand Greater Auckland region. This was a proactive industrial response to address the housing crisis due to greater urban density in this region through multi-storey residential buildings, which was encouraged by The Auckland Council Capacity Growth Study 2013 (known as the Auckland Unitary Plan). The research outcome intends to provide reference to the future revision for NASH Standard Part 1 (which is cited in NZBC) and Part 2, which currently covers low rise building (total height up to 10m and Importance level of 1 and 2) only. Engineering professionals and the broader NZ society will also benefit from this project by introducing consideration of the highly recyclable and construction efficient LSF system, alongside other candidates such as timber, reinforced concrete, or heavy steel structural systems, as viable design options.*

*The research was comprised of four work packages (WPs), addressing critical technical issues for such building type to be accepted in New Zealand market. It covers fire performance, seismic performance and cost estimation for an Importance level of 2, 6-storey LSF residential modular building with an 18m total height and plan of 16mx19m. The work packages were as follows:*

- *WP1 – Fire performance of LSF floors in multi-storey residential buildings*
- *WP2 – Performance of stud-to-bottom plate joints in multi-storey residential buildings*
- *WP3 – Development of bracing solutions for light steel framed multi-storey residential buildings*
- *WP4 – Cost for an exemplar six-storey light steel framed building*

*Reports submitted for the four WPs are presented in the separate files presented in the appendices. The table below summarises the completed reports for each WP and corresponding authors.*

| WPs | Report Reference | Authors |
|---|---|---|
| **WP1** | *WP1-R1 HERA REPORT R4-149 v01d04 Specific Design for Multi-storey light steel framed buildings - Fire performance of light steel framed floors in multi-storey residential buildings* | *HERA in co-oporation with BRANZ* |
| | *WP1-R2 Fire test report FR 5912 – Fire resistance of a load bearing floor/ceiling system* | |
| **WP2** | *WP2-R1 Experimental testing of connections for multi-storey light steel frame buildings* | *University of Auckland* |
| **WP3** | *WP3-R1 Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building incorporating results from WP2* | *University of Auckland* |
| **WP4** | *WP4-R1 Cost structure of exemplar multi-storey light steel framed residential building* | *Massey University* |
| | *WP4-R2 Appendix 1 -Cost estimate* | *Massey University* |
| | *WP4-R3 18021/BRANZ/NZSH Research on specific design of multi-storey light steel framed buildings – structural report* | *EXTRAMILE consulting structural engineers* |

*WP1 investigated the fire performance of the light framed steel floor system in G550 sections. It was identified that both C-section joist floor and lattice floor system almost had an equal market share in New Zealand. Considering that the fire performance for C-section joist floors had been conducted already in New Zealand (e.g. BRANZ appraised GIB products for joist floor) and overseas (e.g. UK tests at BRE for S280 C-section joist floor), the working group decided the research focus to be the lattice floor system.*

*The research consisted of two parts. In the first part, a reduced scale loaded fire test for 4mx3m lattice floor system was performed at BRANZ fire laboratory (WP1-R1). The floor fire performance was identified as FRP=60/30/60, governed by integrity criteria. It was observed that weak detailing of plasterboard joints overlapping in one direction between inner and outer layers caused the flame passing through to the unexposed surface at 59 mins, much earlier than expected. The FRP should really be higher than 60/60/60, should sufficient offset of plasterboard joints in both directions be provided. The second part was advanced numerical modelling conducted by HERA (WP1-R1). The purpose was to establish a well verified model for further analysis of the fundamental fire behaviour of the laboratory test, which could be extended to predict fire performance for other similar floor types for the New Zealand market.*

*WP2 and WP3 were two interrelated work packages, aimed at developing an innovative bracing system to resist seismic actions. Whilst the seismic demand in Auckland region is less compared with metro regions in South Island, the developed system was deemed to serve nationwide application in the long run. The developed bracing system was formed by shear wall system designed and detailed to a limited controlled rocking mechanism. The rocking mode during earthquake was achieved by tension and compression capability of the bolted holding-down connection details between horizontal top/bottom channels of the adjacent walls between storeys and to the RC foundations.*

*The methodology proposed by University of Auckland was to conduct laboratory tests for the stud-to-bottom connection details for inter-storey and ground floor to foundation scenarios, under both tension and compression axial loadings. The full course load-axial deformation curves derived from the tests were further adopted in a SAP2000 model for a desk-top study for the seismic behaviour of the modular building. As permitted by NZS 1170.5 s1 Cl.C6.6, a non-linear static pushover analysis was carried out in a 'special study' for the rocking bracing system. The proposed bracing system was developed to satisfy strength and deflection criteria for seismic demanding at ULS and maximum considered event (MCE) level (2500 years return period for the type of the studied building, as per NZS 1170.5 s1 C3.1.4). The research also targeted at a global structural ductility μ=2. The laboratory tests for stud-to-bottom connections are summarized in WP2-R1. The detailed structural analysis in SAP2000 is presented in WP3-R1.*

*A chartered structural engineer (EXTRAMILE) was engaged during the interface of WP3 and WP4. The structural engineer was responsible for assisting the University of Auckland to optimise the proposed seismic bracing system to suit practical scenarios such as local design practice and manufacturing capability. Meanwhile, the structural engineer prepared specifications for structural elements and primary non-structural internal/external cladding, etc. for WP4, through performing a detailed design of the proposed modular building, including the foundation system under gravity, wind and seismic demand for Auckland region. The detailed design report and structural drawings are presented in WP4-R3.*

*The initial intention of WP4 was to establish a cost comparison of the proposed LSF multi-storey building with a building in similar structural configuration but constructed in another popular NZ construction material, (e.g. timber). Due to the budgetary limitation, Massey University was involved to conduct a quantity survey for the proposed LSF building from WP3 only. The main surveyed items focused on those unique to LSF building such as the primary LSF structural elements, foundation (as per structural design in WP4-R3), construction cost etc.. Primary non-structural claddings for walls, roofs and internal plaster boards were also calculated. The common items to buildings in other materials, such as services, were neglected. The estimated building cost is NZD $3,801,296.39. The detailed methodology, assumptions and discussion for the quantity survey and key survey outcome is presented in WP4-R1, which is accompanied by an Appendix for a detailed cost estimate for bill of quantity, as presented in WP4-R2.*

# Appendix

# WP1-R1

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# SPECIFIC DESIGN FOR MULTI-STORY LIGHT STEEL FRAMED BUILDINGS

# FIRE PERFORMANCE OF LIGHT STEEL FRAMED FLOORS IN MULTI-STORY RESIDENTIAL BUILDINGS

## HERA REPORT R4-149

**OCTOBER 2016**

| Version | Date of Issue | Purpose | Author | Technical Reviewer | Approved |
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| 3 | 25/10/2016 | Final | NM | JC | |

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# EXECUTIVE SUMMARY

This report was prepared by Nandor Mago of the New Zealand Heavy Engineering Research Association (HERA), who was responsible for the finite element modelling/analyses (FEA). Sequentially coupled realistic thermal-stress simulations of experimentally tested light gauged steel floors in fire are reported herein. European Grade S280GD galvanized steel (yield strength 280MPa) is compared with Australasian produced steel Grade 550 (yield strength 550MPa).

Firstly, the influence of steel grade was assessed on an experimentally tested floor, which turned out to be negligible.

Secondly, a typical New Zealand light gauge steel truss floor from Grade 550, 0.75mm thick steel fire resistance rating was predicted. The ceiling consisted of two layers of 13mm thick fire rated plasterboard, 100mm thick fibreglass insulation, Rondo ceiling battens and clips. The study shows that a typical 6m span, simply supported, 350mm deep truss, 20mm particle board floor loaded with 2kPa uniformly distributed pressure is expected to resist 60minutes of fire.

This report covers only the first part of the project under the title “Fire performance of light steel framed floors in multi-story residential buildings” of the 2015/16 Building Research Levy Investment Programme.

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# 1 INTRODUCTION

## 1.1 Objectives

In 2008 the Steel Construction Institute (SCI) conducted a loaded fire test on a 4.1 m span light steel frame floor at the Building Research Establishment (BRE) in the UK [1] (which is equivalent to BRANZ). Supporting a loading of 2.5kPa, the test specimen achieved an FRR of 90minutes. In order to satisfy the acoustic requirements for a separating floor in a multi-storey residential building, the ceiling was formed from 3 layers of 12.5mm fire resistant plasterboard. However, the 200mm deep C-sections were formed from 1.6mm thick European grade S280GD galvanized steel (yield strength 280MPa); this type of steel is very different from that used in Australasia, which is normally G500 or G550 (yield strength 500 or 550 MPa). Given that it has been shown that high strength Australasian produced steels lose their strength more rapidly at elevated temperatures than European steels [2], it is necessary to reconsider the performance of NZ made light steel framed floors in fire. It is therefore proposed that HERA will model the fire test conducted in the UK using finite element analyses, before investigating the effect on the fire resistance of using thinner high strength Australasian steel. Following an optimizing process, it is proposed to verify the performance of a typical light steel frame floor within an exemplar New Zealand multi-storey building by undertaking a loaded fire test at BRANZ using the full extent of their 4.0m long × 3.0m wide furnace. As well as providing input into the fire section of the resulting design guide, the BRANZ test certificate will also provide NZ light steel framing manufacturers access to overseas markets.

# 2 FEA OF BRE (UK) FIRE TEST

## 2.1 Sequentially coupled thermal-stress analysis

The FEA presented in this chapter is based on BRE Test report number 241607 under the title “Fire resistance test in accordance with EN 1365-2:2000 on light steel-framed loaded floor” issued in 2008 [3]. This chapter should be read in conjunction with [3] and the experimental fire test details are not repeated herein.

The objectives of the analysis were as follows:

1. To match the recorded joist thermocouple readings and floor centre deflection.
2. To change the joists/resilient bars from European grade S280GD to NZ G550 and assess the influence on the floor centre deflection.

Abaqus/CAE/Standard version 6.14-1 was used to perform the numerical simulations (i.e. FEA) [4].

Firstly a representative cut out segment from the floor was analysed in detail to find out the most representative thermal material/interaction properties that can be applied on the floor slab. This simple model is shown in Figure 2.1.

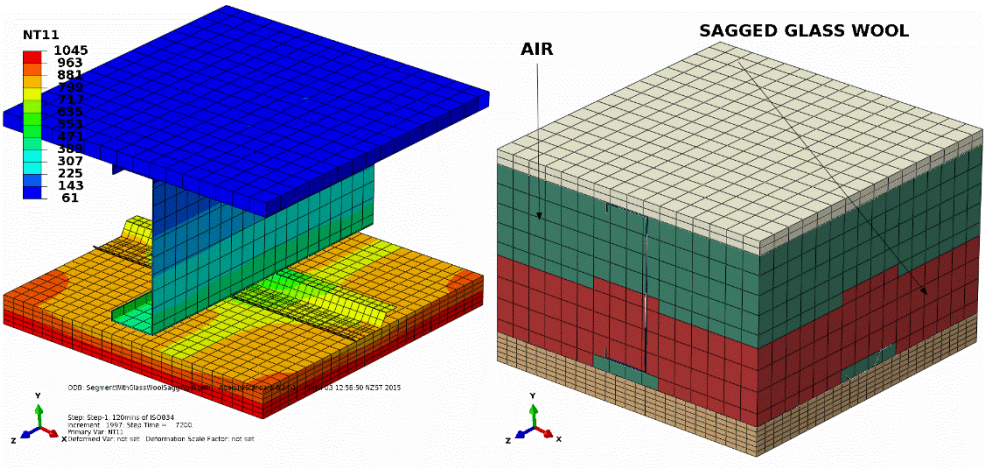


**Figure 2.1** *Simple heat transfer model to calibrate the thermal properties. Temperature contour plot (left) after 2hours of fire.*

The thermal model comprises of plasterboard, steel resilient bars running underneath the steel joists, chipboard flooring, air and sagged glass wool insulation.

The thermal boundary conditions (actually Abaqus interactions) were specified on the floor top and bottom face. The experimentally recorded mean furnace temperature closely followed the ISO 834 curve and it was directly applied to the plasterboard face through surface radiation and convection. The coefficient of heat transfer by convection on the surface exposed to the fire of 25W/m$^2$K was set. Thermal emissivity of 0.99 was chosen, as this value predicted the experimentally recorded temperatures more closely. The chipboard flooring coefficient of convection and emissivity of 4W/m$^2$K and 0.9 was specified, respectively. It was assumed that conduction takes place through the three layers of plasterboard, through the resilient bars, insulation, air, steel joist/channel runners and chipboard flooring.

The temperature dependent material properties (thermal conduction, specific heat and density) for gypsum, glass wool insulation and chipboard vary wildly in the literature. This data is partly given in [3], thus literature review and several iterations with material property estimates were required to match as closely as possible the thermocouple readings in the joist bottom flange and web.

Furthermore, the thermocouples position relative to the resilient bars and along the web height are not given in [3]. However, the temperature in the 1.6mm thick joists bottom flange and web varies along the length and height as it is shown in Figure 2.3 and Figure 2.2. Therefore, the author extracted all nodal temperatures from the bottom flange and web and compared them to the experimentally recorded ones. The following Abaqus files document this work: NASH-BRANZ2015.cae, SegmentWithGlassWoolSagging-A.inp/odb. The material properties used are given in the input (inp) file, which can be opened with any text editor (search for Material).

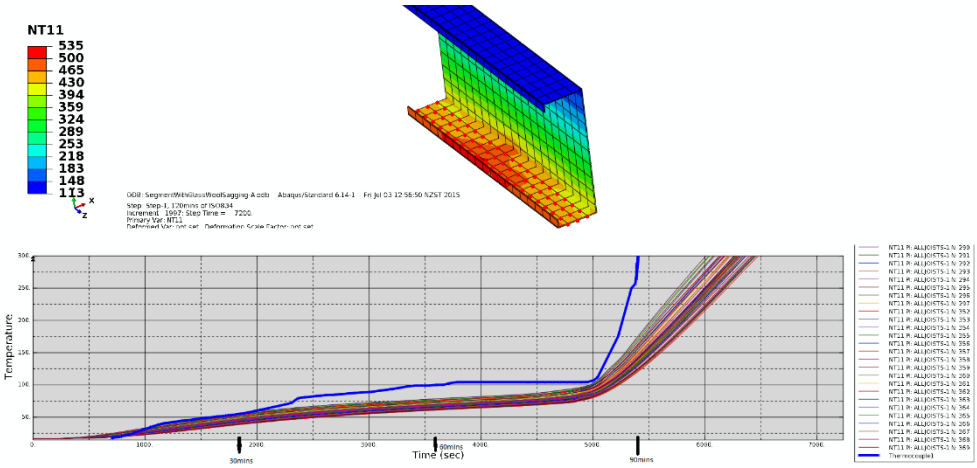


**Figure 2.2** *Temperature comparison thermocouple 1 versus the red highlighted bottom flange nodes in the simple FE model.*

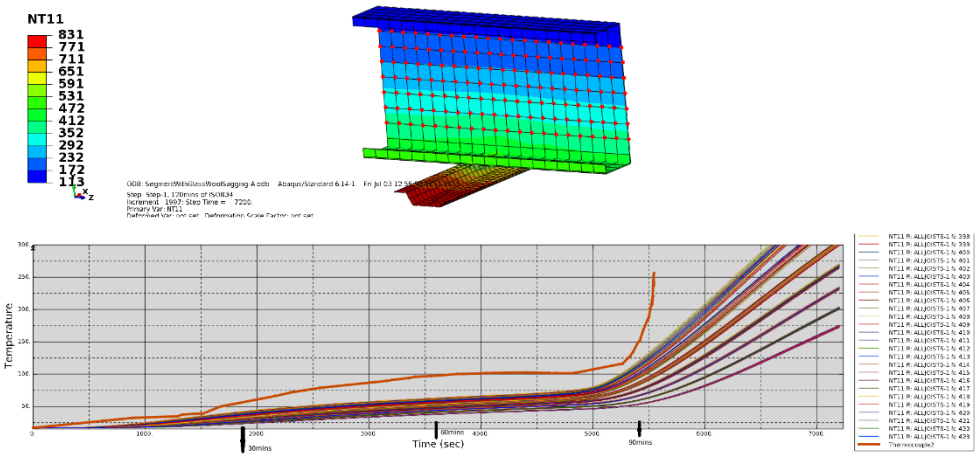


**Figure 2.3** *Temperature comparison thermocouple 2 versus the red highlighted web nodes in the simple FE model.*

The results presented above are the outcome of transient heat transfer analyses up to 2 hours and do not capture exactly the rapid rise in the temperature around 90minutes, when integrity failure (i.e. flames penetrating through the gypsum board) were recoded experimentally. Modelling ablation of plasterboard and flame penetration requires very arduous structural simulations coupled with computational fluid dynamics, which was beyond the scope of this project (it is questionable if it can be done at all). However, it is possible to modify the plasterboard and insulation thermal conductivity and specific heat to account for this phenomena, as it was found out later from [5]. The results of this study are given in Figure 2.4 and Figure 2.5, with

the documenting files being breTestRNo241607-HeatT-Abl-B.inp/odb, SegmentWithGlassWoolSagging-Ablation-B.inp/odb.

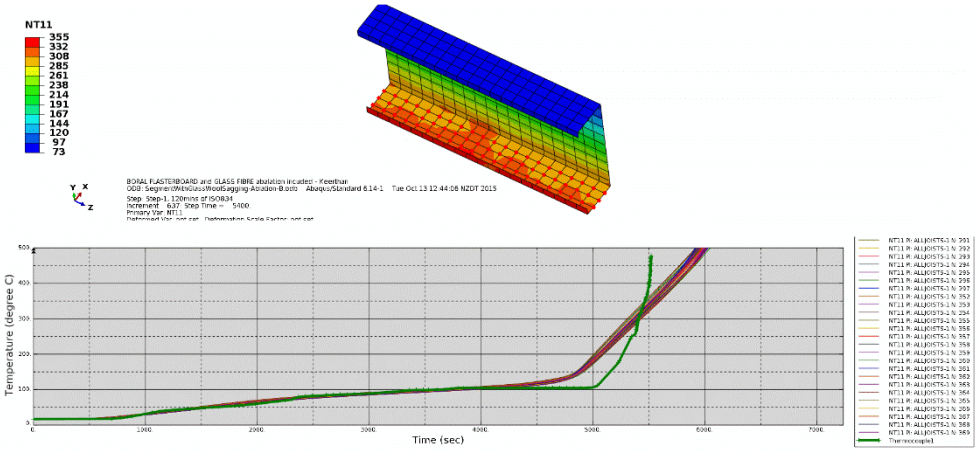


**Figure 2.4** *Temperature comparison thermocouple 1 versus the red highlighted bottom flange nodes in the simple FE model - ablation included in the material properties [5].*

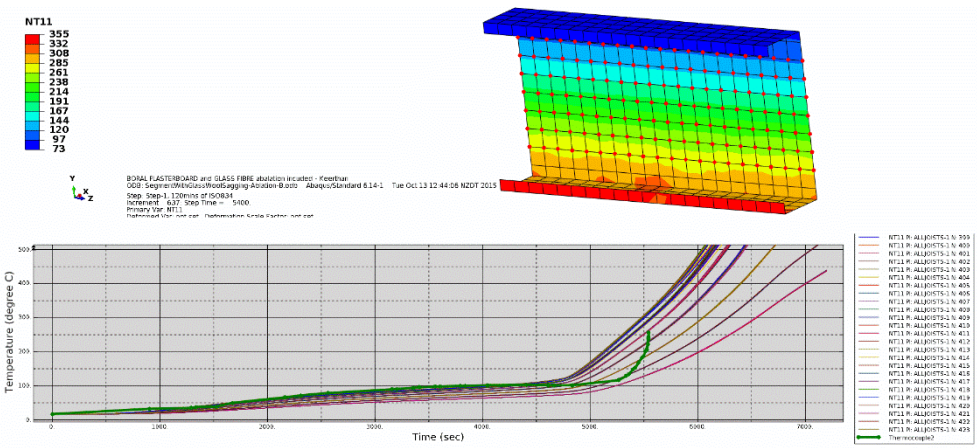


**Figure 2.5** *Temperature comparison thermocouple 2 versus the red highlighted web nodes in the simple FE model - ablation included in the material properties [5].*

The comparisons above show that the onset of failure around 90 minutes of fire is better predicted without the ablation included in the gypsum and insulation thermal material properties (Figure 2.2 and Figure 2.3). However the temperatures are higher than experimentally recorded ones.

On the other hand if ablation is included, the FEA predicted temperatures are much closer to the thermocouple readings, while the onset of failure (i.e. start of rapid temperature rise) is delayed (Figure 2.4 and Figure 2.5).

Consequently both options were implemented in the BRE floor slab simulations.

Following the numerical exercise described above using similar modelling approach half of the floor slab was modelled, taking advantage of symmetry. Transient heat transfer analysis on the undeformed shape was carried out with identical thermal properties used on the simple model (firstly without accounting for ablation). The half model heat transfer analysis has been recorded in breTestRNo241607-HeatT.inp/odb files.

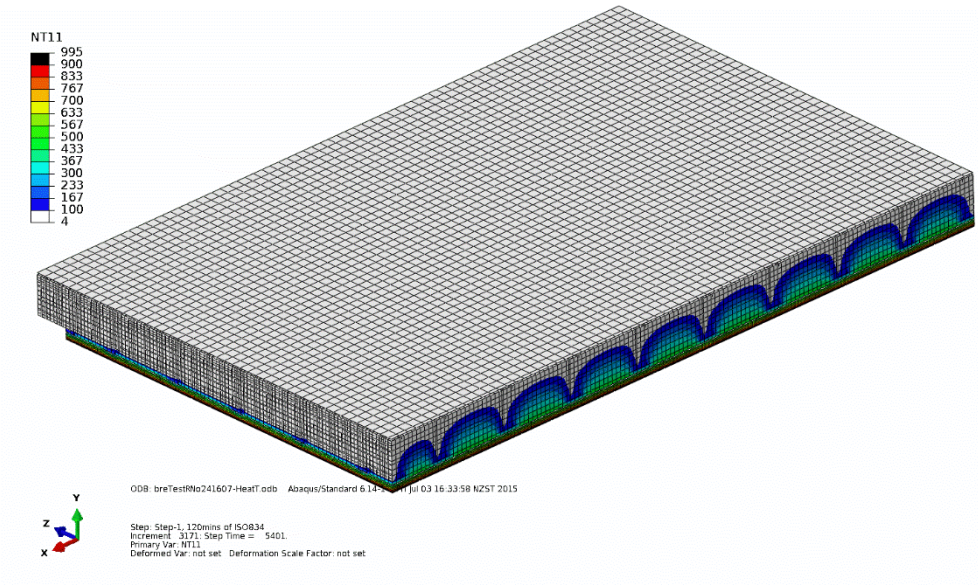


**Figure 2.6** *Temperature contour plot for 90minutes of fire on the half model showing the FE mesh.*

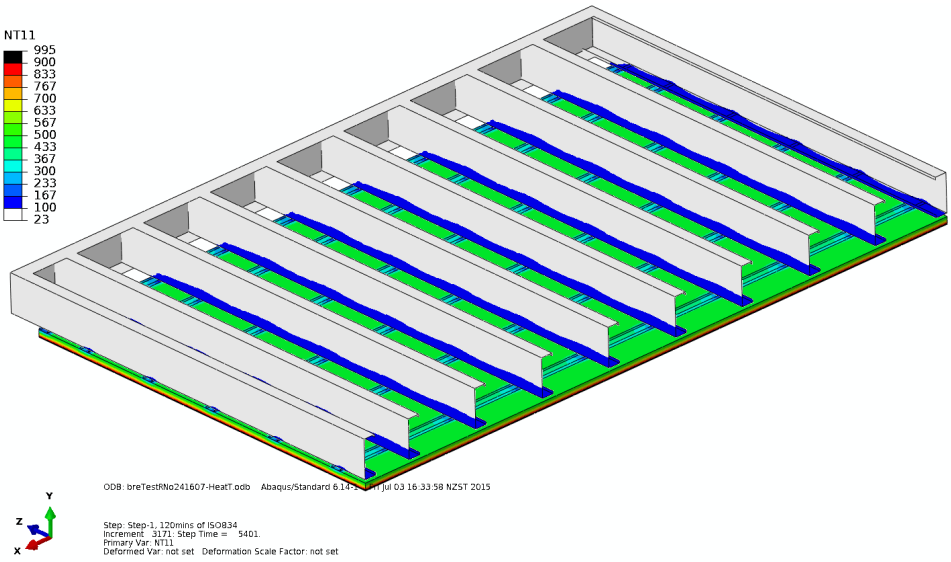


**Figure 2.7** *Temperature contour plot for 90minutes of fire on steel members and plasterboard.*

Subsequently the structural FE model was set up. The air and glass wool insulation was neglected. Abaqus general contact was specified which takes into account all contacting parts. The screws were modelled with mesh independent fasteners. According to the BRE report “an initial deflection of approximately 9mm was measured when loading the floor with the dead weights”. This compares to 8.4mm chipboard flooring centre deflection from FEA, deemed to be adequate. Figure 2.8 shows the structural model.

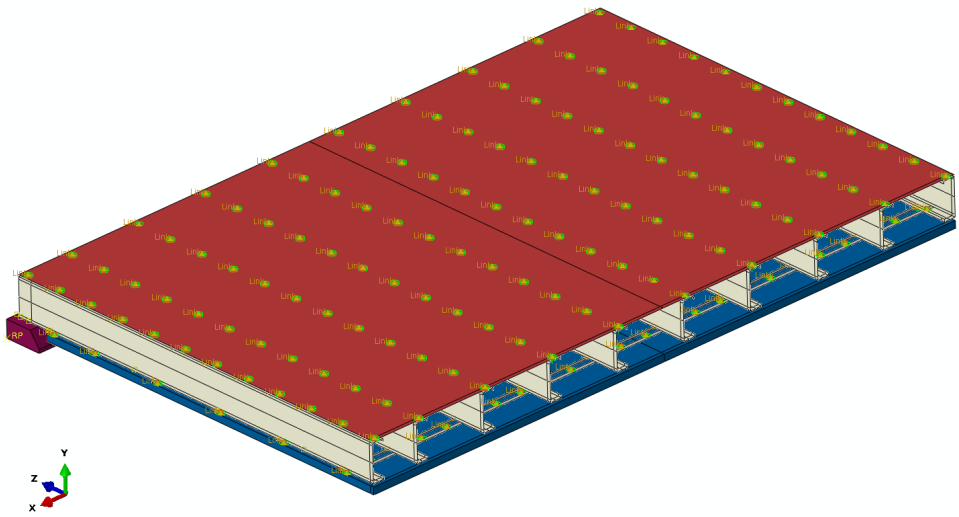


**Figure 2.8** *Structural model showing the screws modelled.*

The 20-25mm average element size mesh for main load carrying members was compatible between the two analysis procedures, with the appropriate element types assigned for the thermal and stress analyses.

Following the application of self-weight and 2.5kPa uniformly distributed pressure, the previously calculated nodal temperatures were applied. The steel, chipboard and plasterboard Young's modulus, density and coefficient of thermal expansion as a function of temperature were used in the numerical simulation. In addition, temperature dependent classical metal plasticity for European grade S280GD and Australasian grade 550 were implemented in two different FE models, which have been documented in breTestRNo241607-Stress-A.inp/odb and breTestRNo241607-Stress-A-NZ.inp/odb files, respectively. Some odb files are very large, thus they remain documented only on the HERA's FEA hardware.

The gypsum and chipboard (and particle board) were modelled as a linear elastic isotropic material being temperature dependent. The coefficient of thermal expansion was also a function of temperature, too. Classical metal plasticity was built in for steel up to 1100°C.

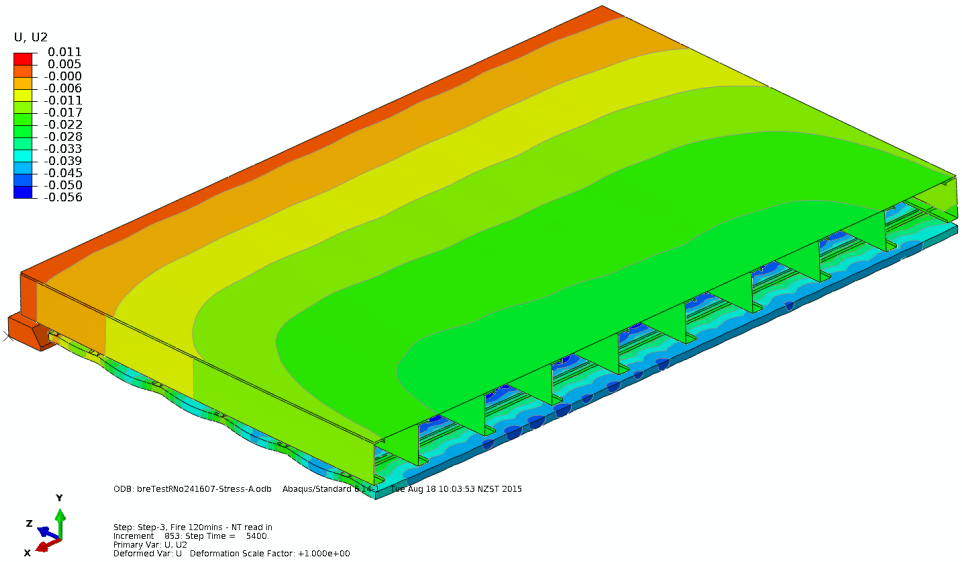


**Figure 2.9** *Deflection contour plot (m) at 90minutes of fire – grade S280GD steel.*

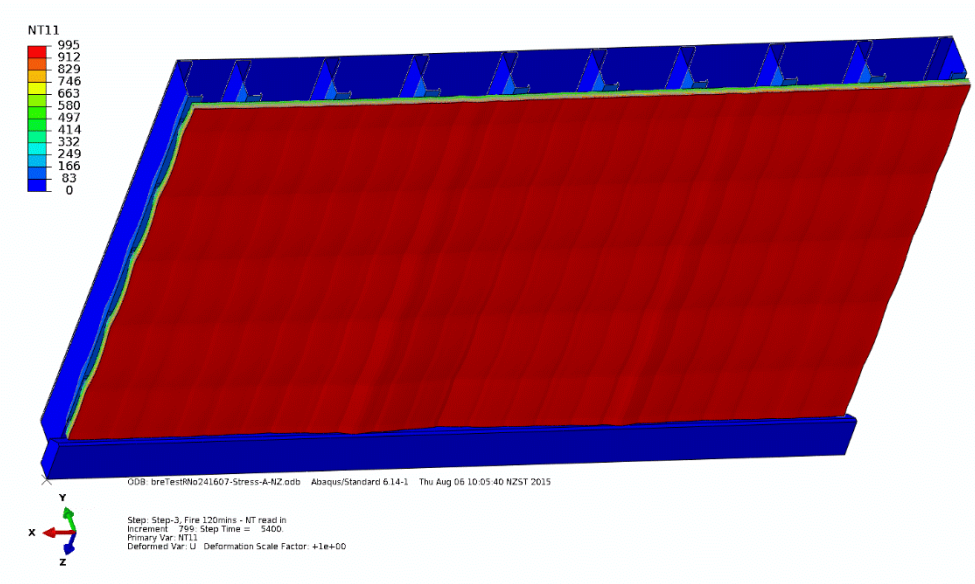


**Figure 2.10** *Temperature (°C) contour plot at 90minutes of fire – grade 550 steel.*

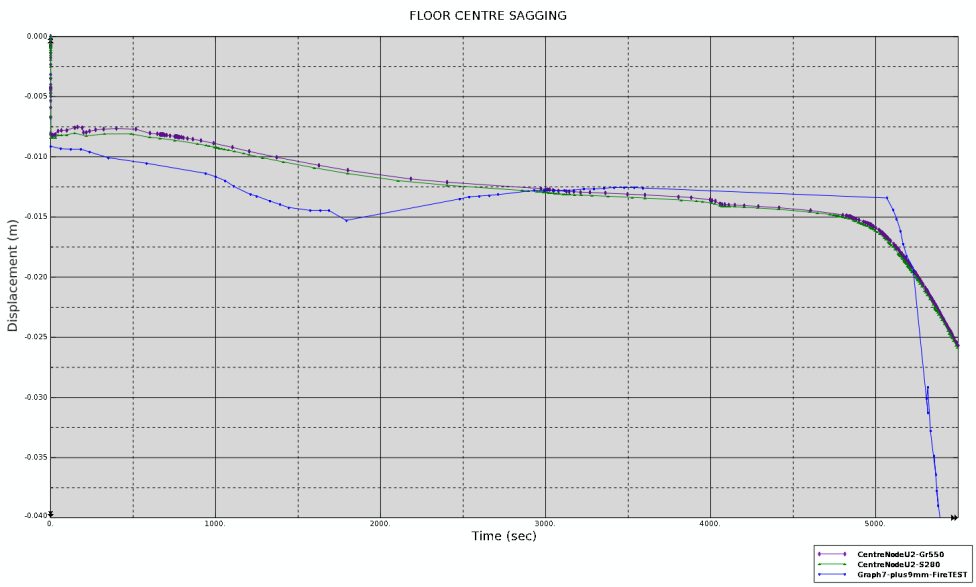

**Figure 2.11** *Floor centre sagging versus time. Experimentally recorded and FEA predicted sagging for grade S280GD, Grade 550 steels.*

Figure 2.11 shows that the deflection is negligibly smaller for Grade 550 steel. The C shaped steel joists thickness was kept constant 1.6mm in both cases. Therefore, the higher grade New Zealand made steel fire performance is directly comparable to the lower strength European steel.

Should we account for ablation in the gypsum board and insulation properties, as recommended in [5], the slab centre node deflection becomes larger and rapid increase in deflection (associated with the onset of failure) occurs conservatively earlier in fire. However, there is hardly any influence of the grade of steel.

Figure 2.12 shows the history of slab centre sagging for two grades of steel and gypsum/insulation material properties implemented with and without ablation. These options were investigated in breTestRNo241607-HeatT-Abl-B.inp/odb, breTestRNo241607-Stress-A-Abl-B.inp/odb (European grade S280GD) and breTestRNo241607-Stress-A-NZ-Abl-B.inp/odb (grade 550 steel) files.

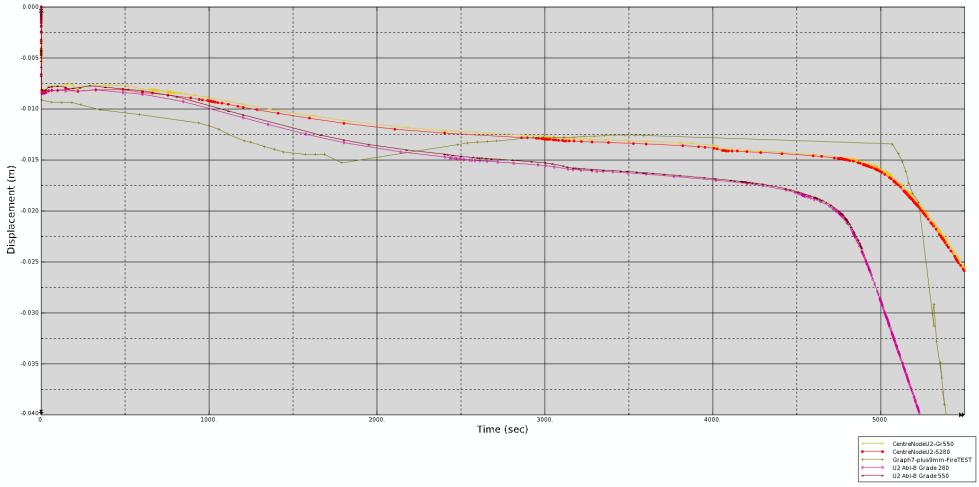


**Figure 2.12** *Floor centre sagging versus time for FE models accounting or not for ablation in gypsum and insulation. Experimentally recorded and FEA predicted sagging for grade S280GD, Grade 550 steels.*

Figure 2.12 also shows that the limiting slab centre deflection in fire is reached conservatively earlier when ablation is included in the plasterboard and insulation thermal properties. Therefore, the typical New Zealand light weight floor slab was investigated based on these material properties.

The BRE fire resistance test (2008) was performed in accordance with EN 1365-2:2000 (with reference to EN 1363-1:1999). There are three performance criteria:

1. Load bearing capacity – can be assessed by numerical simulations

   a) Limiting deflection
   b) Limiting deflection rate
2. Integrity – cannot be assessed by the simulations presented herein
3. Insulation - can be assessed by numerical simulations
   a) Increase the average temperature above the initial average temperature by more than 140°C or
   b) Increase at any location above the initial average temperature by more than 180°C.

"The rate of deflection criteria is not applied until a deflection of L/30 has been reached" (EN 1363-1:1999). However, it appears that this was too generous and "the rate of deflection criteria is not applied in the first 10 min of the fire test" according to EN 1363-1:2012. The measurement of deflection "shall be capable of operating at a frequency of at least one reading per minute."

The sampling frequency of deflection in numerical simulations is generally much finer than 1 minute and it can mean that the rate of deflection criteria governs. In addition, the tighter criteria for deflection rate means that test performed in the past should be evaluated again to the current version of the standard.

Figure 2.13 shows that the insulation criterion does not govern as the maximum temperature reached is 47.6°C and 28.6°C at 93minutes with and without ablation accounted for, respectively. Figure 2.14 shows the mean temperature comparison. The temperatures were only recorded in selected location in the fire test, while the numerical simulation allows to calculate the average temperatures for all the nodes on the surface.

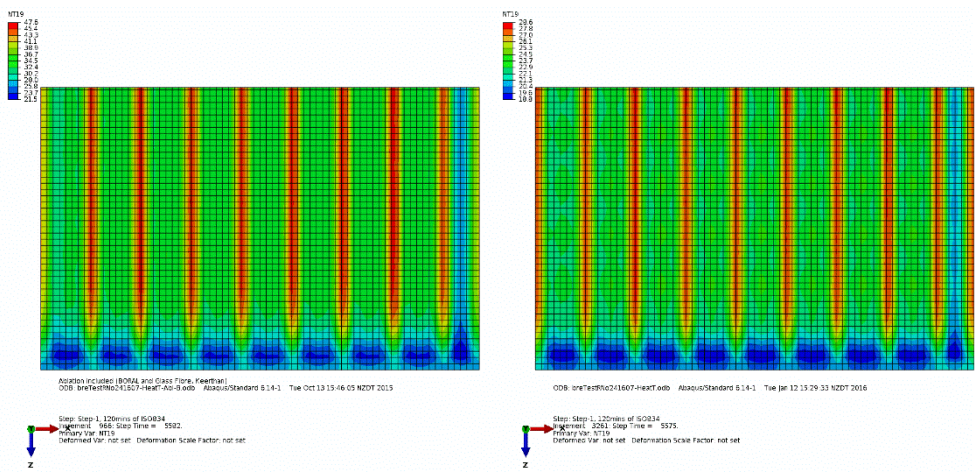

**Figure 2.13** *Particle board top face nodal temperatures with (left) and without ablation accounted for - 93minutes.*

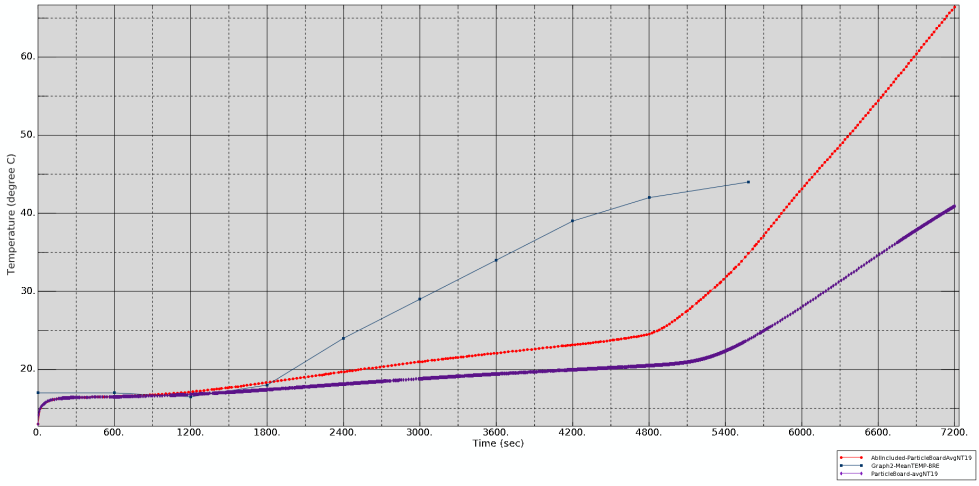


**Figure 2.14** *History of particle board top face mean nodal temperatures with and without ablation accounted for versus mean temperature recorded in the fire test.*

# 3 FEA OF A TYPICAL NZ FLOOR SLAB

## 3.1 General

This chapter intends to verify the performance of a typical light steel frame floor within an exemplar New Zealand multi-storey building. NASH (and their members) provided the data for a typical floor in practice, which is as follows:

- 0.75mm thick Grade 550 steel, 350mm deep Frametek (FTK) truss, spanning 6m and loaded with 2kPa uniformly distributed pressure. The floor joists spacing is 600mm centre to centre.
- 20mm thick particle board is screwed to the top chord of the truss. Rondo 311 clips are fixed to the truss bottom chord, which hold the Gib Rondo 311D ceiling battens. Two layers of 13mm fire rated plasterboards form the ceiling. 100mm thick fibre glass insulation is placed between the steel trusses.

The truss is typically supported by 89mm wide steel framed walls. Walls are also sitting on the particle board at the floor edges (like being clamped). However, this setup is not practical for the proposed BRANZ fire test. The truss will be supported only from underneath, which is conservative in relation to the boundary conditions in practice (i.e. simply supported by the top of the test frame). Therefore, the truss bottom chord ends were pinned (i.e. prevented to move in any direction), like being screwed to the top of a wall.

A 600mm wide strip from the floor with one FTK truss in the middle was modelled, with symmetrical boundary conditions applied at the end planes of the 600mm

tributary width. In addition, only half of the span was modelled in both cases taking advantage of symmetry. Figure 3.1 shows the 6m span model.

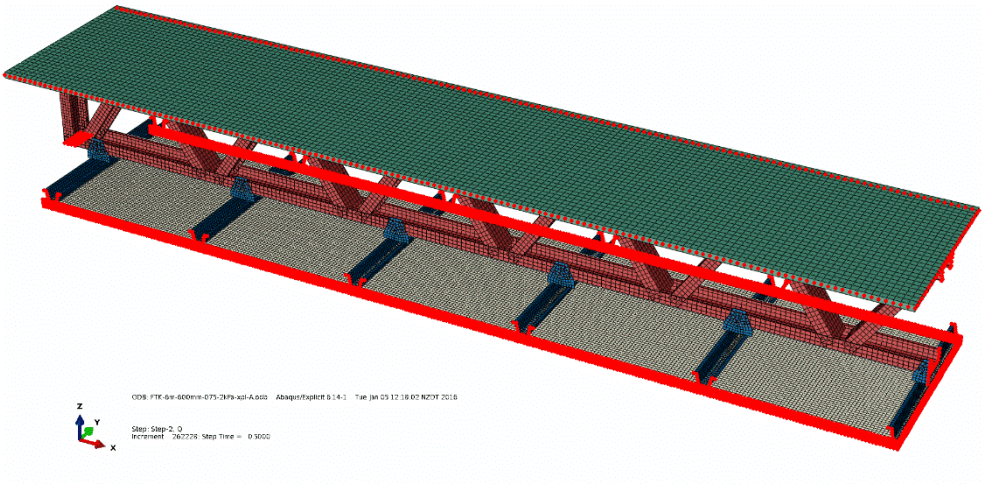

**Figure 3.1** *Boundary conditions applied to a typical floor truss (6m span).Half model of a 600mm wide tributary width floor segment.*

Sequentially coupled thermal-stress analyses (i.e. the temperature and deformation are not calculated simultaneously) were performed on compatible FE meshes as described earlier.

The 100mm fibre glass and air were modelled as a solid medium and the all steel parts were tied to this medium in the heat transfer analysis. This modelled conduction through the floor. The solid modelled plasterboards (26mm in total) were meshed with 6 elements through the thickness. The particle board was modelled by shell elements. Both, the particle board bottom face and the plasterboard top face were tied to the rectangular shape air-insulation part instance. The heat transfer analyses for the 6m (practice) and 4m span (BRANZ) models were run up to 120minutes of fire.

Initially, the stress analysis was run in Abaqus/Standard, but extremely slow convergence was observed in the fire, step-3 (13 days of computing time with 6CPUS to reach 15minutes of fire for the 6m span model, file FTK-6m-600mm-075-2kPa-Stress.inp/odb). Therefore, the author turned to Abaqus/Explicit. The self-weight and uniformly distributed pressure was applied in a smooth step-1 and step-2 in a quasi-static manner. Both steps had a time period of 0.5seconds. The loads from these steps were propagating in step-3, where the nodal temperatures for the structural parts were read in from the output database of the heat transfer analysis. As earlier described, the air and insulation were not part of the stress analysis. The explicit analyses in double precision were run for both spans until the limiting deflection as given in EN 1363-1:2014 and AS 1530.4 were reached, which is $D=L^2/(400d)$, where d=350mm, the clear span is L=5822mm and 4000mm for the typical floor in practice and BRANZ floor, respectively.

Reduced integration shell (S4R) and solid (C3D8R) elements with enhanced hourglass controls had to be employed to reduce up to some extent numerical

phenomena of “hourglassing” (inability of coarse reduced integration elements mesh to represent bending adequately). In addition, arbitrary Lagrangian-Eulerian (ALE) adaptive meshing of the plasterboard helped to prevent excessive element distortion of some gypsum board elements connected to the ceiling fasteners in the explicit analysis. These model modifications allowed to reach the limiting floor centre deflection. The influence of default and enhanced hourglass control and ALE adaptive meshing is shown in Figure 3.2. As it can be seen, the ceiling battens and plasterboard deformation is not consistent between the two models. Finer mesh of the ceiling battens (maybe the truss member, too) in the structural analysis might lessen hourglassing (Note that no spurious deformation modes of the mesh were observed). However, problems were identified when incompatible mesh was used between the heat transfer and structural model. It should be mentioned that the heat transfer analysis required over a week computing time, thus initially the finer mesh option was not pursued.

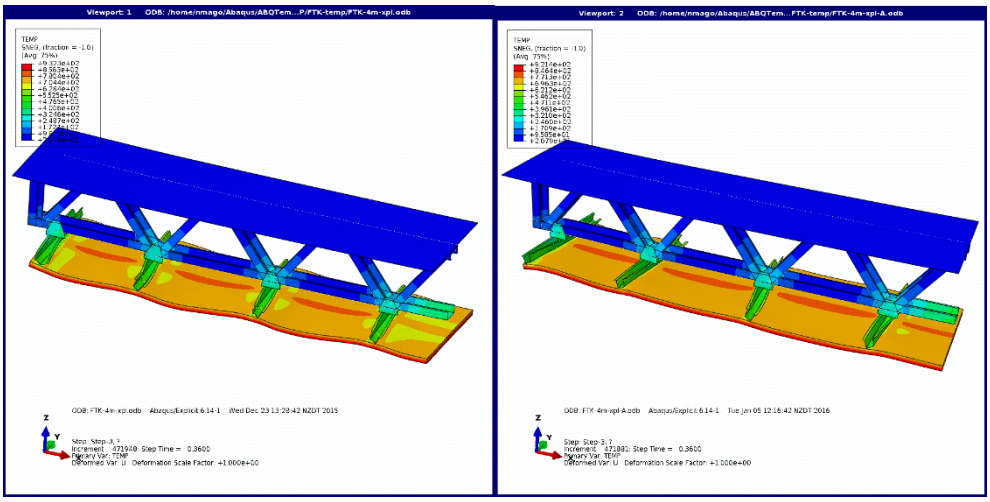

**Figure 3.2** *Temperature contours on the deformed shape for 60 minutes of fire. Abaqus default (left) and enhanced hourglass control (right) for the 4m BRANZ span model.*

Interestingly, hourglassing is not an issue (it is in order of 0.2%; ratio of all artificial energy (ALLAE) to all internal energy (ALLIE)) when Abaqus/Standard is used. However, this solver required prohibitively excessive time to apply the nodal temperatures on the structure (file FTK-6m-600mm-075-2kPa-Stress.inp/odb). As computer time allowed this job was run up to 16minutes of fire and the calculated mid-span deflection was compared to the explicit solver solution (calculated much faster in about 2.5 days computing time).

Screws were represented with mesh independent discrete fasteners. Frictionless tangential and Abaqus “hard” contact (for the explicit solver) was used to model physical contact between the particle board and truss top chord, between members of the FTK truss, between the Rondo 311 clips and truss bottom chord and steel ceiling battens and plasterboard. The ceiling battens were tied (i.e. rigidly connected) to the clips.

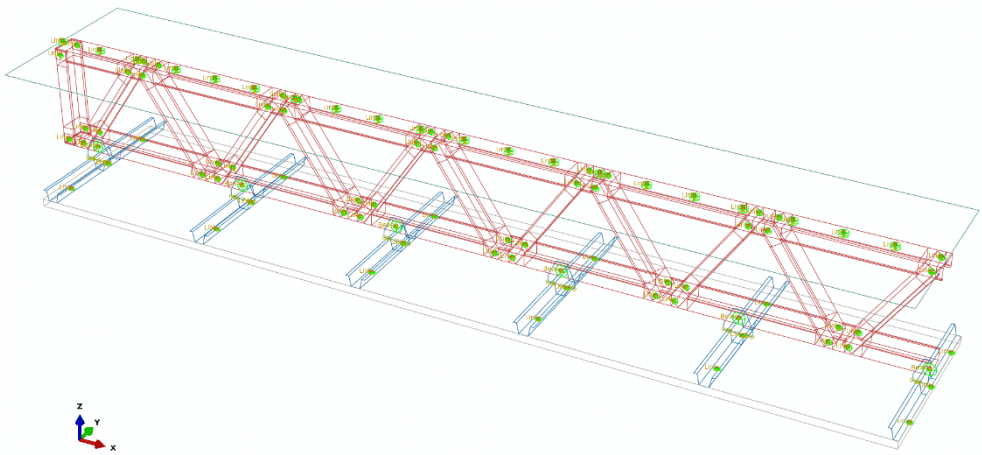

**Figure 3.3** *Screws position in a typical truss floor (wireframe representation to show all fasteners). Typical 6m span floor.*

Time scaling of 1:10 000 was used in step-3 of the explicit analysis. This allowed to run the 7200sec fire in 0.72sec in step-3 of the stress analysis. Details of this approach have been described in details in [6]. The simulations work is given in FrametekTruss-NASH-BRANZ-2015-16.cae file.

The BRANZ fire test was performed according to “AS 1530.4:2014 Methods for fire tests on building materials, components and structures - Fire-resistance tests for elements of construction”. The performance criteria of AS 1530.4:2014 is identical to EN 1363-1:2012, as described earlier, except the rate of deflection criteria, which “shall not apply before a deflection of L/30 is exceeded”.

## 3.2 Typical 6m span truss

In practice the span is typically 6m. In this study, as mentioned earlier, the clear span was actually L=5822mm. Thus, based on EN 1363-1:2012 load bearing capacity the limiting floor centre deflection is D=242.1mm in fire.

The limiting deflection occurs at 75minutes, as Figure 3.4 and Figure 3.5 illustrate. Although the explicit solution is a bit dynamic, the mid-span deflection is comparable to the solution obtained using a much slower implicit solver. The mid-span deflection due to self- weight and 2kPa uniformly distributed pressure (end of step-2) is 23mm versus 25.5mm using the implicit and explicit solver, respectively. Following 935seconds of fire the deflections are 24.9mm versus 26.5mm, correspondingly.

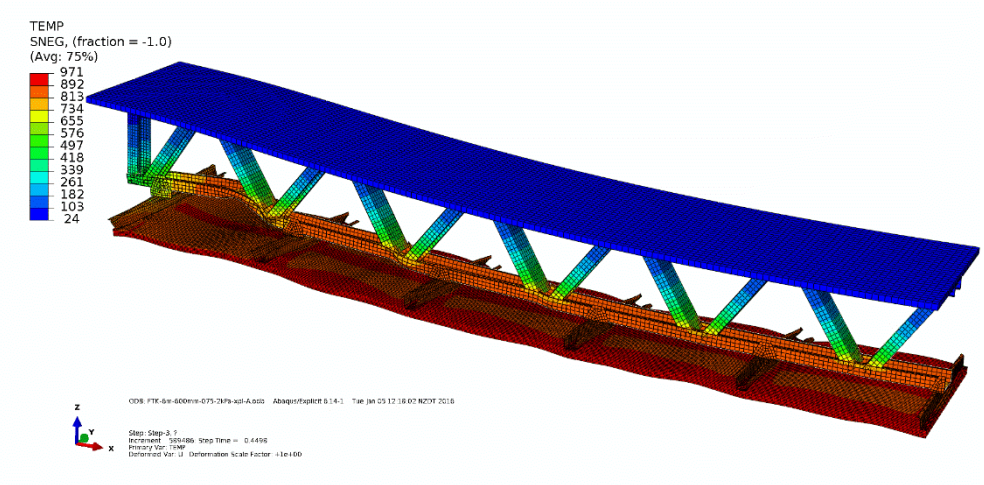


**Figure 3.4** *Deformed shape and temperature contour plot at failure FRR=75min.*

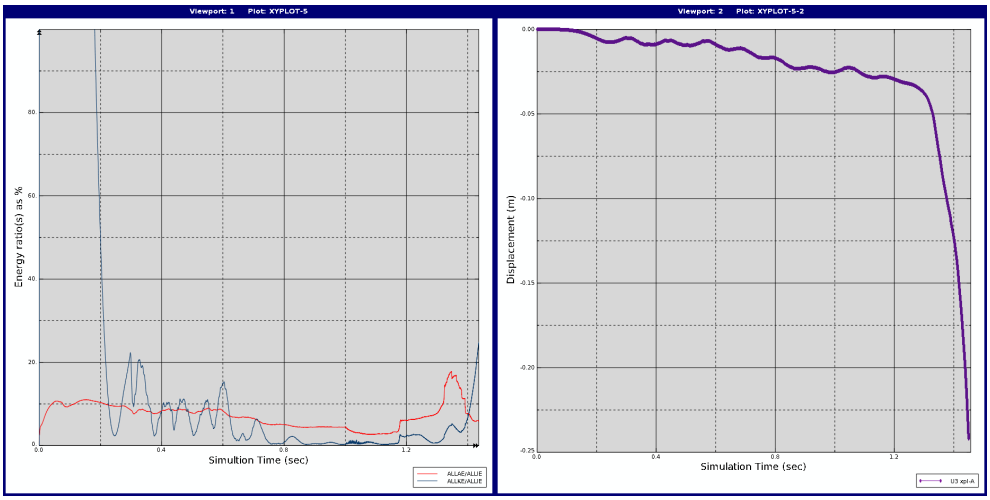


**Figure 3.5** *Energy ratios of the explicit simulation and history of floor centre deflection (m). Time 0.5 and 1 seconds correspond to the application of self-weight and 2kPa. Fire starts from 1 seconds with time scaling 1:10 000 of real time.*

To sum up:

Performance criteria AS 1530.4:2014 – Load bearing capacity:

a) The limiting deflection is 242.1 mm, based on L=5822 mm and d=350mm. The limiting deflection is reached in 75minutes – PASS for FRR=60minutes

b) The limiting deflection rate is 10.8 mm/min. The rate of deflection limit is not applicable in first 10 minutes of the fire. Deflections were recorded in every 0.36seconds in the FEA, meaning 166 sampling in 1 minute. Sampling should be at least in 1minute intervals in fire test (AS 1530.4:2014). Based on this sampling, the first peak 23mm/min in the deflection rate occurs at 65 minutes, then it significantly falls back again under 10mm/min. The deflection rate is consistently larger than 10.8mmm/min after 69minutes (Figure 3.6). – PASS for FRR=60minutes.

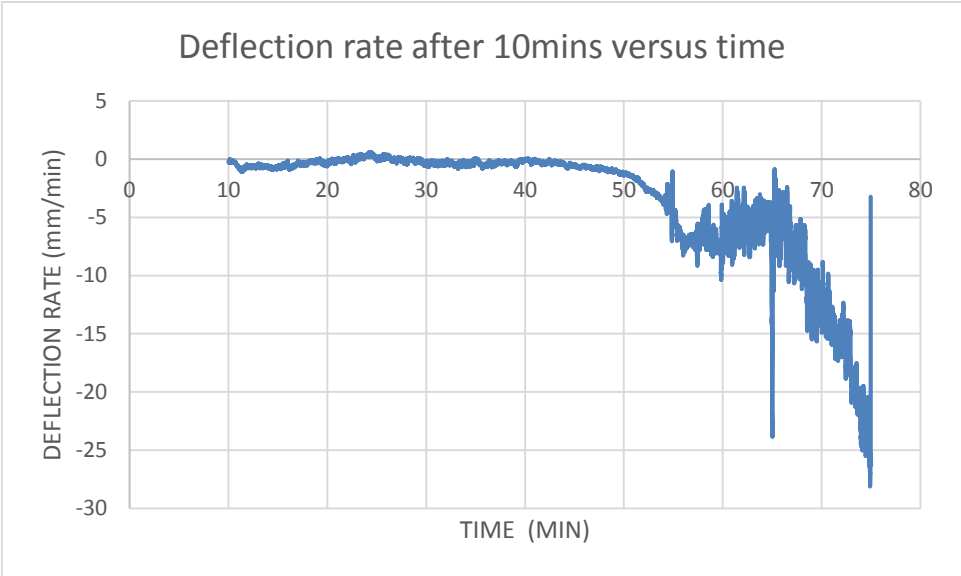


**Figure 3.6** *History of mid-span deflection rate.*

Performance criteria AS 1530.4:2014 - Insulation:

a) The increase in the average temperature above the initial 20 °C is less than 140 °C for 60minutes – PASS.

b) The increase at any location on the unexposed surface is also less than 180 °C for 60minutes – PASS.

13 section points were used through the 20mm thick particle board thickness. Figure 3.7 shows the maximum temperature being 56.4 °C even after 120minutes.

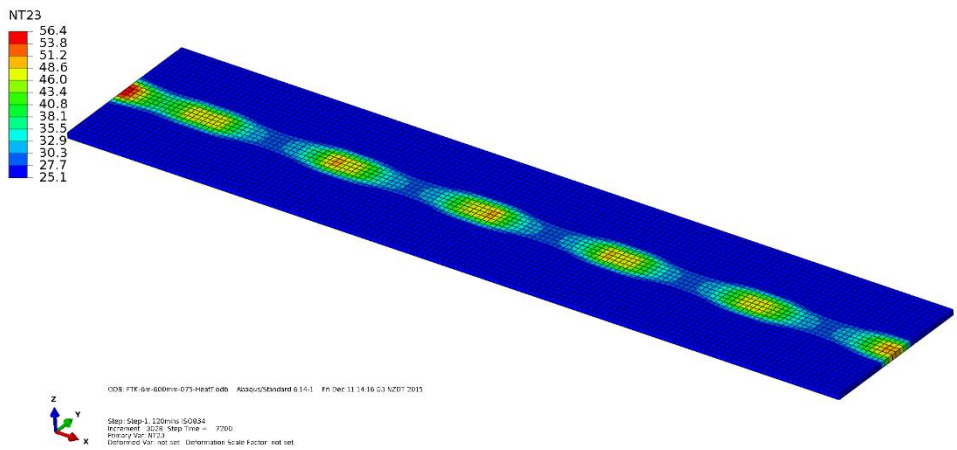


**Figure 3.7** *Temperature distribution on the particle board top face following 120minutes.*

The jobs have been documented in the following files: FTK-6m-600mm-075-HeatT.inp/odb, FTK-6m-600mm-075-2kPa-Stress.inp/odb and FTK-6m-600mm-075-2kPa-xpl-A.inp/odb.

## 3.3 BRANZ furnace span 4m

The BRANZ furnace internal dimensions are 4m x 3m. The truss should span along the 4m span in order to be as representative to the span in practice as possible. It is also very important that the main load carrying member utilisation is comparable to the utilisation in practice. In other words, it is expected that the bending moment at mid-span is identical for both cases. Calculated from basic structural engineering formulae for simply supported beam (qL^2)/8, the uniformly distributed pressure should be increased to (6m/4m)^2=2.25 times (more accurately (5822mm/4000mm)^2=2.12 times). Thus 2.25x2kPa=4.5kPa was applied on the floor slab. Since all materials and thicknesses are identical to the 6m span model, this upscaling of the load is sufficient.

Extracted from AS 1530.4:2014 the limiting floor centre deflection is D=114.3mm in fire.

Based on similar mesh density for the steel members as the 6m model, failure is predicted to occur at 70.7minutes, which is comparable to 75minutes for the 6m span in practice. Figure 3.8 shows the deformed shape at failure. The record of the simulations are in the following files: FTK-4m-HeatT.inp/odb, FTK-4m-Stress.inp/odb (implicit job did not converge), FTK-4m-xpl-A.inp/odb.

Since ALLAE/ALLIE (ratio of all artificial strain energy and all internal energy) is higher than would be normally expected (Figure 3.9), the mesh density of the steel parts were doubled and the heat transfer and stress analysis were run again (files FTK-4m-

HeatT-FM.inp/odb and FTK-4m-xpl-A-FM.inp/odb). The result show that with the finer mesh model failure is expected at 69.7minutes.

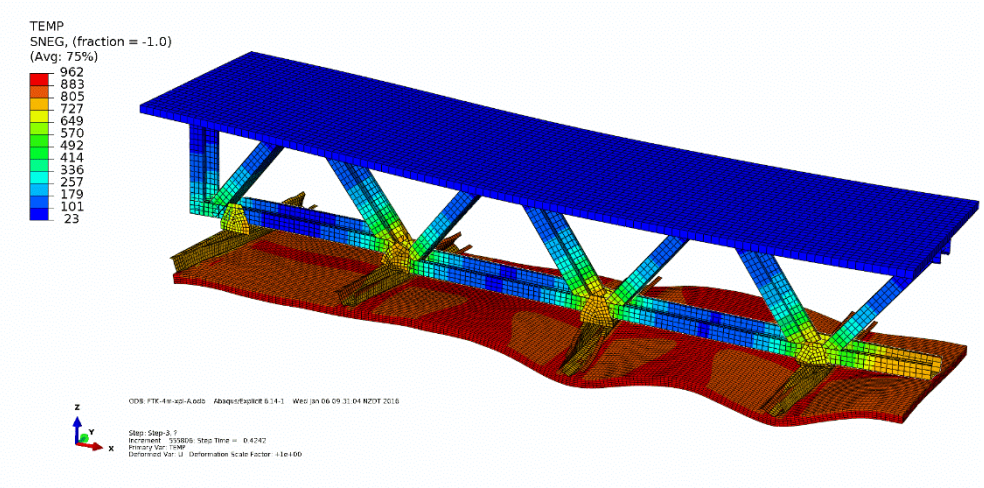


**Figure 3.8** *Deformed shape and temperature contour plot at failure FRR=70.7min.*

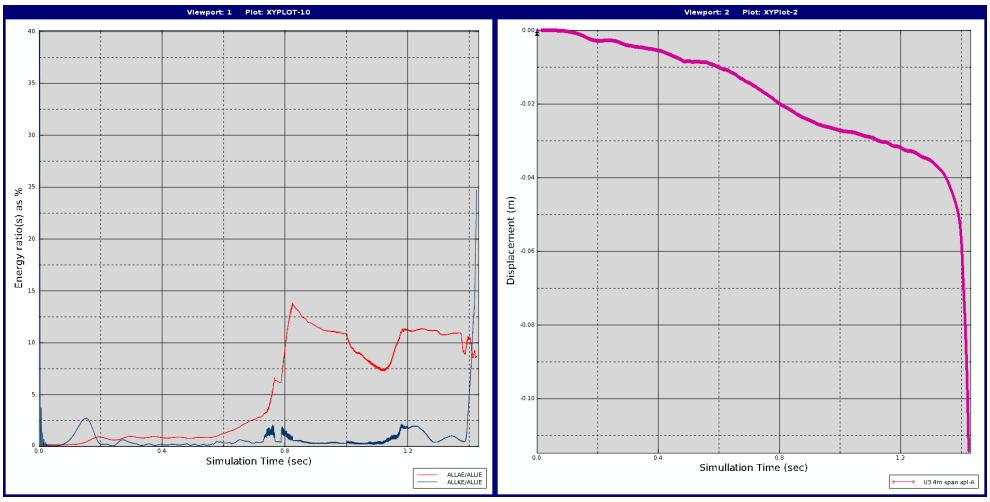


**Figure 3.9** *Energy ratios of the explicit simulation and history of floor centre deflection (m). Fire starts from 1 sec. (Reference to Figure 3.8).*

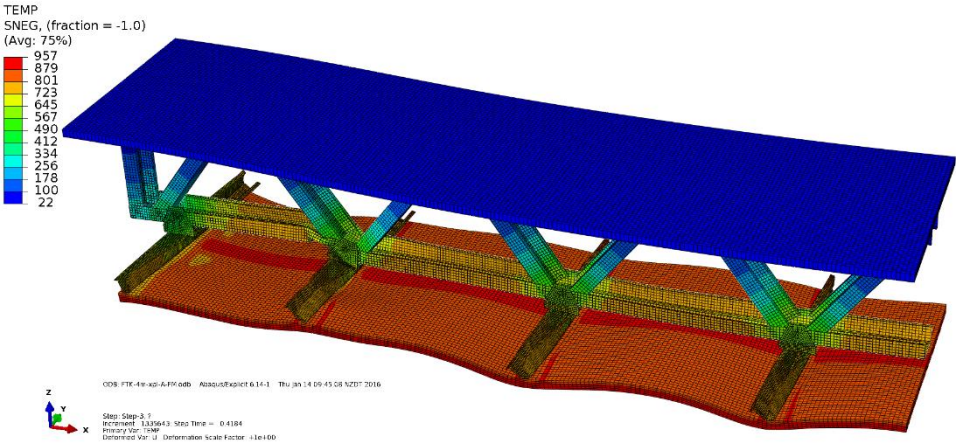


**Figure 3.10** *Deformed shape and temperature contour plot at failure FRR=69.7min with finer mesh versus FRR=70.7min achieved with coarser mesh (Figure 3.8).*

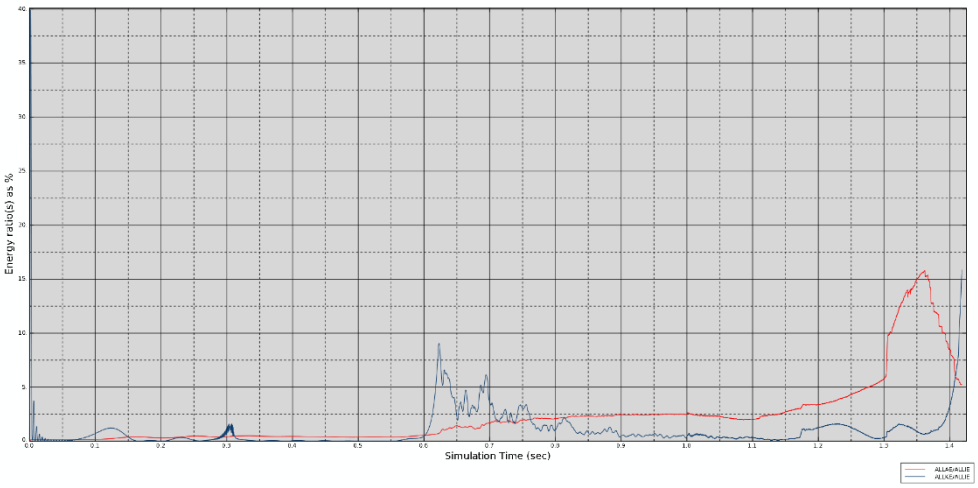


**Figure 3.11** *Energy ratios of the explicit simulation with finer mesh. Fire starts from 1 sec and around 1.3 second the second to the support cleat starts to deform significantly, causing the jump in the ALLAE/ALLIE ratio (Reference to Figure 3.8).*

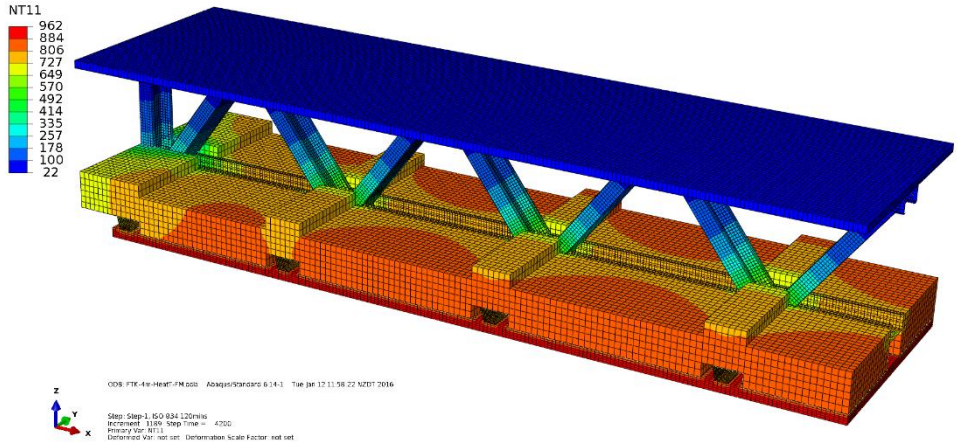


**Figure 3.12** *The temperature contour plot for 70minutes of fire – undeformed shape from heat transfer analysis. The fibreglass insulation sitting over the plasterboard and ceiling battens is also shown.*

All simulations presented above were performed prior to the loaded BRANZ fire test.

## 3.4 BRANZ furnace span 4m and load according to AS/NZS 1170.0:2002

AS/NZS 1170.0:2002 Structural design actions Part 0 General principles section 4.2.4 Combinations of actions for fire:

"The combination of factored actions used when confirming the ultimate limit state for fire shall be as follows:

[G, thermal actions arising from the fire, $\psi_l$ Q]"

Where $\psi_l$ =0.4 long-term factor for residential and domestic and also for office floors. In order to be conservative this long term-factor was not included in the numerical simulations presented above, however it was included in the BRANZ fire test. This means that only 1.8kPa (=0.4 x 4.5kPa) will be applied. On the other hand, it was assumed that the truss bottom chord is fixed to the supporting wall, while in the BRANZ fire test it was decided that the truss bottom chord will be not restrained. In other words, the truss will freely expand in axial direction, sitting on round bars or flat steel plates. To be conservative, round rigid bar was placed under the truss ends and the stress analysis was rerun. The clear span is 4136mm in the FE model, while it will be 4150mm in the test (the truss will be 4300mm long, i.e. 122mm longer than the FE model).

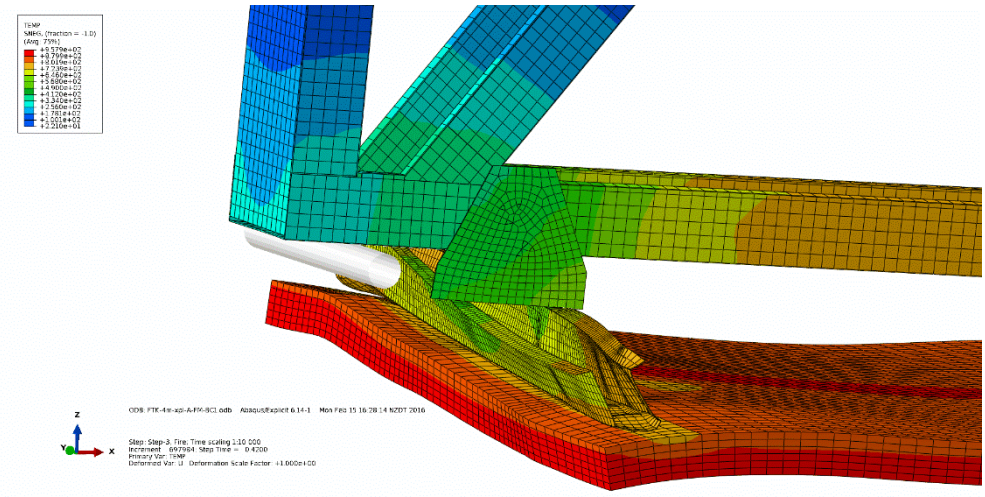

**Figure 3.13** *The temperature contour plot for 73.2minutes of fire around the end support. Insulation not shown.*

The limiting mid-span deflection 114.3mm is reached for 73.2minutes of fire with 1.8kPa uniformly distributed pressure and freely expanding end conditions. The simulation was run further into the fire and the rigid bar indentation into the steel truss is expected around 90minutes (with 474mm mid-span deflection) - Figure 3.14. The results indicate that floor is less sensitive to the applied load and its failure is governed by local buckling of the bottom chord (job FTK-4m-xpl-A-FM-BC1.inp/odb). This is further influenced by the position of the steel clips along the bottom chord. It is possible to postpone the onset of local buckling (and failure) by forming a closed section intermittently in the bottom C section of the truss. This case was not investigated.

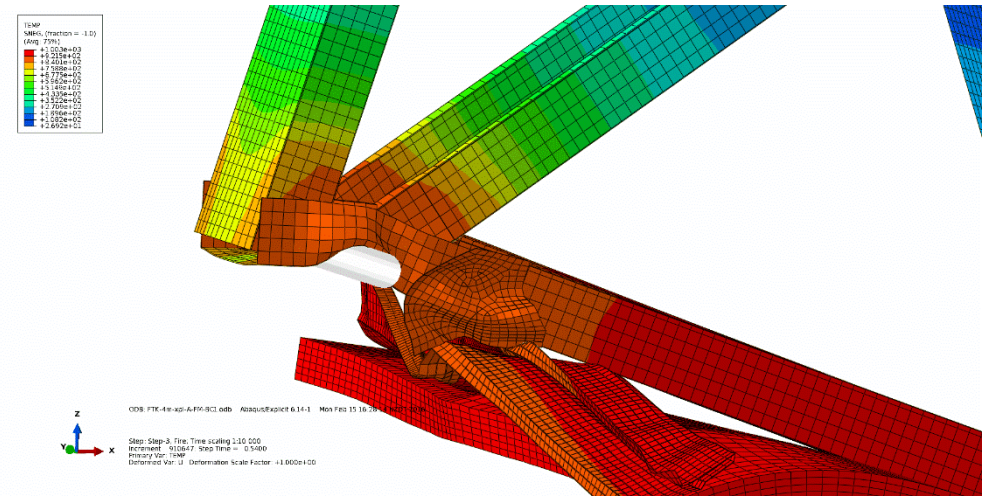

**Figure 3.14** *The temperature contour plot for 90minutes of fire around the end support. Insulation not shown.*

# 4 THE BRANZ FIRE TEST

In the actual fire test the steel trusses were directly supported by the top of the steel test frame. The 100mm thick Pink Batts silencer sheet (600mm wide) ends were pushed and squashed under the truss bottom chord. 20mm Kopine U/lock (3600x1200) H.D. flooring was screwed at 300mm centre to centre to the truss top chord. The truss total length was 4265mm and it was from 0.95mm Grade 550 steel. Prior to the fire test, the Client decided to increase the light gauge steel thickness to 0.95mm with explanation that 0.95mm would be more likely to be used in practice (contrary to the initial design with 0.75mm). Photos of fire test are stored on the HERA server. The BRANZ fire report (FR5912) final version was received in late October of 2016.

Updated simulations have been performed following the fire test. The record of these jobs is given in files AfterFireTest-HeatT.inp/odb and AfterFireTest-xpl.inp/odb (the explicit simulation is a bit dynamic).

With respect to the analyses performed so far, plasterboard was added to the end of the truss, the insulation was positioned as in the fire test, the truss thickness was increased to 0.95mm and the actual furnace average plated thermocouple readings were applied as the fire load. The 600mm wide segment FE model does not capture the joint between the plasterboards linings layout from the test. The two 13mm plasterboards were modelled as a single 26mm thick solid with 9 elements through the thickness, spanning the full span (not as in test 3m+1m length joined).

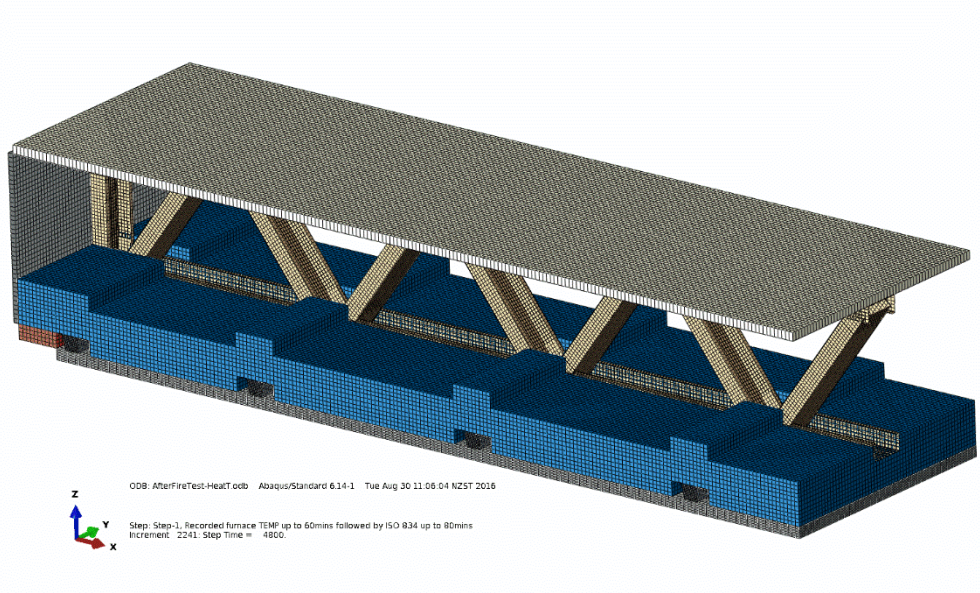


**Figure 4.2** *The materials used in the heat transfer model. The solid modelled air is not shown for clarity.*

The stress analysis was run up to 80minutes. The FE model does not capture/predict the integrity failure mode recorded at 59minutes in the fire test. The floor mid-span deflection (measured at the top of the particle board) is 3mm due to self-weight and 13.5mm when the 1.8kPa is applied. This was not recorded in the fire test. The comparison of mid-span deflection prior and after the fire test shows that the simulations were conservative up to 58minutes.

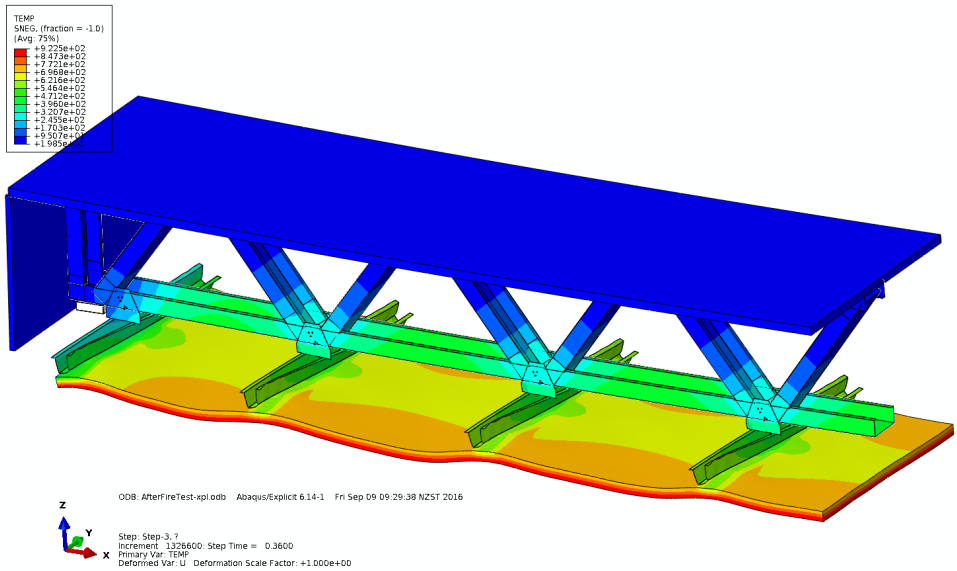


**Figure 4.3** *Deformed shape showing the temperature contour plot for 60minutes of fire.*

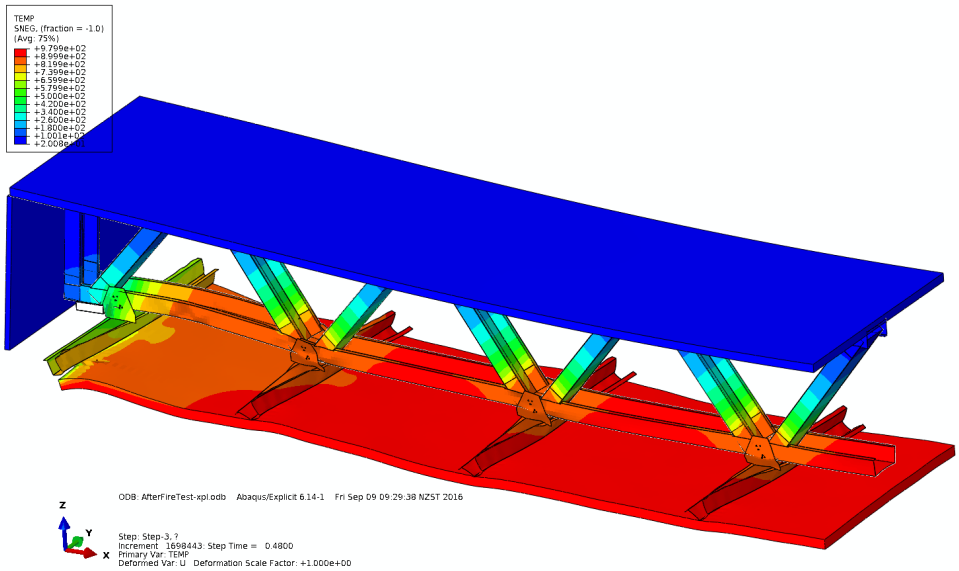


**Figure 4.4** *Deformed shape showing the temperature contour plot for 80minutes of fire.*

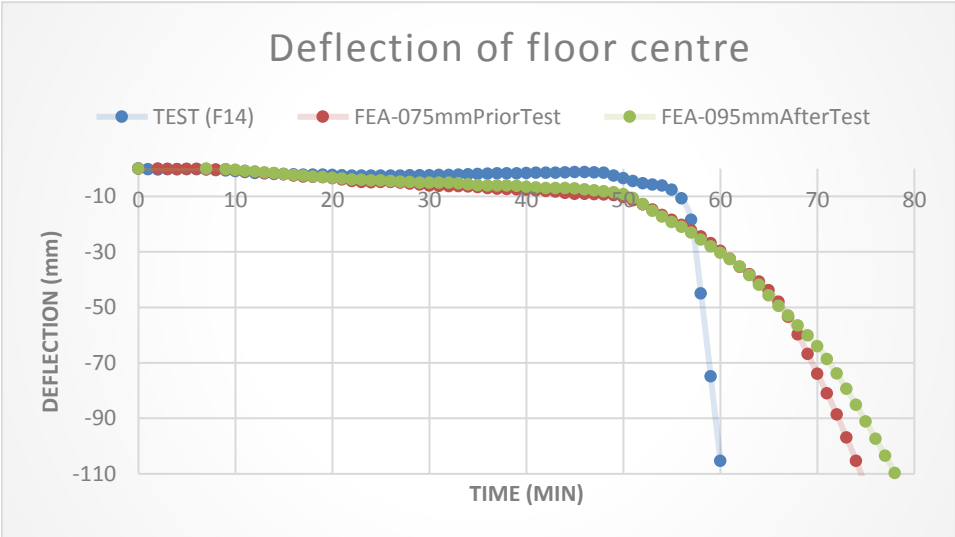


**Figure 4.5** *Floor mid-span deflection comparison before and after the fire test.*

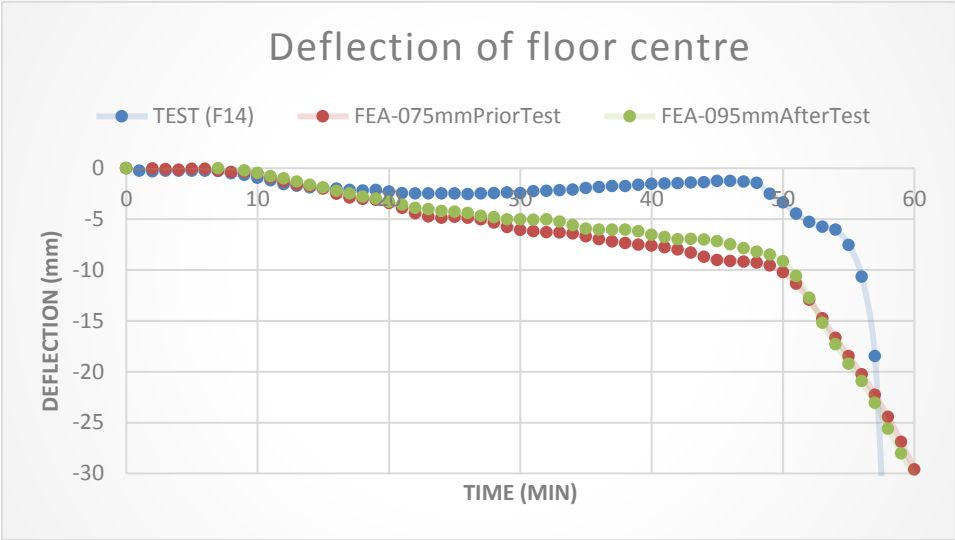


**Figure 4.6** *Floor mid-span deflection comparison before and after the fire test in a narrower range show that the after test simulation is slightly closer to the fire test recording.*

# 5 DISCUSSION

The presented numerical simulations were developed starting from simple models to more complex ones. Good agreement has been obtained with the results of the UK fire test. This was achieved following several iterations and fine tuning of the temperature dependent material properties for the gypsum board and ceiling insulation. The validated material data was used to predict the fire resistance rating (FRR) of typical 6m span light gauge steel truss and the appropriately scaled 4m span truss prior to the BRANZ fire test (12 April 2016). FRR=75minutes and 69.7minutes were calculated for the 6m and 4m spans, respectively (100% applied live load). In the actual BRANZ fire test the live load was reduced by 60% as per AS/NZS 1170.0:2002 Structural design actions Part 0 General principles section 4.2.4 Combinations of actions for fire. The simulation with reduced live load 1.8kPa predicted 73.2minutes of fire resistance rating, which is about 3minutes more than with 4.5kPa pressure prior to the loaded fire test. Failure is governed by local buckling of the truss open section bottom chord.

Updated sequentially coupled thermal-stress analyses were performed following the loaded fire test. The integrity failure - in other words falling of plasterboards, flames penetration through the floor observed experimentally - could not be predicted by the

current FEA. However the Abaqus simulations conservatively predicted larger mid-span deflection almost up to failure (58minutes).

The numerical simulations can be further improved by using finer mesh model, other techniques and more hardware and software resources to force the Abaqus/Standard (implicit) solver to obtain a convergent solution within reasonable time frame. The Abaqus/Explicit solver predicted failure in less time.

It should be mentioned here that integrity failure of the floor/ceiling was recorded in the BRANZ fire test at 59minutes. The review of the test plasterboard lining setup shows a 600mm long part where the inner and outer layer plasterboard joints are aligned. This might represent a typical case in practice, where inevitably minor mistakes occur. However, this was the location were the plasterboard started falling off in the fire test. Should the outer layer joints been offset by 600mm from the inner layer consistently everywhere, the onset of failure would be most likely postponed and the fire test recorded floor mid-span deflection would be closer to the numerically predicted one.

It should be also said that the “radiation barrier method of design of steel frames for dependable performance in severe fires” as given in [8] was reviewed at the start of the research project. Furthermore, the master thesis [9] on this topic was also studied, but the method could not be implemented to the accuracy required in predicting temperatures, deflections and deflection rates of the floor structure. Therefore, it was disregarded.

# 6 CONCLUSIONS

The typical New Zealand light gauge floor truss from 0.75mm or 0.95mm thick grade 550 steel, 6m span, loaded with 2kPa and having 2 layers of 13mm thick fire rated plasterboard is expected to achieve minimum 60minutes of fire resistance rating in practice. This has been confirmed by the simulations capturing the structural stability and insulation criteria requirements of AS1530.4 presented herein. The loaded fire test was aborted due to integrity failure of AS1530.4 after 59minutes, which was not captured by FEA. The influence of grade 300 or 550 is negligible for the floor fire performance.

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# WP1-R2

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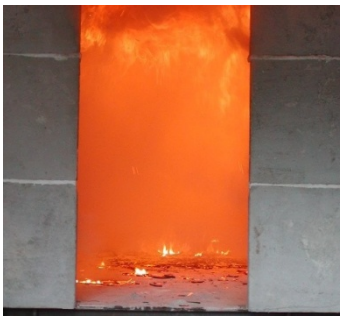

# FIRE TEST REPORT

# FR 5912

## FIRE RESISTANCE OF A LOAD BEARING FLOOR/CEILING SYSTEM

**CLIENT**
Heavy Engineering Research Association
17-19 Gladding Place
Manukau
Auckland 2104
New Zealand

IANZ ACCREDITED LABORATORY
ACCREDITATION Nº: 37

All tests and procedures reported herein, unless indicated, have been performed in accordance with the laboratory's scope of accreditation.



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# TEST SUMMARY

## Objective

To determine the fire resistance of a load bearing floor/ceiling in accordance with AS 1530.4 – 2014 *"Methods for fire tests on building materials, components and structures, Part 4: Fire–resistance test of elements of construction"* with the furnace controlled by plate thermometers.

## Test sponsor

Heavy Engineering Research Association
17-19 Gladding Place
Manukau
Auckland 2104
New Zealand

## Description of test specimen

The test specimen consisted of a load bearing floor/ceiling system with steel joists nominally 350 mm deep positioned at 600 mm centres. To the underside of the joists were Rondo furring channels lined with two layers of 13 mm thick GIB™ Fyreline plasterboard. The top of the joists were lined with nominal 20 mm thick particle board flooring.

## Date of test

12 April 2016

## Test results

The test results in accordance with AS 1530.4 – 2014, *"Methods for fire tests on building materials, components and structures – Part 4: Fire – resistance test of elements of construction"* was as follows:

| | |
|---|---|
| Structural Stability | 60 minutes No failure |
| Integrity | 59 minutes |
| Insulation | 60 minutes No failure |

In accordance with the test standard the fire resistance level (FRL) of the load bearing floor/ceiling system is as follows 60/30/60

*"This report details the methods of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in AS1530.4. Any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than those allowed under the field of direct application in the relevant test method, is not covered by this report.*

*Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result."*

# LIMITATION

The results reported here relate only to the item/s tested.

# TERMS AND CONDITIONS

This report is issued in accordance with the Terms and Conditions as detailed and agreed in the BRANZ Services Agreement for this work.

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# DOCUMENT REVISION STATUS

| ISSUE NO. | DATE ISSUED | DESCRIPTION |
|---|---|---|
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# 1. TEST SPECIFICATION

The test was conducted in accordance with AS 1530.4-2014 “Methods for fire tests on building materials, components and structures, Part 4 Fire-resistance tests of elements of construction, Section 4”, for which the fire resistance of the specimen is the time, expressed in minutes, to failure under one or more of the following criteria.

## 1.1 Structural Adequacy

Failure in relation to structural adequacy shall be deemed to have occurred when collapse occurs, or when the deflection exceeds $L^2/400d$ mm, or when the rate of deflection exceeds $L^2/9000d$ mm/minute after a deflection of L/30 is exceeded, where “L” is the clear span and “d” is the depth of the structural member.

For the test specimen the maximum allowable deflection was 114 mm and the maximum allowable rate of deflection was 5.1 mm per minute.

## 1.2 Integrity Failure Criteria

Failure shall be deemed to occur when;

a) when flames and/or hot gases cause flaming or glowing of the cotton fibre pad; or

b) a 6 mm gap gauge can be passed through an unobstructed gap in the specimen and project into the furnace and move a distance of 150 mm along the gap; or

c) a 25 mm gap gauge can be passed through an unobstructed gap in the specimen and project into the furnace; or

d) Sustained flaming on the surface of the unexposed face for 10 seconds or longer.

## 1.3 Insulation Failure Criteria

Failure in relation to insulation shall be deemed to have occurred if;

a) The average temperature on the unexposed face of the floor exceeds the initial temperature by 140 K: or

b) The maximum temperature at any point on the unexposed face of the floor exceeds the initial temperature by 180 K.



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# 2. DESCRIPTION OF TEST SPECIMEN

## 2.1 General

The test specimen consisted of a load bearing floor/ceiling system with steel joists nominally 350 mm deep positioned at 600 mm centres. To the underside of the joists were Rondo furring channels lined with two layers of 13 mm thick GIB™ Fyreline plasterboard. The top of the joists were lined with nominal 20 mm thick particle board flooring.

All dimensions are nominal unless otherwise stated.

## 2.2 Plans and Specification

A copy of the client supplied drawing is included in this report as Figure 1. Further details of the tested specimens are held on file by BRANZ.

Where discrepancies between the dimensions in the report text and those shown in the attached drawings exist, the text takes precedence.

## 2.3 Selection, Construction and Installation of the Specimen

The supply of the materials and construction of the test specimen was organised by the test sponsor. BRANZ was not involved in the selection of the materials tested.

## 2.4 Specimen Construction

### 2.4.1 Joist construction

The joists consisted of a roll formed mild steel top and bottom flange with intermediate stiffeners which were screw fixed together made from G550 grade 0.95 mm thick mild steel. The overall dimensions were 350 mm high x 89 mm wide. The joists were spaced at nominal 600 mm centres.

The joists were secured together by 38 mm x 36 mm x 0.75 mm thick angles across the top and bottom ends of each joist. The angles were secured with 10g x 16 mm wafer head screws.

### 2.4.2 Ceiling framing

To the underside of the joists Rondo ceiling battens were installed perpendicular to the direction of the joists at nominally 600 mm centres. Rondo direct fixing clip 311 were screw fixed to each of the joists. The clips were nominally 0.9 mm thick and secured with 12-14 x 35 mm Tek screws.

The 35 mm high Rondo ceiling batten 310 were then retained by the 311 clips. The ceiling batten was nominally 0.55 mm thick. The ends of the ceiling batten were retained in a perimeter track which was secured to the test frame. The perimeter track consisted of an un-equal channel measured to be 24 mm x 36 mm x 36 mm x 0.5 mm thick. The 36 mm flange was towards the ceiling lining.

### 2.4.3 Ceiling lining

The ceiling framing was then lined with two layers of 13 mm thick GIB Fyreline® plasterboard. The sheets were orientated in the direction of the joists and secured at nominally 200 mm centres along the ceiling battens and 150 mm centres to the perimeter channel. The joints of the second layer of plasterboard was off-set from the first by nominally 600 mm in both directions. The first layer was secured with GIB® Grabber® 6g x 25 mm screws and the second layer with GIB® Grabber® 6g x 41 mm screws.

The measured properties of the 13 mm thick GIB Fyreline® plasterboard were as follows:

| | |
|---|---|
| Moisture content | 0.8% |
| Weight per $m^2$ | 9.9 $kg/m^2$ |
| Density $kg/m^3$ | 770 $kg/m^3$ |

The joints were stopped with GIB® Paper Joint Tape and GIB Tradeset® 90 stopping compound.

### 2.4.4 Flooring

The nominally 20 mm thick particle board flooring was installed with the joints perpendicular to the direction of the joists. Before the installation of the flooring a bead of Gorilla Grip construction adhesive was applied along the top of each joist. The boards were then secured nominally 15 mm from the edge then at 300 mm centres along each joist with 10-16 x 45 mm screws.

The measured properties of the particle board flooring were as follows:

| | |
|---|---|
| Moisture content | 9.0% |
| Weight per $m^2$ | 9.1 $kg/m^2$ |
| Density $kg/m^3$ | 705 $kg/m^3$ |

### 2.4.5 Insulation

Nominal 100 mm thick Silencer pick batt fibre glass insulation was packed into the gap between the ceiling lining and the underside of the joists.

The measured properties of the Silencer fibre glass insulation were as follows:

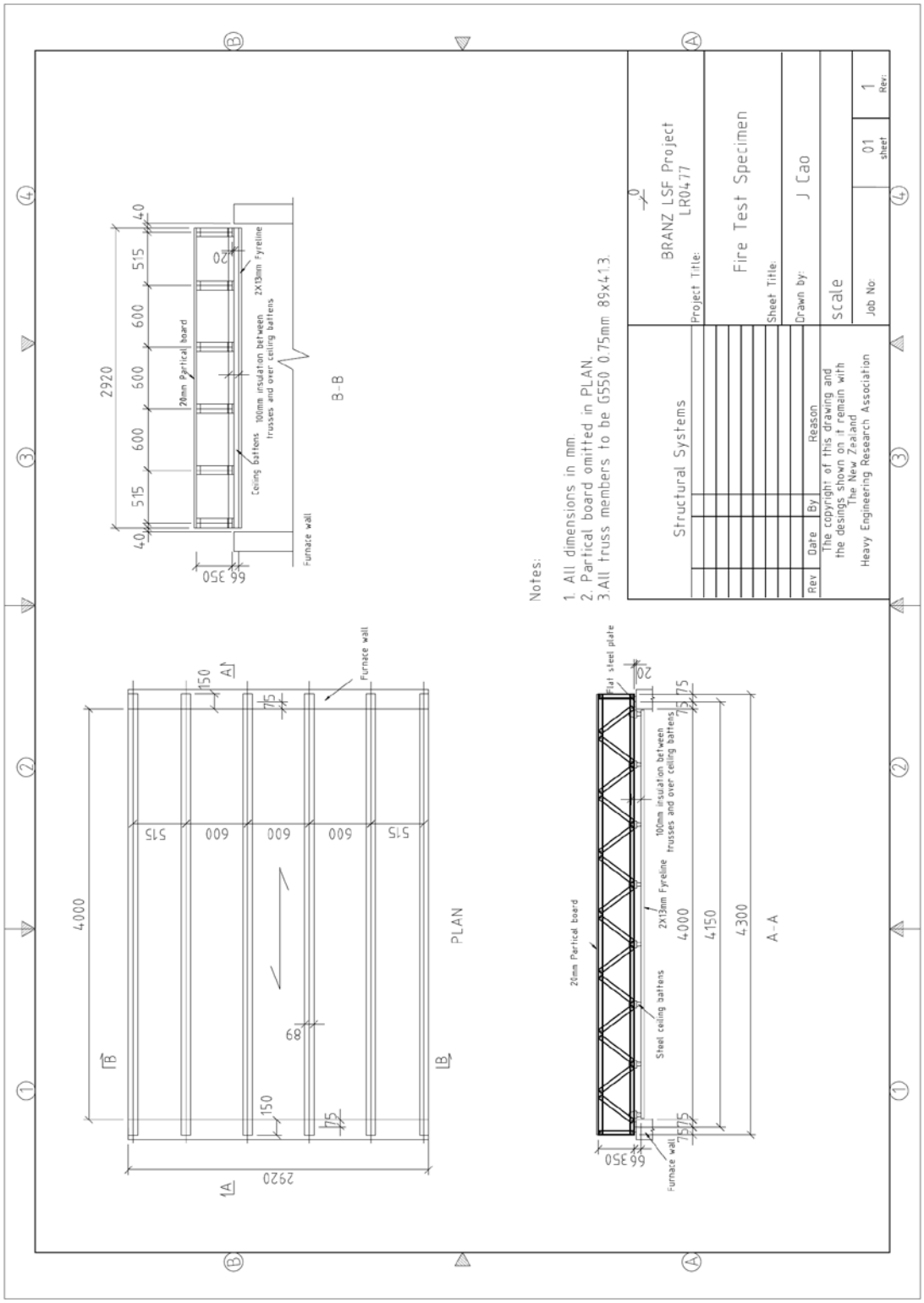
| | |
|---|---|
| Moisture content | 2.2% |
| Density $kg/m^3$ | 13.2 $kg/m^3$ |

### 2.4.6 Restraint conditions and test construction

To enclose the floor ceiling assembly the ends were covered with one layer of 13 mm thick GIB Fyreline® plasterboard. The side of the test frame was lined with two layers of 13 mm plasterboard that extended up to the height of the flooring. A layer of nominal 25 mm thick ceramic fibre was glued to the side of the floor ceiling to allow for free deflection along the span of the test specimen.

The ends of the joists were simply supported on the top of the test frame.

**Figure 1: Client supplied drawing**







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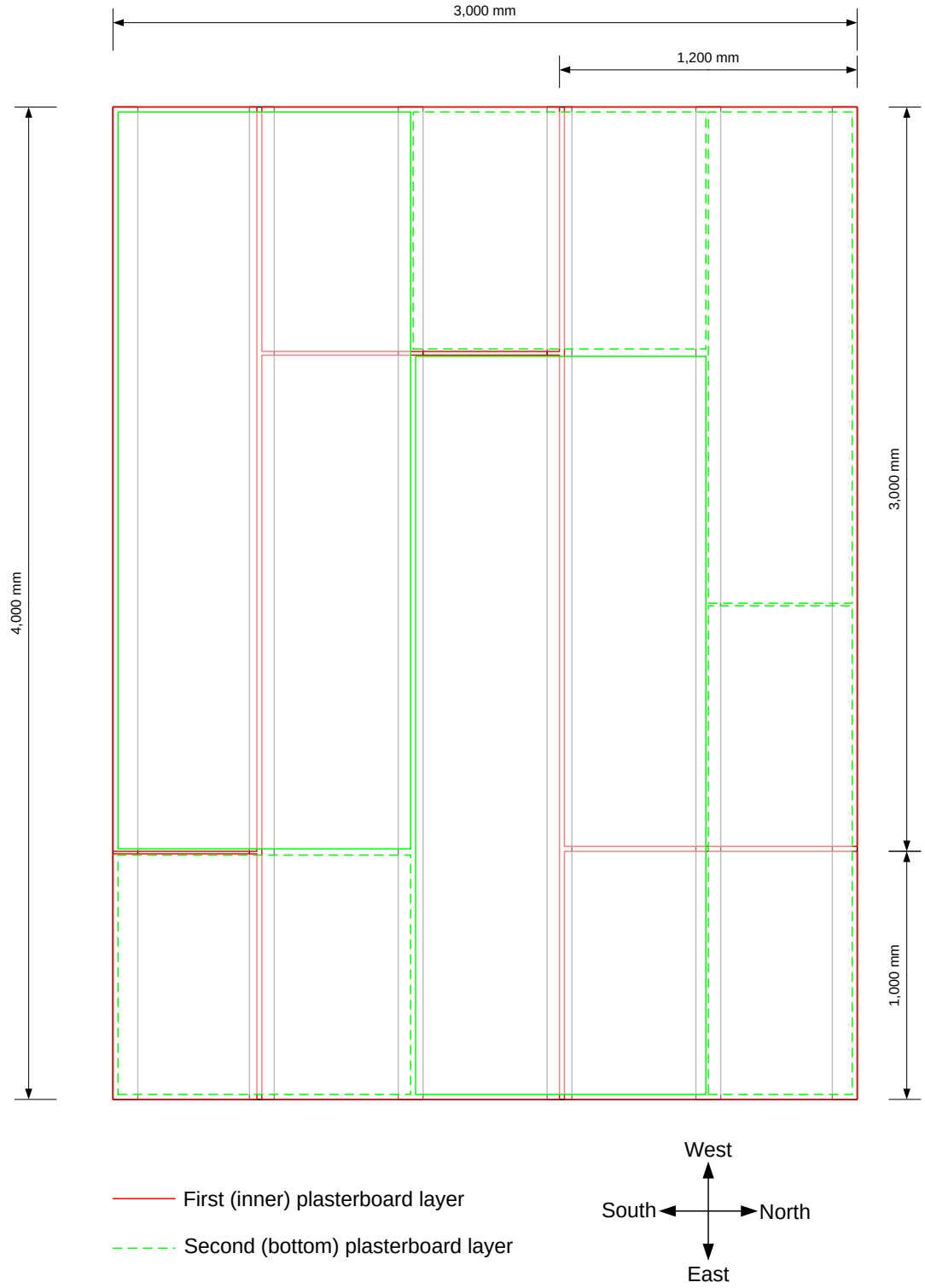
## Figure 2: Plasterboard lining layout







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# 3. TEST CONDITIONS AND RESULTS

## 3.1 General

The specimen was tested on 12 April 2016, at the BRANZ laboratories at Judgeford, New Zealand in the presence of the client.

The ambient temperature at the beginning of the test was 19°C.

The frame containing the test specimen was sealed to the 3,000 mm wide x 4,000 mm horizontal furnace, and the temperature and pressure conditions were controlled as specified in AS 1530.4-2014.

## 3.2 Departure from Test Standard

There were no departures from the test standard other than that stated in section 3.5 Pressure Measurement.

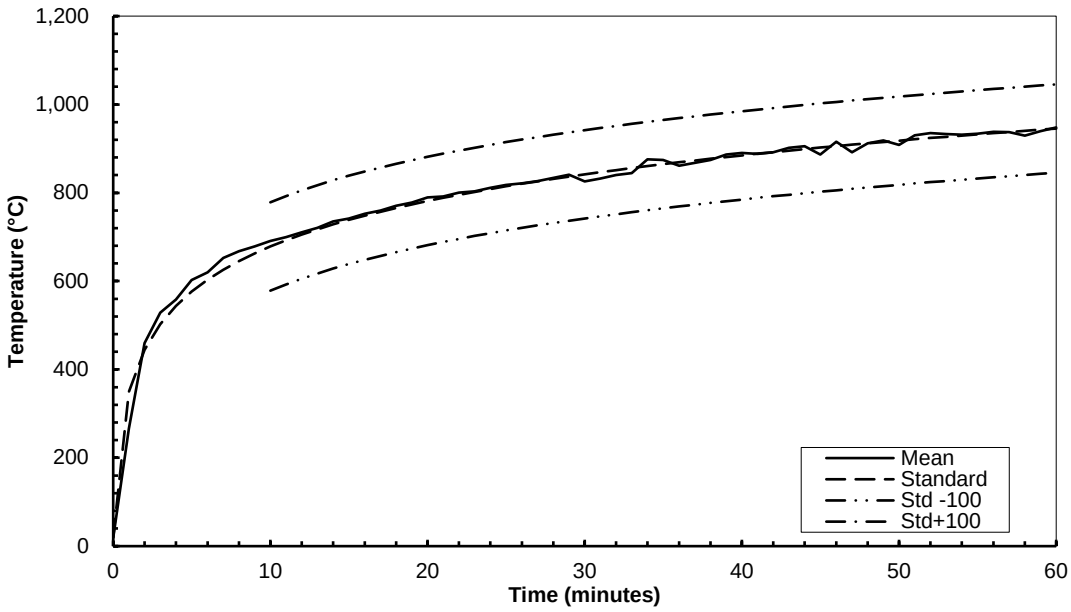
## 3.3 Furnace Temperature Measurement

Temperature measurement within the furnace was made using plate thermometers uniformly distributed in a vertical plane approximately 100 mm from the exposed face of the specimen.

The furnace thermocouples were connected to a computer controlled data logging system which recorded the temperatures at 15 second intervals.

Figure 3 shows the furnace temperature curve and the permitted upper and lower limits in accordance with AS 1530.4-2014. The furnace temperature data is included in Table 2.

**Figure 3: Furnace Temperature**







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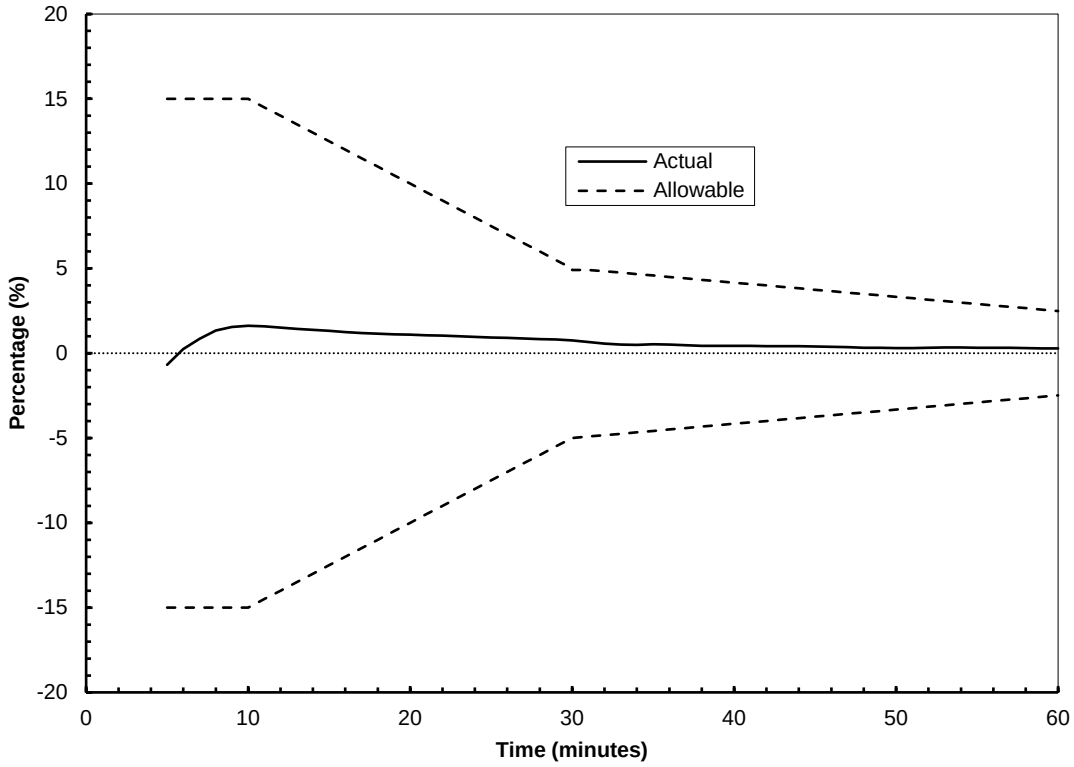
## 3.4 Furnace Control

The percentage deviation of the furnace mean temperature from the standard time temperature curve is shown in Figure 4.

**Figure 4: Percentage Deviation of the furnace drive**




## 3.5 Pressure Measurement

The differential pressure of the furnace above the laboratory atmosphere was controlled to 20 Pa at 100 mm below the ceiling which corresponds to 20 Pa at the pressure probe in the furnace. The differential pressure was monitored using a micromanometer connected to a computer controlled data logging system which recorded the pressure at 15 second intervals.

The furnace pressure was monitored and controlled during the test so that by 5 minutes after the commencement of the test the furnace pressure was ± 2 Pa of the target pressure at the pressure sensor. The pressure sensor was located 100 mm below the underside of the ceiling. Figure 5 shows the furnace pressure variation with time.




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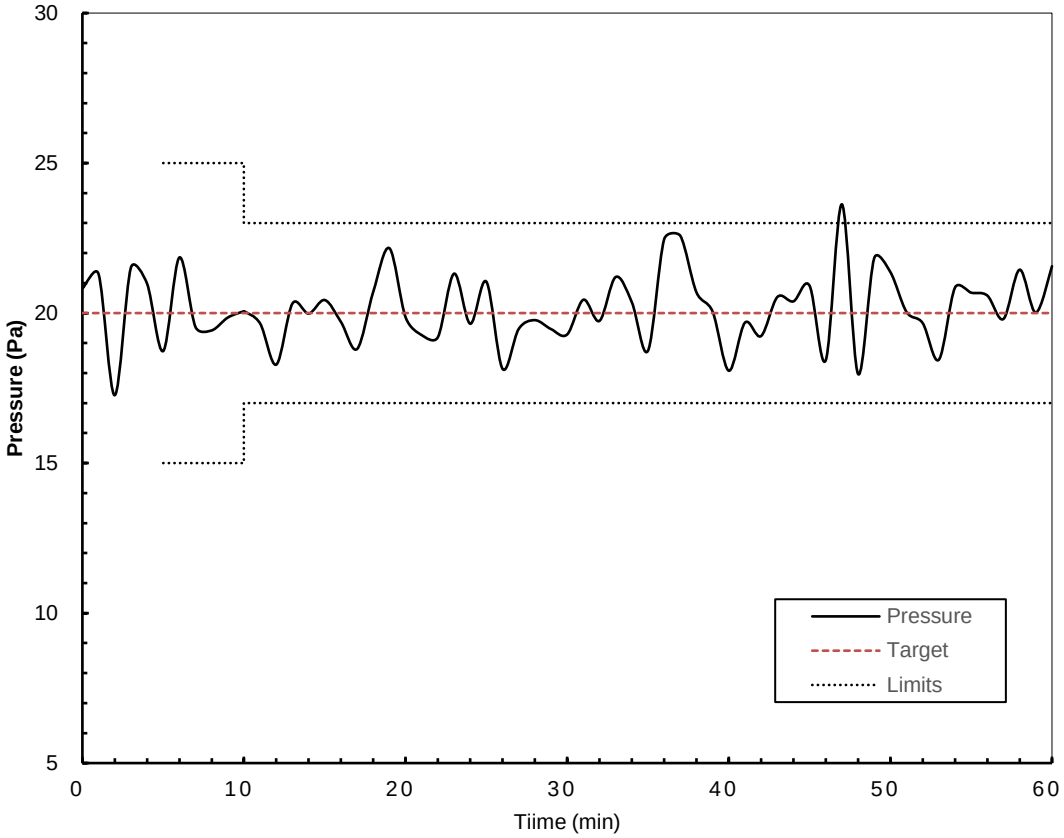
**Figure 5: Furnace Pressure**




The furnace pressure met the requirements of the standard for the majority of the test except for a brief period where it was outside the limits. It is considered the pressure variation outside the standard would not have influenced the tested results.

## 3.6 Specimen Temperature Measurement

The temperature on the unexposed face of the test specimens was measured using chromel-alumel thermocouples mounted on copper discs and covered with insulating pads, in accordance with clause 2.2.3 of the test standard. The thermocouples were placed on the floor as shown in Figure 6. Additional thermocouples were included on the test specimen for information purposes. See Figure 5 and Figure 6 for their location.

All the thermocouples described above were connected to a computer controlled data logging system which recorded the temperatures at 15 second intervals.

A roving thermocouple was available for measuring temperatures elsewhere on the specimen.

The temperature measured is included in Table 3 to Table 8.

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## 3.7 Loading

At the request of the client a uniformly distributed load of 1.8 kPa was placed on the specimen. The load was applied using 20 drums partially filled with water and approximately uniformly distributed over the top of the specimen. Each drum had three swivel feet, each with a contact surface consisting of a 100 mm square of particleboard. The load was applied to the specimen at least 30 minutes before the commencement of the test.

## 3.8 Deflection Measurements

The deflection on the unexposed face of the floor at the positions shown in Figure 6 were measured using linear variable differential transformers (LVDT's) connected to a computer controlled data acquisition system which recorded the deflections at 15 second intervals.

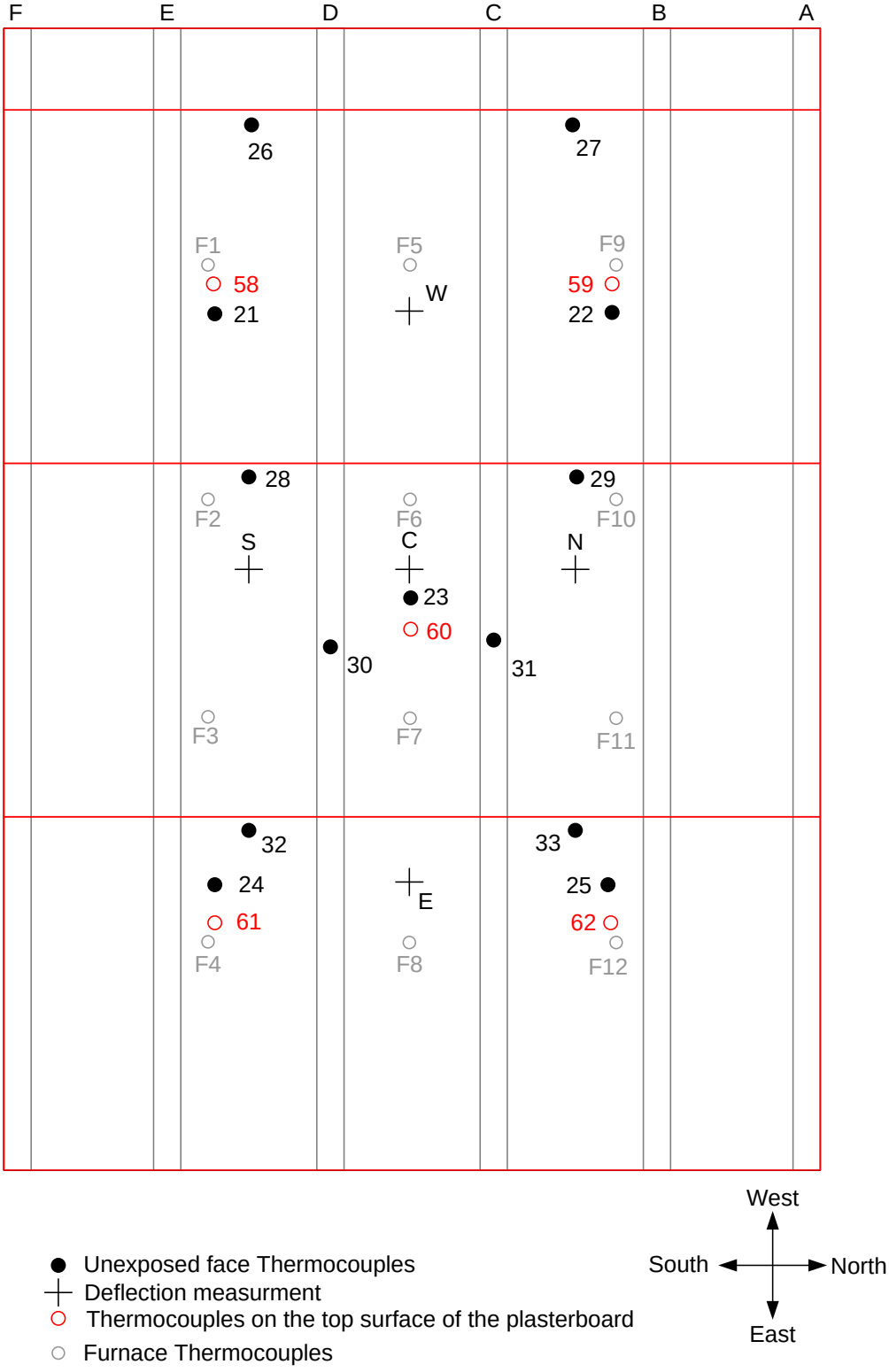
## 3.9 Insulation

The average temperature measured of the unexposed face of the floor did not exceed the 140 K average temperature rise criteria for the 60 minute duration of the test. The highest average temperature rise was 50 K at 60 minutes.

The temperature measured on the unexposed face of the floor did not exceed the 180 K maximum criteria for the duration of the test. The maximum temperature on the unexposed face was 73 K at 60 minutes.

Graphs of the mean and maximum temperature rise of the floor and the thermocouples subject to the maximum criteria are shown in Figure 7 and Figure 9.

**Figure 6: Thermocouple Locations and Deflection points**







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## Figure 7: Internal thermocouple locations on steel framing – section view

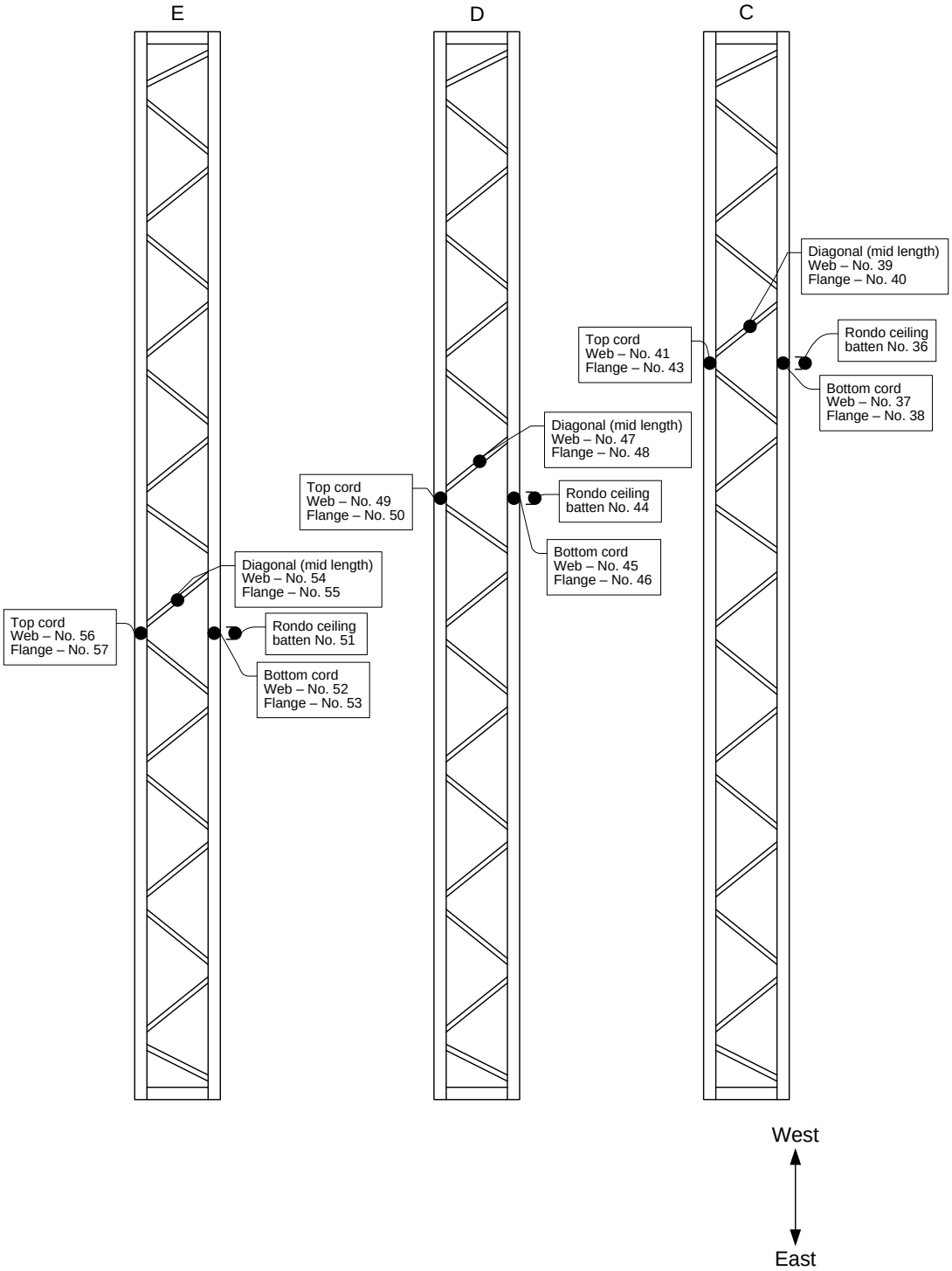





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**Figure 8: Unexposed average and maximum temperature rise**

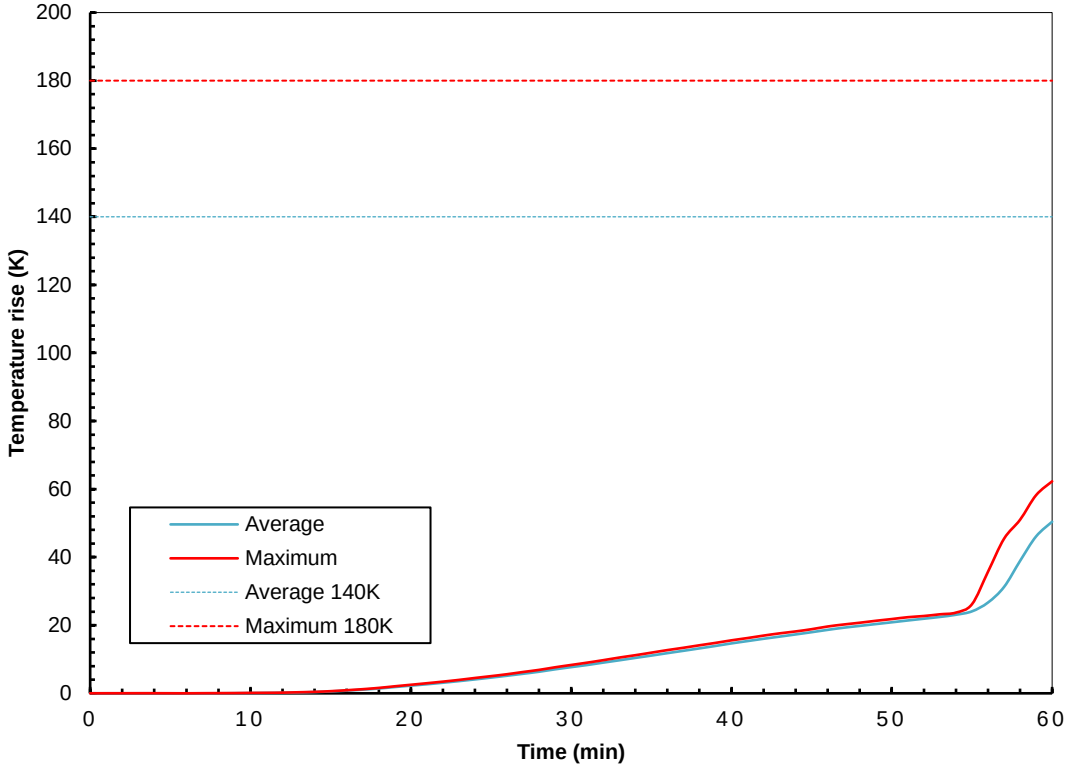
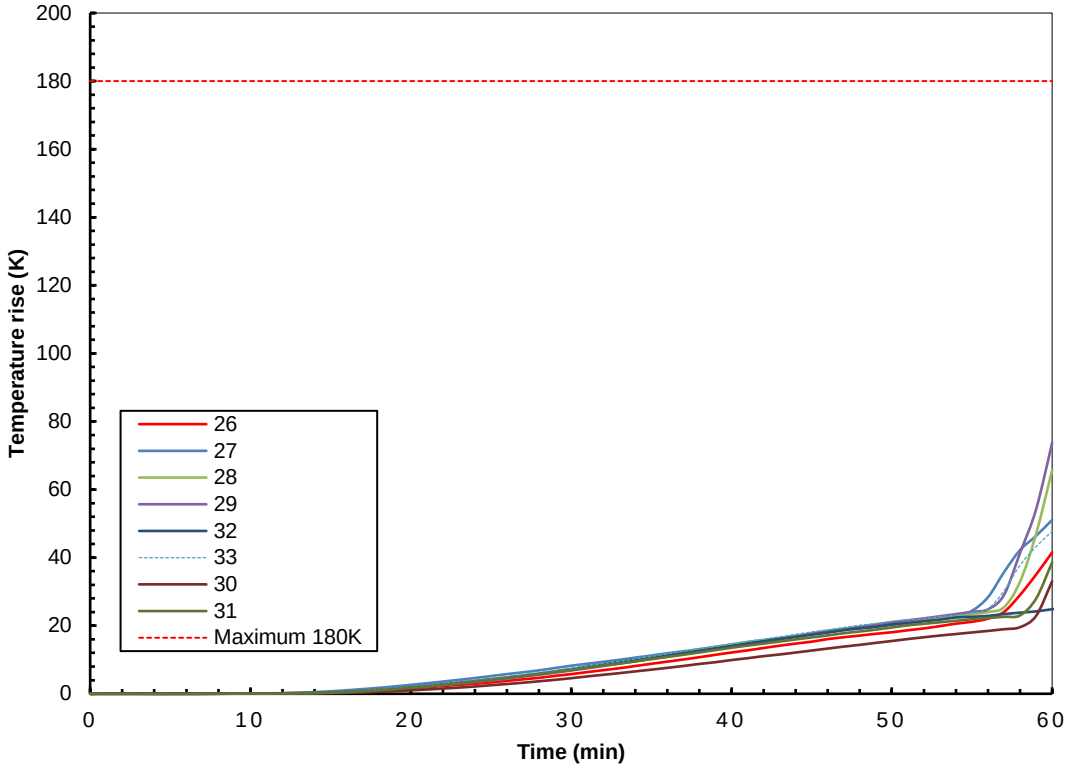



**Figure 9: Unexposed face maximum temperature rise**







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## 3.10 Integrity

The floor/ceiling failed the Integrity criterion after 59 minutes due to glowing of a cotton pad applied over a joint in the particle board flooring.

## 3.11 Structural Adequacy

The maximum measured deflection of the floor was 105 mm downwards towards the furnace at 60 minutes into the test. This deflection was measured at point C which was located at mid-span and mid-width of the floor. The floor did not deflect past the maximum allowable deflection limit of 114 mm for the duration of the test. Figure 10 shows the deflections over the duration of the test.

The maximum measured rate of deflection was 30 mm/min and occurred at 60 minutes at deflection point C. The floor exceeded the 5.1 mm per minute maximum allowable rate of deflection for after 50 minutes however did not exceed the L/30 criteria after which rate of deflection criteria is applicable. Figure 11 shows the rate of deflection over the duration of the test.

**Figure 10: Deflection of the floor**

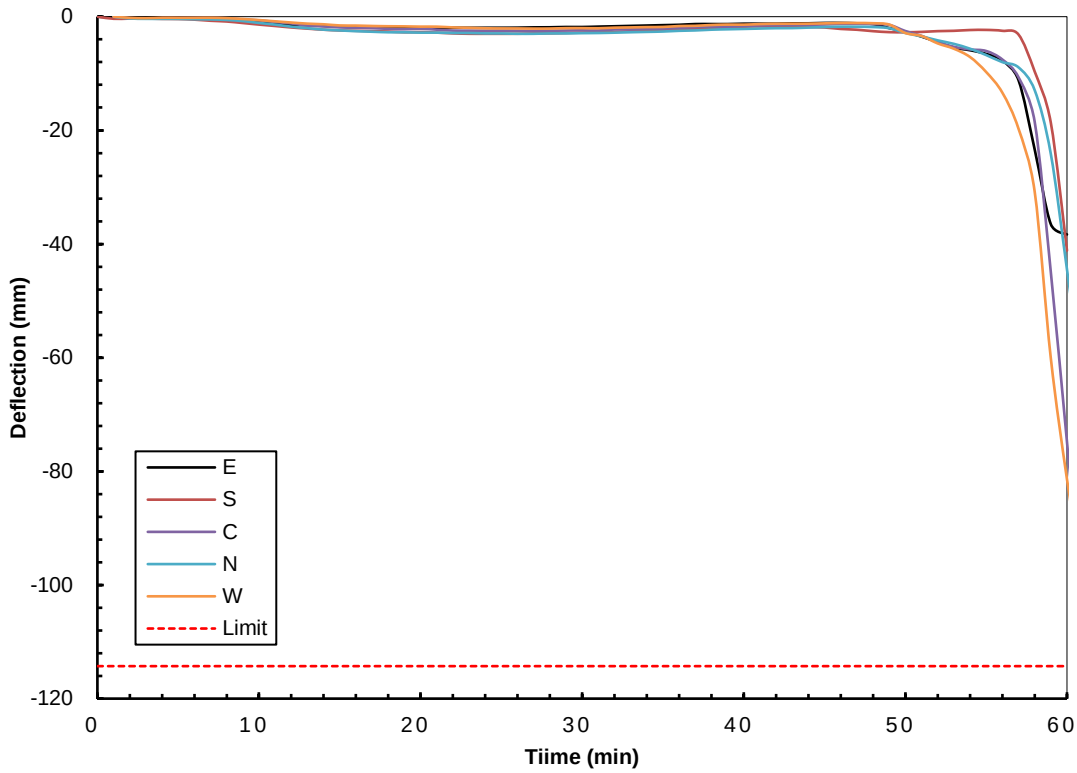




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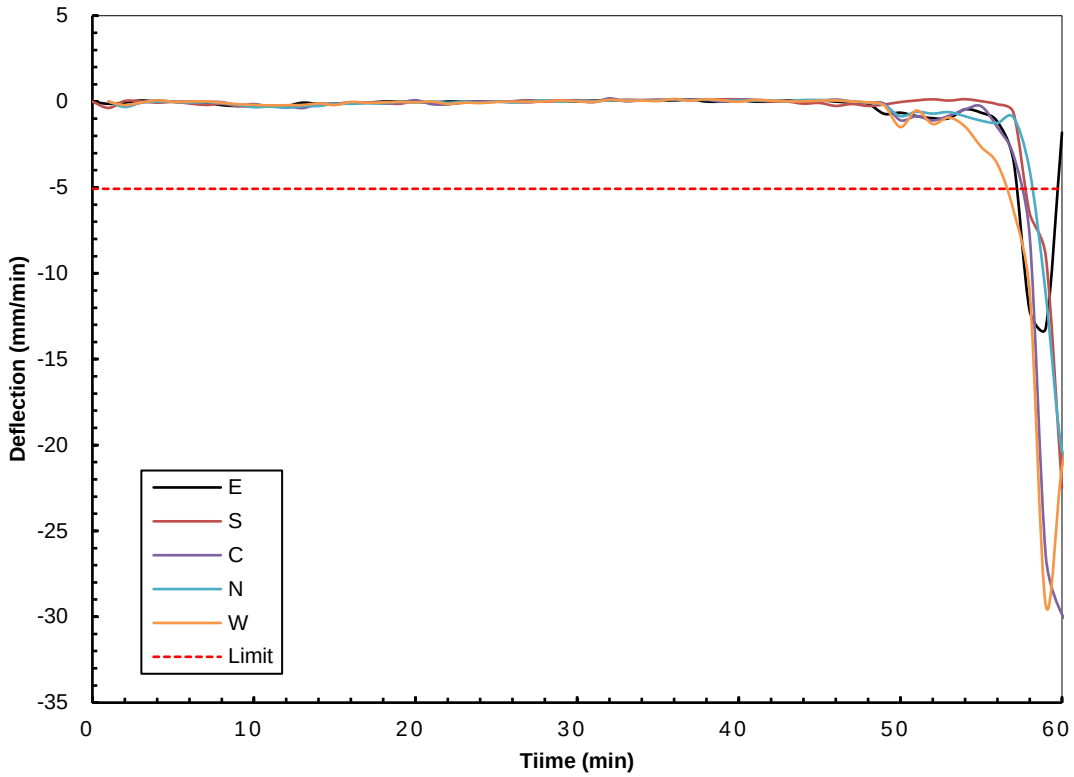
**Figure 11: Rate of deflection of floor**




## 3.12 Observations

### 3.12.1 Test Observations

Observations related to the integrity performance of the specimen were at the times stated in minutes and seconds (refer to Figure 6 for specimen orientation).

**Table 1: Test Observations**

| Time (Min:Sec) | Test face | Observations |
|---|---|---|
| 16:00 | E | The majority of the visible stopping had fallen away from the joints and over the screw heads. |
| 26:30 | E | The edges of the boards that were visible were sagging slightly between fixings. |
| 30:00 | E | The central bottom sheet of plasterboard at the Western end of the furnace had fallen down. The board was still attached from approximately the center to the Eastern end of the furnace. The remainder of the visible boards were still attached. |
| 35:00 | E | Further degradation and sagging of the exposed boards. |
| 37:00 | E | The remainder of the centre layer of plasterboard fell into the furnace. Part of the Eastern end remained attached. |

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| Time (Min:Sec) | Test face | Observations |
|---|---|---|
| 43:00 | E | The North side bottom layer of plasterboard has fallen away into the furnace. |
| 43:50 | E | The south side bottom layer of plasterboard at the Eastern end of the furnace has largely fallen away into the furnace. |
| 49:00 | E | Only the full sheet on the South side lower board remained in place. |
| 53:00 | U | Smoke was being emitted from the test specimen along the central joint in the flooring at mid width. |
| 56:00 | U | There was an increase in the volume of smoke being emitted from the test specimen. Smoke was also being emitted from along all the joints in the flooring. |
| 57:00 | U | There was a significant volume of smoke being emitted from the centre of the central joint in the flooring. A cotton pad test was applied to the centre of the central joint. Discoloration of the pad occurred but no Integrity failure. |
| 58:50 | U | There was now a visible gap in the central joint in the flooring. |
| 59:15 | U | Charring of a cotton pad occurred over the central joint that had opened up in the flooring at approximately mid width. **This is deemed to be an Integrity failure of the floor/ceiling.** Following the charring of the cotton pad flames could be seen along the joint in the flooring. |
| 60:15 | - | Test stopped. |



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# 4. SUMMARY

The test results in accordance with AS 1530.4 – 2014, *"Methods for fire tests on building materials, components and structures – Part 4: Fire – resistance test of elements of construction"* was as follows:

| | |
|---|---|
| Structural Stability | 60 minutes No failure |
| Integrity | 59 minutes |
| Insulation | 60 minutes No failure |

In accordance with the test standard the fire resistance level (FRL) of the loadbearing floor ceiling is as follows 60/30/60

*"This report details the methods of construction, the test conditions and the results obtained when the specific element of construction described herein was tested following the procedure outlined in this standard. any significant variation with respect to size, constructional details, loads, stresses, edge or end conditions, other than those allowed under the field or direct application in the relevant test method, is not covered by this report.*

*Because of the nature of fire resistance testing and the consequent difficulty in quantifying the uncertainty of measurement of fire resistance, it is not possible to provide a stated degree of accuracy of the result."*

# 5. PERMITTED VARIATION

## 5.1 General

The results of the fire resistance test contained in the test report are directly applicable, without reference to the testing authority, to similar constructions where one or more of the changes are permitted below have been made provided no individual component is removed or reduced:

(a) The stress level is reduced and the location and distribution of the load is unchanged.
(b) The rotational and longitudinal restraint is increased.
(c) Thermal insulation is not reduced at any point over the whole area.
(d) The plenum depth in assemblies containing a horizontal protective membrane is increased.

# 6. TEST DATA

## 6.1 Temperature data

The furnace test temperature is given in Table 2. The specimen temperature data collect during the test is given in Table 3 and Table 8. See Figure 6 and Figure 7 for information on the location of the thermocouples.

**Table 2: Furnace temperature data**

| Time | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 | F12 | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 19 | 18 | 18 | 18 | 19 |
| 1 | 269 | 186 | 212 | 201 | 360 | 205 | 327 | 327 | 261 | 302 | 202 | 341 | 266 |
| 2 | 459 | 378 | 399 | 401 | 581 | 415 | 504 | 532 | 453 | 493 | 409 | 497 | 460 |
| 3 | 517 | 519 | 500 | 508 | 577 | 526 | 549 | 560 | 517 | 558 | 501 | 510 | 528 |
| 4 | 530 | 579 | 567 | 565 | 547 | 576 | 586 | 580 | 510 | 572 | 563 | 526 | 558 |
| 5 | 562 | 617 | 604 | 588 | 598 | 628 | 632 | 601 | 571 | 659 | 624 | 546 | 602 |
| 6 | 606 | 627 | 642 | 589 | 631 | 638 | 620 | 615 | 613 | 678 | 615 | 564 | 620 |
| 7 | 628 | 652 | 701 | 625 | 650 | 679 | 650 | 652 | 657 | 699 | 635 | 604 | 653 |
| 8 | 646 | 683 | 733 | 678 | 657 | 697 | 655 | 678 | 652 | 677 | 636 | 620 | 668 |
| 9 | 667 | 705 | 724 | 702 | 672 | 708 | 658 | 697 | 664 | 679 | 637 | 629 | 679 |
| 10 | 687 | 719 | 726 | 725 | 688 | 712 | 668 | 718 | 675 | 685 | 644 | 641 | 691 |
| 11 | 699 | 726 | 732 | 733 | 704 | 717 | 674 | 731 | 682 | 690 | 651 | 655 | 700 |
| 12 | 710 | 736 | 743 | 743 | 712 | 726 | 687 | 744 | 691 | 703 | 662 | 667 | 710 |
| 13 | 716 | 746 | 754 | 752 | 723 | 737 | 700 | 754 | 706 | 714 | 673 | 676 | 721 |
| 14 | 730 | 765 | 766 | 766 | 733 | 755 | 718 | 759 | 720 | 732 | 690 | 690 | 735 |
| 15 | 744 | 766 | 776 | 769 | 746 | 760 | 722 | 763 | 723 | 733 | 700 | 700 | 742 |
| 16 | 753 | 774 | 790 | 779 | 756 | 767 | 737 | 777 | 727 | 743 | 710 | 714 | 752 |
| 17 | 767 | 781 | 796 | 787 | 773 | 773 | 742 | 783 | 733 | 743 | 716 | 722 | 760 |
| 18 | 782 | 790 | 809 | 792 | 788 | 787 | 753 | 788 | 745 | 752 | 728 | 732 | 771 |
| 19 | 799 | 797 | 811 | 791 | 803 | 796 | 760 | 791 | 756 | 760 | 735 | 737 | 778 |
| 20 | 809 | 808 | 824 | 803 | 812 | 807 | 773 | 806 | 764 | 767 | 748 | 750 | 789 |
| 21 | 826 | 809 | 821 | 800 | 810 | 809 | 773 | 805 | 770 | 770 | 751 | 754 | 791 |
| 22 | 830 | 818 | 829 | 809 | 822 | 818 | 785 | 816 | 777 | 780 | 760 | 763 | 801 |
| 23 | 830 | 818 | 836 | 808 | 819 | 820 | 789 | 818 | 781 | 784 | 766 | 768 | 803 |
| 24 | 844 | 826 | 842 | 813 | 835 | 831 | 797 | 821 | 791 | 793 | 773 | 773 | 812 |
| 25 | 851 | 831 | 845 | 816 | 838 | 838 | 803 | 826 | 795 | 803 | 782 | 782 | 817 |
| 26 | 855 | 836 | 849 | 821 | 841 | 840 | 809 | 831 | 799 | 802 | 787 | 787 | 821 |
| 27 | 865 | 841 | 854 | 826 | 842 | 846 | 812 | 837 | 801 | 809 | 793 | 795 | 827 |
| 28 | 871 | 848 | 860 | 833 | 850 | 853 | 820 | 842 | 810 | 816 | 799 | 801 | 833 |
| 29 | 872 | 855 | 866 | 842 | 865 | 860 | 827 | 851 | 821 | 825 | 804 | 806 | 841 |
| 30 | 836 | 830 | 856 | 844 | 846 | 835 | 816 | 849 | 806 | 797 | 794 | 802 | 826 |
| 31 | 831 | 838 | 862 | 868 | 844 | 840 | 824 | 868 | 808 | 799 | 796 | 807 | 832 |
| 32 | 828 | 850 | 874 | 881 | 843 | 851 | 835 | 878 | 813 | 807 | 807 | 816 | 840 |
| 33 | 835 | 840 | 887 | 878 | 836 | 845 | 856 | 884 | 810 | 806 | 828 | 834 | 845 |
| 34 | 894 | 887 | 894 | 875 | 881 | 881 | 874 | 897 | 857 | 856 | 855 | 855 | 875 |
| 35 | 889 | 885 | 880 | 860 | 927 | 883 | 869 | 887 | 866 | 856 | 850 | 844 | 875 |
| 36 | 865 | 865 | 868 | 849 | 877 | 874 | 864 | 875 | 849 | 852 | 847 | 845 | 861 |
| 37 | 881 | 877 | 871 | 867 | 890 | 893 | 866 | 884 | 853 | 859 | 839 | 830 | 867 |
| 38 | 889 | 882 | 874 | 869 | 898 | 903 | 891 | 877 | 855 | 861 | 852 | 838 | 874 |
| 39 | 902 | 900 | 887 | 884 | 911 | 925 | 906 | 845 | 869 | 882 | 873 | 854 | 886 |
| 40 | 888 | 888 | 912 | 902 | 910 | 901 | 893 | 908 | 858 | 872 | 872 | 876 | 890 |
| 41 | 904 | 888 | 909 | 884 | 909 | 897 | 881 | 906 | 874 | 871 | 864 | 874 | 888 |
| 42 | 910 | 890 | 913 | 881 | 917 | 900 | 883 | 906 | 882 | 873 | 868 | 877 | 892 |
| 43 | 914 | 897 | 924 | 891 | 935 | 908 | 893 | 917 | 888 | 883 | 879 | 888 | 902 |
| 44 | 925 | 904 | 925 | 892 | 934 | 916 | 894 | 917 | 898 | 889 | 880 | 890 | 905 |
| 45 | 881 | 887 | 911 | 869 | 893 | 896 | 885 | 921 | 867 | 872 | 871 | 887 | 887 |



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## Table 2/cont: Furnace temperature data

| Time | F1 | F2 | F3 | F4 | F5 | F6 | F7 | F8 | F9 | F10 | F11 | F12 | Avg |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 46 | 928 | 906 | 928 | 889 | 962 | 918 | 917 | 932 | 909 | 903 | 895 | 901 | 916 |
| 47 | 873 | 884 | 912 | 898 | 893 | 898 | 899 | 929 | 862 | 871 | 881 | 896 | 891 |
| 48 | 908 | 915 | 923 | 911 | 908 | 925 | 917 | 940 | 895 | 899 | 897 | 906 | 912 |
| 49 | 906 | 913 | 927 | 916 | 975 | 924 | 918 | 942 | 896 | 901 | 898 | 910 | 919 |
| 50 | 896 | 916 | 932 | 914 | 900 | 930 | 912 | 932 | 874 | 890 | 897 | 905 | 908 |
| 51 | 943 | 934 | 944 | 925 | 959 | 936 | 927 | 943 | 916 | 909 | 911 | 916 | 930 |
| 52 | 954 | 944 | 941 | 921 | 961 | 946 | 927 | 943 | 940 | 917 | 911 | 916 | 935 |
| 53 | 935 | 940 | 936 | 923 | 953 | 944 | 920 | 945 | 949 | 926 | 909 | 916 | 933 |
| 54 | 927 | 961 | 939 | 926 | 954 | 913 | 929 | 951 | 937 | 908 | 911 | 920 | 931 |
| 55 | 919 | 934 | 946 | 924 | 965 | 929 | 925 | 936 | 966 | 933 | 914 | 912 | 934 |
| 56 | 921 | 935 | 954 | 935 | 966 | 918 | 937 | 939 | 965 | 940 | 924 | 918 | 938 |
| 57 | 914 | 939 | 952 | 945 | 953 | 925 | 926 | 940 | 963 | 937 | 928 | 925 | 937 |
| 58 | 907 | 926 | 945 | 951 | 926 | 927 | 924 | 929 | 955 | 929 | 922 | 916 | 930 |
| 59 | 905 | 930 | 955 | 966 | 934 | 934 | 941 | 944 | 975 | 931 | 929 | 928 | 939 |
| 60 | 911 | 938 | 957 | 973 | 956 | 956 | 940 | 947 | 973 | 952 | 935 | 936 | 948 |

## Table 3: Unexposed temperature measurement – part 1

| Time | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|
| 0 | 19.8 | 19.7 | 19.3 | 19.6 | 19.5 |
| 1 | 19.8 | 19.7 | 19.3 | 19.6 | 19.5 |
| 2 | 19.8 | 19.8 | 19.3 | 19.6 | 19.5 |
| 3 | 19.8 | 19.7 | 19.3 | 19.6 | 19.5 |
| 4 | 19.8 | 19.7 | 19.3 | 19.6 | 19.5 |
| 5 | 19.8 | 19.7 | 19.3 | 19.6 | 19.5 |
| 6 | 19.7 | 19.7 | 19.3 | 19.6 | 19.5 |
| 7 | 19.7 | 19.7 | 19.2 | 19.6 | 19.5 |
| 8 | 19.7 | 19.7 | 19.3 | 19.6 | 19.6 |
| 9 | 19.8 | 19.8 | 19.3 | 19.7 | 19.6 |
| 10 | 19.8 | 19.8 | 19.3 | 19.7 | 19.6 |
| 11 | 19.9 | 19.8 | 19.4 | 19.7 | 19.7 |
| 12 | 19.9 | 19.9 | 19.4 | 19.8 | 19.7 |
| 13 | 20.0 | 19.9 | 19.5 | 19.9 | 19.8 |
| 14 | 20.1 | 20.1 | 19.7 | 20.0 | 19.9 |
| 15 | 20.2 | 20.2 | 19.8 | 20.2 | 20.1 |
| 16 | 20.4 | 20.5 | 20.1 | 20.5 | 20.4 |
| 17 | 20.6 | 20.8 | 20.4 | 20.8 | 20.7 |
| 18 | 20.9 | 21.1 | 20.8 | 21.2 | 21.0 |
| 19 | 21.2 | 21.6 | 21.3 | 21.7 | 21.4 |
| 20 | 21.5 | 22.0 | 21.7 | 22.1 | 21.9 |
| 21 | 21.8 | 22.3 | 22.2 | 22.6 | 22.3 |
| 22 | 22.2 | 22.8 | 22.7 | 23.1 | 22.8 |
| 23 | 22.6 | 23.3 | 23.2 | 23.6 | 23.2 |
| 24 | 23.0 | 23.8 | 23.7 | 24.1 | 23.7 |
| 25 | 23.4 | 24.4 | 24.3 | 24.7 | 24.2 |
| 26 | 23.9 | 25.0 | 24.9 | 25.2 | 24.8 |
| 27 | 24.4 | 25.5 | 25.5 | 25.9 | 25.3 |
| 28 | 25.0 | 26.2 | 26.1 | 26.5 | 25.9 |



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## Table 3/cont: Unexposed temperature measurement – part 1

| Time | 21 | 22 | 23 | 24 | 25 |
|---|---|---|---|---|---|
| 29 | 25.6 | 27.0 | 26.8 | 27.3 | 26.5 |
| 30 | 26.3 | 27.6 | 27.5 | 27.9 | 27.1 |
| 31 | 26.9 | 28.2 | 28.0 | 28.6 | 27.7 |
| 32 | 27.6 | 28.9 | 28.8 | 29.4 | 28.5 |
| 33 | 28.2 | 29.5 | 29.5 | 30.1 | 29.1 |
| 34 | 28.9 | 30.2 | 30.2 | 30.8 | 29.8 |
| 35 | 29.6 | 30.9 | 30.9 | 31.6 | 30.5 |
| 36 | 30.3 | 31.6 | 31.6 | 32.3 | 31.2 |
| 37 | 31.0 | 32.2 | 32.3 | 33.0 | 31.9 |
| 38 | 31.8 | 32.8 | 33.0 | 33.7 | 32.6 |
| 39 | 32.5 | 33.7 | 33.7 | 34.4 | 33.3 |
| 40 | 33.2 | 34.4 | 34.4 | 35.2 | 34.1 |
| 41 | 33.8 | 35.1 | 35.2 | 35.9 | 34.7 |
| 42 | 34.6 | 35.7 | 35.8 | 36.6 | 35.3 |
| 43 | 35.2 | 36.4 | 36.5 | 37.2 | 35.9 |
| 44 | 35.9 | 37.0 | 37.2 | 37.8 | 36.5 |
| 45 | 36.6 | 37.6 | 37.9 | 38.5 | 37.3 |
| 46 | 37.3 | 38.3 | 38.5 | 39.2 | 37.9 |
| 47 | 38.0 | 38.9 | 39.1 | 39.8 | 38.6 |
| 48 | 38.4 | 39.4 | 39.6 | 40.4 | 39.2 |
| 49 | 39.0 | 39.9 | 40.2 | 40.9 | 39.7 |
| 50 | 39.6 | 40.3 | 40.7 | 41.4 | 40.2 |
| 51 | 40.1 | 40.9 | 41.2 | 42.0 | 40.7 |
| 52 | 40.6 | 41.6 | 41.8 | 42.3 | 41.3 |
| 53 | 41.1 | 42.2 | 42.3 | 42.8 | 41.6 |
| 54 | 41.8 | 43.2 | 43.0 | 43.3 | 42.0 |
| 55 | 42.4 | 45.9 | 43.7 | 43.7 | 42.7 |
| 56 | 43.3 | 55.5 | 44.8 | 44.0 | 43.8 |
| 57 | 45.4 | 65.2 | 50.6 | 44.5 | 48.5 |
| 58 | 53.2 | 70.7 | 65.0 | 44.9 | 58.6 |
| 59 | 62.6 | 74.6 | 77.5 | 45.4 | 68.3 |
| 60 | 70.3 | 75.9 | 81.6 | 46.2 | 76.0 |



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## Table 4: Unexposed temperature measurement – part 2

| Time | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|
| 0 | 19.5 | 19.6 | 19.4 | 19.4 | 18.9 | 18.9 | 19.1 | 19.1 |
| 1 | 19.5 | 19.6 | 19.5 | 19.4 | 18.9 | 18.9 | 19.1 | 19.1 |
| 2 | 19.5 | 19.6 | 19.4 | 19.4 | 18.9 | 18.9 | 19.1 | 19.1 |
| 3 | 19.5 | 19.6 | 19.4 | 19.4 | 18.9 | 18.9 | 19.1 | 19.1 |
| 4 | 19.5 | 19.6 | 19.4 | 19.4 | 18.9 | 18.9 | 19.1 | 19.1 |
| 5 | 19.5 | 19.6 | 19.4 | 19.4 | 18.9 | 18.9 | 19.1 | 19.1 |
| 6 | 19.5 | 19.6 | 19.4 | 19.4 | 18.9 | 18.9 | 19.1 | 19.1 |
| 7 | 19.5 | 19.6 | 19.4 | 19.4 | 18.9 | 18.9 | 19.1 | 19.2 |
| 8 | 19.5 | 19.6 | 19.5 | 19.4 | 18.9 | 18.9 | 19.1 | 19.2 |
| 9 | 19.5 | 19.6 | 19.5 | 19.5 | 18.9 | 18.9 | 19.1 | 19.2 |
| 10 | 19.6 | 19.7 | 19.5 | 19.5 | 18.9 | 18.9 | 19.1 | 19.2 |
| 11 | 19.6 | 19.7 | 19.5 | 19.5 | 18.9 | 18.9 | 19.2 | 19.2 |
| 12 | 19.6 | 19.7 | 19.6 | 19.5 | 18.9 | 18.9 | 19.3 | 19.3 |
| 13 | 19.7 | 19.9 | 19.6 | 19.6 | 19.0 | 19.0 | 19.4 | 19.4 |
| 14 | 19.8 | 20.0 | 19.7 | 19.7 | 19.0 | 19.1 | 19.5 | 19.5 |
| 15 | 19.9 | 20.3 | 19.9 | 19.8 | 19.0 | 19.2 | 19.7 | 19.6 |
| 16 | 20.1 | 20.6 | 20.1 | 20.0 | 19.1 | 19.4 | 20.0 | 19.9 |
| 17 | 20.3 | 20.9 | 20.3 | 20.2 | 19.2 | 19.6 | 20.2 | 20.1 |
| 18 | 20.5 | 21.3 | 20.6 | 20.5 | 19.4 | 19.9 | 20.6 | 20.4 |
| 19 | 20.8 | 21.7 | 21.0 | 20.9 | 19.6 | 20.3 | 21.0 | 20.8 |
| 20 | 21.1 | 22.2 | 21.3 | 21.2 | 19.9 | 20.7 | 21.4 | 21.2 |
| 21 | 21.4 | 22.6 | 21.7 | 21.6 | 20.1 | 21.1 | 21.9 | 21.7 |
| 22 | 21.8 | 23.1 | 22.2 | 22.0 | 20.4 | 21.5 | 22.4 | 22.1 |
| 23 | 22.1 | 23.6 | 22.6 | 22.4 | 20.7 | 22.0 | 22.8 | 22.6 |
| 24 | 22.5 | 24.2 | 23.1 | 22.9 | 21.0 | 22.5 | 23.3 | 23.1 |
| 25 | 22.8 | 24.8 | 23.6 | 23.4 | 21.4 | 23.0 | 23.9 | 23.6 |
| 26 | 23.3 | 25.3 | 24.1 | 23.9 | 21.7 | 23.5 | 24.4 | 24.2 |
| 27 | 23.7 | 25.9 | 24.7 | 24.5 | 22.1 | 24.1 | 25.0 | 24.7 |
| 28 | 24.2 | 26.4 | 25.2 | 25.0 | 22.5 | 24.7 | 25.6 | 25.3 |
| 29 | 24.8 | 27.1 | 25.9 | 25.6 | 23.0 | 25.3 | 26.3 | 26.0 |
| 30 | 25.3 | 27.8 | 26.6 | 26.3 | 23.4 | 25.9 | 27.0 | 26.6 |
| 31 | 25.9 | 28.4 | 27.3 | 26.9 | 24.0 | 26.5 | 27.7 | 27.3 |
| 32 | 26.4 | 28.9 | 28.0 | 27.6 | 24.4 | 27.1 | 28.4 | 28.0 |
| 33 | 27.0 | 29.5 | 28.7 | 28.3 | 24.9 | 27.7 | 29.0 | 28.6 |
| 34 | 27.7 | 30.2 | 29.4 | 29.0 | 25.4 | 28.4 | 29.7 | 29.3 |
| 35 | 28.3 | 30.8 | 30.1 | 29.7 | 26.0 | 29.0 | 30.4 | 30.0 |
| 36 | 28.9 | 31.5 | 30.9 | 30.4 | 26.5 | 29.7 | 31.1 | 30.8 |
| 37 | 29.6 | 32.0 | 31.5 | 31.1 | 27.0 | 30.3 | 31.7 | 31.6 |
| 38 | 30.2 | 32.7 | 32.3 | 31.8 | 27.6 | 31.0 | 32.4 | 32.3 |
| 39 | 30.9 | 33.4 | 33.0 | 32.4 | 28.1 | 31.7 | 33.1 | 33.0 |
| 40 | 31.6 | 34.0 | 33.7 | 33.3 | 28.8 | 32.4 | 33.8 | 33.8 |
| 41 | 32.2 | 34.8 | 34.5 | 34.1 | 29.3 | 33.0 | 34.5 | 34.5 |
| 42 | 32.9 | 35.3 | 35.1 | 34.8 | 29.9 | 33.6 | 35.2 | 35.2 |
| 43 | 33.6 | 35.9 | 35.8 | 35.5 | 30.4 | 34.2 | 35.8 | 35.8 |
| 44 | 34.2 | 36.5 | 36.5 | 36.2 | 31.0 | 34.8 | 36.4 | 36.6 |
| 45 | 34.8 | 37.1 | 37.2 | 37.1 | 31.6 | 35.4 | 37.0 | 37.3 |



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## Table 4/cont: Unexposed temperature measurement – part 2

| Time | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|
| 46 | 35.6 | 37.7 | 38.0 | 37.8 | 32.2 | 36.0 | 37.7 | 37.9 |
| 47 | 36.1 | 38.3 | 38.6 | 38.3 | 32.7 | 36.7 | 38.3 | 38.6 |
| 48 | 36.6 | 38.7 | 39.2 | 39.0 | 33.2 | 37.2 | 38.8 | 39.2 |
| 49 | 37.1 | 39.2 | 39.8 | 39.7 | 33.8 | 37.7 | 39.4 | 39.7 |
| 50 | 37.6 | 39.8 | 40.4 | 40.4 | 34.4 | 38.4 | 39.9 | 40.4 |
| 51 | 38.2 | 40.4 | 40.9 | 41.0 | 35.0 | 39.0 | 40.4 | 40.8 |
| 52 | 38.7 | 41.0 | 41.4 | 41.6 | 35.5 | 39.5 | 40.8 | 41.2 |
| 53 | 39.4 | 41.5 | 41.8 | 42.2 | 36.0 | 39.9 | 41.5 | 41.7 |
| 54 | 40.1 | 42.4 | 42.2 | 42.8 | 36.4 | 40.3 | 41.7 | 42.2 |
| 55 | 40.6 | 44.0 | 42.8 | 43.5 | 36.9 | 40.8 | 41.9 | 42.9 |
| 56 | 41.6 | 47.9 | 43.4 | 44.2 | 37.3 | 41.1 | 42.5 | 44.1 |
| 57 | 43.6 | 55.3 | 44.9 | 48.5 | 37.8 | 41.5 | 42.9 | 49.3 |
| 58 | 48.5 | 61.8 | 52.4 | 60.8 | 38.4 | 41.9 | 43.3 | 56.9 |
| 59 | 54.5 | 66.0 | 66.4 | 73.6 | 41.8 | 46.8 | 43.9 | 62.3 |
| 60 | 61.0 | 70.6 | 85.1 | 93.1 | 51.9 | 57.5 | 44.3 | 66.8 |

## Table 5: Internal temperature measurement – Joist C

| Time | 36 | 37 | 38 | 39 | 40 | 41 | 43 |
|---|---|---|---|---|---|---|---|
| 0 | 18.6 | 18.8 | 18.8 | 18.9 | 19.0 | 18.1 | 18.4 |
| 1 | 18.6 | 18.8 | 18.8 | 18.9 | 19.0 | 18.1 | 18.4 |
| 2 | 18.8 | 18.8 | 18.8 | 18.9 | 19.0 | 18.1 | 18.4 |
| 3 | 19.5 | 18.8 | 18.9 | 19.0 | 19.1 | 18.1 | 18.4 |
| 4 | 22.2 | 18.9 | 18.9 | 19.0 | 19.1 | 18.2 | 18.6 |
| 5 | 27.8 | 19.0 | 19.0 | 19.0 | 19.1 | 18.4 | 19.1 |
| 6 | 36.9 | 19.3 | 19.2 | 19.2 | 19.2 | 18.8 | 19.9 |
| 7 | 48.8 | 20.3 | 19.9 | 19.6 | 19.6 | 20.4 | 22.5 |
| 8 | 60.5 | 22.4 | 21.4 | 20.8 | 20.8 | 22.5 | 26.1 |
| 9 | 70.0 | 25.9 | 24.2 | 23.2 | 23.3 | 24.9 | 28.8 |
| 10 | 76.8 | 30.6 | 27.9 | 26.6 | 26.8 | 27.4 | 31.9 |
| 11 | 80.9 | 35.8 | 32.3 | 30.4 | 30.4 | 30.0 | 35.2 |
| 12 | 83.4 | 41.0 | 37.0 | 34.0 | 34.1 | 33.5 | 38.2 |
| 13 | 84.7 | 46.1 | 41.5 | 37.2 | 36.8 | 35.1 | 39.5 |
| 14 | 85.8 | 50.5 | 45.4 | 40.1 | 39.8 | 36.9 | 41.4 |
| 15 | 86.8 | 54.1 | 48.6 | 42.7 | 42.7 | 39.0 | 43.0 |
| 16 | 87.8 | 57.0 | 51.7 | 45.0 | 44.9 | 40.7 | 44.7 |
| 17 | 88.7 | 59.4 | 54.3 | 47.0 | 46.8 | 42.1 | 46.2 |
| 18 | 89.6 | 61.6 | 56.6 | 49.1 | 48.9 | 43.7 | 47.8 |
| 19 | 90.5 | 64.0 | 59.1 | 51.0 | 50.8 | 46.2 | 49.9 |
| 20 | 92.0 | 66.4 | 61.4 | 52.7 | 52.9 | 48.7 | 52.5 |
| 21 | 93.7 | 68.9 | 63.3 | 55.3 | 55.5 | 51.7 | 55.4 |
| 22 | 94.8 | 71.8 | 65.5 | 57.8 | 58.1 | 54.2 | 57.8 |
| 23 | 95.6 | 74.2 | 67.4 | 59.8 | 60.0 | 56.5 | 59.7 |
| 24 | 96.5 | 75.9 | 69.3 | 61.2 | 61.1 | 58.5 | 61.9 |
| 25 | 97.4 | 77.7 | 71.0 | 63.0 | 62.5 | 60.8 | 64.0 |



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## Table 5/cont: Internal temperature measurement – Joist C

| Time | 36 | 37 | 38 | 39 | 40 | 41 | 43 |
|---|---|---|---|---|---|---|---|
| 26 | 98.3 | 78.7 | 72.2 | 64.6 | 64.5 | 62.4 | 65.4 |
| 27 | 99.2 | 80.1 | 73.7 | 65.6 | 65.7 | 63.2 | 66.7 |
| 28 | 100.1 | 81.9 | 75.4 | 66.7 | 67.0 | 64.5 | 68.1 |
| 29 | 101.6 | 83.0 | 77.1 | 67.9 | 68.1 | 66.0 | 69.8 |
| 30 | 104.2 | 84.3 | 78.1 | 68.9 | 69.5 | 67.6 | 71.1 |
| 31 | 108.2 | 86.2 | 80.0 | 70.1 | 70.6 | 69.2 | 72.4 |
| 32 | 111.8 | 88.0 | 82.6 | 71.4 | 72.2 | 71.0 | 73.9 |
| 33 | 115.1 | 89.2 | 84.9 | 72.8 | 73.4 | 73.0 | 75.7 |
| 34 | 117.9 | 89.8 | 86.6 | 74.3 | 75.0 | 74.4 | 76.8 |
| 35 | 120.6 | 90.8 | 86.6 | 75.9 | 76.2 | 75.6 | 78.1 |
| 36 | 123.8 | 91.3 | 87.6 | 77.4 | 77.7 | 77.0 | 79.3 |
| 37 | 128.3 | 90.8 | 87.6 | 78.8 | 79.1 | 78.3 | 80.4 |
| 38 | 130.7 | 89.7 | 86.9 | 80.1 | 80.5 | 79.4 | 80.5 |
| 39 | 133.6 | 88.5 | 86.1 | 81.3 | 82.2 | 80.0 | 80.7 |
| 40 | 137.6 | 87.4 | 85.8 | 82.4 | 83.2 | 80.6 | 81.5 |
| 41 | 143.4 | 85.9 | 85.5 | 83.1 | 83.9 | 81.2 | 82.3 |
| 42 | 152.6 | 85.3 | 85.7 | 83.5 | 84.4 | 81.0 | 82.3 |
| 43 | 170.2 | 85.6 | 86.1 | 83.5 | 84.2 | 80.7 | 82.6 |
| 44 | 207.6 | 86.4 | 87.4 | 83.4 | 83.7 | 80.2 | 82.6 |
| 45 | 261.9 | 87.3 | 89.8 | 83.6 | 83.9 | 80.1 | 83.3 |
| 46 | 322.1 | 88.8 | 92.6 | 84.1 | 84.7 | 80.1 | 85.3 |
| 47 | 375.2 | 90.8 | 96.3 | 85.2 | 87.0 | 80.5 | 93.0 |
| 48 | 430.5 | 96.2 | 103.2 | 89.2 | 93.8 | 83.3 | 114.1 |
| 49 | 498.2 | 107.4 | 116.4 | 103.1 | 110.3 | 95.1 | 170.4 |
| 50 | 577.1 | 130.3 | 139.9 | 137.5 | 140.0 | 163.1 | 245.7 |
| 51 | 668.5 | 176.6 | 192.1 | 185.9 | 192.3 | 235.6 | 349.8 |
| 52 | 749.0 | 253.7 | 272.9 | 245.9 | 258.2 | 279.1 | 412.7 |
| 53 | 850.8 | 348.8 | 360.6 | 293.9 | 315.4 | 305.8 | 454.3 |
| 54 | 858.0 | 430.8 | 435.2 | 350.3 | 379.8 | 335.0 | 500.6 |
| 55 | 848.1 | 533.0 | 518.6 | 431.4 | 470.5 | 376.0 | 562.3 |
| 56 | 878.6 | 643.4 | 622.2 | 569.0 | 595.5 | 423.4 | 633.9 |
| 57 | 796.7 | 724.9 | 708.6 | 679.0 | 699.3 | 581.0 | 690.9 |
| 58 | 818.5 | 804.6 | 793.7 | 769.0 | 772.9 | 736.6 | 761.5 |
| 59 | 804.2 | 812.3 | 815.2 | 814.6 | 819.3 | 803.9 | 805.5 |
| 60 | 801.3 | 801.4 | 795.8 | 805.9 | 813.5 | 805.7 | 807.1 |



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## Table 6: Internal temperature measurement – Joist D

| Time | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|
| 0 | 18.1 | 18.6 | 18.7 | 18.8 | 18.7 | 18.8 | 18.8 |
| 1 | 18.1 | 18.6 | 18.7 | 18.8 | 18.7 | 18.9 | 18.8 |
| 2 | 18.2 | 18.5 | 18.7 | 18.8 | 18.7 | 18.9 | 18.8 |
| 3 | 18.5 | 18.5 | 18.7 | 18.7 | 18.7 | 18.9 | 18.8 |
| 4 | 20.1 | 18.6 | 18.7 | 18.8 | 18.7 | 18.9 | 18.8 |
| 5 | 24.3 | 18.6 | 18.7 | 18.8 | 18.8 | 18.9 | 18.9 |
| 6 | 32.5 | 18.7 | 18.8 | 18.9 | 18.8 | 19.0 | 19.2 |
| 7 | 43.9 | 19.5 | 19.2 | 19.4 | 19.3 | 19.7 | 20.4 |
| 8 | 55.7 | 22.0 | 20.7 | 20.4 | 20.6 | 20.7 | 22.2 |
| 9 | 66.3 | 26.6 | 23.8 | 22.4 | 23.0 | 23.1 | 25.6 |
| 10 | 73.9 | 32.3 | 28.7 | 25.8 | 26.6 | 25.5 | 28.8 |
| 11 | 79.0 | 38.6 | 34.7 | 30.2 | 31.8 | 27.9 | 31.4 |
| 12 | 82.5 | 45.1 | 41.0 | 34.8 | 37.0 | 30.5 | 34.4 |
| 13 | 84.8 | 51.1 | 46.7 | 38.6 | 40.3 | 32.9 | 36.9 |
| 14 | 86.7 | 56.2 | 51.6 | 41.8 | 44.5 | 35.3 | 39.1 |
| 15 | 88.1 | 60.4 | 56.0 | 44.8 | 48.1 | 37.1 | 41.0 |
| 16 | 89.5 | 63.8 | 59.5 | 46.7 | 49.3 | 39.3 | 43.1 |
| 17 | 90.8 | 66.4 | 62.3 | 48.8 | 51.4 | 41.4 | 45.1 |
| 18 | 91.7 | 68.4 | 64.6 | 50.6 | 53.3 | 43.3 | 47.1 |
| 19 | 92.5 | 69.8 | 66.2 | 52.8 | 56.1 | 45.1 | 48.6 |
| 20 | 93.3 | 71.5 | 68.0 | 54.9 | 57.6 | 47.2 | 50.9 |
| 21 | 94.5 | 73.8 | 70.3 | 57.3 | 59.0 | 50.0 | 53.8 |
| 22 | 95.6 | 77.2 | 72.9 | 59.8 | 61.1 | 52.4 | 56.1 |
| 23 | 96.5 | 80.5 | 75.8 | 62.1 | 63.4 | 54.7 | 58.4 |
| 24 | 97.0 | 83.1 | 78.4 | 63.8 | 64.4 | 56.5 | 60.4 |
| 25 | 97.6 | 84.9 | 80.5 | 65.6 | 65.4 | 58.4 | 62.5 |
| 26 | 98.3 | 86.5 | 82.3 | 67.2 | 66.8 | 60.4 | 64.3 |
| 27 | 99.0 | 87.6 | 83.6 | 68.5 | 67.8 | 62.3 | 66.1 |
| 28 | 100.0 | 88.5 | 84.6 | 70.0 | 69.5 | 64.0 | 67.4 |
| 29 | 101.5 | 89.1 | 85.5 | 71.6 | 71.8 | 65.2 | 68.4 |
| 30 | 104.6 | 89.5 | 86.2 | 72.9 | 72.1 | 67.0 | 70.4 |
| 31 | 108.1 | 89.9 | 86.8 | 74.4 | 74.1 | 68.5 | 71.8 |
| 32 | 111.3 | 90.5 | 87.5 | 76.0 | 75.8 | 70.0 | 73.1 |
| 33 | 114.0 | 91.1 | 88.4 | 77.5 | 77.6 | 71.4 | 74.3 |
| 34 | 116.2 | 91.5 | 89.1 | 78.9 | 78.6 | 73.3 | 76.0 |
| 35 | 118.0 | 92.1 | 89.9 | 80.3 | 79.1 | 74.6 | 77.2 |
| 36 | 119.4 | 92.7 | 90.9 | 81.4 | 80.5 | 76.5 | 79.0 |
| 37 | 120.4 | 93.2 | 91.5 | 82.4 | 81.7 | 77.9 | 80.4 |
| 38 | 121.3 | 93.4 | 92.0 | 83.3 | 82.9 | 79.2 | 81.5 |
| 39 | 122.1 | 93.7 | 92.4 | 84.5 | 83.9 | 80.5 | 82.5 |
| 40 | 123.7 | 93.5 | 92.3 | 85.0 | 84.7 | 81.0 | 83.1 |
| 41 | 125.4 | 93.5 | 92.3 | 85.2 | 85.1 | 81.6 | 83.6 |
| 42 | 127.1 | 93.3 | 92.2 | 85.5 | 85.3 | 82.0 | 83.9 |
| 43 | 129.2 | 93.1 | 92.1 | 85.4 | 85.1 | 82.2 | 84.0 |
| 44 | 130.8 | 92.1 | 91.7 | 85.4 | 84.7 | 82.1 | 83.9 |
| 45 | 132.0 | 90.4 | 91.0 | 85.4 | 84.6 | 81.9 | 83.8 |



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## Table 6/cont: Internal temperature measurement – Joist D

| Time | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
|---|---|---|---|---|---|---|---|
| 46 | 134.7 | 89.0 | 90.3 | 85.2 | 84.0 | 81.7 | 83.6 |
| 47 | 139.2 | 87.9 | 89.8 | 85.1 | 84.0 | 81.8 | 83.5 |
| 48 | 146.7 | 86.8 | 88.8 | 85.3 | 83.9 | 81.2 | 83.1 |
| 49 | 160.0 | 87.3 | 88.2 | 86.5 | 84.1 | 82.0 | 84.1 |
| 50 | 175.3 | 88.3 | 88.2 | 92.1 | 86.4 | 83.4 | 91.1 |
| 51 | 195.9 | 90.3 | 89.5 | 113.4 | 97.2 | 85.6 | 122.3 |
| 52 | 220.6 | 93.0 | 92.1 | 146.3 | 136.2 | 94.1 | 171.4 |
| 53 | 247.1 | 98.2 | 96.5 | 178.3 | 171.0 | 143.7 | 218.9 |
| 54 | 278.3 | 108.1 | 104.1 | 218.4 | 206.9 | 196.3 | 274.2 |
| 55 | 320.5 | 125.9 | 118.7 | 265.8 | 246.3 | 242.9 | 333.8 |
| 56 | 365.8 | 165.5 | 159.8 | 327.6 | 293.9 | 288.7 | 394.4 |
| 57 | 408.0 | 224.2 | 215.2 | 394.1 | 344.1 | 329.0 | 447.6 |
| 58 | 615.4 | 512.3 | 409.6 | 551.4 | 525.7 | 424.7 | 588.1 |
| 59 | 687.5 | 731.6 | 672.8 | 697.9 | 701.6 | 564.7 | 695.6 |
| 60 | 778.5 | 826.1 | 780.0 | 769.8 | 769.7 | 703.0 | 760.7 |

## Table 7: Internal temperature measurement – Joist E

| Time | 51 | 52 | 53 | 54 | 55 | 56 | 57 |
|---|---|---|---|---|---|---|---|
| 0 | 18.5 | 18.7 | 18.7 | 18.7 | 18.8 | 18.7 | 18.7 |
| 1 | 18.5 | 18.7 | 18.7 | 18.7 | 18.8 | 18.8 | 18.7 |
| 2 | 18.5 | 18.7 | 18.7 | 18.7 | 18.8 | 18.8 | 18.7 |
| 3 | 24.1 | 18.7 | 18.7 | 18.7 | 18.8 | 18.8 | 18.7 |
| 4 | 59.8 | 18.8 | 18.8 | 18.7 | 18.8 | 18.7 | 18.7 |
| 5 | 71.9 | 19.2 | 19.1 | 18.7 | 18.8 | 18.8 | 18.8 |
| 6 | 78.6 | 20.0 | 19.6 | 18.8 | 18.9 | 18.8 | 18.8 |
| 7 | 82.8 | 21.5 | 20.7 | 19.0 | 19.1 | 19.0 | 19.1 |
| 8 | 85.8 | 24.2 | 22.2 | 19.7 | 20.0 | 19.9 | 20.5 |
| 9 | 87.9 | 28.4 | 25.4 | 21.6 | 22.1 | 21.5 | 22.3 |
| 10 | 90.5 | 33.8 | 29.3 | 24.7 | 25.4 | 23.9 | 25.1 |
| 11 | 91.7 | 39.8 | 34.0 | 28.7 | 29.4 | 27.0 | 28.6 |
| 12 | 91.6 | 45.7 | 38.9 | 32.9 | 33.6 | 30.2 | 32.2 |
| 13 | 92.0 | 51.1 | 43.3 | 36.5 | 37.2 | 33.5 | 35.6 |
| 14 | 91.9 | 55.7 | 47.2 | 39.5 | 40.1 | 36.2 | 38.5 |
| 15 | 91.8 | 59.6 | 51.0 | 42.1 | 42.8 | 38.5 | 41.0 |
| 16 | 92.0 | 62.8 | 53.9 | 44.3 | 44.9 | 40.9 | 43.2 |
| 17 | 91.9 | 65.2 | 56.6 | 46.3 | 46.7 | 42.7 | 45.0 |
| 18 | 91.2 | 67.4 | 58.6 | 48.3 | 48.5 | 44.4 | 46.7 |
| 19 | 90.6 | 69.7 | 61.0 | 50.1 | 50.1 | 46.2 | 48.3 |
| 20 | 91.1 | 72.1 | 63.6 | 51.9 | 51.9 | 47.7 | 50.0 |
| 21 | 93.1 | 75.2 | 66.0 | 54.2 | 54.2 | 49.0 | 51.4 |
| 22 | 95.5 | 78.4 | 68.3 | 56.6 | 56.4 | 51.0 | 53.4 |
| 23 | 97.8 | 80.9 | 70.8 | 59.0 | 58.7 | 53.7 | 56.2 |
| 24 | 101.9 | 83.0 | 73.3 | 61.2 | 60.8 | 56.1 | 58.5 |
| 25 | 105.6 | 84.7 | 75.8 | 63.3 | 63.1 | 58.5 | 60.8 |



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## Table 7/cont: Internal temperature measurement – Joist E

| Time | 51 | 52 | 53 | 54 | 55 | 56 | 57 |
|---|---|---|---|---|---|---|---|
| 26 | 110.1 | 86.2 | 77.9 | 65.1 | 64.7 | 61.1 | 63.1 |
| 27 | 115.5 | 87.3 | 79.8 | 66.9 | 66.5 | 62.8 | 64.8 |
| 28 | 120.7 | 87.2 | 80.7 | 68.3 | 68.1 | 64.6 | 66.5 |
| 29 | 126.3 | 88.6 | 81.8 | 69.8 | 69.6 | 65.8 | 67.6 |
| 30 | 131.6 | 89.6 | 83.0 | 71.0 | 70.8 | 67.3 | 69.4 |
| 31 | 137.1 | 90.3 | 84.2 | 72.2 | 72.2 | 68.8 | 70.9 |
| 32 | 142.5 | 90.8 | 85.5 | 73.6 | 73.6 | 70.4 | 72.4 |
| 33 | 147.9 | 90.0 | 86.0 | 74.9 | 75.0 | 72.1 | 74.0 |
| 34 | 152.6 | 90.1 | 86.6 | 76.4 | 76.5 | 73.8 | 75.7 |
| 35 | 153.0 | 90.5 | 87.4 | 77.8 | 77.9 | 75.4 | 77.2 |
| 36 | 157.9 | 90.7 | 87.7 | 79.3 | 79.5 | 77.0 | 78.7 |
| 37 | 165.5 | 90.1 | 88.1 | 80.8 | 81.0 | 78.1 | 80.0 |
| 38 | 174.3 | 89.1 | 88.7 | 82.0 | 82.2 | 79.0 | 81.0 |
| 39 | 186.5 | 88.5 | 88.0 | 83.0 | 83.1 | 80.0 | 81.9 |
| 40 | 199.5 | 87.6 | 88.0 | 83.6 | 83.8 | 81.0 | 82.6 |
| 41 | 212.7 | 87.5 | 87.7 | 84.3 | 84.5 | 81.5 | 83.1 |
| 42 | 228.2 | 86.9 | 87.1 | 84.6 | 84.8 | 82.2 | 83.6 |
| 43 | 244.2 | 86.4 | 87.6 | 84.8 | 84.9 | 82.8 | 83.9 |
| 44 | 260.0 | 86.6 | 88.7 | 84.7 | 84.9 | 83.0 | 84.1 |
| 45 | 276.4 | 86.8 | 89.1 | 84.5 | 84.7 | 82.9 | 83.8 |
| 46 | 295.4 | 86.5 | 89.7 | 84.4 | 84.7 | 82.7 | 83.7 |
| 47 | 314.0 | 86.6 | 90.2 | 84.1 | 84.4 | 82.5 | 83.5 |
| 48 | 327.9 | 88.0 | 89.7 | 83.3 | 83.4 | 82.0 | 82.8 |
| 49 | 336.5 | 90.2 | 90.4 | 82.7 | 82.9 | 81.9 | 82.9 |
| 50 | 344.9 | 90.7 | 91.9 | 83.2 | 83.3 | 82.4 | 84.2 |
| 51 | 358.1 | 91.0 | 94.7 | 85.4 | 85.0 | 82.7 | 86.9 |
| 52 | 376.5 | 91.1 | 99.5 | 93.2 | 92.3 | 83.6 | 93.9 |
| 53 | 403.2 | 91.7 | 105.6 | 115.9 | 113.9 | 84.4 | 106.0 |
| 54 | 437.4 | 94.3 | 115.7 | 138.8 | 137.2 | 85.3 | 122.2 |
| 55 | 477.3 | 99.0 | 128.3 | 164.5 | 161.7 | 88.3 | 139.2 |
| 56 | 520.7 | 108.7 | 145.3 | 190.6 | 187.2 | 117.8 | 168.2 |
| 57 | 572.9 | 128.7 | 166.1 | 218.6 | 213.4 | 157.6 | 202.3 |
| 58 | 629.2 | 166.0 | 206.7 | 282.0 | 262.2 | 227.7 | 287.1 |
| 59 | 719.3 | 220.5 | 260.7 | 378.2 | 337.8 | 308.9 | 392.1 |
| 60 | 768.6 | 301.7 | 321.4 | 458.3 | 409.8 | 383.4 | 483.9 |



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## Table 8: Internal temperature measurement – Top of the plasterboard

| Time | 58 | 59 | 60 | 61 | 62 |
|---|---|---|---|---|---|
| 0 | 18.3 | 18.2 | 18.2 | 18.2 | 18.2 |
| 1 | 18.3 | 18.2 | 18.2 | 18.3 | 18.3 |
| 2 | 18.7 | 18.4 | 18.4 | 18.4 | 18.5 |
| 3 | 21.9 | 20.5 | 20.3 | 20.2 | 21.6 |
| 4 | 29.7 | 27.1 | 26.6 | 26.5 | 29.2 |
| 5 | 41.1 | 37.7 | 36.7 | 37.4 | 39.9 |
| 6 | 54.5 | 52.5 | 48.7 | 50.6 | 52.4 |
| 7 | 67.9 | 68.2 | 61.6 | 64.2 | 65.3 |
| 8 | 78.4 | 79.9 | 73.1 | 76.2 | 75.8 |
| 9 | 84.4 | 85.8 | 81.0 | 84.2 | 82.8 |
| 10 | 87.4 | 88.6 | 85.5 | 88.2 | 86.7 |
| 11 | 89.3 | 90.1 | 88.3 | 90.1 | 89.2 |
| 12 | 90.3 | 91.1 | 89.9 | 90.9 | 90.6 |
| 13 | 90.8 | 91.6 | 90.8 | 91.3 | 91.2 |
| 14 | 90.9 | 91.8 | 91.3 | 91.3 | 91.4 |
| 15 | 90.9 | 91.8 | 91.5 | 91.2 | 91.4 |
| 16 | 91.1 | 91.9 | 91.4 | 91.0 | 91.3 |
| 17 | 91.3 | 92.0 | 91.4 | 91.0 | 91.3 |
| 18 | 91.7 | 92.4 | 92.0 | 91.3 | 91.6 |
| 19 | 92.5 | 93.2 | 92.7 | 92.0 | 91.9 |
| 20 | 95.0 | 94.5 | 94.1 | 93.3 | 93.5 |
| 21 | 95.5 | 96.6 | 96.0 | 95.4 | 95.6 |
| 22 | 95.4 | 97.4 | 96.5 | 96.2 | 96.0 |
| 23 | 95.9 | 97.7 | 96.3 | 96.0 | 95.7 |
| 24 | 96.3 | 97.9 | 96.1 | 96.2 | 96.1 |
| 25 | 96.6 | 98.4 | 96.4 | 96.5 | 96.5 |
| 26 | 97.3 | 98.6 | 96.6 | 96.6 | 96.7 |
| 27 | 98.6 | 98.9 | 97.0 | 96.9 | 97.3 |
| 28 | 100.4 | 99.2 | 97.9 | 97.7 | 98.4 |
| 29 | 102.8 | 99.3 | 99.5 | 99.4 | 100.0 |
| 30 | 105.9 | 101.8 | 102.1 | 101.8 | 102.2 |
| 31 | 109.7 | 103.1 | 105.4 | 104.5 | 104.7 |
| 32 | 113.8 | 105.3 | 109.0 | 107.3 | 107.6 |
| 33 | 117.1 | 108.4 | 112.9 | 110.7 | 110.9 |
| 34 | 119.5 | 111.7 | 116.3 | 114.1 | 114.4 |
| 35 | 121.2 | 116.7 | 119.0 | 117.1 | 117.3 |
| 36 | 122.4 | 122.2 | 120.8 | 119.3 | 119.4 |
| 37 | 123.1 | 127.1 | 121.8 | 121.1 | 120.7 |
| 38 | 123.7 | 132.0 | 123.8 | 122.6 | 122.6 |
| 39 | 124.4 | 139.4 | 126.2 | 123.3 | 125.1 |
| 40 | 125.3 | 153.2 | 129.3 | 124.2 | 128.6 |
| 41 | 126.2 | 204.6 | 133.2 | 124.9 | 132.4 |
| 42 | 127.1 | 280.5 | 139.7 | 125.7 | 137.9 |
| 43 | 128.1 | 358.3 | 149.1 | 126.9 | 147.0 |
| 44 | 129.5 | 426.8 | 182.0 | 129.5 | 176.8 |
| 45 | 131.8 | 478.2 | 255.3 | 134.0 | 265.7 |



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**Table 8/cont: Internal temperature measurement – Top of the plasterboard**

| Time | 58 | 59 | 60 | 61 | 62 |
|---|---|---|---|---|---|
| 46 | 135.7 | 514.5 | 334.8 | 142.4 | 410.5 |
| 47 | 140.6 | 543.5 | 411.9 | 159.9 | 555.4 |
| 48 | 146.6 | 567.0 | 477.2 | 215.7 | 633.4 |
| 49 | 164.0 | 591.6 | 518.5 | 291.4 | 686.2 |
| 50 | 176.5 | 620.3 | 545.1 | 368.4 | 831.4 |
| 51 | 196.7 | 654.6 | 565.7 | 434.6 | 856.3 |
| 52 | 231.0 | 890.2 | 585.5 | 484.2 | 735.0 |
| 53 | 265.6 | 903.9 | 410.2 | 519.8 | 844.8 |
| 54 | 300.1 | 878.9 | 883.0 | 547.2 | 868.1 |
| 55 | 347.0 | 833.3 | 869.0 | 566.1 | 782.0 |
| 56 | 406.4 | 808.7 | 879.6 | 581.4 | 773.7 |
| 57 | 466.1 | 874.1 | 857.9 | 600.7 | 707.5 |
| 58 | 569.9 | 855.4 | 880.7 | 620.7 | 725.9 |
| 59 | 829.7 | 842.5 | 883.3 | 637.8 | 786.3 |
| 60 | 842.8 | 846.8 | 872.4 | 652.6 | 777.9 |

## 6.2 Deflection data

See Figure 6 for the location of the deflection measurement locations. Negative measurements indicates movement of the specimen towards the furnace. Table 9 gives the relative deflection data measured during the test.

**Table 9: Deflection data**

| Time | E | S | C | N | W |
|---|---|---|---|---|---|
| 0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| 1 | -0.1 | -0.4 | -0.3 | -0.3 | -0.2 |
| 2 | -0.2 | -0.3 | -0.3 | -0.4 | -0.3 |
| 3 | -0.1 | -0.3 | -0.3 | -0.4 | -0.2 |
| 4 | -0.1 | -0.4 | -0.3 | -0.4 | -0.2 |
| 5 | -0.1 | -0.4 | -0.2 | -0.4 | -0.2 |
| 6 | -0.2 | -0.5 | -0.3 | -0.5 | -0.2 |
| 7 | -0.3 | -0.7 | -0.3 | -0.6 | -0.3 |
| 8 | -0.5 | -0.9 | -0.5 | -0.8 | -0.4 |
| 9 | -0.7 | -1.1 | -0.7 | -1.1 | -0.6 |
| 10 | -0.9 | -1.4 | -0.9 | -1.4 | -0.8 |
| 11 | -1.2 | -1.6 | -1.2 | -1.8 | -1.0 |
| 12 | -1.4 | -1.9 | -1.6 | -2.0 | -1.2 |
| 13 | -1.5 | -2.1 | -1.7 | -2.3 | -1.3 |
| 14 | -1.6 | -2.3 | -1.9 | -2.4 | -1.5 |
| 15 | -1.8 | -2.4 | -2.0 | -2.5 | -1.6 |
| 16 | -1.8 | -2.5 | -2.0 | -2.6 | -1.6 |
| 17 | -1.9 | -2.5 | -2.1 | -2.7 | -1.7 |
| 18 | -1.9 | -2.6 | -2.2 | -2.8 | -1.7 |
| 19 | -1.9 | -2.7 | -2.1 | -2.8 | -1.8 |


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**Table 9/cont: Deflection data**

| Time | E | S | C | N | W |
|---|---|---|---|---|---|
| 20 | -1.9 | -2.7 | -2.3 | -2.8 | -1.8 |
| 21 | -2.0 | -2.8 | -2.4 | -2.9 | -1.9 |
| 22 | -1.9 | -2.9 | -2.5 | -2.9 | -2.0 |
| 23 | -2.0 | -3.0 | -2.5 | -2.9 | -2.0 |
| 24 | -2.0 | -3.0 | -2.5 | -3.0 | -2.1 |
| 25 | -1.9 | -3.0 | -2.5 | -3.0 | -2.1 |
| 26 | -1.9 | -3.0 | -2.5 | -3.0 | -2.1 |
| 27 | -1.9 | -2.9 | -2.5 | -2.9 | -2.1 |
| 28 | -1.9 | -2.9 | -2.4 | -2.9 | -2.0 |
| 29 | -1.8 | -2.9 | -2.4 | -2.9 | -2.0 |
| 30 | -1.8 | -2.8 | -2.4 | -2.9 | -2.0 |
| 31 | -1.8 | -2.7 | -2.3 | -2.8 | -1.9 |
| 32 | -1.7 | -2.7 | -2.2 | -2.7 | -1.9 |
| 33 | -1.6 | -2.6 | -2.2 | -2.7 | -1.8 |
| 34 | -1.6 | -2.5 | -2.1 | -2.6 | -1.8 |
| 35 | -1.5 | -2.4 | -2.0 | -2.5 | -1.7 |
| 36 | -1.4 | -2.3 | -1.8 | -2.4 | -1.6 |
| 37 | -1.3 | -2.2 | -1.8 | -2.3 | -1.5 |
| 38 | -1.3 | -2.0 | -1.8 | -2.2 | -1.4 |
| 39 | -1.3 | -1.9 | -1.7 | -2.2 | -1.4 |
| 40 | -1.2 | -1.8 | -1.5 | -2.1 | -1.3 |
| 41 | -1.2 | -1.7 | -1.5 | -2.0 | -1.3 |
| 42 | -1.2 | -1.7 | -1.5 | -2.0 | -1.2 |
| 43 | -1.2 | -1.7 | -1.4 | -1.9 | -1.2 |
| 44 | -1.2 | -1.8 | -1.4 | -1.8 | -1.2 |
| 45 | -1.1 | -1.9 | -1.3 | -1.8 | -1.1 |
| 46 | -1.1 | -2.2 | -1.2 | -1.8 | -1.1 |
| 47 | -1.2 | -2.3 | -1.3 | -1.8 | -1.2 |
| 48 | -1.3 | -2.6 | -1.4 | -2.0 | -1.4 |
| 49 | -2.0 | -2.7 | -2.5 | -2.9 | -2.9 |
| 50 | -2.7 | -2.7 | -3.4 | -3.5 | -3.4 |
| 51 | -3.5 | -2.7 | -4.5 | -4.2 | -4.7 |
| 52 | -4.5 | -2.5 | -5.3 | -4.8 | -5.6 |
| 53 | -5.5 | -2.5 | -5.8 | -5.6 | -7.1 |
| 54 | -5.9 | -2.3 | -6.0 | -6.8 | -9.7 |
| 55 | -6.6 | -2.3 | -7.5 | -8.0 | -13.4 |
| 56 | -7.7 | -2.5 | -10.7 | -8.9 | -19.7 |
| 57 | -11.2 | -3.1 | -18.5 | -12.9 | -30.8 |
| 58 | -23.3 | -9.6 | -45.0 | -24.2 | -60.1 |
| 59 | -36.5 | -18.7 | -74.8 | -44.5 | -81.4 |
| 60 | -38.3 | -41.2 | -105.3 | -65.2 | -99.6 |



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# PHOTOGRAPHS

## Photo 1: Framing construction

## Photo 2: Flooring construction

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**Photo 3: Exposed face prior to test**

**Photo 4: Post test**

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# WP2-R1

# EXPERIMENTAL TESTING OF CONNECTIONS FOR MULTI-STOREY LIGHT STEEL FRAME BUILDINGS

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Many Thanks,
Sidhant Kumar

## Abstract

Cold form steel frame building has gained popularity in recent years because of their good environment protection, seismic performance and high construction efficiency. This has been widely used in the United States, Canada, Japan, China and Australia and recently, they have had good application in New Zealand. These buildings consist of many types of connection and since the framing is relatively light, they can carry heavy loadings.

Self-drilling screws are very common fasteners used in cold form steel sections to connect each component. Self-drilling screw is an engineered fastener that operates the same as drill bits with a self-locking feature. These screws create strong connection strengths and are capable of holding very high loads. The screws also faster the process in the construction industry as they can be directly screwed on the member without the use of drill bits and screwdrivers as practised in the past. With ease of operation and broad section of sizes available in the market, it is cost and time efficient in general.

This report represents the behaviour of cold form steel sections and the strength and stiffness capacities primarily the stud to bottom plate connections in low-rise cold form steel buildings. It compares the connections under compression and tension loads at the foundation and intermediate levels with and without end bearing conditions in a building with two gauge sizes (0.75mm and 1.15mm).

Series of compression and tension tests were done in the University of Auckland Campus based in Newmarket in the structures test lab. In compression, the connection does not fail but the stud fails at almost 55kN for 1.15mm specimen and 25kN for 0.75mm specimen whereas for tension the connection capacity was 21kN and 12kN respectively for 1.15mm and 0.75mm specimen. These connection capacities could further define the rocking mechanism between the connections and its limiting strength, which can be used in the following ways:

1. *Attachments to the seismic bracing panels.*
2. *Attachments to the non-seismic bracing unit walls.*

Keywords: Light steel gauge connections, Self-drilling screws, Cold form steel sections

## Executive Summary

This report signifies the behaviour of cold form steel sections and the strength and stiffness capacities primarily the stud to bottom plate connections in low-rise cold form steel buildings. The compression and tension tests were done on at the foundation and intermediate levels with and without end bearing conditions in a building with two gauge sizes. Sections were rolled using G550 CFS with a nominal thickness of 0.75mm and 1.15mm.

The connections with end bearings are showing more compressive strengths under axial loads. The bottom slip of the studs for the specimens with end bearing is considerably less than those without end bearing. The large amount of axial shortening that occurs in the specimen with no end bearing (3mm gap) may lead to cracking of any sheathing. The extreme axial shortening will eventually push the side dimpled connections beyond their shear capacity resulting to an early failure propagation in these zones before the stud reaches to its ultimate capacity. Contrastingly, in specimens with end bearing, the dimpled connections continued bearing until the stud faced failure due to buckling. Thus, if the non-end bearing type of connection is to be used, it should be designed with a serviceability limit state strength not exceeding that of the connection. This bearing type of connection may be suitable to create a rocking wall mechanism which would be very helpful in areas prone to earthquakes. It could be concluded that bearing type without any gap is a superior choice for cold form steel stud in medium rise buildings in terms of axial shortening performance and the load path it takes.

In tensile tests, the stud takes up the tensile load and the screws show slip and eventually shearing of it. Elastic range is also being observed where there is linear increase in the load respect to displacement in the graph. The studs started to enter the nonlinear zone before the ultimate failure load reached due to the failure of L bracket connection. Once the inelastic load is reached, the shearing off the L-bracket starts to begin since the screws connected on the side cannot sustain any further loading and then at ultimate load the L-bracket totally shears off where complete failure of the specimen is observed.

The ductility factor of the wall system developed (stud to bottom track connection) was also computed and presented in the report.

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## 1.0 Introduction

Cold-formed steel (CFS) refers to thin-walled steel that is manufactured by rolling or pressing steel into semi-finished or finished goods at relatively low temperatures (cold working). The term “cold” is used because this type of steel products is manufactured at room temperature. Cold-formed steel is widely used in buildings, automobiles, equipment, roof decks, home and office, furniture, utility poles, storage racks, grain bins, highway products, drainage facilities, and bridges. Cold-formed steel goods are created by the working of steel billet, bar, or sheet using stamping, rolling (including roll forming), or presses to deform it into a usable product. Cold-worked steel products, such as cold-rolled steel (CRS) bar stock and sheet, are commonly used in all areas of manufacturing of durable goods, such as appliances or automobiles, but the phrase cold-formed steel is most prevalently used to describe construction materials.

**Figure 1: Cold-formed steel manufactory using press-braking process**
(Anon., n.d.)

Cold-formed structural members have reduced thickness, complicated sectional sizes and shapes compared to conventional hot-rolled steel. Typical thickness of cold-formed steel section is ranged from 0.9 mm to 3.2 mm. Since its cold formed, the structural bending strength and compression strength depends on the thickness of light gauge steel, shape of the section and its yield strength. Connections in case of cold formed steel play an important role and are chosen based on their requirements. Typical connection types are; Welded connections and Mechanical connections. Welded connections are usually not preferred unlike in hot rolled steel due to limited thickness available of welding. Mechanical connections include bolts, screws and rivets. The requirements of connection can be further classified into structural need and non-structural need. Strength, Stiffness and deformation are the key parameters considered while defining the structural needs of a fastener. Characteristic strength of a connection can be obtained through experiments and theoretical analyses. Number of fasteners used in the connection, type of fastener used and the section type significantly influence the strength and behaviour of the arrangement. Stiffness determines the distribution of traverse, concentrated loads, and has an influence on forces in the connection. Connection stiffness in case of cold formed steel dictates the stiffness of the structure in whole. Deformation, also an important characteristic is primarily distinguished

into elastic and plastic deformation. Brittle fracture of a structure is expected when connections have negligible deformation capacity. Design of connections to behave elastically is important as failure mode with too little strain retention can cause problems to the structure. Also, with the use of light gauge steel, existence of residual secondary stresses around the bolt hole or screw hole is evident. Thus, theoretical procedures find their limit in cold formed steel design and applicability, but can be permitted if the plastic deformation of the fastener is considered along with the residual stress around the fastener hole.

In places of fasteners used for non-structural purpose (not load taking), price of the fastener is given importance to low down the price of the whole structure as connections approximately cost 35-45% in putting up the whole project. Further, the choice of the material used in fastener and its use is dictated by environmental conditions at the construction site, ease and skill required assembly and disassembly of the fastener, design life of the structure and its eventual threats. The effect of temperature, corrosion resistance, durability, humidity and manufacturing process of the fastener also affects the structure significantly. The construction practices are more similar to timber framing using screws to assemble stud frames. These screws are mainly self-drilling screws, which is particularly used in the experiment conducted on the specimen as shown below. Two gauges of Cee sections (1.15mm and 0.75mm) were used to conduct axial compression and tension test to determine the strength and the stiffness of the connection. This report details the compression tests and tension tests carried on light gauge steel framing stud to bottom plate connection using **screw** type of fastener along with a **L-Bracket** (75x80x55mm).

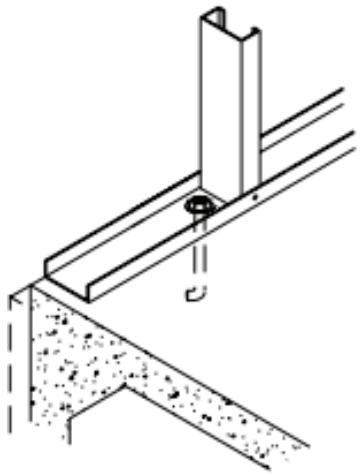


**Figure 2: Test Specimen Setup for Ground Floor**
(Anon., 2009)

The stress–strain graph is also a main property, which can be used to describe the behaviour of CFS. The nominal stress–strain graphs of cold-formed steel as reported by W. M. Quach and J. F. Huang is illustrated below, respectively. These four stress–strain curves are typical for cold-formed steel sheet during tension test for different yield strength of cold formed steel section. The initial slope of the curve may be lowered as a result of the prework. For this type of steel, the yield point is defined by the level at which the stress–strain curve becomes horizontal. Cold forming has the effect of increasing the yield strength of steel, the increase being the consequence of cold working well into the strain-hardening range. This increase is in the zones

where the material is deformed by bending or working. For design purposes, the yield stress can be assumed to have been increased by 15%.

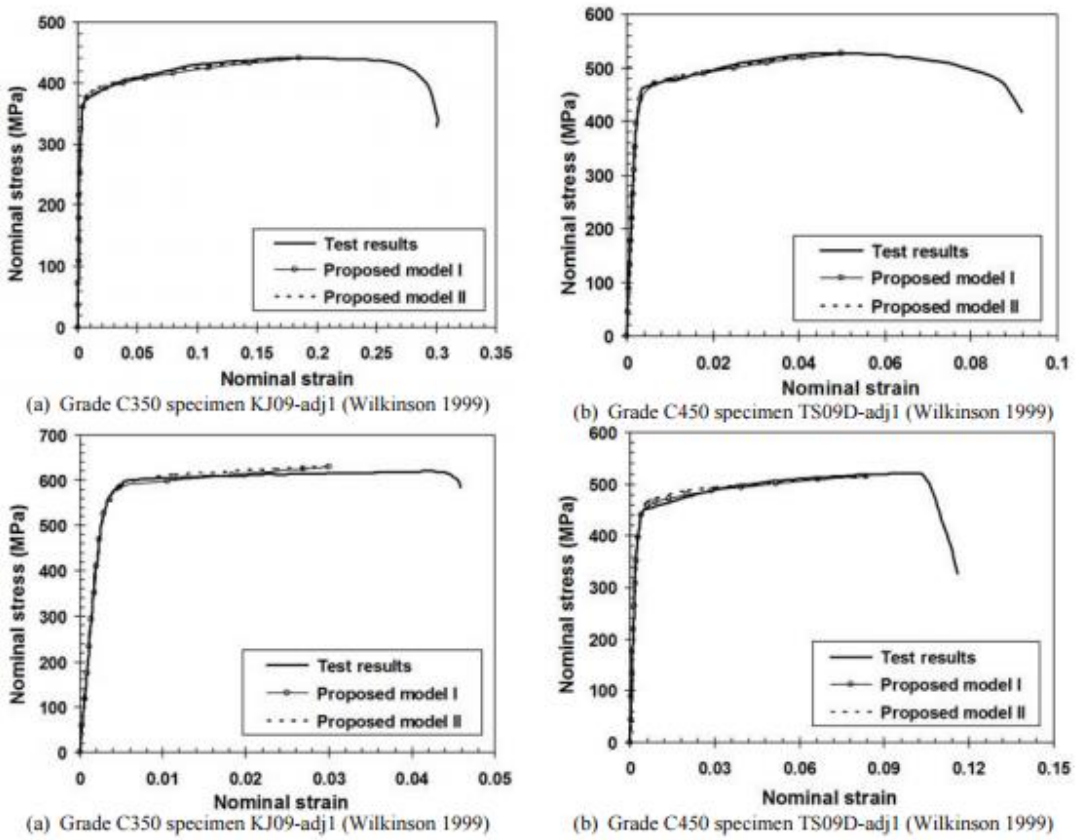



**Figure 3: Stress-strain graphs for CFS with different grades (strength)**
(Quach, Huang, 2011)

The yield stress value of cold-formed steel is usually between 206MPa to 552MPa. The measured values of Modulus of Elasticity based on the standard methods usually range 200GPa. The load-carrying capacities of cold-formed steel flexural and compression members are usually limited by yield point or buckling stresses that are less than the yield point of steel, particularly for those compression elements having relatively large flat-width ratios and for compression members having relatively large slenderness ratios. However, in case of bolted and welded connections, the strength of the connection as well depends on ultimate strength of the material apart from the yield strength.

Today, light gauge steel construction has become so popular in the world where buildings up to 11 stories are built. This is achieved through three generic forms of construction which are known as

- Stick-build construction using one-dimensional (1D) individual members in walls, floors and roofs.
- Panel/Frame construction using two-dimensional (2D) walls and floor cassettes.
- Modular construction in the form of three-dimensional (3D) units.

Finally, for all the construction works in light gauge steel to structurally be more stiffened connection and the type of connection plays a vital role. Thus, the connection types and amount of strength provided by specific type of connection should be well known before it is practiced in the industry.

## 2.0 Literature Review

## 2.1 Buckling of Cold Form Steel

Schafer has categorised buckling modes of cold formed steel columns into three types. They have been named as local, distortional and Euler (flexural or flexural torsional) buckling. The interaction of connection specifications and closed-form prediction of buckling stress defines the local mode of failure. (Schafer, 2002)
The consideration of geometric and elastic stiffness of web and flange could be useful to define distortional failure mode. The paper also reports that post-buckling capacity of distortional mode is lower than that of local buckling. With current methods ignoring local buckling interaction with other forms, Schafer's findings to minimise the errors in strength prediction resulted in the use of direct strength method for column design. Mohite's carries out parametric studies on cold formed steel beams and sections are analysed through CUFSM by varying lip depths (Mohite, Karoo, 2015). Experimental values for flexural strength of lipped channel beams and the values obtained through direct strength method fell within close proximity validating Schafer's direct strength method. Moen in his journal reports about the elastic buckling of cold-formed steel structural members with holes. The study considers two common types of thin-walled sections; stiffened and unstiffened elements. Cold formed steel plate being simply supported at two ends are considered stiffened elements and plates simply supported from three sides are termed unstiffened elements. While element based effective width method and member based Direct strength method addresses three potential failure modes, the author's findings rely on finite strip method to account for new buckling modes of failures and their interaction due to the presence of holes. (Moen, 2008)

### 2.1.1 Prediction of local buckling

Prediction of local buckling in cold formed steel sections can be examined by two approaches; the element approach and the semi-empirical interaction approach. While using elemental approach, the equations calculating the buckling stresses in flange, web and lip are used and the local buckling of that respective section is approximated by choosing the minimum of three obtained stress values. The equations to calculate local buckling stress using this approach are; (Schafer, 2002)

$$(f_{cr\ell})_{web} = k\frac{\pi^2 E}{12(1-\nu^2)}\left(\frac{t}{h}\right)^2 \quad \text{and } k = 4$$

$$(f_{cr\ell})_{flange} = k\frac{\pi^2 E}{12(1-\nu^2)}\left(\frac{t}{b}\right)^2 \quad \text{and } k = 4$$

$$(f_{cr\ell})_{lip} = k\frac{\pi^2 E}{12(1-\nu^2)}\left(\frac{t}{d}\right)^2 \quad \text{and } k = 0.43$$

In case of semi-empirical interaction approach, the above chose "k" values are determined for both flange/lip buckling and flange/web buckling. Equations to determine "k" to closely fit with finite strip results are stated by Schafer as (Schafer, 2002);

$$k_{flange/lip} = -11.07\left(\frac{d}{b}\right)^2 + 3.95\left(\frac{d}{b}\right) + 4 \quad (d/b < 0.6)$$

$$\text{if } \frac{h}{b} \geq 1 \; k_{flange/web} = 4\left(\frac{b}{h}\right)^2\left(2 - \left(\frac{b}{h}\right)^{0.4}\right)$$

$$\text{if } \frac{h}{b} < 1 \; k_{flange/web} = 4\left(2 - \left(\frac{h}{b}\right)^{0.2}\right)$$

### 2.1.2 Prediction of Distortional buckling

While predicting distortional buckling, the key focus is to the rotational restraint at the flange/web junction. The rotational stiffness is the summation of elastic and geometric stiffness with contributions from both flange and web. When the elastic stiffness is eroded by geometric stiffness, distortional buckling is seen. Distortional buckling stress is given by;

$$f = \frac{k_{\phi fe} + k_{\phi we}}{\tilde{k}_{\phi fg} + \tilde{k}_{\phi wg}}.$$

Complete expressions derived by Schafer and Pekoz are used to determine flange rotational stiffness, critical length and web rotational stiffness for both compression and flexural members. (Schafer, 2002)

### 2.1.3 Prediction of Euler buckling (flexural or flexural torsional buckling)

The DSM method which is not based on effective width and the iteration to identify the member design strength, could be used to determine the elastic Local, Distortional and Flexural-Rotational buckling of cold-formed steel members. Because of high elastic buckling values, the section will reach to its full capacity and in this case the material yielding happens normally before the buckling failure modes happening (Susilaa, 2015). Nevertheless, the flexural strength will not decrease after that local, distortional and global buckling happened. Therefore, the DSM method has proposed the below formulas to calculate the flexural strength of cold-formed sections due to lateral-torsional buckling moment $M_{ne}$:

For $M_{cre}$<0.56 My $\quad M_{ne}=M_{cre}$

For 2.78My≥$M_{cre}$≥0.56My $\quad M_{ne} = \frac{10}{9}$ My (1- $\frac{10My}{36Mcre}$ )

For Mcre>2.78My, $\quad M_{ne}$=My

While the section faces local or distortional buckling because of loads applied, the post-buckling strength which redistributes the stress throughout the member changes the global buckling strength of the member. Eventually, the member strength predictions for these buckling modes becomes more complicated (Trouncer, 2013). The previous experimental investigations done on cold-formed sections (Trouncer, 2013) to predict the flexural buckling behavior of such members, have found the profound influence of accurate geometric imperfection measurements on such structural members. Trouncer et al (Trouncer, 2013), used laser transducers to establish a laser rig for calculation of imperfections shape and imperfections magnitude longitudinally. The research concludes that imperfection data plays a basis role on

determination of buckling modes effects on sections capacity. Therefore, the precise imperfections measurement alternatively leads to precise flexural buckling modes predictions.

On the other hand, the flexural-torsional buckling behavior is highly dependent on the boundary conditions and restraints applied to the section. For instance, Oblique flexural restraints will resist deflections as well as flexural rotations, while torsional restraints will resist twist rotations and warping (Trahair, 2005). The coupling along the principal axis will occur when oblique flexural restraints had used. When eccentric flexural restraints are to be used, the coupling between the principal axis deflections and rotations and the twist rotations and warping displacements will happen. In these cases, the general buckling modes will be dominated by torsion and bending about both axes. After applying the axial load $N_0$ to those columns without restraints, the column buckles in a flexural-torsional mode (Trahair, 2005). By increasing the slenderness ration (λ), the buckling mode will be the torsional buckling, whereas, when the slenderness ratio increases the buckling mode will be due to flexural buckling.

### 2.1.4 Post buckling behaviour

The CFS members are made of thin-walled shell plates which are susceptible to different buckling modes due to loads applied to them. Therefore, understanding the post buckling behavior of thin shell structures if critical as they may still remain in elastic zone after buckling and having the capability to continuing carrying the loads. It was found out that in CFS members' low post-critical strength reserves could be an exact post- buckling behavior (Dinis, 2011). In columns for instance, the mode interaction phenomena is affecting the post-buckling strength behavior. The exact elements to the Local or distortional or global buckling zone have less load carrying capacity than those located farther. And as a result the influence of local/distortional mode interface effects on the post-buckling behavior and strength of lipped channel columns led to absorb many researcher's attentions to the importance of the post-buckling behavior.

Unlike the general belief that considers global buckling directly related to the length of columns, the generalized beam theory reveals that most percentage of the column critical buckling curve downward division matches to distortional–flexural–torsional buckling modes with relevant anti-symmetric distortional components. The equilibrium paths related to post-buckling behavior of sections having distortional or flexural-torsional buckling modes are dependent closely to the initial imperfections. These imperfections could be due to pure distortion or due to mainly distortion with outward outer half-waves.

### 2.1.5 Interaction between buckling modes

To account for the interaction between local and member buckling, the direct strength equations proposed by Becque for stainless steel use the member strength instead of the yield strength for the definition of the local buckling slenderness (Becque, Rasmussen, 2009). The direct strength design approach recently incorporated in the Australian/New Zealand standard for cold-formed carbon steel structures, as well as Lecce's (Lecce, Rasmussen, 2006) formulations for stainless steel defines the slenderness for distortional buckling in terms of the elastic distortional buckling stress and the yield stress and, consequently does not account for interaction between distortional and member buckling. However, interaction between

distortional and member buckling was observed during the tests and has been also highlighted in Figure below, three strength curves are presented as follows: The full cross section resistance is assumed and the explicit design strength method is used to determine the flexural torsional compression member capacity; the curve is labelled A fn, E0. The interaction between the distortional and global buckling modes is accounted for using the same principle as for interaction between local and global buckling; i.e., the distortional buckling slenderness "d" is defined in terms of the member design stress fn, E0 and of the distortional buckling stress and then used in conjunction with the direct strength equations. The proposed design approach is summarized as follows; (Rossi, Jaspart, Rasmussen, 2010)

- For ferritic stainless steels

$$N_{cd} = \begin{cases} N_{ce} & \text{for } \lambda_d \leq 0.533 \\ \left(\dfrac{0.9}{\lambda_d^{1.1}} - \dfrac{0.2}{\lambda_d^{2.2}}\right) N_{ce} & \text{for } \lambda_d > 0.533 \end{cases}$$

- For austenitic stainless steels

$$N_{cd} = \begin{cases} N_{ce} & \text{for } \lambda_d \leq 0.533 \\ \left(\dfrac{0.8}{\lambda_d^{1.15}} - \dfrac{0.2}{\lambda_d^{2.2}}\right) N_{ce} & \text{for } \lambda_d > 0.533 \end{cases}$$

where

$$\lambda_d = \sqrt{\frac{N_{ce}}{N_{od}}}$$

$$N_{od} = A f_{od}$$

**Pictures depicting buckling modes**

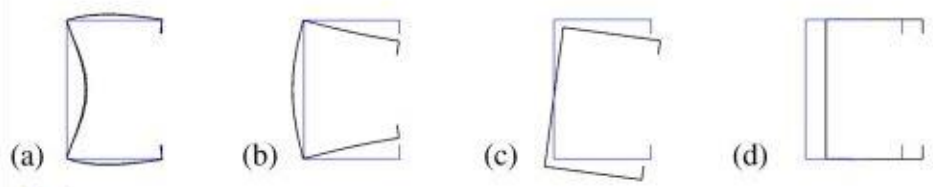



Fig. 1.
Lipped-channel column (a) local, (b) distortional, (c) flexural–torsional and (d) flexural buckling mode (cross-section) shapes.

**Figure 4: Buckling Modes** (Dinis, Camotim, 2011)

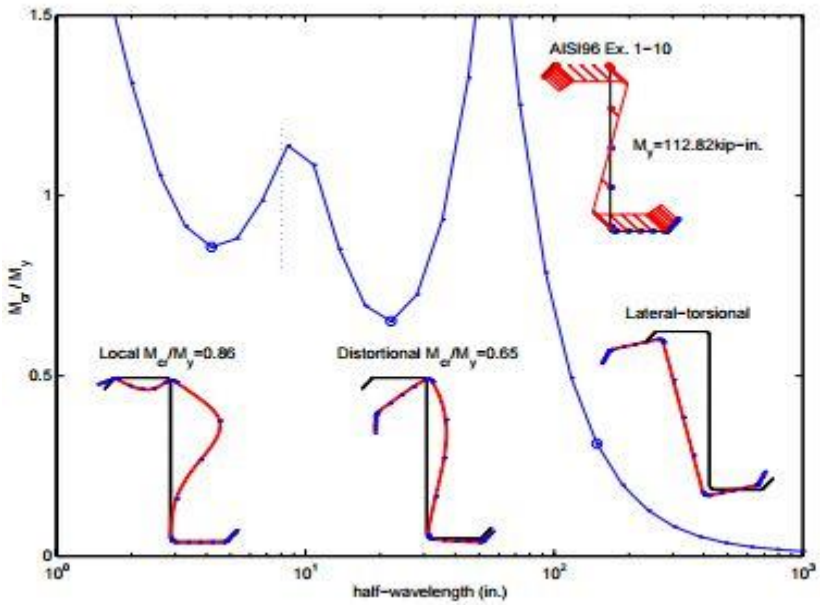



**Figure 5: Buckling modes of cold form steel beam** (Schafer, 2002)

## 2.2 Compression and Tension in Cold Form Steel

A study conducted by Weng tested a total of 68 columns and 25 stub columns for compression and observed that some columns showed lower strength than, that is being predicted by AISI. From the findings of this author, the cross sectional dimensions of column and the magnitude of residual stresses are found to have a significance influence on weakening of the column strength. The several other parameters of stress-strain curve, a very sharp yielding, rolling of cold form steel and many such do not have any influence on column strength. Compression residual stresses are found in the longitudinal direction inside the section and are measured to be 25% to 70% of the yield (Weng, Peköz, 1988). Another research by Kalavagunta and others studied the failure mechanism of 18 uprights and observed all failing by local and distortional bucking (Kalavagunta, Naganathan, Mustapha, 2013).

Russell (University of Auckland) carried out a series of pure axial compression on two different bearing conditions; a) without 3mm gap b) with 3 mm gap. It was observed that peak load sustained by both type of end conditions was almost the same with minor changes. However, due to the gap, the axial shortening of with gap specimens was more than that of end bearing ones. Warping torsion causing torsional buckling was found the reason for increased shortening of with gap specimens. Thus it is concluded that the fully bearing specimens without the gap be used for all compression load bearing applications. Bearing with a nominal gap of 3mm could be used, if serviceability limit state strength does not exceed that of the screwed connection (Russel, 2015).

C-section cold formed steel columns with and without oriented strand board (OSB) and Gypsum board (GYP) are tested by Vieira and Shifferaw. The role of boundary conditions was evaluated at the column ends and these ends are either left free or connected through screws to OSB/GYP. It was observed that sheathing had a good impact on strength and stability of the cold-formed studs. It is reported that sheathing may restrict distortional and global

buckling, and causes the local buckling to dictate the design upon (Vieira, Shifferaw, Schafer, 2011).
Llano's research aims to evaluate the tension-compression cyclic axial response of light gauge steel C-section structural members. A new method that explores the cyclic-response of members experiencing local buckling, distortional buckling and global buckling deformation and also that defines the target axial displacement is found by the author. The cyclic tests resulted to post buckling energy dissipation and thus tension stretching and softening was observed. It is concluded that the quantity of the energy dissipated per cycle increases with cross-section and global slenderness decreased. The observed hysteretic behaviour was asymmetric compression buckling deformation. Longest energy dissipation life was observed in specimens experiencing elastic buckling (Padilla-Llano, Eatherton, Moen, 2016).

Nguyen performed compression tests on cold formed plain steel and dimpled steel columns. Test results showed that ultimate strength and buckling strength of the 'short' dimpled columns was 9-33% and 8-26% higher than plain column specimens. Modes of failure exhibited by dimpled column specimens included plastic mechanism in failure (Nguyen, Wang, Mynors, English, 2013). Johnston investigates the semi-rigid connections for finite connection lengths on the design of CFS. The author reports frames designed with the assumption of rigid connections can potentially be considered unsafe by as much as 60%. And at the apex joint, three out of four frames have reported to be failed as bending moment at apex is dominating. Thus, semi-rigid connections and the way of designing them has to be extensively studied in case of cold formed steel (Johnson, Lim, Jackson, 2012).

## 2.3 Screw Connections

The structural characteristics of cold formed steel have now been proved and thus is being used widely in light gauge steel framing. Unlike hot-rolled steel, cold formed steel connections perform dissimilarly because of thin-walled behaviour of cold formed steel. Connections, a very important aspect in light gauge steel influences the structural stability as a whole. Screw connections, common in connecting two thin-gauge members finds its use due fast installation and easier design. These screw connections are effective and suitable when the gauge of cold steel does not cause problems in self-drilling process. The experimental test for cold formed steel with self-drilling screws showed better moment capacity and rigidity compared to that of conventional joints. It has also been proved that self-drilled screw joints overtake the effective modulus properties.
Screw connections tests usually include both single fastener specimens and multiple fastener specimens. It is advised from one of the literatures that a minimum of two screws is required to connect individual elements. Design equations for connection was first developed by Pekoz. The strength of screwed connection is said to be evaluated along with strength and resistance factors (Pekoz, 1990).
A literature review from university of Sydney collected a total 1890 test data from six sources and these were analysed using AISI (American Iron and steel Institute) equations and also the equations of Rogers and Hancock. The connections having two to seven screws in normal ductility steels, the Rogers and Hancock equations gave more accurate prediction for connection strength. The same Roger's equations could still be used for connections having

more than seven screws, by multiplying by a factor of 0.85. Below demonstrates the equation of Rogers and Hancock for shear strength connection (LaBoube, Babaloala, 2004):

For $t_2/t_1 \leq 1.0$

$$P_{ns} = 4.2*(t_2^3*d)^{1/2}*F_{u2}$$

$$P_{ns} = C*t_1*d*F_{u1}$$

$$P_{ns} = C*t_2*d*F_{u2}$$

For $t_2/t_1 < 2.5$

$$P_{ns} = C*t_1*d*F_{u1}$$

$$P_{ns} = C*t_2*d*F_{u2}$$

Where **C** is

| d/t | C |
|---|---|
| d/t< 6 | 2.7 |
| 6<d/t<13 | 3.3-0.1d/t |
| d/t>13 | 2.0 |

In the above stated formulae;
d = nominal screw diameter.
t-1 = gauge of member in contact with the screw head
t-2 = gauge of member not in contact with the screw head
F-u1 = tensile strength of member in contact with screw head.
F-u2 = tensile strength of member not in contact with screw head
P-ns = Nominal shear strength per unit screw.
t = thickness of smallest member.

Screwed connection loaded in tension can fail either by pulling out of the screw from the plate or pulling of material over the screw head. The design considerations for pull out as recommended by European standards is, tensile capacity of the screw connection equals to product of depth of penetration, nominal screw diameter, strength per unit screw and reduction factor of 0.65.

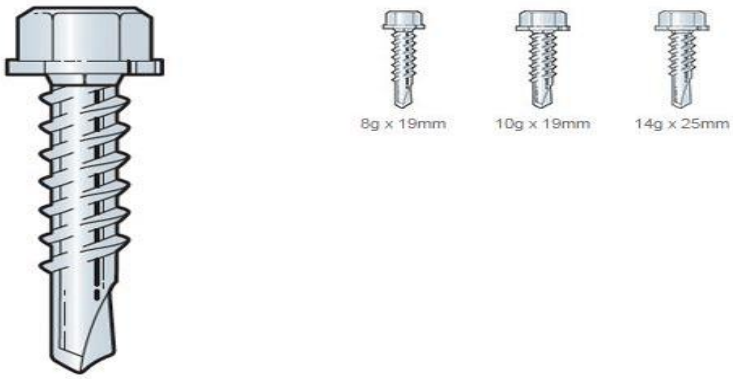



**Figure 6: Self-drilling screws** *(Cold-Formed Steel Construction Connecters)*

| Screw Designation | Nominal Diameter $d^6$ (mm) | Washer Diameter $d_w$ (mm) | LRFD Shear Loads (kN) | | | | | | LRFD Tension Loads (kN) | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | $(\Phi^*P_{ss})$ | Shear $(\Phi^*P_{ns})$ Minimum Steel Thickness (mm) | | | | | $(\Phi^*P_{ts})$ | Tension: Pull-Out $(\Phi^*P_{not})$ Minium Steel Thickness (mm) | | | | |
| | | | | 0.75 | 0.95 | 1.15 | 1.55 | 1.95 | | 0.75 | 0.95 | 1.15 | 1.55 | 1.95 |
| 8g | 4.17 | 8.06 | 2.25 | 1.09 | 1.63 | 2.25 | 2.25 | - | 4.37 | 0.48 | 0.63 | 0.98 | 1.00 | - |
| 10g | 4.83 | 9.53 | 3.69 | 1.18 | 1.76 | 3.56 | 3.69 | 3.69 | 5.87 | 0.56 | 0.73 | 1.21 | 1.46 | 2.38 |
| 14g[7] | 6.15 | 12.70 | 5.40 | 1.33 | 1.98 | 4.02 | 5.40 | 5.40 | 8.16 | 0.53 | 0.93 | 1.25 | 1.34 | 2.15 |

**Table 1: Properties of self-drilling screws** *(Cold-Formed Steel Construction Connecters)*

Self-drilling screws used for connections should have load capacity equal to or greater than those shown in the above table. The above table is also recommended to be used in New Zealand. Screw nominal strength can be calculated by dividing the loads on the structure by a resistance factor of 0.5. The values do depend on the yield strength of cold formed steel members to be connected and minimum yield strength of Fy = 230MPa and tensile strength of Fu = 310MPa for a gauge of 1.09 mm or less. Similarly, more minimum yield strength for higher gauge members is as well recorded by strong tie. Design thickness adopted in arriving at the tabulated results is minimum base metal thickness divided by 0.95. The required screw length is minimum of 19mm.
Universiti Teknologi Malaysia conducted experiments on beam to column connections and a full scale isolated screw joint tests were investigated. It was concluded that initial stiffness of the joints increased as the beam depth increased. Screwed joints were considered into partial strength category as the strength of the joint was more than 25% of connected beam flexural resistance (Tan, Tahir, 2009).

In Hong Kong, a study for screwed connection on thin steel plates elevated to high temperatures was carried out with a total 102 specimens. The failure modes observed included, tilting, bearing, screw shear, net section tension and tear out failure. The screwed connections performed well and it was concluded that the current design specifications were too conservative in predicting the screw connection strength at elevated temperature (Lee, Tan, Mohammad, Tahir, Shek, 2014).

Thus, use of self-drilling screws to connect the light gauge steel frame (LGSF) stud to the bottom plate is proposed and used in the current project.

# 3.0 Methodology

## 3.1 Materials Required for Testing

| Description | Quantity Required |
|---|---|
| LGSF stud | 10 specimens of 0.75mm gauge for compression test<br>10 specimens of 1.15mm gauge for compression test<br>10 specimens of 0.75mm gauge for tensile test<br>10 specimens of 1.15mm gauge for tensile test |
| LGSF bottom plate | 10 specimens of 0.75mm gauge for compression test<br>10 specimens of 1.15mm gauge for compression test<br>10 specimens of 0.75mm gauge for tensile test<br>10 specimens of 1.15mm gauge for tensile test |
| Steel plates | 2 steel plates with 4 holes on it; 2 holes to fit M12 bolt and the top hole to fit M16 bolt.<br>(Dimension of the steel plate: 150mm x 70mm x 15mm) |
| M16 bolts | 4 bolts |
| M12 bolts | 30 bolts |
| M12 anchor bolts | 12 bolts |
| L Brackets | 20 (75x80x55 L-Bracket) |
| Bracket Screws | 1 box self-drilling screws |

**Table 2: Materials required for testing**

## 3.2 Laboratory Resources Required

### 3.2.1 Foundation

A concrete slab (20MPA or more) to anchor the hold down bolt from the bottom plate of the stud. The concrete slab acting as a foundation will need a bolthole to accommodate m12 anchor bolt.

### 3.2.2 Drill bit

We would like to be assisted in drilling process of m12 bolthole on the bottom studs for hold down bolt.

### 3.2.3 Avery testing machine

The Avery testing machine in the materials lab is required to carry out the compression and tensile tests.

**Figure 7: Avery testing machine in materials lab in Newmarket**

### 3.2.4 Linear Variable Displacement Transducer (LVDT)

LVDT's are required to measure the deflection and displacement at their expected weak points.

**Figure 8: Linear Variable Displacement Transducer (LVDT)**

### 3.2.5 Computer

Computer assisted software to plot graph is required to plot the load vs displacement as the test proceeds (Data logger).

## 3.3 Specimen Drawings

### 3.3.1 Axial Compression Test

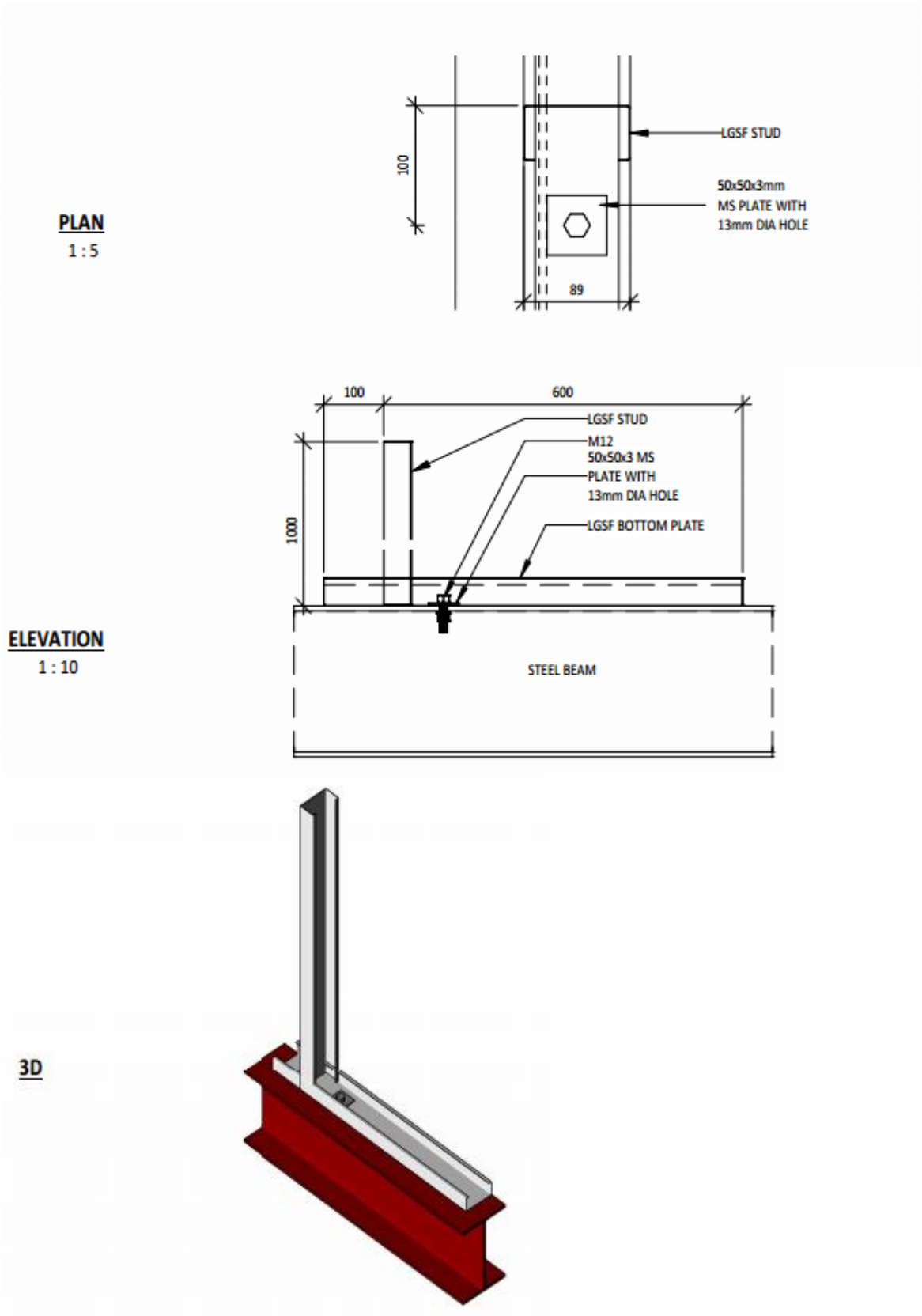



**Figure 9: Axial compression test setup**

### 3.3.2 Tensile Test

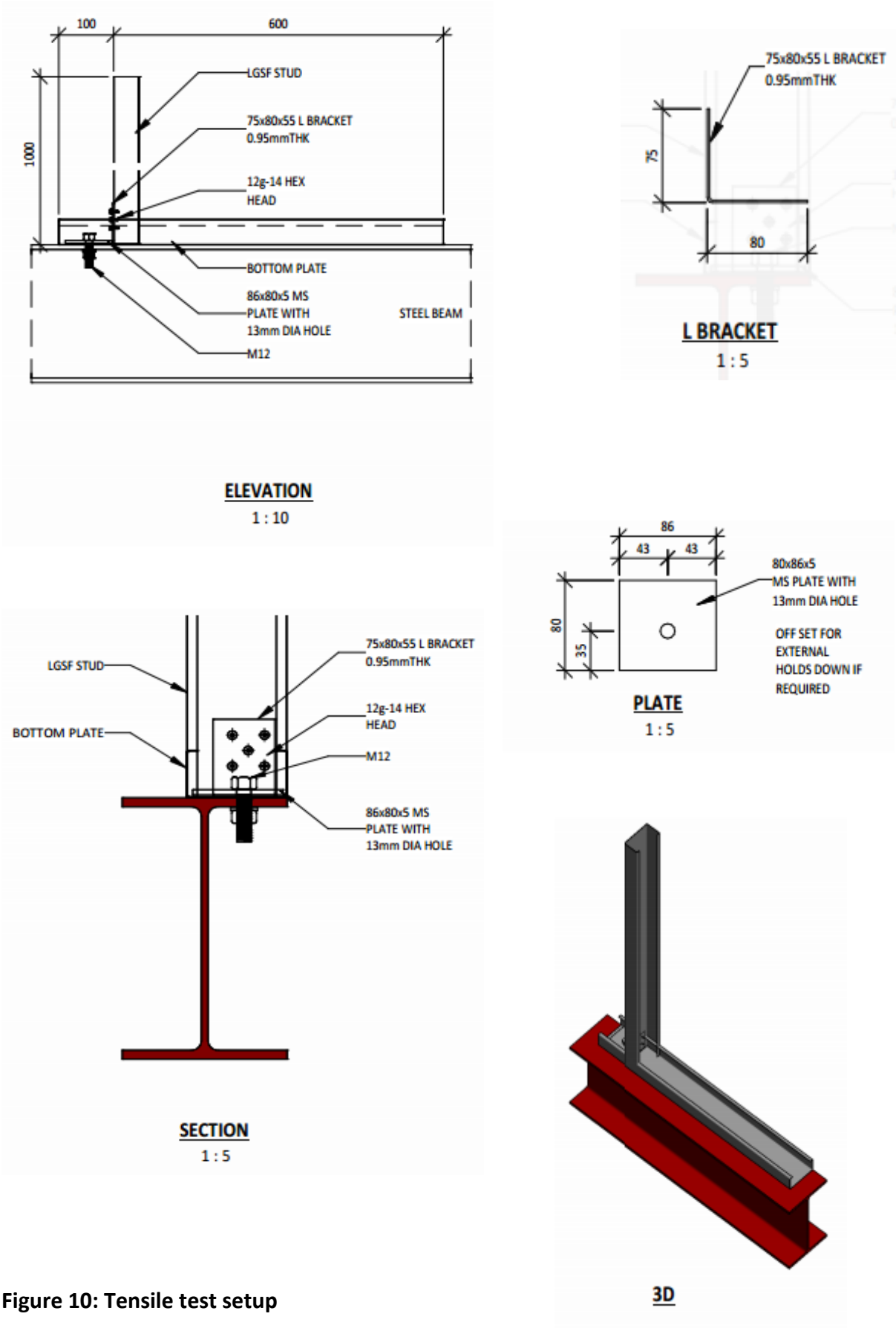



**Figure 10: Tensile test setup**

## 3.3 Specimen Specifications

### 3.3.1 Connection Details

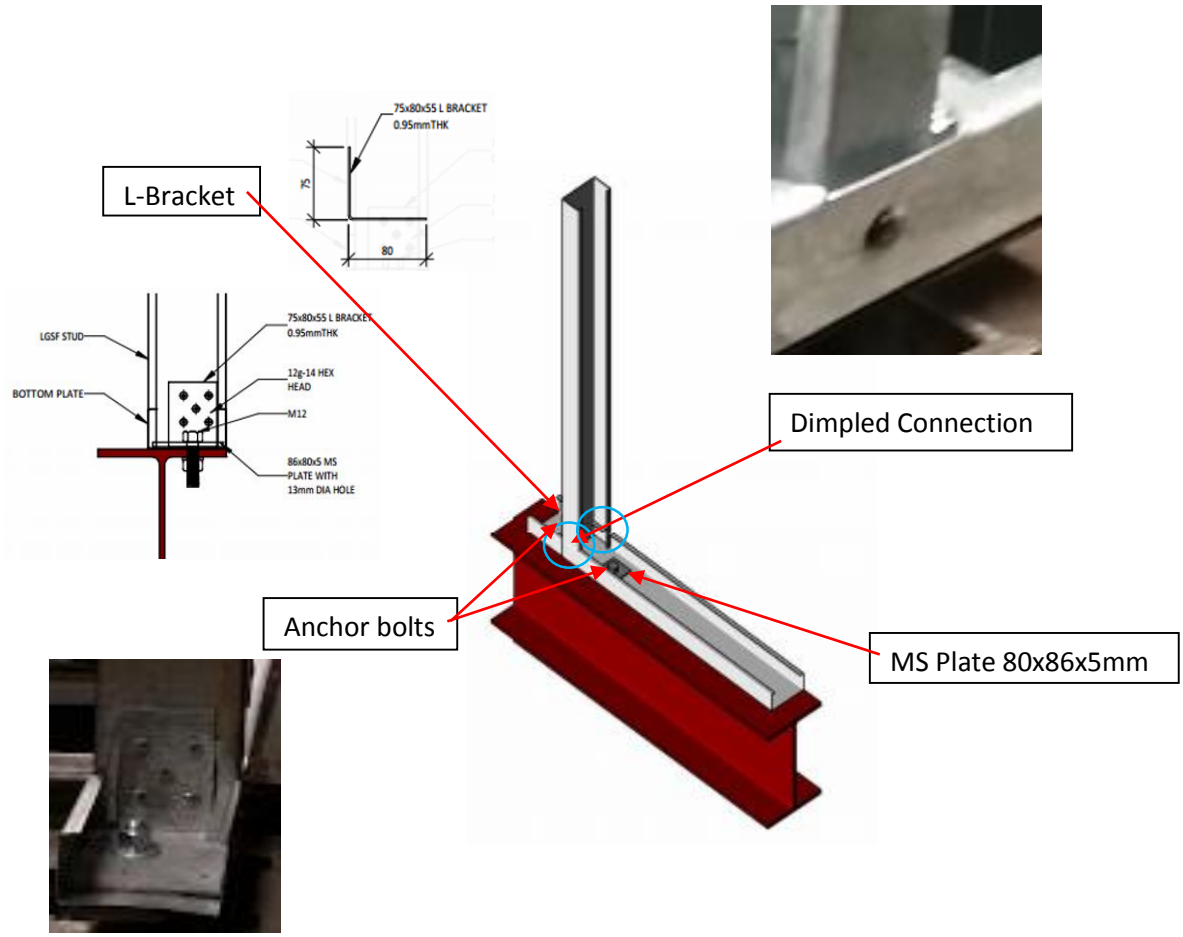



**Figure 11: Connection Details**

The dimpled area connected two flanges by the use of self-drilling screws, screwed on the flanges of the stud to the bottom track.

For the compression test, the anchor bolts were just installed on one side of the bottom plate where as for the tension test the anchor bolts were installed on both the sides for the foundation level and the M12 bolts were also installed on the both side of the stud on a steel beam.

MS plates were used to act as washers, where anchor bolts or M12 bolts were installed.

### 3.3.2 Cee Section Dimension

Specimens were assembled using two different sizes lipped channel Cee-sections with the dimensions displayed in Figure 11 and to the corresponding thickness as shown on table 3. Sections were rolled using G550 CFS with a nominal thickness of 0.75mm and 1.15mm.

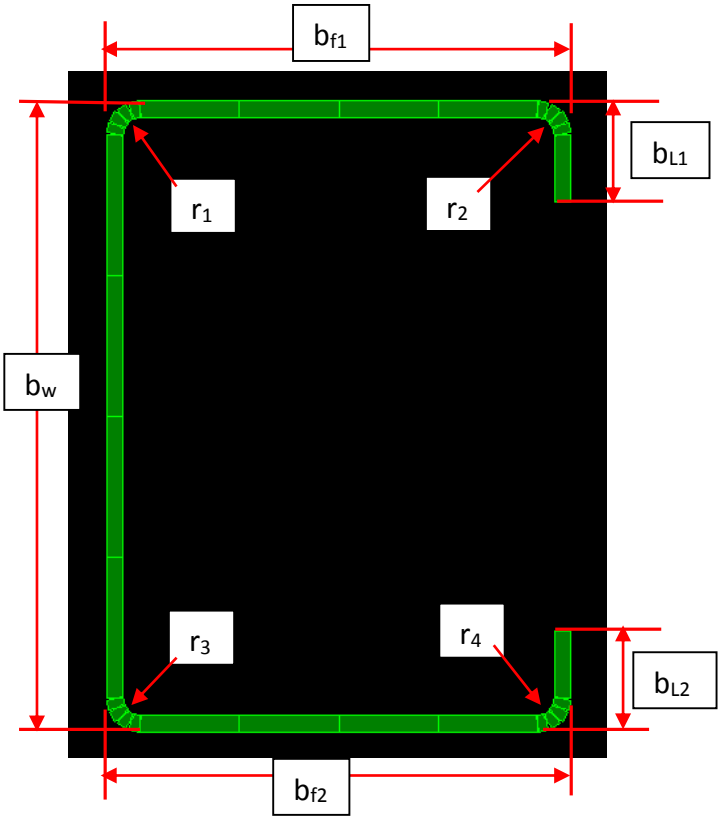



**Figure 12: Specimen geometric and material properties**

**Nominal dimensions:**

| | Cee-section (0.75mm Thickness) | Cee-section (1.15mm Thickness) |
|---|---|---|
| $b_w$ | 90mm | 90mm |
| $b_{f1} = b_{f2}$ | 40mm | 40mm |
| $b_{L1} = b_{L2}$ | 12mm | 12mm |
| $t_w = t_f = t_l$ | 0.75 mm | 1.15 mm |
| $r_1 = r_2 = r_3 = r_4$ | 2.5mm | 2.5mm |

**Table 3: Nominal dimensions for Cee-sections**

## 3.4 Experimental Procedure

### 3.4.1 Compression Testing

1. Both the LGSF 1m long studs and 700mm long bottom plate will be marked and categorized accordingly. Radius-meter will be used to measure corner radius at flange-web and flange-lip junctions for the studs with no end bearing. However, Micrometres and Vernier callipers will be used to measure the widths, depth and thickness of all the specimen used.
2. The LGSF stud will be screwed to the bottom plate at an offset of 100mm from one of the edge as shown under specimen detailing for the compression test.
3. The arrangement will then be placed on a concrete slab (meaning foundation) and is held down firmly with the help M12 bolt (50mmx50mmx3mm). The bolt with the washer from bottom plate is anchored offset 100mm right side to the stud into the foundation.
4. The setup will then be placed on the Avery testing machine and the LGSF stud is aligned to ensure the centroid. Initial straightness of the stud is checked using spirit level. The specimen will be compressed from the top.
5. After ensuring the load application is on the centroid preventing out of plane displacement. Load cell calibration is checked to match the applied force readings.
6. Load will be then applied and internal load cell of the Avery machine is referred for recording. The loading will continue until the specimens cannot sustain further loading.
7. LVDTs are chosen to measure the shortening of the stud in case of non-bearing specimens located at the stud-bottom plate interface. Two (2) more LVDTS are used to check the out-of-plane displacement of the stud end at the top and at the middle of the stud.
8. The graphs of load versus displacement will be plotted to conclude with the results.

### 3.4.2 Tensile Testing

1. Steps 1 and 2 of compression testing are followed for tensile testing as well.
2. The arrangement will then be placed on a concrete slab (meaning foundation) and is held down firmly with the help M12 bolt (50mmx50mmx3mm). The bolt with the washer from bottom plate is anchored offset 100mm left side to the stud into the foundation.
3. Additional brackets with five (5) screws as shown in specimen drawing for heavy connection will be assembled.
4. Steps 4 to 8 will be repeated except the LGSF stud will be pulled from the top. A mechanism was designed to perform tensile testing so that the pull out force acts at the centroid of the Cee section. The stud end on the top will be bolted to a plate which indeed is stronger than the screws thus when the tensile test would be carried out, the brackets and screws would buckle only.

# 4.0 Results

## 4.1 Compression Tests

### 4.1.1 Test 1: Axial Compression Test without End Bearing (1.15mm Specimen)

Axial compression tests was conducted on 3rd May 2016 in the materials lab to determine the axial shortening of the stud closer to the L-bracket connection. The experiment was set up as shown below. 1.15mm Cee sections were used for the stud and the bottom plate with the connection as non-bearing element at the bottom. (3mm nominal gap)

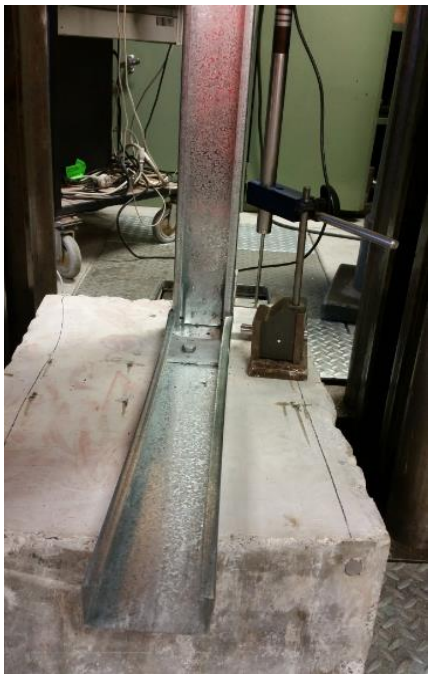


**Figure 13: Axial compression test setup**

Local buckling failure was observed on the stud at around 50kN load. The displacement was measured using LVDT and plotted against the loading. Below show the pictures of the local buckling failure. It was observed that there was no visible damage seen in the connection between stud and the bottom plate. A slight bending was noticed in the bottom track though.

**Figure 14: Observations in the specimen**

Graph plotted using LVDT:

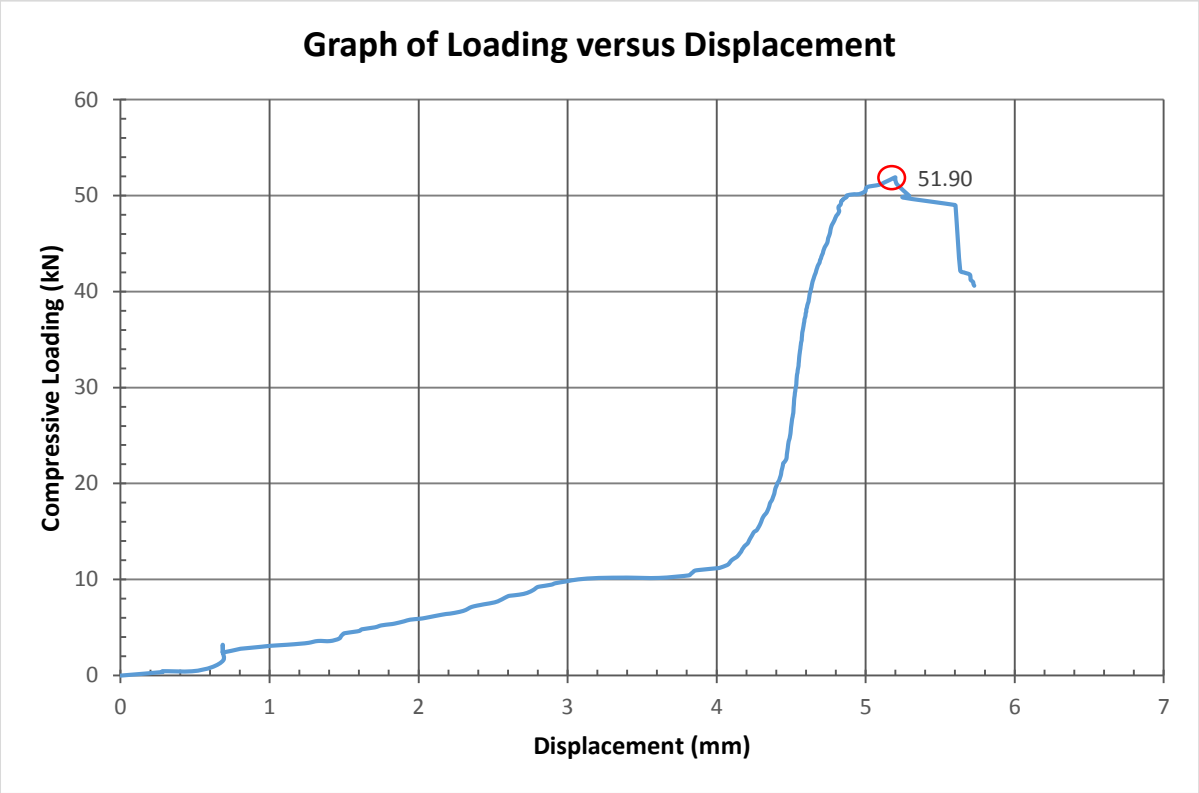



**Figure 15: Graph of load versus displacement for 1.15mm specimen without end bearing**

From the plotted graph, elastic displacement was observed as expected with the maximum loading just before the failure of 50.115kN with the displacement of 4.399mm. The stud to bottom track was connected with a 3mm gap making the connection as non-bearing element. Axial shortening was recoded as presented above.

From the graph, it can be observed that the stud suddenly takes the load once the 3mm gap is closed under the compression load. The following was observed since the start of the experiment:

- When load is first applied, the specimen experiences a small amount of slip (< 3mm), which occurs as the stud end comes into full bearing contact with the bottom track. Before loading begins, the stud end and bottom track are not in full bearing contact due to 3mm gap between the stud end and the bottom track. The slip was observed due to this 3mm gap and due to the corner radius and curvature in the specimens.
- Elastic behaviour is observed once the displacement increases with the applied load (linear increase in axial shortening with applied load).
- Sudden local buckling failure occurs in the stud web at mid-length.
- Post initial buckling failure is also noticed; stud stiffness is maintained for a significant further increase in load. Behaviour in this region is seen with the continuing linear increase in axial shortening with applied load and deformations are mainly recoverable.
- Local-distortional buckling failure is observed just before the specimen totally fails. Deformations within this region are not recoverable as the stud flange-lip junction crumples inward at both sides.
- Finally, the specimen reaches ultimate failure and can sustain no further load.

This non-bearing connection can only be used, taking into account the following considerations:

- The maximum allowable design strength to be appropriately reduced to account for the unpredictability of the connection failure mode, which can result in the introduction of warping torsion and a consequent premature ultimate failure of the column.
- The serviceability limit-state strength for these bearing type specimens should not exceed the screwed connection strength.

### 4.1.2 Test 2: Axial Compression Test with End Bearing (1.15mm Specimen)

The same setup as done in the previous compression test (1.15mm thickness) was repeated but almost without any nominal gap between the bottom track and the stud. The graph of load versus displacement was plotted to see the axial shortening of the stud. The stud was loaded until it cannot sustain any further loading.

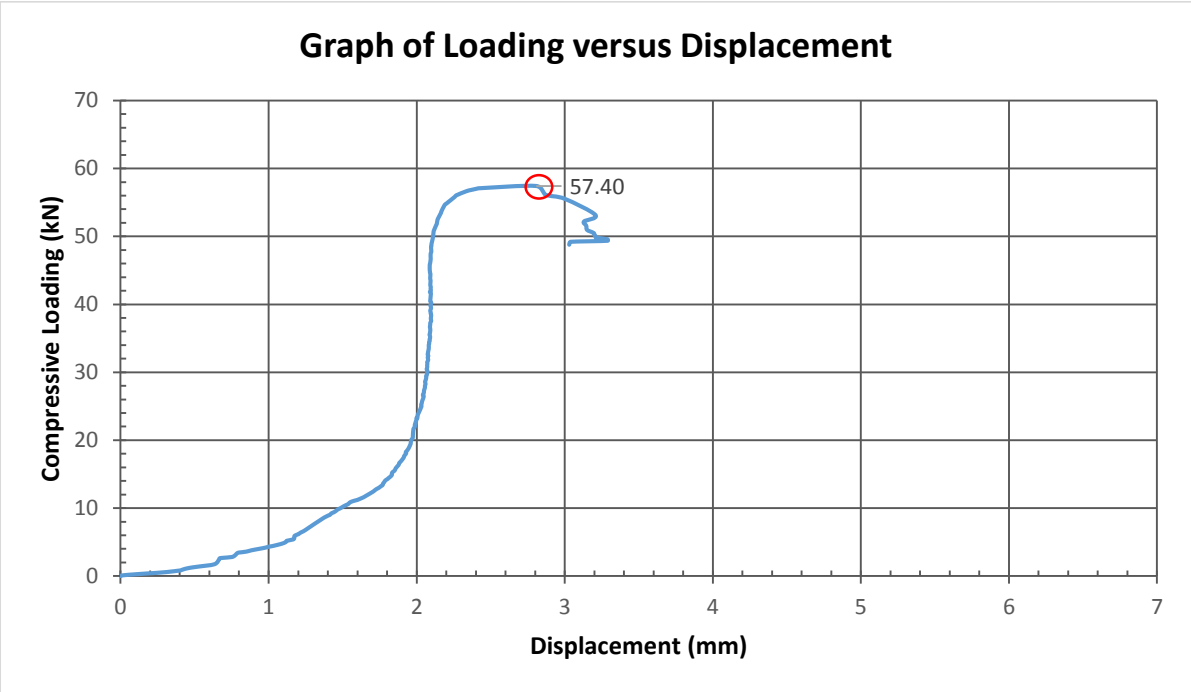



**Figure 16: Graph of load versus displacement for 1.15mm specimen with end bearing**

From the above figure it can be concluded that when there is almost no gap between the bottom track and the stud end, the stud takes the axial compression load more quickly compared to the stud with non-end bearing connection. The graph can be described as almost just the same as the previous test with nominal 3mm gap. These are as follows:

- When load is first applied, the specimen experiences a small amount of slip (< 1mm), which occurs as the stud end comes into full bearing contact with the bottom track. Before loading begins, the stud end and bottom track are nominally in full bearing contact: the slip was observed due to small gaps between the stud end and the bottom track introduced during the hand assembly of specimens due to dimpled connections.
- Elastic behaviour was observed once the displacement increases with the applied load (linear increase in axial shortening with applied load).
- Sudden local buckling failure occurs in the stud web at mid-length.
- Post initial buckling failure is also noticed; stud stiffness is maintained for a significant further increase in load. Behaviour in this region is seen with the continuing linear increase in axial shortening with applied load and deformations are mainly recoverable.
- Local-distortional buckling failure is observed just before the specimen totally fails. Deformations within this region are not recoverable as the stud flange-lip junction crumples inward at both sides.
- Finally, the specimen reaches ultimate failure and can sustain no further load.

### 4.1.3 Test 3: Axial Compression Test without End Bearing (0.75mm Specimen)

The same setup as done in the previous compression test was repeated but this time using 0.75mm specimen and with a 3mm nominal gap between the bottom track web and the stud end. The graph of load versus displacement was plotted to see the axial shortening of the stud. The stud was loaded until it cannot sustain any further loading.

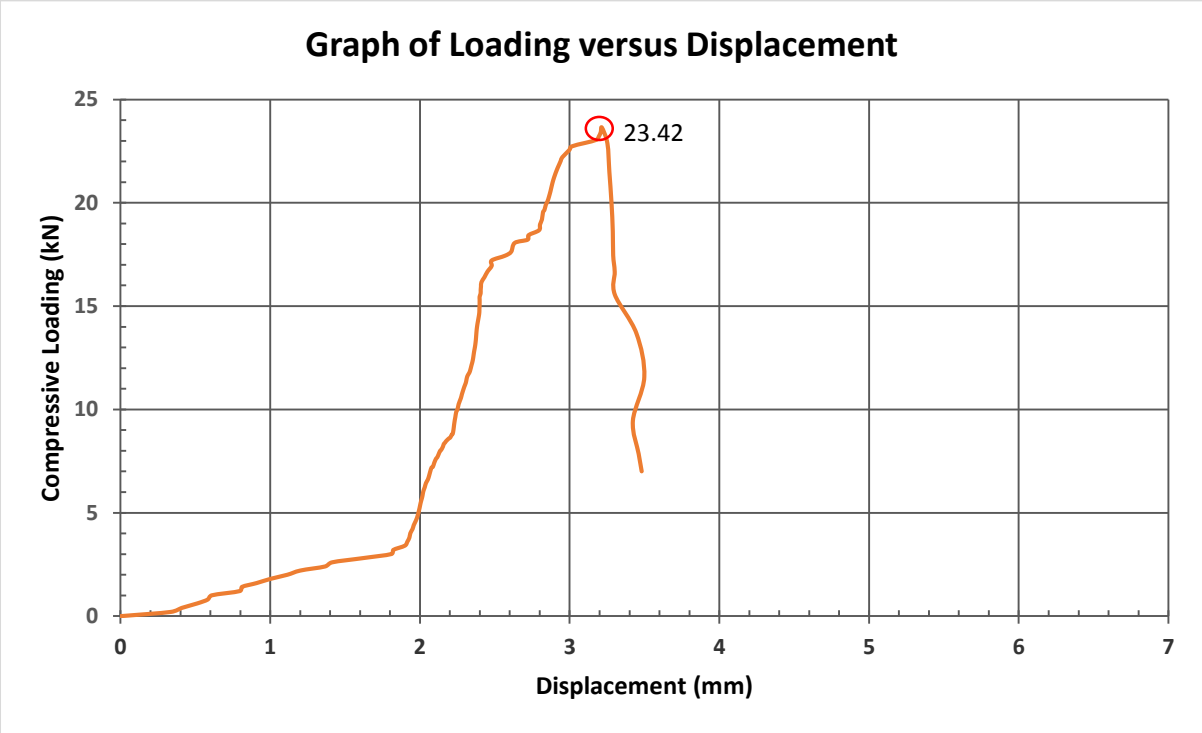



**Figure 17: Graph of load versus displacement for 0.75mm Specimen without end bearing**

Local buckling in the stud is noticed and fails finally at 23kN at a displacement of 3.21mm. It can be seen from the graph that the stud suddenly takes up the load at a displacement of 2mm once the gap closes and at almost 3mm displacement the specimen cannot sustain any further loading.

### 4.1.4 Test 4: Axial Compression Test with End Bearing (0.75mm Specimen)

Similar compression test was repeated for 0.75mm specimen with end bearing connection and the graph of force versus displacement was plotted to see the axial shortening of the stud and its failure mode at a certain loading.

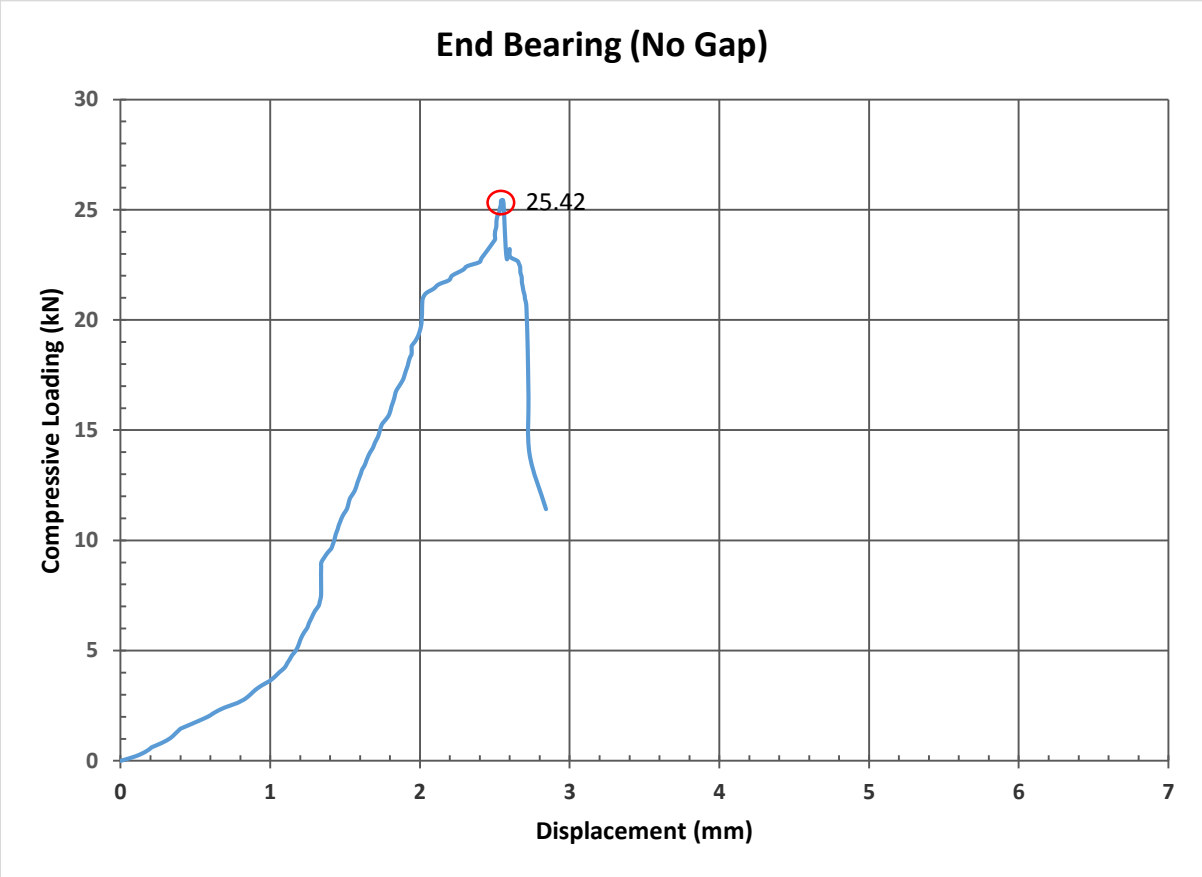



**Figure 18: Graph of load versus displacement for 0.75mm Specimen with end bearing**

Local buckling in the stud is noticed and fails finally at 25kN at a displacement of 2.55mm. It can be seen from the graph that the stud suddenly takes up the load from the start with a linear elastic behaviour.

### 4.1.5 Influence of End-Bearing condition on axial shortening at Peak Load

On average, the connection with 3mm nominal gap bearing type specimens shortened more than end bearing type almost without any gap. The difference in the axial shortening response of the Cee section stud is graphically represented in the figure below.

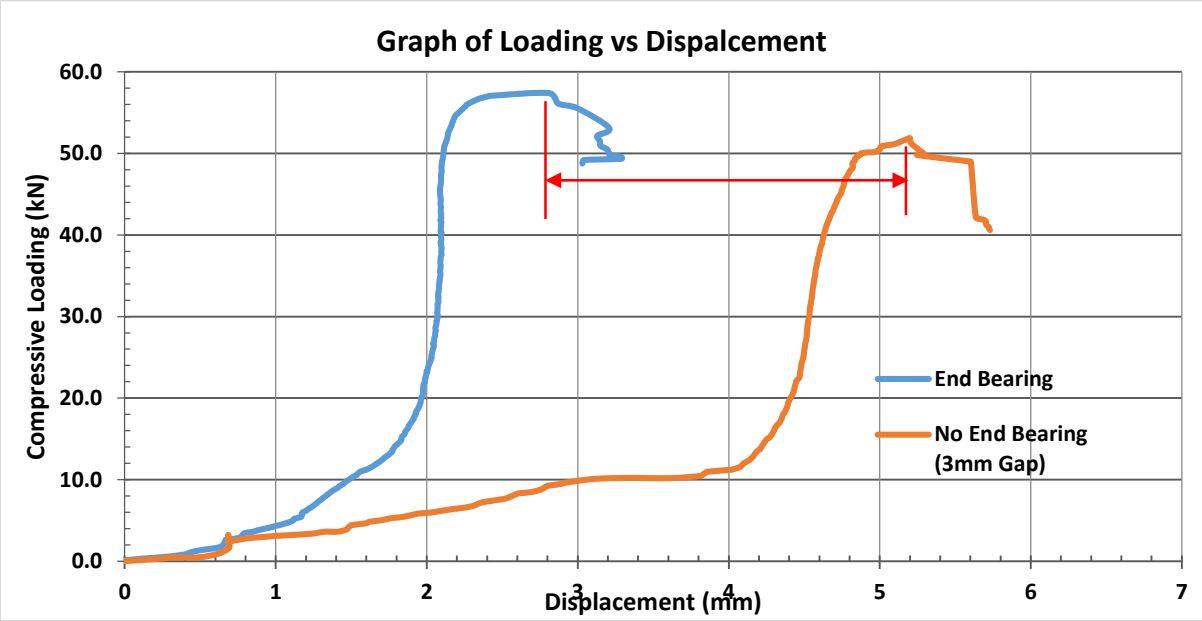



**Figure 19: Graph of load versus displacement for 1.15mm Specimen**

The graph for 0.75mm specimens are plotted below.

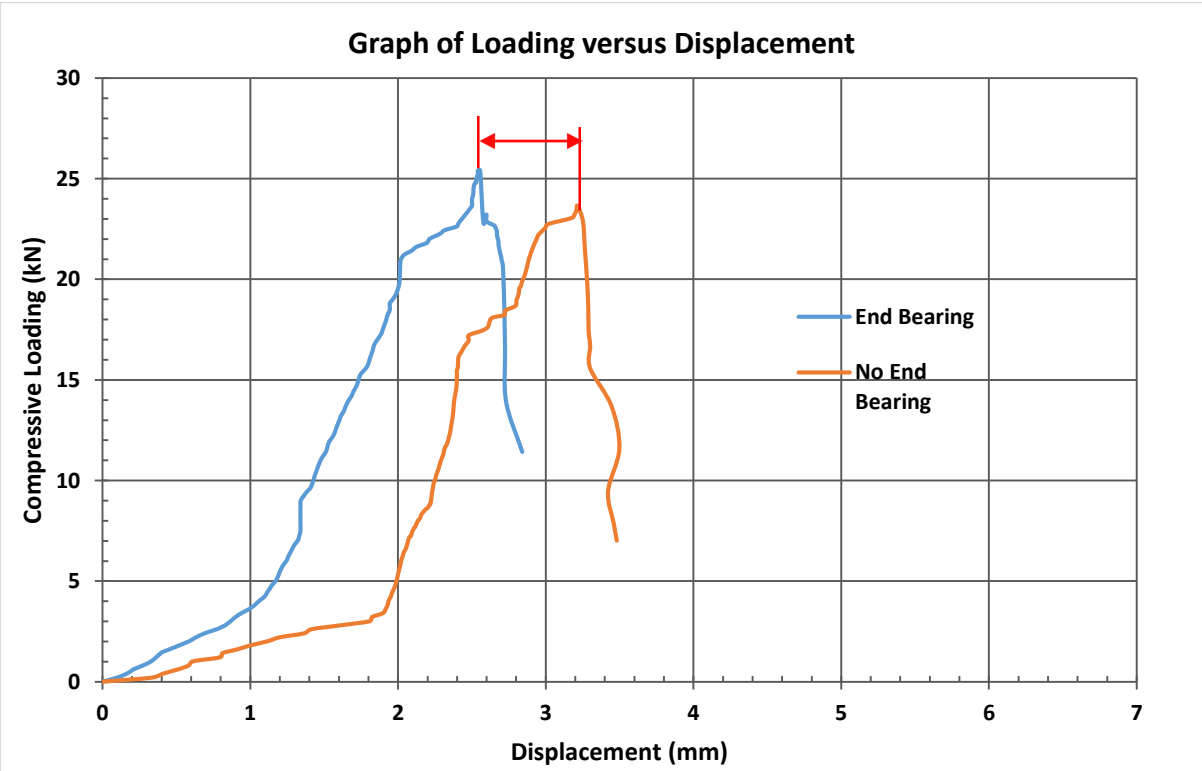



**Figure 20: Graph of load versus displacement for 0.75mm Specimen**

The axial shortening of 2.4mm is noticed as shown using red arrows on the graph for 1.15mm specimen whereas 0.7mm of axial shortening is noticed in 0.75mm specimen. This is due to the stud specimen being unable to sit directly on the bottom plate due to dimple connections but if in real, the stud sits on the bottom plate than an axial shortening of almost 3mm can be observed.

The maximum compression force (loading) values and the displacement are summarised in the table below.

| Specimen Type | Bearing Type | Maximum compressive loading where failure begins (kN) | Displacement (mm) |
|---|---|---|---|
| 1.15mm Specimen | No end bearing (3mm nominal gap) | **51.89** | 5.198 |
| 1.15mm Specimen | End bearing (almost no gap) | **57.40** | 2.808 |
| 0.75mm Specimen | No end bearing (3mm nominal gap) | **23.65** | 3.215 |
| 0.75mm Specimen | End bearing (almost no gap) | **25.42** | 2.555 |

**Table 4: Summary of End bearing Influence on Cee-sections**

It can be concluded from above that the load carrying capacity is increased as the displacement is reduced. This displacement is reduced since the load eccentricity is avoided and the load path assumes a definite path as soon as the load is applied.
It follows that bearing type without any gap is a superior choice for cold form steel stud in medium rise buildings in terms of axial shortening performance and the load path it takes. The large amount of axial shortening that occurs in the specimen with no end bearing (3mm gap) may lead to cracking of any sheathing. Thus, if the non-end bearing type of connection is to be used, it should be designed with a serviceability limit state strength not exceeding that of the connection. This bearing type of connection may be suitable to create a rocking wall mechanism which would be very helpful in areas prone to earthquakes.

## 4.2 Tensile Tests

### 4.2.1 Pilot Test 1

The first set of specimen was set for a trial test on 4th of April 2016 and showed that the failure actually occurred on the hold down system under tensile test of 0.75mm thick stud and bottom plate. The below shows the picture of the setup.

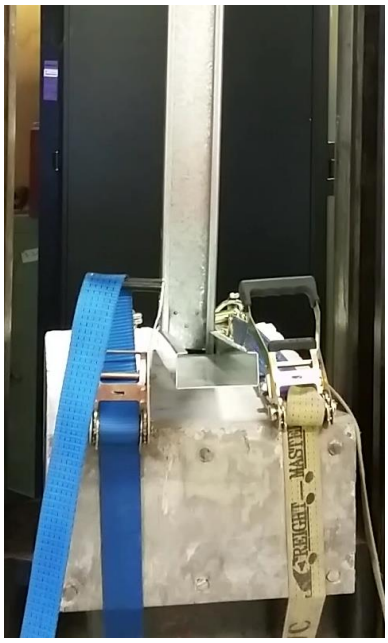
**Figure 21: Pilot tensile test 1 setup in materials lab**

Tensile force applied from the top of the stud acts at the centroid of the Cee section and this pulls up the flanges, which was achievable by designing the system as shown below.

**Figure 22: System developed to apply tension force**

The picture below shows failure at different loadings. The failure only occurred in the hold down system, where the M12 anchor bolt came out of concrete with a little bending.

Failure at 5kN



Complete failure of the specimen

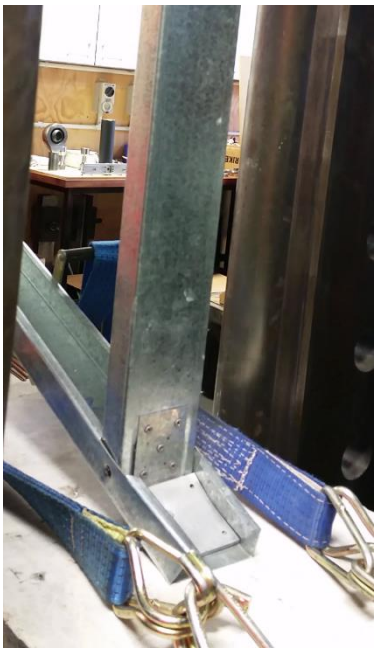


**Figure 23: Test specimens at different loadings**

A very slight bending in 80x86x5 mm MS plate was noticed due to tearing out of the anchor bolt from the concrete slab forming a cone and the concrete stuck to the anchor bolt.

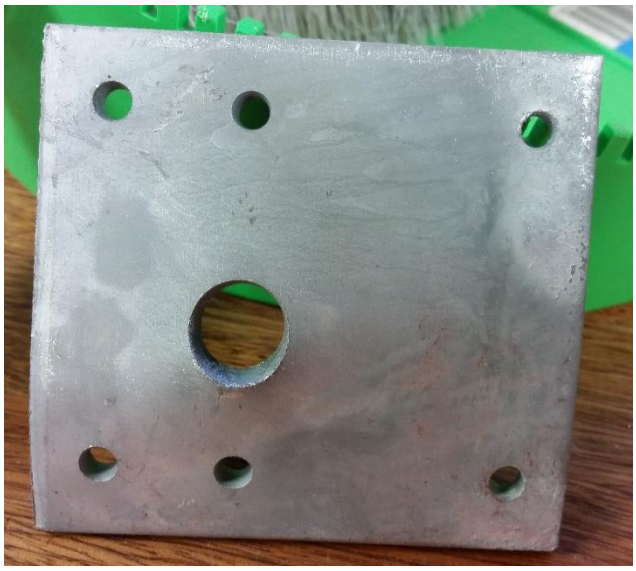


**Figure 24: Pictures of MS plate and failure of anchor bolt in concrete**

From the above results, the connection of the screws to the stud was very strong as they did not go under any failure. It was recommended to use 2xM12 bolts, one on each side of the stud (equally spaced from the stud ends) for the second trial test.

### 4.2.2 Pilot Test 2

Second pilot test was conducted on 6th April 2016 using 2xM12 bolts on each side of the stud as shown below. The anchor bolts were correctly installed on the bottom plate and was checked by the technicians if they were correctly fixed. 0.75mm gauge cee sections were used in the test.

**Figure 25: Pilot tensile test 2 setup in materials lab**

A similar failure as observed in pilot test 1 was observed in this case as well but at a loading of 11kN as shown below.

**Figure 26: Tensile load applied to the specimen**

Below show the pictures at complete failure. The complete pull-out of the anchor bolt is seen below.

**Figure 27: Complete failure of the specimen**

The following observations were made:

1. The connection between the up stand of the tension connecting plate and the web of the stud did not fail or show any visible damage.
2. Slight damage was noticed in the end of the bottom plate closer to the stud.
3. The hold down bolt that was added in the second pilot test pulled out first. The pull-out started to occur at about 9kN and instantly at 20kN the other hold down bolt came out (This hold down bolt was placed at the same place as the first setup). Since the failure started occurring in the anchor bolt, thus the failure continues to occur in it and failure in the connection in not being done.
4. The pictures attached above shows that the concrete came out as lump (cone) formed with the anchor bolt. The cone depth was a bit lager than the anchor bolt depth. (Approximately 90mm). The bolt, which was installed for the second pilot test to add more strength, did not come out with the lump of concrete, it just got sheared out of the concrete whereas the other bolt had a big lump of concrete attached to it when it was pulled out. The Anchor bolt, which was installed for the second test, did not show any bending on the plate and bolt whereas the other anchor bolt showed slight bending in bolt and the plate as shown in pilot test 1.

Finally, it was recommended to find the strength of the connection between the stud and the bottom plate, steel I-beam was proposed with 2xM12 HD bolts so that the hold down system remains stronger than that of the connection strength capacity. It was also proposed that sleeve anchor bolts could be used to give stronger connection in the concrete. These bolts once tighten in the concrete hole expands and creates a grip so that they do not pull out once load is applied. Steel beam and sleeve bolts were ordered for the next set of experiments.

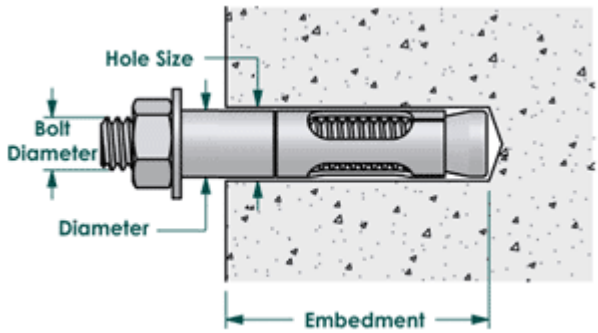



**Figure 28: Sleeve anchor bolt**

### 4.2.3 Tension Test 1

The first test was conducted on 26th May 2016 using 2xM12 bolts on each side of the stud as shown below. The bolts were correctly installed on the bottom plate attached to a steel plate (acted as a steel beam), which was gripped in the Avery machine and was checked by the technicians if they were correctly fixed. 0.75mm gauge cee sections were used in the test. Two LVDT's were connected; one was connected to the bottom plate to measure the displacement in the bottom track and the other was connected to the stud to see the displacement once the tension action began. The two steel plates were inserted at the bottom to make the bottom track perpendicular to the stud.

**Figure 29: Tension test setup on 0.75mm Specimen**

After the tension test being completed on the specimen, the two screws connected on the stud from the sides lead to the failure to the connection. The specimen fully failed at 13.42kN as shown in the graph.

The L-bracket connected to the stud and bottom plate had shear tearing of the whole L-bracket as shown in the pictures. There was a slight buckling seen in the MS plate (80x86x5 mm) and the L-bracket portion connected to the bottom track.

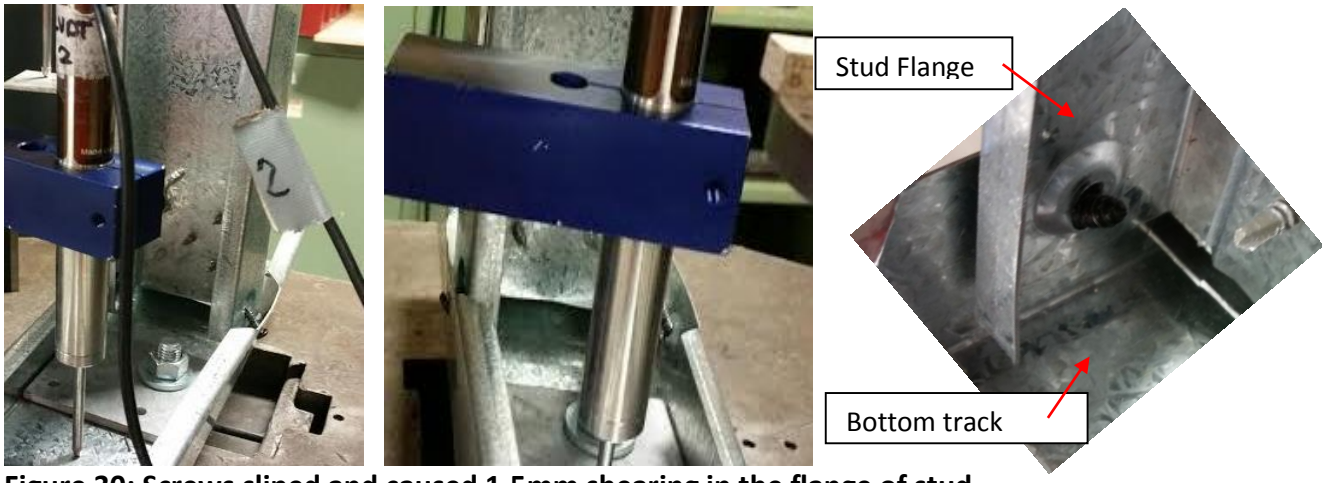



**Figure 30: Screws sliped and caused 1.5mm shearing in the flange of stud**

**Figure 31: Shearing of L-Bracket**

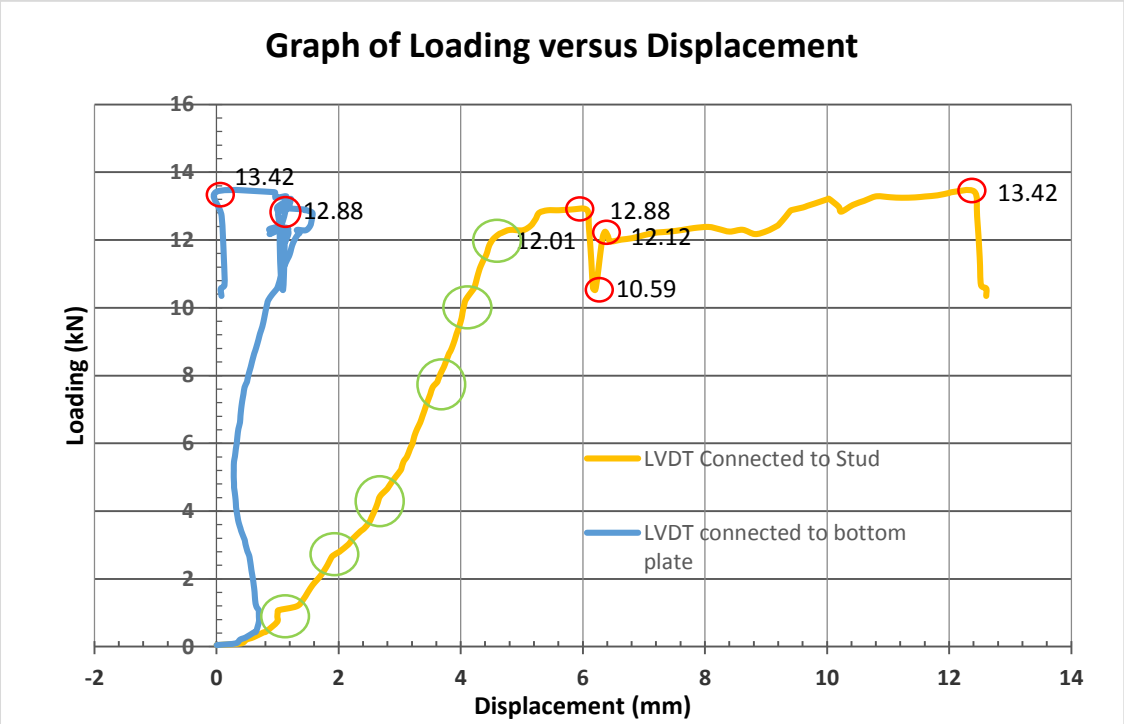



**Figure 32: Graph of Loading versus Displacement for 0.75mm Specimen**

Form the experiment, the following obersvations were made on the stud and is clearly displayed in the graph. These are as follows:

- The stud takes up the tensile load and the show some slip as shown in green circles all over the graph but the major slip being occuring are discussed in the obervations being made in the graph below.
- Elastic range is also being observed where there is linear increase in the load respect to discpalement in the graph.
- Once the load of 12.01kN is reached, the screws get pulled up and then from a load of 12.12kN the shearing off the L-braket starts to begin since the screws connected on the side cannot sustain any further loading and then at 13.42kN the L-bracket totally shears off where complete failure of the specimen is observed.

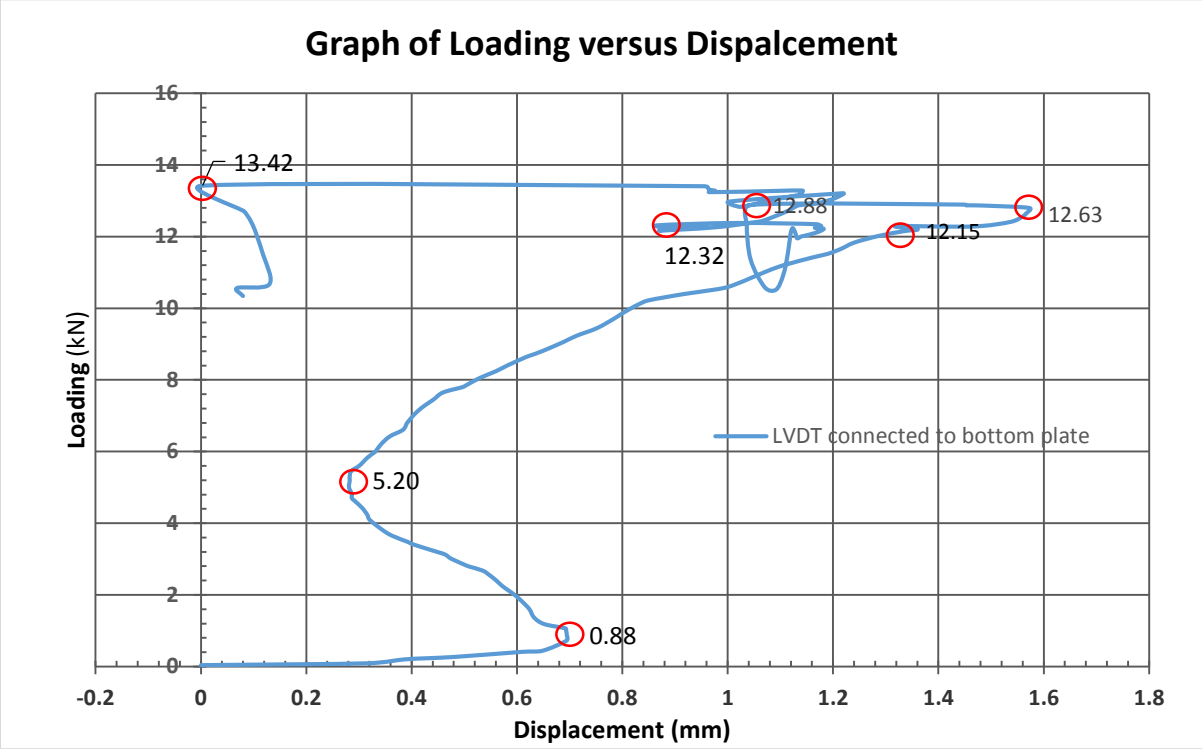



**Figure 33: Graph of Loading versus Displacement (LVDT connected to bottom track)**

Form the experiment, the following obersvations were made on the bottom plate and is clearly displayed in the graph. These are as follows:

- The bottom plate takes the tensile load up to 0.88kN then a bit of slip is observed in the screws connected on the side of the stud (dimpled connection), thus the displacement decreases and load increases up to 5.20kN.
- The bottom plate then again takes the tensile load and a linear range is seen in the graph from 5.20kN to 12.15kN and a slight slip is observed once again.
- From 12.15kN the screw starts to shear off the flange of bottom plate and the stud by causing elongation to the hole, (approximately less than 1mm) and take load upto 12.63kN.
- When reaching the load of 12.01kN, the L-bracket slowly gets sheared off, starting from the right end edge and gets totally sheared off at 13.42kN (total shear cut as shown in the pictures) where the total failure of the specimen is reached.
- A total of 1.5mm elongation is seen at the dimple connection holes caused by the screws.

### 4.2.4 Tension Test 2

The second tensile test was conducted on 27th May 2016 using 2xM12 bolts on each side of the stud as shown below. The bolts were correctly installed on the bottom plate attached to a steel plate (acted as a steel beam), which was gripped in the Avery machine and was checked by the technicians if they were correctly fixed. 1.15mm gauge cee sections were used in the test. Two LVDT's were connected; one was connected to the bottom plate to measure the displacement in the bottom track and the other was connected to the stud to see the displacement once the tensile action began. The two steel plates were inserted at the bottom to make the bottom track perpendicular to the stud.

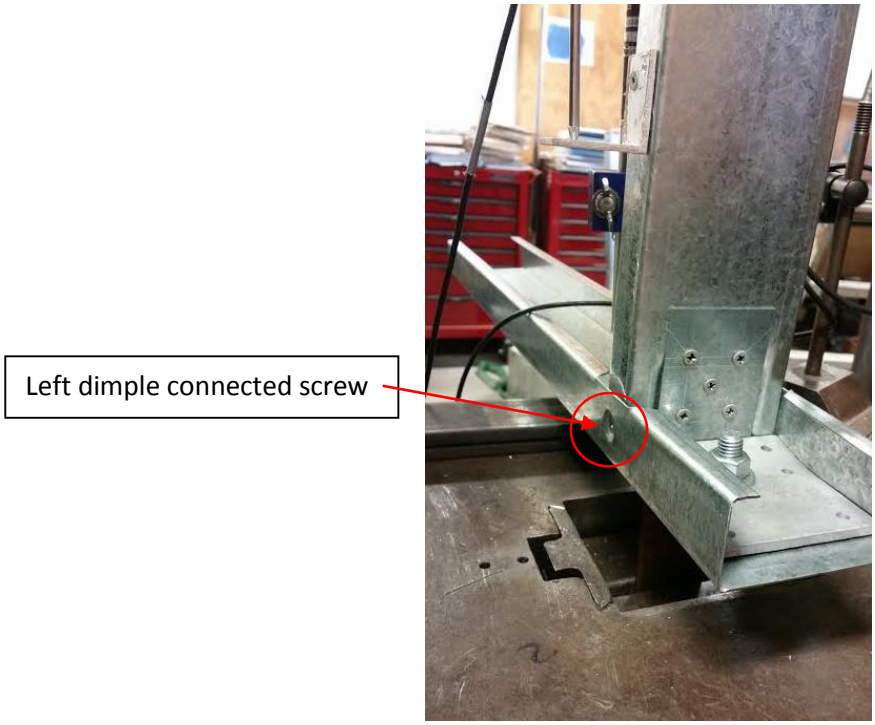



**Figure 34: Tension test setup on 1.15mm Specimen**

The same failure (as noticed in 0.75mm specimen) was also noticed in this test as well. The two screws connected on the stud from the sides lead to the failure to the connection. The specimen started to fail once reaching 20.98kN and then fully failed at 7.98kN as shown in the graph. The L-bracket connected to the stud and bottom plate had shear tearing of the whole L-bracket as shown in the pictures. There was a slight buckling seen in the MS plate (80x86x5 mm) and the L-bracket portion connected to the bottom track.

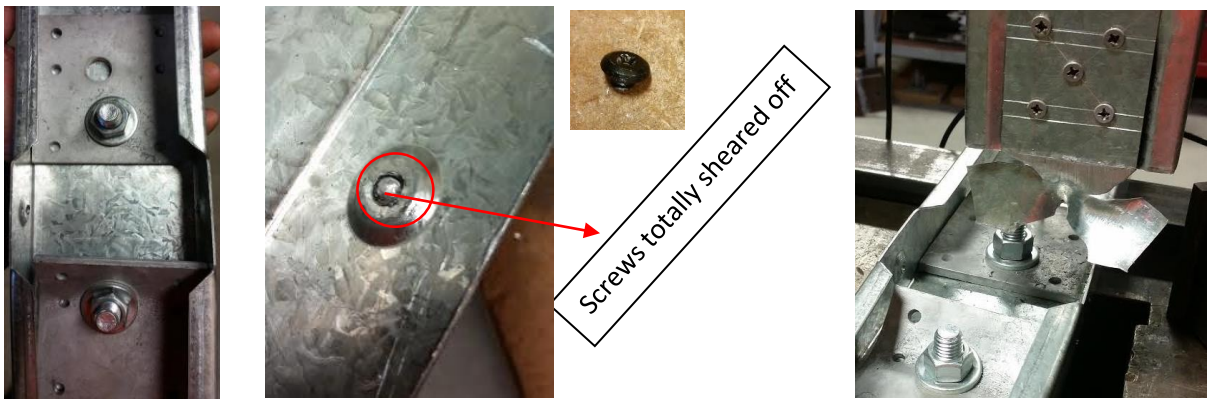



**Figure 35: Pictures at complete failure of the specimen**

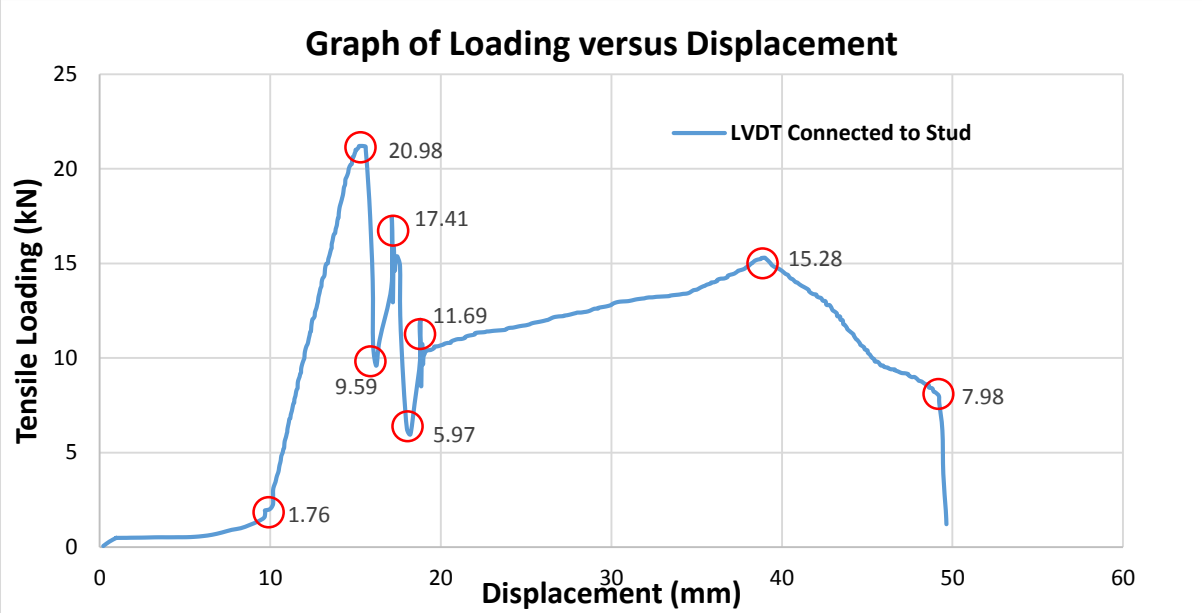



**Figure 36: Graph of load versus displacment (LVDT connected to stud)**

The specimen starts to take the tensile load with a slight slip at 1.76kN upto 20.98kN and then suddenly the screws connected to the side slips and then takes the load from 9.59kN upto 17.40kN where the left dimpled connected screw (as marked in figure 34) gets totally sheared off. The load drops to 5.97kN and then the right dimpled connected screw totally gets sheared off at 11.69kN. The entire load is then taken by the L-braket upto 15.28kN and slowy starts tearing off and finally gets totally sheared of at 7.98kN.

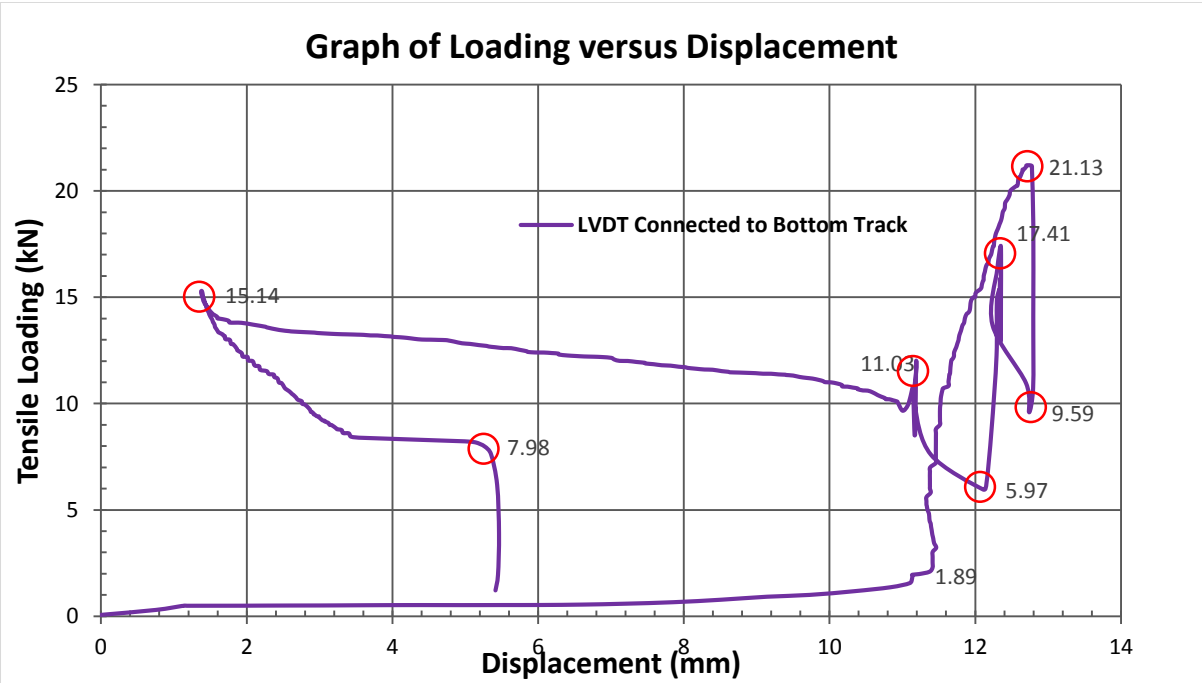
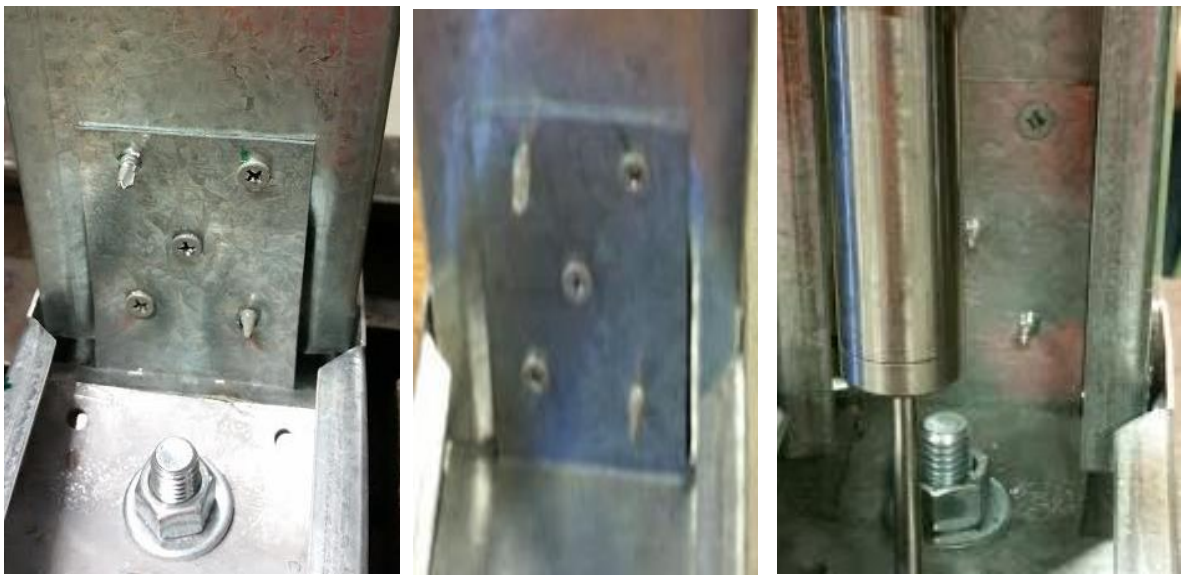



**Figure 37: Graph of load versus displacement (LVDT connected to bottom track)**

The LVDT connected to the bottom track behaves in a similar way with the loading being highlighted with the red circles but it tends to only displace upwards and downwards.
From all the tension tests it can be concluded that the failure starts from the dimpled connected srew which has very less capacity.

### 4.2.4 Tension Test 3

The third tensile test was conducted on 3rd June 2016 using 2xM12 bolts on each side of the stud as shown below. This experiment had two L-brackets connected to the stud web from both the sides. This was achieved by using five (5) self-drilling screws as used in previous tests. Three screws were drilled from the back side of the stud while the other two was drilled from the opposite side.



(Back View) (Front View)

**Figure 38: Double L-bracket connected to the stud**

The bolts were correctly installed on the bottom plate attached to a steel plate (acted as a steel beam), which was gripped in the Avery machine and was checked by the technicians if they were correctly fixed. 1.15mm gauge cee sections were used in the test. Two LVDT's were connected; one was connected to the bottom plate to measure the displacement in the bottom track and the other was connected to the stud to see the displacement once the tensile action began.

The failure started to begin again from the dimpled connected screws, which sheared of first followed by the front L-bracket shearing and then finally the L-bracket connected at the back on the web of the stud got sheared off. It was noticed that all the failure happened at much higher loadings (force). The pictures clearly show the failure occurring in the specimen.

**Figure 39: Failure in Specimen connected with double L-bracket**

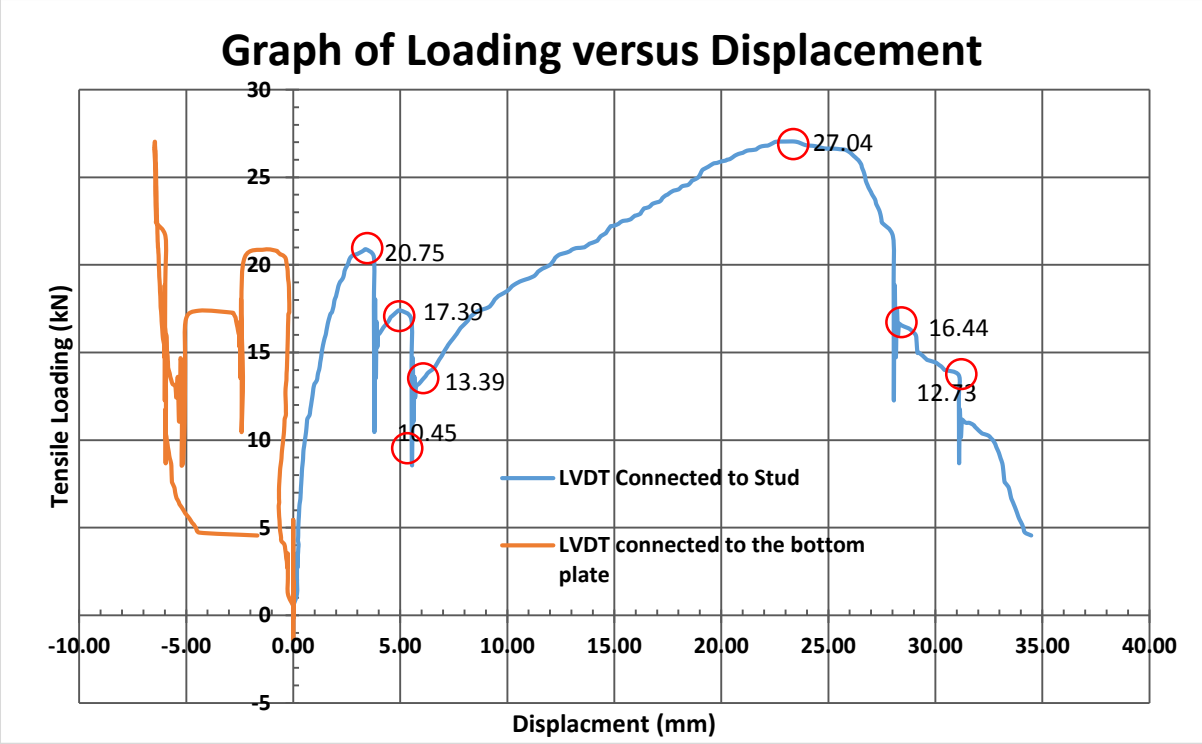



**Figure 40: Graph of loading versus displacement (1.15mm specimen connected with double L-bracket)**

The following observation are made during the experiment and is represented in the graph.

- With the slight slip just at the start of the tensile force, the specimen takes the tensile load up to 20.75kN. At this pointing time the bottom track moves down with the pull from the stud giving a negative displacement.
- The first screw (dimpled connection) gets sheared off at load of 20.75kN and then the load drops and then the second screw gets sheared off at 17.39kN. The bottom track continues to displace downwards. The stud then takes the load from 13.39kN and when it reaches 27.04kN, the L-bracket starts to shear off from this point.
- Finally, at 16.44kN the L-bracket from the back gets sheared off then the other L-bracket gets sheared off at 12.73kN where the specimen reaches to the complete failure.

### 4.2.5 Summary of Tensile Tests

| Test Description | Tensile loading where failure begins(kN) | Displacement of stud (mm) |
|---|---|---|
| Tensile test on 0.75mm specimen | **12.01** | 4.60 |
| Tensile test on 1.15mm specimen | **20.98** | 15 |
| Tensile test on 1.15mm specimen with double L-brackets connected to the stud | **20.75** | 4 |

**Table 5: Summary of Tensile Tests**

## 5.0 Discussion

### 5.1 General

The results from compression and tension test on concrete foundation confirms that the limiting strength of the bottom storey connection is the attachment of the wall base to the concrete in tension (failure due to pull-out of the anchor bolts). This is potentially a good mode of failure as, provided the wall doesn't start to slide due to vertical uplift, the rocking mode of behaviour will absorb energy and allow a structural ductility factor greater than 1.25 to be used. This can be utilised in the following ways:

1. **For attachments to the seismic bracing panels.**
   - These are designed to rock, with uplift on the tension side. So the hold down system comprises HD bolts with springs between the plate washer and the head of the HD bolt. That fastener (or pairs of fasteners) would be near the edge column of the bracing panel (BP) so that, under seismic induced tension, controlled uplifting of the column can occur through elastic squashing of the spring. Moreover, the fastener on one side is as per the tested detail i.e. without the spring and it is intended to be firmly connected to the concrete under the seismic design tension action on the stud associated with say $\mu = 2$ and Sp = 0.7. When uplift occurs, this one starts to pull out and the fastener on the other side can uplift on the spring providing increasing resistance to further uplift.
   - On the compression side the bearing forces go straight into the concrete slab; there is no gap between the end of the stud and the web of the bottom plate. (End bearing connection is recommended)
   - Along the length of the bottom plate bracing unit into the concrete slab are one or preferably two other HD bolts without springs. These are away from the tension columns (say midway between studs) so that they won't be pulled out of the concrete and are designed to transfer the earthquake induced base shears into the walls and thus prevent base sliding.
2. **For the attachments to the non-seismic bracing unit walls.**
   - These are the standard HD detail placed as specified in the NASH book or probably better-placed midway between studs so they are not subject to strong uplifting tension.

### 5.2 Strengths associated with the elastic and inelastic range

When comparing the strengths associated with the elastic range from the compression testing, the specimen dominates with the capacity with a linear increase in both the cases ranging up to the maximum capacity reached to 55kN and 24kN for 1.15mm and 0.75mm specimens respectively. When the specimen fully takes the load in both; end bearing and non-end bearing connection cases, an elastic linear displacement of 1.5mm ($\Delta u$) is noticed for both the specimens (0.75mm and 1.15mm specimen). The load reached upon dropping to 80% of peak load are 44kN and 19.2kN for 1.15mm and 0.75mm specimens respectively. The inelastic deformation from this action from the load deflection curve is noticed to be only 0.6mm ($\Delta y$) from the compression test results.

From the tension test results, the graph display a common shape in all the cases. The failure first starts from the dimple connection for all the cases and show some elastic displacement. This displacement can only be used to determine the design capacity for the initial peak load reached and see whether this is sufficient to resist the serviceability limit state earthquake load which is associated with Sp = 0.7. This elastic displacement is not considered to play role

in ductility design of the wall system, as the displacement observed was quite small. Thus, assumptions were made and graphs were considered very similar from the compression test results hence displacements were chosen at a similar basis as chosen with the compression test results to account for the ductility possible in the wall system. From the graphs, the maximum tensile strength reached just before the specimen totally to fails is 15.28kN and 13.42kN for 1.15mm and 0.75mm specimens respectively. An elastic/inelastic displacement of 6mm (Δu) was noticed in 0.75mm specimen and 24mm (Δu) in 1.15mm specimen. The inelastic linear displacement noticed in the load deflection curve after failure of stud screws was due to the load being fully dependent on the L-bracket. Upon dropping of load to that of 80% peak load observed just before failure, inelastic range of 3mm and 6mm (Δy) was observed for 0.75mm and 1.15mm specimens correspondingly. Failure in the tension test with two L-bracket also begins at a peak of 20kN on 1.15mm specimen giving a linear elastic displacement of 4.5mm as well. This displacement can only be used to determine the design capacity for the initial peak load reached and see whether this is sufficient to resist the serviceability limit state earthquake load which is associated with Sp = 0.7. However, when accounting the ductility factor associated with the two L-bracket in the elastic/inelastic range gives a linear displacement of 26mm (Δu) when reaching a peak load of 27kN. Considering the drop to 80% of above mentioned peak load gave an inelastic displacement of 5mm (Δy).

**5.3 Ductility of the assemblage**

The ductility factor in the component of the wall system can be determined by dividing the displacement from the elastic range by the inelastic displacement (Δu/Δy). The calculated μ is the ductility factor for the component of the wall system only. The following is analysis can be made from the compression and the tension tests:

<u>Ductility factor of specimen from compression tests:</u>

For 0.75mm/1.15mm specimen;

μ = Δu/Δy

= 1.5/0.6

μ = 2.5

**Δinelastic⇓ = 1.5 – 0.6 = 0.9mm ⇓**

<u>Ductility factor of specimen from tension tests:</u>

For 0.75mm specimen with one L-bracket;

μ = 6/3

μ = 2

**Δinelastic⇑ = 6 – 3 = 3mm ⇑**

For 1.15mm specimen with one L-bracket;

μ = 24/6

μ = 4

**Δinelastic⇑ = 24 – 6 = 18mm ⇑**

For 1.15mm specimen connected with two L-brackets;

μ = 26/5

μ = 5.2

**Δinelastic⇑ = 26 – 5 = 21mm ⇑**

For a 2.4m wide wall;
For 0.75mm thick studs;
**θinelastic = (0.9+3)/2.4 = 1.63 milliradians ~ 1.6 milliradian**

For 1.15mm thick studs with 1 L bracket:
**θinelastic = (0.9+18)/2.4 = 7.9 milliradians**

For 1.15mm thick studs with 2 L brackets:
**θinelastic = (0.9+21)/2.4 = 9.1 milliradians**

These results can be used to provide a check for the ultimate limit design (ULS).

### 5.4 Modes of failure

The failure modes seen from the compression experiment testing was the failure in the stud, which buckled at average compressive load of 55kN. The buckling mode was governed by local buckling. There was no failure in the connection. The same failure was expected when the test was to be carried on a steel foundation. Under tensile testing with the foundation as concrete slab, the failure occurred due to the pull-out of the anchor bolt. When tested on the steel beam, the failure first occurred in the screw connection in the stud (dimpled area) then the failure in the L-bracket occurred when the L-bracket totally sheared apart.

### 5.5 Strength Reduction Factors

Based on AS/NZS guidelines, the sampling reduction factors had to be used to account for the uncertainties involved in prototype testing of a small number of samples to derive the characteristic properties of a much larger population. The sampling factors was introduced in loading standards AS/NZS 1170. It requires the use of the minimum value of the test results to be divided by a sampling factor to obtain an estimate of the 5th percentile value of the population. An alternative to the above procedure is proposed in C-H Wang† and L Pham paper (*Sampling factors for prototype testing of structures*) based on the mean value of the test results. It shows that while both procedures are mathematically equivalent, there are advantages associated with the use of the mean values. Wang and Pham provided tables for the sampling factors based on mean test values for Weibull and lognormal distributions based on Monte Carlo simulation. Table below can be used to find the strength reduction factor, which can be used to provide design capacity checks. (Wang, Pham, 2012)

Table 6: $k_t$ value for **minimum** test value, **lognormal** distribution, **90%** confidence level

| **No of specimens *N*** | **Coefficient of variation of structural resistance** $\delta_R$ | | | |
|---|---|---|---|---|
| | **0.1** | **0.2** | **0.3** | **0.4** |
| **1** | 1.34 | 1.79 | 2.36 | 3.09 |
| **3** | 1.19 | 1.41 | 1.66 | 1.95 |
| **5** | 1.14 | 1.3 | 1.47 | 1.66 |
| **7** | 1.11 | 1.23 | 1.37 | 1.51 |
| **10** | 1.09 | 1.18 | 1.27 | 1.37 |
| **20** | 1.04 | 1.08 | 1.13 | 1.17 |

(Wang, Pham, 2012)

Due to less number of specimen being available, only one specimen results are being presented in this report but from few trial experiments the failure mode and results obtained were quite relevant to each other thus no major changes in the results were expected in repeating the test to get an average. Therefore, the strength reduction factor of **1.34** was adopted for the design purpose. Below table gives the design loading values which can be used for the design checks.

| Test Description | Maximum loading where failure begins (kN) | Design Loading (kN) |
|---|---|---|
| Compression test on 1.15mm Specimen with no end bearing (3mm nominal gap) | 51.89 | **38.72** |
| Compression test on 1.15mm Specimen with end bearing | 57.40 | **42.84** |
| Compression test on 0.75mm Specimen with no end bearing (3mm nominal gap) | 23.65 | **17.65** |
| Compression test on 0.75mm Specimen with end bearing | 25.42 | **18.97** |
| Tensile test on 1.15mm specimen with double L-brackets connected to the stud | 20.75 | **15.49** |
| Tensile test on 1.15mm specimen | 20.98 | **15.66** |
| Tensile test on 0.75mm specimen | 12.01 | **8.96** |

**Table 7: Design capacity for compression and tension loading**

## 6.0 Conclusion

Pure axial compression and tensile test on light gauge steel specimens were conducted on 0.75mm and 1.15mm Cee sections connected with L-Bracket. Local buckling of the stud was the primary mode of failure under compression test with no failure observed in the connection. Axial shortening of stud was noticed as indicated in the graphs previously. The connection with end-bearing shortened less thus was recommended for use in medium rise cold-form steel buildings. The tension tests indicated failure in the screw connection in the dimpled area and tearing off the L-bracket at a later stage. The strength of the system can be increased by using some other material for L-bracket, which can give higher strength, and using more screws connected on the side of the stud rather than using only two screws as practised in the industry. The ductility factor of the system can be increased by increasing the thickness of the L-bracket as in these experiments, the L-bracket had a thickness of 0.95mm only. The 5mm mild steel (MS) plate can also be replaced by stainless steel plate to increase the capacity and ductility factor to some extent. Higher ductility factor was achieved by using two L-brackets. This system can also be used as a rocking wall but the common mode of failure in this rocking walls can be the sliding of the wall, thus more anchor bolts which are longer in length can be used to prevent the wall from sliding.

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# WP3-R1

# Specific design for multi-storey light steel framed buildings

## Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building

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**Project title**: ***Specific design for multi-storey light steel framed buildings***

**Work package 3**: **Development of bracing solutions for light steel framed multi storey residential buildings**

The University of Auckland is responsible for evaluating the demand on the bracing within light steel framed multi storey residential buildings from lateral loads, and the ability of existing bracing systems to satisfy these demands. In the present budget it is currently considered that this work package will be a desktop exercise. Should opportunities arise to develop new bracing systems, experimental testing may be necessary; however, the costs for this work are outside the scope of the present project.

Should light steel frame modular construction be considered, the most onerous loading normally occurs when in transit, or when the modules are being lifted and installed; in particular, high stresses will result locally at lifting positions and the adjacent members, which may result in their connections needing to be strengthened accordingly. In some situations, the light steel sections will be replaced by hot rolled steel components to strengthen these locations. As a consequence of this, it may be possible that existing light steel frame modular construction does not require additional bracing requirements for up to 6 storys.

**Work package 2: Performance of stud-to-bottom plate joints in multi-storey residential buildings**

As identified by the BRANZ Building Basics Steel Framing publication, there are several stud-to-bottom plate details that are currently used within 1- to 2-storey dwellings. However, due to the increased loading from light steel framing used in multi-storey applications, it is uncertain whether these existing details are still appropriate. As a consequence of this, in this work package the performance of existing stud-to-bottom plate joints will be experimentally investigated from component tests at the University of Auckland. It is anticipated that in 6-storey applications the current details may need to be modified and, working closely with NASH, it is proposed to develop new details for this situation that can be produced by the NASH membership. To demonstrate the performance of the new details, a final set of tests are planned to be subsequently undertaken by the University of Auckland. Finally, the test arrangement used in this work package will be disseminated in the final design guide as a standard test set-up, to permit light steel framing manufacturers to develop proprietary products in the future.

# 1. Introduction

## 1.1 Scope and General

The particular goal of this study is the development of a six story cold-formed steel multi-story apartment building system concept that meets earthquake and gravity design requirements and is cost-effective. The design is part of a desktop study to develop a solution for medium-rise light steel framed apartment buildings; currently standard cold-formed steel buildings are limited to 3-storys. The particular focus in this initial study is for such a building to be located in Auckland on the most commonly found soil class type in the Auckland region, being soil class C.

Cold formed steel framed buildings have high resistance to earthquakes, as demonstrated in shake table testing [1] and in the 2010/2011 Canterbury earthquake sequence [2] . CFS framing is simpler to erect, reducing the construction time and labour cost; consequently, reducing the overall building cost. In addition, CFS is durable with a high strength-to-weight ratio. Homebuilders and consumers have a general understanding of the benefits of CFS and are receptive to the use of steel framing. This has led to a growth of the application of CFS in residential and commercial construction in New Zealand and other countries. However, current standard designs for CFS buildings are limited to 3 storeys.

The Auckland Council Capacity Growth Study 2013 (Auckland Unitary Plan) [3] is encouraging greater urban density through multi-story residential buildings. These buildings are in the 4 to 6 story range and currently in New Zealand will be composite floors on heavy steel frame or precast concrete floors on either heavy steel or reinforced concrete frame. However, light frame solutions are also feasible and desirable. BRANZ [4] has already identified the need to develop a design guide for multi-story timber-frame buildings using locally sourced materials. To ensure that designers are given complete freedom in their choice of structural solution, a similar design guide for multi-story light steel framed buildings is advocated, which utilizes New Zealand made high strength steel. The proposed guide will extend upon the scope of the existing NASH Standard Part 1 [5] (which is cited in the Building Code), together with the forthcoming NASH Standard Part 2 [6]. This project develops a design solution for such a 6 story CFS building.

It has been shown [7] that the nuisance and inconvenience caused by construction can be significantly reduced by the use of pre-fabricated light steel and modular solutions. Not only do such methods transfer much of the construction off-site, but they also significantly reduce the construction time, thereby limiting the inconvenience caused by site traffic, deliveries, waste clearance and general construction activities. For example, the use of off-site light steel technologies in the UK [7] reduced the construction program for one school from 76 to 54 weeks, which is equivalent to a reduction in the total construction period of 29% and agrees well with a time saving of 25% evaluated from an independent study conducted by the UK National Audit Office [8].

From studies conducted by BRANZ on behalf of Winstone Wallboards [9] [10], it has been shown that there are significant opportunities for multi-story residential buildings in Auckland. Light steel framed multi-story buildings have been successfully used internationally (e.g. the 9-story residential building at One Smithfield Square, Manchester, UK) and full-scale testing has shown that this form of construction performs well in fire [11] as well as under seismic loading [12] [1]. Owing to the fact that the high strength, thin-walled steel used in New Zealand light steel frame construction is unique, much of the existing test data from northern hemisphere countries on thicker, lower strength steels is not directly applicable in this country. Through the expertise of the project team in developing industry standard design guides for steel construction, the resulting design rules will be widely dissimilated within a subsequent design guide that complements AS/NZS 4600 [13] and the NASH Standard Part 1 and 2 [5] [6].

### 1.2 Design Concept Used

Current seismic design of cold-formed steel framed buildings relies largely on the application of bracing panels as shear walls, with their capacity determined by a standard test procedure (the P21 test [14].These are placed in accordance with the design actions along each principal axis [5] [6]to satisfy the seismic design actions arising from NZS 1170.5 [15]. This approach is permitted for up to 3 storeys (2 suspended floors) only. There is considered to be some rocking between adjacent shear panels in a vertically stacked column, however the influence of this is not taken into account.

The design concept adopted in this study has been to utilize the standard bracing panels, stacked vertically to form a shear type vertical stacked shear wall as rocking panels. This has been done

through undertaking a detailed 3D modelling of the CFS frame in order to determine the seismic performance of the entire structural system, utilising the same approach as is adopted in the seismic assessment of existing buildings. The flexibility of the connections between the adjacent vertical panels in both the tension and compression direction has been determined from experimental testing of stud to stud connections under tension and under compression and similar tests have been performed on the stud to base connections. This behaviour has then been represented by a bilinear spine curve representing the strength and stiffness in the elastic and the inelastic condition and these properties incorporated into a full scale model of the building, with the interconnected, vertically stacked shear walls linked by a floor diaphragm which can transfer lateral load between the walls and also tie the individual wall systems together for carrying vertical loading from the floor system.

The CFS full scale building modelling approach has had two major goals: (1) to provide a model that can meaningfully predict the CFS building seismic response in order to provide a design solution for this particular building and (2) to evaluate the feasibility of applying this approach in general to medium rise CFS structures. The full-scale building has been modelled using SAP 2000 software [16]. The initial modelling undertaken by the first author has been peer reviewed by ExtraMile Consulting Engineers who have made a number of modifications to the model and re-run the analyses. Their work is presented in the collated final report in the section WP4-R3 and supersedes the analysis data presented in the earlier drafts of this report. As a result, the outputs from the UofA work have been removed from this report and reference made instead to the ExtraMile report.

When an individual panel rocks, the behaviour is dependent on the strength and stiffness of the connections between adjacent panels in the vertical plane in tension and in compression. Because the experimental testing has been monotonic only, the influence of cyclic inelastic demand on the connections between bracing panels has not been accounted for in the testing. In practice, this cyclic action will cause the connection capacity to deteriorate, especially for tension loading between the studs, when the magnitude of deformation exceeds that for which the load-deflection behaviour is essentially elastic. These limits are shown in Figures 2 and 3.

Because this seismic design is for a low seismic zone, the determination of the design adequacy of the procedure has involved modelling the whole building in 3D and undertaking a pushover analysis

at the centre of rigidity, top floor level, in each of the global building principal axes, to determine the deflected shape and the tensile deformation demand on the links between adjacent vertically stacked panels. If the maximum deformation demand on all links between adjacent panels, up to attainment of the roof deflection associated with 1.8 times the ULS design level roof lateral deflection, is within the elastic limit of the experimentally determined link deformation, then the behaviour under cyclic loading can be taken as being correctly represented by the model. If this is not the case, experimental cyclic testing of these stud to stud connections is needed, to the extent of maximum considered event displacement demand. In this instance, as described in Section 5. For this design, involving a low level of structural displacement ductility demand ($\mu$ = 2.0) and a low seismic zone, the maximum demand on the links was well within the elastic threshold, meaning the monotonic testing has been sufficient to allow confirmation of the design procedure.

The other lateral loading condition on the building is the design wind loading and, for this building, the ExtraMile analyses show that the wind loading produces higher lateral loading than the seismic loading calculated on the above basis. While this has lessened the advantages of allowing for rocking in this instance, it has demonstrated that this rocking solution to introduce ductility in earthquake response is directly applicable in moderate to high seismic zones in New Zealand, meaning that the design solution developed in this study will be applicable with minor to no alteration to most parts of this country.

Section 2 describes the experimental testing undertaken and quantifies the properties of the stud to stud tension and compression capacity that has been subsequently incorporated into the whole building model.

Section 3 describes the building structural features, standards used and presents a detailed step by step summary of the design procedure used.

Section 4 very briefly describes the frame analyses undertaken and then cross references to the ExtraMile report for further details.

Section 5 summarises the analyses results and discussions, including the performance at the three design levels of lateral loading; serviceability, ultimate limit state and maximum considered event lateral deformation demand. These results show that, for this building:

1. The demands on the connections between adjacent panels remain in the elastic range as tested or as determined from test, up to 1.8 times the ultimate limit state level of displacement at roof level in each principal axis of loading.
2. The monotonic testing is therefore adequate to capture the behaviour under cyclic loading.
3. There is no concentration of inelastic demand into one level for any of these levels of roof lateral displacement demand.
4. The lateral loading which generates the maximum tension forces in the stacked bracing panels is from ultimate limit state wind, meaning that the ductility demand from earthquake will in principle and in practice be less that that associated with $\mu_{design} = 2$ on which the original seismic design was based. This means that the design solution would be directly applicable into higher seismic zones than Auckland and potentially readily adaptable into Wellington and other zones with Z = 0.4 from NZS 1170.5.

## 2. Review of the Experimental Testing of Stud to Stud and Stud to Foundation Connections

The concept of stacked, vertical, rocking shear wall panels relies on the observation that the connections between adjacent walls in a vertical stack are much stiffer and stronger in compression than they are in tension. The earthquake generated lateral loading will put shear forces across the top and bottom of each wall bracing panel, generating a rocking motion. Because of the differential strength of the wall to wall connections in compression and tension, the rocking walls will pivot about the compression side, with uplifting occurring on the tension side. The use of the concept involves the following assumptions:

1. On the compression side, the limiting capacity is the member compression capacity of the studs, with the stud to plate connection being such that direct bearing of between the end of the stud and the web of the plate can occur.

2. On the tension side, uplift will occur, governed initially by the elastic stiffness of the stud to plate connection and the out of plane flexibility of the plate webs. If this is exceeded then permanent damage to the stud to plate connections will occur. For now, the intention is to limit the ductility so that the demand stays in the elastic range.
3. The panel is effectively rigid in shear within the range of deformations and design actions expected up the design ultimate limit state deformation. This will need verification for higher seismic demand applications than what is being designed for this project.
4. Shear between panels is resisted by the connections between the plates; if necessary this can be supplemented with additional screws located near the midpoint of the panels or by two sided structural adhesive tape.

A series of experimental testing on stud to bottom track connection have been carried out at the Auckland University laboratory to determine the behaviour of cold-formed steel sections and the strength and stiffness capacities of these connections [17]. The experimental research was carried out to align with the HERA 2$^{nd}$ work-package to investigate the performance of stud-to-bottom plate joints in multi-story residential buildings. The experimental set up is shown in Fig.1 and the results are summarized here.

The report represents the behaviour of cold formed steel sections and the strength and stiffness capacities of the stud to bottom plate connections in cold formed steel buildings. It compares the connections under compression and tension loads at the foundation and intermediate levels, with and without end bearing conditions in a building with two gauge sizes (0.75mm and 1.15mm). A series of compression and tension tests were conducted. In compression, the connection does not fail but the stud fails at almost 57.4 kN for 1.15mm specimen (see Fig.2 and Table 1) and 25 kN for 0.75 mm specimen. In tension, the peak capacity was 27 kN (see Fig.3) and 12 kN, respectively, for 1.15mm and 0.75mm specimen, but with an initial elastic load of 20 kN for the 1.15mm thick stud with the standard stud to plate connection. These connection capacities are used to define the rocking mechanism between the connections and its limiting strength, which is applied in the following ways:

1. Attachments to the seismic bracing panels.

2. Attachments to the non-seismic bracing unit walls.

Note in Fig.2 the initial region of relatively low compression loading versus displacement up to around 20kN of load. This is due to the initial uneven bearing of the stud onto the plate; it took approximately 2mm of slip for the stud to fully bear onto the bottom plate and the bottom plate to fully bear onto the testing beam. In practice in a multi-storey building, especially in the lower storeys, this slip will occur during construction as the increasing load on the walls causes the studs to slip slightly and take up effective bearing against the plates. It does highlight the importance of designing and detailing the stud to brace for end bearing onto the plates rather than for the stud to stop at the beginning of the wall plate flange to web inner radius, leaving a gap between the end of the stud and the inside surface of the plate web. This is a key requirement for medium rise LSF construction.

Once this initial flexibility is taken up, then the stiffness of the compression load path becomes very high, compared with that of the tension load path and the failure in compression is through failure of the stud in compression, rather than through failure of the connection.

It has been important that the translational stiffness of these connections is incorporated into the model at each level, including at the base. This has been done in the SAP model through links as described in section 4.4, in both the original SAP analyses undertaken at the University of Auckland and the peer reviewed and revised model undertaken by ExtraMile consultants.

*Table 1: Design capacity for compression and tension loading*

| ***Test Description*** | **Thickness (mm)** | **Design Load (kN)** | **Failure Load (kN)** | **Displacement (mm)** |
|---|---|---|---|---|
| Compression test with no end bearing (3mm nominal gap) | 1.15 | 38.72 | 51.89 | 5.198 |
| Compression test with end bearing | 1.15 | 42.84 | 57.4 | 2.808 |
| Compression test with no end bearing (3mm nominal gap) | 0.75 | 17.65 | 23.65 | 3.215 |
| Compression test with end bearing | 0.75 | 18.97 | 25.42 | 2.555 |
| Tensile test with double L-brackets connected to the stud | 1.15 | 15.49 | 20.75 | 4 |
| Tensile test specimen | 1.15 | 15.66 | 20.98 | 15 |
| Tensile test specimen | 0.75 | 8.96 | 12.01 | 4.6 |

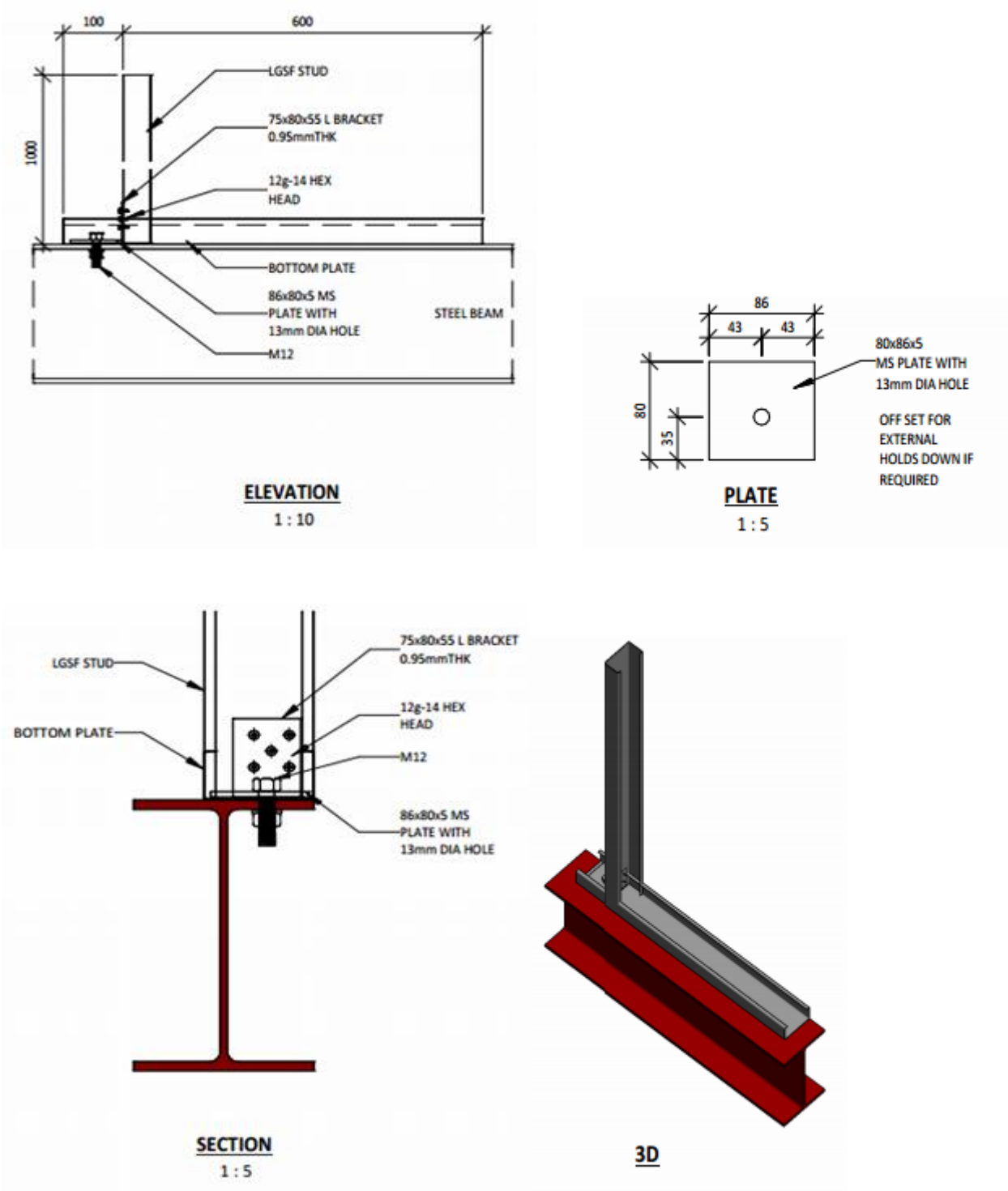



*Figure 1: Tensile test setup*

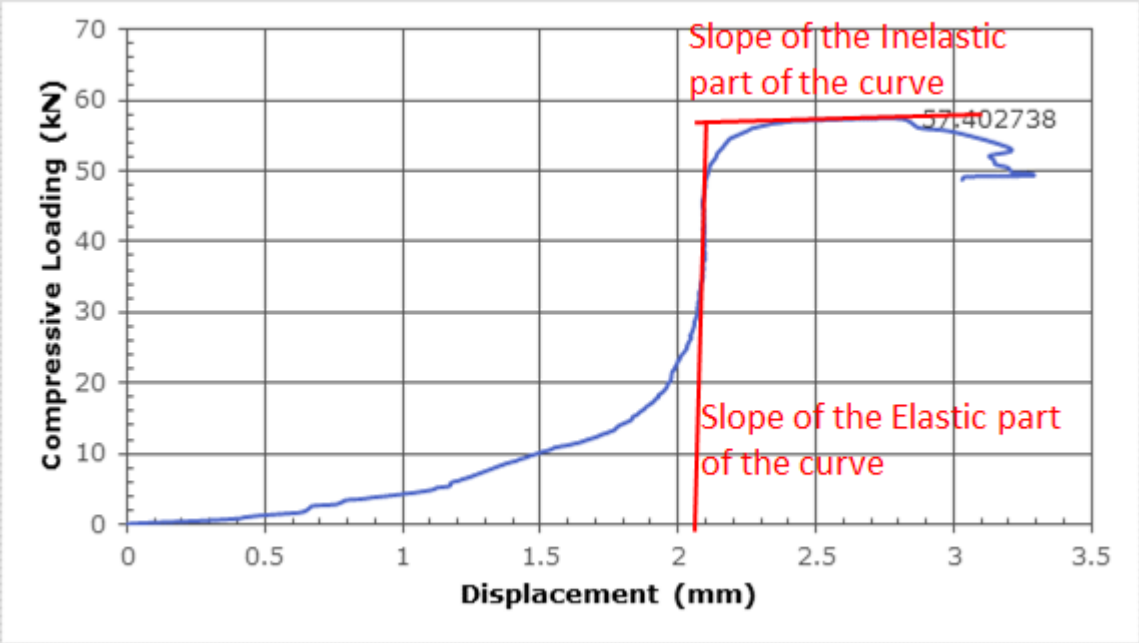



*Figure 2: Graph of load versus displacement in compression test for 1.15mm specimen with end bearing*

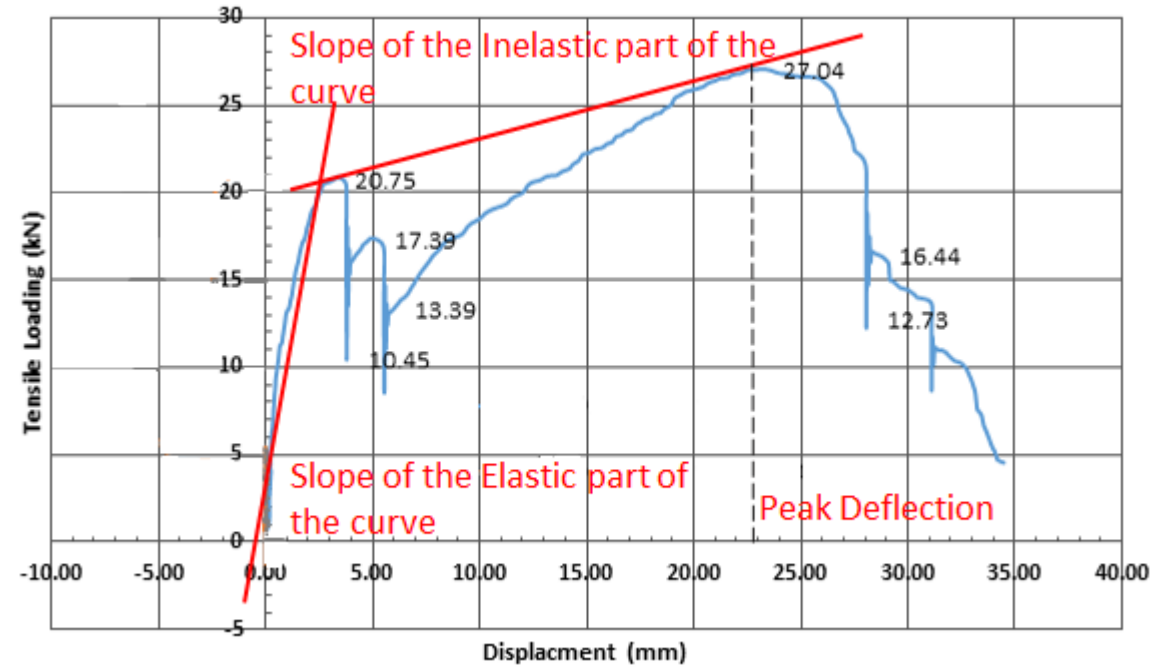



*Figure 3: Load versus displacement in tension test (1.15mm specimen connected with double L-bracket)*

# 3. Building Description

## 3.1 Structural design summary

The six story multi-story building is located in Auckland, New Zealand. Gravity and lateral loads have been determined in accordance with the AS/NZS Loadings Standard. For member sizing, the Australian/New Zealand Standard "Cold-Formed Steel Structures" 2005 edition (AS/NZS 4600) [13] has been used. Member sizes have been determined based on NASH standard parts 1 & 2 [5] [6] criteria. Shear wall and diaphragm design is based on the "National Association of Steel Framed Housing INC", parts 1 and 2 [5] [6].Seismic forces have been determined based on soil class C for Auckland. Direct strength method (DSM) has been used for members and connections design based on AS/NZS 4600 [13] standard. In Section 4, this design procedure is applied to the exemplar building shown below, which is based on one designed for the SCI UK as part of an exercise there to establish a design solution for a medium rise light steel framed apartment building.

.

(a) (b)

*Figure 4: Exemplar 6-story mixed-use residential building (a) cross-section through building (b) repeatable floor plan*

After designing the exemplar building from the structural provisions developed within the current project, it is proposed that NASH members will produce take-offs to enable a Quantity Surveyor to provide costs for the structure (fittings, fixtures, etc. may also be included, as these would be common items for alternative structural forms). This part is belonging to the last section of the HERA's 2015/16 Building Research Levy Investment Program work package entitled "Specific design for multi-story light steel framed buildings".

### 3.2 Gravity System

A 'ledger framing' system has been chosen rather than traditional platform framing. The ledger framing attaches floor and roof joists to the inside flanges of the load-bearing studs via a combination of track and clip angles, as shown in Figure 5. Studs are stopped at the top of each floor level and capped with a wall plate. Walls above are stacked on the lower wall top plate. This means a direct contact and load path through from the wall above to the wall underneath through the top and bottom plates.

The ledger system has the major advantage that design actions from the upper wall to the lower wall can be transferred dependably by the mechanism described above and in section 2. If these actions had to transfer from the upper wall to the lower wall in bearing through the end stud, the modes of failure would be potentially very different. With the ledger system, the vertical studs are mainly responsible to transfer the gravity loads to the ground. The studs used at each floor from the study undertaken herein are presented in table.2. The studs' arrangement were to be placed in every 610 mm rows.

*Table 2: Studs specifications were used in each floor*

| | **Direction** | |
|---|---|---|
| | **X** | **Y** |
| Level-1 | 2C150×38×9×1.6 | 2C150×38×9×1.6 |
| Level-2 | 2C150×38×9×1.6 | C150×38×9×1.6 |
| Level-3 | 2C150×38×9×1.6 | C150×38×9×1.6 |
| Level-4 | C150×38×9×1.6 | C90×38×9×1.6 |
| Level-5 | C90×38×9×1.6 | C90×38×9×1.2 |
| Level-6 | C90×38×9×1.6 | C90×38×9×0.95 |

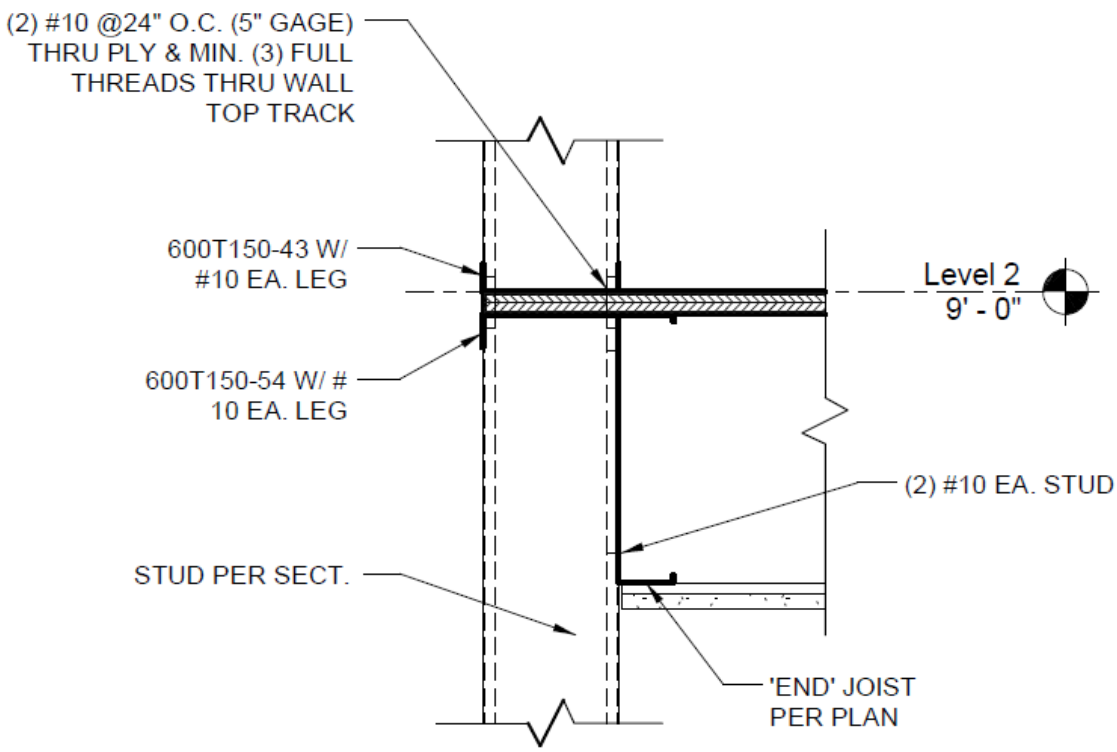



*Figure 5: A typical ledger diagram from [18]*

### 3.3 Floor joists

Floor joists have been designed as simple span members with uniform loading. End rigidity of the attachment to the stud walls was not considered in the roof joist design. Although, the main Gravity loads (Superimposed & Imposed) were applied on the floors, the cladding load equal to 1 kN/m$^2$ was applied to the surrounding joists. The compression flange of the joists was considered to be continuously braced via attachment of sheathing. Based on these loads, C 250×85×33 sections with 1.8 mm thickness were chosen for joists with a distance of 610 mm.

### 3.4 Load bearing walls

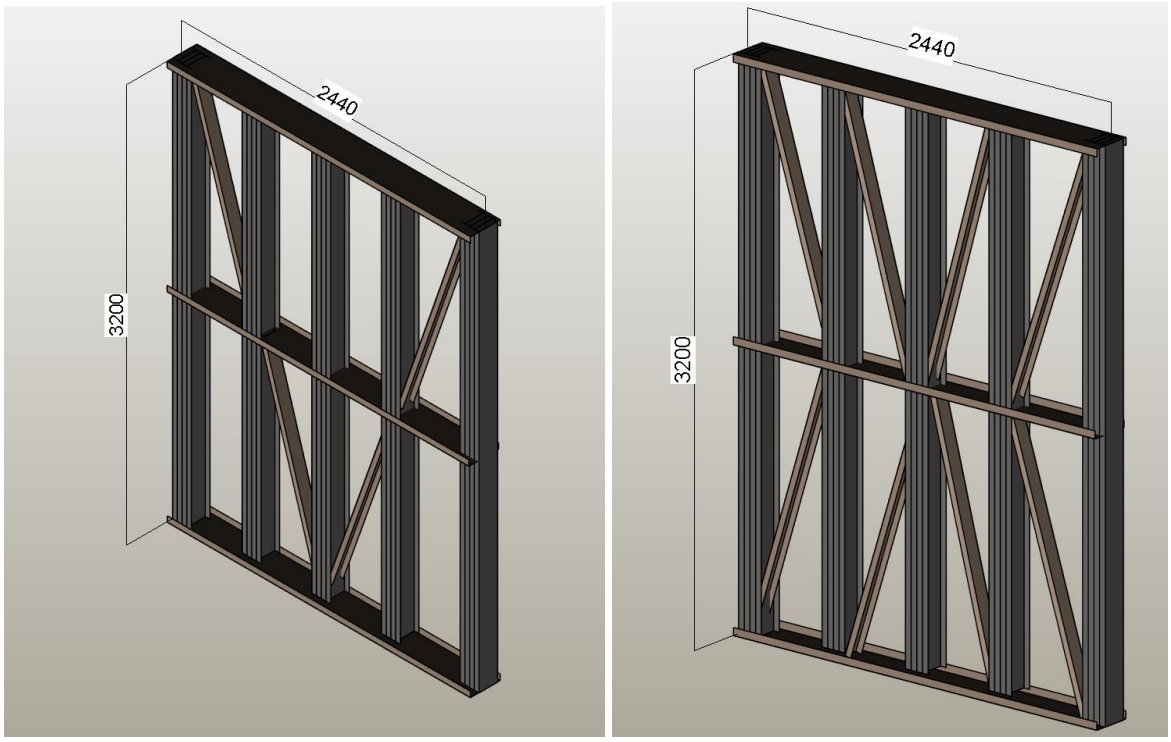
For a desired clear height of framing of 3000 mm deep joists, studs have been designed as 3200 mm in length. Studs are designed to carry earthquake load in combination with dead and live loads, as

per the process described in section 4.1. Since walls will receive gypsum board sheathing on at least one flange, the global buckling of studs were neglected all through the hand calculations. The studs have been sized to be acceptable, in regard to their compression load carrying capacity, with either sheathing bracing, or discrete bracing near mid-height. With the stud size known, the connection of the roof joists to the wall was designed. The connection was designed as a link for shear due to lateral displacements plus tension and compression due to outward acting earthquake loads (suction) on the wall studs and compression due to gravity loads. Track and fasteners were chosen to resist the associated overturning forces.

Walls running perpendicular to the joists transfer out of plane lateral forces to the diaphragm via their connection to the joists. However, for walls parallel to the joists, transferring out of plane wall forces into the diaphragm is accomplished via a direct connection of the wall to the diaphragm sheathing. Lower level walls were designed similarly to the upper level walls and the gravity loads from the roof and wall above were considered concentric. Gravity loads from floor joists were applied at the inboard stud flange, thus introducing an eccentricity of half the stud width. On this basis, C studs @ 610 mm on canter with discrete bridging at mid-height were chosen as indicated in table.2. for the braces and truss members it was decided to used the same section dimensions as per studs at each level except for the levels where twin studs have been used, the brace and truss sections were single. Therefore, by referring to the table.2 the wall members dimensions could be figured out.

The hand calculations based on the AS/NZS 4600 provisions for X direction for instance have shown 2 studs per location to be sufficient to resist the applied loads on levels 1 to 3, with one stud per location on levels 4 and 5 and6. The walls are erected with K and V configurations (Fig.6) with lengths equal to 2440 mm and 1220 mm. The longer walls consist of 5 studs with 610 mm gap between whereas the shorter walls made by 3 studs with gaps of 610 mm between.

The wall placement is illustrated in Fig.7. Walls running along the A, B, C, D and E gridlines are resisting the lateral loads in the Y direction and the walls running parallel to 1,2,3 and 4 gridlines are resisting the lateral loads in the X direction. The red coloured walls along 1, 2, 3 and 4 gridlines are the main gravity load bearing walls, transferring the accumulated gravity loads by the joists to the ground. Walls located at the B and D gridlines are the only load bearing walls in Y direction.




(a) (b)

*Figure 6: Typical V and K braced shear walls with studs running vertical consisted of 3 C sections*

Commonly, in cold-formed steel houses, the lateral load resisting system is Cold-Formed Steel Stud Shear Walls. These shear walls are generally obtained by assembling of single internal and coupled back-to-back external profiles (studs) which have a lipped channel cross-section. The shear walls have had to be designed to take the gravity loads and the lateral loads After placing the first story walls, the second story walls will sit on them so that the bottom section of upper studs will coincide with the top section of below studs of the below wall. The floors are brought into side hangers as shown in Figure 5. This detail is critical to provide the desired load path between the stacked wall panels for robust seismic performance.

The existing AS/NZS design provisions for the Australia and New Zealand are limited to a few wall configurations (combinations of member thickness, sheathing thickness and sheathing connection

pattern). Most of the shear walls used in cold-formed steel buildings in New Zealand are K braced panels or X braced straps which do not leave open areas for architectural openings.

Where large openings due to shear load concentration are not applicable, the V braced panels (Fig.6-a) are proposed. These are panels with limited openings and satisfying stiffness. Figs.7 shows the shear wall placements in two types of framing systems with and without large openings. A lateral framing system for which improvement to the design process is warranted is the screw connected steel sheathed CFS framed shear wall. This method of shear wall connections is currently used for undergoing cold-formed projects in New Zealand, albeit with design by bracing panel resistance rather than by deliberately accounting for rocking action as is proposed here. When the structure is pushed by earthquake lateral loads, the stud at one end of the wall bracing panel will be in compression, while the stud at the other end will be in tension. The tension load path is much less stiff and strong than the compression load path, meaning that tension uplift will occur. The design procedure given in section 4.1 is formulated around limited rocking from this tension uplift occurring and determining the ability of the connection system used to withstand that uplift while

still providing the required shear connection between the connected wall units. Currently this is the reason for limiting the design procedure to structural ductility demand not exceeding 2.

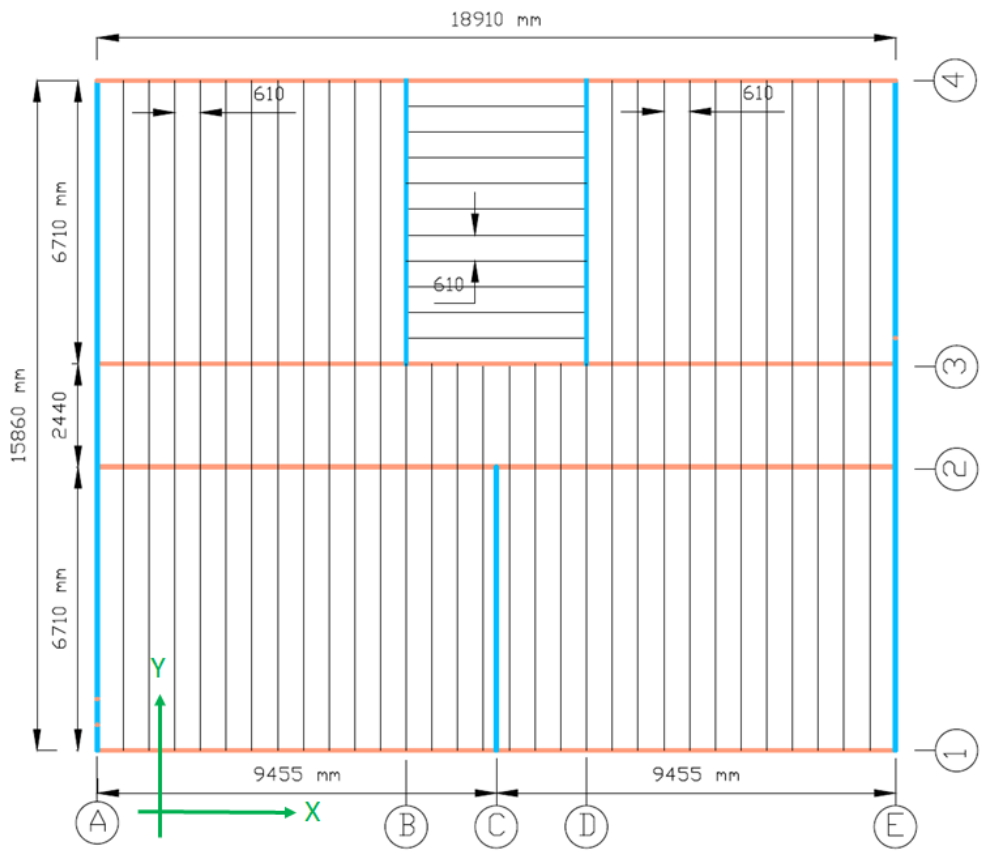



*Figure 7: Building Plan View Showing Structural Walls in Each Principal Axis Direction.*

For the X side of the structure, the openings have been placed at the outer frames as windows and at the inner frames as entrance access. The lintels above the openings (Fig.7) were designed using CFS trusses in order to increase the stiffness of the opening frame and to support loads around window and door openings.

# 4. Frame analysis and design

## 4.1 General analysis and design concept for lateral loading used for this system

The objective of this study has been to develop a seismic damage-resistant system that will enable this multi-story building with cold-formed steel framing to remain stable and we expect functional during and after a design level ultimate limit state earthquake. The design procedure and parameters used are not specific to this building, making the design approach generic, although it is limited to low seismic zones without further experimental testing. The proposed seismic resisting systems comprise the V braced (Fig.6-a) and K (Fig.6-b) braced panel shear walls described in section 3.4, which are designed for carrying both gravity and lateral loads and which are stacked on top of each other throughout the height of the structure. They form stacked shear wall systems which are designed and detailed to undergo limited controlled rocking as part of their seismic-resisting system mechanism. The initial performance of these walls has been determined by testing of key components in the bracing panel system in order to develop a concept of a seismic resisting system with limited ductility. The design procedure that has been applied is described below and then applied to this structure in sections 4.2 to 4.5.

The design procedure has been developed to deliver the following seismic performance:

1) Ductile response of the CFS walls is to be developed for the Ultimate Limit State (ULS) response, based principally around limited rocking between adjacent vertically stacked wall panels. Under the design level ULS loads, no failure of the wall brace to column connections or the braces is expected. Under the design ULS inelastic displacement, calculated in accordance with NZS 1170.5, localised brace to column connection damage but not failure in the more heavily loaded braces is anticipated. Under the MCE inelastic displacement, brace to column connection damage will be more extensive, some braces will undergo limited bucking. Column failure is suppressed at all levels of demand. This is currently limited to low ductility demand in order to keep the uplift demand on the tension side of the wall to wall connection to within the initial elastic range, because of the limited and monotonic only experimental testing undertaken on the rocking mechanism.

2) Collapse prevention to be achieved at the Maximum Considered Event (MCE) level.

Seismic design and evaluation of cold formed buildings above three stories is not addressed in standard solutions eg as developed by NASH in their Standards and Codes of Practice. The general requirements are given in the Loadings Standard set including NZS 1170.5 and in AS/NZS 4600. This requires a bespoke design for these buildings, with the approach used generic, but specifically applied to the exemplar building. This generic concept, currently applied to low seismic regions at ($Z \leq 0.15$) has involved the following key steps:

Step 1: Determine the layout for the bracing wall units and the floor system. The bracing units are stacked vertically to form a series of shear walls made from interconnected stacked vertical bracing units. The floor system spans between walls in such a way that one set of walls is carrying most of the vertical loading. See Figure 7.

Step 2: Determine the load path for the vertical loading (G and Q)

Step 3: Undertake a preliminary design for strength for the load combination 1.2G+1.5Q. Determine the number of studs required to resist the design compression loading from this load case, using the direct strength method of design or the effective width method of design from AS/NZS 4600, taking into account the restraining effects of the linings where these are present under normal in-service conditions. Reduce the number of studs up the building as the loads decrease both for cost efficiency and also to help spread inelastic demand up the height of the structure.

Step 4: Determine the design seismic base shear about each principal axis using the equivalent static method, with the building's fundamental period $T_1$ determined from the NZS 1170.5 empirical equation for a structural wall building, and using a structural ductility factor of 2 and Sp = 0.7 to determine the design base shear.

Step 5: Construct a full 3D model of the structure, taking into account the following:

1. The floor joists are pin ended to the supporting walls.
2. The supporting wall braced bays are connected by ties which have a known strength and stiffness properties in tension, determined as described in section 2 and included in the

model between the wall and foundation and between the top plate of the wall on level *i* and the bottom plate of the adjacent wall on level *i*+1, as shown in Figure 8.

3. The floor system is modelled as a rigid diaphragm interconnecting all nodes on the floor. The out of plane stiffness of this diaphragm is determined conservatively as the out of plane shear stiffness of the structural floor topping.
4. Make sure there is a node located on each floor at the following locations on each floor and that these nodes are connected into the floor diaphragm:
    a. At the location of the Centre of Mass (CofM) on that floor
    b. At 0.1b offset from the CofM in the direction perpendicular to the direction of applied earthquake loading, in accordance with NZS 1170.5 Clause 5.3.2.
5. Incorporate the seismic mass from the load combination ($1.0G+\psi_E Q$) into the model in each of the horizontal principal axes (ie the X and Y directions shown on Fig.7). This can be applied from the loading on the individual frame elements or as a lumped mass at the CofM

Step 6: Determine the adequacy of the wall studs under the loading combination 1.2G+1.5Q directly from the analysis for this load combination and revise the design if required

Step 7: Determine the first translational mode of vibration, $T_1$, in the direction under consideration from the model. If this is more than 10% different from the empirical period used in Step 4 to calculate the design base shear, recalculate this using the new value of $T_1$.

Step 8: Determine the adequacy under earthquake actions (load case $1.0G + \psi_E Q + E_u$) as follows, with this being applied separately in the principal axis Y direction, then in the principal axis X direction (see Fig.7):

1. Generate the distribution of seismic lateral loading at each level of the structure from the equivalent static method
2. Apply this loading at the offset for accidental eccentricity given from step 6 item 4b and determine the lateral displacement of the wall system at roof level that deflects the furthest under those actions.

3. Determine the adequacy of the number of studs determined from step 3 for the design compression action from this load combination and increase the number of studs if required, which means modifying the model and rerunning.
4. Calculate the inelastic displacement at the roof level using NZS 1170.5 Clause 7.2.1.1 for the wall with the greatest lateral deflection from item 2. This means applying a displacemet of equal to the assumed ductility multiplied by the displacement achieved from 2 ($E_x$ or $E_y$ $\times\mu$).
5. Undertake an elasto plastic push over analysis using the pattern of loads generated from Step 8 item 1 applied at the location specified in item 2 and increase these loads until the specified inelastic displacement is reached. Make sure in this analysis that the "Large displacement analysis option" is selected so that P-delta effects are determined.
6. Increase the push over forces until the displacement at the top of the wall being monitored reaches 1.5 x the displacement determined from item 4 above.

Step 9: Check the adequacy of the frame as follows for the inelastic analysis specified from step 8 item 5 as follows:

1. Check that the interstory deflection profile does not show concentration of inelastic demand into any one level; in this check the profile shape under inelastic action (step 8 item 5) should not vary from the profile shape under elastic action (step 8 item 2) by more than 10%
2. Check the compression design loads in the shear studs from the analysis does not exceed the nominal compression capacity of the stud or group of studs sized from step 6 and from step 8, item 3. In this case the comparison is with the nominal compression capacity of the stud(s) – ie with the strength reduction factor set at 1.0.
3. Check where the maximum tension uplift in the ties between walls lies in regard to the limits determined from section 2. Ideally at this time it should be within the elastic deflection limit specified from Fig.3.
4. Check the adequacy of the bracing panel braced frame member connections against the experimentally determined capacity of these connections. If required increase the capacity of these connections with extra screws.
5. Check that the hold down system for the bottom story braced panel to the floor slab and the floor slab itself are adequate to transfer the design base shear from step 8 item 5.

Step 10: Check the adequacy of the frame as follows for the inelastic analysis specified from step 9 item 6 as follows:

1. Check that the compression design loads in the shear studs from the analysis does not exceed 1.25x the nominal compression capacity of the stud or group of studs sized from step 6 and step 8, item 3.
2. Check where the maximum tension uplift in the ties between walls lies in regard to the limits determined from section 2. It will be in the inelastic range but should be close to the elastic limit.

NOTE: Steps 7 to 10 are run for each principal axis separately (ie for the global horizontal direction X and Y shown in Fig.7.

Step 11: Check adequacy for concurrent earthquake action.

1. Apply the seismic design actions generated by step  from 100% of the design action in one principal axis applied about the CofM simultaneously with 30% of the design action in the other principal axis also applied about the CofM
2. Combine these design actions on the columns with the gravity actions from $1.0G + \psi_E Q$ and check the compression adequacy of the column stud groups under the combined actions. In this case the comparison is with the nominal compression capacity of the stud(s) – ie with the strength reduction factor set at 1.0.

Sections 4.2 to 4.5 and section 5 present the application of this procedure to the exemplar building.

Note that subsequent peer review by ExtraMile Consultants has shown that the ultimate limit state wind loading generates higher lateral forces in the bracing system than those generated by the ultimate limit state seismic forces determined from the above procedure. The details are given in [39].

### 4.2 Lateral System

Lateral forces found based on AS/NZS 1170.5 guidelines [15]. Site Class C was chosen as is typical for sites in the vicinity of this project. The building is located in Auckland city, therefore, a Hazard Factor equal to 0.13 was chosen from Table 3.3 of NZS 1170.5.

Lateral resistance is provided by the cold-formed structural walls acting as articulated shear walls. For this system, the following parameters were derived from NZS 1170.5 [17]:

Performance Factor $S_p = 0.7$ along both principal axes of the building
Return Period Factor $R_u = 1.0$ (for this IL2 building)
Structural Ductility Factor $\mu = 2$ along both principal axes of the building

### 4.3 Shear Walls

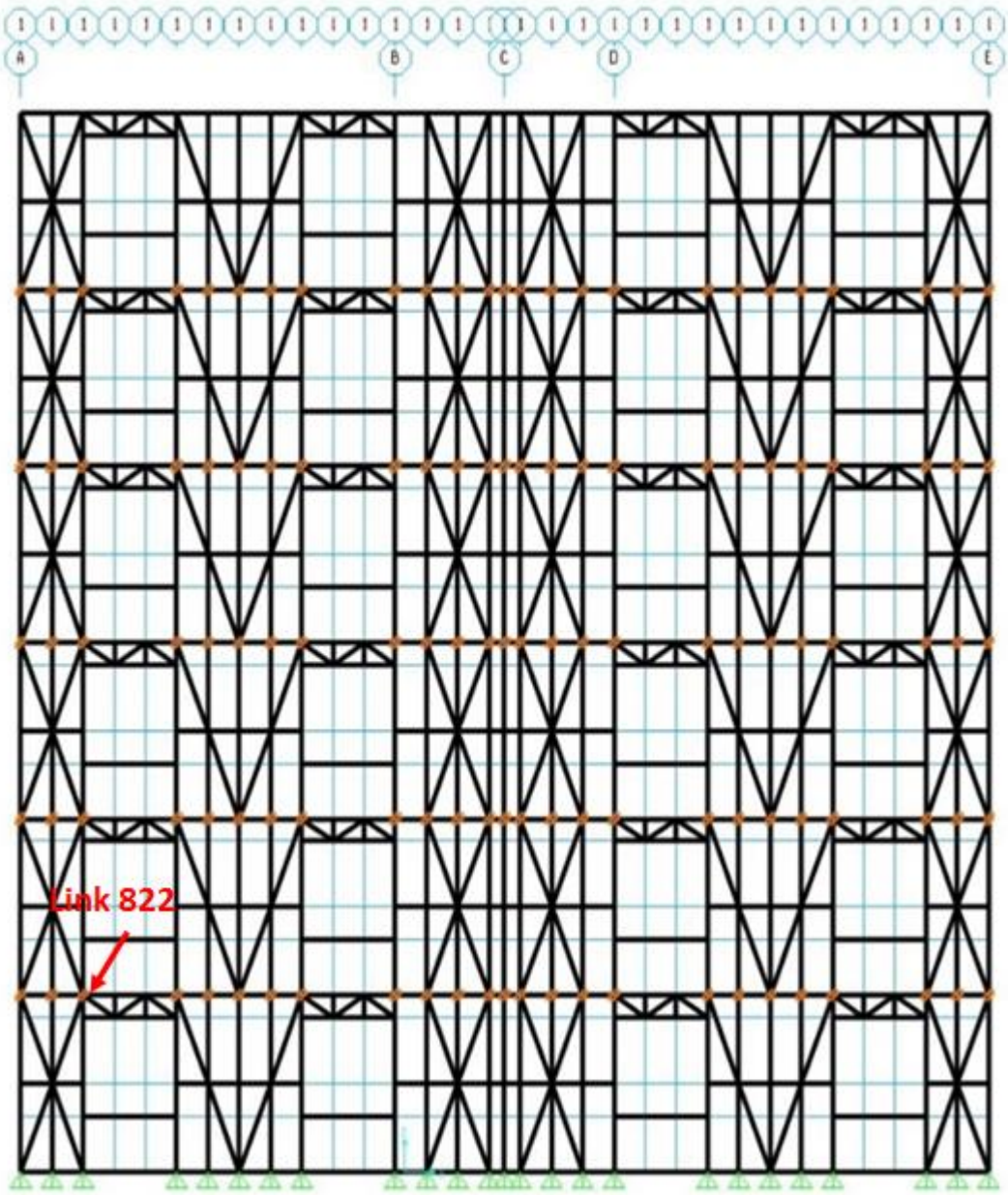
Based on the proposed location of windows and doors, shear wall locations have been selected on each of the (4) perimeter walls and internal frames. Both Type V and Type K shear walls were investigated. The size and location of shear walls on each side of the building and inside the building are varied as illustrated in Fig.8 with lengths equal to 2440 mm or 1220 mm. The stud connections to the bottom track are made by using double L bracket connection style (Fig.1). This is done by fixing L brackets via screws at both sides of the stud and the corner sides were screwed to the bottom track meanwhile. The detail of this connection has been shown in Fig.1.

As seen in the experimental testing of the wall to wall connections undertaken by Kumar [17], the connections are strong in compression, with direct bearing load transfer from the top wall stud to the lower wall stud, however much more flexible and weaker in tension, due to deformation and progressive failure in the screws, L shaped connectors and bottom/top wall plates. This difference is illustrated in Figures 2 and 3. This leads to two approaches for seismic design; either the tension capacity of the connections is increased to prevent stud to plate movement in tension, or the walls are designed to rock. The design procedure described in section 4.1 employs the rocking approach, not only because this does not require strengthening of the upper to lower wall connections in tension but also, equally or more importantly, it limits the compression demands in the wall studs,

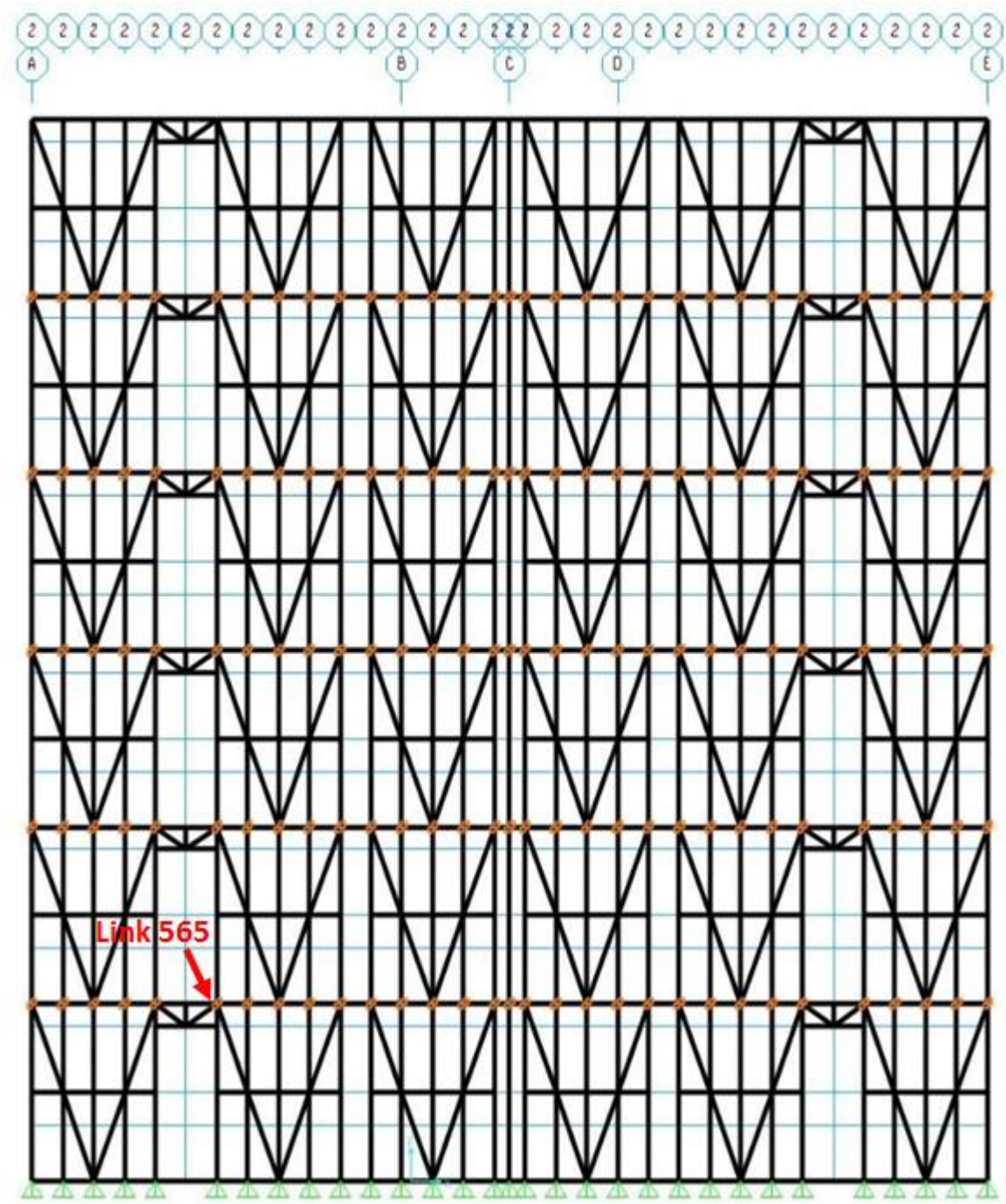
preventing a stud compression failure which would have much more adverse consequences for building strength and stability in a severe earthquake.

Because the tests were only monotonic, this design procedure is based on the tensile deformation demand under the ULS level earthquake not exceeding the elastic limit of the connection as described in section 2, which means the performance will be dependable under multiple cycles of loading to that limit. This check is specifically made in section 5.3.1.

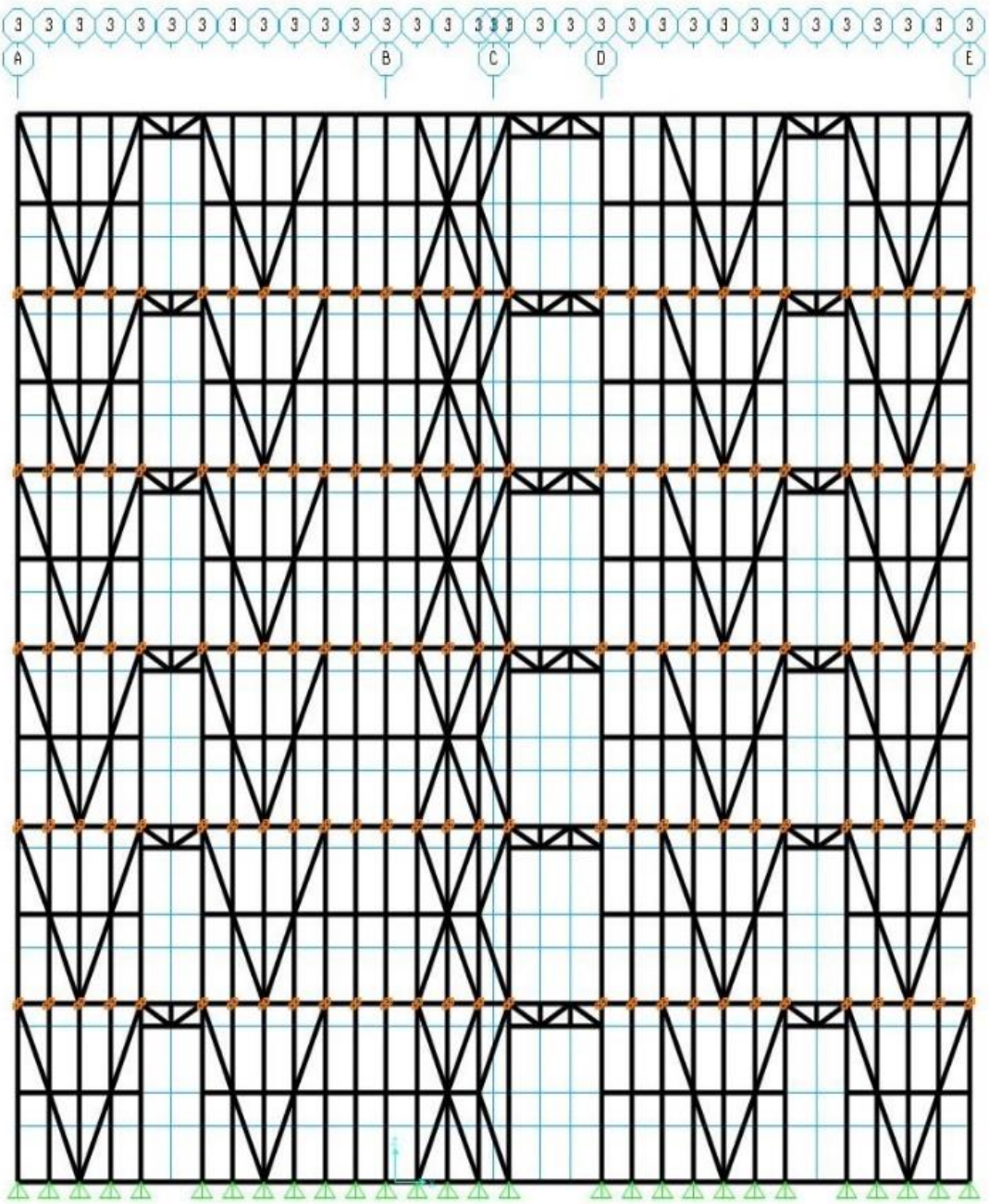
Under all seismic loading conditions, the floor to wall connection system (see Figure 5) is designed and detailed to fulfil its vertical load carrying and diaphragm function.



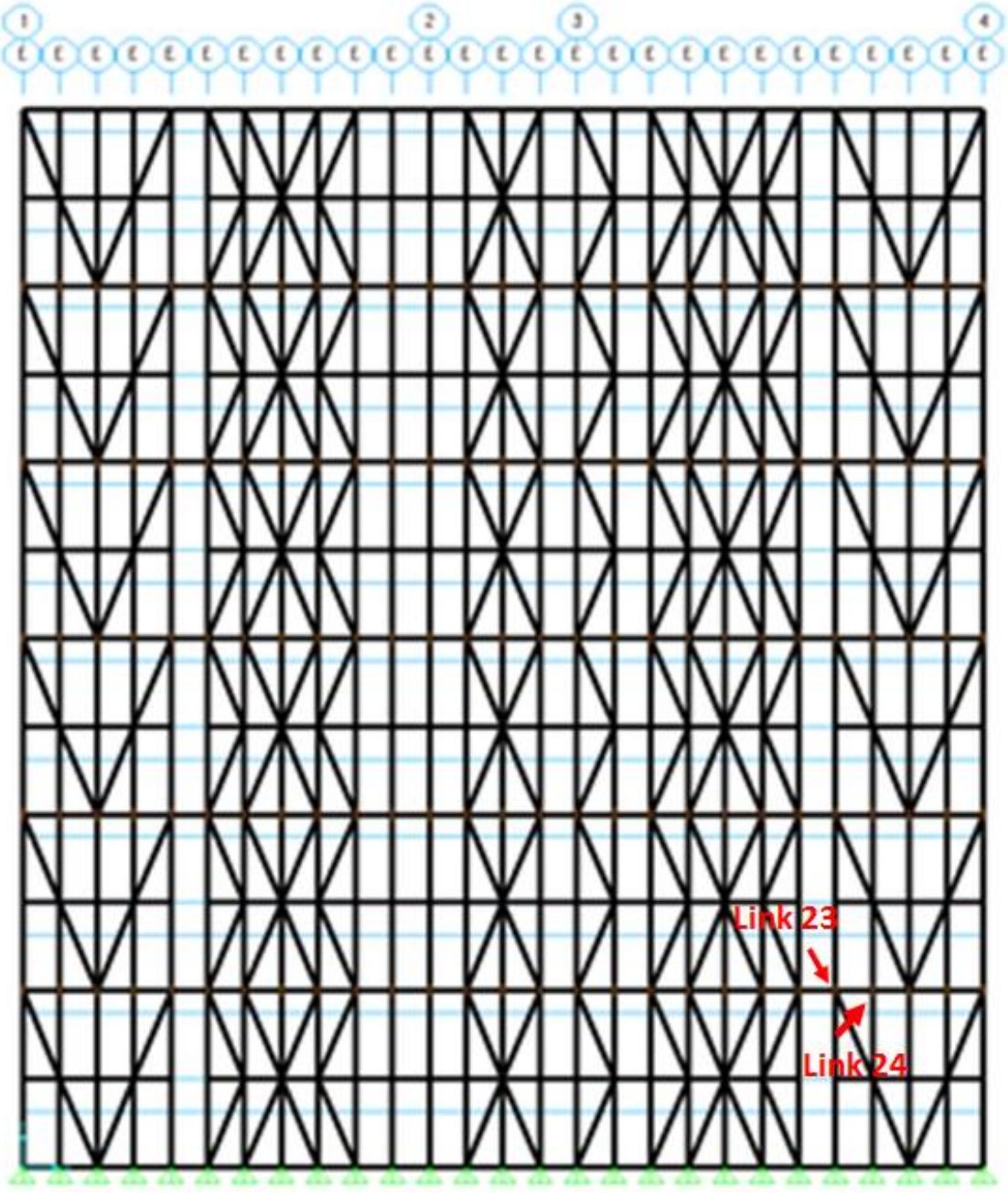

(a) Walls located on A1-E1 and A4-E4 gridlines



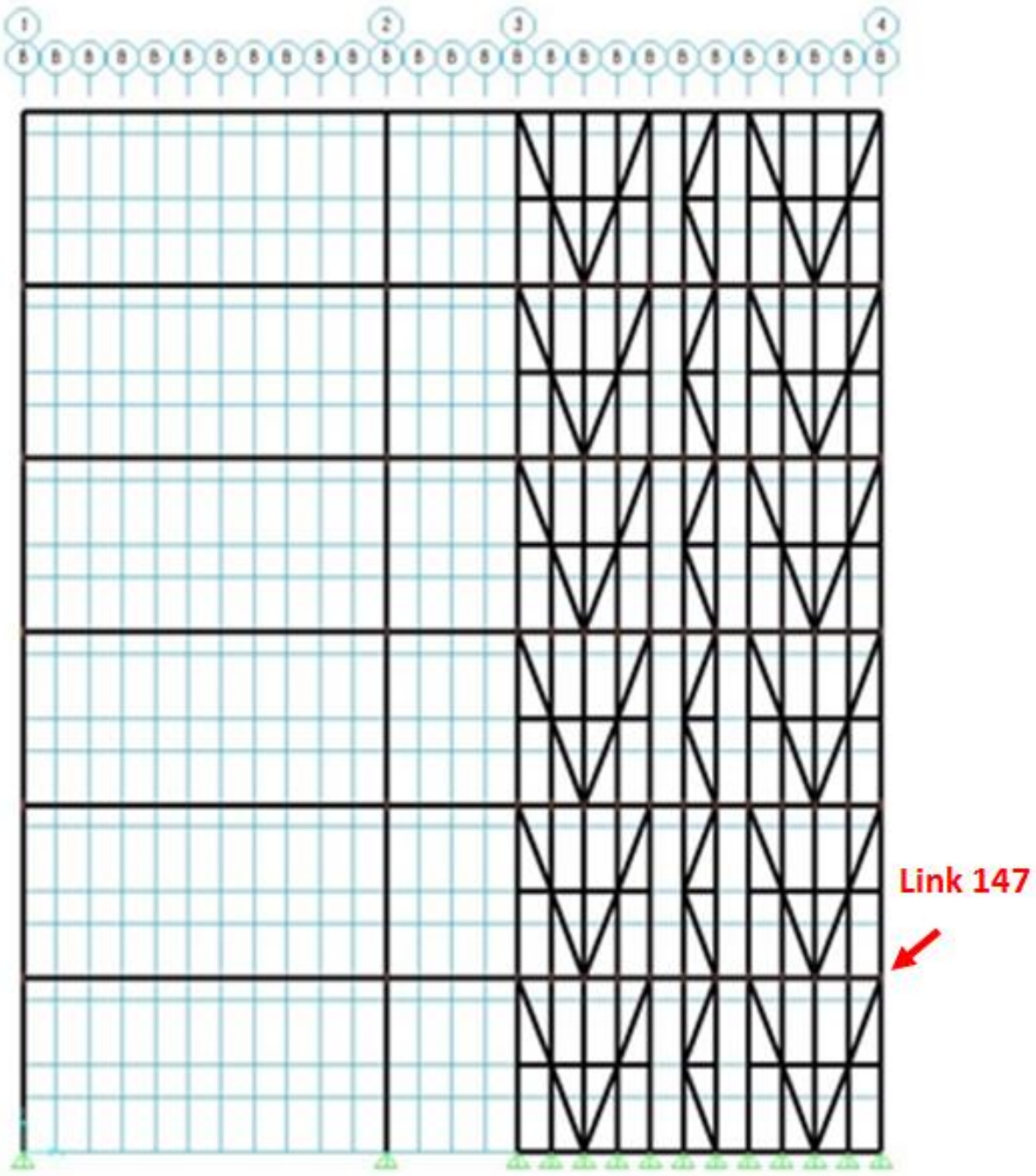

(b) Walls located on A2-E2 gridlines



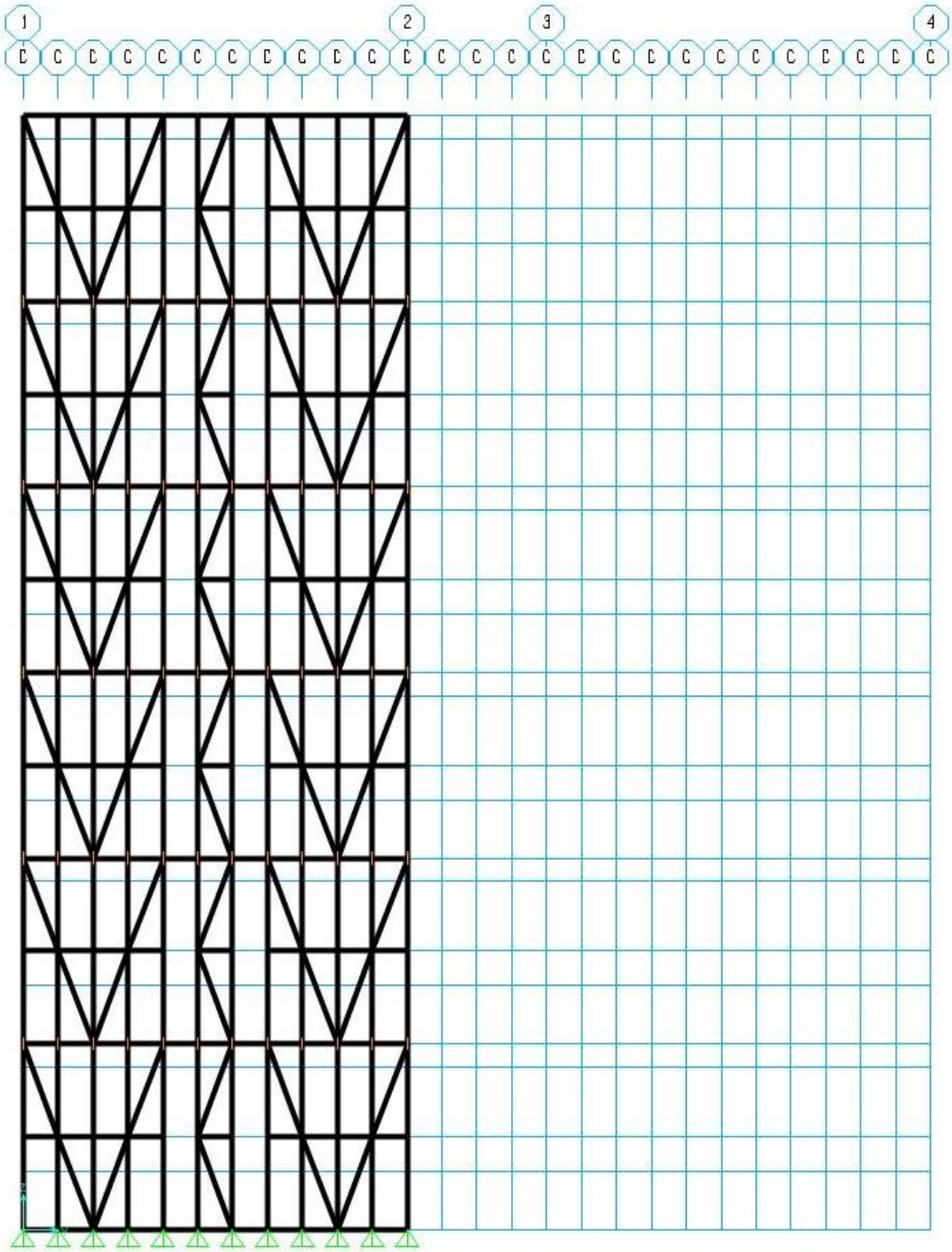

(C) Walls located on A3-E3 gridlines




(D) Walls located on A1-A4 and E1-E4 gridlines




(E) Walls located on B3-B4 and D3-D4 gridlines




(F) Walls located on C1-C2 gridlines

*Figure 8: Wall configurations in internal and external frames with lengths equal to 2.44 and 1.22 m*

## 4.4 Links

In order to simulate the real behaviour of the connections in SAP2000, especially the difference in strength and stiffness in tension compared with in compression, a small gap between studs of each story has been modelled and a two joint Multi-Linear Elastic Link was assigned. In this kind of link all internal deformations are independent. The deformation in one degree of freedom does not affect the behaviour of any other. A Link element is a two-joint connecting spring. Each element is assumed to be composed of six separate springs one for each of six deformational degrees-of freedom (axial, shear, torsion, and pure bending).

### *4.4.1 Link Properties*

Each Link Property specifies the force-deformation relationships for the six internal deformations. The Multi-Linear Elastic Link set contains linear properties that are used by the element for linear analyses. The Multi-Linear Elastic Link sets (Fig.9) also have nonlinear properties that will be used for all nonlinear pushover analyses, and for linear analyses that continue from nonlinear analyses. The compression and tension results obtained from experimental research (Fig 2 and Fig.3) have been used for the property definitions of the links determined as follows:

Link Properties are defined with respect to the local coordinate system of the Link element. The local 1 axis is the longitudinal direction of the element and corresponds to extensional and torsional deformations. The local 2 and 3 directions correspond to shear and bending deformations.

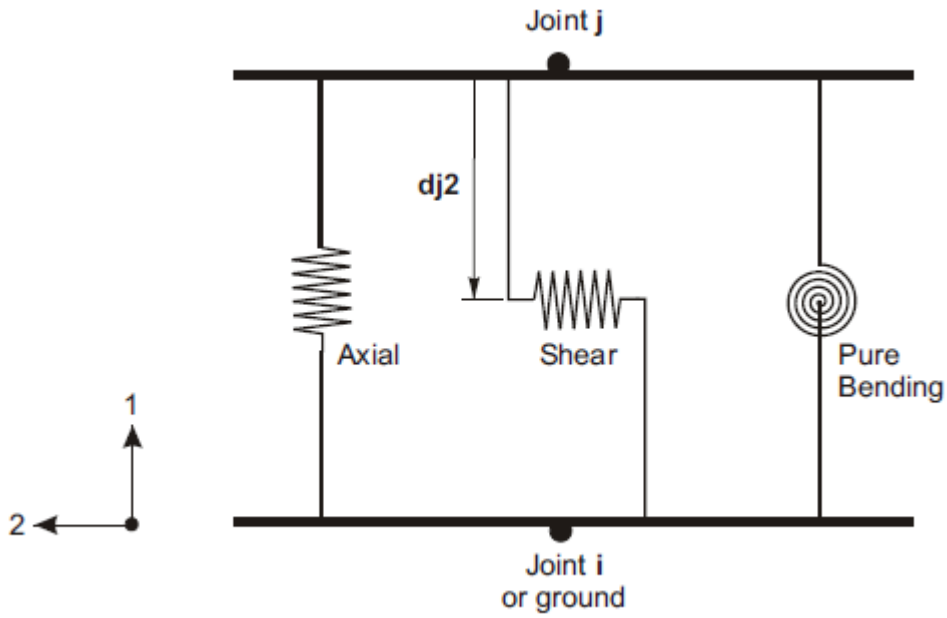



*Figure 9: The springs for three of the deformations: axial, shear in the 1-2 plane, and pure-bending in the 1-2 plane*

The experimental test data was deployed to the link properties in the SAP2000 (Fig.10) to represent the links axial behaviour in tension and compression. The graph in Fig.10 represents a single stud to stud connection stiffness and therefore, the stiffness needs to be multiplied by a factor of studs' number at interaction zones where more than a stud has been used. Based on this, the links compressive stiffness at floors with multiple studs were increased by twice and kept similar to graph in figure.10 where single studs exist. The links tensile performance was set to be similar to the graph in figure.10 at all floors.

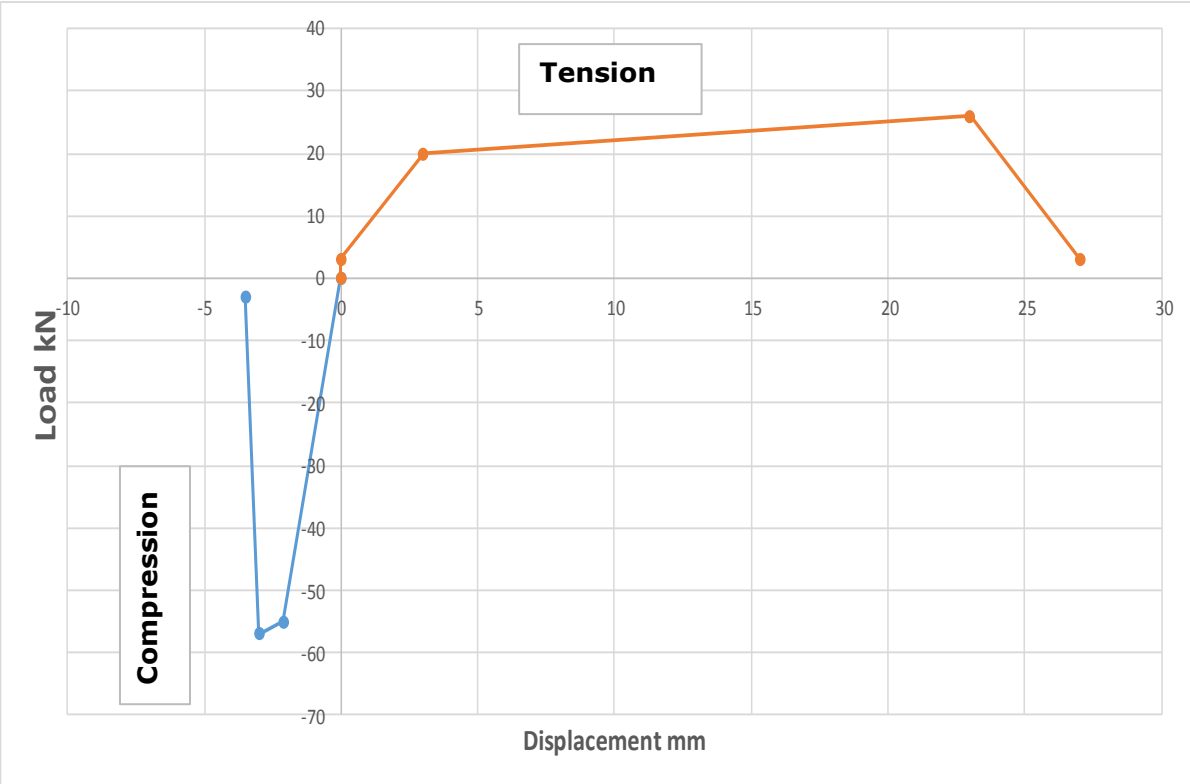



*Figure 10: Link properties for links to a single stud*

**4.5 Ductility**

The main factor influencing the shear walls behaviour is ductility. Ductility is the ability of bearing nonlinear displacements of the system so that when the system reaches its yielding capacity, it can still withstand forces until it reaches substantially nonlinear lateral displacement without the structure being collapsed. Therefore, the wall braces must be able to enter nonlinear behaviour region, scatter the energy resulted from seismic excitations, and continue to desired nonlinear ductility without any failure for the tracks, studs, and their connections. The system's ductility is calculated from equation.1 as:

$$\mu = \Delta m / \Delta y \qquad \text{(Equation.1)}$$

where; $\Delta y$ is the elastic yielding ductility calculated by measuring elastic stiffness ($Ke$) and lateral yielding wall resistance. $\Delta m$ is the rate of displacement failure continuing until there is no resistance.

In general, the failure mechanism in shear walls tested for lateral loads in literature did not propagate by yielding of the brace members [19]. Rather, failure of or extensive damage to the tracks, chord studs, gusset plates, hold-down threaded rods and straps (due to net section fracture) was often observed depending on the wall configuration being tested. None of these are good mechanisms for provision of reliable ductility, therefore the approach taken herein is to allow controlled rocking between the adjacent wall units in the vertical plane, with this rocking occurring before the other failure mechanisms occur. Currently, because of the very small amount of experimental testing that has been done, this is limited to low ductility demand structures ($\mu \leq 2$) in low seismic zones ($Z \leq 0.15$); it is planned that with more experimental testing of the rocking mechanism and determining the capability of the wall panel to sustain this rocking without panel shear failure, this can be extended to higher levels of ductility demand and hence to higher seismic zones.

Ductility plays a fundamental role in a structures robustness as a main factor of structural response to the lateral loads affected. The aim of this research is to design the multi-story CFS building with a ductility demand close to 2. Under seismic testing both the shear wall models and the full 3D model should experience minimal drift and returned to straight after excitation. For the 3D model, the story drift should stay under limitations and no damage should be observed at the wall members. It is important to build the models stronger than engineering design suggests and the designed building in this case will respond as a system, not as a set of uncoupled shear walls and finally the gravity system should contribute to the lateral response.

**Demands and Base Shear Calculations**

The applied imposed load at all floors was 2 KPa and the rest of the gravity actions including the structural weight, services and superimposed loads was set to be 1.25 Kpa. The stud major axis bending moment from eccentric transfer of floor joist shear into the wall studs was included in the loading process to the SAP2000 model. The structures shear forces at each level based on the equivalent static method were calculated and were applied to the center of gravity of the structure at each level in SAP2000 model. Table.3 is showing the base shear force calculation trend.

*Table 3: The equivalent static horizontal forces*

| | | | | | | | | | | Fi equivalent static horizontal force at each level (KN) | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | Height(m) | ∑H (m) | Slabs Gi (KN/M2) | Slabs Qi (KN/M2) | Slabs Gi (KN) | Slabs Qi (KN) | ΨaQi | Seismic weigth (KN) **Wi= Gi+ΨaΨeQi** | $W_i h_i$ | $F_t$= 0.08V | Fi= Ft+0.92V $\frac{Wi\,hi}{\sum Wi\,hi}$ |
| Level-1 | 3.2 | 3.2 | 1.250 | 2.000 | 373.7 | 597.9 | 299.0 | 685.6 | 2193.9 | 0 | 12.98 |
| Level-2 | 3.2 | 6.4 | 1.250 | 2.000 | 373.7 | 597.9 | 299.0 | 685.6 | 4387.9 | 0 | 25.96 |
| Level-3 | 3.2 | 9.6 | 1.250 | 2.000 | 373.7 | 597.9 | 299.0 | 685.6 | 6581.8 | 0 | 38.95 |
| Level-4 | 3.2 | 12.8 | 1.250 | 2.000 | 373.7 | 597.9 | 299.0 | 685.6 | 8775.8 | 0 | 51.93 |
| Level-5 | 3.2 | 16 | 1.250 | 2.000 | 373.7 | 597.9 | 299.0 | 685.6 | 10969.7 | 0 | 64.91 |
| Level-6 | 3.2 | 19.2 | 1.250 | 2 | 373.7 | 597.9 | 299.0 | 685.6 | 13163.7 | 23.706 | 101.60 |
| **∑** | 19.2 | | | | | | | 4113.6 | 46072.8 | | |

**Stud Capacity Check and Failure Modes**

For compression ,local buckling occurs in web. For bending about x-axis, the local buckling occurs on the compression portion of the channel section. For bending about y-axis (where web is in tension and lip in compression), the local buckling occurs in the flange-lip part. It is the compression capacity which is limited by local buckling of the web which needs to be increased. This is the key role of these studs in the multistorey building. The Combination of compression and out of wall plane bending (ie stud bending about the X axis) due to seismic actions will be less critical and in that case the flanges can be taken as restrained against lateral movement by the linings; given that they must be present to generate the seismic loading. So the key is to increase the local buckling stress of the web so as to increase the local buckling capacity of the studs. In practice the linings will eliminate the tendency for distortional buckling however for factored compression loading it is needed to consider the case where linings might be removed on the lower floors for maintenance or refurbishment but the compression load from the upper floors is still there. Therefore, because, linings will prevent distortional buckling of channel section and increase the stiffness of the load bearing walls, their influence was considered in studs' capacity calculation.

## 5. Results and Discussions

As discussed previously, the aim of this study was to design a multistorey-6 level light gauge steel structure based on New Zealand's code at Auckland region. The study continues from a previous project done for HERA with the title of "Performance of stud-to-bottom plate joints in multi-story

residential buildings" [17]. In the first project the stud to bottom track connections behaviour under compression and tension was assessed and the obtained results were used in this research to perform a nonlinear static analysis on a 6 story building prototype. The structure was designed for gravity and earthquake loads based on New Zealand codes and then check for ultimate load bearing capacity.

### 5.1 Ultimate limit state load

The ultimate limit state load is the load at which damage is expected. It is associated with the structure being displaced inelastically by the deformation demand given in section 4.5. It is expected that the damage is in controlled locations at this level of load and that the structure will resist increasing load with increasing deformation with the behaviour remaining dependable in the damaged regions. The load associated with this condition is given by Eq.2, from AS/NZS 1170 code [20] for the basic combinations for the ultimate limit states:

$$1.0G + \psi_E Q + E_u \qquad \text{(Equation .2)}$$

where

G = permanent action (self-weight or 'dead' action)
$E_u$ =ultimate limit state earthquake action in X and Y directions
Q = imposed action (due to occupancy and use, 'live' action)

In order to achieve an acceptably low risk of collapse during severe shaking above the ultimate limit state level, it is necessary to raise the design actions above those that might be expected if a uniform risk was applied across the whole of New Zealand. This has been achieved by setting a minimum level of design load that should be considered with the ULS for low seismic areas. Therefore the New Zealand standard NZS 1170.5 [15]states that "It is inherent within this Standard that, in order to ensure an acceptable risk of collapse, there should be a reasonable margin between the performance of material and structural form combinations at the ULS and at the collapse limit state. For most ductile materials and structure configurations it has been assumed that a margin of at least 1.5 to 1.8 will be available. The 1.5 value has been used in this study. This is intended to apply to both strength and displacement".

To fulfil the above mentioned requirements by NZS 1170.5, the target displacement obtained from Eq.2 is converted to the ULS inelastic displacement, as defined in section 4.1, step 8, item 4 and also to 1.8x that level, as defined in section 4.1, step 8, item 6. That followed the procedure described in section 4.1 by defining a new nonlinear static load case in SAP2000 as a *pushover* load case both in X and Y directions. The results of the pushover analyses are presented in Fig.11 and Fig.12 for the applied displacement in X and Y directions respectively. On these figures are also shown the two deflection limits described above.

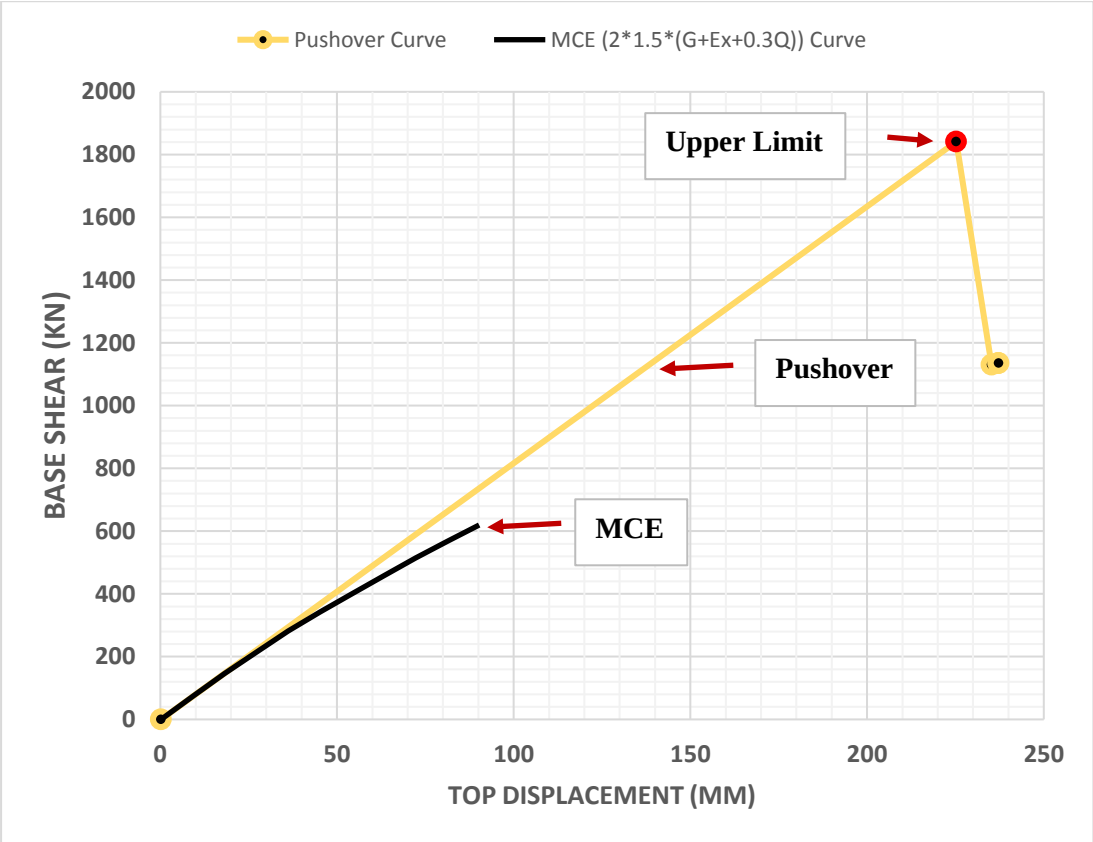



*Figure 11: Base shear vs top displacement of the building from pushover analysis for X direction*

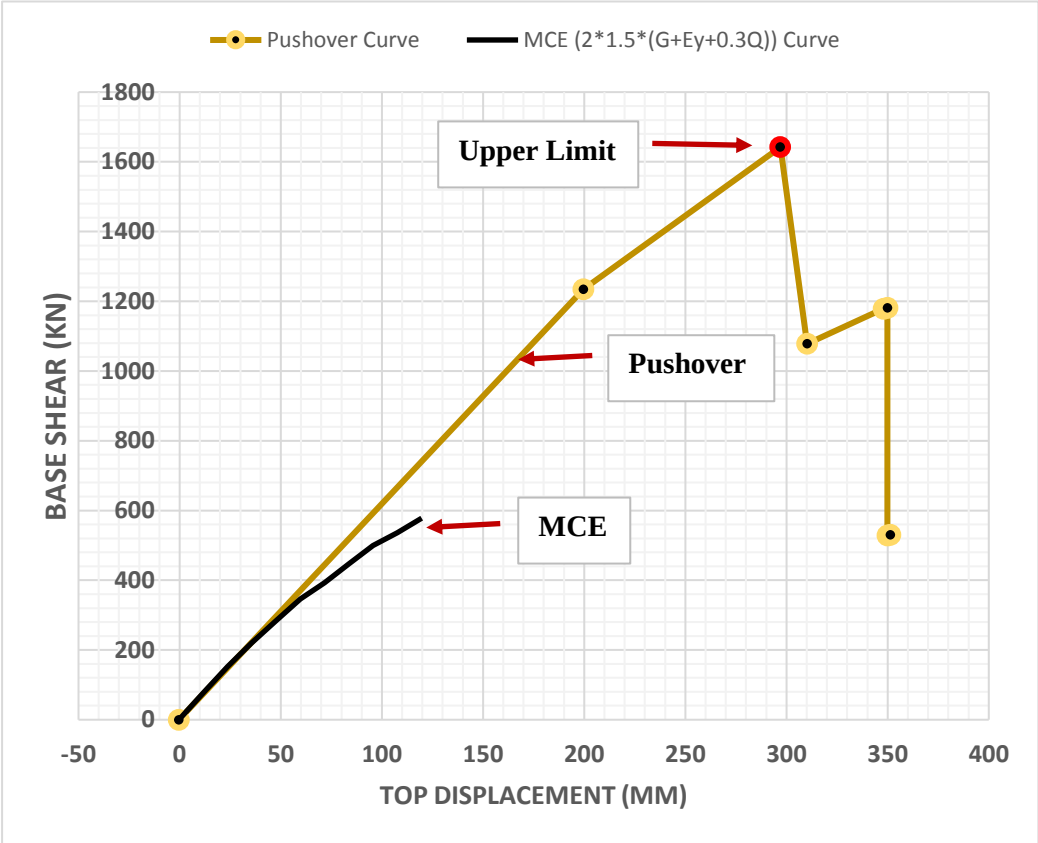



*Figure 12: Base shear vs top displacement of the building from pushover analysis for Y direction*

From Fig.11 and Fig.12 it is seen that the building is stiffer in the X direction, in spite of having more openings in the walls in this direction. The structure is designed with 4 complete overall frames in the X direction (2 external frames and 2 internal frames), whereas for the frames located in Y direction, the internal frames are running half way (Fig.7 and Fig.8-E and Fig.8-F). This is the reason why the structure exhibits greater stiffness in the X direction. However, from pushover graphs it could be concluded that despite higher stiffness in X direction the structure is little bit more ductile in Y direction. In X, the structure is stiff and faces a brittle failure at 225 mm displacement with base share of 1841 kN. But in Y direction, between 200 and 300 mm deflection zone a nonlinear behaviour could be observed with smaller upper limit force (1600 kN) where the structure faces failure. From the graphs it could be concluded that the structure nonlinear behaviour is limited and could only behave nonlinear in Y direction where less shear walls exist with less gravity force affecting.

Fig.13 shows the displaced shape at the centre of mass for each storey for the ULS and Collapse limit states for each direction. This shows that there is no concentration of inelastic demand into any one level for these loading conditions. The deflected profiles of the building at the center of gravity for three different levels of loading; under the elastic (design) base shear, at pushover to the calculated ULS deflection at level 6 and at pushover to the calculated MCE deflection at level 6. The results also show, incorrectly, the lateral deflection at levels 3 and 4 to be the same.. This is due to the diaphragms at each level being coupled in the model, which should not have happened. However, apart from this, the deflected profiles are realistic and are included here to show the overall behaviour, as this information is not given in [39] for the final SAP model.

These profiles show the following:

1. The behaviour is close to elastic at all levels of deformation.

2. There is minimal concentration of inelastic demand at any one level, even under the MCE level of loading.

It should be noted that the structure is more ductile for lateral loads acting in the Y direction. The pushover curve in Fig.12 shows linear behaviour until a base shear of 1200 kN with a top displacement of 200 mm. Then the force decreases significantly with only a small increase in displacement. This corresponds to link failures in tension causing the walls to lose their tension tie-down and hence to engage in rocking that is only restrained by the gravity loading, which is small in this direction. Contrastingly, in X direction the base shear stays linear to reach a peak of 1800 kN (Fig.11) before the structure losses strength and faces brittle failure; this is due to the higher gravity loading from the floor system in this direction.

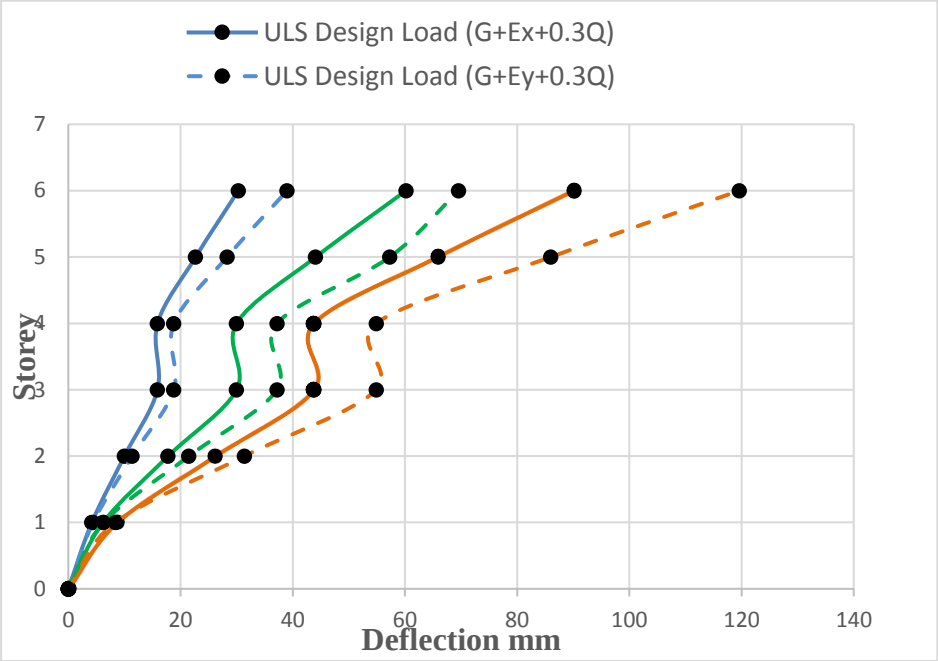



*Figure 13: Deflections at different levels measured at the centre of mass of the building (the centre of the floor) for ULS design (lateral) load, ULS inelastic displacement and the MCE inelastic displacement (Note that the discontinuity in vertical deflection between levels 3 and 4 is due to an incorrect coupling of the diaphragms at these two levels. This has been corrected in the peer review analyses reported in [39]).*

*Table 4: Roof displacement and base shear for ultimate limit state, collapse limit state and upper limit actions*

| | **X direction** | | **Y direction** | |
|---|---|---|---|---|
| | **Roof Displacement (mm)** | **Base Shear (kN)** | **Roof Displacement (mm)** | **Base Shear (kN)** |
| **Ultimate Limit State (ULS) G+E+0.3Q** | 30.3 | 297 | 38.9 | 297 |
| **Collapse Limit State 1.5× Δ×μ (μ=2)** | 90.2 | 621 | 119.6 | 578 |
| **Upper Limit (Before Failure)** | 237.2 | 1840 | 439.5 | 1639 |

### 5.2 Maximum Load

This is defined as the maximum load measured during the analyses before failure happens. Table.4 shows that the damage load (upper limit action) is 1840 kN for X and 1639 kN for Y directions respectively. It is evident that the maximum load that the structure could sustain is much bigger than the calculated damage load (collapse limit state).

The structure's top displacement and base shear for ultimate limit state action and its increase to collapse limit state were monitored and summarized in Table.2. The building is more ductile in the Y direction, but the base shear in X direction is higher than in the Y direction for upper limit action. Both frames behaviour remains liner up to the collapse limit state action, which means that the structure is capable of complying with NZS 1170.5 earthquake design actions resistance, showing near liner behaviour well beyond the 1.8xULS level of deformation. (Recall that the ULS load has been derived using ductility factor equal to $\mu = 2$), the maximum axial load on each stud while designing the studs was 50 kN. The pushover analyses results showed that the axial loads on the majority of the studs do not enhance beyond 50 kN and as a consequence studs will not face local buckling after running the pushover analyses for maximum considered event actions. That is acceptable as limited stud buckling in that condition is acceptable.

Note that the generic design procedure in section 4.1 calls for concurrent application of seismic loading from step 12. However, the results of step 11 show such a high reserve of strength and deformation capacity that this step is unnecessary and so has not been undertaken. Also as wind loading generates higher tension uplifting forces than the earthquake loading determined using $\mu_{design} = 2$, in practice the ductility demand at the ULS and the MCE will be even less than that given herein.

### 5.3 Racking load capacity of shear walls

In this work package similar design procedures to Schafer et al [21] have been used with the difference of using New Zealand earthquake and design codes instead of American ones. The report by Schafer et al was prepared as part of the U.S. National Science Foundation sponsored CFS-NEES project enabling Performance-Based Seismic Design of Multi-Story Cold- Formed Steel Structures. The purpose of that project was to study the behaviour, particularly seismic behaviour, of light-

framed structures using cold-formed steel cee-sections as the primary gravity load carrying elements with wood structural panel diaphragms and shear walls as the primary lateral load resisting system. The report by Schafer et al. discusses the design of the gravity and lateral systems for the CFS-NEES building but the structure's lateral performance especially the shear walls ductile behaviour and damage capacity have not been assessed. By contrast in this study after designing the 6 story cold-formed steel building, the structure's ductility and shear walls racking was investigated using multiple nonlinear pushover analysis procedures.

A cold-formed steel frame consists of many individual members. When the frame is subjected to a racking load and one of the members fails, the frame is deemed to have failed. The corresponding load is defined here as the racking load capacity of the frame. If all joints in a frame are pinned, its individual member can only carry tension or compression. Conversely, if some or all of the joints in a frame are rigid (or semi-rigid), moments develop at the joints, and its members carry combined bending and compression, or combined bending and tension. To avoid the local capacity being exceeded at discrete points at maximum loading, the member should satisfy with equations 3 and 4 which are borrowed from AS/NZS 4600[13].

$$\frac{N^*}{\emptyset_c\, N_c} + \frac{C_{mx} M_x^*}{\alpha_{nx} \emptyset_b\, M_{bx}} + \frac{C_{my} M_y^*}{\alpha_{ny} \emptyset_b\, M_{by}} \leq 1 \qquad \text{(Equation.3)}$$

$$\frac{N^*}{\emptyset_c\, N_s} + \frac{C_{mx} M_x^*}{\emptyset_b\, M_{bx}} + \frac{C_{my} M_y^*}{\emptyset_b\, M_{by}} \leq 1 \qquad \text{(Equation.4)}$$

The achieved results from equations 3 and 4 for damage load indicates that the studs have a coefficient less than 1 which means the studs will not undergo a compression or compression/flexural buckling failure at the level of design loads expected. The final calculation results is presented in chapter .A.

After that the structure was analysed for the demand actions described in section 5.1, an overall check on maximum actions in V and K panels comprising braces and connections was carried out. The entire building's braces were erected with single C sections (section 3.4). Based on the direct strength method depicted in AS/NZS 4600 [13], the compressive members had to be investigated

for flexural-torsional or lateral-torsional buckling, local buckling and for distortional buckling. In order to facilitate the design check out process for all structural members including the braces based on the ULS load combination, the CUFSM software developed by Ben Schafer [22]was used.

However, the connection design work undertaken at the University of Auckland has been supersceded by that from ExtraMile consulting, details of which are presented in [39].

The arrangement of the connections were done by screwing the LSF stud to the bottom plate (Fig.1). The test setup presented in section 2 had one screw at each side of stud to bottom plate connection. These connections had to satisfy the design formulations of clause 5.4 of AS/NZS 4600 for self-tapping screw connections in tension and shear. It had to be indicated that using a single screw at each side of connection was satisfactory, however to enhance the rocking strength of the shear walls, two rows of screws are recommended in walls located in the first and second floors.

See the final details of stud sizes and connections in [39].

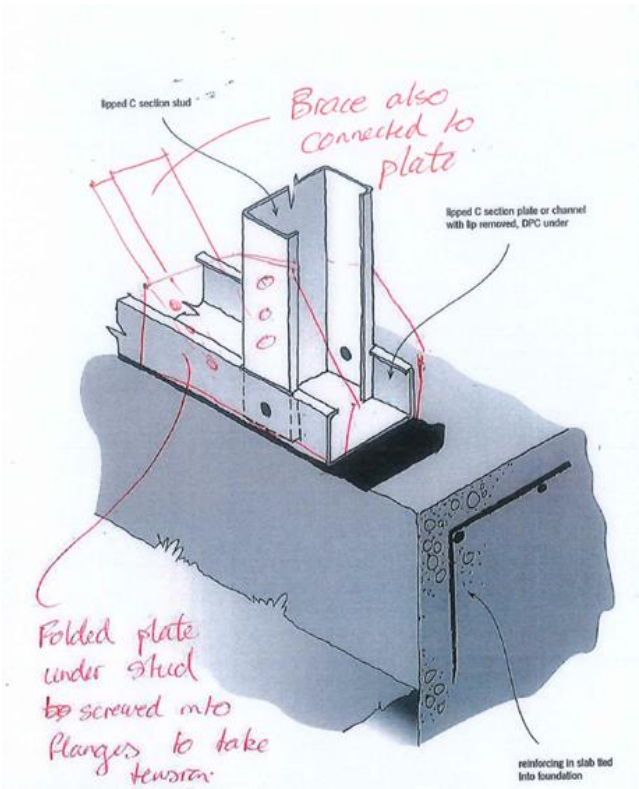



*Figure 14: Brace and Stud to beam connection detail*

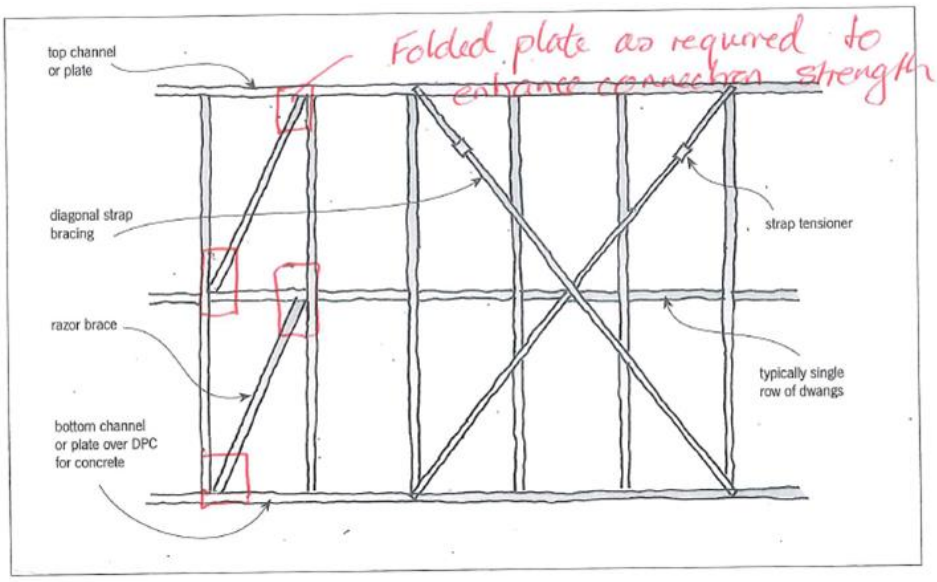



*Figure 15: Wall Frame bracing*

## 6. Conclusions

In this study, a full scale six story building composed of cold-formed steel studs and joists has been designed in accordance with the earthquake loading code NZS 1170.5 and New Zealand cold-formed Steel Structures Standard AS/NZS 4600. The calculated earthquake loads were applied to the shear walls based on a ductility ratio equal to 2 and a Performance Factor Sp = 0.7 and a Return Period Factor Ru = 1. The return period factor was chosen to be 1/500 to consider for a moderate earthquake at the Auckland region.

The design has been undertaken modelling the structural system as accurately as practicable in three dimensions, modelling the floors as rigid diaphragms distributing loading into the frames in both directions. The vertically stacked bracing wall panels are connected by links between adjacent panels with the strength and stiffness of these links determined based on experimental testing.

The structure's overall lateral stability is highly dependent to the bottom tracks in the region of anchor bolts which are defined as links in the SPA2000. The frames nonlinear behaviour is relevant to these connections and the failure of the wall panels can also be attributed to the failure of the connections.

The uplift of the shear wall leads some stud connections of the wall to be under tension and some others under compression. From Table B1, it can be seen that the uplift of all ties at the ULS design level displacement is within the elastic limit from the experimental testing, showing that failure under cyclic loading is not expected. Increasing the displacement to the MCE level gives the same outcome,

This means that the building will achieve its strength and stability earthquake performance requirements with the design and detailing requirements as tested herein. The tensile uplift demand on any connections is within the as tested elastic limit of these connections, meaning their performance under cyclic loading will be satisfactory, even though the test regime was monotonic only.

The SAP2000 model modelled the characteristic curves and the deformation pattern of the entire structure, and it can be used in order to design low to mid-rise cold-formed buildings in regions located at potentially moderate earthquake zones (Auckland). An attempt was made to establish performance criteria on the level of the walls, based on the nonlinear behaviour characteristics of the link connections. An important conclusion of the pushover analysis on steel-to-steel connections is that, for the applied earthquake loadings to the 6 story building, the connections gained load bearing capacity without losing ductility, and the building could still take more lateral loads. Therefore, it is concluded that the 6 story typical cold-formed building designed in the work package 3 is viable against resisting earthquake shocks for a zone like Auckland. Cold-formed steel buildings in Auckland of 8 to 10 storeys may therefore be feasible and the design extended to higher seismic zones supported by further experimental testing to determine the viability of the stacked bracing panel shear wall rocking wall model.

Also once the cyclic behaviour of these links is established and the racking shear capacity of the braced panels including linings is established this concept can be extended to higher seismic zones where the ductility demand is greater and likely to take some of the links in tension beyond their elastic limit. This should be a high priority for ongoing research, especially as the peer review of this building showed that it is in fact wind governed [39] in terms of the strength required in the stacked brace panel lateral load resisting system, meaning that the application to higher seismic

resisting system locations will be easier to undertake with the connection details and systems developed and presented herein and in [39] than was originally envisaged.

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# 8. APPENDICES:

Note there were originally three appendices presented with this report, these being:

Appendix A: Calculation of Stud Capacity.

Appendix B: Element Deformations – Links.

Appendix C: Schedule of Quantities

However, the peer reivew by Milewski et al has resulted in changes to these detials and the updated information is presented in the structural report in [39]. The above appendices have therefore been removed from the final report.

# WP4-R1

# Cost Structure of Exemplar Multi-Storey Light Steel Framed Residential Building

**Massey University, 2018**

**Dr. Temitope Egbelakin**

**Ms Nisha Narayan**

## Summary

The purpose of this report is to evaluate the costs of an exemplar six storey residential/mixed retail building, based hypothetically in Auckland, New Zealand. The exemplar building has been redesigned to suit specific seismic and gravity requirements for New Zealand conditions, and on the assumption of ground conditions with a Soil Class C soil, described as “low permeability” soils within the Auckland region. The building is designed as a light-weight brace-framed structure, with light steel cold-rolled steel sections, and a reinforced concrete raft foundation.

The measurement and costing of the building has been itemised as per NZS4202:1995, the standard method of measurement used for construction projects in New Zealand. Rates have either been built up from first principles to include for materials, labour and transport costs, or obtained directly from subcontractors or main contractors obtain from recent competitive tendering prices, inclusive of all of these. Where there is insufficient detail, QV Costbuilder, a database commonly used by cost consultants has been used to generate typical rates for Auckland.

The estimated building costs is NZD $3,801,296.39, including all reasonable contingencies, margin, overheads, but excluding services. All the building components have been specified to ensure a very light building, that will create significant savings in transportation and site construction costs (i.e. lighter members to transport and erect), as well as a potential shortened construction programme. Although the actual construction programme has not been included as part of this project, there may be a possibility for further savings in cost once an actual construction programme has been generated.

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# 1.0 Introduction

The purpose of this report is to provide analytical cost information for an exemplar multi-storey light steel framed residential building to be situated in Auckland Central, New Zealand. This report forms part of the final work package for the BRANZ-NASH funded research project *Specific design for multi-storey light-steel framed buildings* in conjunction with HERA, Auckland Council and the University of Auckland.

The exemplar building is a hypothetical building modelled off a similar building in the UK [1] but redesigned in this project to satisfy the minimum dwelling sizes given in the Auckland Unitary Plan [2], and in accordance with the New Zealand Building Code and Regulations for construction standards [3], gravity loading requirements as per AS/NZS 1170.1: 2002 [4], AS/NZS 1170.2: 2011 [5], and earthquake requirements [6]. The structural elements have been designed by a consulting Engineer, and quantities are estimated through a schedule of quantities in accordance with NZS4202:1995 [7], most commonly used in the New Zealand construction industry for building works. Costs are then derived from current market rates in Auckland for each trade or discipline in the New Zealand construction industry, such as structural steel, concrete, carpentry, excavation and others. Architectural elements have been assumed and estimated as noted in the schedule. Services such as air-conditioning, lifts/stairways, fire protection and acoustic etc. are not included in this scope of works and therefore have been excluded from this costing exercise. All other exclusions and clarifications have been stated in the report and Bill of Quantities provided in the Appendix. Although the cost of services has been excluded in this report, it is important to note that it is a critical factor that will also contribute to the relative cost of the structural systems, and over building cost, due to the designed level of services integrated in the core positions and horizontal service layouts.

While NZS4202:1995 [7] lays out a schedule on a trades basis, this report also includes a cover sheet that provides information on a broader basis, i.e. provide costs per element of construction items, as well as costs per square metre.

# 2.0 Methodology

This exemplar building has been structurally developed and designed by a team of engineers from the University of Auckland and ExtraMile Consulting Engineers [8], and preliminary drawings have been produced [9], which the cost estimates shall be based on. They are not full construction drawings and therefore rates will be as typically expected in the New Zealand industry where there is insufficient information and details. The structural and architectural

elements have been identified to a detailed design extent, as the building has not been fully architecturally designed.

The building cost data and rates were obtained from a range of sources such as manufacturers, main and sub-contractors, trade-specific companies and suppliers, based on actual prices from previous projects sourced via competitive tendering. Where possible, more than one price has been used to compare and maintain accuracy, or otherwise have been checked against QV Costbuilder [10]; a common estimating tool used in preliminary, pre-contract stages of construction projects in New Zealand. The use of the QV Costbuilder for cost comparison is important to ensure that rates are not unfairly inflated, and are in line with the current New Zealand market conditions.

The measurement of this building has been conducted according to the New Zealand Standard Method of measurement NZS4202: 1995 [7], splitting the cost up over the various trades as required. Using a standard method of measurement ensures accuracy and consistency with how similar buildings across New Zealand have been priced, which allows for a more realistic comparisons if required. It also allows for easier implementation should this exemplar building ever be physically built.

The structural steel members take-offs were provided by the University of Auckland [8] in cooperation with ExtraMile [9] and included the section type, size, location, length of each member and the number of each. The quantities of the non-structural architectural elements such as cladding, joinery, ceilings and floor area and other items not included in the take-off were determined and measured using Bluebeam Revu computer software [11]. The computer aided software can provide accurate measurement and easy conversion to PDF formats, so that mark-ups can be made easily accessible. The use of this software is prevalently used by quantity surveyors practising in the New Zealand construction industry. As previously noted, services have been excluded from the building design as no details have been provided, but it should be noted that the implementation of services add significant costs to a building, as well as provide opportunities for cost savings, if optimally designed for service integration in the structural system of the building.

## 3.0 Overview of Exemplar Building

The building is a 6 storey residential/mixed retail structure, with 24 apartment units (see Figure 1). The building height is 18m. Floor levels 1- 6are identical and comprise of four apartments each (2 no. one-bedroom apartments and 2 no. two-bedroom apartments). The layout of a typical floor is shown in Figure 2. The floor plan is rectangular in plan, and is 16m wide and

19m long, and accessible via a single braced core. The external cladding is profiled metal cladding, and each level is 3m high for this building.

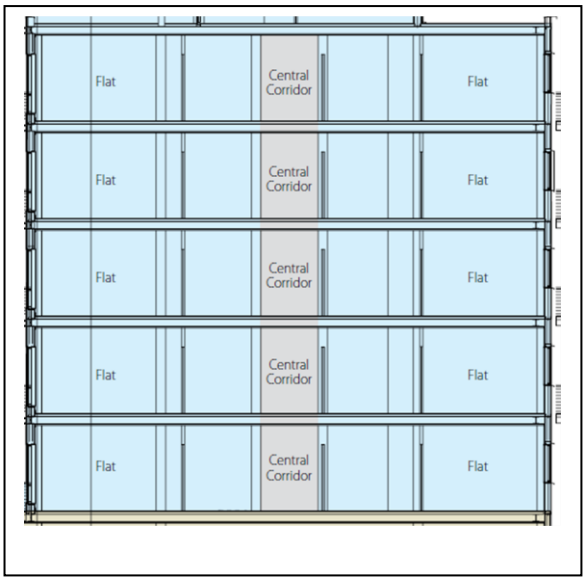


Figure 2: Building Vertical Cross-

Figure 2: Typical Floor Plan

### 3.1 Architectural Details

The building has a total of 437 sqm floor area and provides residential accommodation for six storeys. Each floor has four separate apartments, two identical two bedroom apartment modules, and two identical one bedroom apartment modules. There is also an independent stairwell, lift and corridor on all floors. The building structural elements, interior partitions, cavity walls, exterior cladding and roof systems are designed with light weight elements. All apartments' compartment or separating walls, interior partitions are finished with GIB Fyreline plasterboard linings in all areas, achieving a fire rating of 60/60/60 [9]. A hollow core door, and sliding doors with lightweight aluminium door frames have been assumed in the building. Each apartment is a firecell and will adopt a fire rated plaster lined wall system. Exterior cladding material is lightweight profiled metal cladding, used commonly in New Zealand residential and low-rise commercial buildings and specified in the structural design report by ExtraMile Consulting Engineers [9]. Roof cladding is also profiled metal cladding, fixed to plywood sarking. All walls and ceilings are insulated using R2.2 polyester batts in the walls, and R2.9 polyester batts in the ceiling and roof spaces.

### 3.2 Main Structure and Foundation

The building is designed as a light steel framed modular construction residential/retail structure. The building structural components are designed using cold-rolled steel lipped sections, shear walls and floor joists. The structural system is designed in accordance with AS/NZS 4600: 2005 [12] to resist both earthquake, wind and gravity loading. The typical plan and elevations for the structural system for each level is shown in Figures 3 and 4.

A raft foundation system has been incorporated into the design of this building. It is made up of 400mm thick reinforced concrete with even thickness throughout; with standard 35MPa concrete, reinforced with HD16 bars at the top and bottom of the slab. No underfloor insulation has been allowed for. This type of foundation was considered adequate by the Structural Engineer from ExtraMile Consulting Structural Engineers [9]. This exemplar building will hypothetically be built on the most commonly found soil in Auckland and the Waitemata region, which is Soil Class C. According to Auckland Regional Council, Soil Class C is used to describe “low permeability” soils [13].

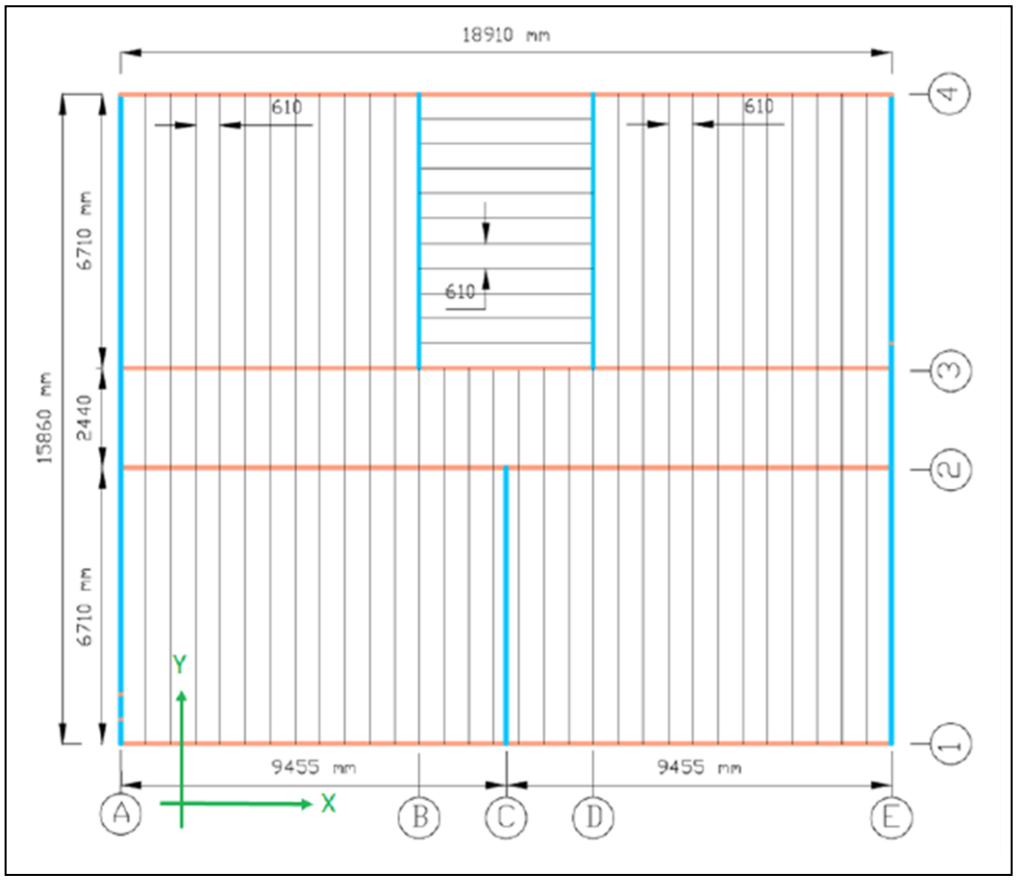


Figure 3: Structural Framing Layout plan

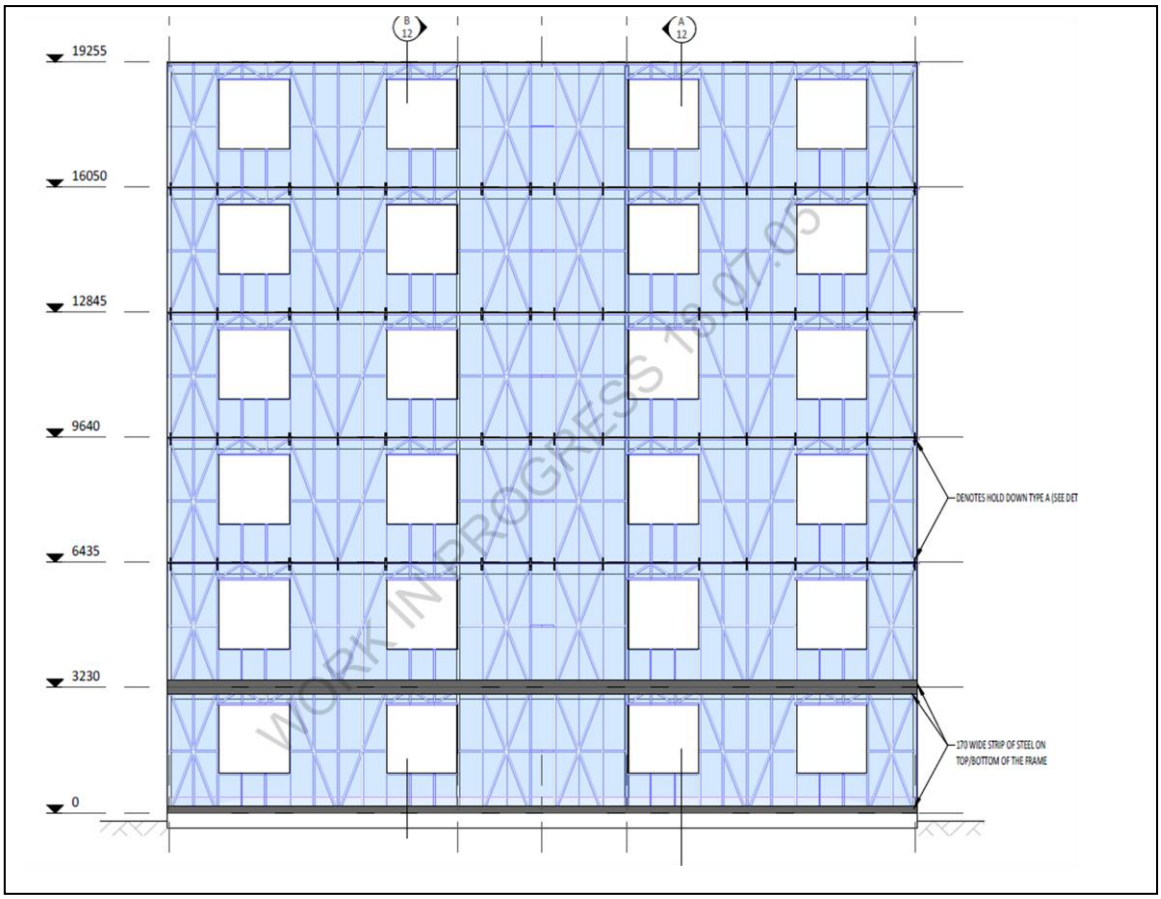


Figure 4: Structural Framing Elevation

### 3.3 Key Design Data

Key design data taken from the Engineering Report [8] and Structural drawings [9] are summarised in Table 1, to provide an overview of fundamental building components.

Table 1: Key Design Data

| | Item | Comment | Notes |
|---|---|---|---|
| 1 | No. of storeys | 6 identical floors | |
| 2 | Floors | 350mm | 6 levels, includes cold rolled C sections covered with particleboard floor covering, and GIB Fyreline plasterboard linings. |
| 3 | Floor to ceiling height | 3200mm | |
| 4 | Building height | 18m | |
| 5 | Fire resistance | 60/60/60 | |
| 6 | Imposed floor loading | 2 kPa | |
| 7 | Superimposed floor loading | 1.25 kPa | |
| 8 | Wall cladding - Metal Profiled | 1141m$^2$ | LT7 Vertical - 90% of façade area |
| | Exterior windows and doors | 118.74m2 | 10% of façade area |

## 4.0 Construction Programming

The programme for building design and construction describe the sequence in which tasks must be carried out so that a project (or part of a project) can be completed as scheduled. The construction programme in this project will confirm the hire periods during site establishment. For example, site offices and ablutions, crane hire, excavators and other minor plant, Management, onsite and offsite overheads must also be considered. All preliminary items will need to be established and included in the final construction cost.

The estimated duration for constructing this building that shall be used to determine all hire periods, supervision and other site establishment and construction costs will be 20 months. It is important to note that no formal construction programme has been designed for this exemplar building at the time of writing this report. This duration time schedule of 20 months was determined through discussions with project managers who have been involved in previous projects in New Zealand with a comprehensive knowledge of resource requirements based on this scope of works. Generally a standard building of this size using construction methodologies more commonly used in New Zealand would have a construction duration of about 24-28 months, however using prefabricated light steel framing, with the manufacture and detailing occurring offsite, maximising productivity and safety [14], this project time schedule is hypothetically reduced to 18-20 months. The higher end of this range has been used for costing purposes to take on a more conservative approach. New Zealand does not yet have similar buildings discussed in this report, hence the specified duration is purely an estimation based on advice from specialists in the project management field.

The construction programme can often have a very high impact on construction costs as they affect plant hire rates, establishment and management costs. Previous studies suggest that using modular construction, pre-fabricated steel framing and the building components described in Section 3, the construction costs such as transportation and installation costs could be reduced by 3-5% [14]. Moreover, using a lightweight system will have the benefit of faster erection times, require less labour, and will reduce the overall construction programme, as well as reducing labour and costs associated with co-ordination and transport [1].

Further cost savings could also be achieved from a reduced floor to ceiling height of the building. The current design showed a standard floor to ceiling height of 3.2m. New Zealand residential apartment floor to ceiling heights are typically 2.4m or 2.7m.The Steel Construction Institute Report in 2012 [14], showed that reducing the floor depth by 300mm could save up to $50NZD per square metre, which in today's value would equate to more. As per the report produced by Extra Mile [9], rather than using C-sections, if lattice floor joists were designed instead, this could result in improved service integration should services be designed or

specified for the building. A reduction in the floor height per storey compared with standard apartment building and construction methods could be possible in this exemplar building as the suspended ceiling space has more room to lay out services within the lattice. Services have not been included in this costing exercise however a building could be designed to maximise the use of this integration should services ever be introduced. This adaptation could then result in either additional floor level heights, reduced building height or a more efficient use of space, which could have the affect reduced cladding, wall lining, finishing costs, and reduced programme time and labour in order to perform these works.

Further assessment and investigation into the building design, construction methodology and programme and efficient service integration may affect the overall construction duration and building cost.

## 5.0 Schedule of key components

The building cost schedule has been broken down into smaller components, and are described below in Table 2. A comprehensive breakdown according to New Zealand industry standard and practice is attached in the Schedule of Quantities provided in the Appendix.

Table 2: Schedule of Key Components

| **Building Key Components and Descriptions** | |
|---|---|
| **1** | **Superstructure** |
| | Cold rolled lipped steel beams and columns assembled in configuration as designed in report [8]. |
| **2** | **Foundation construction** |
| | Reinforced concrete raft foundations 35Mpa concrete poured insitu 400mm thick reinforced with HD16 bars. |
| **3** | **Residential floors** |
| | C section floor joist system with 20mm particle board floor coverings throughout. Insulation laid underfloor on each level within the ceiling space. |
| **4** | **Walls** |
| | *Internal Walls* |
| | Standard areas lined with two layers of 13mm GIB Fyreline plasterboard, primed and painted with 2 coats acrylic paint. All walls insulated with polyester R2.2 insulation. |
| | *External Walls* |
| | Interior lined with GIB Fyreline plasterboard, exterior cladding is lightweight metal profiled cladding fixed to building paper over cavity battens. All walls insulated with R2.2 insulation. |
| | *Partitions* |

| Building Key Components and Descriptions | |
|---|---|
| | Non-structural interior partitions are standard H1.2 90x45 timber framing with studs at 400 crs and noggings at 800 crs, lined both sides with 2 layers 13mm GIB Fyreline plasterboard. All walls insulated with R2.2 polyester insulation. |
| **5** | **Ceilings** |
| | Standard areas lined with one 13mm GIB Fyreline plasterboard, 1 layer 16mm GIB Fyreline plasterboard, primed and painted with 2 coats acrylic paint. Wet areas in kitchens and bathrooms lined with one layer 13mm GIB Aqualine plasterboard ceiling linings, primed and painting with 2 coats acrylic paint. |
| **6** | **Stairs and lifts** |
| | Excluded from study as insufficient details to price. |
| **7** | **Roofing** |
| | Cold rolled steel roof trusses with profiled metal roof cladding, fixed to plywood sarking. R2.9 polyester insulation in roof space. |

## 6.0 Measured Quantities and Construction Costs

The building components and costs has been broken down into smaller elements in order to assess the costs in more detail. The costs included are preliminary and general costs including project management and site construction costs, substructure costs including excavation and foundations, the main structural steel frame, external and interior finishes as well as the roof structure and cladding. It must be noted that all services have been excluded in this costing exercise, including electrical, HVAC, fire alarm services, plumbing, and drainage services. These services have not yet been designed for the building, however being a multi-storey building there will be codes of compliance regarding this, so must be noted that there will be a significant increase in cost with the integration of these into the building. Aspects of the building or site which have insufficient details have also been excluded, such as landscaping costs, and the lift and stair risers which have not yet been designed. A full breakdown of all the exclusions is included in the Bill of Quantities. The estimated cost of the building is be $3,801,296.39 and is comprehensively broken down in the attached Schedule of Quantities. Rates generally include for material costs –obtained from industry suppliers, and labour costs added on top of this, which are obtained from QV Costbuilder [10] for standard durations of construction.

### 6.1 Preliminaries, Margin and Contingencies

Before any construction can get underway, there are costs associated with the management of on-site facilities such as the preparation, installation and construction of the various elements of the building, and the ongoing operational and management costs. These costs

are also known as the preliminaries incurred by the main contractor. This section (see Table 3 below) covers all the costs associated with the design and installation of temporary services, and facilities as required by the site workers such as site offices, toilets, break room, water, power etc. It also include costs such as crane hire and exterior and interior scaffolding as needed for access to get in and around the building during the construction process.

All onsite and offsite overheads are a standard cost component of any New Zealand construction project. A contractor's margin of 10% is generally in line with many New Zealand construction contracts, and upon discussions with commercial managers and quantity surveyors from a range of main contractors, and has been used when calculating in these costs. Supervision costs from the project manager, foreman, quantity surveyor and any other administrative costs must be accounted for, and are included in Table 3 below. The costs allow for a full time project manager and foreman, and a part-time quantity surveyor to manage costs throughout the duration of the project. The salaries applied to derive the costs for the management portion of this project are New Zealand average salaries observed by government obtained statistics [15], resulting in a full time project manager at $120,000 per year, full time foreman at $100,000 per year and a part time QS at $60,000 per year.

In addition, costs under this section also allow for any insurances which must be in place throughout the duration of the construction project. Resource consents, council fees and the like have been excluded from these costs as often these costs may vary from project to project and cannot be easily ascertained with preliminary drawings without an exact site address. Hence, they have been excluded from the preliminary costs.

Transportation costs for the structural steel members has been included in this section. Transport costs have been calculated for all structural steel, as Steelhaus had only priced for the manufacture, supply and detailing, but not for the delivery to site. The cost of transportation is based on an average travel time of one hour for delivery. This was a conservative estimate based on advice from commonly used construction transport companies in Auckland, assuming transport from the outskirts of Auckland where many warehouses are based, with light to moderate congestion into Central Auckland. All other items such as non-prefabricated items, interior finishes and linings, and cladding materials have had prices taken directly from suppliers or subcontractors, with transportation and delivery costs included in the rate.

Table 3: Preliminary and General

| | | |
|---|---|---|
| Insurances | $ | 15,550.00 |
| Temporary installations e.g. storage sheds, site offices, lunchrooms, toilets, fencing etc. | $ | 33,366.80 |
| Temporary services e.g. phone, electricity, water, power, lighting, access roads, etc., | $ | 107,603.90 |
| Setting out | $ | 30,000.00 |
| Supervision, administration, project management | $ | 620,000.00 |
| Plant, tools, cranage | $ | 96,224.00 |
| Transportation | $ | 11,900.00 |
| Exterior and interior scaffolding | $ | 133,272.00 |
| Ongoing site cleaning | $ | 10,920.00 |

## 6.2 Substructure

This section includes costs for the elements below the ground, and the associated construction costs. These elements include the reinforced concrete raft foundation and required steel, concrete and waterproofing underlay, as well as preparation that include excavation, associated plant, labour requirements, and backfill.

The foundation is a 400mm thick reinforced concrete raft foundation with a total floor area of around 300 square metres. The foundation includes a 35Mpa concrete reinforced top and bottom with HD16 reinforcing steel. The rate for concrete includes the supply and delivery from a concrete supplier, and the labour rates are added as additional cost. The labour allowance is in line with New Zealand construction, at 1.75 hours per cubic metre to place and vibrate [9]. Similarly, the steel rate for the raft foundation has been built up using a manufacture and supply rates, as well as an hourly rate from a transport company of $170 per hour, assuming one hour travel time each way into Central Auckland as per advice from transportation companies as discussed in the Preliminaries section of this report. Ground preparation work has been priced with a labour allowance of one hour per cubic metre, using a 1.5 tonne excavator and operator, as well as a spotter in accordance to New Zealand Health and Safety requirements [16]. A summary of substructure costs are shown in Table 4.

Table 4: Substructure

| | | |
|---|---|---|
| Site preparation including clearance, excavation and backfill | $ | 9,420.16 |
| Foundation prep including excavation, filling and blinding layer and site concrete under foundations. | $ | 34,680.32 |
| DPM | $ | 1,372.18 |
| Formwork | $ | 1,512.00 |
| 35 Mpa concrete | $ | 59,306.14 |
| Reinforcing steel | $ | 27,672.20 |

## 6.3 Structural Elements

The main structure is made of cold-rolled light steel framing, which has been priced based on the framing schedule provided in Work Package 3: Development of a seismic gravity design solution for an exemplar light steel framed multi-storey residential building [7]. This cost summarised in Table 5 includes for the manufacture, including the cold-rolling, transport to site, labour to erect, and place. The pricing was obtained from Steelhaus Ltd., a cold-rolled steel section manufacturer and supplier in New Zealand, and accredited by the National Association of Steel Framed Housing (NASH). Fixings have been measured separately, and the required bolts have been priced using rates from commonly used hardware stores such as Mitre 10 or Bunnings. A summary of costs for the structural elements for this the building are shown below in Table 5.

Table 5: Structural Elements

| | | |
|---|---|---|
| Light steel frame (Steelhaus) | $ | 175,432.86 |
| Zinc galvanising coating to steel | $ | 62,381.26 |
| Fixings | $ | 63,426.69 |

## 6.4 Roof

The roof has been priced as a flat roof using light weight steel trusses, with profiled metal cladding. The cost of manufacturing and cold-rolling in the workshop was obtained from a cold-formed steel manufacturer Steelhaus Ltd. The roof framing has been priced against the schedule provided in the engineering report [7].

The roof cladding used n this exemplar building is the Colorsteel Longrun LT7 profiled cladding (see Table 6), fixed over the framing and a plywood substrate. The rate includes for material including an allowance for laps and edges, labour, as well as preparation work and adhesives. This would be a subcontractor performed task and therefore all components of completing this work are included in the rate. Insulation has been assumed for the roof as it is now a compulsory requirement for all residential homes, as per a report by Tenancy Services on

behalf of the Ministry of Business, Innovation and Employment. [17]. The rate includes for the material, labour and access required to install.

Table 6: Roof

| | | |
|---|---|---|
| Light steel roof framing (Steelhaus) | $ | 4,291.82 |
| Plywood sarking | $ | 16,311.24 |
| Roof insulation | $ | 10,323.85 |
| Cladding underlay and cavity battens | $ | 9,939.39 |
| Coloursteel Long run LT7 profiled cladding and associated flashings | $ | 30,127.50 |

## 6.5 Exterior Fabric

The non-structural exterior elements of the exemplar building have not been specified, thus standard and commonly used building material and techniques have been used for the pricing exercise. Included in the price for external fabric is the exterior wall insulation, building wrap to be fixed over the entire envelope and around openings, cladding and associated cavity battens and closure flashings, as well as all exterior windows and doors and their associated flashings.

Polyester insulation has been priced as R2.2 rating - R2.0 is the minimum requirement for walls in residential buildings in accordance with NZS4246: 2016 [18]. The cladding used for the walls is the same as the roof – Colorsteel profiled metal cladding [9]. The price includes for supply and install of this material, and fixing over cavity battens fixed to framing over standard building wrap, creating a complete weather tight non-structural cladding system. Exterior windows and doors are priced as aluminium framed doors, single glazed with Grade A safety glass, with door hardware supplied and fitted into the frame. Building Code requirements may need to be checked to confirm if this is acceptable, and if not, may affect pricing. A summary of the components priced in the exterior fabric are shown in Table 7.

Table 7: Exterior Fabric

| | | |
|---|---|---|
| Building underlay, cavity battens | $ | 64,114.95 |
| Insulation | $ | 32,059.15 |
| Profiled metal wall cladding and associated flashings | $ | 95,112.31 |
| Windows, doors, associated flashings and hardware | $ | 118,318.10 |
| Gutters and downpipes | Excluded | |

## 6.6 Interior Finishing

Elements used for in the interior finishes are not specified in any of the drawings nor were specifications provided. Some of the basic interior finishes used for the cost estimates are provided in Table 8, however more decorative finishes, if required may need a re-evaluation in price.

For non-load bearing internal partitions, standard timber framed walls have been used with 90x45 H1.2 radiata pine framing, insulated with R2.2 polyester insulation, and finished with 2 layers of GIB Fyreline, painted and stopped to a Level 4 finish. Alternatively, decorative finishes will generate additional costs.

Floor coverings allow for floor preparation across the entire floor area, carpet tiles in standard rooms and hall ways, and vinyl in all wet areas. Carpet tiles have been used as in the apartments and common areas because of ease of maintenance and repair should one or more carpet tiles need replacing. Interior doors, skirtings and architraves are all specified as timber, and all door hardware is standard as commonly found at hardware stores, with an allowance for labour on top – one hour per door to fix the door hardware in place.

Basic fittings and fixtures have also been included as shown on the architectural plans – standard benchtops, cook tops, toilets, showers and associated taps and mixers. These have also been priced according to what is readily available in standard hardware or plumbing stores, with an installation labour allowance added into the rates. If custom appliances or fixtures were required, this would increase the cost to manufacture and then install. In the Bill of Quantities, this has been measured under the Joinery trade along with bench tops and the like, despite typically being measured in the plumbing trade [7], as all services have been excluded in the costing exercise as previously stated. A summary of the interior finishes costs are provided in Table 8.

Table 8: Interior Finishes

| | | |
|---|---|---|
| Non-structural wall framing | $ | 63,890.11 |
| Non-structural ceiling framing | $ | 23,197.10 |
| Internal insulation | $ | 72,326.52 |
| Plasterboard wall linings (GIB Fyreline) | $ | 340,578.00 |
| Ceiling linings (GIB Fyreline) | $ | 189,570.60 |
| Stopping | $ | 33,264.00 |
| Painting | $ | 228,414.00 |
| Particleboard floor covering | $ | 103,277.67 |
| Skirting, architraves, reveals | $ | 83,791.96 |
| Interior Doors and associated hardware | $ | 32,514.96 |
| Fittings and Fixtures | $ | 87,078.42 |

### 6.7 Provisional Sums

Provisional sums are used to create a budget for works that has reasonable potential to arise during the design and construction phases, but have insufficient details to provide a detailed fixed price [19]. They are essential for evaluation purposes for the main contractor. These sums typically cover unforeseen circumstances, such as weather delays or ground conditions (e.g. discovery of asbestos or contaminated soil). This section provides provisional sums for costs associated with the items in this scope, shown in Table 9. These figures have been taken from QV Cost Builder [10] based on the percentage of the overall building, but may need to be adjusted based on the exact time of construction and location of the building, and with discussions with the main contractor performing the work to ensure all allowances are reasonable.

Table 9: Provisional Sums and Contingencies

| | | |
|---|---|---|
| Existing site conditions | $ | 60,000.00 |
| Weather delays | $ | 75,000.00 |
| Contingency sum | $ | 220,000.00 |

## 8.0 Conclusion

The costing of the exemplar building evaluated in this report is based on the preliminary design developed by ExtraMile Consulting Structural Engineers [9], which has then been priced according to the standard; NZS4202: 1995. This standard the most commonly used method of measurement in the New Zealand construction industry, used by estimators and quantity surveyors.

The costs associated with each trade have been built in where possible from first principles, considering the materials required, and then the labour allowance and associated transportation and plant costs, with overheads extracted separately where possible and stated. This allows any reader to extract components of specific items and adjust where needed, if required, and if any aspect of the design is further developed. The full schedule of quantities with all allowances, provisional sums and contractors margin gives an estimated cost of $3,801,296.39.

It must be noted however that there are still cost savings opportunities to reduce the overall construction of the building with the current details as discussed in Section 4.0. It would be beneficial to perform a value engineering exercise at early a stage of the project. Using light weight structural elements provides many opportunities for potential cost reduction, such as transportation, savings from floor to ceiling height reduction, which has considered to for

maximise the potential cost savings the structure can offer. Services have been excluded from this contract, however the design of the building could be further developed to maximise the ease of integration and create a compact space to reduce building height and envelope costs.

While further details are required in order to obtain the most accurate costs for this exemplar building, there is a clear idea of the approximate associated costs, as well as avenues for potential savings.

## 9.0 References


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[4] AS/NZS 1170.1 Structural design actions Part 1: Permanent, imposed and other actions. Australian/New Zealand Standard, 2002.

[5] AS/NZS 1170.2 Structural design actions Part 2: Wind actions. Australian/New Zealand Standard, 2011.

[6] NZS 1170.5 Structural Design Actions Part 5: Earthquake actions – New Zealand, 2004.

[7] NZS4202:1995 Standard method of measurement of building works

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# WP4-R2

# APPENDIX 1 - COST ESTIMATE

## PROJECT SUMMARY

| | | | |
|---|---|---|---|
| **Project: 6 Storey Light Steel-Framed Residential Apartment Building** | | | |
| **Location: Auckland, New Zealand** | | | |
| **Contract** | **Cost per M2**<br>**$ 1,449.77** | **Reference** | |
| **Tender Range:** | | **Type of Contract:** | |
| **Gross Floor Area: 2,622m2** | **Number of Stories: 6** | **Date of Tender:** | |
| **Net Lettable Area:** | **Wall/Floor Ratio:** | **Cost Index Reference Series Used:**<br>**Index No:** | |

| **Brief Cost Summary** | | | |
|---|---|---|---|
| **Element Groups** | **% of Total** | **Cost per M2** | **Total Cost** |
| Substructure | 3.52% | $ 51.09 | $ 133,963.01 |
| Structural Elements | 7.92% | $ 114.89 | $ 301,240.81 |
| Roof | 1.87% | $ 27.08 | $ 70,993.81 |
| Exterior Fabric | 8.14% | $ 118.08 | $ 309,604.51 |
| Interior Finishing | 33.09% | $ 479.75 | $ 1,257,903.34 |
| Services | 0% | $ - | EXCLUDED |
| Preliminaries, Margins, Contingencies | 36.10% | $ 523.30 | $ 1,372,090.92 |
| Provisional Sums for excluded items | 9.35% | $ 135.58 | $ 355,500.00 |
| **Totals** | | | $ 3,801,296.39 |

Note: Preliminaries include all management and supervision, insurances, consents, contingency sums, as well as 10% contractors margin.

Note: Margins for Provisional Sums have been included separately should they be excluded from this price.

## 6 Storey Light Steel-Framed Residential Apartment Building
**AT Auckland, New Zealand**

# TRADE SUMMARY as per NZS 4202: 1995

| Sch. | SUMMARY OF TRADES | | TOTAL |
|---|---|---|---|
| **1.** | PRELIMINARY AND GENERAL | | 1,058,836.70 |
| **2.** | EXCAVATION | | 37,877.60 |
| **3.** | CONCRETE | | 68,413.20 |
| **4.** | REINFORCING STEEL | | 27,672.20 |
| **5.** | STRUCTURAL STEEL | | 243,151.37 |
| **6.** | WINDOWS AND DOORS | | 110,638.46 |
| **7.** | CARPENTRY | | 386,169.48 |
| **8.** | JOINERY | | 107,118.42 |
| **9.** | METAL ROOFING AND CLADDING | | 135,179.20 |
| **10.** | PLASTERBOARD LININGS | | 563,412.60 |
| **11.** | FLOOR COVERINGS | | 103,277.67 |
| **12.** | PAINTING | | 290,795.26 |
| Sub Total | | $ | 3,132,542.17 |
| CONTRACTORS MARGIN | | $ | 313,254.22 |
| PROVISIONAL SUMS | | $ | 355,500.00 |
| **TOTAL AMOUNT OF TENDER** | | **$** | **3,801,296.39** |

# TAGS AND CLARIFICATIONS

| |
|---|
| **Project: Light Steel Framed Building** |
| **Location: Auckland, New Zealand** |

- No measurement has been made for any services including electrical, plumbing, fire protection or HVAC services.
- Ditto external works including drainage, connection to existing power/mains lines, landscaping, tree removal, external pavement areas, traffic management.
- Ditto stairs and lifts due to lack of details.
- Balconies and balustrades have been excluded from this measure.
- No allowance has been made for site inspection.
- No allowance has been made for a final building clean or protection of work from sun, wind, rain or on site damage. The allowance in the Preliminary & General section of this Bill only includes for ongoing site clean throughout the duration of the construction programme.
- No allowance has been made for coordinating trades.
- No allowance made for access into ceiling space to maintain services etc.
- No allowance for guarantees or warranties for each trade as may be required.
- All assumptions made for architectural elements have been stated throughout this Bill in their respective line items.
- No allowance for gutters or downpipes around roofing.
- No allowance for underfloor insulation in foundations.

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**PRELIMINARY AND GENERAL**
**BILL OF QUANTITIES**

---

**PREAMBLES**

1/1A All preliminary and general items including management and supervision, and plant hire allowances are based on a provisional construction period of 20 months.

1/1B Where Specification or drawing references are given they must be studied and used as amplification of the descriptions given for billed items.

1/1C Refer to the Conditions of Tender, Conditions of Contract and Preliminary and General Specification as they affect this trade.

| | | | | | |
|---|---|---|---|---|---|
| | **SITE INSPECTION** | | | | Excluded |
| | **INSURANCES** | | | | |
| 1/3A | Contractor's liability, Public Liability, Principal's Liability insurance premiums, levies or expenses. | | Allow | | 15,550.00 |
| 1/3B | Offsite materials insurances as required. | | Allow | | Included |
| | **RESOURCE CONSENT CONDITIONS** | | | | Excluded |
| | **BUILDING CONSENT AND FEES** | | | | Excluded |
| | **TEMPORARY INSTALLATIONS** | | | | |
| 1/6A | Temporary buildings, storage sheds, lunch rooms, etc. | 20 | mth | 576.34 | 11,526.80 |
| 1/6B | Site office. | | Allow | | Included |
| 1/6C | Toilet facilities. | | Allow | | Included |
| 1/6D | Allow for complying with regulations governing fire safety with respect to the Contract. | | Allow | | Included |
| | **TEMPORARY SERVICES** | | | | |
| 1/7A | Temporary roads, footpaths, carparks, crossings etc. | 1 | PS | | 20,000.00 |
| 1/7B | Telephone and data facilities for Contractor use. | 20 | mth | 240.00 | 4,800.00 |
| 1/7C | Temporary water supply. | | Allow | | Included |
| 1/7D | Temporary electrical lighting. | | Allow | | Included |
| 1/7E | Temporary electric power. | 1 | LS | 82,803.90 | 82,803.90 |
| 1/7F | Electric costs for air conditioning | | Allow | | Included |
| 1/7G | Temporary mechanical ventilation as may be required. | | Allow | | Included |
| 1/7H | Temporary drainage system as may be required. | | | External works | Excluded |
| | **SETTING OUT OF WORKS** | | | | |
| 1/8A | Set out all correct positions, levels, dimensions and alignment. | 1 | LS | 30,000.00 | 30,000.00 |
| | **SUPERVISION, ETC.** | | | | |
| 1/9A | Supervision and management salaries | 1 | LS | | 620,000.00 |
| 1/9B | Costs associated with conducting site meetings | | Allow | | Included |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**PRELIMINARY AND GENERAL**
**BILL OF QUANTITIES**

| | | | | | |
|---|---|---|---|---|---|
| 1/9C | Expenses or overheads incurred for overtime, travelling time, | Allow | | | Included |
| 1/9D | Allowance for processing variations as they may occur. | Allow | | | Included |
| 1/9E | Allowance for preparing CCA compliant progress claims and payment schedules as needed. | Allow | | | Included |
| 1/9F | Contract supervision. | Allow | | | Included |
| 1/9G | Updating site records, photos etc. | Allow | | | Included |
| 1/9H | Supervision and co-ordination of the shop drawings. | Allow | | | Included |
| | **PLANT, ETC.** | | | | |
| 1/10A | Plant, tools and PPE. Includes 1.5t excavator, compactor including operators, as well as general health and safety protective equipment and miscellaneous tools. | 1 | LS | 37,604.00 | 37,604.00 |
| 1/10B | Cranage and hoisting appliances. Price includes hire for 60t mobile crane, operator and spotter, and Hiab crane truck with operator and spotter. | 1 | LS | 58,620.00 | 58,620.00 |
| 1/10C | Exterior scaffolding, staging and chutes, etc. | 1 | LS | 90,280.00 | 90,280.00 |
| 1/10D | Interior scaffolding, staging and chutes, etc. | 1 | LS | 42,992.00 | 42,992.00 |
| 1/10E | Cartage and transportation. | | | | |
| 1/10F | Truck and trailer with 22 tonne capacity. | 70 | Hr | 170.00 | 11,900.00 |
| | **MAINTENANCE AND PROTECTION** | | | | |
| 1/11A | Temporary fencing. | Allow | | | 21,840.00 |
| | **CLEANING UP** | | | | |
| 1/12A | Site cleaning. Includes weekly skip bin hire, weekly site office cleaning labour, and general cleaning labour as required. | 1 | LS | 10,920.00 | 10,920.00 |
| 1/12B | Final building clean. | | | | Excluded |
| | | | | | 1,058,836.70 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**EXCAVATION**
**BILL OF QUANTITIES**

---

**PREAMBLES**

2/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices

2/1B Price of work assumes ground to be of Soil Class C. Further soil investigations showing otherwise may affect associated costs within this section.

2/1C Price rates for excavation shall include for the following:

2/1D Excavating in all types of material encountered except solid rock or concrete.

2/1E Machine excavation in soils not exceeding 1m deep, in medium soil.

2/1F Keeping excavations free from water by pumping, bailing or other means and for all temporary drainage and sumps required.

2/1G Trimming sides and forming batters.

2/1H Levelling off, forming falls and consolidating.

2/1J All quantities are solid measure; no allowance has been made for bulking or compaction.

| | | | | |
|---|---|---|---|---|
| | **EXISTING SERVICES** | | | Excluded |
| | **EXISTING VEGETATION** | | | Excluded |
| | **SEDIMENT CONTROL** | | | Excluded |
| | **SITE CLEARANCE** | | | |
| 2/2A | Assuming 2 no. trees to be removed, up to 500mm girth unless otherwise advised. No allowance for removal of existing concrete or | 1 LS | 1,000.00 | 1,000.00 |
| | **BULK EXCAVATION AND FILLING** | | | |
| | **Stripping Topsoil** | | | |
| 2/3A | Average 100mm deep unless otherwise advised. | 957 m2 | 4.42 | 4,228.50 |
| | **Bulk Excavation and Filling** | | | |
| 2/3B | Assuming excavation 300mm deep in clay soil to reduce levels and load into truck, unless otherwise advised. | 287 m3 | 14.60 | 4,191.66 |

**FOUNDATION EXCAVATION AND FILLING**

Excavation

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**EXCAVATION**
**BILL OF QUANTITIES**

| | | | | |
|---|---|---|---|---|
| 2/4A | Excavate pads or bases for foundations in clay soil commencing at reduced levels and not exceeding 1.5m deep. Remove excavated materials from site. | 175 m3 | 109.00 | 19,053.20 |
| | Filling | | | |
| 2/5A | Trim and compact surfaces under floor slab to required levels and lay 150mm thick approved compacted basecourse. | 437 m2 | 14.42 | 6,301.54 |
| 2/5B | 50mm thick sand blinding laid over basecourse under foundations and left ready for damp proof membrane. | 437 m2 | 7.10 | 3,102.70 |
| | | | | 37,877.60 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**CONCRETE**
**BILL OF QUANTITIES**

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**PREAMBLES**

Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

Refer to the Drawings and Specification for full details of materials and workmanship. These shall be read as part of and as amplification of the descriptions given in the Bill.

**Concrete**

Price rates for concrete shall include for the following:
Curing concrete. (N.B. Curing floor slabs has been measured).

Unless described as 'Plain Concrete' meaning unreinforced concrete, all concrete shall be reinforced.

**Formwork**

The quantities given for formwork are the net surface area of the concrete face. Price rates shall include for all centering, bracing, battens and other supports, nails, bolts, etc. and all labour erecting and removing in accordance with the Plans and Specifications.

Formwork generally is to be 'Ordinary Boxing' i.e. formwork of sound construction, true to line and left ready for plastering or otherwise unexposed (e.g. where backfilled).
Where a fair faced finish is required this has been stated in description and price rates for such items shall include for fair faced formwork, cutting off wire ties, and making good concrete surface.

Price rates shall include for forming all bevelled angles as detailed and specified.

**Site Concrete**

| | | | |
|---|---|---|---|
| 10 MPa site concrete 50mm thick laid under foundations. (Area includes allowance for working space where applicable) | 437 m2 | 14.24 | 6,222.88 |
| **Raft Foundations** | | | |
| 35 MPa concrete in 400mm thick raft foundation. | 175 m3 | 339.28 | 59,306.14 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**CONCRETE**
**BILL OF QUANTITIES**

| | | | |
|---|---|---|---|
| Formwork (F1) to sides of raft foundation | 34 m2 | 45.00 | 1,512.00 |
| **Underlays and Waterproofing** | | | |
| Damp Proof Membrane | | | |
| Black polythene sheet 250 micron concrete underlay laid over sand blinding under concrete floor slabs. Include for preparing receiving surfaces and for all lapped and taped joints and tapping around penetrations. | 437 m2 | 3.14 | 1,372.18 |
| | | | 68,413.20 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**

**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**REINFORCING STEEL**
**BILL OF QUANTITIES**

## PREAMBLES

4/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

4/1B The allowance required by the mills for rolling has not been added when calculating weights.

4/1C Rates are to include for:-
Fabrication, delivery, hoisting and placing securely in position.
All tying wire.

4/1D Weights have been scheduled in Kilograms.

4/1E Bars are generally deformed mild steel and the following prefixes have been used to denote different types of bars followed by a number which gives the diameter of the bar in millimetres:
HD = High yield deformed round;
HD16 = 16mm diam. deformed high yield bars.

4/1F Mesh fabric is measured net as laid and no allowance has been made for laps.

4/1G Price rates for mesh fabric shall include for notching around obstructions and openings less than 2m2.

| | | | | |
|---|---|---|---|---|
| | **Raft Foundation** | | | |
| 4/2A | HD16 bars | 5,534 kg | 5.00 | 27,672.20 |
| | | | | 27,672.20 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**STRUCTURAL STEEL**
**BILL OF QUANTITIES**

## PREAMBLES

5/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

5/1B Weights only are given for the various members and rates shall include for supply, complete fabrication, delivery to site, detailing, waste, cutting, notching, holing, drilling, shop welding, etc. Separate items are given for site erection and bolts.

5/1C Only those fixings shown on the drawings have been measured.

5/1D Structural steel specified is cold rolled steel in lipped C sections unless otherwise specified.

| | | | | | |
|---|---|---|---|---|---|
| | **Main Roof** | | | | |
| 5/2A | 150×38×9×1.6 truss members (427kg total weight). | 138 | m | 14.30 | 1,969.97 |
| 5/2B | 90×38×9×1.6 truss members (176kg total weight). | 77 | m | 10.51 | 811.85 |
| 5/2C | Take delivery of the foregoing steelwork, hoist, erect and fix into position complete. (603kg total) | 1 | LS | 1,510.00 | 1,510.00 |
| | **Wall Structure** | | | | |
| 5/3A | 150×38×9×1.6 beams (3,075.76kg total weight). | 992 | m | 14.29 | 14,188.17 |
| 5/3B | 90×38×9×0.95 beams (169.48 kg total weight). | 117 | m | 6.68 | 701.28 |
| 5/3C | 90×38×9×1.2 beams (199.86kg total weight). | 117 | m | 7.88 | 921.38 |
| 5/3D | 90×38×9×1.6 beams (997.45kg total weight). | 437 | m | 10.51 | 4,598.26 |
| 5/3E | 150×38×9×1.6 studs (6,408.32 total weight). | 2,067 | m | 14.29 | 29,542.36 |
| 5/3F | 90×38×9×0.95 studs (352.64kg total weight). | 243 | m | 6.68 | 1,625.67 |
| 5/3G | 90×38×9×1.2 studs (415.87kg total weight). | 243 | m | 7.88 | 1,917.17 |
| 5/3H | 90×38×9×1.6 studs (2,145.02kg total weight). | 941 | m | 10.51 | 9,888.56 |
| 5/3J | 150×38×9×1.6 brace (3,631.19kg total weight). | 1,171 | m | 14.29 | 16,739.76 |
| 5/3K | 90×38×9×0.95 brace (248.31kg total weight). | 171 | m | 6.68 | 1,144.72 |
| 5/3L | 90×38×9×1.2 brace (292.84kg total weight). | 171 | m | 7.88 | 1,349.98 |
| 5/3M | 90×38×9×1.6 brace (1,140.11kg total weight). | 500 | m | 10.51 | 5,255.93 |
| 5/3N | Take delivery of the foregoing steelwork, hoist, erect and fix into position complete. (19,077kg total) | 1 | LS | 12,510.00 | 12,510.00 |
| | **Floor Structure** | | | | |
| 5/4A | 250×85×33×1.8 floor joists (14,223kg total weight). | 2,789 | m | 23.51 | 65,539.62 |
| 5/5C | Take delivery of the foregoing steelwork, hoist, erect and fix into position complete. (14,223kg total) | 1 | LS | 9,510.00 | 9,510.00 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**STRUCTURAL STEEL**
**BILL OF QUANTITIES**

| | | | | | |
|---|---|---|---|---|---|
| | **Fixings** | | | | |
| 5/6A | M12 anchor bolts | 2,616 | No. | 3.48 | 9,103.68 |
| 5/6B | 86x80x5 mild steel plate with 13mm dia. Hole. | 2,616 | No. | 3.60 | 9,417.60 |
| 5/6C | 12g - 14 hex head screws | 86,288 | No. | 0.27 | 23,397.85 |
| 5/6D | 75 x 80 x 55 L bracket 0.95mm thick. | 2,616 | No. | 7.79 | 20,378.64 |
| 5/6E | 10g - 16 hex head screws | 432 | No. | 0.16 | 70.27 |
| 5/6F | 10g - 16 tek screws | 4,812 | No. | 0.22 | 1,058.64 |
| | | | | | 243,151.37 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**WINDOWS AND DOORS**
**BILL OF QUANTITIES**

## PREAMBLES

6/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

6/1B Price rates shall include for:-
6/1C Supply and installation complete.
6/1D Protection of frames and glass and removal of same on completion, including cleaning.
6/1E All fixings, packers, wedges, etc., for fixing as required. Include for removal of packers and wedges on completion.
6/1F All beads, gaskets, sealants, etc., as required.
6/1G All window and door seals and weather strips, as required.
6/1H Glass and glazing which has been measured out separately within this Bill.

6/1J Door hardware has been measured separately in the Carpentry Trade section.

**Exterior Windows and Doors**

| | | | | | |
|---|---|---|---|---|---|
| 6/2A | 900mm wide x 1200 high window with 1 No. fixed pane and 1 No.top hung sash. | 36 | No. | 648.00 | 23,328.00 |
| 6/2B | 1980x1620mm high aluminium double door with 1 No. fixed panes, 1 No. top hung sash, and 1 No. double leaf sliding door in equal leaves, each leaf in 2 no. fixed panes. | 24 | No. | 1,924.56 | 46,189.44 |
| 6/2C | 600mm x 800mm high window with 1 No. top hung sash | 6 | No. | 288.00 | 1,728.00 |
| | Glazing | | | | |
| 6/3A | Single glazed clear laminated Grade A safety glass. | 118.74 | m2 | 260.00 | 30,873.02 |
| | Flashings and Closures | | | | |
| 6/4A | Allow for the supply and installation of all flashings as required to the above windows and doors. | 1 | Allow | 8,520.00 | 8,520.00 |
| | | | | | 110,638.46 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**CARPENTRY**
**BILL OF QUANTITIES**

## PREAMBLES

7/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

7/1B Unless otherwise stated, all sizes of members given are ex or nominal sizes.

7/1C Price rates for all timbers and linings shall include for all nail and screw fixings.

| | | | | | |
|---|---|---|---|---|---|
| | **Main Roof Framing** | | | | |
| | Plywood Sarking | | | | |
| 7/2A | 15mm thick Ecoply Structural Square Edge CD grade H3.2 treated plywood acoustic roof lining fixed to steel roof framing with galvanised screw fixings. Leave surface ready for roof cladding. | 437 | m2 | 37.33 | 16,311.24 |
| | **Interior Wall Framing** | | | | |
| 7/3A | Framing for non-structural interior walls shall be H1.2 treated Radiata pine timber at assumed interior wall heights of 2.4m unless stated otherwise. | | | | |
| 7/3B | Studs shall be assumed to be 400mm crs spacing unless otherwise stated. | | | | |
| 7/3C | Nogging shall be assumed to be 600mm crs spacing unless otherwise stated. | | | | |
| | Non Structural Internal Walls | | | | |
| 7/4A | 100 x 50 bottom plate, bolted. | 1,282 | m | 12.78 | 16,376.28 |
| 7/4B | 100 x 50 top plate. | 1,282 | m | 12.78 | 16,376.28 |
| 7/4C | 100 x 50 studs. | 1,282 | m | 12.78 | 16,376.28 |
| 7/4D | 100 x 50 nogging. | 852 | m | 14.98 | 12,761.26 |
| 7/4E | Allow for fixings (bolts, small tools, etc.) required to install framing. | | Allow | | 2,000.00 |
| | **Interior Ceiling Framing** | | | | |
| | Gib. Rondo 310 metal batten system fixed to underside of timber and/or DHS ceiling framing. | 2,622 | m2 | 8.85 | 23,197.10 |
| | **Insulation (vertical area of insulation measured).** | | | | |
| 7/5A | R2.9 polyester insulation in roof space. Include for polythene straps to support insulation. | 437 | m2 | 23.62 | 10,323.85 |
| 7/5B | R2.2 polyester insulation in walls (external and internal). | 2,680 | m2 | 23.01 | 61,673.28 |
| 7/5C | R1.8 polyester underfloor insulation. | 2,622 | m2 | 16.29 | 42,712.38 |
| | **Exterior Cladding Underlay** | | | | |
| | Building Underlay | | | | |
| 7/6A | Building underlay fixed to framing with laps at sheet and perimeter edges. | 1,393 | m2 | 6.71 | 9,348.47 |
| | Seal Window and Door Reveals | | | | |
| 7/7A | Seal reveals around window and door openings with approved flashing tape. | 341 | m | 5.51 | 1,876.10 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**CARPENTRY**
**BILL OF QUANTITIES**

| | | | | | |
|---|---|---|---|---|---|
| | Cavity Battens | | | | |
| 7/8A | 50 x 25 mm H3.1 kiln dried radiata cavity batten at 400 crs under exterior cladding. | 3,780 | m | 11.10 | 41,942.10 |
| 7/8B | uPVC cavity vent strip. | 504 | m | 21.72 | 10,948.28 |
| | **Interior Trim** | | | | |
| | Skirtings and Architraves | | | | |
| 7/10A | Skirtings and architraves shall be finger jointed bullnosed moulding radiata pine trims, unless otherwise stated. | | Note | | |
| 7/10B | 90 x 18mm skirting. | 1,890 | m | 17.85 | 33,733.67 |
| 7/10C | 60 x 18mm architrave. | 2,520 | m | 18.30 | 46,108.43 |
| | Window and Door Reveals | | | | |
| 7/11A | 10 x 19mm reveal liner. | 341 | m | 11.59 | 3,949.87 |
| | **Door Hardware** | | | | |
| 7/12A | Price rates for door hardware shall include for supplying and fixing in position complete to timber and/or aluminium doors and frames. | | Note | | |
| 7/12B | Locware Naples privacy set door handles | 108 | No. | 89.98 | 9,717.84 |
| 7/12C | Locware Naples entrance set door handles and deadbolt | 24 | No. | 114.88 | 2,757.12 |
| 7/12D | Yale Black Mawson Sliding door handle and lock | 24 | No. | 124.90 | 2,997.60 |
| 7/12E | Jaeco Standard wedge fastener Satin Chrome | 66 | No. | 70.94 | 4,682.04 |
| | | | | | 386,169.48 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**JOINERY**
**BILL OF QUANTITIES**

## PREAMBLES

8/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

8/1B Price rates shall include for complete fabrication, delivery to site and fixing in position complete.

8/1C Door hardware has been measured separately in the Carpentry Trade section.

| | | | | | |
|---|---|---|---|---|---|
| | | | Note | | |
| | **Interior Doors** | | | | |
| 8/2A | Interior doors shall be Hume Doors 35mm thick honeycomb core Ascot 4 panel smooth interior doors with pre-primed MDF skins unless otherwise stated. | | | | |
| | | | Note | | |
| 8/2B | 810 x 1980mm high single leaf door and frame. | 132 | No | 151.82 | 20,040.00 |
| | **Fittings and Fixtures** | | | | |
| 8/3A | Bellini 60cm 5 Function Gas Oven and Cooktop | 24 | No. | 761.50 | 18,276.00 |
| 8/3B | Project Forte Sink Bowl 800x500mm 1 bowl 1 drainer | 24 | No. | 165.04 | 3,961.00 |
| 8/3C | Kitko 2400 x 900mm Marble Slice Benchtop | 172 | m | 96.49 | 16,622.42 |
| 8/3D | Clearlite Bathrooms 1655 x 740 x 405mm White Pacific Bath | 24 | No. | 280.00 | 6,720.00 |
| 8/3E | Mondella 410mm 1TH White Square Vitreous China Rococo Basin | 36 | No. | 141.75 | 5,103.00 |
| 8/3F | Stein 1200mm Emilio Shower Return | 12 | No. | 431.00 | 5,172.00 |
| 8/3G | Mondella Concerto Back To Wall Toilet Suite | 36 | No. | 293.00 | 10,548.00 |
| 8/3H | Foreno Flo Sink Mixer | 60 | No. | 119.00 | 7,140.00 |
| 8/3J | Foreno Flo Slide Shower | 36 | No. | 164.00 | 5,904.00 |
| 8/3K | Foreno Chrome Equaliser Shower Mixer | 36 | No. | 212.00 | 7,632.00 |
| | | | | | 107,118.42 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**METAL ROOFING AND CLADDING**
**BILL OF QUANTITIES**

**PREAMBLES**

13/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

13/1C All quantities are nett in position and price rates shall include for laps and waste.

13/1D Price rates for flashings shall include for all angles, laps, junctions and expansion joints as required and for sealants and priming.

13/1E Price rates for roofing shall include for roofing in single lengths. Where lengths exceed 15 meters these have been scheduled separately.

| | | | | | |
|---|---|---|---|---|---|
| | **Metal Roof Cladding** | | | | |
| | Underlay | | | | |
| 13/2A | Thermakraft 215 roof underlay laid over and fixed to timber and/or steel purlins. | 437 | m2 | 4.47 | 1,953.22 |
| | Cavity Battens | | | | |
| 13/2D | 50 x 25 mm H3.1 kiln dried radiata cavity batten at 400 crs under exterior cladding. | 1,093 | m | 7.31 | 7,986.18 |
| | Metal Roof Cladding | | | | |
| | Coloursteel Longrun LT7 profiled metal cladding, fixed to timber and/or steel purlins over plywood substrate in accordance with the manufacturers instructions. (No allowance for pitch, assumed flat roof). | 437 | m2 | 57.50 | 25,127.50 |
| | Flashings | | | | |
| | Allowance for flashings associated with metal roof cladding. | 1 | Allow | 5,000.00 | 5,000.00 |
| 13/5G | **Metal Wall Cladding** | | | | |
| 13/5H | Wall Cladding | | | | |
| | 0.55mm BMT Dimondek 400 profile steel wall cladding with ColorCote ZinaCore finish, fixed vertically to cavity battens in accordance with the manufacturers instructions. | 1,393 | m2 | 57.50 | 80,112.31 |
| | Flashings | | | | |
| | Allowance for flashings associated with metal wall cladding. | 1 | Allow | 15,000.00 | 15,000.00 |
| | **Gutters** | | | | Excluded |
| | **Downpipes** | | | | Excluded |
| | | | | | 135,179.20 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**PLASTERBOARD LININGS**
**BILL OF QUANTITIES**

## PREAMBLES

10/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

10/1B Plasterboard wall and ceiling linings shall be stopped to a Level 4 finish, unless stated otherwise.

| | | | | | |
|---|---|---|---|---|---|
| | **Wall Linings** | | | | |
| | Fire Rated Walls | | | | |
| 10/2A | Double layer 13mm thick Gib. Fyreline wall linings fixed to timber framing, with bottom layer left unstopped and top layer stopped and flush pointed ready for paint finish. | 6,426 | m2 | 53.00 | 340,578.00 |
| | **Ceiling Linings** | | | | |
| | Fire Rated Ceilings | | | | |
| 10/3A | 13mm thick Gib. Fyreline ceiling linings fixed to wall framing, stopped to L4 finish and flush pointed ready for paint finish. | 2,622 | m2 | 31.40 | 82,330.80 |
| 10/3B | 16mm thick Gib. Fyreline ceiling linings fixed to wall framing, stopped to L4 finish and flush pointed ready for paint finish. | 2,622 | m2 | 40.90 | 107,239.80 |
| | Sundries | | | | |
| 10/4A | Square stopping at junction between plasterboard wall and ceiling linings. | 1,890 | m | 7.60 | 14,364.00 |
| 10/4B | Finish linings up to adjacent surfaces. Include for Gib. Rondo stopping angle P25 and all stopping. | 1,890 | m | 10.00 | 18,900.00 |
| | | | | | 563,412.60 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**FLOOR COVERINGS**
**BILL OF QUANTITIES**

**PREAMBLES**

11/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

11/1B All vinyls and adhesives shall be applied and fixed strictly in accordance with the manufacturer's instructions.

11/1C Price rates for flooring include for preparing receiving surfaces as required ready for new coverings and for suitably sealing where appropriate.

| | | | | |
|---|---|---|---|---|
| | **Particle Board Floor Coverings** | | | |
| 11/2A | 20mm particle board sheet laid to all floor areas. | 2,622 m2 | 39.39 | 103,277.67 |
| | | | | 103,277.67 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**PAINTING**
**BILL OF QUANTITIES**

## PREAMBLES

12/1A Pricing based on drawings and specifications as per report "Specific design for multi-storey light steel framed buildings. Work Package 3: Development of a seismic and gravity design solution for an exemplar light steel framed multi storey residential building." Further development of this design and specification may affect prices provided in this Bill.

12/1B Price rates shall include for the following:-

12/1C All preparatory work, knotting, stopping and sanding between coats, degreasing and wire brushing of Steelwork.

12/1D The removal as necessary of all hardware (handles, locks, etc.) during painting operations and refixing on completion.

12/1E All necessary masking, etc., of adjacent surfaces and removal of protection on completion.

12/1F Painting in the various colours selected and any cutting in occasioned by different colours or Paint Systems.

12/1G Unless stated otherwise, all quantities are girthed measure.

12/1H Contrary to NZS4202:1995, coating to structural steel work shall be priced by weight of steel, not in square metres.

| | | | | |
|---|---|---|---|---|
| | **Structural Steel** | | | |
| 12/2A | Hot dip galvanising prior to fixing. | 33,903 kg | 1.84 | 62,381.26 |
| | **Interior Plasterboard** | | | |
| | One coat sealer, Two coats semi-gloss acrylic paint to plasterboard or similar smooth surface. | | | |
| 12/3A | Plasterboard wall linings. | 6,426 m2 | 18.00 | 115,668.00 |
| | One coat sealer, Two coats semi-gloss acrylic paint to plasterboard or similar smooth surface. | | | |
| 12/3B | Plasterboard ceiling linings. | 2,622 m2 | 18.00 | 47,196.00 |
| | **Interior Floor Coverings** | | | |
| | Two coats Resene Fireguard intumescent coating to general surfaces | | | |
| 12/3C | Particle board floor coverings | 2,622 m2 | 25.00 | 65,550.00 |
| | | | | 290,795.26 |

**LIGHT STEEL FRAMED BUILDING**
**AT**
**AUCKLAND, NEW ZEALAND**
**FOR**
**HEAVY ENGINEERING RESEARCH ASSOCIATION (HERA)**

**PROVISIONAL SUMS**
**BILL OF QUANTITIES**

| | | | |
|---|---|---|---|
| | **EXISTING SITE CONDITIONS** | | |
| 13/1A | Allow in price the Net Provisional Sum of $55,000.00 (Fifty Five Thousand Dollars) for the removal and/or protection of existing trees or underground services and making good ground conditions upon completion | Sum | 55,000.00 |
| | Add margin. | Sum | 5,500.00 |
| | **WEATHER DELAYS** | | |
| 13/9A | Allow in tender the Net Provisional Sum of $75,000.00 (Seventy Five Thousand Dollars) to allow for any acceleration or accomodation of delays arising by unexpected weather. | Sum | 75,000.00 |
| | **CONTINGENCY SUM** | | |
| 13/10A | Allow in tender the Net Provisional Sum of $200,000.00 (Two Hundred Thousand Dollars for any contingencies that may arise in the duration of construction, as well as including for any sundry jobs that may arise and the supervision and subcontracting of these. | Sum | 200,000.00 |
| 13/10B | Add Margin. | Allow | 20,000.00 |
| | | | 355,500.00 |

# WP4-R3

EXTRAMILE
consulting structural engineers

10 August 2018

| | | |
|---|---|---|
| Initial issue | 10/8/2018 | For information |
| Revised as per comments | 30/8/2018 | For information |

**18021 / BRANZ /NASH Research on Specific Design of Multi-Storey Light Steel Framed Buildings – Structural Report**

EXECUTIVE SUMMARY:

ExtraMile Consulting (EMC) was engaged by Heavy Engineering Research Association (HERA) to complete structural design and detailing for the selected stages of the research project "**Research on Specific Design of Multi-Storey Light Steel Framed Buildings".**

The scope of EMC's involvement included:

a) Review of the structural design of the main structure completed by the University of Auckland (UoA);
b) Completion of the structural design of primary and secondary structural elements of the proposed scheme;
c) Completion of the structural design of the connections for the proposed scheme
d) Completion of the structural design of foundations for the proposed scheme
e) Specification of external and internal wall claddings/linings and roof finishes to the proposed scheme
f) Production of outline bills of structural materials/quantities based on the above designs
g) Production of structural general arrangement and detail drawings for the proposed scheme.

All above elements, together with some background information are presented in this report and its appendices.

All site-specific factors influencing the design were chosen as typical for Auckland region based on EMC's experience and engineering judgement.

Structure of the building and its details was designed using current New Zealand Standards and in accordance with the Building Code. The design is based on similar buildings designed by EMC both in New Zealand and overseas.

The design procedures employed comprise a mixture of finite element modelling (using ETABS software) and manual calculations as appropriate.

Non-structural claddings and internal finishes are also specified at the level allowing cost estimation. Proposed build-ups are based on common practice in New Zealand, and specifically in Auckland Region.

Appendices to this report include calculations, bill of quantities and structural drawings.

# 1. Assumed Site Conditions

## 1.1. General:

The site is assumed to be located in Auckland, as per the assumptions adopted for the whole research project.

Given the size and nature of the building, it was assumed that it would be located directly outside the CBD as is normally the case for this size multi-residential buildings.

## 1.2. Wind Climate

Auckland and its surroundings are located in wind region A6 as defined in AS/NZS1170.2, therefore the Basic Ultimate Wind Speed was taken as 45m/s.

Despite the assumption of building being located in the city it was considered that, surrounding buildings are likely to be lower. It was also considered that, as typical topography of Auckland region is not flat, the building is likely to be located on the slope. Consequently, terrain surrounding the building was assumed to be category 3 (as per AS/NZS1170).

Since, as stated above, the building is likely to be surrounded by lower building no reduction for shielding was taken into account and the topography of the site was assumed not to be significant. We consider that those assumptions achieve a balance between delivering a conservative solution and keeping the site conditions generic.

Based on the above assumptions, the site wind speed was calculated as 42.3m/s – detailed calculation is included in Appendix B.

### 1.3. Geotechnical Considerations

Typical geology of Auckland region includes volcanic clays and ash deposits overlaying the "basement" of greywacke and basaltic rocks.

In the case of majority of sites the available strength of the ground will be relatively high right from the surface and increasing with depth – this common characteristic was reflected in allowable bearing pressures assumed for the design.

It is not common for Auckland area sites to be affected by liquefaction therefore no measures specific to this hazard were allowed for.

At the same time, significant portion of sites in Auckland area is affected by the soil shrink-swell potential, to allow for that the hypothetical site considered for this design is assumed to be category M, as defined in AS2870.

Based on the above, the Ultimate Bearing Strength has been assumed as 200kPa, to be used with design loads as per AS/NZS1170 and a strength reduction factor of 0.5 (as per table 1 of Verification Method 4, B1/VM4).

To limit settlements the bearing pressure under serviceability loading was limited to 60kPa.

For seismic calculations the soil was assumed to be class C, as defined in NZS1170.5.

### 1.4. Earthquake Climate

Auckland is one of the least seismically active areas of New Zealand.

As recommended by NZS1170.5 the seismic risk factor was taken as 0.14.

As there are no significant active faults in the Auckland region, the near fault factor was taken as 1.0.

## 2. Structure of the Proposed Building

### 2.1. General:

The proposed building is a 6-storey residential structure, rectangular on plan with dimensions of 19x23 meters and a total height of 18m (typical storey height of 3m).

The layout of the building is repetitive for all floors and allows for 4 apartments per floor and associated communication spaces.

### 2.2. Wall Construction:

The structure of the walls comprises cold formed light gauge steel frames formed of top/bottom plates, vertical studs, diagonal braces and horizontal noggins.

As it normal for this type of structure the frames are assumed to have been prefabricated off site (by screwing or riveting individual elements) and assembled on site in parts limited in size by transport considerations (typical frame would be, say, 3x6m).

The profiles forming the structural frame are lipped c-channels with 90mm deep webs and approx.. 40mm flanges.

Thickness of the material varies for different stories to accommodate increasing loads, whilst maintaining economy for lighter loaded upper part of the building.

Channels forming vertical wall studs are, in some instances, doubled in a so called “back to back” configuration. This configuration can in some cases be especially structurally advantageous, as compressive strength of the compound “back to back” section can be higher than the sum of the strengths of studs forming it.

Frame is assumed to be connected together by self-tapping screws (some systems on the market use rivets instead of screws, achieving similar capacities) applied to pre-notched joints between individual members.

Details of individual connections within the frame vary depending on the frame manufacturer, however their capacity is, in almost all cases, limited by the screws.

Consequently, design based on a given material/section properties and identifying the required number of screws is, to an extent, generic and can be applied to various frame manufacturers products despite fine detail of their connections being varied and system-specific.

### **2.3.** Floor Construction:

Floors are assumed to be formed of cold formed deep C sections spanning one way between load bearing walls.

The C sections are set out in line with wall studs to minimise demands on top plates/edge members and also accommodate the module of lining sheets.

The sections have pre-formed, circular service openings to accommodate services that are to be installed in the floor.

It should be noted that, as an alternative to deep C sections, lattice floor joists could be used with similar effect.

### **2.4.** Roof Construction

Roof structure is similar to floor structure formed of deep C sections and, similarly to the floor, could also utilise lattice joists.

### **2.5.** Ground Floor/Foundation Slab

Light gauge steel framed buildings are significantly lighter than buildings constructed using other construction techniques. Even timber framed buildings are significantly heavier.

The proposed foundation scheme has, therefore, been designed to utilise the reduced weight and consequent low demands on foundations.

The proposed scheme comprises a 400mm deep reinforced concrete raft under the whole area of the building. This solution allows to evenly distribute the weight of the building over its footprint and therefore reduce the bearing pressures.

Also, the rigid base that the raft is providing will minimise any adverse effect of differential settlements caused by the moderate plasticity and volume change potential of the assumed soil.

Although not included in current details, use of void formers (cobiax/bubbledeck or similar) could be considered to further reduce the cost of the foundations.

## **2.6.** Connections

### 2.6.1. Connections Within Wall Frame

Refer point 2.2

### 2.6.2. Floor/Roof to Wall Connections

In order to allow the walls to be in direct contact the floors are side fixed rather than resting on top of the them.

This results in the floor load being transferred entirely by the screws as per the details.

The capacity of the screws was calculated in accordance with AS/NZS4600:2005 and sufficient number of screws was provided, firstly between the joist and the perimeter member, then between perimeter member and a corresponding wall stud. The capacity of screws is considered to govern by inspection therefore no additional checks on the local strength of the connected cold steel members are considered necessary.

### 2.6.3. Wall to Wall Connections

Due to the floor being side-fixed the walls of adjacent stories are in direct contact. Connections between those walls are likely to be the most stressed part of the structure with demands increasing for the lower stories as the loads are transferred down the building.

The proposed design approach is based on previously tested hold-down details (to transfer tensile loads) and direct bearing for compression loads. It should be noted that direct bearing was assumed, between studs ant top/bottom plates they sit in as well as between adjacent top/bottom plates.

Different type of detail was employed for different levels to accommodate varying demands.

Details of all proposed connections are presented on the drawings in the appendix.

## 3. Analysis and Design

### **3.1.** General:

Analysis and design of the proposed building has been completed by a combination of manual calculations and computer modelling.

Where possible the forces were directly calculated by hand (out of plane bending of walls, design of the floor for gravity loading etc.).

Computer modelling was employed to determine internal forces arising from global load transfer through the structure (axial loads in wall studs and braces).

### **3.2.** Floor/Roof Design Methodology

Floors are assumed to span 1 way between walls and are designed as simply supported. Internal forces and required stiffnesses were calculated using simple manual calculation based on loading as stated in the appendix.

The member properties and capacities were checked in accordance with AS/NZS4600:2005 using proprietary software, ColdSteel.

### 3.3. Wall Design

Walls at each level were designed separately to rationalise the material usage.

Only one section size, however, was used for all members within a given storey based on a most stressed member at that level – this simplification is normal for steel framing due to most prefabricated steel framing systems only allowing for one section type to be present in a prefabricated frame.

### 3.4. Connections

Connections have been designed manually based on forces from relevant element design.

For inter-story hold-down connections, the same rationalisation was implemented as for stud design, i.e. connections at each level are designed for a max. force for that specific storey.

# 4. Non-Structural Elements

## 4.1. General:

Non-structural elements within the scope of this research include internal and external wall linings and floor/ceiling/roof finishes.

## 4.2. Roof Finishes:

Typical roof finish for this type of development would typically include the following build-up:

- Coloursteel Longrun LT7 profiled metal;
- Thermakraft 215 roof underlay;
- Ventilated, isolated battens on top of purlins (Cavibat or similar);
- Cold formed roof tophat purlins;
- Structural framing as per details;
- Mineral wool insulation between structural framing;
- Cold formed ceiling battens;
- 12mm gypsum plasterboard.

## 4.3. Wall Finishes:

Typical wall finish for this type of development would typically include the following build-up:

- LT7 vertical profiled metal wall cladding;
- Ventilated isolated battens on top of structural battens;
- Cold formed or H3.2 timber battens horizontally;
- Structural wall framing;
- Two layers of 13mm GIB Fyreline or similar (both sides for internal walls).

**4.4.** Floor Finishes:

Typical floor finish for this type of development would typically include the following build-up:

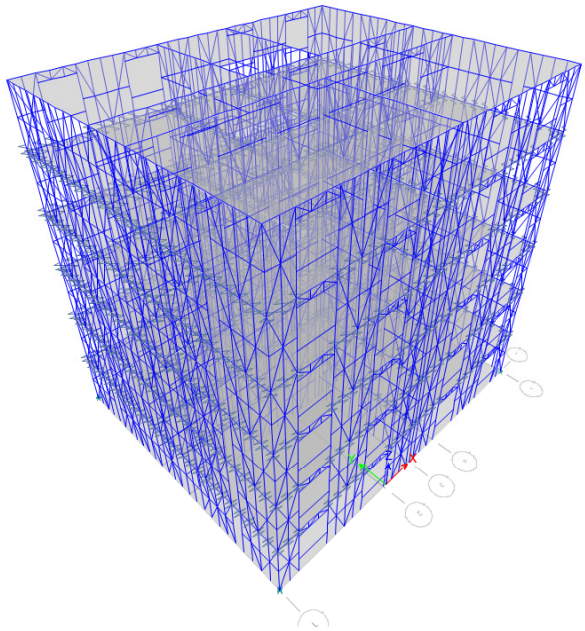
- 20mm particleboard;
- Structural floor framing with 75mm mineral wool between;
- GIB Rondo (or similar) ceiling battens on acoustic brackets (GIB quiet clip or similar);
- One layer of 16mm GIB Fyreline (or similar);
- One layer of 13mm GIB Fyreline.

Floor finish proposed above allows for fire resistance rating of 60/60/60

Appendix A:

Structural Analysis Report - ETABS

ETABS® version 17
Integrated Building Design Software



# FEM Report

Model File: v0, Revision 0
9/08/2018

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# 1 Structure Data

This chapter provides model geometry information, including items such as story levels, point coordinates, and element connectivity.

## 1.1 Story Data

**Table 1.1 - Story Data**

| Name | Height mm | Elevation mm | Master Story | Similar To | Splice Story |
|---|---|---|---|---|---|
| level 6 | 3205 | 19225 | Yes | None | No |
| level 5 | 3205 | 16020 | Yes | None | No |
| level 4 | 3205 | 12815 | Yes | None | No |
| level 3 | 3205 | 9610 | Yes | None | No |
| level 2 | 3205 | 6405 | Yes | None | No |
| level 1 | 3200 | 3200 | Yes | None | No |
| Base | 0 | 0 | No | None | No |

## 1.2 Grid Data

**Table 1.2 - Grid Systems**

| Name | Type | Story Range | X Origin m | Y Origin m | Rotation deg | Bubble Size mm | Color |
|---|---|---|---|---|---|---|---|
| HERA | Cartesian | Default | 0 | 0 | 0 | 1250 | ffa0a0a0 |

**Table 1.3 - Grid Lines**

| Grid System | Grid Direction | Grid ID | Visible | Bubble Location | X1 m | Y1 m | X2 m | Y2 m |
|---|---|---|---|---|---|---|---|---|
| HERA | General | 1 | Yes | End | -7.5 | 15.86 | -7.5 | 0 |
| HERA | General | 2 | Yes | End | -0.18 | 15.86 | -0.18 | -0.115 |
| HERA | General | 3 | Yes | End | 1.955 | 6.71 | 1.955 | 0 |
| HERA | General | 4 | Yes | End | 4.09 | 15.86 | 4.09 | 0 |
| HERA | General | 5 | Yes | End | 11.41 | 15.86 | 11.41 | 0 |
| HERA | General | 6 | Yes | End | -7.5 | 0 | 11.41 | 0 |
| HERA | General | 7 | Yes | End | -7.5 | 6.71 | 11.41 | 6.71 |
| HERA | General | 8 | Yes | End | -7.5 | 9.15 | 11.41 | 9.15 |
| HERA | General | 9 | Yes | End | -7.5 | 15.86 | 11.41 | 15.86 |

## 1.3 Mass

**Table 1.4 - Mass Source**

| Name | Include Elements | Include Added Mass | Include Loads | Include Lateral | Include Vertical | Lump at Stories | IsDefault | Load Pattern | Multiplier |
|---|---|---|---|---|---|---|---|---|---|
| MsSrc1 | Yes | Yes | Yes | Yes | No | Yes | Yes | Q | 0.15 |

**Table 1.5 - Centers of Mass and Rigidity**

| Story | Diaphragm | Mass X kg | Mass Y kg | XCM m | YCM m | Cumulative X kg | Cumulative Y kg | XCCM m | YCCM m | XCR m | YCR m |
|---|---|---|---|---|---|---|---|---|---|---|---|
| level 1 | I-1 | 0 | 0 | 1.9543 | 7.8976 | 0 | 0 | 0 | 0 | | |
| level 2 | I-2 | 0 | 0 | 1.9544 | 7.8929 | 0 | 0 | 0 | 0 | | |
| level 3 | I-3 | 0 | 0 | 1.9544 | 7.8908 | 0 | 0 | 0 | 0 | | |
| level 4 | I-4 | 0 | 0 | 1.955 | 7.8833 | 0 | 0 | 0 | 0 | | |
| level 5 | I-5 | 0 | 0 | 1.9546 | 7.8858 | 0 | 0 | 0 | 0 | | |
| level 6 | I-6 | 0 | 0 | 1.9549 | 7.8795 | 0 | 0 | 0 | 0 | | |

**Table 1.6 - Mass Summary by Diaphragm**

| Story | Diaphragm | Mass X kg | Mass Y kg | Mass Moment of Inertia ton-m² | X Mass Center m | Y Mass Center m |
|---|---|---|---|---|---|---|
| level 6 | I-6 | 0 | 0 | 0 | 1.9549 | 7.8795 |
| level 5 | I-5 | 0 | 0 | 0 | 1.9546 | 7.8858 |
| level 4 | I-4 | 0 | 0 | 0 | 1.955 | 7.8833 |
| level 3 | I-3 | 0 | 0 | 0 | 1.9544 | 7.8908 |
| level 2 | I-2 | 0 | 0 | 0 | 1.9544 | 7.8929 |
| level 1 | I-1 | 0 | 0 | 0 | 1.9543 | 7.8976 |

**Table 1.7 - Mass Summary by Story**

| Story | UX kg | UY kg | UZ kg |
|---|---|---|---|
| level 6 | 49939.76 | 49939.76 | 0 |
| level 5 | 51149.33 | 51149.33 | 0 |
| level 4 | 47513.67 | 47513.67 | 0 |
| level 3 | 52152.14 | 52152.14 | 0 |
| level 2 | 52546.82 | 52546.82 | 0 |
| level 1 | 53533.69 | 53533.69 | 0 |
| Base | 304902.89 | 304902.89 | 0 |

## 1.4 Groups

**Table 1.8 - Group Definitions**

| Name | Color |
|---|---|
| All | Yellow |

# 2 Properties

This chapter provides property information for materials, frame sections, shell sections, and links.

## 2.1 Materials

**Table 2.1 - Material Properties - Summary**

| Name | Type | E MPa | v | Unit Weight kN/m³ | Design Strengths |
|---|---|---|---|---|---|
| 30MPa | Concrete | 25742.96 | 0.2 | 24 | Fc=30 MPa |
| A416Gr270 | Tendon | 203395.36 | 0.3 | 76.9729 | Fy=1689.91 MPa, Fu=1861.58 MPa |
| A615Gr60 | Rebar | 203395.36 | 0.3 | 76.9729 | Fy=413.69 MPa, Fu=620.53 MPa |
| AS1397-G350 | Steel | 205000 | 0.3 | 76.9729 | Fy=350 MPa, Fu=420 MPa |
| AS1397-G550 | Steel | 205000 | 0.3 | 76.9729 | Fy=550 MPa, Fu=550 MPa |

## 2.2 Frame Sections

**Table 2.2 - Frame Sections - Summary**

| Name | Material | Shape |
|---|---|---|
| 90LC115 | AS1397-G550 | Cold Formed C |
| 90LC115BTB | AS1397-G550 | Cold Formed C |
| 90LC150 | AS1397-G350 | Cold Formed C |
| 90LC150BTB | AS1397-G350 | Cold Formed C |
| 90LC95BTB | AS1397-G550 | Cold Formed C |

## 2.3 Links

**Table 2.3 - Link Properties - Summary**

| Name | Type | Degrees of Freedom | Mass kg | Weight kN | DefLength m | DefArea m² |
|---|---|---|---|---|---|---|
| HDx1 | Multilinear Elastic | U1; U2; U3 | 0 | 0 | 0.001 | 0 |

# 3 Assignments

This chapter provides a listing of the assignments applied to the model.

## 3.1 Joint Assignments

**Table 3.1 - Joint Assignments - Summary**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 1 | 3370 | From Area | | Yes |
| level 6 | 2 | 3371 | From Area | | Yes |
| level 6 | 3 | 3372 | From Area | | Yes |
| level 6 | 4 | 3373 | From Area | | Yes |
| level 6 | 5 | 3374 | From Area | | Yes |
| level 6 | 6 | 3375 | From Area | | Yes |
| level 6 | 7 | 3376 | From Area | | Yes |
| level 6 | 8 | 3377 | From Area | | Yes |
| level 6 | 9 | 3379 | From Area | | Yes |
| level 6 | 10 | 3380 | From Area | | Yes |
| level 6 | 11 | 3381 | From Area | | Yes |
| level 6 | 12 | 3382 | From Area | | Yes |
| level 6 | 13 | 3561 | From Area | | Yes |
| level 6 | 14 | 3383 | From Area | | Yes |
| level 6 | 15 | 3415 | From Area | | Yes |
| level 6 | 16 | 3414 | From Area | | Yes |
| level 6 | 17 | 3413 | From Area | | Yes |
| level 6 | 18 | 3407 | From Area | | Yes |
| level 6 | 19 | 3412 | From Area | | Yes |
| level 6 | 20 | 3411 | From Area | | Yes |
| level 6 | 21 | 3410 | From Area | | Yes |
| level 6 | 22 | 3406 | From Area | | Yes |
| level 6 | 23 | 3405 | From Area | | Yes |
| level 6 | 24 | 3409 | From Area | | Yes |
| level 6 | 25 | 3404 | From Area | | Yes |
| level 6 | 26 | 3450 | From Area | | Yes |
| level 6 | 27 | 3562 | From Area | | Yes |
| level 6 | 28 | 3637 | From Area | | Yes |
| level 6 | 29 | 3451 | From Area | | Yes |
| level 6 | 30 | 3563 | From Area | | Yes |
| level 6 | 31 | 3638 | From Area | | Yes |
| level 6 | 32 | 3452 | From Area | | Yes |
| level 6 | 33 | 3564 | From Area | | Yes |
| level 6 | 34 | 3639 | From Area | | Yes |
| level 6 | 35 | 3453 | From Area | | Yes |
| level 6 | 36 | 3565 | From Area | | Yes |
| level 6 | 37 | 3640 | From Area | | Yes |
| level 6 | 38 | 3454 | From Area | | Yes |
| level 6 | 39 | 3566 | From Area | | Yes |
| level 6 | 40 | 3641 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 41 | 3455 | From Area | | Yes |
| level 6 | 42 | 3567 | From Area | | Yes |
| level 6 | 43 | 3642 | From Area | | Yes |
| level 6 | 44 | 3456 | From Area | | Yes |
| level 6 | 45 | 3568 | From Area | | Yes |
| level 6 | 46 | 3643 | From Area | | Yes |
| level 6 | 47 | 3457 | From Area | | Yes |
| level 6 | 48 | 3569 | From Area | | Yes |
| level 6 | 49 | 3644 | From Area | | Yes |
| level 6 | 50 | 3458 | From Area | | Yes |
| level 6 | 51 | 3570 | From Area | | Yes |
| level 6 | 52 | 3645 | From Area | | Yes |
| level 6 | 53 | 3459 | From Area | | Yes |
| level 6 | 54 | 3571 | From Area | | Yes |
| level 6 | 55 | 3646 | From Area | | Yes |
| level 6 | 56 | 3460 | From Area | | Yes |
| level 6 | 57 | 3504 | From Area | | Yes |
| level 6 | 58 | 3505 | From Area | | Yes |
| level 6 | 59 | 3506 | From Area | | Yes |
| level 6 | 60 | 3499 | From Area | | Yes |
| level 6 | 61 | 3503 | From Area | | Yes |
| level 6 | 62 | 3524 | From Area | | Yes |
| level 6 | 63 | 3523 | From Area | | Yes |
| level 6 | 64 | 3522 | From Area | | Yes |
| level 6 | 65 | 3521 | From Area | | Yes |
| level 6 | 66 | 3520 | From Area | | Yes |
| level 6 | 67 | 3519 | From Area | | Yes |
| level 6 | 68 | 3518 | From Area | | Yes |
| level 6 | 69 | 3517 | From Area | | Yes |
| level 6 | 70 | 3516 | From Area | | Yes |
| level 6 | 71 | 3560 | From Area | | Yes |
| level 6 | 72 | 3515 | From Area | | Yes |
| level 6 | 73 | 3514 | From Area | | Yes |
| level 6 | 74 | 3513 | From Area | | Yes |
| level 6 | 75 | 3512 | From Area | | Yes |
| level 6 | 76 | 3511 | From Area | | Yes |
| level 6 | 77 | 3510 | From Area | | Yes |
| level 6 | 78 | 3509 | From Area | | Yes |
| level 6 | 79 | 3508 | From Area | | Yes |
| level 6 | 80 | 3507 | From Area | | Yes |
| level 6 | 81 | 3502 | From Area | | Yes |
| level 6 | 82 | 3501 | From Area | | Yes |
| level 6 | 83 | 3525 | From Area | | Yes |
| level 6 | 84 | 3526 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 85 | 3527 | From Area | | Yes |
| level 6 | 86 | 3500 | From Area | | Yes |
| level 6 | 87 | 3461 | From Area | | Yes |
| level 6 | 88 | 3647 | From Area | | Yes |
| level 6 | 89 | 3462 | From Area | | Yes |
| level 6 | 90 | 3648 | From Area | | Yes |
| level 6 | 91 | 3463 | From Area | | Yes |
| level 6 | 92 | 3649 | From Area | | Yes |
| level 6 | 93 | 3464 | From Area | | Yes |
| level 6 | 94 | 3589 | From Area | | Yes |
| level 6 | 95 | 3590 | From Area | | Yes |
| level 6 | 96 | 3591 | From Area | | Yes |
| level 6 | 97 | 3584 | From Area | | Yes |
| level 6 | 98 | 3588 | From Area | | Yes |
| level 6 | 99 | 3606 | From Area | | Yes |
| level 6 | 100 | 3605 | From Area | | Yes |
| level 6 | 101 | 3604 | From Area | | Yes |
| level 6 | 102 | 3603 | From Area | | Yes |
| level 6 | 103 | 3602 | From Area | | Yes |
| level 6 | 104 | 3601 | From Area | | Yes |
| level 6 | 105 | 3600 | From Area | | Yes |
| level 6 | 106 | 3599 | From Area | | Yes |
| level 6 | 107 | 3636 | From Area | | Yes |
| level 6 | 108 | 3598 | From Area | | Yes |
| level 6 | 109 | 3597 | From Area | | Yes |
| level 6 | 110 | 3596 | From Area | | Yes |
| level 6 | 111 | 3595 | From Area | | Yes |
| level 6 | 112 | 3594 | From Area | | Yes |
| level 6 | 113 | 3593 | From Area | | Yes |
| level 6 | 114 | 3592 | From Area | | Yes |
| level 6 | 115 | 3587 | From Area | | Yes |
| level 6 | 116 | 3586 | From Area | | Yes |
| level 6 | 117 | 3607 | From Area | | Yes |
| level 6 | 118 | 3608 | From Area | | Yes |
| level 6 | 119 | 3609 | From Area | | Yes |
| level 6 | 120 | 3585 | From Area | | Yes |
| level 6 | 121 | 3465 | From Area | | Yes |
| level 6 | 122 | 3804 | From Area | | Yes |
| level 6 | 123 | 3762 | From Area | | Yes |
| level 6 | 124 | 3650 | From Area | | Yes |
| level 6 | 125 | 3466 | From Area | | Yes |
| level 6 | 126 | 3805 | From Area | | Yes |
| level 6 | 127 | 3763 | From Area | | Yes |
| level 6 | 128 | 3651 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 129 | 3467 | From Area | | Yes |
| level 6 | 130 | 3806 | From Area | | Yes |
| level 6 | 131 | 3764 | From Area | | Yes |
| level 6 | 132 | 3652 | From Area | | Yes |
| level 6 | 133 | 3473 | From Area | | Yes |
| level 6 | 134 | 3807 | From Area | | Yes |
| level 6 | 135 | 3765 | From Area | | Yes |
| level 6 | 136 | 3658 | From Area | | Yes |
| level 6 | 137 | 3474 | From Area | | Yes |
| level 6 | 138 | 3808 | From Area | | Yes |
| level 6 | 139 | 3766 | From Area | | Yes |
| level 6 | 140 | 3659 | From Area | | Yes |
| level 6 | 141 | 3475 | From Area | | Yes |
| level 6 | 142 | 3809 | From Area | | Yes |
| level 6 | 143 | 3767 | From Area | | Yes |
| level 6 | 144 | 3660 | From Area | | Yes |
| level 6 | 145 | 3476 | From Area | | Yes |
| level 6 | 146 | 3810 | From Area | | Yes |
| level 6 | 147 | 3768 | From Area | | Yes |
| level 6 | 148 | 3661 | From Area | | Yes |
| level 6 | 149 | 3477 | From Area | | Yes |
| level 6 | 150 | 3811 | From Area | | Yes |
| level 6 | 151 | 3769 | From Area | | Yes |
| level 6 | 152 | 3662 | From Area | | Yes |
| level 6 | 153 | 3478 | From Area | | Yes |
| level 6 | 154 | 3812 | From Area | | Yes |
| level 6 | 155 | 3770 | From Area | | Yes |
| level 6 | 156 | 3663 | From Area | | Yes |
| level 6 | 157 | 3479 | From Area | | Yes |
| level 6 | 158 | 3813 | From Area | | Yes |
| level 6 | 159 | 3771 | From Area | | Yes |
| level 6 | 160 | 3664 | From Area | | Yes |
| level 6 | 161 | 3480 | From Area | | Yes |
| level 6 | 162 | 3685 | From Area | | Yes |
| level 6 | 163 | 3686 | From Area | | Yes |
| level 6 | 164 | 3687 | From Area | | Yes |
| level 6 | 165 | 3688 | From Area | | Yes |
| level 6 | 166 | 3689 | From Area | | Yes |
| level 6 | 167 | 3690 | From Area | | Yes |
| level 6 | 168 | 3691 | From Area | | Yes |
| level 6 | 169 | 3693 | From Area | | Yes |
| level 6 | 170 | 3694 | From Area | | Yes |
| level 6 | 171 | 3695 | From Area | | Yes |
| level 6 | 172 | 3696 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 173 | 3697 | From Area | | Yes |
| level 6 | 174 | 3727 | From Area | | Yes |
| level 6 | 175 | 3726 | From Area | | Yes |
| level 6 | 176 | 3725 | From Area | | Yes |
| level 6 | 177 | 3719 | From Area | | Yes |
| level 6 | 178 | 3724 | From Area | | Yes |
| level 6 | 179 | 3723 | From Area | | Yes |
| level 6 | 180 | 3722 | From Area | | Yes |
| level 6 | 181 | 3718 | From Area | | Yes |
| level 6 | 182 | 3717 | From Area | | Yes |
| level 6 | 183 | 3721 | From Area | | Yes |
| level 6 | 184 | 3665 | From Area | | Yes |
| level 6 | 185 | 3378 | From Area | | Yes |
| level 6 | 186 | 3384 | From Area | | Yes |
| level 6 | 187 | 3385 | From Area | | Yes |
| level 6 | 188 | 3386 | From Area | | Yes |
| level 6 | 189 | 3387 | From Area | | Yes |
| level 6 | 190 | 3388 | From Area | | Yes |
| level 6 | 191 | 3389 | From Area | | Yes |
| level 6 | 192 | 3390 | From Area | | Yes |
| level 6 | 193 | 3391 | From Area | | Yes |
| level 6 | 194 | 3392 | From Area | | Yes |
| level 6 | 195 | 3393 | From Area | | Yes |
| level 6 | 196 | 3394 | From Area | | Yes |
| level 6 | 197 | 3395 | From Area | | Yes |
| level 6 | 198 | 3396 | From Area | | Yes |
| level 6 | 199 | 3397 | From Area | | Yes |
| level 6 | 200 | 3398 | From Area | | Yes |
| level 6 | 201 | 3399 | From Area | | Yes |
| level 6 | 202 | 3400 | From Area | | Yes |
| level 6 | 203 | 3401 | From Area | | Yes |
| level 6 | 204 | 3402 | From Area | | Yes |
| level 6 | 205 | 3403 | From Area | | Yes |
| level 6 | 206 | 3408 | From Area | | Yes |
| level 6 | 207 | 3416 | From Area | | Yes |
| level 6 | 208 | 3417 | From Area | | Yes |
| level 6 | 209 | 3418 | From Area | | Yes |
| level 6 | 210 | 3419 | From Area | | Yes |
| level 6 | 211 | 3420 | From Area | | Yes |
| level 6 | 212 | 3421 | From Area | | Yes |
| level 6 | 213 | 3422 | From Area | | Yes |
| level 6 | 214 | 3423 | From Area | | Yes |
| level 6 | 215 | 3424 | From Area | | Yes |
| level 6 | 216 | 3425 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 217 | 3426 | From Area | | Yes |
| level 6 | 218 | 3427 | From Area | | Yes |
| level 6 | 219 | 3428 | From Area | | Yes |
| level 6 | 220 | 3429 | From Area | | Yes |
| level 6 | 221 | 3430 | From Area | | Yes |
| level 6 | 222 | 3431 | From Area | | Yes |
| level 6 | 223 | 3432 | From Area | | Yes |
| level 6 | 224 | 3433 | From Area | | Yes |
| level 6 | 225 | 3434 | From Area | | Yes |
| level 6 | 226 | 3435 | From Area | | Yes |
| level 6 | 227 | 3436 | From Area | | Yes |
| level 6 | 228 | 3437 | From Area | | Yes |
| level 6 | 229 | 3438 | From Area | | Yes |
| level 6 | 230 | 3439 | From Area | | Yes |
| level 6 | 231 | 3440 | From Area | | Yes |
| level 6 | 232 | 3441 | From Area | | Yes |
| level 6 | 233 | 3442 | From Area | | Yes |
| level 6 | 234 | 3443 | From Area | | Yes |
| level 6 | 235 | 3444 | From Area | | Yes |
| level 6 | 236 | 3445 | From Area | | Yes |
| level 6 | 237 | 3446 | From Area | | Yes |
| level 6 | 238 | 3447 | From Area | | Yes |
| level 6 | 239 | 3448 | From Area | | Yes |
| level 6 | 240 | 3449 | From Area | | Yes |
| level 6 | 241 | 3468 | From Area | | Yes |
| level 6 | 242 | 3469 | From Area | | Yes |
| level 6 | 243 | 3470 | From Area | | Yes |
| level 6 | 244 | 3471 | From Area | | Yes |
| level 6 | 245 | 3472 | From Area | | Yes |
| level 6 | 246 | 3481 | From Area | | Yes |
| level 6 | 247 | 3482 | From Area | | Yes |
| level 6 | 248 | 3483 | From Area | | Yes |
| level 6 | 249 | 3484 | From Area | | Yes |
| level 6 | 250 | 3485 | From Area | | Yes |
| level 6 | 251 | 3486 | From Area | | Yes |
| level 6 | 252 | 3487 | From Area | | Yes |
| level 6 | 253 | 3488 | From Area | | Yes |
| level 6 | 254 | 3489 | From Area | | Yes |
| level 6 | 255 | 3490 | From Area | | Yes |
| level 6 | 256 | 3491 | From Area | | Yes |
| level 6 | 257 | 3492 | From Area | | Yes |
| level 6 | 258 | 3493 | From Area | | Yes |
| level 6 | 259 | 3494 | From Area | | Yes |
| level 6 | 260 | 3495 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 261 | 3496 | From Area | | Yes |
| level 6 | 262 | 3497 | From Area | | Yes |
| level 6 | 263 | 3498 | From Area | | Yes |
| level 6 | 264 | 3528 | From Area | | Yes |
| level 6 | 265 | 3529 | From Area | | Yes |
| level 6 | 266 | 3530 | From Area | | Yes |
| level 6 | 267 | 3531 | From Area | | Yes |
| level 6 | 268 | 3532 | From Area | | Yes |
| level 6 | 269 | 3533 | From Area | | Yes |
| level 6 | 270 | 3534 | From Area | | Yes |
| level 6 | 271 | 3535 | From Area | | Yes |
| level 6 | 272 | 3536 | From Area | | Yes |
| level 6 | 273 | 3537 | From Area | | Yes |
| level 6 | 274 | 3538 | From Area | | Yes |
| level 6 | 275 | 3539 | From Area | | Yes |
| level 6 | 276 | 3540 | From Area | | Yes |
| level 6 | 277 | 3541 | From Area | | Yes |
| level 6 | 278 | 3542 | From Area | | Yes |
| level 6 | 279 | 3543 | From Area | | Yes |
| level 6 | 280 | 3544 | From Area | | Yes |
| level 6 | 281 | 3545 | From Area | | Yes |
| level 6 | 282 | 3546 | From Area | | Yes |
| level 6 | 283 | 3547 | From Area | | Yes |
| level 6 | 284 | 3548 | From Area | | Yes |
| level 6 | 285 | 3549 | From Area | | Yes |
| level 6 | 286 | 3550 | From Area | | Yes |
| level 6 | 287 | 3551 | From Area | | Yes |
| level 6 | 288 | 3552 | From Area | | Yes |
| level 6 | 289 | 3553 | From Area | | Yes |
| level 6 | 290 | 3554 | From Area | | Yes |
| level 6 | 291 | 3555 | From Area | | Yes |
| level 6 | 292 | 3556 | From Area | | Yes |
| level 6 | 293 | 3557 | From Area | | Yes |
| level 6 | 294 | 3558 | From Area | | Yes |
| level 6 | 295 | 3559 | From Area | | Yes |
| level 6 | 296 | 3572 | From Area | | Yes |
| level 6 | 297 | 3573 | From Area | | Yes |
| level 6 | 298 | 3574 | From Area | | Yes |
| level 6 | 299 | 3575 | From Area | | Yes |
| level 6 | 300 | 3576 | From Area | | Yes |
| level 6 | 301 | 3577 | From Area | | Yes |
| level 6 | 302 | 3578 | From Area | | Yes |
| level 6 | 303 | 3579 | From Area | | Yes |
| level 6 | 304 | 3580 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 305 | 3581 | From Area | | Yes |
| level 6 | 306 | 3582 | From Area | | Yes |
| level 6 | 307 | 3583 | From Area | | Yes |
| level 6 | 308 | 3610 | From Area | | Yes |
| level 6 | 309 | 3611 | From Area | | Yes |
| level 6 | 310 | 3612 | From Area | | Yes |
| level 6 | 311 | 3613 | From Area | | Yes |
| level 6 | 312 | 3614 | From Area | | Yes |
| level 6 | 313 | 3615 | From Area | | Yes |
| level 6 | 314 | 3616 | From Area | | Yes |
| level 6 | 315 | 3617 | From Area | | Yes |
| level 6 | 316 | 3618 | From Area | | Yes |
| level 6 | 317 | 3619 | From Area | | Yes |
| level 6 | 318 | 3620 | From Area | | Yes |
| level 6 | 319 | 3621 | From Area | | Yes |
| level 6 | 320 | 3622 | From Area | | Yes |
| level 6 | 321 | 3623 | From Area | | Yes |
| level 6 | 322 | 3624 | From Area | | Yes |
| level 6 | 323 | 3625 | From Area | | Yes |
| level 6 | 324 | 3626 | From Area | | Yes |
| level 6 | 325 | 3627 | From Area | | Yes |
| level 6 | 326 | 3628 | From Area | | Yes |
| level 6 | 327 | 3629 | From Area | | Yes |
| level 6 | 328 | 3630 | From Area | | Yes |
| level 6 | 329 | 3631 | From Area | | Yes |
| level 6 | 330 | 3632 | From Area | | Yes |
| level 6 | 331 | 3633 | From Area | | Yes |
| level 6 | 332 | 3634 | From Area | | Yes |
| level 6 | 333 | 3635 | From Area | | Yes |
| level 6 | 334 | 3653 | From Area | | Yes |
| level 6 | 335 | 3654 | From Area | | Yes |
| level 6 | 336 | 3655 | From Area | | Yes |
| level 6 | 337 | 3656 | From Area | | Yes |
| level 6 | 338 | 3657 | From Area | | Yes |
| level 6 | 339 | 3666 | From Area | | Yes |
| level 6 | 340 | 3667 | From Area | | Yes |
| level 6 | 341 | 3668 | From Area | | Yes |
| level 6 | 342 | 3669 | From Area | | Yes |
| level 6 | 343 | 3670 | From Area | | Yes |
| level 6 | 344 | 3671 | From Area | | Yes |
| level 6 | 345 | 3672 | From Area | | Yes |
| level 6 | 346 | 3673 | From Area | | Yes |
| level 6 | 347 | 3674 | From Area | | Yes |
| level 6 | 348 | 3675 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 349 | 3676 | From Area | | Yes |
| level 6 | 350 | 3677 | From Area | | Yes |
| level 6 | 351 | 3678 | From Area | | Yes |
| level 6 | 352 | 3679 | From Area | | Yes |
| level 6 | 353 | 3680 | From Area | | Yes |
| level 6 | 354 | 3681 | From Area | | Yes |
| level 6 | 355 | 3682 | From Area | | Yes |
| level 6 | 356 | 3683 | From Area | | Yes |
| level 6 | 357 | 3684 | From Area | | Yes |
| level 6 | 358 | 3692 | From Area | | Yes |
| level 6 | 359 | 3698 | From Area | | Yes |
| level 6 | 360 | 3699 | From Area | | Yes |
| level 6 | 361 | 3700 | From Area | | Yes |
| level 6 | 362 | 3701 | From Area | | Yes |
| level 6 | 363 | 3702 | From Area | | Yes |
| level 6 | 364 | 3703 | From Area | | Yes |
| level 6 | 365 | 3704 | From Area | | Yes |
| level 6 | 366 | 3705 | From Area | | Yes |
| level 6 | 367 | 3706 | From Area | | Yes |
| level 6 | 368 | 3707 | From Area | | Yes |
| level 6 | 369 | 3708 | From Area | | Yes |
| level 6 | 370 | 3709 | From Area | | Yes |
| level 6 | 371 | 3710 | From Area | | Yes |
| level 6 | 372 | 3711 | From Area | | Yes |
| level 6 | 373 | 3712 | From Area | | Yes |
| level 6 | 374 | 3713 | From Area | | Yes |
| level 6 | 375 | 3714 | From Area | | Yes |
| level 6 | 376 | 3715 | From Area | | Yes |
| level 6 | 377 | 3716 | From Area | | Yes |
| level 6 | 378 | 3720 | From Area | | Yes |
| level 6 | 379 | 3728 | From Area | | Yes |
| level 6 | 380 | 3729 | From Area | | Yes |
| level 6 | 381 | 3730 | From Area | | Yes |
| level 6 | 382 | 3731 | From Area | | Yes |
| level 6 | 383 | 3732 | From Area | | Yes |
| level 6 | 384 | 3733 | From Area | | Yes |
| level 6 | 385 | 3734 | From Area | | Yes |
| level 6 | 386 | 3735 | From Area | | Yes |
| level 6 | 387 | 3736 | From Area | | Yes |
| level 6 | 388 | 3737 | From Area | | Yes |
| level 6 | 389 | 3738 | From Area | | Yes |
| level 6 | 390 | 3739 | From Area | | Yes |
| level 6 | 391 | 3740 | From Area | | Yes |
| level 6 | 392 | 3741 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 393 | 3742 | From Area | | Yes |
| level 6 | 394 | 3743 | From Area | | Yes |
| level 6 | 395 | 3744 | From Area | | Yes |
| level 6 | 396 | 3745 | From Area | | Yes |
| level 6 | 397 | 3746 | From Area | | Yes |
| level 6 | 398 | 3747 | From Area | | Yes |
| level 6 | 399 | 3748 | From Area | | Yes |
| level 6 | 400 | 3749 | From Area | | Yes |
| level 6 | 401 | 3750 | From Area | | Yes |
| level 6 | 402 | 3751 | From Area | | Yes |
| level 6 | 403 | 3752 | From Area | | Yes |
| level 6 | 404 | 3753 | From Area | | Yes |
| level 6 | 405 | 3754 | From Area | | Yes |
| level 6 | 406 | 3755 | From Area | | Yes |
| level 6 | 407 | 3756 | From Area | | Yes |
| level 6 | 408 | 3757 | From Area | | Yes |
| level 6 | 409 | 3758 | From Area | | Yes |
| level 6 | 410 | 3759 | From Area | | Yes |
| level 6 | 411 | 3760 | From Area | | Yes |
| level 6 | 412 | 3761 | From Area | | Yes |
| level 6 | 413 | 3772 | From Area | | Yes |
| level 6 | 414 | 3773 | From Area | | Yes |
| level 6 | 415 | 3774 | From Area | | Yes |
| level 6 | 416 | 3775 | From Area | | Yes |
| level 6 | 417 | 3776 | From Area | | Yes |
| level 6 | 418 | 3777 | From Area | | Yes |
| level 6 | 419 | 3778 | From Area | | Yes |
| level 6 | 420 | 3779 | From Area | | Yes |
| level 6 | 421 | 3780 | From Area | | Yes |
| level 6 | 422 | 3781 | From Area | | Yes |
| level 6 | 423 | 3782 | From Area | | Yes |
| level 6 | 424 | 3783 | From Area | | Yes |
| level 6 | 425 | 3784 | From Area | | Yes |
| level 6 | 426 | 3785 | From Area | | Yes |
| level 6 | 427 | 3786 | From Area | | Yes |
| level 6 | 428 | 3787 | From Area | | Yes |
| level 6 | 429 | 3788 | From Area | | Yes |
| level 6 | 430 | 3789 | From Area | | Yes |
| level 6 | 431 | 3790 | From Area | | Yes |
| level 6 | 432 | 3791 | From Area | | Yes |
| level 6 | 433 | 3792 | From Area | | Yes |
| level 6 | 434 | 3793 | From Area | | Yes |
| level 6 | 435 | 3794 | From Area | | Yes |
| level 6 | 436 | 3795 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 437 | 3796 | From Area | | Yes |
| level 6 | 438 | 3797 | From Area | | Yes |
| level 6 | 439 | 3798 | From Area | | Yes |
| level 6 | 440 | 3799 | From Area | | Yes |
| level 6 | 441 | 3800 | From Area | | Yes |
| level 6 | 442 | 3801 | From Area | | Yes |
| level 6 | 443 | 3802 | From Area | | Yes |
| level 6 | 444 | 3803 | From Area | | Yes |
| level 6 | 445 | 3814 | From Area | | Yes |
| level 6 | 446 | 3815 | From Area | | Yes |
| level 6 | 447 | 3816 | From Area | | Yes |
| level 6 | 448 | 3817 | From Area | | Yes |
| level 6 | 449 | 3818 | From Area | | Yes |
| level 6 | 450 | 3819 | From Area | | Yes |
| level 6 | 451 | 3820 | From Area | | Yes |
| level 6 | 452 | 3821 | From Area | | Yes |
| level 6 | 453 | 3822 | From Area | | Yes |
| level 6 | 454 | 3823 | From Area | | Yes |
| level 6 | 455 | 3824 | From Area | | Yes |
| level 6 | 456 | 1376 | From Area | | Yes |
| level 6 | 457 | 1377 | From Area | | Yes |
| level 6 | 458 | 1378 | From Area | | Yes |
| level 6 | 459 | 1379 | From Area | | Yes |
| level 6 | 460 | 1380 | From Area | | Yes |
| level 6 | 461 | 1381 | From Area | | Yes |
| level 6 | 462 | 1382 | From Area | | Yes |
| level 6 | 463 | 1383 | From Area | | Yes |
| level 6 | 464 | 1384 | From Area | | Yes |
| level 6 | 465 | 1385 | From Area | | Yes |
| level 6 | 466 | 1386 | From Area | | Yes |
| level 6 | 467 | 1387 | From Area | | Yes |
| level 6 | 468 | 1388 | From Area | | Yes |
| level 6 | 469 | 1389 | From Area | | Yes |
| level 6 | 470 | 1390 | From Area | | Yes |
| level 6 | 471 | 1391 | From Area | | Yes |
| level 6 | 472 | 1392 | From Area | | Yes |
| level 6 | 473 | 1393 | From Area | | Yes |
| level 6 | 474 | 1394 | From Area | | Yes |
| level 6 | 475 | 1395 | From Area | | Yes |
| level 6 | 476 | 1396 | From Area | | Yes |
| level 6 | 477 | 1397 | From Area | | Yes |
| level 6 | 478 | 1398 | From Area | | Yes |
| level 6 | 479 | 1399 | From Area | | Yes |
| level 6 | 480 | 1400 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 481 | 1401 | From Area | | Yes |
| level 6 | 482 | 1402 | From Area | | Yes |
| level 6 | 483 | 1403 | From Area | | Yes |
| level 6 | 484 | 1404 | From Area | | Yes |
| level 6 | 485 | 1405 | From Area | | Yes |
| level 6 | 486 | 1406 | From Area | | Yes |
| level 6 | 487 | 1407 | From Area | | Yes |
| level 6 | 488 | 1408 | From Area | | Yes |
| level 6 | 489 | 1409 | From Area | | Yes |
| level 6 | 490 | 1410 | From Area | | Yes |
| level 6 | 491 | 1411 | From Area | | Yes |
| level 6 | 492 | 1412 | From Area | | Yes |
| level 6 | 493 | 1413 | From Area | | Yes |
| level 6 | 494 | 1414 | From Area | | Yes |
| level 6 | 495 | 1415 | From Area | | Yes |
| level 6 | 496 | 1416 | From Area | | Yes |
| level 6 | 497 | 1417 | From Area | | Yes |
| level 6 | 498 | 1418 | From Area | | Yes |
| level 6 | 499 | 1419 | From Area | | Yes |
| level 6 | 500 | 1420 | From Area | | Yes |
| level 6 | 501 | 1421 | From Area | | Yes |
| level 6 | 502 | 1422 | From Area | | Yes |
| level 6 | 503 | 1423 | From Area | | Yes |
| level 6 | 504 | 1424 | From Area | | Yes |
| level 6 | 505 | 1425 | From Area | | Yes |
| level 6 | 506 | 1426 | From Area | | Yes |
| level 6 | 507 | 1427 | From Area | | Yes |
| level 6 | 508 | 1428 | From Area | | Yes |
| level 6 | 509 | 1429 | From Area | | Yes |
| level 6 | 510 | 1430 | From Area | | Yes |
| level 6 | 511 | 1431 | From Area | | Yes |
| level 6 | 512 | 1432 | From Area | | Yes |
| level 6 | 513 | 1433 | From Area | | Yes |
| level 6 | 514 | 1434 | From Area | | Yes |
| level 6 | 515 | 1435 | From Area | | Yes |
| level 6 | 516 | 1436 | From Area | | Yes |
| level 6 | 517 | 1437 | From Area | | Yes |
| level 6 | 518 | 1438 | From Area | | Yes |
| level 6 | 519 | 1439 | From Area | | Yes |
| level 6 | 520 | 1440 | From Area | | Yes |
| level 6 | 521 | 1441 | From Area | | Yes |
| level 6 | 522 | 1442 | From Area | | Yes |
| level 6 | 523 | 1443 | From Area | | Yes |
| level 6 | 524 | 1444 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 525 | 1445 | From Area | | Yes |
| level 6 | 526 | 1446 | From Area | | Yes |
| level 6 | 527 | 1447 | From Area | | Yes |
| level 6 | 528 | 1448 | From Area | | Yes |
| level 6 | 529 | 1449 | From Area | | Yes |
| level 6 | 530 | 1450 | From Area | | Yes |
| level 6 | 531 | 1451 | From Area | | Yes |
| level 6 | 532 | 1452 | From Area | | Yes |
| level 6 | 533 | 1453 | From Area | | Yes |
| level 6 | 534 | 1454 | From Area | | Yes |
| level 6 | 535 | 1455 | From Area | | Yes |
| level 6 | 536 | 1456 | From Area | | Yes |
| level 6 | 537 | 1457 | From Area | | Yes |
| level 6 | 538 | 1458 | From Area | | Yes |
| level 6 | 539 | 1459 | From Area | | Yes |
| level 6 | 540 | 1460 | From Area | | Yes |
| level 6 | 541 | 1461 | From Area | | Yes |
| level 6 | 542 | 1462 | From Area | | Yes |
| level 6 | 543 | 1463 | From Area | | Yes |
| level 6 | 544 | 1464 | From Area | | Yes |
| level 6 | 545 | 1465 | From Area | | Yes |
| level 6 | 546 | 1466 | From Area | | Yes |
| level 6 | 547 | 1467 | From Area | | Yes |
| level 6 | 548 | 1468 | From Area | | Yes |
| level 6 | 549 | 1469 | From Area | | Yes |
| level 6 | 550 | 1470 | From Area | | Yes |
| level 6 | 551 | 1471 | From Area | | Yes |
| level 6 | 552 | 1472 | From Area | | Yes |
| level 6 | 553 | 1473 | From Area | | Yes |
| level 6 | 554 | 1474 | From Area | | Yes |
| level 6 | 555 | 1475 | From Area | | Yes |
| level 6 | 556 | 1476 | From Area | | Yes |
| level 6 | 557 | 1477 | From Area | | Yes |
| level 6 | 558 | 1478 | From Area | | Yes |
| level 6 | 559 | 1479 | From Area | | Yes |
| level 6 | 560 | 1480 | From Area | | Yes |
| level 6 | 561 | 1481 | From Area | | Yes |
| level 6 | 562 | 1482 | From Area | | Yes |
| level 6 | 563 | 1483 | From Area | | Yes |
| level 6 | 564 | 1484 | From Area | | Yes |
| level 6 | 565 | 1485 | From Area | | Yes |
| level 6 | 566 | 1486 | From Area | | Yes |
| level 6 | 567 | 1487 | From Area | | Yes |
| level 6 | 568 | 1488 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 569 | 1489 | From Area | | Yes |
| level 6 | 570 | 1490 | From Area | | Yes |
| level 6 | 571 | 1491 | From Area | | Yes |
| level 6 | 572 | 1492 | From Area | | Yes |
| level 6 | 573 | 1493 | From Area | | Yes |
| level 6 | 574 | 1494 | From Area | | Yes |
| level 6 | 575 | 1495 | From Area | | Yes |
| level 6 | 576 | 1496 | From Area | | Yes |
| level 6 | 577 | 1497 | From Area | | Yes |
| level 6 | 578 | 1498 | From Area | | Yes |
| level 6 | 579 | 1499 | From Area | | Yes |
| level 6 | 580 | 1500 | From Area | | Yes |
| level 6 | 581 | 1501 | From Area | | Yes |
| level 6 | 582 | 1502 | From Area | | Yes |
| level 6 | 583 | 1503 | From Area | | Yes |
| level 6 | 584 | 1504 | From Area | | Yes |
| level 6 | 585 | 1505 | From Area | | Yes |
| level 6 | 586 | 1506 | From Area | | Yes |
| level 6 | 587 | 1507 | From Area | | Yes |
| level 6 | 588 | 1508 | From Area | | Yes |
| level 6 | 589 | 1509 | From Area | | Yes |
| level 6 | 590 | 1510 | From Area | | Yes |
| level 6 | 591 | 1511 | From Area | | Yes |
| level 6 | 592 | 1512 | From Area | | Yes |
| level 6 | 593 | 1513 | From Area | | Yes |
| level 6 | 594 | 1514 | From Area | | Yes |
| level 6 | 595 | 1515 | From Area | | Yes |
| level 6 | 596 | 1516 | From Area | | Yes |
| level 6 | 597 | 1517 | From Area | | Yes |
| level 6 | 598 | 1518 | From Area | | Yes |
| level 6 | 599 | 1519 | From Area | | Yes |
| level 6 | 600 | 1520 | From Area | | Yes |
| level 6 | 601 | 1521 | From Area | | Yes |
| level 6 | 602 | 1522 | From Area | | Yes |
| level 6 | 603 | 1523 | From Area | | Yes |
| level 6 | 604 | 1524 | From Area | | Yes |
| level 6 | 605 | 1525 | From Area | | Yes |
| level 6 | 606 | 1526 | From Area | | Yes |
| level 6 | 607 | 1527 | From Area | | Yes |
| level 6 | 608 | 1528 | From Area | | Yes |
| level 6 | 609 | 1529 | From Area | | Yes |
| level 6 | 610 | 1530 | From Area | | Yes |
| level 6 | 611 | 1531 | From Area | | Yes |
| level 6 | 612 | 1532 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 6 | 613 | 1533 | From Area | | Yes |
| level 6 | 614 | 1534 | From Area | | Yes |
| level 6 | 615 | 1535 | From Area | | Yes |
| level 6 | 616 | 1536 | From Area | | Yes |
| level 6 | 617 | 1537 | From Area | | Yes |
| level 6 | 618 | 1538 | From Area | | Yes |
| level 6 | 619 | 1539 | From Area | | Yes |
| level 6 | 620 | 1540 | From Area | | Yes |
| level 6 | 621 | 1541 | From Area | | Yes |
| level 6 | 622 | 1542 | From Area | | Yes |
| level 6 | 623 | 1543 | From Area | | Yes |
| level 6 | 624 | 1544 | From Area | | Yes |
| level 6 | 625 | 1545 | From Area | | Yes |
| level 6 | 626 | 1546 | From Area | | Yes |
| level 6 | 627 | 1547 | From Area | | Yes |
| level 6 | 628 | 1548 | From Area | | Yes |
| level 6 | 629 | 1549 | From Area | | Yes |
| level 6 | 630 | 3825 | From Area | | Yes |
| level 6 | 631 | 3826 | From Area | | Yes |
| level 6 | 632 | 3827 | From Area | | Yes |
| level 6 | 633 | 3828 | From Area | | Yes |
| level 6 | 634 | 3829 | From Area | | Yes |
| level 6 | 635 | 3830 | From Area | | Yes |
| level 6 | 636 | 3831 | From Area | | Yes |
| level 6 | 637 | 3832 | From Area | | Yes |
| level 6 | 638 | 3833 | From Area | | Yes |
| level 6 | 639 | 3834 | From Area | | Yes |
| level 5 | 1 | 2915 | From Area | | Yes |
| level 5 | 2 | 2916 | From Area | | Yes |
| level 5 | 3 | 2917 | From Area | | Yes |
| level 5 | 4 | 2918 | From Area | | Yes |
| level 5 | 5 | 2919 | From Area | | Yes |
| level 5 | 6 | 2920 | From Area | | Yes |
| level 5 | 7 | 2921 | From Area | | Yes |
| level 5 | 8 | 2922 | From Area | | Yes |
| level 5 | 9 | 2924 | From Area | | Yes |
| level 5 | 10 | 2925 | From Area | | Yes |
| level 5 | 11 | 2926 | From Area | | Yes |
| level 5 | 12 | 2927 | From Area | | Yes |
| level 5 | 13 | 3106 | From Area | | Yes |
| level 5 | 14 | 2928 | From Area | | Yes |
| level 5 | 15 | 2960 | From Area | | Yes |
| level 5 | 16 | 2959 | From Area | | Yes |
| level 5 | 17 | 2958 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 18 | 2952 | From Area | | Yes |
| level 5 | 19 | 2957 | From Area | | Yes |
| level 5 | 20 | 2956 | From Area | | Yes |
| level 5 | 21 | 2955 | From Area | | Yes |
| level 5 | 22 | 2951 | From Area | | Yes |
| level 5 | 23 | 2950 | From Area | | Yes |
| level 5 | 24 | 2954 | From Area | | Yes |
| level 5 | 25 | 2949 | From Area | | Yes |
| level 5 | 26 | 2995 | From Area | | Yes |
| level 5 | 27 | 3107 | From Area | | Yes |
| level 5 | 28 | 3182 | From Area | | Yes |
| level 5 | 29 | 2996 | From Area | | Yes |
| level 5 | 30 | 3108 | From Area | | Yes |
| level 5 | 31 | 3183 | From Area | | Yes |
| level 5 | 32 | 2997 | From Area | | Yes |
| level 5 | 33 | 3109 | From Area | | Yes |
| level 5 | 34 | 3184 | From Area | | Yes |
| level 5 | 35 | 2998 | From Area | | Yes |
| level 5 | 36 | 3110 | From Area | | Yes |
| level 5 | 37 | 3185 | From Area | | Yes |
| level 5 | 38 | 2999 | From Area | | Yes |
| level 5 | 39 | 3111 | From Area | | Yes |
| level 5 | 40 | 3186 | From Area | | Yes |
| level 5 | 41 | 3000 | From Area | | Yes |
| level 5 | 42 | 3112 | From Area | | Yes |
| level 5 | 43 | 3187 | From Area | | Yes |
| level 5 | 44 | 3001 | From Area | | Yes |
| level 5 | 45 | 3113 | From Area | | Yes |
| level 5 | 46 | 3188 | From Area | | Yes |
| level 5 | 47 | 3002 | From Area | | Yes |
| level 5 | 48 | 3114 | From Area | | Yes |
| level 5 | 49 | 3189 | From Area | | Yes |
| level 5 | 50 | 3003 | From Area | | Yes |
| level 5 | 51 | 3115 | From Area | | Yes |
| level 5 | 52 | 3190 | From Area | | Yes |
| level 5 | 53 | 3004 | From Area | | Yes |
| level 5 | 54 | 3116 | From Area | | Yes |
| level 5 | 55 | 3191 | From Area | | Yes |
| level 5 | 56 | 3005 | From Area | | Yes |
| level 5 | 57 | 3049 | From Area | | Yes |
| level 5 | 58 | 3050 | From Area | | Yes |
| level 5 | 59 | 3051 | From Area | | Yes |
| level 5 | 60 | 3044 | From Area | | Yes |
| level 5 | 61 | 3048 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 62 | 3069 | From Area | | Yes |
| level 5 | 63 | 3068 | From Area | | Yes |
| level 5 | 64 | 3067 | From Area | | Yes |
| level 5 | 65 | 3066 | From Area | | Yes |
| level 5 | 66 | 3065 | From Area | | Yes |
| level 5 | 67 | 3064 | From Area | | Yes |
| level 5 | 68 | 3063 | From Area | | Yes |
| level 5 | 69 | 3062 | From Area | | Yes |
| level 5 | 70 | 3061 | From Area | | Yes |
| level 5 | 71 | 3105 | From Area | | Yes |
| level 5 | 72 | 3060 | From Area | | Yes |
| level 5 | 73 | 3059 | From Area | | Yes |
| level 5 | 74 | 3058 | From Area | | Yes |
| level 5 | 75 | 3057 | From Area | | Yes |
| level 5 | 76 | 3056 | From Area | | Yes |
| level 5 | 77 | 3055 | From Area | | Yes |
| level 5 | 78 | 3054 | From Area | | Yes |
| level 5 | 79 | 3053 | From Area | | Yes |
| level 5 | 80 | 3052 | From Area | | Yes |
| level 5 | 81 | 3047 | From Area | | Yes |
| level 5 | 82 | 3046 | From Area | | Yes |
| level 5 | 83 | 3070 | From Area | | Yes |
| level 5 | 84 | 3071 | From Area | | Yes |
| level 5 | 85 | 3072 | From Area | | Yes |
| level 5 | 86 | 3045 | From Area | | Yes |
| level 5 | 87 | 3006 | From Area | | Yes |
| level 5 | 88 | 3192 | From Area | | Yes |
| level 5 | 89 | 3007 | From Area | | Yes |
| level 5 | 90 | 3193 | From Area | | Yes |
| level 5 | 91 | 3008 | From Area | | Yes |
| level 5 | 92 | 3194 | From Area | | Yes |
| level 5 | 93 | 3009 | From Area | | Yes |
| level 5 | 94 | 3134 | From Area | | Yes |
| level 5 | 95 | 3135 | From Area | | Yes |
| level 5 | 96 | 3136 | From Area | | Yes |
| level 5 | 97 | 3129 | From Area | | Yes |
| level 5 | 98 | 3133 | From Area | | Yes |
| level 5 | 99 | 3151 | From Area | | Yes |
| level 5 | 100 | 3150 | From Area | | Yes |
| level 5 | 101 | 3149 | From Area | | Yes |
| level 5 | 102 | 3148 | From Area | | Yes |
| level 5 | 103 | 3147 | From Area | | Yes |
| level 5 | 104 | 3146 | From Area | | Yes |
| level 5 | 105 | 3145 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 106 | 3144 | From Area | | Yes |
| level 5 | 107 | 3181 | From Area | | Yes |
| level 5 | 108 | 3143 | From Area | | Yes |
| level 5 | 109 | 3142 | From Area | | Yes |
| level 5 | 110 | 3141 | From Area | | Yes |
| level 5 | 111 | 3140 | From Area | | Yes |
| level 5 | 112 | 3139 | From Area | | Yes |
| level 5 | 113 | 3138 | From Area | | Yes |
| level 5 | 114 | 3137 | From Area | | Yes |
| level 5 | 115 | 3132 | From Area | | Yes |
| level 5 | 116 | 3131 | From Area | | Yes |
| level 5 | 117 | 3152 | From Area | | Yes |
| level 5 | 118 | 3153 | From Area | | Yes |
| level 5 | 119 | 3154 | From Area | | Yes |
| level 5 | 120 | 3130 | From Area | | Yes |
| level 5 | 121 | 3010 | From Area | | Yes |
| level 5 | 122 | 3349 | From Area | | Yes |
| level 5 | 123 | 3307 | From Area | | Yes |
| level 5 | 124 | 3195 | From Area | | Yes |
| level 5 | 125 | 3011 | From Area | | Yes |
| level 5 | 126 | 3350 | From Area | | Yes |
| level 5 | 127 | 3308 | From Area | | Yes |
| level 5 | 128 | 3196 | From Area | | Yes |
| level 5 | 129 | 3012 | From Area | | Yes |
| level 5 | 130 | 3351 | From Area | | Yes |
| level 5 | 131 | 3309 | From Area | | Yes |
| level 5 | 132 | 3197 | From Area | | Yes |
| level 5 | 133 | 3018 | From Area | | Yes |
| level 5 | 134 | 3352 | From Area | | Yes |
| level 5 | 135 | 3310 | From Area | | Yes |
| level 5 | 136 | 3203 | From Area | | Yes |
| level 5 | 137 | 3019 | From Area | | Yes |
| level 5 | 138 | 3353 | From Area | | Yes |
| level 5 | 139 | 3311 | From Area | | Yes |
| level 5 | 140 | 3204 | From Area | | Yes |
| level 5 | 141 | 3020 | From Area | | Yes |
| level 5 | 142 | 3354 | From Area | | Yes |
| level 5 | 143 | 3312 | From Area | | Yes |
| level 5 | 144 | 3205 | From Area | | Yes |
| level 5 | 145 | 3021 | From Area | | Yes |
| level 5 | 146 | 3355 | From Area | | Yes |
| level 5 | 147 | 3313 | From Area | | Yes |
| level 5 | 148 | 3206 | From Area | | Yes |
| level 5 | 149 | 3022 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 150 | 3356 | From Area | | Yes |
| level 5 | 151 | 3314 | From Area | | Yes |
| level 5 | 152 | 3207 | From Area | | Yes |
| level 5 | 153 | 3023 | From Area | | Yes |
| level 5 | 154 | 3357 | From Area | | Yes |
| level 5 | 155 | 3315 | From Area | | Yes |
| level 5 | 156 | 3208 | From Area | | Yes |
| level 5 | 157 | 3024 | From Area | | Yes |
| level 5 | 158 | 3358 | From Area | | Yes |
| level 5 | 159 | 3316 | From Area | | Yes |
| level 5 | 160 | 3209 | From Area | | Yes |
| level 5 | 161 | 3025 | From Area | | Yes |
| level 5 | 162 | 3230 | From Area | | Yes |
| level 5 | 163 | 3231 | From Area | | Yes |
| level 5 | 164 | 3232 | From Area | | Yes |
| level 5 | 165 | 3233 | From Area | | Yes |
| level 5 | 166 | 3234 | From Area | | Yes |
| level 5 | 167 | 3235 | From Area | | Yes |
| level 5 | 168 | 3236 | From Area | | Yes |
| level 5 | 169 | 3238 | From Area | | Yes |
| level 5 | 170 | 3239 | From Area | | Yes |
| level 5 | 171 | 3240 | From Area | | Yes |
| level 5 | 172 | 3241 | From Area | | Yes |
| level 5 | 173 | 3242 | From Area | | Yes |
| level 5 | 174 | 3272 | From Area | | Yes |
| level 5 | 175 | 3271 | From Area | | Yes |
| level 5 | 176 | 3270 | From Area | | Yes |
| level 5 | 177 | 3264 | From Area | | Yes |
| level 5 | 178 | 3269 | From Area | | Yes |
| level 5 | 179 | 3268 | From Area | | Yes |
| level 5 | 180 | 3267 | From Area | | Yes |
| level 5 | 181 | 3263 | From Area | | Yes |
| level 5 | 182 | 3262 | From Area | | Yes |
| level 5 | 183 | 3266 | From Area | | Yes |
| level 5 | 184 | 3210 | From Area | | Yes |
| level 5 | 185 | 2923 | From Area | | Yes |
| level 5 | 186 | 2929 | From Area | | Yes |
| level 5 | 187 | 2930 | From Area | | Yes |
| level 5 | 188 | 2931 | From Area | | Yes |
| level 5 | 189 | 2932 | From Area | | Yes |
| level 5 | 190 | 2933 | From Area | | Yes |
| level 5 | 191 | 2934 | From Area | | Yes |
| level 5 | 192 | 2935 | From Area | | Yes |
| level 5 | 193 | 2936 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 194 | 2937 | From Area | | Yes |
| level 5 | 195 | 2938 | From Area | | Yes |
| level 5 | 196 | 2939 | From Area | | Yes |
| level 5 | 197 | 2940 | From Area | | Yes |
| level 5 | 198 | 2941 | From Area | | Yes |
| level 5 | 199 | 2942 | From Area | | Yes |
| level 5 | 200 | 2943 | From Area | | Yes |
| level 5 | 201 | 2944 | From Area | | Yes |
| level 5 | 202 | 2945 | From Area | | Yes |
| level 5 | 203 | 2946 | From Area | | Yes |
| level 5 | 204 | 2947 | From Area | | Yes |
| level 5 | 205 | 2948 | From Area | | Yes |
| level 5 | 206 | 2953 | From Area | | Yes |
| level 5 | 207 | 2961 | From Area | | Yes |
| level 5 | 208 | 2962 | From Area | | Yes |
| level 5 | 209 | 2963 | From Area | | Yes |
| level 5 | 210 | 2964 | From Area | | Yes |
| level 5 | 211 | 2965 | From Area | | Yes |
| level 5 | 212 | 2966 | From Area | | Yes |
| level 5 | 213 | 2967 | From Area | | Yes |
| level 5 | 214 | 2968 | From Area | | Yes |
| level 5 | 215 | 2969 | From Area | | Yes |
| level 5 | 216 | 2970 | From Area | | Yes |
| level 5 | 217 | 2971 | From Area | | Yes |
| level 5 | 218 | 2972 | From Area | | Yes |
| level 5 | 219 | 2973 | From Area | | Yes |
| level 5 | 220 | 2974 | From Area | | Yes |
| level 5 | 221 | 2975 | From Area | | Yes |
| level 5 | 222 | 2976 | From Area | | Yes |
| level 5 | 223 | 2977 | From Area | | Yes |
| level 5 | 224 | 2978 | From Area | | Yes |
| level 5 | 225 | 2979 | From Area | | Yes |
| level 5 | 226 | 2980 | From Area | | Yes |
| level 5 | 227 | 2981 | From Area | | Yes |
| level 5 | 228 | 2982 | From Area | | Yes |
| level 5 | 229 | 2983 | From Area | | Yes |
| level 5 | 230 | 2984 | From Area | | Yes |
| level 5 | 231 | 2985 | From Area | | Yes |
| level 5 | 232 | 2986 | From Area | | Yes |
| level 5 | 233 | 2987 | From Area | | Yes |
| level 5 | 234 | 2988 | From Area | | Yes |
| level 5 | 235 | 2989 | From Area | | Yes |
| level 5 | 236 | 2990 | From Area | | Yes |
| level 5 | 237 | 2991 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 238 | 2992 | From Area | | Yes |
| level 5 | 239 | 2993 | From Area | | Yes |
| level 5 | 240 | 2994 | From Area | | Yes |
| level 5 | 241 | 3013 | From Area | | Yes |
| level 5 | 242 | 3014 | From Area | | Yes |
| level 5 | 243 | 3015 | From Area | | Yes |
| level 5 | 244 | 3016 | From Area | | Yes |
| level 5 | 245 | 3017 | From Area | | Yes |
| level 5 | 246 | 3026 | From Area | | Yes |
| level 5 | 247 | 3027 | From Area | | Yes |
| level 5 | 248 | 3028 | From Area | | Yes |
| level 5 | 249 | 3029 | From Area | | Yes |
| level 5 | 250 | 3030 | From Area | | Yes |
| level 5 | 251 | 3031 | From Area | | Yes |
| level 5 | 252 | 3032 | From Area | | Yes |
| level 5 | 253 | 3033 | From Area | | Yes |
| level 5 | 254 | 3034 | From Area | | Yes |
| level 5 | 255 | 3035 | From Area | | Yes |
| level 5 | 256 | 3036 | From Area | | Yes |
| level 5 | 257 | 3037 | From Area | | Yes |
| level 5 | 258 | 3038 | From Area | | Yes |
| level 5 | 259 | 3039 | From Area | | Yes |
| level 5 | 260 | 3040 | From Area | | Yes |
| level 5 | 261 | 3041 | From Area | | Yes |
| level 5 | 262 | 3042 | From Area | | Yes |
| level 5 | 263 | 3043 | From Area | | Yes |
| level 5 | 264 | 3073 | From Area | | Yes |
| level 5 | 265 | 3074 | From Area | | Yes |
| level 5 | 266 | 3075 | From Area | | Yes |
| level 5 | 267 | 3076 | From Area | | Yes |
| level 5 | 268 | 3077 | From Area | | Yes |
| level 5 | 269 | 3078 | From Area | | Yes |
| level 5 | 270 | 3079 | From Area | | Yes |
| level 5 | 271 | 3080 | From Area | | Yes |
| level 5 | 272 | 3081 | From Area | | Yes |
| level 5 | 273 | 3082 | From Area | | Yes |
| level 5 | 274 | 3083 | From Area | | Yes |
| level 5 | 275 | 3084 | From Area | | Yes |
| level 5 | 276 | 3085 | From Area | | Yes |
| level 5 | 277 | 3086 | From Area | | Yes |
| level 5 | 278 | 3087 | From Area | | Yes |
| level 5 | 279 | 3088 | From Area | | Yes |
| level 5 | 280 | 3089 | From Area | | Yes |
| level 5 | 281 | 3090 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 282 | 3091 | From Area | | Yes |
| level 5 | 283 | 3092 | From Area | | Yes |
| level 5 | 284 | 3093 | From Area | | Yes |
| level 5 | 285 | 3094 | From Area | | Yes |
| level 5 | 286 | 3095 | From Area | | Yes |
| level 5 | 287 | 3096 | From Area | | Yes |
| level 5 | 288 | 3097 | From Area | | Yes |
| level 5 | 289 | 3098 | From Area | | Yes |
| level 5 | 290 | 3099 | From Area | | Yes |
| level 5 | 291 | 3100 | From Area | | Yes |
| level 5 | 292 | 3101 | From Area | | Yes |
| level 5 | 293 | 3102 | From Area | | Yes |
| level 5 | 294 | 3103 | From Area | | Yes |
| level 5 | 295 | 3104 | From Area | | Yes |
| level 5 | 296 | 3117 | From Area | | Yes |
| level 5 | 297 | 3118 | From Area | | Yes |
| level 5 | 298 | 3119 | From Area | | Yes |
| level 5 | 299 | 3120 | From Area | | Yes |
| level 5 | 300 | 3121 | From Area | | Yes |
| level 5 | 301 | 3122 | From Area | | Yes |
| level 5 | 302 | 3123 | From Area | | Yes |
| level 5 | 303 | 3124 | From Area | | Yes |
| level 5 | 304 | 3125 | From Area | | Yes |
| level 5 | 305 | 3126 | From Area | | Yes |
| level 5 | 306 | 3127 | From Area | | Yes |
| level 5 | 307 | 3128 | From Area | | Yes |
| level 5 | 308 | 3155 | From Area | | Yes |
| level 5 | 309 | 3156 | From Area | | Yes |
| level 5 | 310 | 3157 | From Area | | Yes |
| level 5 | 311 | 3158 | From Area | | Yes |
| level 5 | 312 | 3159 | From Area | | Yes |
| level 5 | 313 | 3160 | From Area | | Yes |
| level 5 | 314 | 3161 | From Area | | Yes |
| level 5 | 315 | 3162 | From Area | | Yes |
| level 5 | 316 | 3163 | From Area | | Yes |
| level 5 | 317 | 3164 | From Area | | Yes |
| level 5 | 318 | 3165 | From Area | | Yes |
| level 5 | 319 | 3166 | From Area | | Yes |
| level 5 | 320 | 3167 | From Area | | Yes |
| level 5 | 321 | 3168 | From Area | | Yes |
| level 5 | 322 | 3169 | From Area | | Yes |
| level 5 | 323 | 3170 | From Area | | Yes |
| level 5 | 324 | 3171 | From Area | | Yes |
| level 5 | 325 | 3172 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 326 | 3173 | From Area | | Yes |
| level 5 | 327 | 3174 | From Area | | Yes |
| level 5 | 328 | 3175 | From Area | | Yes |
| level 5 | 329 | 3176 | From Area | | Yes |
| level 5 | 330 | 3177 | From Area | | Yes |
| level 5 | 331 | 3178 | From Area | | Yes |
| level 5 | 332 | 3179 | From Area | | Yes |
| level 5 | 333 | 3180 | From Area | | Yes |
| level 5 | 334 | 3198 | From Area | | Yes |
| level 5 | 335 | 3199 | From Area | | Yes |
| level 5 | 336 | 3200 | From Area | | Yes |
| level 5 | 337 | 3201 | From Area | | Yes |
| level 5 | 338 | 3202 | From Area | | Yes |
| level 5 | 339 | 3211 | From Area | | Yes |
| level 5 | 340 | 3212 | From Area | | Yes |
| level 5 | 341 | 3213 | From Area | | Yes |
| level 5 | 342 | 3214 | From Area | | Yes |
| level 5 | 343 | 3215 | From Area | | Yes |
| level 5 | 344 | 3216 | From Area | | Yes |
| level 5 | 345 | 3217 | From Area | | Yes |
| level 5 | 346 | 3218 | From Area | | Yes |
| level 5 | 347 | 3219 | From Area | | Yes |
| level 5 | 348 | 3220 | From Area | | Yes |
| level 5 | 349 | 3221 | From Area | | Yes |
| level 5 | 350 | 3222 | From Area | | Yes |
| level 5 | 351 | 3223 | From Area | | Yes |
| level 5 | 352 | 3224 | From Area | | Yes |
| level 5 | 353 | 3225 | From Area | | Yes |
| level 5 | 354 | 3226 | From Area | | Yes |
| level 5 | 355 | 3227 | From Area | | Yes |
| level 5 | 356 | 3228 | From Area | | Yes |
| level 5 | 357 | 3229 | From Area | | Yes |
| level 5 | 358 | 3237 | From Area | | Yes |
| level 5 | 359 | 3243 | From Area | | Yes |
| level 5 | 360 | 3244 | From Area | | Yes |
| level 5 | 361 | 3245 | From Area | | Yes |
| level 5 | 362 | 3246 | From Area | | Yes |
| level 5 | 363 | 3247 | From Area | | Yes |
| level 5 | 364 | 3248 | From Area | | Yes |
| level 5 | 365 | 3249 | From Area | | Yes |
| level 5 | 366 | 3250 | From Area | | Yes |
| level 5 | 367 | 3251 | From Area | | Yes |
| level 5 | 368 | 3252 | From Area | | Yes |
| level 5 | 369 | 3253 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 370 | 3254 | From Area | | Yes |
| level 5 | 371 | 3255 | From Area | | Yes |
| level 5 | 372 | 3256 | From Area | | Yes |
| level 5 | 373 | 3257 | From Area | | Yes |
| level 5 | 374 | 3258 | From Area | | Yes |
| level 5 | 375 | 3259 | From Area | | Yes |
| level 5 | 376 | 3260 | From Area | | Yes |
| level 5 | 377 | 3261 | From Area | | Yes |
| level 5 | 378 | 3265 | From Area | | Yes |
| level 5 | 379 | 3273 | From Area | | Yes |
| level 5 | 380 | 3274 | From Area | | Yes |
| level 5 | 381 | 3275 | From Area | | Yes |
| level 5 | 382 | 3276 | From Area | | Yes |
| level 5 | 383 | 3277 | From Area | | Yes |
| level 5 | 384 | 3278 | From Area | | Yes |
| level 5 | 385 | 3279 | From Area | | Yes |
| level 5 | 386 | 3280 | From Area | | Yes |
| level 5 | 387 | 3281 | From Area | | Yes |
| level 5 | 388 | 3282 | From Area | | Yes |
| level 5 | 389 | 3283 | From Area | | Yes |
| level 5 | 390 | 3284 | From Area | | Yes |
| level 5 | 391 | 3285 | From Area | | Yes |
| level 5 | 392 | 3286 | From Area | | Yes |
| level 5 | 393 | 3287 | From Area | | Yes |
| level 5 | 394 | 3288 | From Area | | Yes |
| level 5 | 395 | 3289 | From Area | | Yes |
| level 5 | 396 | 3290 | From Area | | Yes |
| level 5 | 397 | 3291 | From Area | | Yes |
| level 5 | 398 | 3292 | From Area | | Yes |
| level 5 | 399 | 3293 | From Area | | Yes |
| level 5 | 400 | 3294 | From Area | | Yes |
| level 5 | 401 | 3295 | From Area | | Yes |
| level 5 | 402 | 3296 | From Area | | Yes |
| level 5 | 403 | 3297 | From Area | | Yes |
| level 5 | 404 | 3298 | From Area | | Yes |
| level 5 | 405 | 3299 | From Area | | Yes |
| level 5 | 406 | 3300 | From Area | | Yes |
| level 5 | 407 | 3301 | From Area | | Yes |
| level 5 | 408 | 3302 | From Area | | Yes |
| level 5 | 409 | 3303 | From Area | | Yes |
| level 5 | 410 | 3304 | From Area | | Yes |
| level 5 | 411 | 3305 | From Area | | Yes |
| level 5 | 412 | 3306 | From Area | | Yes |
| level 5 | 413 | 3317 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 414 | 3318 | From Area | | Yes |
| level 5 | 415 | 3319 | From Area | | Yes |
| level 5 | 416 | 3320 | From Area | | Yes |
| level 5 | 417 | 3321 | From Area | | Yes |
| level 5 | 418 | 3322 | From Area | | Yes |
| level 5 | 419 | 3323 | From Area | | Yes |
| level 5 | 420 | 3324 | From Area | | Yes |
| level 5 | 421 | 3325 | From Area | | Yes |
| level 5 | 422 | 3326 | From Area | | Yes |
| level 5 | 423 | 3327 | From Area | | Yes |
| level 5 | 424 | 3328 | From Area | | Yes |
| level 5 | 425 | 3329 | From Area | | Yes |
| level 5 | 426 | 3330 | From Area | | Yes |
| level 5 | 427 | 3331 | From Area | | Yes |
| level 5 | 428 | 3332 | From Area | | Yes |
| level 5 | 429 | 3333 | From Area | | Yes |
| level 5 | 430 | 3334 | From Area | | Yes |
| level 5 | 431 | 3335 | From Area | | Yes |
| level 5 | 432 | 3336 | From Area | | Yes |
| level 5 | 433 | 3337 | From Area | | Yes |
| level 5 | 434 | 3338 | From Area | | Yes |
| level 5 | 435 | 3339 | From Area | | Yes |
| level 5 | 436 | 3340 | From Area | | Yes |
| level 5 | 437 | 3341 | From Area | | Yes |
| level 5 | 438 | 3342 | From Area | | Yes |
| level 5 | 439 | 3343 | From Area | | Yes |
| level 5 | 440 | 3344 | From Area | | Yes |
| level 5 | 441 | 3345 | From Area | | Yes |
| level 5 | 442 | 3346 | From Area | | Yes |
| level 5 | 443 | 3347 | From Area | | Yes |
| level 5 | 444 | 3348 | From Area | | Yes |
| level 5 | 445 | 3359 | From Area | | Yes |
| level 5 | 446 | 3360 | From Area | | Yes |
| level 5 | 447 | 3361 | From Area | | Yes |
| level 5 | 448 | 3362 | From Area | | Yes |
| level 5 | 449 | 3363 | From Area | | Yes |
| level 5 | 450 | 3364 | From Area | | Yes |
| level 5 | 451 | 3365 | From Area | | Yes |
| level 5 | 452 | 3366 | From Area | | Yes |
| level 5 | 453 | 3367 | From Area | | Yes |
| level 5 | 454 | 3368 | From Area | | Yes |
| level 5 | 455 | 3369 | From Area | | Yes |
| level 5 | 456 | 1192 | From Area | | Yes |
| level 5 | 457 | 1193 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 458 | 1194 | From Area | | Yes |
| level 5 | 459 | 1195 | From Area | | Yes |
| level 5 | 460 | 1196 | From Area | | Yes |
| level 5 | 461 | 1197 | From Area | | Yes |
| level 5 | 462 | 1198 | From Area | | Yes |
| level 5 | 463 | 1199 | From Area | | Yes |
| level 5 | 464 | 1200 | From Area | | Yes |
| level 5 | 465 | 1201 | From Area | | Yes |
| level 5 | 466 | 1202 | From Area | | Yes |
| level 5 | 467 | 1203 | From Area | | Yes |
| level 5 | 468 | 1204 | From Area | | Yes |
| level 5 | 469 | 1205 | From Area | | Yes |
| level 5 | 470 | 1206 | From Area | | Yes |
| level 5 | 471 | 1207 | From Area | | Yes |
| level 5 | 472 | 1208 | From Area | | Yes |
| level 5 | 473 | 1209 | From Area | | Yes |
| level 5 | 474 | 1210 | From Area | | Yes |
| level 5 | 475 | 1211 | From Area | | Yes |
| level 5 | 476 | 1212 | From Area | | Yes |
| level 5 | 477 | 1213 | From Area | | Yes |
| level 5 | 478 | 1214 | From Area | | Yes |
| level 5 | 479 | 1215 | From Area | | Yes |
| level 5 | 480 | 1216 | From Area | | Yes |
| level 5 | 481 | 1217 | From Area | | Yes |
| level 5 | 482 | 1218 | From Area | | Yes |
| level 5 | 483 | 1219 | From Area | | Yes |
| level 5 | 484 | 1220 | From Area | | Yes |
| level 5 | 485 | 1221 | From Area | | Yes |
| level 5 | 486 | 1222 | From Area | | Yes |
| level 5 | 487 | 1223 | From Area | | Yes |
| level 5 | 488 | 1224 | From Area | | Yes |
| level 5 | 489 | 1225 | From Area | | Yes |
| level 5 | 490 | 1226 | From Area | | Yes |
| level 5 | 491 | 1227 | From Area | | Yes |
| level 5 | 492 | 1228 | From Area | | Yes |
| level 5 | 493 | 1229 | From Area | | Yes |
| level 5 | 494 | 1230 | From Area | | Yes |
| level 5 | 495 | 1231 | From Area | | Yes |
| level 5 | 496 | 1232 | From Area | | Yes |
| level 5 | 497 | 1233 | From Area | | Yes |
| level 5 | 498 | 1234 | From Area | | Yes |
| level 5 | 499 | 1235 | From Area | | Yes |
| level 5 | 500 | 1236 | From Area | | Yes |
| level 5 | 501 | 1237 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 502 | 1238 | From Area | | Yes |
| level 5 | 503 | 1239 | From Area | | Yes |
| level 5 | 504 | 1240 | From Area | | Yes |
| level 5 | 505 | 1241 | From Area | | Yes |
| level 5 | 506 | 1242 | From Area | | Yes |
| level 5 | 507 | 1243 | From Area | | Yes |
| level 5 | 508 | 1244 | From Area | | Yes |
| level 5 | 509 | 1245 | From Area | | Yes |
| level 5 | 510 | 1246 | From Area | | Yes |
| level 5 | 511 | 1247 | From Area | | Yes |
| level 5 | 512 | 1248 | From Area | | Yes |
| level 5 | 513 | 1249 | From Area | | Yes |
| level 5 | 514 | 1250 | From Area | | Yes |
| level 5 | 515 | 1251 | From Area | | Yes |
| level 5 | 516 | 1252 | From Area | | Yes |
| level 5 | 517 | 1253 | From Area | | Yes |
| level 5 | 518 | 1254 | From Area | | Yes |
| level 5 | 519 | 1255 | From Area | | Yes |
| level 5 | 520 | 1256 | From Area | | Yes |
| level 5 | 521 | 1257 | From Area | | Yes |
| level 5 | 522 | 1258 | From Area | | Yes |
| level 5 | 523 | 1259 | From Area | | Yes |
| level 5 | 524 | 1260 | From Area | | Yes |
| level 5 | 525 | 1261 | From Area | | Yes |
| level 5 | 526 | 1262 | From Area | | Yes |
| level 5 | 527 | 1263 | From Area | | Yes |
| level 5 | 528 | 1264 | From Area | | Yes |
| level 5 | 529 | 1265 | From Area | | Yes |
| level 5 | 530 | 1266 | From Area | | Yes |
| level 5 | 531 | 1267 | From Area | | Yes |
| level 5 | 532 | 1268 | From Area | | Yes |
| level 5 | 533 | 1269 | From Area | | Yes |
| level 5 | 534 | 1270 | From Area | | Yes |
| level 5 | 535 | 1271 | From Area | | Yes |
| level 5 | 536 | 1272 | From Area | | Yes |
| level 5 | 537 | 1273 | From Area | | Yes |
| level 5 | 538 | 1274 | From Area | | Yes |
| level 5 | 539 | 1275 | From Area | | Yes |
| level 5 | 540 | 1276 | From Area | | Yes |
| level 5 | 541 | 1277 | From Area | | Yes |
| level 5 | 542 | 1278 | From Area | | Yes |
| level 5 | 543 | 1279 | From Area | | Yes |
| level 5 | 544 | 1280 | From Area | | Yes |
| level 5 | 545 | 1281 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 546 | 1282 | From Area | | Yes |
| level 5 | 547 | 1283 | From Area | | Yes |
| level 5 | 548 | 1284 | From Area | | Yes |
| level 5 | 549 | 1285 | From Area | | Yes |
| level 5 | 550 | 1286 | From Area | | Yes |
| level 5 | 551 | 1287 | From Area | | Yes |
| level 5 | 552 | 1288 | From Area | | Yes |
| level 5 | 553 | 1289 | From Area | | Yes |
| level 5 | 554 | 1290 | From Area | | Yes |
| level 5 | 555 | 1291 | From Area | | Yes |
| level 5 | 556 | 1292 | From Area | | Yes |
| level 5 | 557 | 1293 | From Area | | Yes |
| level 5 | 558 | 1294 | From Area | | Yes |
| level 5 | 559 | 1295 | From Area | | Yes |
| level 5 | 560 | 1296 | From Area | | Yes |
| level 5 | 561 | 1297 | From Area | | Yes |
| level 5 | 562 | 1298 | From Area | | Yes |
| level 5 | 563 | 1299 | From Area | | Yes |
| level 5 | 564 | 1300 | From Area | | Yes |
| level 5 | 565 | 1301 | From Area | | Yes |
| level 5 | 566 | 1302 | From Area | | Yes |
| level 5 | 567 | 1303 | From Area | | Yes |
| level 5 | 568 | 1304 | From Area | | Yes |
| level 5 | 569 | 1305 | From Area | | Yes |
| level 5 | 570 | 1306 | From Area | | Yes |
| level 5 | 571 | 1307 | From Area | | Yes |
| level 5 | 572 | 1308 | From Area | | Yes |
| level 5 | 573 | 1309 | From Area | | Yes |
| level 5 | 574 | 1310 | From Area | | Yes |
| level 5 | 575 | 1311 | From Area | | Yes |
| level 5 | 576 | 1312 | From Area | | Yes |
| level 5 | 577 | 1313 | From Area | | Yes |
| level 5 | 578 | 1314 | From Area | | Yes |
| level 5 | 579 | 1315 | From Area | | Yes |
| level 5 | 580 | 1316 | From Area | | Yes |
| level 5 | 581 | 1317 | From Area | | Yes |
| level 5 | 582 | 1318 | From Area | | Yes |
| level 5 | 583 | 1319 | From Area | | Yes |
| level 5 | 584 | 1320 | From Area | | Yes |
| level 5 | 585 | 1321 | From Area | | Yes |
| level 5 | 586 | 1322 | From Area | | Yes |
| level 5 | 587 | 1323 | From Area | | Yes |
| level 5 | 588 | 1324 | From Area | | Yes |
| level 5 | 589 | 1325 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 590 | 1326 | From Area | | Yes |
| level 5 | 591 | 1327 | From Area | | Yes |
| level 5 | 592 | 1328 | From Area | | Yes |
| level 5 | 593 | 1329 | From Area | | Yes |
| level 5 | 594 | 1330 | From Area | | Yes |
| level 5 | 595 | 1331 | From Area | | Yes |
| level 5 | 596 | 1332 | From Area | | Yes |
| level 5 | 597 | 1333 | From Area | | Yes |
| level 5 | 598 | 1334 | From Area | | Yes |
| level 5 | 599 | 1335 | From Area | | Yes |
| level 5 | 600 | 1336 | From Area | | Yes |
| level 5 | 601 | 1337 | From Area | | Yes |
| level 5 | 602 | 1338 | From Area | | Yes |
| level 5 | 603 | 1339 | From Area | | Yes |
| level 5 | 604 | 1340 | From Area | | Yes |
| level 5 | 605 | 1341 | From Area | | Yes |
| level 5 | 606 | 1342 | From Area | | Yes |
| level 5 | 607 | 1343 | From Area | | Yes |
| level 5 | 608 | 1344 | From Area | | Yes |
| level 5 | 609 | 1345 | From Area | | Yes |
| level 5 | 610 | 1346 | From Area | | Yes |
| level 5 | 611 | 1347 | From Area | | Yes |
| level 5 | 612 | 1348 | From Area | | Yes |
| level 5 | 613 | 1349 | From Area | | Yes |
| level 5 | 614 | 1350 | From Area | | Yes |
| level 5 | 615 | 1351 | From Area | | Yes |
| level 5 | 616 | 1352 | From Area | | Yes |
| level 5 | 617 | 1353 | From Area | | Yes |
| level 5 | 618 | 1354 | From Area | | Yes |
| level 5 | 619 | 1355 | From Area | | Yes |
| level 5 | 620 | 1356 | From Area | | Yes |
| level 5 | 621 | 1357 | From Area | | Yes |
| level 5 | 622 | 1358 | From Area | | Yes |
| level 5 | 623 | 1359 | From Area | | Yes |
| level 5 | 624 | 1360 | From Area | | Yes |
| level 5 | 625 | 1361 | From Area | | Yes |
| level 5 | 626 | 1362 | From Area | | Yes |
| level 5 | 627 | 1363 | From Area | | Yes |
| level 5 | 628 | 1364 | From Area | | Yes |
| level 5 | 629 | 1365 | From Area | | Yes |
| level 5 | 630 | 1366 | From Area | | Yes |
| level 5 | 631 | 1367 | From Area | | Yes |
| level 5 | 632 | 1368 | From Area | | Yes |
| level 5 | 633 | 1369 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 5 | 634 | 1370 | From Area | | Yes |
| level 5 | 635 | 1371 | From Area | | Yes |
| level 5 | 636 | 1372 | From Area | | Yes |
| level 5 | 637 | 1373 | From Area | | Yes |
| level 5 | 638 | 1374 | From Area | | Yes |
| level 5 | 639 | 1375 | From Area | | Yes |
| level 4 | 1 | 2460 | From Area | | Yes |
| level 4 | 2 | 2461 | From Area | | Yes |
| level 4 | 3 | 2462 | From Area | | Yes |
| level 4 | 4 | 2463 | From Area | | Yes |
| level 4 | 5 | 2464 | From Area | | Yes |
| level 4 | 6 | 2465 | From Area | | Yes |
| level 4 | 7 | 2466 | From Area | | Yes |
| level 4 | 8 | 2467 | From Area | | Yes |
| level 4 | 9 | 2469 | From Area | | Yes |
| level 4 | 10 | 2470 | From Area | | Yes |
| level 4 | 11 | 2471 | From Area | | Yes |
| level 4 | 12 | 2472 | From Area | | Yes |
| level 4 | 13 | 2651 | From Area | | Yes |
| level 4 | 14 | 2473 | From Area | | Yes |
| level 4 | 15 | 2505 | From Area | | Yes |
| level 4 | 16 | 2504 | From Area | | Yes |
| level 4 | 17 | 2503 | From Area | | Yes |
| level 4 | 18 | 2497 | From Area | | Yes |
| level 4 | 19 | 2502 | From Area | | Yes |
| level 4 | 20 | 2501 | From Area | | Yes |
| level 4 | 21 | 2500 | From Area | | Yes |
| level 4 | 22 | 2496 | From Area | | Yes |
| level 4 | 23 | 2495 | From Area | | Yes |
| level 4 | 24 | 2499 | From Area | | Yes |
| level 4 | 25 | 2494 | From Area | | Yes |
| level 4 | 26 | 2540 | From Area | | Yes |
| level 4 | 27 | 2652 | From Area | | Yes |
| level 4 | 28 | 2727 | From Area | | Yes |
| level 4 | 29 | 2541 | From Area | | Yes |
| level 4 | 30 | 2653 | From Area | | Yes |
| level 4 | 31 | 2728 | From Area | | Yes |
| level 4 | 32 | 2542 | From Area | | Yes |
| level 4 | 33 | 2654 | From Area | | Yes |
| level 4 | 34 | 2729 | From Area | | Yes |
| level 4 | 35 | 2543 | From Area | | Yes |
| level 4 | 36 | 2655 | From Area | | Yes |
| level 4 | 37 | 2730 | From Area | | Yes |
| level 4 | 38 | 2544 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 39 | 2656 | From Area | | Yes |
| level 4 | 40 | 2731 | From Area | | Yes |
| level 4 | 41 | 2545 | From Area | | Yes |
| level 4 | 42 | 2657 | From Area | | Yes |
| level 4 | 43 | 2732 | From Area | | Yes |
| level 4 | 44 | 2546 | From Area | | Yes |
| level 4 | 45 | 2658 | From Area | | Yes |
| level 4 | 46 | 2733 | From Area | | Yes |
| level 4 | 47 | 2547 | From Area | | Yes |
| level 4 | 48 | 2659 | From Area | | Yes |
| level 4 | 49 | 2734 | From Area | | Yes |
| level 4 | 50 | 2548 | From Area | | Yes |
| level 4 | 51 | 2660 | From Area | | Yes |
| level 4 | 52 | 2735 | From Area | | Yes |
| level 4 | 53 | 2549 | From Area | | Yes |
| level 4 | 54 | 2661 | From Area | | Yes |
| level 4 | 55 | 2736 | From Area | | Yes |
| level 4 | 56 | 2550 | From Area | | Yes |
| level 4 | 57 | 2594 | From Area | | Yes |
| level 4 | 58 | 2595 | From Area | | Yes |
| level 4 | 59 | 2596 | From Area | | Yes |
| level 4 | 60 | 2589 | From Area | | Yes |
| level 4 | 61 | 2593 | From Area | | Yes |
| level 4 | 62 | 2614 | From Area | | Yes |
| level 4 | 63 | 2613 | From Area | | Yes |
| level 4 | 64 | 2612 | From Area | | Yes |
| level 4 | 65 | 2611 | From Area | | Yes |
| level 4 | 66 | 2610 | From Area | | Yes |
| level 4 | 67 | 2609 | From Area | | Yes |
| level 4 | 68 | 2608 | From Area | | Yes |
| level 4 | 69 | 2607 | From Area | | Yes |
| level 4 | 70 | 2606 | From Area | | Yes |
| level 4 | 71 | 2650 | From Area | | Yes |
| level 4 | 72 | 2605 | From Area | | Yes |
| level 4 | 73 | 2604 | From Area | | Yes |
| level 4 | 74 | 2603 | From Area | | Yes |
| level 4 | 75 | 2602 | From Area | | Yes |
| level 4 | 76 | 2601 | From Area | | Yes |
| level 4 | 77 | 2600 | From Area | | Yes |
| level 4 | 78 | 2599 | From Area | | Yes |
| level 4 | 79 | 2598 | From Area | | Yes |
| level 4 | 80 | 2597 | From Area | | Yes |
| level 4 | 81 | 2592 | From Area | | Yes |
| level 4 | 82 | 2591 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 83 | 2615 | From Area | | Yes |
| level 4 | 84 | 2616 | From Area | | Yes |
| level 4 | 85 | 2617 | From Area | | Yes |
| level 4 | 86 | 2590 | From Area | | Yes |
| level 4 | 87 | 2551 | From Area | | Yes |
| level 4 | 88 | 2737 | From Area | | Yes |
| level 4 | 89 | 2552 | From Area | | Yes |
| level 4 | 90 | 2738 | From Area | | Yes |
| level 4 | 91 | 2553 | From Area | | Yes |
| level 4 | 92 | 2739 | From Area | | Yes |
| level 4 | 93 | 2554 | From Area | | Yes |
| level 4 | 94 | 2679 | From Area | | Yes |
| level 4 | 95 | 2680 | From Area | | Yes |
| level 4 | 96 | 2681 | From Area | | Yes |
| level 4 | 97 | 2674 | From Area | | Yes |
| level 4 | 98 | 2678 | From Area | | Yes |
| level 4 | 99 | 2696 | From Area | | Yes |
| level 4 | 100 | 2695 | From Area | | Yes |
| level 4 | 101 | 2694 | From Area | | Yes |
| level 4 | 102 | 2693 | From Area | | Yes |
| level 4 | 103 | 2692 | From Area | | Yes |
| level 4 | 104 | 2691 | From Area | | Yes |
| level 4 | 105 | 2690 | From Area | | Yes |
| level 4 | 106 | 2689 | From Area | | Yes |
| level 4 | 107 | 2726 | From Area | | Yes |
| level 4 | 108 | 2688 | From Area | | Yes |
| level 4 | 109 | 2687 | From Area | | Yes |
| level 4 | 110 | 2686 | From Area | | Yes |
| level 4 | 111 | 2685 | From Area | | Yes |
| level 4 | 112 | 2684 | From Area | | Yes |
| level 4 | 113 | 2683 | From Area | | Yes |
| level 4 | 114 | 2682 | From Area | | Yes |
| level 4 | 115 | 2677 | From Area | | Yes |
| level 4 | 116 | 2676 | From Area | | Yes |
| level 4 | 117 | 2697 | From Area | | Yes |
| level 4 | 118 | 2698 | From Area | | Yes |
| level 4 | 119 | 2699 | From Area | | Yes |
| level 4 | 120 | 2675 | From Area | | Yes |
| level 4 | 121 | 2555 | From Area | | Yes |
| level 4 | 122 | 2894 | From Area | | Yes |
| level 4 | 123 | 2852 | From Area | | Yes |
| level 4 | 124 | 2740 | From Area | | Yes |
| level 4 | 125 | 2556 | From Area | | Yes |
| level 4 | 126 | 2895 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 127 | 2853 | From Area | | Yes |
| level 4 | 128 | 2741 | From Area | | Yes |
| level 4 | 129 | 2557 | From Area | | Yes |
| level 4 | 130 | 2896 | From Area | | Yes |
| level 4 | 131 | 2854 | From Area | | Yes |
| level 4 | 132 | 2742 | From Area | | Yes |
| level 4 | 133 | 2563 | From Area | | Yes |
| level 4 | 134 | 2897 | From Area | | Yes |
| level 4 | 135 | 2855 | From Area | | Yes |
| level 4 | 136 | 2748 | From Area | | Yes |
| level 4 | 137 | 2564 | From Area | | Yes |
| level 4 | 138 | 2898 | From Area | | Yes |
| level 4 | 139 | 2856 | From Area | | Yes |
| level 4 | 140 | 2749 | From Area | | Yes |
| level 4 | 141 | 2565 | From Area | | Yes |
| level 4 | 142 | 2899 | From Area | | Yes |
| level 4 | 143 | 2857 | From Area | | Yes |
| level 4 | 144 | 2750 | From Area | | Yes |
| level 4 | 145 | 2566 | From Area | | Yes |
| level 4 | 146 | 2900 | From Area | | Yes |
| level 4 | 147 | 2858 | From Area | | Yes |
| level 4 | 148 | 2751 | From Area | | Yes |
| level 4 | 149 | 2567 | From Area | | Yes |
| level 4 | 150 | 2901 | From Area | | Yes |
| level 4 | 151 | 2859 | From Area | | Yes |
| level 4 | 152 | 2752 | From Area | | Yes |
| level 4 | 153 | 2568 | From Area | | Yes |
| level 4 | 154 | 2902 | From Area | | Yes |
| level 4 | 155 | 2860 | From Area | | Yes |
| level 4 | 156 | 2753 | From Area | | Yes |
| level 4 | 157 | 2569 | From Area | | Yes |
| level 4 | 158 | 2903 | From Area | | Yes |
| level 4 | 159 | 2861 | From Area | | Yes |
| level 4 | 160 | 2754 | From Area | | Yes |
| level 4 | 161 | 2570 | From Area | | Yes |
| level 4 | 162 | 2775 | From Area | | Yes |
| level 4 | 163 | 2776 | From Area | | Yes |
| level 4 | 164 | 2777 | From Area | | Yes |
| level 4 | 165 | 2778 | From Area | | Yes |
| level 4 | 166 | 2779 | From Area | | Yes |
| level 4 | 167 | 2780 | From Area | | Yes |
| level 4 | 168 | 2781 | From Area | | Yes |
| level 4 | 169 | 2783 | From Area | | Yes |
| level 4 | 170 | 2784 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 171 | 2785 | From Area | | Yes |
| level 4 | 172 | 2786 | From Area | | Yes |
| level 4 | 173 | 2787 | From Area | | Yes |
| level 4 | 174 | 2817 | From Area | | Yes |
| level 4 | 175 | 2816 | From Area | | Yes |
| level 4 | 176 | 2815 | From Area | | Yes |
| level 4 | 177 | 2809 | From Area | | Yes |
| level 4 | 178 | 2814 | From Area | | Yes |
| level 4 | 179 | 2813 | From Area | | Yes |
| level 4 | 180 | 2812 | From Area | | Yes |
| level 4 | 181 | 2808 | From Area | | Yes |
| level 4 | 182 | 2807 | From Area | | Yes |
| level 4 | 183 | 2811 | From Area | | Yes |
| level 4 | 184 | 2755 | From Area | | Yes |
| level 4 | 185 | 2468 | From Area | | Yes |
| level 4 | 186 | 2474 | From Area | | Yes |
| level 4 | 187 | 2475 | From Area | | Yes |
| level 4 | 188 | 2476 | From Area | | Yes |
| level 4 | 189 | 2477 | From Area | | Yes |
| level 4 | 190 | 2478 | From Area | | Yes |
| level 4 | 191 | 2479 | From Area | | Yes |
| level 4 | 192 | 2480 | From Area | | Yes |
| level 4 | 193 | 2481 | From Area | | Yes |
| level 4 | 194 | 2482 | From Area | | Yes |
| level 4 | 195 | 2483 | From Area | | Yes |
| level 4 | 196 | 2484 | From Area | | Yes |
| level 4 | 197 | 2485 | From Area | | Yes |
| level 4 | 198 | 2486 | From Area | | Yes |
| level 4 | 199 | 2487 | From Area | | Yes |
| level 4 | 200 | 2488 | From Area | | Yes |
| level 4 | 201 | 2489 | From Area | | Yes |
| level 4 | 202 | 2490 | From Area | | Yes |
| level 4 | 203 | 2491 | From Area | | Yes |
| level 4 | 204 | 2492 | From Area | | Yes |
| level 4 | 205 | 2493 | From Area | | Yes |
| level 4 | 206 | 2498 | From Area | | Yes |
| level 4 | 207 | 2506 | From Area | | Yes |
| level 4 | 208 | 2507 | From Area | | Yes |
| level 4 | 209 | 2508 | From Area | | Yes |
| level 4 | 210 | 2509 | From Area | | Yes |
| level 4 | 211 | 2510 | From Area | | Yes |
| level 4 | 212 | 2511 | From Area | | Yes |
| level 4 | 213 | 2512 | From Area | | Yes |
| level 4 | 214 | 2513 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 215 | 2514 | From Area | | Yes |
| level 4 | 216 | 2515 | From Area | | Yes |
| level 4 | 217 | 2516 | From Area | | Yes |
| level 4 | 218 | 2517 | From Area | | Yes |
| level 4 | 219 | 2518 | From Area | | Yes |
| level 4 | 220 | 2519 | From Area | | Yes |
| level 4 | 221 | 2520 | From Area | | Yes |
| level 4 | 222 | 2521 | From Area | | Yes |
| level 4 | 223 | 2522 | From Area | | Yes |
| level 4 | 224 | 2523 | From Area | | Yes |
| level 4 | 225 | 2524 | From Area | | Yes |
| level 4 | 226 | 2525 | From Area | | Yes |
| level 4 | 227 | 2526 | From Area | | Yes |
| level 4 | 228 | 2527 | From Area | | Yes |
| level 4 | 229 | 2528 | From Area | | Yes |
| level 4 | 230 | 2529 | From Area | | Yes |
| level 4 | 231 | 2530 | From Area | | Yes |
| level 4 | 232 | 2531 | From Area | | Yes |
| level 4 | 233 | 2532 | From Area | | Yes |
| level 4 | 234 | 2533 | From Area | | Yes |
| level 4 | 235 | 2534 | From Area | | Yes |
| level 4 | 236 | 2535 | From Area | | Yes |
| level 4 | 237 | 2536 | From Area | | Yes |
| level 4 | 238 | 2537 | From Area | | Yes |
| level 4 | 239 | 2538 | From Area | | Yes |
| level 4 | 240 | 2539 | From Area | | Yes |
| level 4 | 241 | 2558 | From Area | | Yes |
| level 4 | 242 | 2559 | From Area | | Yes |
| level 4 | 243 | 2560 | From Area | | Yes |
| level 4 | 244 | 2561 | From Area | | Yes |
| level 4 | 245 | 2562 | From Area | | Yes |
| level 4 | 246 | 2571 | From Area | | Yes |
| level 4 | 247 | 2572 | From Area | | Yes |
| level 4 | 248 | 2573 | From Area | | Yes |
| level 4 | 249 | 2574 | From Area | | Yes |
| level 4 | 250 | 2575 | From Area | | Yes |
| level 4 | 251 | 2576 | From Area | | Yes |
| level 4 | 252 | 2577 | From Area | | Yes |
| level 4 | 253 | 2578 | From Area | | Yes |
| level 4 | 254 | 2579 | From Area | | Yes |
| level 4 | 255 | 2580 | From Area | | Yes |
| level 4 | 256 | 2581 | From Area | | Yes |
| level 4 | 257 | 2582 | From Area | | Yes |
| level 4 | 258 | 2583 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 259 | 2584 | From Area | | Yes |
| level 4 | 260 | 2585 | From Area | | Yes |
| level 4 | 261 | 2586 | From Area | | Yes |
| level 4 | 262 | 2587 | From Area | | Yes |
| level 4 | 263 | 2588 | From Area | | Yes |
| level 4 | 264 | 2618 | From Area | | Yes |
| level 4 | 265 | 2619 | From Area | | Yes |
| level 4 | 266 | 2620 | From Area | | Yes |
| level 4 | 267 | 2621 | From Area | | Yes |
| level 4 | 268 | 2622 | From Area | | Yes |
| level 4 | 269 | 2623 | From Area | | Yes |
| level 4 | 270 | 2624 | From Area | | Yes |
| level 4 | 271 | 2625 | From Area | | Yes |
| level 4 | 272 | 2626 | From Area | | Yes |
| level 4 | 273 | 2627 | From Area | | Yes |
| level 4 | 274 | 2628 | From Area | | Yes |
| level 4 | 275 | 2629 | From Area | | Yes |
| level 4 | 276 | 2630 | From Area | | Yes |
| level 4 | 277 | 2631 | From Area | | Yes |
| level 4 | 278 | 2632 | From Area | | Yes |
| level 4 | 279 | 2633 | From Area | | Yes |
| level 4 | 280 | 2634 | From Area | | Yes |
| level 4 | 281 | 2635 | From Area | | Yes |
| level 4 | 282 | 2636 | From Area | | Yes |
| level 4 | 283 | 2637 | From Area | | Yes |
| level 4 | 284 | 2638 | From Area | | Yes |
| level 4 | 285 | 2639 | From Area | | Yes |
| level 4 | 286 | 2640 | From Area | | Yes |
| level 4 | 287 | 2641 | From Area | | Yes |
| level 4 | 288 | 2642 | From Area | | Yes |
| level 4 | 289 | 2643 | From Area | | Yes |
| level 4 | 290 | 2644 | From Area | | Yes |
| level 4 | 291 | 2645 | From Area | | Yes |
| level 4 | 292 | 2646 | From Area | | Yes |
| level 4 | 293 | 2647 | From Area | | Yes |
| level 4 | 294 | 2648 | From Area | | Yes |
| level 4 | 295 | 2649 | From Area | | Yes |
| level 4 | 296 | 2662 | From Area | | Yes |
| level 4 | 297 | 2663 | From Area | | Yes |
| level 4 | 298 | 2664 | From Area | | Yes |
| level 4 | 299 | 2665 | From Area | | Yes |
| level 4 | 300 | 2666 | From Area | | Yes |
| level 4 | 301 | 2667 | From Area | | Yes |
| level 4 | 302 | 2668 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 303 | 2669 | From Area | | Yes |
| level 4 | 304 | 2670 | From Area | | Yes |
| level 4 | 305 | 2671 | From Area | | Yes |
| level 4 | 306 | 2672 | From Area | | Yes |
| level 4 | 307 | 2673 | From Area | | Yes |
| level 4 | 308 | 2700 | From Area | | Yes |
| level 4 | 309 | 2701 | From Area | | Yes |
| level 4 | 310 | 2702 | From Area | | Yes |
| level 4 | 311 | 2703 | From Area | | Yes |
| level 4 | 312 | 2704 | From Area | | Yes |
| level 4 | 313 | 2705 | From Area | | Yes |
| level 4 | 314 | 2706 | From Area | | Yes |
| level 4 | 315 | 2707 | From Area | | Yes |
| level 4 | 316 | 2708 | From Area | | Yes |
| level 4 | 317 | 2709 | From Area | | Yes |
| level 4 | 318 | 2710 | From Area | | Yes |
| level 4 | 319 | 2711 | From Area | | Yes |
| level 4 | 320 | 2712 | From Area | | Yes |
| level 4 | 321 | 2713 | From Area | | Yes |
| level 4 | 322 | 2714 | From Area | | Yes |
| level 4 | 323 | 2715 | From Area | | Yes |
| level 4 | 324 | 2716 | From Area | | Yes |
| level 4 | 325 | 2717 | From Area | | Yes |
| level 4 | 326 | 2718 | From Area | | Yes |
| level 4 | 327 | 2719 | From Area | | Yes |
| level 4 | 328 | 2720 | From Area | | Yes |
| level 4 | 329 | 2721 | From Area | | Yes |
| level 4 | 330 | 2722 | From Area | | Yes |
| level 4 | 331 | 2723 | From Area | | Yes |
| level 4 | 332 | 2724 | From Area | | Yes |
| level 4 | 333 | 2725 | From Area | | Yes |
| level 4 | 334 | 2743 | From Area | | Yes |
| level 4 | 335 | 2744 | From Area | | Yes |
| level 4 | 336 | 2745 | From Area | | Yes |
| level 4 | 337 | 2746 | From Area | | Yes |
| level 4 | 338 | 2747 | From Area | | Yes |
| level 4 | 339 | 2756 | From Area | | Yes |
| level 4 | 340 | 2757 | From Area | | Yes |
| level 4 | 341 | 2758 | From Area | | Yes |
| level 4 | 342 | 2759 | From Area | | Yes |
| level 4 | 343 | 2760 | From Area | | Yes |
| level 4 | 344 | 2761 | From Area | | Yes |
| level 4 | 345 | 2762 | From Area | | Yes |
| level 4 | 346 | 2763 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 347 | 2764 | From Area | | Yes |
| level 4 | 348 | 2765 | From Area | | Yes |
| level 4 | 349 | 2766 | From Area | | Yes |
| level 4 | 350 | 2767 | From Area | | Yes |
| level 4 | 351 | 2768 | From Area | | Yes |
| level 4 | 352 | 2769 | From Area | | Yes |
| level 4 | 353 | 2770 | From Area | | Yes |
| level 4 | 354 | 2771 | From Area | | Yes |
| level 4 | 355 | 2772 | From Area | | Yes |
| level 4 | 356 | 2773 | From Area | | Yes |
| level 4 | 357 | 2774 | From Area | | Yes |
| level 4 | 358 | 2782 | From Area | | Yes |
| level 4 | 359 | 2788 | From Area | | Yes |
| level 4 | 360 | 2789 | From Area | | Yes |
| level 4 | 361 | 2790 | From Area | | Yes |
| level 4 | 362 | 2791 | From Area | | Yes |
| level 4 | 363 | 2792 | From Area | | Yes |
| level 4 | 364 | 2793 | From Area | | Yes |
| level 4 | 365 | 2794 | From Area | | Yes |
| level 4 | 366 | 2795 | From Area | | Yes |
| level 4 | 367 | 2796 | From Area | | Yes |
| level 4 | 368 | 2797 | From Area | | Yes |
| level 4 | 369 | 2798 | From Area | | Yes |
| level 4 | 370 | 2799 | From Area | | Yes |
| level 4 | 371 | 2800 | From Area | | Yes |
| level 4 | 372 | 2801 | From Area | | Yes |
| level 4 | 373 | 2802 | From Area | | Yes |
| level 4 | 374 | 2803 | From Area | | Yes |
| level 4 | 375 | 2804 | From Area | | Yes |
| level 4 | 376 | 2805 | From Area | | Yes |
| level 4 | 377 | 2806 | From Area | | Yes |
| level 4 | 378 | 2810 | From Area | | Yes |
| level 4 | 379 | 2818 | From Area | | Yes |
| level 4 | 380 | 2819 | From Area | | Yes |
| level 4 | 381 | 2820 | From Area | | Yes |
| level 4 | 382 | 2821 | From Area | | Yes |
| level 4 | 383 | 2822 | From Area | | Yes |
| level 4 | 384 | 2823 | From Area | | Yes |
| level 4 | 385 | 2824 | From Area | | Yes |
| level 4 | 386 | 2825 | From Area | | Yes |
| level 4 | 387 | 2826 | From Area | | Yes |
| level 4 | 388 | 2827 | From Area | | Yes |
| level 4 | 389 | 2828 | From Area | | Yes |
| level 4 | 390 | 2829 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 391 | 2830 | From Area | | Yes |
| level 4 | 392 | 2831 | From Area | | Yes |
| level 4 | 393 | 2832 | From Area | | Yes |
| level 4 | 394 | 2833 | From Area | | Yes |
| level 4 | 395 | 2834 | From Area | | Yes |
| level 4 | 396 | 2835 | From Area | | Yes |
| level 4 | 397 | 2836 | From Area | | Yes |
| level 4 | 398 | 2837 | From Area | | Yes |
| level 4 | 399 | 2838 | From Area | | Yes |
| level 4 | 400 | 2839 | From Area | | Yes |
| level 4 | 401 | 2840 | From Area | | Yes |
| level 4 | 402 | 2841 | From Area | | Yes |
| level 4 | 403 | 2842 | From Area | | Yes |
| level 4 | 404 | 2843 | From Area | | Yes |
| level 4 | 405 | 2844 | From Area | | Yes |
| level 4 | 406 | 2845 | From Area | | Yes |
| level 4 | 407 | 2846 | From Area | | Yes |
| level 4 | 408 | 2847 | From Area | | Yes |
| level 4 | 409 | 2848 | From Area | | Yes |
| level 4 | 410 | 2849 | From Area | | Yes |
| level 4 | 411 | 2850 | From Area | | Yes |
| level 4 | 412 | 2851 | From Area | | Yes |
| level 4 | 413 | 2862 | From Area | | Yes |
| level 4 | 414 | 2863 | From Area | | Yes |
| level 4 | 415 | 2864 | From Area | | Yes |
| level 4 | 416 | 2865 | From Area | | Yes |
| level 4 | 417 | 2866 | From Area | | Yes |
| level 4 | 418 | 2867 | From Area | | Yes |
| level 4 | 419 | 2868 | From Area | | Yes |
| level 4 | 420 | 2869 | From Area | | Yes |
| level 4 | 421 | 2870 | From Area | | Yes |
| level 4 | 422 | 2871 | From Area | | Yes |
| level 4 | 423 | 2872 | From Area | | Yes |
| level 4 | 424 | 2873 | From Area | | Yes |
| level 4 | 425 | 2874 | From Area | | Yes |
| level 4 | 426 | 2875 | From Area | | Yes |
| level 4 | 427 | 2876 | From Area | | Yes |
| level 4 | 428 | 2877 | From Area | | Yes |
| level 4 | 429 | 2878 | From Area | | Yes |
| level 4 | 430 | 2879 | From Area | | Yes |
| level 4 | 431 | 2880 | From Area | | Yes |
| level 4 | 432 | 2881 | From Area | | Yes |
| level 4 | 433 | 2882 | From Area | | Yes |
| level 4 | 434 | 2883 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 435 | 2884 | From Area | | Yes |
| level 4 | 436 | 2885 | From Area | | Yes |
| level 4 | 437 | 2886 | From Area | | Yes |
| level 4 | 438 | 2887 | From Area | | Yes |
| level 4 | 439 | 2888 | From Area | | Yes |
| level 4 | 440 | 2889 | From Area | | Yes |
| level 4 | 441 | 2890 | From Area | | Yes |
| level 4 | 442 | 2891 | From Area | | Yes |
| level 4 | 443 | 2892 | From Area | | Yes |
| level 4 | 444 | 2893 | From Area | | Yes |
| level 4 | 445 | 2904 | From Area | | Yes |
| level 4 | 446 | 2905 | From Area | | Yes |
| level 4 | 447 | 2906 | From Area | | Yes |
| level 4 | 448 | 2907 | From Area | | Yes |
| level 4 | 449 | 2908 | From Area | | Yes |
| level 4 | 450 | 2909 | From Area | | Yes |
| level 4 | 451 | 2910 | From Area | | Yes |
| level 4 | 452 | 2911 | From Area | | Yes |
| level 4 | 453 | 2912 | From Area | | Yes |
| level 4 | 454 | 2913 | From Area | | Yes |
| level 4 | 455 | 2914 | From Area | | Yes |
| level 4 | 456 | 1008 | From Area | | Yes |
| level 4 | 457 | 1009 | From Area | | Yes |
| level 4 | 458 | 1010 | From Area | | Yes |
| level 4 | 459 | 1011 | From Area | | Yes |
| level 4 | 460 | 1012 | From Area | | Yes |
| level 4 | 461 | 1013 | From Area | | Yes |
| level 4 | 462 | 1014 | From Area | | Yes |
| level 4 | 463 | 1015 | From Area | | Yes |
| level 4 | 464 | 1016 | From Area | | Yes |
| level 4 | 465 | 1017 | From Area | | Yes |
| level 4 | 466 | 1018 | From Area | | Yes |
| level 4 | 467 | 1019 | From Area | | Yes |
| level 4 | 468 | 1020 | From Area | | Yes |
| level 4 | 469 | 1021 | From Area | | Yes |
| level 4 | 470 | 1022 | From Area | | Yes |
| level 4 | 471 | 1023 | From Area | | Yes |
| level 4 | 472 | 1024 | From Area | | Yes |
| level 4 | 473 | 1025 | From Area | | Yes |
| level 4 | 474 | 1026 | From Area | | Yes |
| level 4 | 475 | 1027 | From Area | | Yes |
| level 4 | 476 | 1028 | From Area | | Yes |
| level 4 | 477 | 1029 | From Area | | Yes |
| level 4 | 478 | 1030 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 479 | 1031 | From Area | | Yes |
| level 4 | 480 | 1032 | From Area | | Yes |
| level 4 | 481 | 1033 | From Area | | Yes |
| level 4 | 482 | 1034 | From Area | | Yes |
| level 4 | 483 | 1035 | From Area | | Yes |
| level 4 | 484 | 1036 | From Area | | Yes |
| level 4 | 485 | 1037 | From Area | | Yes |
| level 4 | 486 | 1038 | From Area | | Yes |
| level 4 | 487 | 1039 | From Area | | Yes |
| level 4 | 488 | 1040 | From Area | | Yes |
| level 4 | 489 | 1041 | From Area | | Yes |
| level 4 | 490 | 1042 | From Area | | Yes |
| level 4 | 491 | 1043 | From Area | | Yes |
| level 4 | 492 | 1044 | From Area | | Yes |
| level 4 | 493 | 1045 | From Area | | Yes |
| level 4 | 494 | 1046 | From Area | | Yes |
| level 4 | 495 | 1047 | From Area | | Yes |
| level 4 | 496 | 1048 | From Area | | Yes |
| level 4 | 497 | 1049 | From Area | | Yes |
| level 4 | 498 | 1050 | From Area | | Yes |
| level 4 | 499 | 1051 | From Area | | Yes |
| level 4 | 500 | 1052 | From Area | | Yes |
| level 4 | 501 | 1053 | From Area | | Yes |
| level 4 | 502 | 1054 | From Area | | Yes |
| level 4 | 503 | 1055 | From Area | | Yes |
| level 4 | 504 | 1056 | From Area | | Yes |
| level 4 | 505 | 1057 | From Area | | Yes |
| level 4 | 506 | 1058 | From Area | | Yes |
| level 4 | 507 | 1059 | From Area | | Yes |
| level 4 | 508 | 1060 | From Area | | Yes |
| level 4 | 509 | 1061 | From Area | | Yes |
| level 4 | 510 | 1062 | From Area | | Yes |
| level 4 | 511 | 1063 | From Area | | Yes |
| level 4 | 512 | 1064 | From Area | | Yes |
| level 4 | 513 | 1065 | From Area | | Yes |
| level 4 | 514 | 1066 | From Area | | Yes |
| level 4 | 515 | 1067 | From Area | | Yes |
| level 4 | 516 | 1068 | From Area | | Yes |
| level 4 | 517 | 1069 | From Area | | Yes |
| level 4 | 518 | 1070 | From Area | | Yes |
| level 4 | 519 | 1071 | From Area | | Yes |
| level 4 | 520 | 1072 | From Area | | Yes |
| level 4 | 521 | 1073 | From Area | | Yes |
| level 4 | 522 | 1074 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 523 | 1075 | From Area | | Yes |
| level 4 | 524 | 1076 | From Area | | Yes |
| level 4 | 525 | 1077 | From Area | | Yes |
| level 4 | 526 | 1078 | From Area | | Yes |
| level 4 | 527 | 1079 | From Area | | Yes |
| level 4 | 528 | 1080 | From Area | | Yes |
| level 4 | 529 | 1081 | From Area | | Yes |
| level 4 | 530 | 1082 | From Area | | Yes |
| level 4 | 531 | 1083 | From Area | | Yes |
| level 4 | 532 | 1084 | From Area | | Yes |
| level 4 | 533 | 1085 | From Area | | Yes |
| level 4 | 534 | 1086 | From Area | | Yes |
| level 4 | 535 | 1087 | From Area | | Yes |
| level 4 | 536 | 1088 | From Area | | Yes |
| level 4 | 537 | 1089 | From Area | | Yes |
| level 4 | 538 | 1090 | From Area | | Yes |
| level 4 | 539 | 1091 | From Area | | Yes |
| level 4 | 540 | 1092 | From Area | | Yes |
| level 4 | 541 | 1093 | From Area | | Yes |
| level 4 | 542 | 1094 | From Area | | Yes |
| level 4 | 543 | 1095 | From Area | | Yes |
| level 4 | 544 | 1096 | From Area | | Yes |
| level 4 | 545 | 1097 | From Area | | Yes |
| level 4 | 546 | 1098 | From Area | | Yes |
| level 4 | 547 | 1099 | From Area | | Yes |
| level 4 | 548 | 1100 | From Area | | Yes |
| level 4 | 549 | 1101 | From Area | | Yes |
| level 4 | 550 | 1102 | From Area | | Yes |
| level 4 | 551 | 1103 | From Area | | Yes |
| level 4 | 552 | 1104 | From Area | | Yes |
| level 4 | 553 | 1105 | From Area | | Yes |
| level 4 | 554 | 1106 | From Area | | Yes |
| level 4 | 555 | 1107 | From Area | | Yes |
| level 4 | 556 | 1108 | From Area | | Yes |
| level 4 | 557 | 1109 | From Area | | Yes |
| level 4 | 558 | 1110 | From Area | | Yes |
| level 4 | 559 | 1111 | From Area | | Yes |
| level 4 | 560 | 1112 | From Area | | Yes |
| level 4 | 561 | 1113 | From Area | | Yes |
| level 4 | 562 | 1114 | From Area | | Yes |
| level 4 | 563 | 1115 | From Area | | Yes |
| level 4 | 564 | 1116 | From Area | | Yes |
| level 4 | 565 | 1117 | From Area | | Yes |
| level 4 | 566 | 1118 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 567 | 1119 | From Area | | Yes |
| level 4 | 568 | 1120 | From Area | | Yes |
| level 4 | 569 | 1121 | From Area | | Yes |
| level 4 | 570 | 1122 | From Area | | Yes |
| level 4 | 571 | 1123 | From Area | | Yes |
| level 4 | 572 | 1124 | From Area | | Yes |
| level 4 | 573 | 1125 | From Area | | Yes |
| level 4 | 574 | 1126 | From Area | | Yes |
| level 4 | 575 | 1127 | From Area | | Yes |
| level 4 | 576 | 1128 | From Area | | Yes |
| level 4 | 577 | 1129 | From Area | | Yes |
| level 4 | 578 | 1130 | From Area | | Yes |
| level 4 | 579 | 1131 | From Area | | Yes |
| level 4 | 580 | 1132 | From Area | | Yes |
| level 4 | 581 | 1133 | From Area | | Yes |
| level 4 | 582 | 1134 | From Area | | Yes |
| level 4 | 583 | 1135 | From Area | | Yes |
| level 4 | 584 | 1136 | From Area | | Yes |
| level 4 | 585 | 1137 | From Area | | Yes |
| level 4 | 586 | 1138 | From Area | | Yes |
| level 4 | 587 | 1139 | From Area | | Yes |
| level 4 | 588 | 1140 | From Area | | Yes |
| level 4 | 589 | 1141 | From Area | | Yes |
| level 4 | 590 | 1142 | From Area | | Yes |
| level 4 | 591 | 1143 | From Area | | Yes |
| level 4 | 592 | 1144 | From Area | | Yes |
| level 4 | 593 | 1145 | From Area | | Yes |
| level 4 | 594 | 1146 | From Area | | Yes |
| level 4 | 595 | 1147 | From Area | | Yes |
| level 4 | 596 | 1148 | From Area | | Yes |
| level 4 | 597 | 1149 | From Area | | Yes |
| level 4 | 598 | 1150 | From Area | | Yes |
| level 4 | 599 | 1151 | From Area | | Yes |
| level 4 | 600 | 1152 | From Area | | Yes |
| level 4 | 601 | 1153 | From Area | | Yes |
| level 4 | 602 | 1154 | From Area | | Yes |
| level 4 | 603 | 1155 | From Area | | Yes |
| level 4 | 604 | 1156 | From Area | | Yes |
| level 4 | 605 | 1157 | From Area | | Yes |
| level 4 | 606 | 1158 | From Area | | Yes |
| level 4 | 607 | 1159 | From Area | | Yes |
| level 4 | 608 | 1160 | From Area | | Yes |
| level 4 | 609 | 1161 | From Area | | Yes |
| level 4 | 610 | 1162 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 4 | 611 | 1163 | From Area | | Yes |
| level 4 | 612 | 1164 | From Area | | Yes |
| level 4 | 613 | 1165 | From Area | | Yes |
| level 4 | 614 | 1166 | From Area | | Yes |
| level 4 | 615 | 1167 | From Area | | Yes |
| level 4 | 616 | 1168 | From Area | | Yes |
| level 4 | 617 | 1169 | From Area | | Yes |
| level 4 | 618 | 1170 | From Area | | Yes |
| level 4 | 619 | 1171 | From Area | | Yes |
| level 4 | 620 | 1172 | From Area | | Yes |
| level 4 | 621 | 1173 | From Area | | Yes |
| level 4 | 622 | 1174 | From Area | | Yes |
| level 4 | 623 | 1175 | From Area | | Yes |
| level 4 | 624 | 1176 | From Area | | Yes |
| level 4 | 625 | 1177 | From Area | | Yes |
| level 4 | 626 | 1178 | From Area | | Yes |
| level 4 | 627 | 1179 | From Area | | Yes |
| level 4 | 628 | 1180 | From Area | | Yes |
| level 4 | 629 | 1181 | From Area | | Yes |
| level 4 | 630 | 1182 | From Area | | Yes |
| level 4 | 631 | 1183 | From Area | | Yes |
| level 4 | 632 | 1184 | From Area | | Yes |
| level 4 | 633 | 1185 | From Area | | Yes |
| level 4 | 634 | 1186 | From Area | | Yes |
| level 4 | 635 | 1187 | From Area | | Yes |
| level 4 | 636 | 1188 | From Area | | Yes |
| level 4 | 637 | 1189 | From Area | | Yes |
| level 4 | 638 | 1190 | From Area | | Yes |
| level 4 | 639 | 1191 | From Area | | Yes |
| level 3 | 1 | 2005 | From Area | | Yes |
| level 3 | 2 | 2006 | From Area | | Yes |
| level 3 | 3 | 2007 | From Area | | Yes |
| level 3 | 4 | 2008 | From Area | | Yes |
| level 3 | 5 | 2009 | From Area | | Yes |
| level 3 | 6 | 2010 | From Area | | Yes |
| level 3 | 7 | 2011 | From Area | | Yes |
| level 3 | 8 | 2012 | From Area | | Yes |
| level 3 | 9 | 2014 | From Area | | Yes |
| level 3 | 10 | 2015 | From Area | | Yes |
| level 3 | 11 | 2016 | From Area | | Yes |
| level 3 | 12 | 2017 | From Area | | Yes |
| level 3 | 13 | 2196 | From Area | | Yes |
| level 3 | 14 | 2018 | From Area | | Yes |
| level 3 | 15 | 2050 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 16 | 2049 | From Area | | Yes |
| level 3 | 17 | 2048 | From Area | | Yes |
| level 3 | 18 | 2042 | From Area | | Yes |
| level 3 | 19 | 2047 | From Area | | Yes |
| level 3 | 20 | 2046 | From Area | | Yes |
| level 3 | 21 | 2045 | From Area | | Yes |
| level 3 | 22 | 2041 | From Area | | Yes |
| level 3 | 23 | 2040 | From Area | | Yes |
| level 3 | 24 | 2044 | From Area | | Yes |
| level 3 | 25 | 2039 | From Area | | Yes |
| level 3 | 26 | 2085 | From Area | | Yes |
| level 3 | 27 | 2197 | From Area | | Yes |
| level 3 | 28 | 2272 | From Area | | Yes |
| level 3 | 29 | 2086 | From Area | | Yes |
| level 3 | 30 | 2198 | From Area | | Yes |
| level 3 | 31 | 2273 | From Area | | Yes |
| level 3 | 32 | 2087 | From Area | | Yes |
| level 3 | 33 | 2199 | From Area | | Yes |
| level 3 | 34 | 2274 | From Area | | Yes |
| level 3 | 35 | 2088 | From Area | | Yes |
| level 3 | 36 | 2200 | From Area | | Yes |
| level 3 | 37 | 2275 | From Area | | Yes |
| level 3 | 38 | 2089 | From Area | | Yes |
| level 3 | 39 | 2201 | From Area | | Yes |
| level 3 | 40 | 2276 | From Area | | Yes |
| level 3 | 41 | 2090 | From Area | | Yes |
| level 3 | 42 | 2202 | From Area | | Yes |
| level 3 | 43 | 2277 | From Area | | Yes |
| level 3 | 44 | 2091 | From Area | | Yes |
| level 3 | 45 | 2203 | From Area | | Yes |
| level 3 | 46 | 2278 | From Area | | Yes |
| level 3 | 47 | 2092 | From Area | | Yes |
| level 3 | 48 | 2204 | From Area | | Yes |
| level 3 | 49 | 2279 | From Area | | Yes |
| level 3 | 50 | 2093 | From Area | | Yes |
| level 3 | 51 | 2205 | From Area | | Yes |
| level 3 | 52 | 2280 | From Area | | Yes |
| level 3 | 53 | 2094 | From Area | | Yes |
| level 3 | 54 | 2206 | From Area | | Yes |
| level 3 | 55 | 2281 | From Area | | Yes |
| level 3 | 56 | 2095 | From Area | | Yes |
| level 3 | 57 | 2139 | From Area | | Yes |
| level 3 | 58 | 2140 | From Area | | Yes |
| level 3 | 59 | 2141 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 60 | 2134 | From Area | | Yes |
| level 3 | 61 | 2138 | From Area | | Yes |
| level 3 | 62 | 2159 | From Area | | Yes |
| level 3 | 63 | 2158 | From Area | | Yes |
| level 3 | 64 | 2157 | From Area | | Yes |
| level 3 | 65 | 2156 | From Area | | Yes |
| level 3 | 66 | 2155 | From Area | | Yes |
| level 3 | 67 | 2154 | From Area | | Yes |
| level 3 | 68 | 2153 | From Area | | Yes |
| level 3 | 69 | 2152 | From Area | | Yes |
| level 3 | 70 | 2151 | From Area | | Yes |
| level 3 | 71 | 2195 | From Area | | Yes |
| level 3 | 72 | 2150 | From Area | | Yes |
| level 3 | 73 | 2149 | From Area | | Yes |
| level 3 | 74 | 2148 | From Area | | Yes |
| level 3 | 75 | 2147 | From Area | | Yes |
| level 3 | 76 | 2146 | From Area | | Yes |
| level 3 | 77 | 2145 | From Area | | Yes |
| level 3 | 78 | 2144 | From Area | | Yes |
| level 3 | 79 | 2143 | From Area | | Yes |
| level 3 | 80 | 2142 | From Area | | Yes |
| level 3 | 81 | 2137 | From Area | | Yes |
| level 3 | 82 | 2136 | From Area | | Yes |
| level 3 | 83 | 2160 | From Area | | Yes |
| level 3 | 84 | 2161 | From Area | | Yes |
| level 3 | 85 | 2162 | From Area | | Yes |
| level 3 | 86 | 2135 | From Area | | Yes |
| level 3 | 87 | 2096 | From Area | | Yes |
| level 3 | 88 | 2282 | From Area | | Yes |
| level 3 | 89 | 2097 | From Area | | Yes |
| level 3 | 90 | 2283 | From Area | | Yes |
| level 3 | 91 | 2098 | From Area | | Yes |
| level 3 | 92 | 2284 | From Area | | Yes |
| level 3 | 93 | 2099 | From Area | | Yes |
| level 3 | 94 | 2224 | From Area | | Yes |
| level 3 | 95 | 2225 | From Area | | Yes |
| level 3 | 96 | 2226 | From Area | | Yes |
| level 3 | 97 | 2219 | From Area | | Yes |
| level 3 | 98 | 2223 | From Area | | Yes |
| level 3 | 99 | 2241 | From Area | | Yes |
| level 3 | 100 | 2240 | From Area | | Yes |
| level 3 | 101 | 2239 | From Area | | Yes |
| level 3 | 102 | 2238 | From Area | | Yes |
| level 3 | 103 | 2237 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 104 | 2236 | From Area | | Yes |
| level 3 | 105 | 2235 | From Area | | Yes |
| level 3 | 106 | 2234 | From Area | | Yes |
| level 3 | 107 | 2271 | From Area | | Yes |
| level 3 | 108 | 2233 | From Area | | Yes |
| level 3 | 109 | 2232 | From Area | | Yes |
| level 3 | 110 | 2231 | From Area | | Yes |
| level 3 | 111 | 2230 | From Area | | Yes |
| level 3 | 112 | 2229 | From Area | | Yes |
| level 3 | 113 | 2228 | From Area | | Yes |
| level 3 | 114 | 2227 | From Area | | Yes |
| level 3 | 115 | 2222 | From Area | | Yes |
| level 3 | 116 | 2221 | From Area | | Yes |
| level 3 | 117 | 2242 | From Area | | Yes |
| level 3 | 118 | 2243 | From Area | | Yes |
| level 3 | 119 | 2244 | From Area | | Yes |
| level 3 | 120 | 2220 | From Area | | Yes |
| level 3 | 121 | 2100 | From Area | | Yes |
| level 3 | 122 | 2439 | From Area | | Yes |
| level 3 | 123 | 2397 | From Area | | Yes |
| level 3 | 124 | 2285 | From Area | | Yes |
| level 3 | 125 | 2101 | From Area | | Yes |
| level 3 | 126 | 2440 | From Area | | Yes |
| level 3 | 127 | 2398 | From Area | | Yes |
| level 3 | 128 | 2286 | From Area | | Yes |
| level 3 | 129 | 2102 | From Area | | Yes |
| level 3 | 130 | 2441 | From Area | | Yes |
| level 3 | 131 | 2399 | From Area | | Yes |
| level 3 | 132 | 2287 | From Area | | Yes |
| level 3 | 133 | 2108 | From Area | | Yes |
| level 3 | 134 | 2442 | From Area | | Yes |
| level 3 | 135 | 2400 | From Area | | Yes |
| level 3 | 136 | 2293 | From Area | | Yes |
| level 3 | 137 | 2109 | From Area | | Yes |
| level 3 | 138 | 2443 | From Area | | Yes |
| level 3 | 139 | 2401 | From Area | | Yes |
| level 3 | 140 | 2294 | From Area | | Yes |
| level 3 | 141 | 2110 | From Area | | Yes |
| level 3 | 142 | 2444 | From Area | | Yes |
| level 3 | 143 | 2402 | From Area | | Yes |
| level 3 | 144 | 2295 | From Area | | Yes |
| level 3 | 145 | 2111 | From Area | | Yes |
| level 3 | 146 | 2445 | From Area | | Yes |
| level 3 | 147 | 2403 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 148 | 2296 | From Area | | Yes |
| level 3 | 149 | 2112 | From Area | | Yes |
| level 3 | 150 | 2446 | From Area | | Yes |
| level 3 | 151 | 2404 | From Area | | Yes |
| level 3 | 152 | 2297 | From Area | | Yes |
| level 3 | 153 | 2113 | From Area | | Yes |
| level 3 | 154 | 2447 | From Area | | Yes |
| level 3 | 155 | 2405 | From Area | | Yes |
| level 3 | 156 | 2298 | From Area | | Yes |
| level 3 | 157 | 2114 | From Area | | Yes |
| level 3 | 158 | 2448 | From Area | | Yes |
| level 3 | 159 | 2406 | From Area | | Yes |
| level 3 | 160 | 2299 | From Area | | Yes |
| level 3 | 161 | 2115 | From Area | | Yes |
| level 3 | 162 | 2320 | From Area | | Yes |
| level 3 | 163 | 2321 | From Area | | Yes |
| level 3 | 164 | 2322 | From Area | | Yes |
| level 3 | 165 | 2323 | From Area | | Yes |
| level 3 | 166 | 2324 | From Area | | Yes |
| level 3 | 167 | 2325 | From Area | | Yes |
| level 3 | 168 | 2326 | From Area | | Yes |
| level 3 | 169 | 2328 | From Area | | Yes |
| level 3 | 170 | 2329 | From Area | | Yes |
| level 3 | 171 | 2330 | From Area | | Yes |
| level 3 | 172 | 2331 | From Area | | Yes |
| level 3 | 173 | 2332 | From Area | | Yes |
| level 3 | 174 | 2362 | From Area | | Yes |
| level 3 | 175 | 2361 | From Area | | Yes |
| level 3 | 176 | 2360 | From Area | | Yes |
| level 3 | 177 | 2354 | From Area | | Yes |
| level 3 | 178 | 2359 | From Area | | Yes |
| level 3 | 179 | 2358 | From Area | | Yes |
| level 3 | 180 | 2357 | From Area | | Yes |
| level 3 | 181 | 2353 | From Area | | Yes |
| level 3 | 182 | 2352 | From Area | | Yes |
| level 3 | 183 | 2356 | From Area | | Yes |
| level 3 | 184 | 2300 | From Area | | Yes |
| level 3 | 185 | 2013 | From Area | | Yes |
| level 3 | 186 | 2019 | From Area | | Yes |
| level 3 | 187 | 2020 | From Area | | Yes |
| level 3 | 188 | 2021 | From Area | | Yes |
| level 3 | 189 | 2022 | From Area | | Yes |
| level 3 | 190 | 2023 | From Area | | Yes |
| level 3 | 191 | 2024 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 192 | 2025 | From Area | | Yes |
| level 3 | 193 | 2026 | From Area | | Yes |
| level 3 | 194 | 2027 | From Area | | Yes |
| level 3 | 195 | 2028 | From Area | | Yes |
| level 3 | 196 | 2029 | From Area | | Yes |
| level 3 | 197 | 2030 | From Area | | Yes |
| level 3 | 198 | 2031 | From Area | | Yes |
| level 3 | 199 | 2032 | From Area | | Yes |
| level 3 | 200 | 2033 | From Area | | Yes |
| level 3 | 201 | 2034 | From Area | | Yes |
| level 3 | 202 | 2035 | From Area | | Yes |
| level 3 | 203 | 2036 | From Area | | Yes |
| level 3 | 204 | 2037 | From Area | | Yes |
| level 3 | 205 | 2038 | From Area | | Yes |
| level 3 | 206 | 2043 | From Area | | Yes |
| level 3 | 207 | 2051 | From Area | | Yes |
| level 3 | 208 | 2052 | From Area | | Yes |
| level 3 | 209 | 2053 | From Area | | Yes |
| level 3 | 210 | 2054 | From Area | | Yes |
| level 3 | 211 | 2055 | From Area | | Yes |
| level 3 | 212 | 2056 | From Area | | Yes |
| level 3 | 213 | 2057 | From Area | | Yes |
| level 3 | 214 | 2058 | From Area | | Yes |
| level 3 | 215 | 2059 | From Area | | Yes |
| level 3 | 216 | 2060 | From Area | | Yes |
| level 3 | 217 | 2061 | From Area | | Yes |
| level 3 | 218 | 2062 | From Area | | Yes |
| level 3 | 219 | 2063 | From Area | | Yes |
| level 3 | 220 | 2064 | From Area | | Yes |
| level 3 | 221 | 2065 | From Area | | Yes |
| level 3 | 222 | 2066 | From Area | | Yes |
| level 3 | 223 | 2067 | From Area | | Yes |
| level 3 | 224 | 2068 | From Area | | Yes |
| level 3 | 225 | 2069 | From Area | | Yes |
| level 3 | 226 | 2070 | From Area | | Yes |
| level 3 | 227 | 2071 | From Area | | Yes |
| level 3 | 228 | 2072 | From Area | | Yes |
| level 3 | 229 | 2073 | From Area | | Yes |
| level 3 | 230 | 2074 | From Area | | Yes |
| level 3 | 231 | 2075 | From Area | | Yes |
| level 3 | 232 | 2076 | From Area | | Yes |
| level 3 | 233 | 2077 | From Area | | Yes |
| level 3 | 234 | 2078 | From Area | | Yes |
| level 3 | 235 | 2079 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 236 | 2080 | From Area | | Yes |
| level 3 | 237 | 2081 | From Area | | Yes |
| level 3 | 238 | 2082 | From Area | | Yes |
| level 3 | 239 | 2083 | From Area | | Yes |
| level 3 | 240 | 2084 | From Area | | Yes |
| level 3 | 241 | 2103 | From Area | | Yes |
| level 3 | 242 | 2104 | From Area | | Yes |
| level 3 | 243 | 2105 | From Area | | Yes |
| level 3 | 244 | 2106 | From Area | | Yes |
| level 3 | 245 | 2107 | From Area | | Yes |
| level 3 | 246 | 2116 | From Area | | Yes |
| level 3 | 247 | 2117 | From Area | | Yes |
| level 3 | 248 | 2118 | From Area | | Yes |
| level 3 | 249 | 2119 | From Area | | Yes |
| level 3 | 250 | 2120 | From Area | | Yes |
| level 3 | 251 | 2121 | From Area | | Yes |
| level 3 | 252 | 2122 | From Area | | Yes |
| level 3 | 253 | 2123 | From Area | | Yes |
| level 3 | 254 | 2124 | From Area | | Yes |
| level 3 | 255 | 2125 | From Area | | Yes |
| level 3 | 256 | 2126 | From Area | | Yes |
| level 3 | 257 | 2127 | From Area | | Yes |
| level 3 | 258 | 2128 | From Area | | Yes |
| level 3 | 259 | 2129 | From Area | | Yes |
| level 3 | 260 | 2130 | From Area | | Yes |
| level 3 | 261 | 2131 | From Area | | Yes |
| level 3 | 262 | 2132 | From Area | | Yes |
| level 3 | 263 | 2133 | From Area | | Yes |
| level 3 | 264 | 2163 | From Area | | Yes |
| level 3 | 265 | 2164 | From Area | | Yes |
| level 3 | 266 | 2165 | From Area | | Yes |
| level 3 | 267 | 2166 | From Area | | Yes |
| level 3 | 268 | 2167 | From Area | | Yes |
| level 3 | 269 | 2168 | From Area | | Yes |
| level 3 | 270 | 2169 | From Area | | Yes |
| level 3 | 271 | 2170 | From Area | | Yes |
| level 3 | 272 | 2171 | From Area | | Yes |
| level 3 | 273 | 2172 | From Area | | Yes |
| level 3 | 274 | 2173 | From Area | | Yes |
| level 3 | 275 | 2174 | From Area | | Yes |
| level 3 | 276 | 2175 | From Area | | Yes |
| level 3 | 277 | 2176 | From Area | | Yes |
| level 3 | 278 | 2177 | From Area | | Yes |
| level 3 | 279 | 2178 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 280 | 2179 | From Area | | Yes |
| level 3 | 281 | 2180 | From Area | | Yes |
| level 3 | 282 | 2181 | From Area | | Yes |
| level 3 | 283 | 2182 | From Area | | Yes |
| level 3 | 284 | 2183 | From Area | | Yes |
| level 3 | 285 | 2184 | From Area | | Yes |
| level 3 | 286 | 2185 | From Area | | Yes |
| level 3 | 287 | 2186 | From Area | | Yes |
| level 3 | 288 | 2187 | From Area | | Yes |
| level 3 | 289 | 2188 | From Area | | Yes |
| level 3 | 290 | 2189 | From Area | | Yes |
| level 3 | 291 | 2190 | From Area | | Yes |
| level 3 | 292 | 2191 | From Area | | Yes |
| level 3 | 293 | 2192 | From Area | | Yes |
| level 3 | 294 | 2193 | From Area | | Yes |
| level 3 | 295 | 2194 | From Area | | Yes |
| level 3 | 296 | 2207 | From Area | | Yes |
| level 3 | 297 | 2208 | From Area | | Yes |
| level 3 | 298 | 2209 | From Area | | Yes |
| level 3 | 299 | 2210 | From Area | | Yes |
| level 3 | 300 | 2211 | From Area | | Yes |
| level 3 | 301 | 2212 | From Area | | Yes |
| level 3 | 302 | 2213 | From Area | | Yes |
| level 3 | 303 | 2214 | From Area | | Yes |
| level 3 | 304 | 2215 | From Area | | Yes |
| level 3 | 305 | 2216 | From Area | | Yes |
| level 3 | 306 | 2217 | From Area | | Yes |
| level 3 | 307 | 2218 | From Area | | Yes |
| level 3 | 308 | 2245 | From Area | | Yes |
| level 3 | 309 | 2246 | From Area | | Yes |
| level 3 | 310 | 2247 | From Area | | Yes |
| level 3 | 311 | 2248 | From Area | | Yes |
| level 3 | 312 | 2249 | From Area | | Yes |
| level 3 | 313 | 2250 | From Area | | Yes |
| level 3 | 314 | 2251 | From Area | | Yes |
| level 3 | 315 | 2252 | From Area | | Yes |
| level 3 | 316 | 2253 | From Area | | Yes |
| level 3 | 317 | 2254 | From Area | | Yes |
| level 3 | 318 | 2255 | From Area | | Yes |
| level 3 | 319 | 2256 | From Area | | Yes |
| level 3 | 320 | 2257 | From Area | | Yes |
| level 3 | 321 | 2258 | From Area | | Yes |
| level 3 | 322 | 2259 | From Area | | Yes |
| level 3 | 323 | 2260 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 324 | 2261 | From Area | | Yes |
| level 3 | 325 | 2262 | From Area | | Yes |
| level 3 | 326 | 2263 | From Area | | Yes |
| level 3 | 327 | 2264 | From Area | | Yes |
| level 3 | 328 | 2265 | From Area | | Yes |
| level 3 | 329 | 2266 | From Area | | Yes |
| level 3 | 330 | 2267 | From Area | | Yes |
| level 3 | 331 | 2268 | From Area | | Yes |
| level 3 | 332 | 2269 | From Area | | Yes |
| level 3 | 333 | 2270 | From Area | | Yes |
| level 3 | 334 | 2288 | From Area | | Yes |
| level 3 | 335 | 2289 | From Area | | Yes |
| level 3 | 336 | 2290 | From Area | | Yes |
| level 3 | 337 | 2291 | From Area | | Yes |
| level 3 | 338 | 2292 | From Area | | Yes |
| level 3 | 339 | 2301 | From Area | | Yes |
| level 3 | 340 | 2302 | From Area | | Yes |
| level 3 | 341 | 2303 | From Area | | Yes |
| level 3 | 342 | 2304 | From Area | | Yes |
| level 3 | 343 | 2305 | From Area | | Yes |
| level 3 | 344 | 2306 | From Area | | Yes |
| level 3 | 345 | 2307 | From Area | | Yes |
| level 3 | 346 | 2308 | From Area | | Yes |
| level 3 | 347 | 2309 | From Area | | Yes |
| level 3 | 348 | 2310 | From Area | | Yes |
| level 3 | 349 | 2311 | From Area | | Yes |
| level 3 | 350 | 2312 | From Area | | Yes |
| level 3 | 351 | 2313 | From Area | | Yes |
| level 3 | 352 | 2314 | From Area | | Yes |
| level 3 | 353 | 2315 | From Area | | Yes |
| level 3 | 354 | 2316 | From Area | | Yes |
| level 3 | 355 | 2317 | From Area | | Yes |
| level 3 | 356 | 2318 | From Area | | Yes |
| level 3 | 357 | 2319 | From Area | | Yes |
| level 3 | 358 | 2327 | From Area | | Yes |
| level 3 | 359 | 2333 | From Area | | Yes |
| level 3 | 360 | 2334 | From Area | | Yes |
| level 3 | 361 | 2335 | From Area | | Yes |
| level 3 | 362 | 2336 | From Area | | Yes |
| level 3 | 363 | 2337 | From Area | | Yes |
| level 3 | 364 | 2338 | From Area | | Yes |
| level 3 | 365 | 2339 | From Area | | Yes |
| level 3 | 366 | 2340 | From Area | | Yes |
| level 3 | 367 | 2341 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 368 | 2342 | From Area | | Yes |
| level 3 | 369 | 2343 | From Area | | Yes |
| level 3 | 370 | 2344 | From Area | | Yes |
| level 3 | 371 | 2345 | From Area | | Yes |
| level 3 | 372 | 2346 | From Area | | Yes |
| level 3 | 373 | 2347 | From Area | | Yes |
| level 3 | 374 | 2348 | From Area | | Yes |
| level 3 | 375 | 2349 | From Area | | Yes |
| level 3 | 376 | 2350 | From Area | | Yes |
| level 3 | 377 | 2351 | From Area | | Yes |
| level 3 | 378 | 2355 | From Area | | Yes |
| level 3 | 379 | 2363 | From Area | | Yes |
| level 3 | 380 | 2364 | From Area | | Yes |
| level 3 | 381 | 2365 | From Area | | Yes |
| level 3 | 382 | 2366 | From Area | | Yes |
| level 3 | 383 | 2367 | From Area | | Yes |
| level 3 | 384 | 2368 | From Area | | Yes |
| level 3 | 385 | 2369 | From Area | | Yes |
| level 3 | 386 | 2370 | From Area | | Yes |
| level 3 | 387 | 2371 | From Area | | Yes |
| level 3 | 388 | 2372 | From Area | | Yes |
| level 3 | 389 | 2373 | From Area | | Yes |
| level 3 | 390 | 2374 | From Area | | Yes |
| level 3 | 391 | 2375 | From Area | | Yes |
| level 3 | 392 | 2376 | From Area | | Yes |
| level 3 | 393 | 2377 | From Area | | Yes |
| level 3 | 394 | 2378 | From Area | | Yes |
| level 3 | 395 | 2379 | From Area | | Yes |
| level 3 | 396 | 2380 | From Area | | Yes |
| level 3 | 397 | 2381 | From Area | | Yes |
| level 3 | 398 | 2382 | From Area | | Yes |
| level 3 | 399 | 2383 | From Area | | Yes |
| level 3 | 400 | 2384 | From Area | | Yes |
| level 3 | 401 | 2385 | From Area | | Yes |
| level 3 | 402 | 2386 | From Area | | Yes |
| level 3 | 403 | 2387 | From Area | | Yes |
| level 3 | 404 | 2388 | From Area | | Yes |
| level 3 | 405 | 2389 | From Area | | Yes |
| level 3 | 406 | 2390 | From Area | | Yes |
| level 3 | 407 | 2391 | From Area | | Yes |
| level 3 | 408 | 2392 | From Area | | Yes |
| level 3 | 409 | 2393 | From Area | | Yes |
| level 3 | 410 | 2394 | From Area | | Yes |
| level 3 | 411 | 2395 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 412 | 2396 | From Area | | Yes |
| level 3 | 413 | 2407 | From Area | | Yes |
| level 3 | 414 | 2408 | From Area | | Yes |
| level 3 | 415 | 2409 | From Area | | Yes |
| level 3 | 416 | 2410 | From Area | | Yes |
| level 3 | 417 | 2411 | From Area | | Yes |
| level 3 | 418 | 2412 | From Area | | Yes |
| level 3 | 419 | 2413 | From Area | | Yes |
| level 3 | 420 | 2414 | From Area | | Yes |
| level 3 | 421 | 2415 | From Area | | Yes |
| level 3 | 422 | 2416 | From Area | | Yes |
| level 3 | 423 | 2417 | From Area | | Yes |
| level 3 | 424 | 2418 | From Area | | Yes |
| level 3 | 425 | 2419 | From Area | | Yes |
| level 3 | 426 | 2420 | From Area | | Yes |
| level 3 | 427 | 2421 | From Area | | Yes |
| level 3 | 428 | 2422 | From Area | | Yes |
| level 3 | 429 | 2423 | From Area | | Yes |
| level 3 | 430 | 2424 | From Area | | Yes |
| level 3 | 431 | 2425 | From Area | | Yes |
| level 3 | 432 | 2426 | From Area | | Yes |
| level 3 | 433 | 2427 | From Area | | Yes |
| level 3 | 434 | 2428 | From Area | | Yes |
| level 3 | 435 | 2429 | From Area | | Yes |
| level 3 | 436 | 2430 | From Area | | Yes |
| level 3 | 437 | 2431 | From Area | | Yes |
| level 3 | 438 | 2432 | From Area | | Yes |
| level 3 | 439 | 2433 | From Area | | Yes |
| level 3 | 440 | 2434 | From Area | | Yes |
| level 3 | 441 | 2435 | From Area | | Yes |
| level 3 | 442 | 2436 | From Area | | Yes |
| level 3 | 443 | 2437 | From Area | | Yes |
| level 3 | 444 | 2438 | From Area | | Yes |
| level 3 | 445 | 2449 | From Area | | Yes |
| level 3 | 446 | 2450 | From Area | | Yes |
| level 3 | 447 | 2451 | From Area | | Yes |
| level 3 | 448 | 2452 | From Area | | Yes |
| level 3 | 449 | 2453 | From Area | | Yes |
| level 3 | 450 | 2454 | From Area | | Yes |
| level 3 | 451 | 2455 | From Area | | Yes |
| level 3 | 452 | 2456 | From Area | | Yes |
| level 3 | 453 | 2457 | From Area | | Yes |
| level 3 | 454 | 2458 | From Area | | Yes |
| level 3 | 455 | 2459 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 456 | 642 | From Area | | Yes |
| level 3 | 457 | 643 | From Area | | Yes |
| level 3 | 458 | 644 | From Area | | Yes |
| level 3 | 459 | 645 | From Area | | Yes |
| level 3 | 460 | 646 | From Area | | Yes |
| level 3 | 461 | 647 | From Area | | Yes |
| level 3 | 462 | 648 | From Area | | Yes |
| level 3 | 463 | 649 | From Area | | Yes |
| level 3 | 464 | 650 | From Area | | Yes |
| level 3 | 465 | 651 | From Area | | Yes |
| level 3 | 466 | 652 | From Area | | Yes |
| level 3 | 467 | 653 | From Area | | Yes |
| level 3 | 468 | 654 | From Area | | Yes |
| level 3 | 469 | 655 | From Area | | Yes |
| level 3 | 470 | 656 | From Area | | Yes |
| level 3 | 471 | 657 | From Area | | Yes |
| level 3 | 472 | 658 | From Area | | Yes |
| level 3 | 473 | 659 | From Area | | Yes |
| level 3 | 474 | 660 | From Area | | Yes |
| level 3 | 475 | 661 | From Area | | Yes |
| level 3 | 476 | 662 | From Area | | Yes |
| level 3 | 477 | 663 | From Area | | Yes |
| level 3 | 478 | 664 | From Area | | Yes |
| level 3 | 479 | 665 | From Area | | Yes |
| level 3 | 480 | 666 | From Area | | Yes |
| level 3 | 481 | 667 | From Area | | Yes |
| level 3 | 482 | 668 | From Area | | Yes |
| level 3 | 483 | 669 | From Area | | Yes |
| level 3 | 484 | 670 | From Area | | Yes |
| level 3 | 485 | 671 | From Area | | Yes |
| level 3 | 486 | 672 | From Area | | Yes |
| level 3 | 487 | 771 | From Area | | Yes |
| level 3 | 488 | 772 | From Area | | Yes |
| level 3 | 489 | 857 | From Area | | Yes |
| level 3 | 490 | 858 | From Area | | Yes |
| level 3 | 491 | 859 | From Area | | Yes |
| level 3 | 492 | 860 | From Area | | Yes |
| level 3 | 493 | 861 | From Area | | Yes |
| level 3 | 494 | 862 | From Area | | Yes |
| level 3 | 495 | 863 | From Area | | Yes |
| level 3 | 496 | 864 | From Area | | Yes |
| level 3 | 497 | 865 | From Area | | Yes |
| level 3 | 498 | 866 | From Area | | Yes |
| level 3 | 499 | 867 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 500 | 868 | From Area | | Yes |
| level 3 | 501 | 869 | From Area | | Yes |
| level 3 | 502 | 870 | From Area | | Yes |
| level 3 | 503 | 871 | From Area | | Yes |
| level 3 | 504 | 872 | From Area | | Yes |
| level 3 | 505 | 873 | From Area | | Yes |
| level 3 | 506 | 874 | From Area | | Yes |
| level 3 | 507 | 875 | From Area | | Yes |
| level 3 | 508 | 876 | From Area | | Yes |
| level 3 | 509 | 877 | From Area | | Yes |
| level 3 | 510 | 878 | From Area | | Yes |
| level 3 | 511 | 879 | From Area | | Yes |
| level 3 | 512 | 880 | From Area | | Yes |
| level 3 | 513 | 881 | From Area | | Yes |
| level 3 | 514 | 882 | From Area | | Yes |
| level 3 | 515 | 883 | From Area | | Yes |
| level 3 | 516 | 884 | From Area | | Yes |
| level 3 | 517 | 885 | From Area | | Yes |
| level 3 | 518 | 886 | From Area | | Yes |
| level 3 | 519 | 887 | From Area | | Yes |
| level 3 | 520 | 888 | From Area | | Yes |
| level 3 | 521 | 889 | From Area | | Yes |
| level 3 | 522 | 890 | From Area | | Yes |
| level 3 | 523 | 891 | From Area | | Yes |
| level 3 | 524 | 892 | From Area | | Yes |
| level 3 | 525 | 893 | From Area | | Yes |
| level 3 | 526 | 894 | From Area | | Yes |
| level 3 | 527 | 895 | From Area | | Yes |
| level 3 | 528 | 896 | From Area | | Yes |
| level 3 | 529 | 897 | From Area | | Yes |
| level 3 | 530 | 898 | From Area | | Yes |
| level 3 | 531 | 899 | From Area | | Yes |
| level 3 | 532 | 900 | From Area | | Yes |
| level 3 | 533 | 901 | From Area | | Yes |
| level 3 | 534 | 902 | From Area | | Yes |
| level 3 | 535 | 903 | From Area | | Yes |
| level 3 | 536 | 904 | From Area | | Yes |
| level 3 | 537 | 905 | From Area | | Yes |
| level 3 | 538 | 906 | From Area | | Yes |
| level 3 | 539 | 907 | From Area | | Yes |
| level 3 | 540 | 908 | From Area | | Yes |
| level 3 | 541 | 909 | From Area | | Yes |
| level 3 | 542 | 910 | From Area | | Yes |
| level 3 | 543 | 911 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 544 | 912 | From Area | | Yes |
| level 3 | 545 | 913 | From Area | | Yes |
| level 3 | 546 | 914 | From Area | | Yes |
| level 3 | 547 | 915 | From Area | | Yes |
| level 3 | 548 | 916 | From Area | | Yes |
| level 3 | 549 | 917 | From Area | | Yes |
| level 3 | 550 | 918 | From Area | | Yes |
| level 3 | 551 | 919 | From Area | | Yes |
| level 3 | 552 | 920 | From Area | | Yes |
| level 3 | 553 | 921 | From Area | | Yes |
| level 3 | 554 | 922 | From Area | | Yes |
| level 3 | 555 | 923 | From Area | | Yes |
| level 3 | 556 | 924 | From Area | | Yes |
| level 3 | 557 | 925 | From Area | | Yes |
| level 3 | 558 | 926 | From Area | | Yes |
| level 3 | 559 | 927 | From Area | | Yes |
| level 3 | 560 | 928 | From Area | | Yes |
| level 3 | 561 | 929 | From Area | | Yes |
| level 3 | 562 | 930 | From Area | | Yes |
| level 3 | 563 | 931 | From Area | | Yes |
| level 3 | 564 | 932 | From Area | | Yes |
| level 3 | 565 | 933 | From Area | | Yes |
| level 3 | 566 | 934 | From Area | | Yes |
| level 3 | 567 | 935 | From Area | | Yes |
| level 3 | 568 | 936 | From Area | | Yes |
| level 3 | 569 | 937 | From Area | | Yes |
| level 3 | 570 | 938 | From Area | | Yes |
| level 3 | 571 | 939 | From Area | | Yes |
| level 3 | 572 | 940 | From Area | | Yes |
| level 3 | 573 | 941 | From Area | | Yes |
| level 3 | 574 | 942 | From Area | | Yes |
| level 3 | 575 | 943 | From Area | | Yes |
| level 3 | 576 | 944 | From Area | | Yes |
| level 3 | 577 | 945 | From Area | | Yes |
| level 3 | 578 | 946 | From Area | | Yes |
| level 3 | 579 | 947 | From Area | | Yes |
| level 3 | 580 | 948 | From Area | | Yes |
| level 3 | 581 | 949 | From Area | | Yes |
| level 3 | 582 | 950 | From Area | | Yes |
| level 3 | 583 | 951 | From Area | | Yes |
| level 3 | 584 | 952 | From Area | | Yes |
| level 3 | 585 | 953 | From Area | | Yes |
| level 3 | 586 | 954 | From Area | | Yes |
| level 3 | 587 | 955 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 588 | 956 | From Area | | Yes |
| level 3 | 589 | 957 | From Area | | Yes |
| level 3 | 590 | 958 | From Area | | Yes |
| level 3 | 591 | 959 | From Area | | Yes |
| level 3 | 592 | 960 | From Area | | Yes |
| level 3 | 593 | 961 | From Area | | Yes |
| level 3 | 594 | 962 | From Area | | Yes |
| level 3 | 595 | 963 | From Area | | Yes |
| level 3 | 596 | 964 | From Area | | Yes |
| level 3 | 597 | 965 | From Area | | Yes |
| level 3 | 598 | 966 | From Area | | Yes |
| level 3 | 599 | 967 | From Area | | Yes |
| level 3 | 600 | 968 | From Area | | Yes |
| level 3 | 601 | 969 | From Area | | Yes |
| level 3 | 602 | 970 | From Area | | Yes |
| level 3 | 603 | 971 | From Area | | Yes |
| level 3 | 604 | 972 | From Area | | Yes |
| level 3 | 605 | 973 | From Area | | Yes |
| level 3 | 606 | 974 | From Area | | Yes |
| level 3 | 607 | 975 | From Area | | Yes |
| level 3 | 608 | 976 | From Area | | Yes |
| level 3 | 609 | 977 | From Area | | Yes |
| level 3 | 610 | 978 | From Area | | Yes |
| level 3 | 611 | 979 | From Area | | Yes |
| level 3 | 612 | 980 | From Area | | Yes |
| level 3 | 613 | 981 | From Area | | Yes |
| level 3 | 614 | 982 | From Area | | Yes |
| level 3 | 615 | 983 | From Area | | Yes |
| level 3 | 616 | 984 | From Area | | Yes |
| level 3 | 617 | 985 | From Area | | Yes |
| level 3 | 618 | 986 | From Area | | Yes |
| level 3 | 619 | 987 | From Area | | Yes |
| level 3 | 620 | 988 | From Area | | Yes |
| level 3 | 621 | 989 | From Area | | Yes |
| level 3 | 622 | 990 | From Area | | Yes |
| level 3 | 623 | 991 | From Area | | Yes |
| level 3 | 624 | 992 | From Area | | Yes |
| level 3 | 625 | 993 | From Area | | Yes |
| level 3 | 626 | 994 | From Area | | Yes |
| level 3 | 627 | 995 | From Area | | Yes |
| level 3 | 628 | 996 | From Area | | Yes |
| level 3 | 629 | 997 | From Area | | Yes |
| level 3 | 630 | 998 | From Area | | Yes |
| level 3 | 631 | 999 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 3 | 632 | 1000 | From Area | | Yes |
| level 3 | 633 | 1001 | From Area | | Yes |
| level 3 | 634 | 1002 | From Area | | Yes |
| level 3 | 635 | 1003 | From Area | | Yes |
| level 3 | 636 | 1004 | From Area | | Yes |
| level 3 | 637 | 1005 | From Area | | Yes |
| level 3 | 638 | 1006 | From Area | | Yes |
| level 3 | 639 | 1007 | From Area | | Yes |
| level 2 | 1 | 1550 | From Area | | Yes |
| level 2 | 2 | 1551 | From Area | | Yes |
| level 2 | 3 | 1552 | From Area | | Yes |
| level 2 | 4 | 1553 | From Area | | Yes |
| level 2 | 5 | 1554 | From Area | | Yes |
| level 2 | 6 | 1555 | From Area | | Yes |
| level 2 | 7 | 1556 | From Area | | Yes |
| level 2 | 8 | 1557 | From Area | | Yes |
| level 2 | 9 | 1559 | From Area | | Yes |
| level 2 | 10 | 1560 | From Area | | Yes |
| level 2 | 11 | 1561 | From Area | | Yes |
| level 2 | 12 | 1562 | From Area | | Yes |
| level 2 | 13 | 1741 | From Area | | Yes |
| level 2 | 14 | 1563 | From Area | | Yes |
| level 2 | 15 | 1595 | From Area | | Yes |
| level 2 | 16 | 1594 | From Area | | Yes |
| level 2 | 17 | 1593 | From Area | | Yes |
| level 2 | 18 | 1587 | From Area | | Yes |
| level 2 | 19 | 1592 | From Area | | Yes |
| level 2 | 20 | 1591 | From Area | | Yes |
| level 2 | 21 | 1590 | From Area | | Yes |
| level 2 | 22 | 1586 | From Area | | Yes |
| level 2 | 23 | 1585 | From Area | | Yes |
| level 2 | 24 | 1589 | From Area | | Yes |
| level 2 | 25 | 1584 | From Area | | Yes |
| level 2 | 26 | 1630 | From Area | | Yes |
| level 2 | 27 | 1742 | From Area | | Yes |
| level 2 | 28 | 1817 | From Area | | Yes |
| level 2 | 29 | 1631 | From Area | | Yes |
| level 2 | 30 | 1743 | From Area | | Yes |
| level 2 | 31 | 1818 | From Area | | Yes |
| level 2 | 32 | 1632 | From Area | | Yes |
| level 2 | 33 | 1744 | From Area | | Yes |
| level 2 | 34 | 1819 | From Area | | Yes |
| level 2 | 35 | 1633 | From Area | | Yes |
| level 2 | 36 | 1745 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 37 | 1820 | From Area | | Yes |
| level 2 | 38 | 1634 | From Area | | Yes |
| level 2 | 39 | 1746 | From Area | | Yes |
| level 2 | 40 | 1821 | From Area | | Yes |
| level 2 | 41 | 1635 | From Area | | Yes |
| level 2 | 42 | 1747 | From Area | | Yes |
| level 2 | 43 | 1822 | From Area | | Yes |
| level 2 | 44 | 1636 | From Area | | Yes |
| level 2 | 45 | 1748 | From Area | | Yes |
| level 2 | 46 | 1823 | From Area | | Yes |
| level 2 | 47 | 1637 | From Area | | Yes |
| level 2 | 48 | 1749 | From Area | | Yes |
| level 2 | 49 | 1824 | From Area | | Yes |
| level 2 | 50 | 1638 | From Area | | Yes |
| level 2 | 51 | 1750 | From Area | | Yes |
| level 2 | 52 | 1825 | From Area | | Yes |
| level 2 | 53 | 1639 | From Area | | Yes |
| level 2 | 54 | 1751 | From Area | | Yes |
| level 2 | 55 | 1826 | From Area | | Yes |
| level 2 | 56 | 1640 | From Area | | Yes |
| level 2 | 57 | 1684 | From Area | | Yes |
| level 2 | 58 | 1685 | From Area | | Yes |
| level 2 | 59 | 1686 | From Area | | Yes |
| level 2 | 60 | 1679 | From Area | | Yes |
| level 2 | 61 | 1683 | From Area | | Yes |
| level 2 | 62 | 1704 | From Area | | Yes |
| level 2 | 63 | 1703 | From Area | | Yes |
| level 2 | 64 | 1702 | From Area | | Yes |
| level 2 | 65 | 1701 | From Area | | Yes |
| level 2 | 66 | 1700 | From Area | | Yes |
| level 2 | 67 | 1699 | From Area | | Yes |
| level 2 | 68 | 1698 | From Area | | Yes |
| level 2 | 69 | 1697 | From Area | | Yes |
| level 2 | 70 | 1696 | From Area | | Yes |
| level 2 | 71 | 1740 | From Area | | Yes |
| level 2 | 72 | 1695 | From Area | | Yes |
| level 2 | 73 | 1694 | From Area | | Yes |
| level 2 | 74 | 1693 | From Area | | Yes |
| level 2 | 75 | 1692 | From Area | | Yes |
| level 2 | 76 | 1691 | From Area | | Yes |
| level 2 | 77 | 1690 | From Area | | Yes |
| level 2 | 78 | 1689 | From Area | | Yes |
| level 2 | 79 | 1688 | From Area | | Yes |
| level 2 | 80 | 1687 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 81 | 1682 | From Area | | Yes |
| level 2 | 82 | 1681 | From Area | | Yes |
| level 2 | 83 | 1705 | From Area | | Yes |
| level 2 | 84 | 1706 | From Area | | Yes |
| level 2 | 85 | 1707 | From Area | | Yes |
| level 2 | 86 | 1680 | From Area | | Yes |
| level 2 | 87 | 1641 | From Area | | Yes |
| level 2 | 88 | 1827 | From Area | | Yes |
| level 2 | 89 | 1642 | From Area | | Yes |
| level 2 | 90 | 1828 | From Area | | Yes |
| level 2 | 91 | 1643 | From Area | | Yes |
| level 2 | 92 | 1829 | From Area | | Yes |
| level 2 | 93 | 1644 | From Area | | Yes |
| level 2 | 94 | 1769 | From Area | | Yes |
| level 2 | 95 | 1770 | From Area | | Yes |
| level 2 | 96 | 1771 | From Area | | Yes |
| level 2 | 97 | 1764 | From Area | | Yes |
| level 2 | 98 | 1768 | From Area | | Yes |
| level 2 | 99 | 1786 | From Area | | Yes |
| level 2 | 100 | 1785 | From Area | | Yes |
| level 2 | 101 | 1784 | From Area | | Yes |
| level 2 | 102 | 1783 | From Area | | Yes |
| level 2 | 103 | 1782 | From Area | | Yes |
| level 2 | 104 | 1781 | From Area | | Yes |
| level 2 | 105 | 1780 | From Area | | Yes |
| level 2 | 106 | 1779 | From Area | | Yes |
| level 2 | 107 | 1816 | From Area | | Yes |
| level 2 | 108 | 1778 | From Area | | Yes |
| level 2 | 109 | 1777 | From Area | | Yes |
| level 2 | 110 | 1776 | From Area | | Yes |
| level 2 | 111 | 1775 | From Area | | Yes |
| level 2 | 112 | 1774 | From Area | | Yes |
| level 2 | 113 | 1773 | From Area | | Yes |
| level 2 | 114 | 1772 | From Area | | Yes |
| level 2 | 115 | 1767 | From Area | | Yes |
| level 2 | 116 | 1766 | From Area | | Yes |
| level 2 | 117 | 1787 | From Area | | Yes |
| level 2 | 118 | 1788 | From Area | | Yes |
| level 2 | 119 | 1789 | From Area | | Yes |
| level 2 | 120 | 1765 | From Area | | Yes |
| level 2 | 121 | 1645 | From Area | | Yes |
| level 2 | 122 | 1984 | From Area | | Yes |
| level 2 | 123 | 1942 | From Area | | Yes |
| level 2 | 124 | 1830 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 125 | 1646 | From Area | | Yes |
| level 2 | 126 | 1985 | From Area | | Yes |
| level 2 | 127 | 1943 | From Area | | Yes |
| level 2 | 128 | 1831 | From Area | | Yes |
| level 2 | 129 | 1647 | From Area | | Yes |
| level 2 | 130 | 1986 | From Area | | Yes |
| level 2 | 131 | 1944 | From Area | | Yes |
| level 2 | 132 | 1832 | From Area | | Yes |
| level 2 | 133 | 1653 | From Area | | Yes |
| level 2 | 134 | 1987 | From Area | | Yes |
| level 2 | 135 | 1945 | From Area | | Yes |
| level 2 | 136 | 1838 | From Area | | Yes |
| level 2 | 137 | 1654 | From Area | | Yes |
| level 2 | 138 | 1988 | From Area | | Yes |
| level 2 | 139 | 1946 | From Area | | Yes |
| level 2 | 140 | 1839 | From Area | | Yes |
| level 2 | 141 | 1655 | From Area | | Yes |
| level 2 | 142 | 1989 | From Area | | Yes |
| level 2 | 143 | 1947 | From Area | | Yes |
| level 2 | 144 | 1840 | From Area | | Yes |
| level 2 | 145 | 1656 | From Area | | Yes |
| level 2 | 146 | 1990 | From Area | | Yes |
| level 2 | 147 | 1948 | From Area | | Yes |
| level 2 | 148 | 1841 | From Area | | Yes |
| level 2 | 149 | 1657 | From Area | | Yes |
| level 2 | 150 | 1991 | From Area | | Yes |
| level 2 | 151 | 1949 | From Area | | Yes |
| level 2 | 152 | 1842 | From Area | | Yes |
| level 2 | 153 | 1658 | From Area | | Yes |
| level 2 | 154 | 1992 | From Area | | Yes |
| level 2 | 155 | 1950 | From Area | | Yes |
| level 2 | 156 | 1843 | From Area | | Yes |
| level 2 | 157 | 1659 | From Area | | Yes |
| level 2 | 158 | 1993 | From Area | | Yes |
| level 2 | 159 | 1951 | From Area | | Yes |
| level 2 | 160 | 1844 | From Area | | Yes |
| level 2 | 161 | 1660 | From Area | | Yes |
| level 2 | 162 | 1865 | From Area | | Yes |
| level 2 | 163 | 1866 | From Area | | Yes |
| level 2 | 164 | 1867 | From Area | | Yes |
| level 2 | 165 | 1868 | From Area | | Yes |
| level 2 | 166 | 1869 | From Area | | Yes |
| level 2 | 167 | 1870 | From Area | | Yes |
| level 2 | 168 | 1871 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 169 | 1873 | From Area | | Yes |
| level 2 | 170 | 1874 | From Area | | Yes |
| level 2 | 171 | 1875 | From Area | | Yes |
| level 2 | 172 | 1876 | From Area | | Yes |
| level 2 | 173 | 1877 | From Area | | Yes |
| level 2 | 174 | 1907 | From Area | | Yes |
| level 2 | 175 | 1906 | From Area | | Yes |
| level 2 | 176 | 1905 | From Area | | Yes |
| level 2 | 177 | 1899 | From Area | | Yes |
| level 2 | 178 | 1904 | From Area | | Yes |
| level 2 | 179 | 1903 | From Area | | Yes |
| level 2 | 180 | 1902 | From Area | | Yes |
| level 2 | 181 | 1898 | From Area | | Yes |
| level 2 | 182 | 1897 | From Area | | Yes |
| level 2 | 183 | 1901 | From Area | | Yes |
| level 2 | 184 | 1845 | From Area | | Yes |
| level 2 | 185 | 1558 | From Area | | Yes |
| level 2 | 186 | 1564 | From Area | | Yes |
| level 2 | 187 | 1565 | From Area | | Yes |
| level 2 | 188 | 1566 | From Area | | Yes |
| level 2 | 189 | 1567 | From Area | | Yes |
| level 2 | 190 | 1568 | From Area | | Yes |
| level 2 | 191 | 1569 | From Area | | Yes |
| level 2 | 192 | 1570 | From Area | | Yes |
| level 2 | 193 | 1571 | From Area | | Yes |
| level 2 | 194 | 1572 | From Area | | Yes |
| level 2 | 195 | 1573 | From Area | | Yes |
| level 2 | 196 | 1574 | From Area | | Yes |
| level 2 | 197 | 1575 | From Area | | Yes |
| level 2 | 198 | 1576 | From Area | | Yes |
| level 2 | 199 | 1577 | From Area | | Yes |
| level 2 | 200 | 1578 | From Area | | Yes |
| level 2 | 201 | 1579 | From Area | | Yes |
| level 2 | 202 | 1580 | From Area | | Yes |
| level 2 | 203 | 1581 | From Area | | Yes |
| level 2 | 204 | 1582 | From Area | | Yes |
| level 2 | 205 | 1583 | From Area | | Yes |
| level 2 | 206 | 1588 | From Area | | Yes |
| level 2 | 207 | 1596 | From Area | | Yes |
| level 2 | 208 | 1597 | From Area | | Yes |
| level 2 | 209 | 1598 | From Area | | Yes |
| level 2 | 210 | 1599 | From Area | | Yes |
| level 2 | 211 | 1600 | From Area | | Yes |
| level 2 | 212 | 1601 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 213 | 1602 | From Area | | Yes |
| level 2 | 214 | 1603 | From Area | | Yes |
| level 2 | 215 | 1604 | From Area | | Yes |
| level 2 | 216 | 1605 | From Area | | Yes |
| level 2 | 217 | 1606 | From Area | | Yes |
| level 2 | 218 | 1607 | From Area | | Yes |
| level 2 | 219 | 1608 | From Area | | Yes |
| level 2 | 220 | 1609 | From Area | | Yes |
| level 2 | 221 | 1610 | From Area | | Yes |
| level 2 | 222 | 1611 | From Area | | Yes |
| level 2 | 223 | 1612 | From Area | | Yes |
| level 2 | 224 | 1613 | From Area | | Yes |
| level 2 | 225 | 1614 | From Area | | Yes |
| level 2 | 226 | 1615 | From Area | | Yes |
| level 2 | 227 | 1616 | From Area | | Yes |
| level 2 | 228 | 1617 | From Area | | Yes |
| level 2 | 229 | 1618 | From Area | | Yes |
| level 2 | 230 | 1619 | From Area | | Yes |
| level 2 | 231 | 1620 | From Area | | Yes |
| level 2 | 232 | 1621 | From Area | | Yes |
| level 2 | 233 | 1622 | From Area | | Yes |
| level 2 | 234 | 1623 | From Area | | Yes |
| level 2 | 235 | 1624 | From Area | | Yes |
| level 2 | 236 | 1625 | From Area | | Yes |
| level 2 | 237 | 1626 | From Area | | Yes |
| level 2 | 238 | 1627 | From Area | | Yes |
| level 2 | 239 | 1628 | From Area | | Yes |
| level 2 | 240 | 1629 | From Area | | Yes |
| level 2 | 241 | 1648 | From Area | | Yes |
| level 2 | 242 | 1649 | From Area | | Yes |
| level 2 | 243 | 1650 | From Area | | Yes |
| level 2 | 244 | 1651 | From Area | | Yes |
| level 2 | 245 | 1652 | From Area | | Yes |
| level 2 | 246 | 1661 | From Area | | Yes |
| level 2 | 247 | 1662 | From Area | | Yes |
| level 2 | 248 | 1663 | From Area | | Yes |
| level 2 | 249 | 1664 | From Area | | Yes |
| level 2 | 250 | 1665 | From Area | | Yes |
| level 2 | 251 | 1666 | From Area | | Yes |
| level 2 | 252 | 1667 | From Area | | Yes |
| level 2 | 253 | 1668 | From Area | | Yes |
| level 2 | 254 | 1669 | From Area | | Yes |
| level 2 | 255 | 1670 | From Area | | Yes |
| level 2 | 256 | 1671 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 257 | 1672 | From Area | | Yes |
| level 2 | 258 | 1673 | From Area | | Yes |
| level 2 | 259 | 1674 | From Area | | Yes |
| level 2 | 260 | 1675 | From Area | | Yes |
| level 2 | 261 | 1676 | From Area | | Yes |
| level 2 | 262 | 1677 | From Area | | Yes |
| level 2 | 263 | 1678 | From Area | | Yes |
| level 2 | 264 | 1708 | From Area | | Yes |
| level 2 | 265 | 1709 | From Area | | Yes |
| level 2 | 266 | 1710 | From Area | | Yes |
| level 2 | 267 | 1711 | From Area | | Yes |
| level 2 | 268 | 1712 | From Area | | Yes |
| level 2 | 269 | 1713 | From Area | | Yes |
| level 2 | 270 | 1714 | From Area | | Yes |
| level 2 | 271 | 1715 | From Area | | Yes |
| level 2 | 272 | 1716 | From Area | | Yes |
| level 2 | 273 | 1717 | From Area | | Yes |
| level 2 | 274 | 1718 | From Area | | Yes |
| level 2 | 275 | 1719 | From Area | | Yes |
| level 2 | 276 | 1720 | From Area | | Yes |
| level 2 | 277 | 1721 | From Area | | Yes |
| level 2 | 278 | 1722 | From Area | | Yes |
| level 2 | 279 | 1723 | From Area | | Yes |
| level 2 | 280 | 1724 | From Area | | Yes |
| level 2 | 281 | 1725 | From Area | | Yes |
| level 2 | 282 | 1726 | From Area | | Yes |
| level 2 | 283 | 1727 | From Area | | Yes |
| level 2 | 284 | 1728 | From Area | | Yes |
| level 2 | 285 | 1729 | From Area | | Yes |
| level 2 | 286 | 1730 | From Area | | Yes |
| level 2 | 287 | 1731 | From Area | | Yes |
| level 2 | 288 | 1732 | From Area | | Yes |
| level 2 | 289 | 1733 | From Area | | Yes |
| level 2 | 290 | 1734 | From Area | | Yes |
| level 2 | 291 | 1735 | From Area | | Yes |
| level 2 | 292 | 1736 | From Area | | Yes |
| level 2 | 293 | 1737 | From Area | | Yes |
| level 2 | 294 | 1738 | From Area | | Yes |
| level 2 | 295 | 1739 | From Area | | Yes |
| level 2 | 296 | 1752 | From Area | | Yes |
| level 2 | 297 | 1753 | From Area | | Yes |
| level 2 | 298 | 1754 | From Area | | Yes |
| level 2 | 299 | 1755 | From Area | | Yes |
| level 2 | 300 | 1756 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 301 | 1757 | From Area | | Yes |
| level 2 | 302 | 1758 | From Area | | Yes |
| level 2 | 303 | 1759 | From Area | | Yes |
| level 2 | 304 | 1760 | From Area | | Yes |
| level 2 | 305 | 1761 | From Area | | Yes |
| level 2 | 306 | 1762 | From Area | | Yes |
| level 2 | 307 | 1763 | From Area | | Yes |
| level 2 | 308 | 1790 | From Area | | Yes |
| level 2 | 309 | 1791 | From Area | | Yes |
| level 2 | 310 | 1792 | From Area | | Yes |
| level 2 | 311 | 1793 | From Area | | Yes |
| level 2 | 312 | 1794 | From Area | | Yes |
| level 2 | 313 | 1795 | From Area | | Yes |
| level 2 | 314 | 1796 | From Area | | Yes |
| level 2 | 315 | 1797 | From Area | | Yes |
| level 2 | 316 | 1798 | From Area | | Yes |
| level 2 | 317 | 1799 | From Area | | Yes |
| level 2 | 318 | 1800 | From Area | | Yes |
| level 2 | 319 | 1801 | From Area | | Yes |
| level 2 | 320 | 1802 | From Area | | Yes |
| level 2 | 321 | 1803 | From Area | | Yes |
| level 2 | 322 | 1804 | From Area | | Yes |
| level 2 | 323 | 1805 | From Area | | Yes |
| level 2 | 324 | 1806 | From Area | | Yes |
| level 2 | 325 | 1807 | From Area | | Yes |
| level 2 | 326 | 1808 | From Area | | Yes |
| level 2 | 327 | 1809 | From Area | | Yes |
| level 2 | 328 | 1810 | From Area | | Yes |
| level 2 | 329 | 1811 | From Area | | Yes |
| level 2 | 330 | 1812 | From Area | | Yes |
| level 2 | 331 | 1813 | From Area | | Yes |
| level 2 | 332 | 1814 | From Area | | Yes |
| level 2 | 333 | 1815 | From Area | | Yes |
| level 2 | 334 | 1833 | From Area | | Yes |
| level 2 | 335 | 1834 | From Area | | Yes |
| level 2 | 336 | 1835 | From Area | | Yes |
| level 2 | 337 | 1836 | From Area | | Yes |
| level 2 | 338 | 1837 | From Area | | Yes |
| level 2 | 339 | 1846 | From Area | | Yes |
| level 2 | 340 | 1847 | From Area | | Yes |
| level 2 | 341 | 1848 | From Area | | Yes |
| level 2 | 342 | 1849 | From Area | | Yes |
| level 2 | 343 | 1850 | From Area | | Yes |
| level 2 | 344 | 1851 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 345 | 1852 | From Area | | Yes |
| level 2 | 346 | 1853 | From Area | | Yes |
| level 2 | 347 | 1854 | From Area | | Yes |
| level 2 | 348 | 1855 | From Area | | Yes |
| level 2 | 349 | 1856 | From Area | | Yes |
| level 2 | 350 | 1857 | From Area | | Yes |
| level 2 | 351 | 1858 | From Area | | Yes |
| level 2 | 352 | 1859 | From Area | | Yes |
| level 2 | 353 | 1860 | From Area | | Yes |
| level 2 | 354 | 1861 | From Area | | Yes |
| level 2 | 355 | 1862 | From Area | | Yes |
| level 2 | 356 | 1863 | From Area | | Yes |
| level 2 | 357 | 1864 | From Area | | Yes |
| level 2 | 358 | 1872 | From Area | | Yes |
| level 2 | 359 | 1878 | From Area | | Yes |
| level 2 | 360 | 1879 | From Area | | Yes |
| level 2 | 361 | 1880 | From Area | | Yes |
| level 2 | 362 | 1881 | From Area | | Yes |
| level 2 | 363 | 1882 | From Area | | Yes |
| level 2 | 364 | 1883 | From Area | | Yes |
| level 2 | 365 | 1884 | From Area | | Yes |
| level 2 | 366 | 1885 | From Area | | Yes |
| level 2 | 367 | 1886 | From Area | | Yes |
| level 2 | 368 | 1887 | From Area | | Yes |
| level 2 | 369 | 1888 | From Area | | Yes |
| level 2 | 370 | 1889 | From Area | | Yes |
| level 2 | 371 | 1890 | From Area | | Yes |
| level 2 | 372 | 1891 | From Area | | Yes |
| level 2 | 373 | 1892 | From Area | | Yes |
| level 2 | 374 | 1893 | From Area | | Yes |
| level 2 | 375 | 1894 | From Area | | Yes |
| level 2 | 376 | 1895 | From Area | | Yes |
| level 2 | 377 | 1896 | From Area | | Yes |
| level 2 | 378 | 1900 | From Area | | Yes |
| level 2 | 379 | 1908 | From Area | | Yes |
| level 2 | 380 | 1909 | From Area | | Yes |
| level 2 | 381 | 1910 | From Area | | Yes |
| level 2 | 382 | 1911 | From Area | | Yes |
| level 2 | 383 | 1912 | From Area | | Yes |
| level 2 | 384 | 1913 | From Area | | Yes |
| level 2 | 385 | 1914 | From Area | | Yes |
| level 2 | 386 | 1915 | From Area | | Yes |
| level 2 | 387 | 1916 | From Area | | Yes |
| level 2 | 388 | 1917 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 389 | 1918 | From Area | | Yes |
| level 2 | 390 | 1919 | From Area | | Yes |
| level 2 | 391 | 1920 | From Area | | Yes |
| level 2 | 392 | 1921 | From Area | | Yes |
| level 2 | 393 | 1922 | From Area | | Yes |
| level 2 | 394 | 1923 | From Area | | Yes |
| level 2 | 395 | 1924 | From Area | | Yes |
| level 2 | 396 | 1925 | From Area | | Yes |
| level 2 | 397 | 1926 | From Area | | Yes |
| level 2 | 398 | 1927 | From Area | | Yes |
| level 2 | 399 | 1928 | From Area | | Yes |
| level 2 | 400 | 1929 | From Area | | Yes |
| level 2 | 401 | 1930 | From Area | | Yes |
| level 2 | 402 | 1931 | From Area | | Yes |
| level 2 | 403 | 1932 | From Area | | Yes |
| level 2 | 404 | 1933 | From Area | | Yes |
| level 2 | 405 | 1934 | From Area | | Yes |
| level 2 | 406 | 1935 | From Area | | Yes |
| level 2 | 407 | 1936 | From Area | | Yes |
| level 2 | 408 | 1937 | From Area | | Yes |
| level 2 | 409 | 1938 | From Area | | Yes |
| level 2 | 410 | 1939 | From Area | | Yes |
| level 2 | 411 | 1940 | From Area | | Yes |
| level 2 | 412 | 1941 | From Area | | Yes |
| level 2 | 413 | 1952 | From Area | | Yes |
| level 2 | 414 | 1953 | From Area | | Yes |
| level 2 | 415 | 1954 | From Area | | Yes |
| level 2 | 416 | 1955 | From Area | | Yes |
| level 2 | 417 | 1956 | From Area | | Yes |
| level 2 | 418 | 1957 | From Area | | Yes |
| level 2 | 419 | 1958 | From Area | | Yes |
| level 2 | 420 | 1959 | From Area | | Yes |
| level 2 | 421 | 1960 | From Area | | Yes |
| level 2 | 422 | 1961 | From Area | | Yes |
| level 2 | 423 | 1962 | From Area | | Yes |
| level 2 | 424 | 1963 | From Area | | Yes |
| level 2 | 425 | 1964 | From Area | | Yes |
| level 2 | 426 | 1965 | From Area | | Yes |
| level 2 | 427 | 1966 | From Area | | Yes |
| level 2 | 428 | 1967 | From Area | | Yes |
| level 2 | 429 | 1968 | From Area | | Yes |
| level 2 | 430 | 1969 | From Area | | Yes |
| level 2 | 431 | 1970 | From Area | | Yes |
| level 2 | 432 | 1971 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 433 | 1972 | From Area | | Yes |
| level 2 | 434 | 1973 | From Area | | Yes |
| level 2 | 435 | 1974 | From Area | | Yes |
| level 2 | 436 | 1975 | From Area | | Yes |
| level 2 | 437 | 1976 | From Area | | Yes |
| level 2 | 438 | 1977 | From Area | | Yes |
| level 2 | 439 | 1978 | From Area | | Yes |
| level 2 | 440 | 1979 | From Area | | Yes |
| level 2 | 441 | 1980 | From Area | | Yes |
| level 2 | 442 | 1981 | From Area | | Yes |
| level 2 | 443 | 1982 | From Area | | Yes |
| level 2 | 444 | 1983 | From Area | | Yes |
| level 2 | 445 | 1994 | From Area | | Yes |
| level 2 | 446 | 1995 | From Area | | Yes |
| level 2 | 447 | 1996 | From Area | | Yes |
| level 2 | 448 | 1997 | From Area | | Yes |
| level 2 | 449 | 1998 | From Area | | Yes |
| level 2 | 450 | 1999 | From Area | | Yes |
| level 2 | 451 | 2000 | From Area | | Yes |
| level 2 | 452 | 2001 | From Area | | Yes |
| level 2 | 453 | 2002 | From Area | | Yes |
| level 2 | 454 | 2003 | From Area | | Yes |
| level 2 | 455 | 2004 | From Area | | Yes |
| level 2 | 456 | 200 | From Area | | Yes |
| level 2 | 457 | 317 | From Area | | Yes |
| level 2 | 458 | 318 | From Area | | Yes |
| level 2 | 459 | 319 | From Area | | Yes |
| level 2 | 460 | 320 | From Area | | Yes |
| level 2 | 461 | 363 | From Area | | Yes |
| level 2 | 462 | 371 | From Area | | Yes |
| level 2 | 463 | 372 | From Area | | Yes |
| level 2 | 464 | 378 | From Area | | Yes |
| level 2 | 465 | 452 | From Area | | Yes |
| level 2 | 466 | 467 | From Area | | Yes |
| level 2 | 467 | 468 | From Area | | Yes |
| level 2 | 468 | 469 | From Area | | Yes |
| level 2 | 469 | 470 | From Area | | Yes |
| level 2 | 470 | 471 | From Area | | Yes |
| level 2 | 471 | 472 | From Area | | Yes |
| level 2 | 472 | 473 | From Area | | Yes |
| level 2 | 473 | 474 | From Area | | Yes |
| level 2 | 474 | 475 | From Area | | Yes |
| level 2 | 475 | 476 | From Area | | Yes |
| level 2 | 476 | 477 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 477 | 478 | From Area | | Yes |
| level 2 | 478 | 479 | From Area | | Yes |
| level 2 | 479 | 480 | From Area | | Yes |
| level 2 | 480 | 481 | From Area | | Yes |
| level 2 | 481 | 482 | From Area | | Yes |
| level 2 | 482 | 483 | From Area | | Yes |
| level 2 | 483 | 484 | From Area | | Yes |
| level 2 | 484 | 485 | From Area | | Yes |
| level 2 | 485 | 486 | From Area | | Yes |
| level 2 | 486 | 487 | From Area | | Yes |
| level 2 | 487 | 488 | From Area | | Yes |
| level 2 | 488 | 489 | From Area | | Yes |
| level 2 | 489 | 490 | From Area | | Yes |
| level 2 | 490 | 491 | From Area | | Yes |
| level 2 | 491 | 492 | From Area | | Yes |
| level 2 | 492 | 493 | From Area | | Yes |
| level 2 | 493 | 494 | From Area | | Yes |
| level 2 | 494 | 495 | From Area | | Yes |
| level 2 | 495 | 496 | From Area | | Yes |
| level 2 | 496 | 497 | From Area | | Yes |
| level 2 | 497 | 498 | From Area | | Yes |
| level 2 | 498 | 499 | From Area | | Yes |
| level 2 | 499 | 500 | From Area | | Yes |
| level 2 | 500 | 501 | From Area | | Yes |
| level 2 | 501 | 502 | From Area | | Yes |
| level 2 | 502 | 503 | From Area | | Yes |
| level 2 | 503 | 505 | From Area | | Yes |
| level 2 | 504 | 506 | From Area | | Yes |
| level 2 | 505 | 507 | From Area | | Yes |
| level 2 | 506 | 508 | From Area | | Yes |
| level 2 | 507 | 509 | From Area | | Yes |
| level 2 | 508 | 510 | From Area | | Yes |
| level 2 | 509 | 511 | From Area | | Yes |
| level 2 | 510 | 512 | From Area | | Yes |
| level 2 | 511 | 513 | From Area | | Yes |
| level 2 | 512 | 514 | From Area | | Yes |
| level 2 | 513 | 515 | From Area | | Yes |
| level 2 | 514 | 516 | From Area | | Yes |
| level 2 | 515 | 517 | From Area | | Yes |
| level 2 | 516 | 518 | From Area | | Yes |
| level 2 | 517 | 519 | From Area | | Yes |
| level 2 | 518 | 520 | From Area | | Yes |
| level 2 | 519 | 521 | From Area | | Yes |
| level 2 | 520 | 522 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 521 | 523 | From Area | | Yes |
| level 2 | 522 | 524 | From Area | | Yes |
| level 2 | 523 | 525 | From Area | | Yes |
| level 2 | 524 | 526 | From Area | | Yes |
| level 2 | 525 | 527 | From Area | | Yes |
| level 2 | 526 | 528 | From Area | | Yes |
| level 2 | 527 | 529 | From Area | | Yes |
| level 2 | 528 | 530 | From Area | | Yes |
| level 2 | 529 | 531 | From Area | | Yes |
| level 2 | 530 | 532 | From Area | | Yes |
| level 2 | 531 | 533 | From Area | | Yes |
| level 2 | 532 | 534 | From Area | | Yes |
| level 2 | 533 | 535 | From Area | | Yes |
| level 2 | 534 | 536 | From Area | | Yes |
| level 2 | 535 | 537 | From Area | | Yes |
| level 2 | 536 | 538 | From Area | | Yes |
| level 2 | 537 | 539 | From Area | | Yes |
| level 2 | 538 | 540 | From Area | | Yes |
| level 2 | 539 | 541 | From Area | | Yes |
| level 2 | 540 | 542 | From Area | | Yes |
| level 2 | 541 | 543 | From Area | | Yes |
| level 2 | 542 | 544 | From Area | | Yes |
| level 2 | 543 | 545 | From Area | | Yes |
| level 2 | 544 | 546 | From Area | | Yes |
| level 2 | 545 | 547 | From Area | | Yes |
| level 2 | 546 | 548 | From Area | | Yes |
| level 2 | 547 | 549 | From Area | | Yes |
| level 2 | 548 | 550 | From Area | | Yes |
| level 2 | 549 | 551 | From Area | | Yes |
| level 2 | 550 | 552 | From Area | | Yes |
| level 2 | 551 | 553 | From Area | | Yes |
| level 2 | 552 | 554 | From Area | | Yes |
| level 2 | 553 | 555 | From Area | | Yes |
| level 2 | 554 | 556 | From Area | | Yes |
| level 2 | 555 | 557 | From Area | | Yes |
| level 2 | 556 | 558 | From Area | | Yes |
| level 2 | 557 | 559 | From Area | | Yes |
| level 2 | 558 | 560 | From Area | | Yes |
| level 2 | 559 | 561 | From Area | | Yes |
| level 2 | 560 | 562 | From Area | | Yes |
| level 2 | 561 | 563 | From Area | | Yes |
| level 2 | 562 | 564 | From Area | | Yes |
| level 2 | 563 | 565 | From Area | | Yes |
| level 2 | 564 | 566 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 565 | 567 | From Area | | Yes |
| level 2 | 566 | 568 | From Area | | Yes |
| level 2 | 567 | 569 | From Area | | Yes |
| level 2 | 568 | 570 | From Area | | Yes |
| level 2 | 569 | 571 | From Area | | Yes |
| level 2 | 570 | 572 | From Area | | Yes |
| level 2 | 571 | 573 | From Area | | Yes |
| level 2 | 572 | 574 | From Area | | Yes |
| level 2 | 573 | 575 | From Area | | Yes |
| level 2 | 574 | 576 | From Area | | Yes |
| level 2 | 575 | 577 | From Area | | Yes |
| level 2 | 576 | 578 | From Area | | Yes |
| level 2 | 577 | 579 | From Area | | Yes |
| level 2 | 578 | 580 | From Area | | Yes |
| level 2 | 579 | 581 | From Area | | Yes |
| level 2 | 580 | 582 | From Area | | Yes |
| level 2 | 581 | 583 | From Area | | Yes |
| level 2 | 582 | 584 | From Area | | Yes |
| level 2 | 583 | 585 | From Area | | Yes |
| level 2 | 584 | 586 | From Area | | Yes |
| level 2 | 585 | 587 | From Area | | Yes |
| level 2 | 586 | 588 | From Area | | Yes |
| level 2 | 587 | 589 | From Area | | Yes |
| level 2 | 588 | 590 | From Area | | Yes |
| level 2 | 589 | 591 | From Area | | Yes |
| level 2 | 590 | 592 | From Area | | Yes |
| level 2 | 591 | 593 | From Area | | Yes |
| level 2 | 592 | 594 | From Area | | Yes |
| level 2 | 593 | 595 | From Area | | Yes |
| level 2 | 594 | 596 | From Area | | Yes |
| level 2 | 595 | 597 | From Area | | Yes |
| level 2 | 596 | 598 | From Area | | Yes |
| level 2 | 597 | 599 | From Area | | Yes |
| level 2 | 598 | 600 | From Area | | Yes |
| level 2 | 599 | 601 | From Area | | Yes |
| level 2 | 600 | 602 | From Area | | Yes |
| level 2 | 601 | 603 | From Area | | Yes |
| level 2 | 602 | 604 | From Area | | Yes |
| level 2 | 603 | 605 | From Area | | Yes |
| level 2 | 604 | 606 | From Area | | Yes |
| level 2 | 605 | 607 | From Area | | Yes |
| level 2 | 606 | 608 | From Area | | Yes |
| level 2 | 607 | 609 | From Area | | Yes |
| level 2 | 608 | 610 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 2 | 609 | 611 | From Area | | Yes |
| level 2 | 610 | 612 | From Area | | Yes |
| level 2 | 611 | 613 | From Area | | Yes |
| level 2 | 612 | 614 | From Area | | Yes |
| level 2 | 613 | 615 | From Area | | Yes |
| level 2 | 614 | 616 | From Area | | Yes |
| level 2 | 615 | 617 | From Area | | Yes |
| level 2 | 616 | 618 | From Area | | Yes |
| level 2 | 617 | 619 | From Area | | Yes |
| level 2 | 618 | 620 | From Area | | Yes |
| level 2 | 619 | 621 | From Area | | Yes |
| level 2 | 620 | 622 | From Area | | Yes |
| level 2 | 621 | 623 | From Area | | Yes |
| level 2 | 622 | 624 | From Area | | Yes |
| level 2 | 623 | 625 | From Area | | Yes |
| level 2 | 624 | 626 | From Area | | Yes |
| level 2 | 625 | 627 | From Area | | Yes |
| level 2 | 626 | 628 | From Area | | Yes |
| level 2 | 627 | 629 | From Area | | Yes |
| level 2 | 628 | 630 | From Area | | Yes |
| level 2 | 629 | 631 | From Area | | Yes |
| level 2 | 630 | 632 | From Area | | Yes |
| level 2 | 631 | 633 | From Area | | Yes |
| level 2 | 632 | 634 | From Area | | Yes |
| level 2 | 633 | 635 | From Area | | Yes |
| level 2 | 634 | 636 | From Area | | Yes |
| level 2 | 635 | 637 | From Area | | Yes |
| level 2 | 636 | 638 | From Area | | Yes |
| level 2 | 637 | 639 | From Area | | Yes |
| level 2 | 638 | 640 | From Area | | Yes |
| level 2 | 639 | 641 | From Area | | Yes |
| level 1 | 1 | 12 | From Area | | Yes |
| level 1 | 2 | 14 | From Area | | Yes |
| level 1 | 3 | 16 | From Area | | Yes |
| level 1 | 4 | 18 | From Area | | Yes |
| level 1 | 5 | 20 | From Area | | Yes |
| level 1 | 6 | 22 | From Area | | Yes |
| level 1 | 7 | 24 | From Area | | Yes |
| level 1 | 8 | 26 | From Area | | Yes |
| level 1 | 9 | 30 | From Area | | Yes |
| level 1 | 10 | 32 | From Area | | Yes |
| level 1 | 11 | 34 | From Area | | Yes |
| level 1 | 12 | 36 | From Area | | Yes |
| level 1 | 13 | 126 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 14 | 38 | From Area | | Yes |
| level 1 | 15 | 50 | From Area | | Yes |
| level 1 | 16 | 48 | From Area | | Yes |
| level 1 | 17 | 46 | From Area | | Yes |
| level 1 | 18 | 4 | From Area | | Yes |
| level 1 | 19 | 42 | From Area | | Yes |
| level 1 | 20 | 40 | From Area | | Yes |
| level 1 | 21 | 10 | From Area | | Yes |
| level 1 | 22 | 3 | From Area | | Yes |
| level 1 | 23 | 2 | From Area | | Yes |
| level 1 | 24 | 6 | From Area | | Yes |
| level 1 | 25 | 1 | From Area | | Yes |
| level 1 | 26 | 44 | From Area | | Yes |
| level 1 | 27 | 129 | From Area | | Yes |
| level 1 | 28 | 380 | From Area | | Yes |
| level 1 | 29 | 72 | From Area | | Yes |
| level 1 | 30 | 130 | From Area | | Yes |
| level 1 | 31 | 381 | From Area | | Yes |
| level 1 | 32 | 78 | From Area | | Yes |
| level 1 | 33 | 133 | From Area | | Yes |
| level 1 | 34 | 383 | From Area | | Yes |
| level 1 | 35 | 86 | From Area | | Yes |
| level 1 | 36 | 134 | From Area | | Yes |
| level 1 | 37 | 387 | From Area | | Yes |
| level 1 | 38 | 90 | From Area | | Yes |
| level 1 | 39 | 137 | From Area | | Yes |
| level 1 | 40 | 388 | From Area | | Yes |
| level 1 | 41 | 95 | From Area | | Yes |
| level 1 | 42 | 138 | From Area | | Yes |
| level 1 | 43 | 391 | From Area | | Yes |
| level 1 | 44 | 96 | From Area | | Yes |
| level 1 | 45 | 141 | From Area | | Yes |
| level 1 | 46 | 392 | From Area | | Yes |
| level 1 | 47 | 103 | From Area | | Yes |
| level 1 | 48 | 142 | From Area | | Yes |
| level 1 | 49 | 395 | From Area | | Yes |
| level 1 | 50 | 104 | From Area | | Yes |
| level 1 | 51 | 145 | From Area | | Yes |
| level 1 | 52 | 396 | From Area | | Yes |
| level 1 | 53 | 106 | From Area | | Yes |
| level 1 | 54 | 151 | From Area | | Yes |
| level 1 | 55 | 398 | From Area | | Yes |
| level 1 | 56 | 110 | From Area | | Yes |
| level 1 | 57 | 213 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 58 | 215 | From Area | | Yes |
| level 1 | 59 | 217 | From Area | | Yes |
| level 1 | 60 | 208 | From Area | | Yes |
| level 1 | 61 | 212 | From Area | | Yes |
| level 1 | 62 | 256 | From Area | | Yes |
| level 1 | 63 | 254 | From Area | | Yes |
| level 1 | 64 | 252 | From Area | | Yes |
| level 1 | 65 | 250 | From Area | | Yes |
| level 1 | 66 | 248 | From Area | | Yes |
| level 1 | 67 | 246 | From Area | | Yes |
| level 1 | 68 | 244 | From Area | | Yes |
| level 1 | 69 | 242 | From Area | | Yes |
| level 1 | 70 | 240 | From Area | | Yes |
| level 1 | 71 | 385 | From Area | | Yes |
| level 1 | 72 | 238 | From Area | | Yes |
| level 1 | 73 | 236 | From Area | | Yes |
| level 1 | 74 | 234 | From Area | | Yes |
| level 1 | 75 | 232 | From Area | | Yes |
| level 1 | 76 | 230 | From Area | | Yes |
| level 1 | 77 | 228 | From Area | | Yes |
| level 1 | 78 | 226 | From Area | | Yes |
| level 1 | 79 | 224 | From Area | | Yes |
| level 1 | 80 | 222 | From Area | | Yes |
| level 1 | 81 | 211 | From Area | | Yes |
| level 1 | 82 | 210 | From Area | | Yes |
| level 1 | 83 | 259 | From Area | | Yes |
| level 1 | 84 | 261 | From Area | | Yes |
| level 1 | 85 | 263 | From Area | | Yes |
| level 1 | 86 | 209 | From Area | | Yes |
| level 1 | 87 | 113 | From Area | | Yes |
| level 1 | 88 | 401 | From Area | | Yes |
| level 1 | 89 | 114 | From Area | | Yes |
| level 1 | 90 | 402 | From Area | | Yes |
| level 1 | 91 | 117 | From Area | | Yes |
| level 1 | 92 | 405 | From Area | | Yes |
| level 1 | 93 | 118 | From Area | | Yes |
| level 1 | 94 | 206 | From Area | | Yes |
| level 1 | 95 | 298 | From Area | | Yes |
| level 1 | 96 | 300 | From Area | | Yes |
| level 1 | 97 | 201 | From Area | | Yes |
| level 1 | 98 | 205 | From Area | | Yes |
| level 1 | 99 | 338 | From Area | | Yes |
| level 1 | 100 | 336 | From Area | | Yes |
| level 1 | 101 | 334 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 102 | 332 | From Area | | Yes |
| level 1 | 103 | 330 | From Area | | Yes |
| level 1 | 104 | 328 | From Area | | Yes |
| level 1 | 105 | 326 | From Area | | Yes |
| level 1 | 106 | 324 | From Area | | Yes |
| level 1 | 107 | 377 | From Area | | Yes |
| level 1 | 108 | 321 | From Area | | Yes |
| level 1 | 109 | 315 | From Area | | Yes |
| level 1 | 110 | 313 | From Area | | Yes |
| level 1 | 111 | 311 | From Area | | Yes |
| level 1 | 112 | 309 | From Area | | Yes |
| level 1 | 113 | 307 | From Area | | Yes |
| level 1 | 114 | 305 | From Area | | Yes |
| level 1 | 115 | 204 | From Area | | Yes |
| level 1 | 116 | 203 | From Area | | Yes |
| level 1 | 117 | 341 | From Area | | Yes |
| level 1 | 118 | 343 | From Area | | Yes |
| level 1 | 119 | 345 | From Area | | Yes |
| level 1 | 120 | 202 | From Area | | Yes |
| level 1 | 121 | 121 | From Area | | Yes |
| level 1 | 122 | 826 | From Area | | Yes |
| level 1 | 123 | 774 | From Area | | Yes |
| level 1 | 124 | 407 | From Area | | Yes |
| level 1 | 125 | 122 | From Area | | Yes |
| level 1 | 126 | 828 | From Area | | Yes |
| level 1 | 127 | 776 | From Area | | Yes |
| level 1 | 128 | 408 | From Area | | Yes |
| level 1 | 129 | 125 | From Area | | Yes |
| level 1 | 130 | 831 | From Area | | Yes |
| level 1 | 131 | 779 | From Area | | Yes |
| level 1 | 132 | 411 | From Area | | Yes |
| level 1 | 133 | 157 | From Area | | Yes |
| level 1 | 134 | 832 | From Area | | Yes |
| level 1 | 135 | 780 | From Area | | Yes |
| level 1 | 136 | 418 | From Area | | Yes |
| level 1 | 137 | 159 | From Area | | Yes |
| level 1 | 138 | 835 | From Area | | Yes |
| level 1 | 139 | 783 | From Area | | Yes |
| level 1 | 140 | 420 | From Area | | Yes |
| level 1 | 141 | 161 | From Area | | Yes |
| level 1 | 142 | 836 | From Area | | Yes |
| level 1 | 143 | 784 | From Area | | Yes |
| level 1 | 144 | 422 | From Area | | Yes |
| level 1 | 145 | 163 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 146 | 839 | From Area | | Yes |
| level 1 | 147 | 787 | From Area | | Yes |
| level 1 | 148 | 424 | From Area | | Yes |
| level 1 | 149 | 165 | From Area | | Yes |
| level 1 | 150 | 840 | From Area | | Yes |
| level 1 | 151 | 788 | From Area | | Yes |
| level 1 | 152 | 426 | From Area | | Yes |
| level 1 | 153 | 167 | From Area | | Yes |
| level 1 | 154 | 843 | From Area | | Yes |
| level 1 | 155 | 791 | From Area | | Yes |
| level 1 | 156 | 428 | From Area | | Yes |
| level 1 | 157 | 169 | From Area | | Yes |
| level 1 | 158 | 844 | From Area | | Yes |
| level 1 | 159 | 792 | From Area | | Yes |
| level 1 | 160 | 430 | From Area | | Yes |
| level 1 | 161 | 171 | From Area | | Yes |
| level 1 | 162 | 674 | From Area | | Yes |
| level 1 | 163 | 676 | From Area | | Yes |
| level 1 | 164 | 678 | From Area | | Yes |
| level 1 | 165 | 680 | From Area | | Yes |
| level 1 | 166 | 682 | From Area | | Yes |
| level 1 | 167 | 684 | From Area | | Yes |
| level 1 | 168 | 686 | From Area | | Yes |
| level 1 | 169 | 689 | From Area | | Yes |
| level 1 | 170 | 691 | From Area | | Yes |
| level 1 | 171 | 693 | From Area | | Yes |
| level 1 | 172 | 695 | From Area | | Yes |
| level 1 | 173 | 697 | From Area | | Yes |
| level 1 | 174 | 736 | From Area | | Yes |
| level 1 | 175 | 734 | From Area | | Yes |
| level 1 | 176 | 732 | From Area | | Yes |
| level 1 | 177 | 720 | From Area | | Yes |
| level 1 | 178 | 730 | From Area | | Yes |
| level 1 | 179 | 728 | From Area | | Yes |
| level 1 | 180 | 726 | From Area | | Yes |
| level 1 | 181 | 719 | From Area | | Yes |
| level 1 | 182 | 718 | From Area | | Yes |
| level 1 | 183 | 722 | From Area | | Yes |
| level 1 | 184 | 432 | From Area | | Yes |
| level 1 | 185 | 28 | From Area | | Yes |
| level 1 | 186 | 61 | From Area | | Yes |
| level 1 | 187 | 62 | From Area | | Yes |
| level 1 | 188 | 63 | From Area | | Yes |
| level 1 | 189 | 64 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 190 | 65 | From Area | | Yes |
| level 1 | 191 | 70 | From Area | | Yes |
| level 1 | 192 | 71 | From Area | | Yes |
| level 1 | 193 | 73 | From Area | | Yes |
| level 1 | 194 | 74 | From Area | | Yes |
| level 1 | 195 | 75 | From Area | | Yes |
| level 1 | 196 | 83 | From Area | | Yes |
| level 1 | 197 | 84 | From Area | | Yes |
| level 1 | 198 | 93 | From Area | | Yes |
| level 1 | 199 | 94 | From Area | | Yes |
| level 1 | 200 | 97 | From Area | | Yes |
| level 1 | 201 | 98 | From Area | | Yes |
| level 1 | 202 | 99 | From Area | | Yes |
| level 1 | 203 | 100 | From Area | | Yes |
| level 1 | 204 | 107 | From Area | | Yes |
| level 1 | 205 | 108 | From Area | | Yes |
| level 1 | 206 | 5 | From Area | | Yes |
| level 1 | 207 | 52 | From Area | | Yes |
| level 1 | 208 | 53 | From Area | | Yes |
| level 1 | 209 | 54 | From Area | | Yes |
| level 1 | 210 | 55 | From Area | | Yes |
| level 1 | 211 | 56 | From Area | | Yes |
| level 1 | 212 | 57 | From Area | | Yes |
| level 1 | 213 | 58 | From Area | | Yes |
| level 1 | 214 | 60 | From Area | | Yes |
| level 1 | 215 | 66 | From Area | | Yes |
| level 1 | 216 | 67 | From Area | | Yes |
| level 1 | 217 | 68 | From Area | | Yes |
| level 1 | 218 | 69 | From Area | | Yes |
| level 1 | 219 | 76 | From Area | | Yes |
| level 1 | 220 | 80 | From Area | | Yes |
| level 1 | 221 | 81 | From Area | | Yes |
| level 1 | 222 | 82 | From Area | | Yes |
| level 1 | 223 | 87 | From Area | | Yes |
| level 1 | 224 | 88 | From Area | | Yes |
| level 1 | 225 | 89 | From Area | | Yes |
| level 1 | 226 | 453 | From Area | | Yes |
| level 1 | 227 | 454 | From Area | | Yes |
| level 1 | 228 | 455 | From Area | | Yes |
| level 1 | 229 | 456 | From Area | | Yes |
| level 1 | 230 | 457 | From Area | | Yes |
| level 1 | 231 | 458 | From Area | | Yes |
| level 1 | 232 | 459 | From Area | | Yes |
| level 1 | 233 | 460 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 234 | 461 | From Area | | Yes |
| level 1 | 235 | 462 | From Area | | Yes |
| level 1 | 236 | 463 | From Area | | Yes |
| level 1 | 237 | 464 | From Area | | Yes |
| level 1 | 238 | 465 | From Area | | Yes |
| level 1 | 239 | 466 | From Area | | Yes |
| level 1 | 240 | 504 | From Area | | Yes |
| level 1 | 241 | 146 | From Area | | Yes |
| level 1 | 242 | 147 | From Area | | Yes |
| level 1 | 243 | 148 | From Area | | Yes |
| level 1 | 244 | 149 | From Area | | Yes |
| level 1 | 245 | 150 | From Area | | Yes |
| level 1 | 246 | 172 | From Area | | Yes |
| level 1 | 247 | 173 | From Area | | Yes |
| level 1 | 248 | 174 | From Area | | Yes |
| level 1 | 249 | 175 | From Area | | Yes |
| level 1 | 250 | 176 | From Area | | Yes |
| level 1 | 251 | 177 | From Area | | Yes |
| level 1 | 252 | 178 | From Area | | Yes |
| level 1 | 253 | 179 | From Area | | Yes |
| level 1 | 254 | 180 | From Area | | Yes |
| level 1 | 255 | 181 | From Area | | Yes |
| level 1 | 256 | 182 | From Area | | Yes |
| level 1 | 257 | 183 | From Area | | Yes |
| level 1 | 258 | 184 | From Area | | Yes |
| level 1 | 259 | 186 | From Area | | Yes |
| level 1 | 260 | 187 | From Area | | Yes |
| level 1 | 261 | 188 | From Area | | Yes |
| level 1 | 262 | 189 | From Area | | Yes |
| level 1 | 263 | 190 | From Area | | Yes |
| level 1 | 264 | 266 | From Area | | Yes |
| level 1 | 265 | 267 | From Area | | Yes |
| level 1 | 266 | 268 | From Area | | Yes |
| level 1 | 267 | 269 | From Area | | Yes |
| level 1 | 268 | 270 | From Area | | Yes |
| level 1 | 269 | 271 | From Area | | Yes |
| level 1 | 270 | 272 | From Area | | Yes |
| level 1 | 271 | 273 | From Area | | Yes |
| level 1 | 272 | 274 | From Area | | Yes |
| level 1 | 273 | 275 | From Area | | Yes |
| level 1 | 274 | 276 | From Area | | Yes |
| level 1 | 275 | 277 | From Area | | Yes |
| level 1 | 276 | 278 | From Area | | Yes |
| level 1 | 277 | 279 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 278 | 280 | From Area | | Yes |
| level 1 | 279 | 281 | From Area | | Yes |
| level 1 | 280 | 282 | From Area | | Yes |
| level 1 | 281 | 283 | From Area | | Yes |
| level 1 | 282 | 284 | From Area | | Yes |
| level 1 | 283 | 285 | From Area | | Yes |
| level 1 | 284 | 286 | From Area | | Yes |
| level 1 | 285 | 287 | From Area | | Yes |
| level 1 | 286 | 288 | From Area | | Yes |
| level 1 | 287 | 289 | From Area | | Yes |
| level 1 | 288 | 290 | From Area | | Yes |
| level 1 | 289 | 291 | From Area | | Yes |
| level 1 | 290 | 292 | From Area | | Yes |
| level 1 | 291 | 293 | From Area | | Yes |
| level 1 | 292 | 294 | From Area | | Yes |
| level 1 | 293 | 295 | From Area | | Yes |
| level 1 | 294 | 296 | From Area | | Yes |
| level 1 | 295 | 297 | From Area | | Yes |
| level 1 | 296 | 154 | From Area | | Yes |
| level 1 | 297 | 155 | From Area | | Yes |
| level 1 | 298 | 185 | From Area | | Yes |
| level 1 | 299 | 191 | From Area | | Yes |
| level 1 | 300 | 192 | From Area | | Yes |
| level 1 | 301 | 193 | From Area | | Yes |
| level 1 | 302 | 194 | From Area | | Yes |
| level 1 | 303 | 195 | From Area | | Yes |
| level 1 | 304 | 196 | From Area | | Yes |
| level 1 | 305 | 197 | From Area | | Yes |
| level 1 | 306 | 198 | From Area | | Yes |
| level 1 | 307 | 199 | From Area | | Yes |
| level 1 | 308 | 348 | From Area | | Yes |
| level 1 | 309 | 349 | From Area | | Yes |
| level 1 | 310 | 350 | From Area | | Yes |
| level 1 | 311 | 351 | From Area | | Yes |
| level 1 | 312 | 352 | From Area | | Yes |
| level 1 | 313 | 353 | From Area | | Yes |
| level 1 | 314 | 354 | From Area | | Yes |
| level 1 | 315 | 355 | From Area | | Yes |
| level 1 | 316 | 356 | From Area | | Yes |
| level 1 | 317 | 357 | From Area | | Yes |
| level 1 | 318 | 358 | From Area | | Yes |
| level 1 | 319 | 359 | From Area | | Yes |
| level 1 | 320 | 360 | From Area | | Yes |
| level 1 | 321 | 361 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 322 | 362 | From Area | | Yes |
| level 1 | 323 | 364 | From Area | | Yes |
| level 1 | 324 | 365 | From Area | | Yes |
| level 1 | 325 | 366 | From Area | | Yes |
| level 1 | 326 | 367 | From Area | | Yes |
| level 1 | 327 | 368 | From Area | | Yes |
| level 1 | 328 | 369 | From Area | | Yes |
| level 1 | 329 | 370 | From Area | | Yes |
| level 1 | 330 | 373 | From Area | | Yes |
| level 1 | 331 | 374 | From Area | | Yes |
| level 1 | 332 | 375 | From Area | | Yes |
| level 1 | 333 | 376 | From Area | | Yes |
| level 1 | 334 | 412 | From Area | | Yes |
| level 1 | 335 | 413 | From Area | | Yes |
| level 1 | 336 | 414 | From Area | | Yes |
| level 1 | 337 | 415 | From Area | | Yes |
| level 1 | 338 | 416 | From Area | | Yes |
| level 1 | 339 | 433 | From Area | | Yes |
| level 1 | 340 | 434 | From Area | | Yes |
| level 1 | 341 | 435 | From Area | | Yes |
| level 1 | 342 | 436 | From Area | | Yes |
| level 1 | 343 | 437 | From Area | | Yes |
| level 1 | 344 | 438 | From Area | | Yes |
| level 1 | 345 | 439 | From Area | | Yes |
| level 1 | 346 | 440 | From Area | | Yes |
| level 1 | 347 | 441 | From Area | | Yes |
| level 1 | 348 | 442 | From Area | | Yes |
| level 1 | 349 | 443 | From Area | | Yes |
| level 1 | 350 | 444 | From Area | | Yes |
| level 1 | 351 | 445 | From Area | | Yes |
| level 1 | 352 | 446 | From Area | | Yes |
| level 1 | 353 | 447 | From Area | | Yes |
| level 1 | 354 | 448 | From Area | | Yes |
| level 1 | 355 | 449 | From Area | | Yes |
| level 1 | 356 | 450 | From Area | | Yes |
| level 1 | 357 | 451 | From Area | | Yes |
| level 1 | 358 | 687 | From Area | | Yes |
| level 1 | 359 | 699 | From Area | | Yes |
| level 1 | 360 | 700 | From Area | | Yes |
| level 1 | 361 | 701 | From Area | | Yes |
| level 1 | 362 | 702 | From Area | | Yes |
| level 1 | 363 | 703 | From Area | | Yes |
| level 1 | 364 | 704 | From Area | | Yes |
| level 1 | 365 | 705 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 366 | 706 | From Area | | Yes |
| level 1 | 367 | 707 | From Area | | Yes |
| level 1 | 368 | 708 | From Area | | Yes |
| level 1 | 369 | 709 | From Area | | Yes |
| level 1 | 370 | 710 | From Area | | Yes |
| level 1 | 371 | 711 | From Area | | Yes |
| level 1 | 372 | 712 | From Area | | Yes |
| level 1 | 373 | 713 | From Area | | Yes |
| level 1 | 374 | 714 | From Area | | Yes |
| level 1 | 375 | 715 | From Area | | Yes |
| level 1 | 376 | 716 | From Area | | Yes |
| level 1 | 377 | 717 | From Area | | Yes |
| level 1 | 378 | 721 | From Area | | Yes |
| level 1 | 379 | 738 | From Area | | Yes |
| level 1 | 380 | 739 | From Area | | Yes |
| level 1 | 381 | 740 | From Area | | Yes |
| level 1 | 382 | 741 | From Area | | Yes |
| level 1 | 383 | 742 | From Area | | Yes |
| level 1 | 384 | 743 | From Area | | Yes |
| level 1 | 385 | 744 | From Area | | Yes |
| level 1 | 386 | 745 | From Area | | Yes |
| level 1 | 387 | 746 | From Area | | Yes |
| level 1 | 388 | 747 | From Area | | Yes |
| level 1 | 389 | 748 | From Area | | Yes |
| level 1 | 390 | 749 | From Area | | Yes |
| level 1 | 391 | 750 | From Area | | Yes |
| level 1 | 392 | 751 | From Area | | Yes |
| level 1 | 393 | 752 | From Area | | Yes |
| level 1 | 394 | 753 | From Area | | Yes |
| level 1 | 395 | 754 | From Area | | Yes |
| level 1 | 396 | 755 | From Area | | Yes |
| level 1 | 397 | 756 | From Area | | Yes |
| level 1 | 398 | 757 | From Area | | Yes |
| level 1 | 399 | 758 | From Area | | Yes |
| level 1 | 400 | 759 | From Area | | Yes |
| level 1 | 401 | 760 | From Area | | Yes |
| level 1 | 402 | 761 | From Area | | Yes |
| level 1 | 403 | 762 | From Area | | Yes |
| level 1 | 404 | 763 | From Area | | Yes |
| level 1 | 405 | 764 | From Area | | Yes |
| level 1 | 406 | 765 | From Area | | Yes |
| level 1 | 407 | 766 | From Area | | Yes |
| level 1 | 408 | 767 | From Area | | Yes |
| level 1 | 409 | 768 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 410 | 769 | From Area | | Yes |
| level 1 | 411 | 770 | From Area | | Yes |
| level 1 | 412 | 773 | From Area | | Yes |
| level 1 | 413 | 794 | From Area | | Yes |
| level 1 | 414 | 795 | From Area | | Yes |
| level 1 | 415 | 796 | From Area | | Yes |
| level 1 | 416 | 797 | From Area | | Yes |
| level 1 | 417 | 798 | From Area | | Yes |
| level 1 | 418 | 799 | From Area | | Yes |
| level 1 | 419 | 800 | From Area | | Yes |
| level 1 | 420 | 801 | From Area | | Yes |
| level 1 | 421 | 802 | From Area | | Yes |
| level 1 | 422 | 803 | From Area | | Yes |
| level 1 | 423 | 804 | From Area | | Yes |
| level 1 | 424 | 805 | From Area | | Yes |
| level 1 | 425 | 806 | From Area | | Yes |
| level 1 | 426 | 807 | From Area | | Yes |
| level 1 | 427 | 808 | From Area | | Yes |
| level 1 | 428 | 809 | From Area | | Yes |
| level 1 | 429 | 810 | From Area | | Yes |
| level 1 | 430 | 811 | From Area | | Yes |
| level 1 | 431 | 812 | From Area | | Yes |
| level 1 | 432 | 813 | From Area | | Yes |
| level 1 | 433 | 814 | From Area | | Yes |
| level 1 | 434 | 815 | From Area | | Yes |
| level 1 | 435 | 816 | From Area | | Yes |
| level 1 | 436 | 817 | From Area | | Yes |
| level 1 | 437 | 818 | From Area | | Yes |
| level 1 | 438 | 819 | From Area | | Yes |
| level 1 | 439 | 820 | From Area | | Yes |
| level 1 | 440 | 821 | From Area | | Yes |
| level 1 | 441 | 822 | From Area | | Yes |
| level 1 | 442 | 823 | From Area | | Yes |
| level 1 | 443 | 824 | From Area | | Yes |
| level 1 | 444 | 825 | From Area | | Yes |
| level 1 | 445 | 846 | From Area | | Yes |
| level 1 | 446 | 847 | From Area | | Yes |
| level 1 | 447 | 848 | From Area | | Yes |
| level 1 | 448 | 849 | From Area | | Yes |
| level 1 | 449 | 850 | From Area | | Yes |
| level 1 | 450 | 851 | From Area | | Yes |
| level 1 | 451 | 852 | From Area | | Yes |
| level 1 | 452 | 853 | From Area | | Yes |
| level 1 | 453 | 854 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| level 1 | 454 | 855 | From Area | | Yes |
| level 1 | 455 | 856 | From Area | | Yes |
| level 1 | 641 | 5861 | From Area | | Yes |
| Base | 1 | 5689 | From Area | UX; UY | Yes |
| Base | 2 | 5677 | From Area | | Yes |
| Base | 3 | 5678 | From Area | | Yes |
| Base | 4 | 5679 | From Area | | Yes |
| Base | 5 | 5680 | From Area | | Yes |
| Base | 6 | 5681 | From Area | | Yes |
| Base | 7 | 5682 | From Area | | Yes |
| Base | 8 | 5683 | From Area | | Yes |
| Base | 9 | 5684 | From Area | | Yes |
| Base | 10 | 5685 | From Area | | Yes |
| Base | 11 | 5686 | From Area | | Yes |
| Base | 12 | 5687 | From Area | | Yes |
| Base | 13 | 5756 | From Area | | Yes |
| Base | 14 | 5688 | From Area | | Yes |
| Base | 15 | 5700 | From Area | | Yes |
| Base | 16 | 5699 | From Area | | Yes |
| Base | 17 | 5698 | From Area | | Yes |
| Base | 18 | 5697 | From Area | | Yes |
| Base | 19 | 5696 | From Area | | Yes |
| Base | 20 | 5695 | From Area | | Yes |
| Base | 21 | 5694 | From Area | | Yes |
| Base | 22 | 5693 | From Area | | Yes |
| Base | 23 | 5692 | From Area | | Yes |
| Base | 24 | 5691 | From Area | | Yes |
| Base | 25 | 5690 | From Area | UX; UY | Yes |
| Base | 26 | 5701 | From Area | | Yes |
| Base | 27 | 5757 | From Area | | Yes |
| Base | 28 | 5795 | From Area | | Yes |
| Base | 29 | 5702 | From Area | | Yes |
| Base | 30 | 5758 | From Area | | Yes |
| Base | 31 | 5796 | From Area | | Yes |
| Base | 32 | 5703 | From Area | | Yes |
| Base | 33 | 5759 | From Area | | Yes |
| Base | 34 | 5797 | From Area | | Yes |
| Base | 35 | 5704 | From Area | | Yes |
| Base | 36 | 5760 | From Area | | Yes |
| Base | 37 | 5798 | From Area | | Yes |
| Base | 38 | 5705 | From Area | | Yes |
| Base | 39 | 5761 | From Area | | Yes |
| Base | 40 | 5799 | From Area | | Yes |
| Base | 41 | 5706 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| Base | 42 | 5762 | From Area | | Yes |
| Base | 43 | 5800 | From Area | | Yes |
| Base | 44 | 5707 | From Area | | Yes |
| Base | 45 | 5763 | From Area | | Yes |
| Base | 46 | 5801 | From Area | | Yes |
| Base | 47 | 5708 | From Area | | Yes |
| Base | 48 | 5764 | From Area | | Yes |
| Base | 49 | 5802 | From Area | | Yes |
| Base | 50 | 5709 | From Area | | Yes |
| Base | 51 | 5765 | From Area | | Yes |
| Base | 52 | 5803 | From Area | | Yes |
| Base | 53 | 5710 | From Area | | Yes |
| Base | 54 | 5766 | From Area | | Yes |
| Base | 55 | 5804 | From Area | | Yes |
| Base | 56 | 5711 | From Area | | Yes |
| Base | 57 | 5727 | From Area | | Yes |
| Base | 58 | 5728 | From Area | | Yes |
| Base | 59 | 5729 | From Area | | Yes |
| Base | 60 | 5730 | From Area | | Yes |
| Base | 61 | 5731 | From Area | | Yes |
| Base | 62 | 5750 | From Area | | Yes |
| Base | 63 | 5749 | From Area | | Yes |
| Base | 64 | 5748 | From Area | | Yes |
| Base | 65 | 5747 | From Area | | Yes |
| Base | 66 | 5746 | From Area | | Yes |
| Base | 67 | 5745 | From Area | | Yes |
| Base | 68 | 5744 | From Area | | Yes |
| Base | 69 | 5743 | From Area | | Yes |
| Base | 70 | 5742 | From Area | | Yes |
| Base | 71 | 5767 | From Area | | Yes |
| Base | 72 | 5741 | From Area | | Yes |
| Base | 73 | 5740 | From Area | | Yes |
| Base | 74 | 5739 | From Area | | Yes |
| Base | 75 | 5738 | From Area | | Yes |
| Base | 76 | 5737 | From Area | | Yes |
| Base | 77 | 5736 | From Area | | Yes |
| Base | 78 | 5735 | From Area | | Yes |
| Base | 79 | 5734 | From Area | | Yes |
| Base | 80 | 5733 | From Area | | Yes |
| Base | 81 | 5732 | From Area | | Yes |
| Base | 82 | 5751 | From Area | | Yes |
| Base | 83 | 5752 | From Area | | Yes |
| Base | 84 | 5753 | From Area | | Yes |
| Base | 85 | 5754 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| Base | 86 | 5755 | From Area | | Yes |
| Base | 87 | 5712 | From Area | | Yes |
| Base | 88 | 5805 | From Area | | Yes |
| Base | 89 | 5713 | From Area | | Yes |
| Base | 90 | 5806 | From Area | | Yes |
| Base | 91 | 5714 | From Area | | Yes |
| Base | 92 | 5807 | From Area | | Yes |
| Base | 93 | 5726 | From Area | | Yes |
| Base | 94 | 5768 | From Area | | Yes |
| Base | 95 | 5769 | From Area | | Yes |
| Base | 96 | 5770 | From Area | | Yes |
| Base | 97 | 5771 | From Area | | Yes |
| Base | 98 | 5772 | From Area | | Yes |
| Base | 99 | 5789 | From Area | | Yes |
| Base | 100 | 5788 | From Area | | Yes |
| Base | 101 | 5787 | From Area | | Yes |
| Base | 102 | 5786 | From Area | | Yes |
| Base | 103 | 5785 | From Area | | Yes |
| Base | 104 | 5784 | From Area | | Yes |
| Base | 105 | 5783 | From Area | | Yes |
| Base | 106 | 5782 | From Area | | Yes |
| Base | 107 | 5781 | From Area | | Yes |
| Base | 108 | 5780 | From Area | | Yes |
| Base | 109 | 5779 | From Area | | Yes |
| Base | 110 | 5778 | From Area | | Yes |
| Base | 111 | 5777 | From Area | | Yes |
| Base | 112 | 5776 | From Area | | Yes |
| Base | 113 | 5775 | From Area | | Yes |
| Base | 114 | 5774 | From Area | | Yes |
| Base | 115 | 5773 | From Area | | Yes |
| Base | 116 | 5790 | From Area | | Yes |
| Base | 117 | 5791 | From Area | | Yes |
| Base | 118 | 5792 | From Area | | Yes |
| Base | 119 | 5793 | From Area | | Yes |
| Base | 120 | 5794 | From Area | | Yes |
| Base | 121 | 5715 | From Area | | Yes |
| Base | 122 | 5851 | From Area | | Yes |
| Base | 123 | 5841 | From Area | | Yes |
| Base | 124 | 5808 | From Area | | Yes |
| Base | 125 | 5716 | From Area | | Yes |
| Base | 126 | 5852 | From Area | | Yes |
| Base | 127 | 5842 | From Area | | Yes |
| Base | 128 | 5809 | From Area | | Yes |
| Base | 129 | 5717 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| Base | 130 | 5853 | From Area | | Yes |
| Base | 131 | 5843 | From Area | | Yes |
| Base | 132 | 5810 | From Area | | Yes |
| Base | 133 | 5718 | From Area | | Yes |
| Base | 134 | 5854 | From Area | | Yes |
| Base | 135 | 5844 | From Area | | Yes |
| Base | 136 | 5811 | From Area | | Yes |
| Base | 137 | 5719 | From Area | | Yes |
| Base | 138 | 5855 | From Area | | Yes |
| Base | 139 | 5845 | From Area | | Yes |
| Base | 140 | 5812 | From Area | | Yes |
| Base | 141 | 5720 | From Area | | Yes |
| Base | 142 | 5856 | From Area | | Yes |
| Base | 143 | 5846 | From Area | | Yes |
| Base | 144 | 5813 | From Area | | Yes |
| Base | 145 | 5721 | From Area | | Yes |
| Base | 146 | 5857 | From Area | | Yes |
| Base | 147 | 5847 | From Area | | Yes |
| Base | 148 | 5814 | From Area | | Yes |
| Base | 149 | 5722 | From Area | | Yes |
| Base | 150 | 5858 | From Area | | Yes |
| Base | 151 | 5848 | From Area | | Yes |
| Base | 152 | 5815 | From Area | | Yes |
| Base | 153 | 5723 | From Area | | Yes |
| Base | 154 | 5859 | From Area | | Yes |
| Base | 155 | 5849 | From Area | | Yes |
| Base | 156 | 5816 | From Area | | Yes |
| Base | 157 | 5724 | From Area | | Yes |
| Base | 158 | 5860 | From Area | | Yes |
| Base | 159 | 5850 | From Area | | Yes |
| Base | 160 | 5817 | From Area | | Yes |
| Base | 161 | 5725 | From Area | UX; UY | Yes |
| Base | 162 | 5819 | From Area | | Yes |
| Base | 163 | 5820 | From Area | | Yes |
| Base | 164 | 5821 | From Area | | Yes |
| Base | 165 | 5822 | From Area | | Yes |
| Base | 166 | 5823 | From Area | | Yes |
| Base | 167 | 5824 | From Area | | Yes |
| Base | 168 | 5825 | From Area | | Yes |
| Base | 169 | 5826 | From Area | | Yes |
| Base | 170 | 5827 | From Area | | Yes |
| Base | 171 | 5828 | From Area | | Yes |
| Base | 172 | 5829 | From Area | | Yes |
| Base | 173 | 5830 | From Area | | Yes |

**Table 3.1 - Joint Assignments - Summary (continued)**

| Story | Label | Unique Name | Diaphragm | Restraints | Include in Mesh |
|---|---|---|---|---|---|
| Base | 174 | 5840 | From Area | | Yes |
| Base | 175 | 5839 | From Area | | Yes |
| Base | 176 | 5838 | From Area | | Yes |
| Base | 177 | 5837 | From Area | | Yes |
| Base | 178 | 5836 | From Area | | Yes |
| Base | 179 | 5835 | From Area | | Yes |
| Base | 180 | 5834 | From Area | | Yes |
| Base | 181 | 5833 | From Area | | Yes |
| Base | 182 | 5832 | From Area | | Yes |
| Base | 183 | 5831 | From Area | | Yes |
| Base | 184 | 5818 | From Area | UX; UY | Yes |

## 3.2 Frame Assignments

**Table 3.2 - Frame Assignments - Summary**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C1249 | 3964 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1250 | 3965 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1262 | 4002 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1263 | 4003 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1264 | 4011 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1265 | 4012 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1266 | 4016 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1267 | 4017 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1399 | 4408 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1400 | 4409 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1411 | 4445 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1412 | 4446 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1413 | 4454 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1414 | 4455 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1415 | 4459 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1416 | 4460 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1427 | 4499 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1428 | 4500 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1429 | 4525 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1430 | 4528 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1431 | 4531 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1432 | 4535 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C1 | 7294 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C2 | 7295 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C4 | 7281 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C6 | 7283 | Column | 600 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C7 | 7284 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C8 | 7285 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C10 | 7287 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C11 | 7288 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C12 | 7289 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C14 | 7291 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C16 | 7293 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C19 | 7297 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C20 | 7298 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C21 | 7299 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C23 | 7301 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C24 | 7302 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C25 | 7303 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C27 | 7305 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C29 | 7307 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C31 | 7309 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C33 | 7311 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C35 | 7327 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C37 | 7329 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C39 | 7331 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C40 | 7332 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C41 | 7333 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C43 | 7335 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C44 | 7336 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C45 | 7337 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C47 | 7339 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C49 | 7341 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C51 | 7343 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C53 | 7345 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C54 | 7346 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C55 | 7347 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C57 | 7349 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C58 | 7350 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C59 | 7351 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C61 | 7353 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C63 | 7355 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C65 | 7389 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C67 | 7391 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C69 | 7393 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C71 | 7395 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C73 | 7397 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C75 | 7399 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C77 | 7401 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C79 | 7403 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C81 | 7405 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C83 | 7407 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C85 | 7409 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C87 | 7411 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C89 | 7413 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C91 | 7415 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C93 | 7417 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C95 | 7419 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C97 | 7421 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C99 | 7423 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C101 | 7425 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C103 | 7427 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C105 | 7429 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C107 | 7431 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C109 | 7433 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C111 | 7435 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C113 | 7437 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C115 | 7463 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C117 | 7473 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C119 | 7475 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C121 | 7477 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C123 | 7479 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C124 | 7480 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C126 | 7482 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C127 | 7483 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C129 | 7485 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C130 | 7486 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C132 | 7488 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C134 | 7490 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C136 | 7492 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C138 | 7494 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C140 | 7496 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C142 | 7498 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C144 | 7500 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C146 | 7502 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C148 | 7504 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C150 | 7506 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C152 | 7508 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C154 | 7510 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C156 | 7512 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C158 | 7514 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C160 | 7516 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C162 | 7518 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C164 | 7520 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C166 | 7522 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C168 | 7524 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C169 | 7525 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C171 | 7527 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C173 | 7529 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C175 | 7531 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C177 | 7533 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C179 | 7555 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C181 | 7557 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C183 | 7559 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C185 | 7561 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C187 | 7563 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C189 | 7565 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C191 | 7567 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C193 | 7569 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C195 | 7571 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C197 | 7573 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C199 | 7575 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C201 | 7577 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C203 | 7587 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C205 | 7597 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C207 | 7599 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C209 | 7601 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C211 | 7603 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C212 | 7604 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C214 | 7606 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C215 | 7607 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C217 | 7609 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C218 | 7610 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C220 | 7612 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C222 | 7614 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C224 | 7616 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C226 | 7618 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C228 | 7620 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C230 | 7622 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C231 | 7623 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C233 | 7625 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C235 | 7627 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C237 | 7629 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C239 | 7631 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C241 | 7633 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C242 | 7634 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C244 | 7636 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C246 | 7638 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C248 | 7640 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C250 | 7642 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C252 | 7644 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C254 | 7646 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C255 | 7647 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C257 | 7649 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C259 | 7651 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C261 | 7653 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C263 | 7655 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C265 | 7677 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C267 | 7679 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C269 | 7681 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C271 | 7683 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C273 | 7685 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C275 | 7687 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C277 | 7689 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C279 | 7691 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C281 | 7693 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C283 | 7695 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C285 | 7697 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C287 | 7699 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C289 | 7701 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C291 | 7703 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C293 | 7705 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C295 | 7707 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C297 | 7709 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C299 | 7711 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C301 | 7713 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C303 | 7715 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C305 | 7717 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C307 | 7719 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C309 | 7721 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C311 | 7723 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C313 | 7749 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C315 | 7751 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C316 | 7752 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C317 | 7753 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C319 | 7755 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C320 | 7756 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C321 | 7757 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C323 | 7759 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C325 | 7761 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C327 | 7763 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C329 | 7765 | Column | 600 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C330 | 7766 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C331 | 7767 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C333 | 7769 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C334 | 7770 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C335 | 7771 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C337 | 7773 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C339 | 7775 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C341 | 7777 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C343 | 7779 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C345 | 7795 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C347 | 7797 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C348 | 7798 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C349 | 7799 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C351 | 7801 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C352 | 7802 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C353 | 7803 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C355 | 7805 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C357 | 7807 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C359 | 7809 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C361 | 7811 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C362 | 7812 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C363 | 7813 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C365 | 7815 | Column | 600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C366 | 7816 | Column | 1200 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C367 | 7817 | Column | 400 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C369 | 7819 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C371 | 7821 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C373 | 7854 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C375 | 7856 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C377 | 7858 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C379 | 7860 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C381 | 7862 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C383 | 7864 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C385 | 7866 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C387 | 7868 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C389 | 7870 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C391 | 7872 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C393 | 7893 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C395 | 7895 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C397 | 7897 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C399 | 7899 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C401 | 7901 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C403 | 7903 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C405 | 7905 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C407 | 7907 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C409 | 7909 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C411 | 7911 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C412 | 7280 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C413 | 7282 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C414 | 7286 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C415 | 7290 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C416 | 7292 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C417 | 7296 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C418 | 7300 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C419 | 7304 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C420 | 7306 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C421 | 7308 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C422 | 7310 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C423 | 7326 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C424 | 7328 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C425 | 7330 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C426 | 7334 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C427 | 7338 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C428 | 7340 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C429 | 7342 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C430 | 7344 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C431 | 7348 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C432 | 7352 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C433 | 7354 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C434 | 7388 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C435 | 7390 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C436 | 7392 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C437 | 7394 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C438 | 7396 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C439 | 7398 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C440 | 7400 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C441 | 7402 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C442 | 7404 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C443 | 7406 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C444 | 7408 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C445 | 7410 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C446 | 7412 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C447 | 7414 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C448 | 7416 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C449 | 7418 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C450 | 7420 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C451 | 7422 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C452 | 7424 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C453 | 7426 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C454 | 7428 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C455 | 7430 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C456 | 7432 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C457 | 7434 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C458 | 7436 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C459 | 7462 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C460 | 7472 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C461 | 7474 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C462 | 7476 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C463 | 7478 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C464 | 7481 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C465 | 7484 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C466 | 7487 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C467 | 7489 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C468 | 7491 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C469 | 7493 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C470 | 7495 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C471 | 7497 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C472 | 7499 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C473 | 7501 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C474 | 7503 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C475 | 7505 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C476 | 7507 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C477 | 7509 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C478 | 7511 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C479 | 7513 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C480 | 7515 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C481 | 7517 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C482 | 7519 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C483 | 7521 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C484 | 7523 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C485 | 7526 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C486 | 7528 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C487 | 7530 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C488 | 7532 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C489 | 7554 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C490 | 7556 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C491 | 7558 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C492 | 7560 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C493 | 7562 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C494 | 7564 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C495 | 7566 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C496 | 7568 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C497 | 7570 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C498 | 7572 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C499 | 7574 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C500 | 7576 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C501 | 7586 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C502 | 7596 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C503 | 7598 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C504 | 7600 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C505 | 7602 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C506 | 7605 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C507 | 7608 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C508 | 7611 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C509 | 7613 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C510 | 7615 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C511 | 7617 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C512 | 7619 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C513 | 7621 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C514 | 7624 | Column | 2800 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C515 | 7626 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C516 | 7628 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C517 | 7630 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C518 | 7632 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C519 | 7635 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C520 | 7637 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C521 | 7639 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C522 | 7641 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C523 | 7643 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C524 | 7645 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C525 | 7648 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C526 | 7650 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C527 | 7652 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C528 | 7654 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C529 | 7676 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C530 | 7678 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C531 | 7680 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C532 | 7682 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C533 | 7684 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C534 | 7686 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C535 | 7688 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C536 | 7690 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C537 | 7692 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C538 | 7694 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C539 | 7696 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C540 | 7698 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C541 | 7700 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C542 | 7702 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C543 | 7704 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C544 | 7706 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C545 | 7708 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C546 | 7710 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C547 | 7712 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C548 | 7714 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C549 | 7716 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C550 | 7718 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C551 | 7720 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C552 | 7722 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C553 | 7748 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C554 | 7750 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C555 | 7754 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C556 | 7758 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C557 | 7760 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C558 | 7762 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C559 | 7764 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C560 | 7768 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C561 | 7772 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C562 | 7774 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C563 | 7776 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C564 | 7778 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C565 | 7794 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C566 | 7796 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C567 | 7800 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C568 | 7804 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C569 | 7806 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C570 | 7808 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C571 | 7810 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C572 | 7814 | Column | 1000 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C573 | 7818 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C574 | 7820 | Column | 1600 | 90LC115 | N/A | 90 | | 3 |
| level 6 | C575 | 7853 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C576 | 7855 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C577 | 7857 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C578 | 7859 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C579 | 7861 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C580 | 7863 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C581 | 7865 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C582 | 7867 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C583 | 7869 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C584 | 7871 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | C585 | 7892 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C586 | 7894 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C587 | 7896 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C588 | 7898 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C589 | 7900 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C590 | 7902 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C591 | 7904 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C592 | 7906 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C593 | 7908 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 6 | C594 | 7910 | Column | 1600 | 90LC115 | N/A | 180 | | 3 |
| level 5 | C1249 | 3192 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1250 | 3193 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1262 | 3230 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1263 | 3231 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1264 | 3239 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1265 | 3240 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1266 | 3244 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1267 | 3245 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1399 | 3671 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1400 | 3672 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1411 | 3708 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1412 | 3709 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1413 | 3717 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1414 | 3718 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1415 | 3722 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1416 | 3723 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1427 | 3762 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1428 | 3763 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1429 | 3793 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1430 | 3796 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1431 | 3799 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1432 | 3803 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C1 | 6654 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C2 | 6655 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C4 | 6641 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C6 | 6643 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C7 | 6644 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C8 | 6645 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C10 | 6647 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C11 | 6648 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C12 | 6649 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C14 | 6651 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C16 | 6653 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C19 | 6657 | Column | 600 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C20 | 6658 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C21 | 6659 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C23 | 6661 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C24 | 6662 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C25 | 6663 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C27 | 6665 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C29 | 6667 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C31 | 6669 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C33 | 6671 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C35 | 6687 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C37 | 6689 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C39 | 6691 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C40 | 6692 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C41 | 6693 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C43 | 6695 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C44 | 6696 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C45 | 6697 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C47 | 6699 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C49 | 6701 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C51 | 6703 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C53 | 6705 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C54 | 6706 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C55 | 6707 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C57 | 6709 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C58 | 6710 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C59 | 6711 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C61 | 6713 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C63 | 6715 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C65 | 6749 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C67 | 6751 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C69 | 6753 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C71 | 6755 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C73 | 6757 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C75 | 6759 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C77 | 6761 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C79 | 6763 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C81 | 6765 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C83 | 6767 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C85 | 6769 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C87 | 6771 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C89 | 6773 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C91 | 6775 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C93 | 6777 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C95 | 6779 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C97 | 6781 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C99 | 6783 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C101 | 6785 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C103 | 6787 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C105 | 6789 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C107 | 6791 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C109 | 6793 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C111 | 6795 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C113 | 6797 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C115 | 6823 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C117 | 6833 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C119 | 6835 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C121 | 6837 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C123 | 6839 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C124 | 6840 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C126 | 6842 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C127 | 6843 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C129 | 6845 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C130 | 6846 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C132 | 6848 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C134 | 6850 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C136 | 6852 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C138 | 6854 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C140 | 6856 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C142 | 6858 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C144 | 6860 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C146 | 6862 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C148 | 6864 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C150 | 6866 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C152 | 6868 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C154 | 6870 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C156 | 6872 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C158 | 6874 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C160 | 6876 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C162 | 6878 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C164 | 6880 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C166 | 6882 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C168 | 6884 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C169 | 6885 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C171 | 6887 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C173 | 6889 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C175 | 6891 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C177 | 6893 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C179 | 6915 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C181 | 6917 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C183 | 6919 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C185 | 6921 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C187 | 6923 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C189 | 6925 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C191 | 6927 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C193 | 6929 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C195 | 6931 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C197 | 6933 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C199 | 6935 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C201 | 6937 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C203 | 6947 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C205 | 6957 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C207 | 6959 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C209 | 6961 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C211 | 6963 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C212 | 6964 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C214 | 6966 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C215 | 6967 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C217 | 6969 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C218 | 6970 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C220 | 6972 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C222 | 6974 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C224 | 6976 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C226 | 6978 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C228 | 6980 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C230 | 6982 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C231 | 6983 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C233 | 6985 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C235 | 6987 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C237 | 6989 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C239 | 6991 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C241 | 6993 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C242 | 6994 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C244 | 6996 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C246 | 6998 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C248 | 7000 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C250 | 7002 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C252 | 7004 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C254 | 7006 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C255 | 7007 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C257 | 7009 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C259 | 7011 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C261 | 7013 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C263 | 7015 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C265 | 7037 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C267 | 7039 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C269 | 7041 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C271 | 7043 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C273 | 7045 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C275 | 7047 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C277 | 7049 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C279 | 7051 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C281 | 7053 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C283 | 7055 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C285 | 7057 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C287 | 7059 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C289 | 7061 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C291 | 7063 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C293 | 7065 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C295 | 7067 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C297 | 7069 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C299 | 7071 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C301 | 7073 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C303 | 7075 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C305 | 7077 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C307 | 7079 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C309 | 7081 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C311 | 7083 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C313 | 7109 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C315 | 7111 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C316 | 7112 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C317 | 7113 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C319 | 7115 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C320 | 7116 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C321 | 7117 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C323 | 7119 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C325 | 7121 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C327 | 7123 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C329 | 7125 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C330 | 7126 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C331 | 7127 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C333 | 7129 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C334 | 7130 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C335 | 7131 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C337 | 7133 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C339 | 7135 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C341 | 7137 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C343 | 7139 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C345 | 7155 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C347 | 7157 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C348 | 7158 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C349 | 7159 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C351 | 7161 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C352 | 7162 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C353 | 7163 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C355 | 7165 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C357 | 7167 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C359 | 7169 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C361 | 7171 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C362 | 7172 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C363 | 7173 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C365 | 7175 | Column | 600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C366 | 7176 | Column | 1200 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C367 | 7177 | Column | 400 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C369 | 7179 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C371 | 7181 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C373 | 7214 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C375 | 7216 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C377 | 7218 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C379 | 7220 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C381 | 7222 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C383 | 7224 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C385 | 7226 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C387 | 7228 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C389 | 7230 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C391 | 7232 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C393 | 7253 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C395 | 7255 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C397 | 7257 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C399 | 7259 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C401 | 7261 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C403 | 7263 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C405 | 7265 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C407 | 7267 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C409 | 7269 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C411 | 7271 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C412 | 6640 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C413 | 6642 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C414 | 6646 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C415 | 6650 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C416 | 6652 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C417 | 6656 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C418 | 6660 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C419 | 6664 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C420 | 6666 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C421 | 6668 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C422 | 6670 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C423 | 6686 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C424 | 6688 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C425 | 6690 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C426 | 6694 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C427 | 6698 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C428 | 6700 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C429 | 6702 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C430 | 6704 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C431 | 6708 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C432 | 6712 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C433 | 6714 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C434 | 6748 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C435 | 6750 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C436 | 6752 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C437 | 6754 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C438 | 6756 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C439 | 6758 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C440 | 6760 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C441 | 6762 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C442 | 6764 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C443 | 6766 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C444 | 6768 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C445 | 6770 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C446 | 6772 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C447 | 6774 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C448 | 6776 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C449 | 6778 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C450 | 6780 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C451 | 6782 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C452 | 6784 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C453 | 6786 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C454 | 6788 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C455 | 6790 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C456 | 6792 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C457 | 6794 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C458 | 6796 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C459 | 6822 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C460 | 6832 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C461 | 6834 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C462 | 6836 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C463 | 6838 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C464 | 6841 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C465 | 6844 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C466 | 6847 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C467 | 6849 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C468 | 6851 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C469 | 6853 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C470 | 6855 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C471 | 6857 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C472 | 6859 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C473 | 6861 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C474 | 6863 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C475 | 6865 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C476 | 6867 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C477 | 6869 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C478 | 6871 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C479 | 6873 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C480 | 6875 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C481 | 6877 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C482 | 6879 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C483 | 6881 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C484 | 6883 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C485 | 6886 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C486 | 6888 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C487 | 6890 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C488 | 6892 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C489 | 6914 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C490 | 6916 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C491 | 6918 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C492 | 6920 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C493 | 6922 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C494 | 6924 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C495 | 6926 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C496 | 6928 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C497 | 6930 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C498 | 6932 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C499 | 6934 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C500 | 6936 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C501 | 6946 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C502 | 6956 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C503 | 6958 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C504 | 6960 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C505 | 6962 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C506 | 6965 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C507 | 6968 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C508 | 6971 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C509 | 6973 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C510 | 6975 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C511 | 6977 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C512 | 6979 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C513 | 6981 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C514 | 6984 | Column | 2800 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C515 | 6986 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C516 | 6988 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C517 | 6990 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C518 | 6992 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C519 | 6995 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C520 | 6997 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C521 | 6999 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C522 | 7001 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C523 | 7003 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C524 | 7005 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C525 | 7008 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C526 | 7010 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C527 | 7012 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C528 | 7014 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C529 | 7036 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C530 | 7038 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C531 | 7040 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C532 | 7042 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C533 | 7044 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C534 | 7046 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C535 | 7048 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C536 | 7050 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C537 | 7052 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C538 | 7054 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C539 | 7056 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C540 | 7058 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C541 | 7060 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C542 | 7062 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C543 | 7064 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C544 | 7066 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C545 | 7068 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C546 | 7070 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C547 | 7072 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C548 | 7074 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C549 | 7076 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C550 | 7078 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C551 | 7080 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C552 | 7082 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C553 | 7108 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C554 | 7110 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C555 | 7114 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C556 | 7118 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C557 | 7120 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C558 | 7122 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C559 | 7124 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C560 | 7128 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C561 | 7132 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C562 | 7134 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C563 | 7136 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C564 | 7138 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C565 | 7154 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C566 | 7156 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C567 | 7160 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C568 | 7164 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C569 | 7166 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C570 | 7168 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C571 | 7170 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C572 | 7174 | Column | 1000 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C573 | 7178 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C574 | 7180 | Column | 1600 | 90LC150 | N/A | 90 | | 3 |
| level 5 | C575 | 7213 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C576 | 7215 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C577 | 7217 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C578 | 7219 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C579 | 7221 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C580 | 7223 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C581 | 7225 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C582 | 7227 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C583 | 7229 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C584 | 7231 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C585 | 7252 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C586 | 7254 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C587 | 7256 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C588 | 7258 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C589 | 7260 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C590 | 7262 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C591 | 7264 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C592 | 7266 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | C593 | 7268 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 5 | C594 | 7270 | Column | 1600 | 90LC150 | N/A | 180 | | 3 |
| level 4 | C1249 | 2420 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1250 | 2421 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1262 | 2458 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1263 | 2459 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1264 | 2467 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1265 | 2468 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1266 | 2472 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1267 | 2473 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1399 | 2899 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1400 | 2900 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1411 | 2936 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1412 | 2937 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1413 | 2945 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1414 | 2946 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1415 | 2950 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1416 | 2951 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1427 | 2990 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1428 | 2991 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1429 | 3021 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1430 | 3024 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1431 | 3027 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1432 | 3031 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C1 | 6014 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C2 | 6015 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C4 | 6001 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C6 | 6003 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C7 | 6004 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C8 | 6005 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C10 | 6007 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C11 | 6008 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C12 | 6009 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C14 | 6011 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C16 | 6013 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C19 | 6017 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C20 | 6018 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C21 | 6019 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C23 | 6021 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C24 | 6022 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C25 | 6023 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C27 | 6025 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C29 | 6027 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C31 | 6029 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C33 | 6031 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C35 | 6047 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C37 | 6049 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C39 | 6051 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C40 | 6052 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C41 | 6053 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C43 | 6055 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C44 | 6056 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C45 | 6057 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C47 | 6059 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C49 | 6061 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C51 | 6063 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C53 | 6065 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C54 | 6066 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C55 | 6067 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C57 | 6069 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C58 | 6070 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C59 | 6071 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C61 | 6073 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C63 | 6075 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C65 | 6109 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C67 | 6111 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C69 | 6113 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C71 | 6115 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C73 | 6117 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C75 | 6119 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C77 | 6121 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C79 | 6123 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C81 | 6125 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C83 | 6127 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C85 | 6129 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C87 | 6131 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C89 | 6133 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C91 | 6135 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C93 | 6137 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C95 | 6139 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C97 | 6141 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C99 | 6143 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C101 | 6145 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C103 | 6147 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C105 | 6149 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C107 | 6151 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C109 | 6153 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C111 | 6155 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C113 | 6157 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C115 | 6183 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C117 | 6193 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C119 | 6195 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C121 | 6197 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C123 | 6199 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C124 | 6200 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C126 | 6202 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C127 | 6203 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C129 | 6205 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C130 | 6206 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C132 | 6208 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C134 | 6210 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C136 | 6212 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C138 | 6214 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C140 | 6216 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C142 | 6218 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C144 | 6220 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C146 | 6222 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C148 | 6224 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C150 | 6226 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C152 | 6228 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C154 | 6230 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C156 | 6232 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C158 | 6234 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C160 | 6236 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C162 | 6238 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C164 | 6240 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C166 | 6242 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C168 | 6244 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C169 | 6245 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C171 | 6247 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C173 | 6249 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C175 | 6251 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C177 | 6253 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C179 | 6275 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C181 | 6277 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C183 | 6279 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C185 | 6281 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C187 | 6283 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C189 | 6285 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C191 | 6287 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C193 | 6289 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C195 | 6291 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C197 | 6293 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C199 | 6295 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C201 | 6297 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C203 | 6307 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C205 | 6317 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C207 | 6319 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C209 | 6321 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C211 | 6323 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C212 | 6324 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C214 | 6326 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C215 | 6327 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C217 | 6329 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C218 | 6330 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C220 | 6332 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C222 | 6334 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C224 | 6336 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C226 | 6338 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C228 | 6340 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C230 | 6342 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C231 | 6343 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C233 | 6345 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C235 | 6347 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C237 | 6349 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C239 | 6351 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C241 | 6353 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C242 | 6354 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C244 | 6356 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C246 | 6358 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C248 | 6360 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C250 | 6362 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C252 | 6364 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C254 | 6366 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C255 | 6367 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C257 | 6369 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C259 | 6371 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C261 | 6373 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C263 | 6375 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C265 | 6397 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C267 | 6399 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C269 | 6401 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C271 | 6403 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C273 | 6405 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C275 | 6407 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C277 | 6409 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C279 | 6411 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C281 | 6413 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C283 | 6415 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C285 | 6417 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C287 | 6419 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C289 | 6421 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C291 | 6423 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C293 | 6425 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C295 | 6427 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C297 | 6429 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C299 | 6431 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C301 | 6433 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C303 | 6435 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C305 | 6437 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C307 | 6439 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C309 | 6441 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C311 | 6443 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C313 | 6469 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C315 | 6471 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C316 | 6472 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C317 | 6473 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C319 | 6475 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C320 | 6476 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C321 | 6477 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C323 | 6479 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C325 | 6481 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C327 | 6483 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C329 | 6485 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C330 | 6486 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C331 | 6487 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C333 | 6489 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C334 | 6490 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C335 | 6491 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C337 | 6493 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C339 | 6495 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C341 | 6497 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C343 | 6499 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C345 | 6515 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C347 | 6517 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C348 | 6518 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C349 | 6519 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C351 | 6521 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C352 | 6522 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C353 | 6523 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C355 | 6525 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C357 | 6527 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C359 | 6529 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C361 | 6531 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C362 | 6532 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C363 | 6533 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C365 | 6535 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C366 | 6536 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C367 | 6537 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C369 | 6539 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C371 | 6541 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C373 | 6574 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C375 | 6576 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C377 | 6578 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C379 | 6580 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C381 | 6582 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C383 | 6584 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C385 | 6586 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C387 | 6588 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C389 | 6590 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C391 | 6592 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C393 | 6613 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C395 | 6615 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C397 | 6617 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C399 | 6619 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C401 | 6621 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C403 | 6623 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C405 | 6625 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C407 | 6627 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C409 | 6629 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C411 | 6631 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C412 | 6000 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C413 | 6002 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C414 | 6006 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C415 | 6010 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C416 | 6012 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C417 | 6016 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C418 | 6020 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C419 | 6024 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C420 | 6026 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C421 | 6028 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C422 | 6030 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C423 | 6046 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C424 | 6048 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C425 | 6050 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C426 | 6054 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C427 | 6058 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C428 | 6060 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C429 | 6062 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C430 | 6064 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C431 | 6068 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C432 | 6072 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C433 | 6074 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C434 | 6108 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C435 | 6110 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C436 | 6112 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C437 | 6114 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C438 | 6116 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C439 | 6118 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C440 | 6120 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C441 | 6122 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C442 | 6124 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C443 | 6126 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C444 | 6128 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C445 | 6130 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C446 | 6132 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C447 | 6134 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C448 | 6136 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C449 | 6138 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C450 | 6140 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C451 | 6142 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C452 | 6144 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C453 | 6146 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C454 | 6148 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C455 | 6150 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C456 | 6152 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C457 | 6154 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C458 | 6156 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C459 | 6182 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C460 | 6192 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C461 | 6194 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C462 | 6196 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C463 | 6198 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C464 | 6201 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C465 | 6204 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C466 | 6207 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C467 | 6209 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C468 | 6211 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C469 | 6213 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C470 | 6215 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C471 | 6217 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C472 | 6219 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C473 | 6221 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C474 | 6223 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C475 | 6225 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C476 | 6227 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C477 | 6229 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C478 | 6231 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C479 | 6233 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C480 | 6235 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C481 | 6237 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C482 | 6239 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C483 | 6241 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C484 | 6243 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C485 | 6246 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C486 | 6248 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C487 | 6250 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C488 | 6252 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C489 | 6274 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C490 | 6276 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C491 | 6278 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C492 | 6280 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C493 | 6282 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C494 | 6284 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C495 | 6286 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C496 | 6288 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C497 | 6290 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C498 | 6292 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C499 | 6294 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C500 | 6296 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C501 | 6306 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C502 | 6316 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C503 | 6318 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C504 | 6320 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C505 | 6322 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C506 | 6325 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C507 | 6328 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C508 | 6331 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C509 | 6333 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C510 | 6335 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C511 | 6337 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C512 | 6339 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C513 | 6341 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C514 | 6344 | Column | 2800 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C515 | 6346 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C516 | 6348 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C517 | 6350 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C518 | 6352 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C519 | 6355 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C520 | 6357 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C521 | 6359 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C522 | 6361 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C523 | 6363 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C524 | 6365 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C525 | 6368 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C526 | 6370 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C527 | 6372 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C528 | 6374 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C529 | 6396 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C530 | 6398 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C531 | 6400 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C532 | 6402 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C533 | 6404 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C534 | 6406 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C535 | 6408 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C536 | 6410 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C537 | 6412 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C538 | 6414 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C539 | 6416 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C540 | 6418 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C541 | 6420 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C542 | 6422 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C543 | 6424 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C544 | 6426 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C545 | 6428 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C546 | 6430 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C547 | 6432 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C548 | 6434 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C549 | 6436 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C550 | 6438 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C551 | 6440 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C552 | 6442 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C553 | 6468 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C554 | 6470 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C555 | 6474 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C556 | 6478 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | C557 | 6480 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C558 | 6482 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C559 | 6484 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C560 | 6488 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C561 | 6492 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C562 | 6494 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C563 | 6496 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C564 | 6498 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C565 | 6514 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C566 | 6516 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C567 | 6520 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C568 | 6524 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C569 | 6526 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C570 | 6528 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C571 | 6530 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C572 | 6534 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C573 | 6538 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C574 | 6540 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | C575 | 6573 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C576 | 6575 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C577 | 6577 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C578 | 6579 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C579 | 6581 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C580 | 6583 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C581 | 6585 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C582 | 6587 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C583 | 6589 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C584 | 6591 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C585 | 6612 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C586 | 6614 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C587 | 6616 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C588 | 6618 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C589 | 6620 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C590 | 6622 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C591 | 6624 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C592 | 6626 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C593 | 6628 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 4 | C594 | 6630 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C1249 | 1648 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1250 | 1649 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1262 | 1686 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1263 | 1687 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1264 | 1695 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1265 | 1696 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C1266 | 1700 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1267 | 1701 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1399 | 2127 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1400 | 2128 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1411 | 2164 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1412 | 2165 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1413 | 2173 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1414 | 2174 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1415 | 2178 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1416 | 2179 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1427 | 2218 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1428 | 2219 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1429 | 2249 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1430 | 2252 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1431 | 2255 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1432 | 2259 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C1 | 5374 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C2 | 5375 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C4 | 5361 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C6 | 5363 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C7 | 5364 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C8 | 5365 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C10 | 5367 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C11 | 5368 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C12 | 5369 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C14 | 5371 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C16 | 5373 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C19 | 5377 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C20 | 5378 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C21 | 5379 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C23 | 5381 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C24 | 5382 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C25 | 5383 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C27 | 5385 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C29 | 5387 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C31 | 5389 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C33 | 5391 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C35 | 5407 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C37 | 5409 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C39 | 5411 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C40 | 5412 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C41 | 5413 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C43 | 5415 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C44 | 5416 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C45 | 5417 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C47 | 5419 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C49 | 5421 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C51 | 5423 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C53 | 5425 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C54 | 5426 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C55 | 5427 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C57 | 5429 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C58 | 5430 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C59 | 5431 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C61 | 5433 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C63 | 5435 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C65 | 5469 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C67 | 5471 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C69 | 5473 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C71 | 5475 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C73 | 5477 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C75 | 5479 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C77 | 5481 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C79 | 5483 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C81 | 5485 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C83 | 5487 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C85 | 5489 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C87 | 5491 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C89 | 5493 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C91 | 5495 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C93 | 5497 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C95 | 5499 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C97 | 5501 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C99 | 5503 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C101 | 5505 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C103 | 5507 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C105 | 5509 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C107 | 5511 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C109 | 5513 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C111 | 5515 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C113 | 5517 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C115 | 5543 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C117 | 5553 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C119 | 5555 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C121 | 5557 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C123 | 5559 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C124 | 5560 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C126 | 5562 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C127 | 5563 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C129 | 5565 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C130 | 5566 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C132 | 5568 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C134 | 5570 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C136 | 5572 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C138 | 5574 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C140 | 5576 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C142 | 5578 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C144 | 5580 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C146 | 5582 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C148 | 5584 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C150 | 5586 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C152 | 5588 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C154 | 5590 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C156 | 5592 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C158 | 5594 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C160 | 5596 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C162 | 5598 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C164 | 5600 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C166 | 5602 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C168 | 5604 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C169 | 5605 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C171 | 5607 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C173 | 5609 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C175 | 5611 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C177 | 5613 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C179 | 5635 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C181 | 5637 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C183 | 5639 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C185 | 5641 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C187 | 5643 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C189 | 5645 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C191 | 5647 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C193 | 5649 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C195 | 5651 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C197 | 5653 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C199 | 5655 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C201 | 5657 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C203 | 5667 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C205 | 5677 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C207 | 5679 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C209 | 5681 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C211 | 5683 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C212 | 5684 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C214 | 5686 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C215 | 5687 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C217 | 5689 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C218 | 5690 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C220 | 5692 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C222 | 5694 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C224 | 5696 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C226 | 5698 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C228 | 5700 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C230 | 5702 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C231 | 5703 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C233 | 5705 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C235 | 5707 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C237 | 5709 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C239 | 5711 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C241 | 5713 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C242 | 5714 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C244 | 5716 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C246 | 5718 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C248 | 5720 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C250 | 5722 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C252 | 5724 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C254 | 5726 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C255 | 5727 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C257 | 5729 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C259 | 5731 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C261 | 5733 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C263 | 5735 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C265 | 5757 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C267 | 5759 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C269 | 5761 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C271 | 5763 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C273 | 5765 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C275 | 5767 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C277 | 5769 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C279 | 5771 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C281 | 5773 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C283 | 5775 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C285 | 5777 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C287 | 5779 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C289 | 5781 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C291 | 5783 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C293 | 5785 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C295 | 5787 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C297 | 5789 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C299 | 5791 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C301 | 5793 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C303 | 5795 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C305 | 5797 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C307 | 5799 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C309 | 5801 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C311 | 5803 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C313 | 5829 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C315 | 5831 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C316 | 5832 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C317 | 5833 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C319 | 5835 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C320 | 5836 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C321 | 5837 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C323 | 5839 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C325 | 5841 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C327 | 5843 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C329 | 5845 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C330 | 5846 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C331 | 5847 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C333 | 5849 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C334 | 5850 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C335 | 5851 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C337 | 5853 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C339 | 5855 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C341 | 5857 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C343 | 5859 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C345 | 5875 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C347 | 5877 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C348 | 5878 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C349 | 5879 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C351 | 5881 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C352 | 5882 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C353 | 5883 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C355 | 5885 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C357 | 5887 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C359 | 5889 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C361 | 5891 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C362 | 5892 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C363 | 5893 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C365 | 5895 | Column | 600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C366 | 5896 | Column | 1200 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C367 | 5897 | Column | 400 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C369 | 5899 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C371 | 5901 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C373 | 5934 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C375 | 5936 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C377 | 5938 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C379 | 5940 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C381 | 5942 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C383 | 5944 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C385 | 5946 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C387 | 5948 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C389 | 5950 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C391 | 5952 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C393 | 5973 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C395 | 5975 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C397 | 5977 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C399 | 5979 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C401 | 5981 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C403 | 5983 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C405 | 5985 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C407 | 5987 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C409 | 5989 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C411 | 5991 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C412 | 5360 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C413 | 5362 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C414 | 5366 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C415 | 5370 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C416 | 5372 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C417 | 5376 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C418 | 5380 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C419 | 5384 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C420 | 5386 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C421 | 5388 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C422 | 5390 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C423 | 5406 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C424 | 5408 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C425 | 5410 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C426 | 5414 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C427 | 5418 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C428 | 5420 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C429 | 5422 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C430 | 5424 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C431 | 5428 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C432 | 5432 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C433 | 5434 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C434 | 5468 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C435 | 5470 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C436 | 5472 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C437 | 5474 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C438 | 5476 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C439 | 5478 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C440 | 5480 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C441 | 5482 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C442 | 5484 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C443 | 5486 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C444 | 5488 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C445 | 5490 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C446 | 5492 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C447 | 5494 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C448 | 5496 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C449 | 5498 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C450 | 5500 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C451 | 5502 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C452 | 5504 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C453 | 5506 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C454 | 5508 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C455 | 5510 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C456 | 5512 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C457 | 5514 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C458 | 5516 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C459 | 5542 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C460 | 5552 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C461 | 5554 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C462 | 5556 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C463 | 5558 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C464 | 5561 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C465 | 5564 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C466 | 5567 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C467 | 5569 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C468 | 5571 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C469 | 5573 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C470 | 5575 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C471 | 5577 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C472 | 5579 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C473 | 5581 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C474 | 5583 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C475 | 5585 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C476 | 5587 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C477 | 5589 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C478 | 5591 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C479 | 5593 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C480 | 5595 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C481 | 5597 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C482 | 5599 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C483 | 5601 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C484 | 5603 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C485 | 5606 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C486 | 5608 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C487 | 5610 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C488 | 5612 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C489 | 5634 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C490 | 5636 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C491 | 5638 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C492 | 5640 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C493 | 5642 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C494 | 5644 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C495 | 5646 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C496 | 5648 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C497 | 5650 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C498 | 5652 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C499 | 5654 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C500 | 5656 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C501 | 5666 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C502 | 5676 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C503 | 5678 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C504 | 5680 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C505 | 5682 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C506 | 5685 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C507 | 5688 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C508 | 5691 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C509 | 5693 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C510 | 5695 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C511 | 5697 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C512 | 5699 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C513 | 5701 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C514 | 5704 | Column | 2800 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C515 | 5706 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C516 | 5708 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C517 | 5710 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C518 | 5712 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C519 | 5715 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C520 | 5717 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C521 | 5719 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C522 | 5721 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C523 | 5723 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C524 | 5725 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C525 | 5728 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C526 | 5730 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C527 | 5732 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C528 | 5734 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C529 | 5756 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C530 | 5758 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C531 | 5760 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C532 | 5762 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C533 | 5764 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C534 | 5766 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C535 | 5768 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C536 | 5770 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C537 | 5772 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C538 | 5774 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C539 | 5776 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C540 | 5778 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C541 | 5780 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C542 | 5782 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C543 | 5784 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C544 | 5786 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C545 | 5788 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C546 | 5790 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C547 | 5792 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C548 | 5794 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C549 | 5796 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C550 | 5798 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C551 | 5800 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C552 | 5802 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C553 | 5828 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C554 | 5830 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C555 | 5834 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C556 | 5838 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C557 | 5840 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C558 | 5842 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C559 | 5844 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C560 | 5848 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C561 | 5852 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C562 | 5854 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C563 | 5856 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C564 | 5858 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | C565 | 5874 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C566 | 5876 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C567 | 5880 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C568 | 5884 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C569 | 5886 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C570 | 5888 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C571 | 5890 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C572 | 5894 | Column | 1000 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C573 | 5898 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C574 | 5900 | Column | 1600 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | C575 | 5933 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C576 | 5935 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C577 | 5937 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C578 | 5939 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C579 | 5941 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C580 | 5943 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C581 | 5945 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C582 | 5947 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C583 | 5949 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C584 | 5951 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C585 | 5972 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C586 | 5974 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C587 | 5976 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C588 | 5978 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C589 | 5980 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C590 | 5982 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C591 | 5984 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C592 | 5986 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C593 | 5988 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 3 | C594 | 5990 | Column | 1600 | 90LC95BTB | N/A | 180 | | 3 |
| level 2 | C1249 | 876 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1250 | 877 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1262 | 914 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1263 | 915 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1264 | 923 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1265 | 924 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1266 | 928 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1267 | 929 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1399 | 1355 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1400 | 1356 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1411 | 1392 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1412 | 1393 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1413 | 1401 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1414 | 1402 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C1415 | 1406 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1416 | 1407 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1427 | 1446 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1428 | 1447 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1429 | 1477 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1430 | 1480 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1431 | 1483 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1432 | 1487 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C1 | 88 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C2 | 89 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C4 | 4723 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C6 | 4725 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C7 | 4726 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C8 | 4727 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C10 | 4729 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C11 | 4730 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C12 | 4731 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C14 | 4733 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C16 | 4735 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C19 | 4737 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C20 | 4738 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C21 | 4739 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C23 | 4741 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C24 | 4742 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C25 | 4743 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C27 | 4745 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C29 | 4747 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C31 | 4749 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C33 | 4751 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C35 | 4767 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C37 | 4769 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C39 | 4771 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C40 | 4772 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C41 | 4773 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C43 | 4775 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C44 | 4776 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C45 | 4777 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C47 | 4779 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C49 | 4781 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C51 | 4783 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C53 | 4785 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C54 | 4786 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C55 | 4787 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C57 | 4789 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C58 | 4790 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C59 | 4791 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C61 | 4793 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C63 | 4795 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C65 | 4829 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C67 | 4831 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C69 | 4833 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C71 | 4835 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C73 | 4837 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C75 | 4839 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C77 | 4841 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C79 | 4843 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C81 | 4845 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C83 | 4847 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C85 | 4849 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C87 | 4851 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C89 | 4853 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C91 | 4855 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C93 | 4857 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C95 | 4859 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C97 | 4861 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C99 | 4863 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C101 | 4865 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C103 | 4867 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C105 | 4869 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C107 | 4871 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C109 | 4873 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C111 | 4875 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C113 | 4877 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C115 | 4903 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C117 | 4913 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C119 | 4915 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C121 | 4917 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C123 | 4919 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C124 | 4920 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C126 | 4922 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C127 | 4923 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C129 | 4925 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C130 | 4926 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C132 | 4928 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C134 | 4930 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C136 | 4932 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C138 | 4934 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C140 | 4936 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C142 | 4938 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C144 | 4940 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C146 | 4942 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C148 | 4944 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C150 | 4946 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C152 | 4948 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C154 | 4950 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C156 | 4952 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C158 | 4954 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C160 | 4956 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C162 | 4958 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C164 | 4960 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C166 | 4962 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C168 | 4964 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C169 | 4965 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C171 | 4967 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C173 | 4969 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C175 | 4971 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C177 | 4973 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C179 | 4995 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C181 | 4997 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C183 | 4999 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C185 | 5001 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C187 | 5003 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C189 | 5005 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C191 | 5007 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C193 | 5009 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C195 | 5011 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C197 | 5013 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C199 | 5015 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C201 | 5017 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C203 | 5027 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C205 | 5037 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C207 | 5039 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C209 | 5041 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C211 | 5043 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C212 | 5044 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C214 | 5046 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C215 | 5047 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C217 | 5049 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C218 | 5050 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C220 | 5052 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C222 | 5054 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C224 | 5056 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C226 | 5058 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C228 | 5060 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C230 | 5062 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C231 | 5063 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C233 | 5065 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C235 | 5067 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C237 | 5069 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C239 | 5071 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C241 | 5073 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C242 | 5074 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C244 | 5076 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C246 | 5078 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C248 | 5080 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C250 | 5082 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C252 | 5084 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C254 | 5086 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C255 | 5087 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C257 | 5089 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C259 | 5091 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C261 | 5093 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C263 | 5095 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C265 | 5117 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C267 | 5119 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C269 | 5121 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C271 | 5123 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C273 | 5125 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C275 | 5127 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C277 | 5129 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C279 | 5131 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C281 | 5133 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C283 | 5135 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C285 | 5137 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C287 | 5139 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C289 | 5141 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C291 | 5143 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C293 | 5145 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C295 | 5147 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C297 | 5149 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C299 | 5151 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C301 | 5153 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C303 | 5155 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C305 | 5157 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C307 | 5159 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C309 | 5161 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C311 | 5163 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C313 | 5189 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C315 | 5191 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C316 | 5192 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C317 | 5193 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C319 | 5195 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C320 | 5196 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C321 | 5197 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C323 | 5199 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C325 | 5201 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C327 | 5203 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C329 | 5205 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C330 | 5206 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C331 | 5207 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C333 | 5209 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C334 | 5210 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C335 | 5211 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C337 | 5213 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C339 | 5215 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C341 | 5217 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C343 | 5219 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C345 | 5235 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C347 | 5237 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C348 | 5238 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C349 | 5239 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C351 | 5241 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C352 | 5242 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C353 | 5243 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C355 | 5245 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C357 | 5247 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C359 | 5249 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C361 | 5251 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C362 | 5252 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C363 | 5253 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C365 | 5255 | Column | 600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C366 | 5256 | Column | 1200 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C367 | 5257 | Column | 400 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C369 | 5259 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C371 | 5261 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C373 | 5294 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C375 | 5296 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C377 | 5298 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C379 | 5300 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C381 | 5302 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C383 | 5304 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C385 | 5306 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C387 | 5308 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C389 | 5310 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C391 | 5312 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C393 | 5333 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C395 | 5335 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C397 | 5337 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C399 | 5339 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C401 | 5341 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C403 | 5343 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C405 | 5345 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C407 | 5347 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C409 | 5349 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C411 | 5351 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C412 | 4722 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C413 | 4724 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C414 | 4728 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C415 | 4732 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C416 | 4734 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C417 | 4736 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C418 | 4740 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C419 | 4744 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C420 | 4746 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C421 | 4748 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C422 | 4750 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C423 | 4766 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C424 | 4768 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C425 | 4770 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C426 | 4774 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C427 | 4778 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C428 | 4780 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C429 | 4782 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C430 | 4784 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C431 | 4788 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C432 | 4792 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C433 | 4794 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C434 | 4828 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C435 | 4830 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C436 | 4832 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C437 | 4834 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C438 | 4836 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C439 | 4838 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C440 | 4840 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C441 | 4842 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C442 | 4844 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C443 | 4846 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C444 | 4848 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C445 | 4850 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C446 | 4852 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C447 | 4854 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C448 | 4856 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C449 | 4858 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C450 | 4860 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C451 | 4862 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C452 | 4864 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C453 | 4866 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C454 | 4868 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C455 | 4870 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C456 | 4872 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C457 | 4874 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C458 | 4876 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C459 | 4902 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C460 | 4912 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C461 | 4914 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C462 | 4916 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C463 | 4918 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C464 | 4921 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C465 | 4924 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C466 | 4927 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C467 | 4929 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C468 | 4931 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C469 | 4933 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C470 | 4935 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C471 | 4937 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C472 | 4939 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C473 | 4941 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C474 | 4943 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C475 | 4945 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C476 | 4947 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C477 | 4949 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C478 | 4951 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C479 | 4953 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C480 | 4955 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C481 | 4957 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C482 | 4959 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C483 | 4961 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C484 | 4963 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C485 | 4966 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C486 | 4968 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C487 | 4970 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C488 | 4972 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C489 | 4994 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C490 | 4996 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C491 | 4998 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C492 | 5000 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C493 | 5002 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C494 | 5004 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C495 | 5006 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C496 | 5008 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C497 | 5010 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C498 | 5012 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C499 | 5014 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C500 | 5016 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C501 | 5026 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C502 | 5036 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C503 | 5038 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C504 | 5040 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C505 | 5042 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C506 | 5045 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C507 | 5048 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C508 | 5051 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C509 | 5053 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C510 | 5055 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C511 | 5057 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C512 | 5059 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C513 | 5061 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C514 | 5064 | Column | 2800 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C515 | 5066 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C516 | 5068 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C517 | 5070 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C518 | 5072 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C519 | 5075 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C520 | 5077 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C521 | 5079 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C522 | 5081 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C523 | 5083 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C524 | 5085 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C525 | 5088 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C526 | 5090 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C527 | 5092 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C528 | 5094 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C529 | 5116 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C530 | 5118 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C531 | 5120 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C532 | 5122 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C533 | 5124 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C534 | 5126 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C535 | 5128 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C536 | 5130 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C537 | 5132 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C538 | 5134 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C539 | 5136 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C540 | 5138 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C541 | 5140 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C542 | 5142 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C543 | 5144 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C544 | 5146 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C545 | 5148 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C546 | 5150 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C547 | 5152 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C548 | 5154 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C549 | 5156 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C550 | 5158 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C551 | 5160 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C552 | 5162 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C553 | 5188 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C554 | 5190 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C555 | 5194 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C556 | 5198 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C557 | 5200 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C558 | 5202 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C559 | 5204 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C560 | 5208 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C561 | 5212 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C562 | 5214 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C563 | 5216 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C564 | 5218 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C565 | 5234 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C566 | 5236 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C567 | 5240 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C568 | 5244 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C569 | 5246 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C570 | 5248 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C571 | 5250 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C572 | 5254 | Column | 1000 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | C573 | 5258 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C574 | 5260 | Column | 1600 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | C575 | 5293 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C576 | 5295 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C577 | 5297 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C578 | 5299 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C579 | 5301 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C580 | 5303 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C581 | 5305 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C582 | 5307 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C583 | 5309 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C584 | 5311 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C585 | 5332 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C586 | 5334 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C587 | 5336 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C588 | 5338 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C589 | 5340 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C590 | 5342 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C591 | 5344 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C592 | 5346 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C593 | 5348 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 2 | C594 | 5350 | Column | 1600 | 90LC115BTB | N/A | 180 | | 3 |
| level 1 | C1249 | 31 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1250 | 32 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1262 | 69 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1263 | 70 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1264 | 78 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1265 | 79 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1266 | 83 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1267 | 84 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1399 | 564 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1400 | 565 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1411 | 601 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1412 | 602 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1413 | 610 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1414 | 611 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1415 | 615 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1416 | 616 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1427 | 664 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1428 | 665 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1429 | 700 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1430 | 703 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1431 | 706 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C1432 | 710 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C2 | 197 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C3 | 90 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C4 | 91 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C5 | 92 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C6 | 93 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C7 | 94 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C8 | 95 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C9 | 96 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C10 | 189 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C11 | 190 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C12 | 191 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C13 | 192 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C14 | 193 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C15 | 194 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C16 | 195 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C17 | 196 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C18 | 280 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C19 | 281 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C20 | 282 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C21 | 283 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C22 | 284 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C23 | 285 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C24 | 286 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C25 | 287 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C26 | 288 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C27 | 289 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C28 | 290 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C29 | 340 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C30 | 341 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C31 | 342 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C32 | 343 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C33 | 344 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C34 | 516 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C35 | 517 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C36 | 518 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C37 | 519 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C38 | 520 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C39 | 521 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C40 | 620 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C41 | 621 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C42 | 622 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C43 | 623 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C44 | 624 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C45 | 625 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C46 | 626 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C47 | 627 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C48 | 628 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C49 | 693 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C50 | 694 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C51 | 695 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C52 | 696 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C53 | 697 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C54 | 748 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C55 | 749 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C56 | 750 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C57 | 751 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C58 | 752 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C59 | 753 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C60 | 754 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C61 | 755 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C62 | 756 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C63 | 757 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C64 | 790 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C65 | 791 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C66 | 792 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C67 | 793 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C68 | 794 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C69 | 795 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C70 | 796 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C71 | 797 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C72 | 798 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C73 | 799 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C74 | 800 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C75 | 801 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C76 | 802 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C77 | 803 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C78 | 804 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C79 | 805 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C80 | 806 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C81 | 807 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C82 | 808 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C83 | 809 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C84 | 810 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C85 | 811 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C86 | 812 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C87 | 813 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C88 | 814 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C89 | 815 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C90 | 816 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C91 | 817 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C92 | 818 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C93 | 819 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C94 | 820 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C95 | 821 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C96 | 822 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C97 | 823 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C98 | 824 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C99 | 825 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C100 | 826 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C101 | 827 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C102 | 828 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C103 | 829 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C104 | 830 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C105 | 831 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C106 | 832 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C107 | 833 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C108 | 834 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C109 | 835 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C110 | 836 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C111 | 837 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C112 | 838 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C113 | 839 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C114 | 1543 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C115 | 1544 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C116 | 1553 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C117 | 1554 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C118 | 1555 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C119 | 1556 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C120 | 1557 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C121 | 1558 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C122 | 1559 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C123 | 1560 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C124 | 1561 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C125 | 1562 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C126 | 1563 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C127 | 1564 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C128 | 1565 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C129 | 1566 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C130 | 1567 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C131 | 1568 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C132 | 1569 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C133 | 1570 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C134 | 1571 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C135 | 1572 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C136 | 1573 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C137 | 1574 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C138 | 1575 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C139 | 1576 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C140 | 1577 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C141 | 1578 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C142 | 1579 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C143 | 1580 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C144 | 1581 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C145 | 1582 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C146 | 1583 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C147 | 1584 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C148 | 1585 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C149 | 1586 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C150 | 1587 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C151 | 1588 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C152 | 1589 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C153 | 1590 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C154 | 1591 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C155 | 1592 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C156 | 1593 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C157 | 1594 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C158 | 1595 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C159 | 1596 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C160 | 1597 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C161 | 1598 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C162 | 1599 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C163 | 1600 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C164 | 1601 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C165 | 1602 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C166 | 1603 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C167 | 1604 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C168 | 1605 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C169 | 1606 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C170 | 1607 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C171 | 1608 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C172 | 1609 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C173 | 1610 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C174 | 1611 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C175 | 1612 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C176 | 1613 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C177 | 1614 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C178 | 2315 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C179 | 2316 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C180 | 2317 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C181 | 2318 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C182 | 2319 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C183 | 2320 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C184 | 2321 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C185 | 2322 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C186 | 2323 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C187 | 2324 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C188 | 2325 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C189 | 2326 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C190 | 2327 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C191 | 2328 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C192 | 2329 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C193 | 2330 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C194 | 2331 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C195 | 2332 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C196 | 2333 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C197 | 2334 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C198 | 2335 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C199 | 2336 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C200 | 2337 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C201 | 2338 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C202 | 2347 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C203 | 2348 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C204 | 2357 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C205 | 2358 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C206 | 2359 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C207 | 2360 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C208 | 2361 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C209 | 2362 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C210 | 2363 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C211 | 2364 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C212 | 2365 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C213 | 2366 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C214 | 2367 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C215 | 2368 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C216 | 2369 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C217 | 2370 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C218 | 2371 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C219 | 2372 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C220 | 2373 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C221 | 2374 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C222 | 2375 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C223 | 2376 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C224 | 2377 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C225 | 2378 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C226 | 2379 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C227 | 2380 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C228 | 2381 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C229 | 2382 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C230 | 2383 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C231 | 2384 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C232 | 2385 | Column | 2800 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C233 | 2386 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C234 | 2387 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C235 | 2388 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C236 | 3069 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C237 | 3070 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C238 | 3071 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C239 | 3072 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C240 | 3073 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C241 | 3074 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C242 | 3075 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C243 | 3076 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C244 | 3077 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C245 | 3078 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C246 | 3079 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C247 | 3080 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C248 | 3081 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C249 | 3082 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C250 | 3083 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C251 | 3084 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C252 | 3085 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C253 | 3086 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C254 | 3087 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C255 | 3088 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C256 | 3089 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C257 | 3090 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C258 | 3091 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C259 | 3092 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C260 | 3093 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C261 | 3094 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C262 | 3095 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C263 | 3096 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C264 | 3117 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C265 | 3118 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C266 | 3119 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C267 | 3120 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C268 | 3121 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C269 | 3122 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C270 | 3123 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C271 | 3124 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C272 | 3125 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C273 | 3126 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C274 | 3127 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C275 | 3128 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C276 | 3129 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C277 | 3130 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C278 | 3131 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C279 | 3132 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C280 | 3133 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C281 | 3134 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C282 | 3135 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C283 | 3136 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C284 | 3137 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C285 | 3138 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C286 | 3139 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C287 | 3140 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C288 | 3141 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C289 | 3142 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C290 | 3143 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C291 | 3144 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C292 | 3145 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C293 | 3146 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C294 | 3147 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C295 | 3148 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C296 | 3149 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C297 | 3150 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C298 | 3151 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C299 | 3152 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C300 | 3153 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C301 | 3154 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C302 | 3155 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C303 | 3156 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C304 | 3157 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C305 | 3158 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C306 | 3159 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C307 | 3160 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C308 | 3841 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C309 | 3842 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C310 | 3843 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C311 | 3844 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C312 | 3869 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C313 | 3870 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C314 | 3871 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C315 | 3872 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C316 | 3873 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C317 | 3874 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C318 | 3875 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C319 | 3876 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C320 | 3877 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C321 | 3878 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C322 | 3879 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C323 | 3880 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C324 | 3881 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C325 | 3882 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C326 | 3883 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C327 | 3884 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C328 | 3885 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C329 | 3886 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C330 | 3887 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C331 | 3888 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C332 | 3889 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C333 | 3890 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C334 | 3891 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C335 | 3892 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C336 | 3893 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C337 | 3894 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C338 | 3895 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C339 | 3896 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C340 | 3897 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C341 | 3898 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C342 | 3899 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C343 | 3900 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C344 | 3915 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C345 | 3916 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C346 | 3917 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C347 | 3918 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C348 | 3919 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C349 | 3920 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C350 | 3921 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C351 | 3922 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C352 | 3923 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C353 | 3924 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C354 | 3925 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C355 | 3926 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C356 | 3927 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C357 | 3928 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C358 | 3929 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C359 | 3930 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C360 | 3931 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C361 | 3932 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C362 | 4568 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C363 | 4569 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C364 | 4570 | Column | 1000 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C365 | 4571 | Column | 600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C366 | 4572 | Column | 1200 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C367 | 4573 | Column | 400 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C368 | 4574 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C369 | 4575 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C370 | 4576 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C371 | 4577 | Column | 1600 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | C372 | 4609 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C373 | 4610 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C374 | 4611 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C375 | 4612 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C376 | 4613 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C377 | 4614 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C378 | 4615 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C379 | 4616 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C380 | 4617 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C381 | 4618 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C382 | 4619 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C383 | 4620 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C384 | 4621 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C385 | 4622 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C386 | 4623 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C387 | 4624 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C388 | 4625 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C389 | 4626 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C390 | 4627 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C391 | 4628 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C392 | 4648 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C393 | 4649 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C394 | 4650 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C395 | 4651 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C396 | 4652 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C397 | 4653 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | C398 | 4654 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C399 | 4655 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C400 | 4656 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C401 | 4657 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C402 | 4658 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C403 | 4659 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C404 | 4706 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C405 | 4707 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C406 | 4708 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C407 | 4709 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C408 | 4710 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C409 | 4711 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C410 | 4712 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 1 | C411 | 4713 | Column | 1600 | 90LC150BTB | N/A | 180 | | 3 |
| level 6 | B316 | 4093 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B322 | 4226 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B330 | 4361 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B433 | 4227 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B547 | 4228 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B742 | 4192 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B824 | 4197 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1223 | 4301 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1267 | 4660 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1293 | 4304 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1550 | 4564 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1557 | 4519 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1649 | 4565 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1662 | 4520 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1752 | 4099 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1759 | 4566 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1766 | 4521 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1773 | 4367 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2148 | 3950 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2149 | 3951 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2150 | 3952 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2151 | 3953 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2152 | 3954 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2154 | 3956 | Beam | 1830 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2156 | 3966 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2157 | 3967 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2158 | 3987 | Beam | 1830 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2159 | 3988 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2160 | 3989 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2161 | 3990 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B2162 | 3991 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2163 | 3992 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2164 | 3993 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2165 | 3998 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2166 | 3999 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2167 | 4000 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2169 | 4007 | Beam | 1830 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2170 | 4008 | Beam | 1830 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2173 | 4027 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2174 | 4028 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2175 | 4074 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2176 | 4075 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2177 | 4076 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2178 | 4077 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2179 | 4078 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2180 | 4079 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2181 | 4080 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2182 | 4081 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2183 | 4082 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2184 | 4083 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2185 | 4084 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2186 | 4085 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2187 | 4086 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2188 | 4087 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2189 | 4088 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2190 | 4089 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2191 | 4090 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2192 | 4091 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2193 | 4137 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2194 | 4138 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2195 | 4139 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2196 | 4140 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2197 | 4145 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2198 | 4146 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2199 | 4147 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2200 | 4148 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2201 | 4165 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2202 | 4166 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2203 | 4167 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2204 | 4168 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2205 | 4169 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2206 | 4170 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2207 | 4171 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2208 | 4172 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B2209 | 4173 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2210 | 4174 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2211 | 4175 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2212 | 4176 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2213 | 4177 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2214 | 4178 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2215 | 4179 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2216 | 4180 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2217 | 4185 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2218 | 4186 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2219 | 4187 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2220 | 4188 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2221 | 4189 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2222 | 4190 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2223 | 4194 | Beam | 305 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2224 | 4195 | Beam | 305 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2225 | 4216 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2226 | 4217 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2227 | 4218 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2228 | 4219 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2229 | 4220 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2230 | 4221 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2231 | 4222 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2232 | 4223 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2233 | 4224 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2234 | 4265 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2235 | 4266 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2236 | 4267 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2237 | 4268 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2238 | 4273 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2239 | 4274 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2240 | 4275 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2241 | 4276 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2242 | 4285 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2243 | 4286 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2244 | 4287 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2245 | 4288 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2246 | 4289 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2247 | 4290 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2248 | 4291 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2249 | 4292 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2250 | 4293 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2251 | 4294 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2252 | 4295 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B2253 | 4296 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2254 | 4297 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2255 | 4342 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2256 | 4343 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2257 | 4344 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2258 | 4345 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2259 | 4346 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2260 | 4347 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2261 | 4348 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2262 | 4349 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2263 | 4350 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2264 | 4351 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2265 | 4352 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2266 | 4353 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2267 | 4354 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2268 | 4355 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2269 | 4356 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2270 | 4357 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2271 | 4358 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2272 | 4359 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2273 | 4371 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2274 | 4372 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2275 | 4373 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2276 | 4374 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2277 | 4375 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2278 | 4376 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2279 | 4394 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2280 | 4395 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2281 | 4396 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2282 | 4397 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2283 | 4398 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2285 | 4400 | Beam | 1830 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2287 | 4410 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2288 | 4411 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2289 | 4430 | Beam | 1830 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2290 | 4431 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2291 | 4432 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2292 | 4433 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2293 | 4434 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2294 | 4435 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2295 | 4436 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2296 | 4441 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2297 | 4442 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2298 | 4443 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B2300 | 4450 | Beam | 1830 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2301 | 4451 | Beam | 1830 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2304 | 4470 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2305 | 4471 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2306 | 4486 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2307 | 4487 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2309 | 4509 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2310 | 4510 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2311 | 4511 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2312 | 4512 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2313 | 4513 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2314 | 4514 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2315 | 4515 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2316 | 4516 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2317 | 4517 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2322 | 4554 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2323 | 4555 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2324 | 4556 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2325 | 4557 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2326 | 4558 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2327 | 4559 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2328 | 4560 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2329 | 4561 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2330 | 4562 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B1 | 7312 | Beam | 305 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B2 | 7313 | Beam | 305 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B3 | 7314 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B4 | 7315 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B5 | 7316 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B6 | 7317 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B7 | 7318 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B9 | 7319 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B10 | 7320 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B11 | 7321 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B12 | 7322 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B13 | 7323 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B14 | 7324 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B15 | 7325 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B16 | 7356 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B17 | 7357 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B18 | 7358 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B19 | 7359 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B21 | 7360 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B22 | 7361 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B23 | 7362 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B24 | 7363 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B25 | 7364 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B26 | 7365 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B27 | 7366 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B28 | 7367 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B29 | 7368 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B30 | 7369 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B31 | 7370 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B32 | 7371 | Beam | 305 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B33 | 7372 | Beam | 305 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B34 | 7373 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B35 | 7374 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B36 | 7375 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B37 | 7376 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B38 | 7377 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B39 | 7378 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B40 | 7379 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B41 | 7380 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B42 | 7381 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B43 | 7382 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B44 | 7383 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B45 | 7384 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B46 | 7385 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B47 | 7386 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B48 | 7387 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B49 | 7438 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B50 | 7439 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B52 | 7440 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B53 | 7441 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B54 | 7442 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B55 | 7443 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B56 | 7444 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B57 | 7445 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B58 | 7446 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B59 | 7447 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B60 | 7448 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B61 | 7449 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B62 | 7450 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B63 | 7451 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B64 | 7452 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B65 | 7453 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B66 | 7454 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B67 | 7455 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B68 | 7456 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B70 | 7457 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B71 | 7458 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B72 | 7459 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B73 | 7460 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B74 | 7461 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B75 | 7464 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B76 | 7465 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B77 | 7466 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B78 | 7467 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B79 | 7468 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B80 | 7469 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B81 | 7470 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B82 | 7471 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B83 | 7534 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B84 | 7535 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B85 | 7536 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B86 | 7537 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B87 | 7538 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B88 | 7539 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B89 | 7540 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B90 | 7541 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B91 | 7542 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B92 | 7543 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B93 | 7544 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B94 | 7545 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B95 | 7546 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B96 | 7547 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B97 | 7548 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B98 | 7549 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B99 | 7550 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B100 | 7551 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B101 | 7552 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B102 | 7553 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B103 | 7578 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B104 | 7579 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B105 | 7580 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B107 | 7581 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B108 | 7582 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B109 | 7583 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B110 | 7584 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B111 | 7585 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B112 | 7588 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B113 | 7589 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B114 | 7590 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B115 | 7591 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B116 | 7592 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B117 | 7593 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B118 | 7594 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B119 | 7595 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B120 | 7656 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B121 | 7657 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B122 | 7658 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B123 | 7659 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B124 | 7660 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B125 | 7661 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B126 | 7662 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B127 | 7663 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B128 | 7664 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B129 | 7665 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B130 | 7666 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B131 | 7667 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B132 | 7668 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B133 | 7669 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B134 | 7670 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B135 | 7671 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B137 | 7672 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B138 | 7673 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B139 | 7674 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B140 | 7675 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B141 | 7724 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B142 | 7725 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B143 | 7726 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B144 | 7727 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B145 | 7728 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B146 | 7729 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B147 | 7730 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B148 | 7731 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B149 | 7732 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B150 | 7733 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B151 | 7734 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B152 | 7735 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B153 | 7736 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B154 | 7737 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B155 | 7738 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B156 | 7739 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B157 | 7740 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B158 | 7741 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B159 | 7742 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B160 | 7743 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B161 | 7744 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B162 | 7745 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B163 | 7746 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B164 | 7747 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B165 | 7780 | Beam | 305 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B167 | 7781 | Beam | 305 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B168 | 7782 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B169 | 7783 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B170 | 7784 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B171 | 7785 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B172 | 7786 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B173 | 7787 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B174 | 7788 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B175 | 7789 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B176 | 7790 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B177 | 7791 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B178 | 7792 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B179 | 7793 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B180 | 7822 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B181 | 7823 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B182 | 7824 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B183 | 7825 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B184 | 7826 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B186 | 7827 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B187 | 7828 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B188 | 7829 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B189 | 7830 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B190 | 7831 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B191 | 7832 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B192 | 7833 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B193 | 7834 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B194 | 7835 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B195 | 7836 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B196 | 7837 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B197 | 7838 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B198 | 7839 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B199 | 7840 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B200 | 7841 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B201 | 7842 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B202 | 7843 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B203 | 7844 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B204 | 7845 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | B205 | 7846 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B206 | 7847 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B207 | 7848 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B208 | 7849 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B210 | 7850 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B211 | 7851 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B212 | 7852 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B213 | 7873 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B214 | 7874 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B215 | 7875 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B216 | 7876 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B217 | 7877 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B218 | 7878 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B219 | 7879 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B220 | 7880 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B221 | 7881 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B222 | 7882 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B223 | 7883 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B224 | 7884 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B225 | 7885 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B226 | 7886 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B227 | 7887 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B228 | 7888 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B229 | 7889 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B230 | 7890 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B231 | 7891 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B232 | 7912 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B233 | 7913 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B234 | 7914 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B235 | 7915 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B236 | 7916 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B237 | 7917 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B238 | 7918 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B239 | 7919 | Beam | 610 | 90LC115 | N/A | 90 | 500 | |
| level 6 | B8 | 6 | Beam | 4270 | 90LC115 | N/A | 180 | 500 | |
| level 5 | B316 | 3333 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B322 | 3473 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B330 | 3621 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B433 | 3474 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B547 | 3475 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B742 | 3434 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B824 | 3439 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1223 | 3549 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1267 | 3933 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B1293 | 3552 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1550 | 3837 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1557 | 3787 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1649 | 3838 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1662 | 3788 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1752 | 3339 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1759 | 3839 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1766 | 3789 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1773 | 3627 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2148 | 3178 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2149 | 3179 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2150 | 3180 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2151 | 3181 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2152 | 3182 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2154 | 3184 | Beam | 1830 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2156 | 3194 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2157 | 3195 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2158 | 3215 | Beam | 1830 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2159 | 3216 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2160 | 3217 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2161 | 3218 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2162 | 3219 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2163 | 3220 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2164 | 3221 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2165 | 3226 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2166 | 3227 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2167 | 3228 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2169 | 3235 | Beam | 1830 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2170 | 3236 | Beam | 1830 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2173 | 3255 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2174 | 3256 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2175 | 3314 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2176 | 3315 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2177 | 3316 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2178 | 3317 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2179 | 3318 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2180 | 3319 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2181 | 3320 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2182 | 3321 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2183 | 3322 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2184 | 3323 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2185 | 3324 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2186 | 3325 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2187 | 3326 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B2188 | 3327 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2189 | 3328 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2190 | 3329 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2191 | 3330 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2192 | 3331 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2193 | 3377 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2194 | 3378 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2195 | 3379 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2196 | 3380 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2197 | 3385 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2198 | 3386 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2199 | 3387 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2200 | 3388 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2201 | 3405 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2202 | 3406 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2203 | 3407 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2204 | 3408 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2205 | 3409 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2206 | 3410 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2207 | 3411 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2208 | 3412 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2209 | 3413 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2210 | 3414 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2211 | 3415 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2212 | 3416 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2213 | 3417 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2214 | 3418 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2215 | 3419 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2216 | 3420 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2217 | 3427 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2218 | 3428 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2219 | 3429 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2220 | 3430 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2221 | 3431 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2222 | 3432 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2223 | 3436 | Beam | 305 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2224 | 3437 | Beam | 305 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2225 | 3463 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2226 | 3464 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2227 | 3465 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2228 | 3466 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2229 | 3467 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2230 | 3468 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2231 | 3469 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B2232 | 3470 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2233 | 3471 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2234 | 3513 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2235 | 3514 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2236 | 3515 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2237 | 3516 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2238 | 3521 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2239 | 3522 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2240 | 3523 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2241 | 3524 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2242 | 3533 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2243 | 3534 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2244 | 3535 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2245 | 3536 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2246 | 3537 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2247 | 3538 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2248 | 3539 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2249 | 3540 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2250 | 3541 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2251 | 3542 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2252 | 3543 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2253 | 3544 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2254 | 3545 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2255 | 3602 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2256 | 3603 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2257 | 3604 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2258 | 3605 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2259 | 3606 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2260 | 3607 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2261 | 3608 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2262 | 3609 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2263 | 3610 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2264 | 3611 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2265 | 3612 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2266 | 3613 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2267 | 3614 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2268 | 3615 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2269 | 3616 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2270 | 3617 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2271 | 3618 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2272 | 3619 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2273 | 3633 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2274 | 3634 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2275 | 3635 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B2276 | 3636 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2277 | 3637 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2278 | 3638 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2279 | 3657 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2280 | 3658 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2281 | 3659 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2282 | 3660 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2283 | 3661 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2285 | 3663 | Beam | 1830 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2287 | 3673 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2288 | 3674 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2289 | 3693 | Beam | 1830 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2290 | 3694 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2291 | 3695 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2292 | 3696 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2293 | 3697 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2294 | 3698 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2295 | 3699 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2296 | 3704 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2297 | 3705 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2298 | 3706 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2300 | 3713 | Beam | 1830 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2301 | 3714 | Beam | 1830 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2304 | 3733 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2305 | 3734 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2306 | 3749 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2307 | 3750 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2309 | 3777 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2310 | 3778 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2311 | 3779 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2312 | 3780 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2313 | 3781 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2314 | 3782 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2315 | 3783 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2316 | 3784 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2317 | 3785 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2322 | 3827 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2323 | 3828 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2324 | 3829 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2325 | 3830 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2326 | 3831 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2327 | 3832 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2328 | 3833 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2329 | 3834 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B2330 | 3835 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B1 | 6672 | Beam | 305 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B2 | 6673 | Beam | 305 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B3 | 6674 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B4 | 6675 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B5 | 6676 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B6 | 6677 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B7 | 6678 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B9 | 6679 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B10 | 6680 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B11 | 6681 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B12 | 6682 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B13 | 6683 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B14 | 6684 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B15 | 6685 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B16 | 6716 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B17 | 6717 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B18 | 6718 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B19 | 6719 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B21 | 6720 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B22 | 6721 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B23 | 6722 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B24 | 6723 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B25 | 6724 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B26 | 6725 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B27 | 6726 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B28 | 6727 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B29 | 6728 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B30 | 6729 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B31 | 6730 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B32 | 6731 | Beam | 305 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B33 | 6732 | Beam | 305 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B34 | 6733 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B35 | 6734 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B36 | 6735 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B37 | 6736 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B38 | 6737 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B39 | 6738 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B40 | 6739 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B41 | 6740 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B42 | 6741 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B43 | 6742 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B44 | 6743 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B45 | 6744 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B46 | 6745 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B47 | 6746 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B48 | 6747 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B49 | 6798 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B50 | 6799 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B52 | 6800 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B53 | 6801 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B54 | 6802 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B55 | 6803 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B56 | 6804 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B57 | 6805 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B58 | 6806 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B59 | 6807 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B60 | 6808 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B61 | 6809 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B62 | 6810 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B63 | 6811 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B64 | 6812 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B65 | 6813 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B66 | 6814 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B67 | 6815 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B68 | 6816 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B70 | 6817 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B71 | 6818 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B72 | 6819 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B73 | 6820 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B74 | 6821 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B75 | 6824 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B76 | 6825 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B77 | 6826 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B78 | 6827 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B79 | 6828 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B80 | 6829 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B81 | 6830 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B82 | 6831 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B83 | 6894 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B84 | 6895 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B85 | 6896 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B86 | 6897 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B87 | 6898 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B88 | 6899 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B89 | 6900 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B90 | 6901 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B91 | 6902 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B92 | 6903 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B93 | 6904 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B94 | 6905 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B95 | 6906 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B96 | 6907 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B97 | 6908 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B98 | 6909 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B99 | 6910 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B100 | 6911 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B101 | 6912 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B102 | 6913 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B103 | 6938 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B104 | 6939 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B105 | 6940 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B107 | 6941 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B108 | 6942 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B109 | 6943 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B110 | 6944 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B111 | 6945 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B112 | 6948 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B113 | 6949 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B114 | 6950 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B115 | 6951 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B116 | 6952 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B117 | 6953 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B118 | 6954 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B119 | 6955 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B120 | 7016 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B121 | 7017 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B122 | 7018 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B123 | 7019 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B124 | 7020 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B125 | 7021 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B126 | 7022 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B127 | 7023 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B128 | 7024 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B129 | 7025 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B130 | 7026 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B131 | 7027 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B132 | 7028 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B133 | 7029 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B134 | 7030 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B135 | 7031 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B137 | 7032 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B138 | 7033 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B139 | 7034 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B140 | 7035 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B141 | 7084 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B142 | 7085 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B143 | 7086 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B144 | 7087 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B145 | 7088 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B146 | 7089 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B147 | 7090 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B148 | 7091 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B149 | 7092 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B150 | 7093 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B151 | 7094 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B152 | 7095 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B153 | 7096 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B154 | 7097 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B155 | 7098 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B156 | 7099 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B157 | 7100 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B158 | 7101 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B159 | 7102 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B160 | 7103 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B161 | 7104 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B162 | 7105 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B163 | 7106 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B164 | 7107 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B165 | 7140 | Beam | 305 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B167 | 7141 | Beam | 305 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B168 | 7142 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B169 | 7143 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B170 | 7144 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B171 | 7145 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B172 | 7146 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B173 | 7147 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B174 | 7148 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B175 | 7149 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B176 | 7150 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B177 | 7151 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B178 | 7152 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B179 | 7153 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B180 | 7182 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B181 | 7183 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B182 | 7184 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B183 | 7185 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B184 | 7186 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B186 | 7187 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B187 | 7188 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B188 | 7189 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B189 | 7190 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B190 | 7191 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B191 | 7192 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B192 | 7193 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B193 | 7194 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B194 | 7195 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B195 | 7196 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B196 | 7197 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B197 | 7198 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B198 | 7199 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B199 | 7200 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B200 | 7201 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B201 | 7202 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B202 | 7203 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B203 | 7204 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B204 | 7205 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B205 | 7206 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B206 | 7207 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B207 | 7208 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B208 | 7209 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B210 | 7210 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B211 | 7211 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B212 | 7212 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B213 | 7233 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B214 | 7234 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B215 | 7235 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B216 | 7236 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B217 | 7237 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B218 | 7238 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B219 | 7239 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B220 | 7240 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B221 | 7241 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B222 | 7242 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B223 | 7243 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B224 | 7244 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B225 | 7245 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B226 | 7246 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B227 | 7247 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B228 | 7248 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | B229 | 7249 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B230 | 7250 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B231 | 7251 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B232 | 7272 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B233 | 7273 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B234 | 7274 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B235 | 7275 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B236 | 7276 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B237 | 7277 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B238 | 7278 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B239 | 7279 | Beam | 610 | 90LC150 | N/A | 90 | 500 | |
| level 5 | B8 | 5 | Beam | 4270 | 90LC150 | N/A | 180 | 500 | |
| level 4 | B316 | 2561 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B322 | 2701 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B330 | 2849 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B433 | 2702 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B547 | 2703 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B742 | 2662 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B824 | 2667 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1223 | 2777 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1267 | 3161 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1293 | 2780 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1550 | 3065 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1557 | 3015 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1649 | 3066 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1662 | 3016 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1752 | 2567 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1759 | 3067 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1766 | 3017 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1773 | 2855 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2148 | 2406 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2149 | 2407 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2150 | 2408 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2151 | 2409 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2152 | 2410 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2154 | 2412 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2156 | 2422 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2157 | 2423 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2158 | 2443 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2159 | 2444 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2160 | 2445 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2161 | 2446 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2162 | 2447 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2163 | 2448 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B2164 | 2449 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2165 | 2454 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2166 | 2455 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2167 | 2456 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2169 | 2463 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2170 | 2464 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2173 | 2483 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2174 | 2484 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2175 | 2542 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2176 | 2543 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2177 | 2544 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2178 | 2545 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2179 | 2546 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2180 | 2547 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2181 | 2548 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2182 | 2549 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2183 | 2550 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2184 | 2551 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2185 | 2552 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2186 | 2553 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2187 | 2554 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2188 | 2555 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2189 | 2556 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2190 | 2557 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2191 | 2558 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2192 | 2559 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2193 | 2605 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2194 | 2606 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2195 | 2607 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2196 | 2608 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2197 | 2613 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2198 | 2614 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2199 | 2615 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2200 | 2616 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2201 | 2633 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2202 | 2634 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2203 | 2635 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2204 | 2636 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2205 | 2637 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2206 | 2638 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2207 | 2639 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2208 | 2640 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2209 | 2641 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2210 | 2642 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B2211 | 2643 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2212 | 2644 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2213 | 2645 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2214 | 2646 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2215 | 2647 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2216 | 2648 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2217 | 2655 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2218 | 2656 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2219 | 2657 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2220 | 2658 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2221 | 2659 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2222 | 2660 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2223 | 2664 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2224 | 2665 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2225 | 2691 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2226 | 2692 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2227 | 2693 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2228 | 2694 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2229 | 2695 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2230 | 2696 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2231 | 2697 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2232 | 2698 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2233 | 2699 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2234 | 2741 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2235 | 2742 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2236 | 2743 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2237 | 2744 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2238 | 2749 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2239 | 2750 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2240 | 2751 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2241 | 2752 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2242 | 2761 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2243 | 2762 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2244 | 2763 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2245 | 2764 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2246 | 2765 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2247 | 2766 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2248 | 2767 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2249 | 2768 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2250 | 2769 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2251 | 2770 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2252 | 2771 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2253 | 2772 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2254 | 2773 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B2255 | 2830 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2256 | 2831 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2257 | 2832 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2258 | 2833 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2259 | 2834 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2260 | 2835 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2261 | 2836 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2262 | 2837 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2263 | 2838 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2264 | 2839 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2265 | 2840 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2266 | 2841 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2267 | 2842 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2268 | 2843 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2269 | 2844 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2270 | 2845 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2271 | 2846 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2272 | 2847 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2273 | 2861 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2274 | 2862 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2275 | 2863 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2276 | 2864 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2277 | 2865 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2278 | 2866 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2279 | 2885 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2280 | 2886 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2281 | 2887 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2282 | 2888 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2283 | 2889 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2285 | 2891 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2287 | 2901 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2288 | 2902 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2289 | 2921 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2290 | 2922 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2291 | 2923 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2292 | 2924 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2293 | 2925 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2294 | 2926 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2295 | 2927 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2296 | 2932 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2297 | 2933 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2298 | 2934 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2300 | 2941 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2301 | 2942 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B2304 | 2961 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2305 | 2962 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2306 | 2977 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2307 | 2978 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2309 | 3005 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2310 | 3006 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2311 | 3007 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2312 | 3008 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2313 | 3009 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2314 | 3010 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2315 | 3011 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2316 | 3012 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2317 | 3013 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2322 | 3055 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2323 | 3056 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2324 | 3057 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2325 | 3058 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2326 | 3059 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2327 | 3060 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2328 | 3061 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2329 | 3062 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2330 | 3063 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B1 | 6032 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B2 | 6033 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B3 | 6034 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B4 | 6035 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B5 | 6036 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B6 | 6037 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B7 | 6038 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B9 | 6039 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B10 | 6040 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B11 | 6041 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B12 | 6042 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B13 | 6043 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B14 | 6044 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B15 | 6045 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B16 | 6076 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B17 | 6077 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B18 | 6078 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B19 | 6079 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B21 | 6080 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B22 | 6081 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B23 | 6082 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B24 | 6083 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B25 | 6084 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B26 | 6085 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B27 | 6086 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B28 | 6087 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B29 | 6088 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B30 | 6089 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B31 | 6090 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B32 | 6091 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B33 | 6092 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B34 | 6093 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B35 | 6094 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B36 | 6095 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B37 | 6096 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B38 | 6097 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B39 | 6098 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B40 | 6099 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B41 | 6100 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B42 | 6101 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B43 | 6102 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B44 | 6103 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B45 | 6104 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B46 | 6105 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B47 | 6106 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B48 | 6107 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B49 | 6158 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B50 | 6159 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B52 | 6160 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B53 | 6161 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B54 | 6162 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B55 | 6163 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B56 | 6164 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B57 | 6165 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B58 | 6166 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B59 | 6167 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B60 | 6168 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B61 | 6169 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B62 | 6170 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B63 | 6171 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B64 | 6172 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B65 | 6173 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B66 | 6174 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B67 | 6175 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B68 | 6176 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B70 | 6177 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B71 | 6178 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B72 | 6179 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B73 | 6180 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B74 | 6181 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B75 | 6184 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B76 | 6185 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B77 | 6186 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B78 | 6187 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B79 | 6188 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B80 | 6189 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B81 | 6190 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B82 | 6191 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B83 | 6254 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B84 | 6255 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B85 | 6256 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B86 | 6257 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B87 | 6258 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B88 | 6259 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B89 | 6260 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B90 | 6261 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B91 | 6262 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B92 | 6263 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B93 | 6264 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B94 | 6265 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B95 | 6266 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B96 | 6267 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B97 | 6268 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B98 | 6269 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B99 | 6270 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B100 | 6271 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B101 | 6272 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B102 | 6273 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B103 | 6298 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B104 | 6299 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B105 | 6300 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B107 | 6301 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B108 | 6302 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B109 | 6303 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B110 | 6304 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B111 | 6305 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B112 | 6308 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B113 | 6309 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B114 | 6310 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B115 | 6311 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B116 | 6312 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B117 | 6313 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B118 | 6314 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B119 | 6315 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B120 | 6376 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B121 | 6377 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B122 | 6378 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B123 | 6379 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B124 | 6380 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B125 | 6381 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B126 | 6382 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B127 | 6383 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B128 | 6384 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B129 | 6385 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B130 | 6386 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B131 | 6387 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B132 | 6388 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B133 | 6389 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B134 | 6390 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B135 | 6391 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B137 | 6392 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B138 | 6393 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B139 | 6394 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B140 | 6395 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B141 | 6444 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B142 | 6445 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B143 | 6446 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B144 | 6447 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B145 | 6448 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B146 | 6449 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B147 | 6450 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B148 | 6451 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B149 | 6452 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B150 | 6453 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B151 | 6454 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B152 | 6455 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B153 | 6456 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B154 | 6457 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B155 | 6458 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B156 | 6459 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B157 | 6460 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B158 | 6461 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B159 | 6462 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B160 | 6463 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B161 | 6464 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B162 | 6465 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B163 | 6466 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B164 | 6467 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B165 | 6500 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B167 | 6501 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B168 | 6502 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B169 | 6503 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B170 | 6504 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B171 | 6505 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B172 | 6506 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B173 | 6507 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B174 | 6508 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B175 | 6509 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B176 | 6510 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B177 | 6511 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B178 | 6512 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B179 | 6513 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B180 | 6542 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B181 | 6543 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B182 | 6544 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B183 | 6545 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B184 | 6546 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B186 | 6547 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B187 | 6548 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B188 | 6549 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B189 | 6550 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B190 | 6551 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B191 | 6552 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B192 | 6553 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B193 | 6554 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B194 | 6555 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B195 | 6556 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B196 | 6557 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B197 | 6558 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B198 | 6559 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B199 | 6560 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B200 | 6561 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B201 | 6562 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B202 | 6563 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B203 | 6564 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B204 | 6565 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B205 | 6566 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B206 | 6567 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | B207 | 6568 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B208 | 6569 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B210 | 6570 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B211 | 6571 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B212 | 6572 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B213 | 6593 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B214 | 6594 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B215 | 6595 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B216 | 6596 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B217 | 6597 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B218 | 6598 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B219 | 6599 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B220 | 6600 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B221 | 6601 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B222 | 6602 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B223 | 6603 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B224 | 6604 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B225 | 6605 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B226 | 6606 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B227 | 6607 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B228 | 6608 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B229 | 6609 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B230 | 6610 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B231 | 6611 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B232 | 6632 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B233 | 6633 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B234 | 6634 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B235 | 6635 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B236 | 6636 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B237 | 6637 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B238 | 6638 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B239 | 6639 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 4 | B8 | 4 | Beam | 4270 | 90LC95BTB | N/A | 180 | 500 | |
| level 3 | B316 | 1789 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B322 | 1929 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B330 | 2077 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B433 | 1930 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B547 | 1931 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B742 | 1890 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B824 | 1895 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1223 | 2005 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1267 | 2389 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1293 | 2008 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1550 | 2293 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B1557 | 2243 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1649 | 2294 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1662 | 2244 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1752 | 1795 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1759 | 2295 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1766 | 2245 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1773 | 2083 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2148 | 1634 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2149 | 1635 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2150 | 1636 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2151 | 1637 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2152 | 1638 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2154 | 1640 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2156 | 1650 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2157 | 1651 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2158 | 1671 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2159 | 1672 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2160 | 1673 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2161 | 1674 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2162 | 1675 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2163 | 1676 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2164 | 1677 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2165 | 1682 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2166 | 1683 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2167 | 1684 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2169 | 1691 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2170 | 1692 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2173 | 1711 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2174 | 1712 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2175 | 1770 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2176 | 1771 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2177 | 1772 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2178 | 1773 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2179 | 1774 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2180 | 1775 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2181 | 1776 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2182 | 1777 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2183 | 1778 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2184 | 1779 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2185 | 1780 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2186 | 1781 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2187 | 1782 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2188 | 1783 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2189 | 1784 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B2190 | 1785 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2191 | 1786 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2192 | 1787 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2193 | 1833 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2194 | 1834 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2195 | 1835 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2196 | 1836 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2197 | 1841 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2198 | 1842 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2199 | 1843 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2200 | 1844 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2201 | 1861 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2202 | 1862 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2203 | 1863 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2204 | 1864 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2205 | 1865 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2206 | 1866 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2207 | 1867 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2208 | 1868 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2209 | 1869 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2210 | 1870 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2211 | 1871 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2212 | 1872 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2213 | 1873 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2214 | 1874 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2215 | 1875 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2216 | 1876 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2217 | 1883 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2218 | 1884 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2219 | 1885 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2220 | 1886 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2221 | 1887 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2222 | 1888 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2223 | 1892 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2224 | 1893 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2225 | 1919 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2226 | 1920 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2227 | 1921 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2228 | 1922 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2229 | 1923 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2230 | 1924 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2231 | 1925 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2232 | 1926 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2233 | 1927 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B2234 | 1969 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2235 | 1970 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2236 | 1971 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2237 | 1972 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2238 | 1977 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2239 | 1978 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2240 | 1979 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2241 | 1980 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2242 | 1989 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2243 | 1990 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2244 | 1991 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2245 | 1992 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2246 | 1993 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2247 | 1994 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2248 | 1995 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2249 | 1996 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2250 | 1997 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2251 | 1998 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2252 | 1999 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2253 | 2000 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2254 | 2001 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2255 | 2058 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2256 | 2059 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2257 | 2060 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2258 | 2061 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2259 | 2062 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2260 | 2063 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2261 | 2064 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2262 | 2065 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2263 | 2066 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2264 | 2067 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2265 | 2068 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2266 | 2069 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2267 | 2070 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2268 | 2071 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2269 | 2072 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2270 | 2073 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2271 | 2074 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2272 | 2075 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2273 | 2089 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2274 | 2090 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2275 | 2091 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2276 | 2092 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2277 | 2093 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B2278 | 2094 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2279 | 2113 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2280 | 2114 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2281 | 2115 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2282 | 2116 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2283 | 2117 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2285 | 2119 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2287 | 2129 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2288 | 2130 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2289 | 2149 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2290 | 2150 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2291 | 2151 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2292 | 2152 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2293 | 2153 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2294 | 2154 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2295 | 2155 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2296 | 2160 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2297 | 2161 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2298 | 2162 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2300 | 2169 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2301 | 2170 | Beam | 1830 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2304 | 2189 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2305 | 2190 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2306 | 2205 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2307 | 2206 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2309 | 2233 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2310 | 2234 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2311 | 2235 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2312 | 2236 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2313 | 2237 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2314 | 2238 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2315 | 2239 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2316 | 2240 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2317 | 2241 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2322 | 2283 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2323 | 2284 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2324 | 2285 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2325 | 2286 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2326 | 2287 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2327 | 2288 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2328 | 2289 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2329 | 2290 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B2330 | 2291 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B1 | 5392 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B2 | 5393 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B3 | 5394 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B4 | 5395 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B5 | 5396 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B6 | 5397 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B7 | 5398 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B9 | 5399 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B10 | 5400 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B11 | 5401 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B12 | 5402 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B13 | 5403 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B14 | 5404 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B15 | 5405 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B16 | 5436 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B17 | 5437 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B18 | 5438 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B19 | 5439 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B21 | 5440 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B22 | 5441 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B23 | 5442 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B24 | 5443 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B25 | 5444 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B26 | 5445 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B27 | 5446 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B28 | 5447 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B29 | 5448 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B30 | 5449 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B31 | 5450 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B32 | 5451 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B33 | 5452 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B34 | 5453 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B35 | 5454 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B36 | 5455 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B37 | 5456 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B38 | 5457 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B39 | 5458 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B40 | 5459 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B41 | 5460 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B42 | 5461 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B43 | 5462 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B44 | 5463 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B45 | 5464 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B46 | 5465 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B47 | 5466 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B48 | 5467 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B49 | 5518 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B50 | 5519 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B52 | 5520 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B53 | 5521 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B54 | 5522 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B55 | 5523 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B56 | 5524 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B57 | 5525 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B58 | 5526 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B59 | 5527 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B60 | 5528 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B61 | 5529 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B62 | 5530 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B63 | 5531 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B64 | 5532 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B65 | 5533 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B66 | 5534 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B67 | 5535 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B68 | 5536 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B70 | 5537 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B71 | 5538 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B72 | 5539 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B73 | 5540 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B74 | 5541 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B75 | 5544 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B76 | 5545 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B77 | 5546 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B78 | 5547 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B79 | 5548 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B80 | 5549 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B81 | 5550 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B82 | 5551 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B83 | 5614 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B84 | 5615 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B85 | 5616 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B86 | 5617 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B87 | 5618 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B88 | 5619 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B89 | 5620 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B90 | 5621 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B91 | 5622 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B92 | 5623 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B93 | 5624 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B94 | 5625 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B95 | 5626 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B96 | 5627 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B97 | 5628 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B98 | 5629 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B99 | 5630 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B100 | 5631 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B101 | 5632 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B102 | 5633 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B103 | 5658 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B104 | 5659 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B105 | 5660 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B107 | 5661 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B108 | 5662 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B109 | 5663 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B110 | 5664 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B111 | 5665 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B112 | 5668 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B113 | 5669 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B114 | 5670 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B115 | 5671 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B116 | 5672 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B117 | 5673 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B118 | 5674 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B119 | 5675 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B120 | 5736 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B121 | 5737 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B122 | 5738 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B123 | 5739 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B124 | 5740 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B125 | 5741 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B126 | 5742 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B127 | 5743 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B128 | 5744 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B129 | 5745 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B130 | 5746 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B131 | 5747 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B132 | 5748 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B133 | 5749 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B134 | 5750 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B135 | 5751 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B137 | 5752 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B138 | 5753 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B139 | 5754 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B140 | 5755 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B141 | 5804 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B142 | 5805 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B143 | 5806 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B144 | 5807 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B145 | 5808 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B146 | 5809 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B147 | 5810 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B148 | 5811 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B149 | 5812 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B150 | 5813 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B151 | 5814 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B152 | 5815 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B153 | 5816 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B154 | 5817 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B155 | 5818 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B156 | 5819 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B157 | 5820 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B158 | 5821 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B159 | 5822 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B160 | 5823 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B161 | 5824 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B162 | 5825 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B163 | 5826 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B164 | 5827 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B165 | 5860 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B167 | 5861 | Beam | 305 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B168 | 5862 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B169 | 5863 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B170 | 5864 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B171 | 5865 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B172 | 5866 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B173 | 5867 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B174 | 5868 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B175 | 5869 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B176 | 5870 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B177 | 5871 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B178 | 5872 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B179 | 5873 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B180 | 5902 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B181 | 5903 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B182 | 5904 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B183 | 5905 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B184 | 5906 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B186 | 5907 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B187 | 5908 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B188 | 5909 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B189 | 5910 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B190 | 5911 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B191 | 5912 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B192 | 5913 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B193 | 5914 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B194 | 5915 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B195 | 5916 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B196 | 5917 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B197 | 5918 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B198 | 5919 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B199 | 5920 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B200 | 5921 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B201 | 5922 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B202 | 5923 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B203 | 5924 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B204 | 5925 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B205 | 5926 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B206 | 5927 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B207 | 5928 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B208 | 5929 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B210 | 5930 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B211 | 5931 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B212 | 5932 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B213 | 5953 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B214 | 5954 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B215 | 5955 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B216 | 5956 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B217 | 5957 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B218 | 5958 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B219 | 5959 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B220 | 5960 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B221 | 5961 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B222 | 5962 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B223 | 5963 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B224 | 5964 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B225 | 5965 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B226 | 5966 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B227 | 5967 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B228 | 5968 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B229 | 5969 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B230 | 5970 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | B231 | 5971 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B232 | 5992 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B233 | 5993 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B234 | 5994 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B235 | 5995 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B236 | 5996 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B237 | 5997 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B238 | 5998 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B239 | 5999 | Beam | 610 | 90LC95BTB | N/A | 90 | 500 | |
| level 3 | B8 | 3 | Beam | 4270 | 90LC95BTB | N/A | 180 | 500 | |
| level 2 | B316 | 1017 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B322 | 1157 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B330 | 1305 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B433 | 1158 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B547 | 1159 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B742 | 1118 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B824 | 1123 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1223 | 1233 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1267 | 1617 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1293 | 1236 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1550 | 1521 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1557 | 1471 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1649 | 1522 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1662 | 1472 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1752 | 1023 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1759 | 1523 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1766 | 1473 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1773 | 1311 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2148 | 862 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2149 | 863 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2150 | 864 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2151 | 865 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2152 | 866 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2154 | 868 | Beam | 1830 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2156 | 878 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2157 | 879 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2158 | 899 | Beam | 1830 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2159 | 900 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2160 | 901 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2161 | 902 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2162 | 903 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2163 | 904 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2164 | 905 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2165 | 910 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B2166 | 911 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2167 | 912 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2169 | 919 | Beam | 1830 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2170 | 920 | Beam | 1830 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2173 | 939 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2174 | 940 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2175 | 998 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2176 | 999 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2177 | 1000 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2178 | 1001 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2179 | 1002 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2180 | 1003 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2181 | 1004 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2182 | 1005 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2183 | 1006 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2184 | 1007 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2185 | 1008 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2186 | 1009 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2187 | 1010 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2188 | 1011 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2189 | 1012 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2190 | 1013 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2191 | 1014 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2192 | 1015 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2193 | 1061 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2194 | 1062 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2195 | 1063 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2196 | 1064 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2197 | 1069 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2198 | 1070 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2199 | 1071 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2200 | 1072 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2201 | 1089 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2202 | 1090 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2203 | 1091 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2204 | 1092 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2205 | 1093 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2206 | 1094 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2207 | 1095 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2208 | 1096 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2209 | 1097 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2210 | 1098 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2211 | 1099 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2212 | 1100 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B2213 | 1101 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2214 | 1102 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2215 | 1103 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2216 | 1104 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2217 | 1111 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2218 | 1112 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2219 | 1113 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2220 | 1114 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2221 | 1115 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2222 | 1116 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2223 | 1120 | Beam | 305 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2224 | 1121 | Beam | 305 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2225 | 1147 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2226 | 1148 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2227 | 1149 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2228 | 1150 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2229 | 1151 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2230 | 1152 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2231 | 1153 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2232 | 1154 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2233 | 1155 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2234 | 1197 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2235 | 1198 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2236 | 1199 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2237 | 1200 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2238 | 1205 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2239 | 1206 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2240 | 1207 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2241 | 1208 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2242 | 1217 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2243 | 1218 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2244 | 1219 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2245 | 1220 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2246 | 1221 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2247 | 1222 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2248 | 1223 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2249 | 1224 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2250 | 1225 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2251 | 1226 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2252 | 1227 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2253 | 1228 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2254 | 1229 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2255 | 1286 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2256 | 1287 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B2257 | 1288 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2258 | 1289 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2259 | 1290 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2260 | 1291 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2261 | 1292 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2262 | 1293 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2263 | 1294 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2264 | 1295 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2265 | 1296 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2266 | 1297 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2267 | 1298 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2268 | 1299 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2269 | 1300 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2270 | 1301 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2271 | 1302 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2272 | 1303 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2273 | 1317 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2274 | 1318 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2275 | 1319 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2276 | 1320 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2277 | 1321 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2278 | 1322 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2279 | 1341 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2280 | 1342 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2281 | 1343 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2282 | 1344 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2283 | 1345 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2285 | 1347 | Beam | 1830 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2287 | 1357 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2288 | 1358 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2289 | 1377 | Beam | 1830 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2290 | 1378 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2291 | 1379 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2292 | 1380 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2293 | 1381 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2294 | 1382 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2295 | 1383 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2296 | 1388 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2297 | 1389 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2298 | 1390 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2300 | 1397 | Beam | 1830 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2301 | 1398 | Beam | 1830 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2304 | 1417 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2305 | 1418 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B2306 | 1433 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2307 | 1434 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2309 | 1461 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2310 | 1462 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2311 | 1463 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2312 | 1464 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2313 | 1465 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2314 | 1466 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2315 | 1467 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2316 | 1468 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2317 | 1469 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2322 | 1511 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2323 | 1512 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2324 | 1513 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2325 | 1514 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2326 | 1515 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2327 | 1516 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2328 | 1517 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2329 | 1518 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2330 | 1519 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B1 | 4752 | Beam | 305 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B2 | 4753 | Beam | 305 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B3 | 4754 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B4 | 4755 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B5 | 4756 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B6 | 4757 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B7 | 4758 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B9 | 4759 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B10 | 4760 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B11 | 4761 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B12 | 4762 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B13 | 4763 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B14 | 4764 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B15 | 4765 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B16 | 4796 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B17 | 4797 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B18 | 4798 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B19 | 4799 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B21 | 4800 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B22 | 4801 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B23 | 4802 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B24 | 4803 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B25 | 4804 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B26 | 4805 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B27 | 4806 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B28 | 4807 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B29 | 4808 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B30 | 4809 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B31 | 4810 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B32 | 4811 | Beam | 305 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B33 | 4812 | Beam | 305 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B34 | 4813 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B35 | 4814 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B36 | 4815 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B37 | 4816 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B38 | 4817 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B39 | 4818 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B40 | 4819 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B41 | 4820 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B42 | 4821 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B43 | 4822 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B44 | 4823 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B45 | 4824 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B46 | 4825 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B47 | 4826 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B48 | 4827 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B49 | 4878 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B50 | 4879 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B52 | 4880 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B53 | 4881 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B54 | 4882 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B55 | 4883 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B56 | 4884 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B57 | 4885 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B58 | 4886 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B59 | 4887 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B60 | 4888 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B61 | 4889 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B62 | 4890 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B63 | 4891 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B64 | 4892 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B65 | 4893 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B66 | 4894 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B67 | 4895 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B68 | 4896 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B70 | 4897 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B71 | 4898 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B72 | 4899 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B73 | 4900 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B74 | 4901 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B75 | 4904 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B76 | 4905 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B77 | 4906 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B78 | 4907 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B79 | 4908 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B80 | 4909 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B81 | 4910 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B82 | 4911 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B83 | 4974 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B84 | 4975 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B85 | 4976 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B86 | 4977 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B87 | 4978 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B88 | 4979 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B89 | 4980 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B90 | 4981 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B91 | 4982 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B92 | 4983 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B93 | 4984 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B94 | 4985 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B95 | 4986 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B96 | 4987 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B97 | 4988 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B98 | 4989 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B99 | 4990 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B100 | 4991 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B101 | 4992 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B102 | 4993 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B103 | 5018 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B104 | 5019 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B105 | 5020 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B107 | 5021 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B108 | 5022 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B109 | 5023 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B110 | 5024 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B111 | 5025 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B112 | 5028 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B113 | 5029 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B114 | 5030 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B115 | 5031 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B116 | 5032 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B117 | 5033 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B118 | 5034 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B119 | 5035 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B120 | 5096 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B121 | 5097 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B122 | 5098 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B123 | 5099 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B124 | 5100 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B125 | 5101 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B126 | 5102 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B127 | 5103 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B128 | 5104 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B129 | 5105 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B130 | 5106 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B131 | 5107 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B132 | 5108 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B133 | 5109 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B134 | 5110 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B135 | 5111 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B137 | 5112 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B138 | 5113 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B139 | 5114 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B140 | 5115 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B141 | 5164 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B142 | 5165 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B143 | 5166 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B144 | 5167 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B145 | 5168 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B146 | 5169 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B147 | 5170 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B148 | 5171 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B149 | 5172 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B150 | 5173 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B151 | 5174 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B152 | 5175 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B153 | 5176 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B154 | 5177 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B155 | 5178 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B156 | 5179 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B157 | 5180 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B158 | 5181 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B159 | 5182 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B160 | 5183 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B161 | 5184 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B162 | 5185 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B163 | 5186 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B164 | 5187 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B165 | 5220 | Beam | 305 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B167 | 5221 | Beam | 305 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B168 | 5222 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B169 | 5223 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B170 | 5224 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B171 | 5225 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B172 | 5226 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B173 | 5227 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B174 | 5228 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B175 | 5229 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B176 | 5230 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B177 | 5231 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B178 | 5232 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B179 | 5233 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B180 | 5262 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B181 | 5263 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B182 | 5264 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B183 | 5265 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B184 | 5266 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B186 | 5267 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B187 | 5268 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B188 | 5269 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B189 | 5270 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B190 | 5271 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B191 | 5272 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B192 | 5273 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B193 | 5274 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B194 | 5275 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B195 | 5276 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B196 | 5277 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B197 | 5278 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B198 | 5279 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B199 | 5280 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B200 | 5281 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B201 | 5282 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B202 | 5283 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B203 | 5284 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B204 | 5285 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B205 | 5286 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B206 | 5287 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B207 | 5288 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B208 | 5289 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | B210 | 5290 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B211 | 5291 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B212 | 5292 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B213 | 5313 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B214 | 5314 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B215 | 5315 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B216 | 5316 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B217 | 5317 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B218 | 5318 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B219 | 5319 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B220 | 5320 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B221 | 5321 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B222 | 5322 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B223 | 5323 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B224 | 5324 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B225 | 5325 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B226 | 5326 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B227 | 5327 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B228 | 5328 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B229 | 5329 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B230 | 5330 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B231 | 5331 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B232 | 5352 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B233 | 5353 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B234 | 5354 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B235 | 5355 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B236 | 5356 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B237 | 5357 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B238 | 5358 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B239 | 5359 | Beam | 610 | 90LC115BTB | N/A | 90 | 500 | |
| level 2 | B8 | 2 | Beam | 4270 | 90LC115BTB | N/A | 180 | 500 | |
| level 1 | B316 | 181 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B322 | 346 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B330 | 505 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B433 | 347 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B547 | 348 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B742 | 302 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B824 | 307 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1223 | 433 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1267 | 845 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1293 | 436 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1550 | 744 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1557 | 689 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1649 | 745 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B1662 | 690 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1752 | 187 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1759 | 746 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1766 | 691 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1773 | 511 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2148 | 17 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2149 | 18 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2150 | 19 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2151 | 20 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2152 | 21 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2154 | 23 | Beam | 1830 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2156 | 33 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2157 | 34 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2158 | 54 | Beam | 1830 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2159 | 55 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2160 | 56 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2161 | 57 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2162 | 58 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2163 | 59 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2164 | 60 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2165 | 65 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2166 | 66 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2167 | 67 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2169 | 74 | Beam | 1830 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2170 | 75 | Beam | 1830 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2173 | 103 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2174 | 104 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2175 | 162 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2176 | 163 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2177 | 164 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2178 | 165 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2179 | 166 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2180 | 167 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2181 | 168 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2182 | 169 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2183 | 170 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2184 | 171 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2185 | 172 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2186 | 173 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2187 | 174 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2188 | 175 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2189 | 176 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2190 | 177 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2191 | 178 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B2192 | 179 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2193 | 234 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2194 | 235 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2195 | 236 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2196 | 237 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2197 | 242 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2198 | 243 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2199 | 244 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2200 | 245 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2201 | 262 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2202 | 263 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2203 | 264 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2204 | 265 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2205 | 266 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2206 | 267 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2207 | 268 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2208 | 269 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2209 | 270 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2210 | 271 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2211 | 272 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2212 | 273 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2213 | 274 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2214 | 275 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2215 | 276 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2216 | 277 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2217 | 295 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2218 | 296 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2219 | 297 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2220 | 298 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2221 | 299 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2222 | 300 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2223 | 304 | Beam | 305 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2224 | 305 | Beam | 305 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2225 | 331 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2226 | 332 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2227 | 333 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2228 | 334 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2229 | 335 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2230 | 336 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2231 | 337 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2232 | 338 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2233 | 339 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2234 | 386 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2235 | 387 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B2236 | 388 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2237 | 389 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2238 | 394 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2239 | 395 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2240 | 396 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2241 | 397 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2242 | 406 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2243 | 407 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2244 | 408 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2245 | 409 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2246 | 410 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2247 | 411 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2248 | 412 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2249 | 413 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2250 | 414 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2251 | 415 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2252 | 416 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2253 | 417 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2254 | 418 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2255 | 486 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2256 | 487 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2257 | 488 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2258 | 489 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2259 | 490 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2260 | 491 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2261 | 492 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2262 | 493 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2263 | 494 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2264 | 495 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2265 | 496 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2266 | 497 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2267 | 498 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2268 | 499 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2269 | 500 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2270 | 501 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2271 | 502 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2272 | 503 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2273 | 526 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2274 | 527 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2275 | 528 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2276 | 529 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2277 | 530 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2278 | 531 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2279 | 550 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B2280 | 551 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2281 | 552 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2282 | 553 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2283 | 554 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2285 | 556 | Beam | 1830 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2287 | 566 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2288 | 567 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2289 | 586 | Beam | 1830 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2290 | 587 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2291 | 588 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2292 | 589 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2293 | 590 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2294 | 591 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2295 | 592 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2296 | 597 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2297 | 598 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2298 | 599 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2300 | 606 | Beam | 1830 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2301 | 607 | Beam | 1830 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2304 | 635 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2305 | 636 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2306 | 651 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2307 | 652 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2309 | 679 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2310 | 680 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2311 | 681 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2312 | 682 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2313 | 683 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2314 | 684 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2315 | 685 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2316 | 686 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2317 | 687 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2322 | 734 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2323 | 735 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2324 | 736 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2325 | 737 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2326 | 738 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2327 | 739 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2328 | 740 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2329 | 741 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2330 | 742 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B1 | 421 | Beam | 305 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B2 | 422 | Beam | 305 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B3 | 423 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B4 | 424 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B5 | 425 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B6 | 426 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B7 | 427 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B9 | 428 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B10 | 429 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B11 | 430 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B12 | 431 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B13 | 513 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B14 | 514 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B15 | 515 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B16 | 758 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B17 | 759 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B18 | 760 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B19 | 761 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B21 | 762 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B22 | 763 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B23 | 764 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B24 | 765 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B25 | 766 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B26 | 767 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B27 | 768 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B28 | 769 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B29 | 770 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B30 | 771 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B31 | 772 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B32 | 773 | Beam | 305 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B33 | 774 | Beam | 305 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B34 | 775 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B35 | 776 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B36 | 777 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B37 | 778 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B38 | 779 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B39 | 780 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B40 | 781 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B41 | 782 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B42 | 783 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B43 | 784 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B44 | 785 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B45 | 786 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B46 | 787 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B47 | 788 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B48 | 789 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B49 | 840 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B50 | 841 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B52 | 842 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B53 | 843 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B54 | 844 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B55 | 851 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B56 | 1525 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B57 | 1526 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B58 | 1527 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B59 | 1528 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B60 | 1529 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B61 | 1530 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B62 | 1531 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B63 | 1532 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B64 | 1533 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B65 | 1534 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B66 | 1535 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B67 | 1536 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B68 | 1537 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B70 | 1538 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B71 | 1539 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B72 | 1540 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B73 | 1541 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B74 | 1542 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B75 | 1545 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B76 | 1546 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B77 | 1547 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B78 | 1548 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B79 | 1549 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B80 | 1550 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B81 | 1551 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B82 | 1552 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B83 | 1615 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B84 | 1616 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B85 | 2297 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B86 | 2298 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B87 | 2299 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B88 | 2300 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B89 | 2301 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B90 | 2302 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B91 | 2303 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B92 | 2304 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B93 | 2305 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B94 | 2306 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B95 | 2307 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B96 | 2308 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B97 | 2309 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B98 | 2310 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B99 | 2311 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B100 | 2312 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B101 | 2313 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B102 | 2314 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B103 | 2339 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B104 | 2340 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B105 | 2341 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B107 | 2342 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B108 | 2343 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B109 | 2344 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B110 | 2345 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B111 | 2346 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B112 | 2349 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B113 | 2350 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B114 | 2351 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B115 | 2352 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B116 | 2353 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B117 | 2354 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B118 | 2355 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B119 | 2356 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B120 | 3097 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B121 | 3098 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B122 | 3099 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B123 | 3100 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B124 | 3101 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B125 | 3102 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B126 | 3103 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B127 | 3104 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B128 | 3105 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B129 | 3106 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B130 | 3107 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B131 | 3108 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B132 | 3109 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B133 | 3110 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B134 | 3111 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B135 | 3112 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B137 | 3113 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B138 | 3114 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B139 | 3115 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B140 | 3116 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B141 | 3845 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B142 | 3846 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B143 | 3847 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B144 | 3848 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B145 | 3849 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B146 | 3850 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B147 | 3851 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B148 | 3852 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B149 | 3853 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B150 | 3854 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B151 | 3855 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B152 | 3856 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B153 | 3857 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B154 | 3858 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B155 | 3859 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B156 | 3860 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B157 | 3861 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B158 | 3862 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B159 | 3863 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B160 | 3864 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B161 | 3865 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B162 | 3866 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B163 | 3867 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B164 | 3868 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B165 | 3901 | Beam | 305 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B167 | 3902 | Beam | 305 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B168 | 3903 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B169 | 3904 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B170 | 3905 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B171 | 3906 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B172 | 3907 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B173 | 3908 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B174 | 3909 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B175 | 3910 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B176 | 3911 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B177 | 3912 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B178 | 3913 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B179 | 3914 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B180 | 4578 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B181 | 4579 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B182 | 4580 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B183 | 4581 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B184 | 4582 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B186 | 4583 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B187 | 4584 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B188 | 4585 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B189 | 4586 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B190 | 4587 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B191 | 4588 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B192 | 4589 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B193 | 4590 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B194 | 4591 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B195 | 4592 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B196 | 4593 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B197 | 4594 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B198 | 4595 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B199 | 4596 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B200 | 4597 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B201 | 4598 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B202 | 4599 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B203 | 4600 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B204 | 4601 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B205 | 4602 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B206 | 4603 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B207 | 4604 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B208 | 4605 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B210 | 4606 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B211 | 4607 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B212 | 4608 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B213 | 4629 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B214 | 4630 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B215 | 4631 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B216 | 4632 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B217 | 4633 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B218 | 4634 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B219 | 4635 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B220 | 4636 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B221 | 4637 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B222 | 4638 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B223 | 4639 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B224 | 4640 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B225 | 4641 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B226 | 4642 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B227 | 4643 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B228 | 4644 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B229 | 4645 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B230 | 4646 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B231 | 4647 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B232 | 4714 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | B233 | 4715 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B234 | 4716 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B235 | 4717 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B236 | 4718 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B237 | 4719 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B238 | 4720 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B239 | 4721 | Beam | 610 | 90LC150BTB | N/A | 90 | 500 | |
| level 1 | B8 | 1 | Beam | 4270 | 90LC150BTB | N/A | 180 | 500 | |
| level 6 | D1315 | 3946 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1317 | 3948 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1319 | 3961 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1320 | 3962 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1321 | 3963 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1322 | 3968 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1324 | 3970 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1326 | 3983 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1328 | 3985 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1330 | 3994 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1332 | 3996 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1334 | 4004 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1335 | 4005 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1336 | 4006 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1337 | 4013 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1338 | 4014 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1339 | 4015 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1340 | 4018 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1341 | 4019 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1342 | 4020 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1343 | 4029 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1346 | 4032 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1347 | 4033 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1350 | 4036 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1351 | 4054 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1354 | 4055 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1355 | 4056 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1357 | 4057 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1359 | 4058 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1361 | 4059 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1363 | 4068 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1366 | 4069 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1367 | 4070 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1369 | 4071 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1371 | 4072 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1373 | 4073 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | D1375 | 4133 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1378 | 4136 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1379 | 4141 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1382 | 4144 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1383 | 4149 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1386 | 4152 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1387 | 4153 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1390 | 4156 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1391 | 4157 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1394 | 4160 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1395 | 4161 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1398 | 4164 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1399 | 4183 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1401 | 4184 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1403 | 4211 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1406 | 4212 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1407 | 4213 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1410 | 4214 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1411 | 4215 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1413 | 4231 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1415 | 4261 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1418 | 4264 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1419 | 4269 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1422 | 4272 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1423 | 4277 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1426 | 4280 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1427 | 4281 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1430 | 4284 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1431 | 4322 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1434 | 4323 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1435 | 4324 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1437 | 4325 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1439 | 4326 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1441 | 4327 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1443 | 4336 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1446 | 4337 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1447 | 4338 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1449 | 4339 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1451 | 4340 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1453 | 4341 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1455 | 4369 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1457 | 4370 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1459 | 4377 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1461 | 4390 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | D1463 | 4392 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1465 | 4405 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1466 | 4406 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1467 | 4407 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1468 | 4412 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1470 | 4414 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1472 | 4426 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1474 | 4428 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1476 | 4437 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1478 | 4439 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1480 | 4447 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1481 | 4448 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1482 | 4449 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1483 | 4456 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1484 | 4457 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1485 | 4458 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1486 | 4461 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1487 | 4462 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1488 | 4463 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1489 | 4472 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1492 | 4475 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1493 | 4476 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1496 | 4479 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1497 | 4480 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1499 | 4482 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1501 | 4484 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1503 | 4501 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1504 | 4502 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1505 | 4503 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1506 | 4504 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1509 | 4505 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1510 | 4506 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1513 | 4507 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1514 | 4508 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1516 | 4526 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1517 | 4527 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1518 | 4529 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1519 | 4530 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1520 | 4532 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1521 | 4533 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1522 | 4534 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1523 | 4536 | Brace | 729.5 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1524 | 4549 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1527 | 4550 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | D1528 | 4551 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1531 | 4552 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1532 | 4553 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1534 | 3947 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1535 | 3949 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1536 | 3969 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1537 | 3971 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1538 | 3984 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1539 | 3986 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1540 | 3995 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1541 | 3997 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1542 | 4030 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1543 | 4031 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1544 | 4034 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1545 | 4035 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1546 | 4691 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1547 | 4692 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1548 | 4693 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1549 | 4694 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1550 | 4695 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1551 | 4696 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1552 | 4705 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1553 | 4704 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1554 | 4703 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1555 | 4702 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1556 | 4701 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1557 | 4700 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1558 | 4134 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1559 | 4135 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1560 | 4142 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1561 | 4143 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1562 | 4150 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1563 | 4151 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1564 | 4154 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1565 | 4155 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1566 | 4158 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1567 | 4159 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1568 | 4162 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1569 | 4163 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1570 | 4697 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1571 | 4698 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1572 | 4666 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1573 | 4667 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1574 | 4670 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | D1575 | 4669 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1576 | 4668 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1577 | 4699 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1578 | 4262 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1579 | 4263 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1580 | 4270 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1581 | 4271 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1582 | 4278 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1583 | 4279 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1584 | 4282 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1585 | 4283 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1586 | 4676 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1587 | 4677 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1588 | 4678 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1589 | 4679 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1590 | 4680 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1591 | 4681 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1592 | 4690 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1593 | 4689 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1594 | 4688 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1595 | 4687 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1596 | 4686 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1597 | 4685 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1598 | 4682 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1599 | 4683 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1600 | 4684 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1601 | 4391 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1602 | 4393 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1603 | 4413 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1604 | 4415 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1605 | 4427 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1606 | 4429 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1607 | 4438 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1608 | 4440 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1609 | 4473 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1610 | 4474 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1611 | 4477 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1612 | 4478 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1613 | 4481 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1614 | 4483 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1615 | 4485 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1616 | 4671 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1617 | 4672 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1618 | 4675 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | D1619 | 4674 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1620 | 4673 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1621 | 4661 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1622 | 4662 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1623 | 4665 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1624 | 4664 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 6 | D1625 | 4663 | Brace | 1712.3 | 90LC115 | N/A | 90 | | 3 |
| level 5 | D1315 | 3174 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1317 | 3176 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1319 | 3189 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1320 | 3190 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1321 | 3191 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1322 | 3196 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1324 | 3198 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1326 | 3211 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1328 | 3213 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1330 | 3222 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1332 | 3224 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1334 | 3232 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1335 | 3233 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1336 | 3234 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1337 | 3241 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1338 | 3242 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1339 | 3243 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1340 | 3246 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1341 | 3247 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1342 | 3248 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1343 | 3257 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1346 | 3260 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1347 | 3261 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1350 | 3264 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1351 | 3282 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1354 | 3285 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1355 | 3286 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1357 | 3288 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1359 | 3290 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1361 | 3292 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1363 | 3302 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1366 | 3305 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1367 | 3306 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1369 | 3308 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1371 | 3310 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1373 | 3312 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1375 | 3373 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | D1378 | 3376 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1379 | 3381 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1382 | 3384 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1383 | 3389 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1386 | 3392 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1387 | 3393 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1390 | 3396 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1391 | 3397 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1394 | 3400 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1395 | 3401 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1398 | 3404 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1399 | 3423 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1401 | 3425 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1403 | 3453 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1406 | 3456 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1407 | 3457 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1410 | 3460 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1411 | 3461 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1413 | 3478 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1415 | 3509 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1418 | 3512 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1419 | 3517 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1422 | 3520 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1423 | 3525 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1426 | 3528 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1427 | 3529 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1430 | 3532 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1431 | 3570 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1434 | 3573 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1435 | 3574 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1437 | 3576 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1439 | 3578 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1441 | 3580 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1443 | 3590 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1446 | 3593 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1447 | 3594 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1449 | 3596 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1451 | 3598 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1453 | 3600 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1455 | 3629 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1457 | 3631 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1459 | 3639 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1461 | 3653 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1463 | 3655 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | D1465 | 3668 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1466 | 3669 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1467 | 3670 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1468 | 3675 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1470 | 3677 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1472 | 3689 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1474 | 3691 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1476 | 3700 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1478 | 3702 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1480 | 3710 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1481 | 3711 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1482 | 3712 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1483 | 3719 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1484 | 3720 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1485 | 3721 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1486 | 3724 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1487 | 3725 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1488 | 3726 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1489 | 3735 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1492 | 3738 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1493 | 3739 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1496 | 3742 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1497 | 3743 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1499 | 3745 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1501 | 3747 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1503 | 3764 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1504 | 3765 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1505 | 3766 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1506 | 3767 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1509 | 3770 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1510 | 3771 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1513 | 3774 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1514 | 3775 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1516 | 3794 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1517 | 3795 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1518 | 3797 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1519 | 3798 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1520 | 3800 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1521 | 3801 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1522 | 3802 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1523 | 3804 | Brace | 729.5 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1524 | 3817 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1527 | 3820 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1528 | 3821 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | D1531 | 3824 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1532 | 3825 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1534 | 3175 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1535 | 3177 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1536 | 3197 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1537 | 3199 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1538 | 3212 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1539 | 3214 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1540 | 3223 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1541 | 3225 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1542 | 3258 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1543 | 3259 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1544 | 3262 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1545 | 3263 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1546 | 3283 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1547 | 3284 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1548 | 3287 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1549 | 3289 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1550 | 3291 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1551 | 3293 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1552 | 3303 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1553 | 3304 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1554 | 3307 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1555 | 3309 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1556 | 3311 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1557 | 3313 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1558 | 3374 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1559 | 3375 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1560 | 3382 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1561 | 3383 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1562 | 3390 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1563 | 3391 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1564 | 3394 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1565 | 3395 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1566 | 3398 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1567 | 3399 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1568 | 3402 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1569 | 3403 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1570 | 3424 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1571 | 3426 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1572 | 3454 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1573 | 3455 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1574 | 3458 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1575 | 3459 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | D1576 | 3462 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1577 | 3479 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1578 | 3510 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1579 | 3511 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1580 | 3518 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1581 | 3519 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1582 | 3526 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1583 | 3527 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1584 | 3530 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1585 | 3531 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1586 | 3571 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1587 | 3572 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1588 | 3575 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1589 | 3577 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1590 | 3579 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1591 | 3581 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1592 | 3591 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1593 | 3592 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1594 | 3595 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1595 | 3597 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1596 | 3599 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1597 | 3601 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1598 | 3630 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1599 | 3632 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1600 | 3640 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1601 | 3654 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1602 | 3656 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1603 | 3676 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1604 | 3678 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1605 | 3690 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1606 | 3692 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1607 | 3701 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1608 | 3703 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1609 | 3736 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1610 | 3737 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1611 | 3740 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1612 | 3741 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1613 | 3744 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1614 | 3746 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1615 | 3748 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1616 | 3768 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1617 | 3769 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1618 | 3772 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1619 | 3773 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | D1620 | 3776 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1621 | 3818 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1622 | 3819 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1623 | 3822 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1624 | 3823 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 5 | D1625 | 3826 | Brace | 1712.3 | 90LC150 | N/A | 90 | | 3 |
| level 4 | D1315 | 2402 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1317 | 2404 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1319 | 2417 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1320 | 2418 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1321 | 2419 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1322 | 2424 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1324 | 2426 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1326 | 2439 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1328 | 2441 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1330 | 2450 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1332 | 2452 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1334 | 2460 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1335 | 2461 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1336 | 2462 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1337 | 2469 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1338 | 2470 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1339 | 2471 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1340 | 2474 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1341 | 2475 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1342 | 2476 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1343 | 2485 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1346 | 2488 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1347 | 2489 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1350 | 2492 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1351 | 2510 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1354 | 2513 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1355 | 2514 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1357 | 2516 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1359 | 2518 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1361 | 2520 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1363 | 2530 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1366 | 2533 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1367 | 2534 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1369 | 2536 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1371 | 2538 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1373 | 2540 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1375 | 2601 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1378 | 2604 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | D1379 | 2609 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1382 | 2612 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1383 | 2617 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1386 | 2620 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1387 | 2621 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1390 | 2624 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1391 | 2625 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1394 | 2628 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1395 | 2629 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1398 | 2632 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1399 | 2651 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1401 | 2653 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1403 | 2681 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1406 | 2684 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1407 | 2685 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1410 | 2688 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1411 | 2689 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1413 | 2706 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1415 | 2737 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1418 | 2740 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1419 | 2745 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1422 | 2748 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1423 | 2753 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1426 | 2756 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1427 | 2757 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1430 | 2760 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1431 | 2798 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1434 | 2801 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1435 | 2802 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1437 | 2804 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1439 | 2806 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1441 | 2808 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1443 | 2818 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1446 | 2821 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1447 | 2822 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1449 | 2824 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1451 | 2826 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1453 | 2828 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1455 | 2857 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1457 | 2859 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1459 | 2867 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1461 | 2881 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1463 | 2883 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1465 | 2896 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | D1466 | 2897 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1467 | 2898 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1468 | 2903 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1470 | 2905 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1472 | 2917 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1474 | 2919 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1476 | 2928 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1478 | 2930 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1480 | 2938 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1481 | 2939 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1482 | 2940 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1483 | 2947 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1484 | 2948 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1485 | 2949 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1486 | 2952 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1487 | 2953 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1488 | 2954 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1489 | 2963 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1492 | 2966 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1493 | 2967 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1496 | 2970 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1497 | 2971 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1499 | 2973 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1501 | 2975 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1503 | 2992 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1504 | 2993 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1505 | 2994 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1506 | 2995 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1509 | 2998 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1510 | 2999 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1513 | 3002 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1514 | 3003 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1516 | 3022 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1517 | 3023 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1518 | 3025 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1519 | 3026 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1520 | 3028 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1521 | 3029 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1522 | 3030 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1523 | 3032 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1524 | 3045 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1527 | 3048 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1528 | 3049 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1531 | 3052 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | D1532 | 3053 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1534 | 2403 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1535 | 2405 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1536 | 2425 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1537 | 2427 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1538 | 2440 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1539 | 2442 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1540 | 2451 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1541 | 2453 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1542 | 2486 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1543 | 2487 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1544 | 2490 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1545 | 2491 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1546 | 2511 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1547 | 2512 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1548 | 2515 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1549 | 2517 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1550 | 2519 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1551 | 2521 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1552 | 2531 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1553 | 2532 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1554 | 2535 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1555 | 2537 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1556 | 2539 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1557 | 2541 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1558 | 2602 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1559 | 2603 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1560 | 2610 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1561 | 2611 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1562 | 2618 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1563 | 2619 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1564 | 2622 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1565 | 2623 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1566 | 2626 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1567 | 2627 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1568 | 2630 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1569 | 2631 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1570 | 2652 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1571 | 2654 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1572 | 2682 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1573 | 2683 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1574 | 2686 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1575 | 2687 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1576 | 2690 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | D1577 | 2707 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1578 | 2738 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1579 | 2739 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1580 | 2746 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1581 | 2747 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1582 | 2754 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1583 | 2755 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1584 | 2758 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1585 | 2759 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1586 | 2799 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1587 | 2800 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1588 | 2803 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1589 | 2805 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1590 | 2807 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1591 | 2809 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1592 | 2819 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1593 | 2820 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1594 | 2823 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1595 | 2825 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1596 | 2827 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1597 | 2829 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1598 | 2858 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1599 | 2860 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1600 | 2868 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1601 | 2882 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1602 | 2884 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1603 | 2904 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1604 | 2906 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1605 | 2918 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1606 | 2920 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1607 | 2929 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1608 | 2931 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1609 | 2964 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1610 | 2965 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1611 | 2968 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1612 | 2969 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1613 | 2972 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1614 | 2974 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1615 | 2976 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1616 | 2996 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1617 | 2997 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1618 | 3000 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1619 | 3001 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1620 | 3004 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | D1621 | 3046 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1622 | 3047 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1623 | 3050 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1624 | 3051 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 4 | D1625 | 3054 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1315 | 1630 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1317 | 1632 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1319 | 1645 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1320 | 1646 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1321 | 1647 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1322 | 1652 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1324 | 1654 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1326 | 1667 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1328 | 1669 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1330 | 1678 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1332 | 1680 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1334 | 1688 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1335 | 1689 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1336 | 1690 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1337 | 1697 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1338 | 1698 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1339 | 1699 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1340 | 1702 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1341 | 1703 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1342 | 1704 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1343 | 1713 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1346 | 1716 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1347 | 1717 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1350 | 1720 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1351 | 1738 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1354 | 1741 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1355 | 1742 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1357 | 1744 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1359 | 1746 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1361 | 1748 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1363 | 1758 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1366 | 1761 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1367 | 1762 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1369 | 1764 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1371 | 1766 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1373 | 1768 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1375 | 1829 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1378 | 1832 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1379 | 1837 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | D1382 | 1840 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1383 | 1845 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1386 | 1848 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1387 | 1849 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1390 | 1852 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1391 | 1853 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1394 | 1856 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1395 | 1857 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1398 | 1860 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1399 | 1879 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1401 | 1881 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1403 | 1909 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1406 | 1912 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1407 | 1913 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1410 | 1916 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1411 | 1917 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1413 | 1934 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1415 | 1965 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1418 | 1968 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1419 | 1973 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1422 | 1976 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1423 | 1981 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1426 | 1984 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1427 | 1985 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1430 | 1988 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1431 | 2026 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1434 | 2029 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1435 | 2030 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1437 | 2032 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1439 | 2034 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1441 | 2036 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1443 | 2046 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1446 | 2049 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1447 | 2050 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1449 | 2052 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1451 | 2054 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1453 | 2056 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1455 | 2085 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1457 | 2087 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1459 | 2095 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1461 | 2109 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1463 | 2111 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1465 | 2124 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1466 | 2125 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | D1467 | 2126 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1468 | 2131 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1470 | 2133 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1472 | 2145 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1474 | 2147 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1476 | 2156 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1478 | 2158 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1480 | 2166 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1481 | 2167 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1482 | 2168 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1483 | 2175 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1484 | 2176 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1485 | 2177 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1486 | 2180 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1487 | 2181 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1488 | 2182 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1489 | 2191 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1492 | 2194 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1493 | 2195 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1496 | 2198 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1497 | 2199 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1499 | 2201 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1501 | 2203 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1503 | 2220 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1504 | 2221 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1505 | 2222 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1506 | 2223 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1509 | 2226 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1510 | 2227 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1513 | 2230 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1514 | 2231 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1516 | 2250 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1517 | 2251 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1518 | 2253 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1519 | 2254 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1520 | 2256 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1521 | 2257 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1522 | 2258 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1523 | 2260 | Brace | 729.5 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1524 | 2273 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1527 | 2276 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1528 | 2277 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1531 | 2280 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1532 | 2281 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | D1534 | 1631 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1535 | 1633 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1536 | 1653 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1537 | 1655 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1538 | 1668 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1539 | 1670 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1540 | 1679 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1541 | 1681 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1542 | 1714 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1543 | 1715 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1544 | 1718 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1545 | 1719 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1546 | 1739 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1547 | 1740 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1548 | 1743 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1549 | 1745 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1550 | 1747 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1551 | 1749 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1552 | 1759 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1553 | 1760 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1554 | 1763 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1555 | 1765 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1556 | 1767 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1557 | 1769 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1558 | 1830 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1559 | 1831 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1560 | 1838 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1561 | 1839 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1562 | 1846 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1563 | 1847 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1564 | 1850 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1565 | 1851 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1566 | 1854 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1567 | 1855 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1568 | 1858 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1569 | 1859 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1570 | 1880 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1571 | 1882 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1572 | 1910 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1573 | 1911 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1574 | 1914 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1575 | 1915 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1576 | 1918 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1577 | 1935 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | D1578 | 1966 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1579 | 1967 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1580 | 1974 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1581 | 1975 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1582 | 1982 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1583 | 1983 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1584 | 1986 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1585 | 1987 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1586 | 2027 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1587 | 2028 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1588 | 2031 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1589 | 2033 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1590 | 2035 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1591 | 2037 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1592 | 2047 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1593 | 2048 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1594 | 2051 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1595 | 2053 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1596 | 2055 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1597 | 2057 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1598 | 2086 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1599 | 2088 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1600 | 2096 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1601 | 2110 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1602 | 2112 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1603 | 2132 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1604 | 2134 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1605 | 2146 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1606 | 2148 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1607 | 2157 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1608 | 2159 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1609 | 2192 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1610 | 2193 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1611 | 2196 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1612 | 2197 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1613 | 2200 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1614 | 2202 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1615 | 2204 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1616 | 2224 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1617 | 2225 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1618 | 2228 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1619 | 2229 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1620 | 2232 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1621 | 2274 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 3 | D1622 | 2275 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1623 | 2278 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1624 | 2279 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 3 | D1625 | 2282 | Brace | 1712.3 | 90LC95BTB | N/A | 90 | | 3 |
| level 2 | D1315 | 858 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1317 | 860 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1319 | 873 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1320 | 874 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1321 | 875 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1322 | 880 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1324 | 882 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1326 | 895 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1328 | 897 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1330 | 906 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1332 | 908 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1334 | 916 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1335 | 917 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1336 | 918 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1337 | 925 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1338 | 926 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1339 | 927 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1340 | 930 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1341 | 931 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1342 | 932 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1343 | 941 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1346 | 944 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1347 | 945 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1350 | 948 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1351 | 966 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1354 | 969 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1355 | 970 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1357 | 972 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1359 | 974 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1361 | 976 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1363 | 986 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1366 | 989 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1367 | 990 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1369 | 992 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1371 | 994 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1373 | 996 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1375 | 1057 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1378 | 1060 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1379 | 1065 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1382 | 1068 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | D1383 | 1073 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1386 | 1076 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1387 | 1077 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1390 | 1080 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1391 | 1081 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1394 | 1084 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1395 | 1085 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1398 | 1088 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1399 | 1107 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1401 | 1109 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1403 | 1137 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1406 | 1140 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1407 | 1141 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1410 | 1144 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1411 | 1145 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1413 | 1162 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1415 | 1193 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1418 | 1196 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1419 | 1201 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1422 | 1204 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1423 | 1209 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1426 | 1212 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1427 | 1213 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1430 | 1216 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1431 | 1254 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1434 | 1257 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1435 | 1258 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1437 | 1260 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1439 | 1262 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1441 | 1264 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1443 | 1274 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1446 | 1277 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1447 | 1278 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1449 | 1280 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1451 | 1282 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1453 | 1284 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1455 | 1313 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1457 | 1315 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1459 | 1323 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1461 | 1337 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1463 | 1339 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1465 | 1352 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1466 | 1353 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1467 | 1354 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | D1468 | 1359 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1470 | 1361 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1472 | 1373 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1474 | 1375 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1476 | 1384 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1478 | 1386 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1480 | 1394 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1481 | 1395 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1482 | 1396 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1483 | 1403 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1484 | 1404 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1485 | 1405 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1486 | 1408 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1487 | 1409 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1488 | 1410 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1489 | 1419 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1492 | 1422 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1493 | 1423 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1496 | 1426 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1497 | 1427 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1499 | 1429 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1501 | 1431 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1503 | 1448 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1504 | 1449 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1505 | 1450 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1506 | 1451 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1509 | 1454 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1510 | 1455 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1513 | 1458 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1514 | 1459 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1516 | 1478 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1517 | 1479 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1518 | 1481 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1519 | 1482 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1520 | 1484 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1521 | 1485 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1522 | 1486 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1523 | 1488 | Brace | 729.5 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1524 | 1501 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1527 | 1504 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1528 | 1505 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1531 | 1508 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1532 | 1509 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1534 | 859 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | D1535 | 861 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1536 | 881 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1537 | 883 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1538 | 896 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1539 | 898 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1540 | 907 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1541 | 909 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1542 | 942 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1543 | 943 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1544 | 946 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1545 | 947 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1546 | 967 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1547 | 968 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1548 | 971 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1549 | 973 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1550 | 975 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1551 | 977 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1552 | 987 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1553 | 988 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1554 | 991 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1555 | 993 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1556 | 995 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1557 | 997 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1558 | 1058 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1559 | 1059 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1560 | 1066 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1561 | 1067 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1562 | 1074 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1563 | 1075 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1564 | 1078 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1565 | 1079 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1566 | 1082 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1567 | 1083 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1568 | 1086 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1569 | 1087 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1570 | 1108 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1571 | 1110 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1572 | 1138 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1573 | 1139 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1574 | 1142 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1575 | 1143 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1576 | 1146 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1577 | 1163 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1578 | 1194 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | D1579 | 1195 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1580 | 1202 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1581 | 1203 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1582 | 1210 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1583 | 1211 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1584 | 1214 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1585 | 1215 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1586 | 1255 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1587 | 1256 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1588 | 1259 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1589 | 1261 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1590 | 1263 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1591 | 1265 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1592 | 1275 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1593 | 1276 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1594 | 1279 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1595 | 1281 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1596 | 1283 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1597 | 1285 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1598 | 1314 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1599 | 1316 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1600 | 1324 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1601 | 1338 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1602 | 1340 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1603 | 1360 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1604 | 1362 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1605 | 1374 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1606 | 1376 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1607 | 1385 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1608 | 1387 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1609 | 1420 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1610 | 1421 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1611 | 1424 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1612 | 1425 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1613 | 1428 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1614 | 1430 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1615 | 1432 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1616 | 1452 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1617 | 1453 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1618 | 1456 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1619 | 1457 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1620 | 1460 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1621 | 1502 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1622 | 1503 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | D1623 | 1506 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1624 | 1507 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 2 | D1625 | 1510 | Brace | 1712.3 | 90LC115BTB | N/A | 90 | | 3 |
| level 1 | D1315 | 13 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1316 | 14 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1317 | 15 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1318 | 16 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1319 | 28 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1320 | 29 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1321 | 30 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1322 | 35 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1323 | 36 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1324 | 37 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1325 | 38 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1326 | 50 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1327 | 51 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1328 | 52 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1329 | 53 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1330 | 61 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1331 | 62 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1332 | 63 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1333 | 64 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1334 | 71 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1335 | 72 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1336 | 73 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1337 | 80 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1338 | 81 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1339 | 82 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1340 | 85 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1341 | 86 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1342 | 87 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1343 | 105 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1344 | 106 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1345 | 107 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1346 | 108 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1347 | 109 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1348 | 110 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1349 | 111 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1350 | 112 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1351 | 130 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1352 | 131 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1353 | 132 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1354 | 133 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1355 | 134 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | D1356 | 135 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1357 | 136 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1358 | 137 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1359 | 138 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1360 | 139 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1361 | 140 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1362 | 141 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1363 | 150 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1364 | 151 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1365 | 152 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1366 | 153 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1367 | 154 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1368 | 155 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1369 | 156 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1370 | 157 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1371 | 158 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1372 | 159 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1373 | 160 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1374 | 161 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1375 | 230 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1376 | 231 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1377 | 232 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1378 | 233 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1379 | 238 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1380 | 239 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1381 | 240 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1382 | 241 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1383 | 246 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1384 | 247 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1385 | 248 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1386 | 249 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1387 | 250 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1388 | 251 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1389 | 252 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1390 | 253 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1391 | 254 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1392 | 255 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1393 | 256 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1394 | 257 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1395 | 258 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1396 | 259 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1397 | 260 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1398 | 261 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1399 | 291 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | D1400 | 292 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1401 | 293 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1402 | 294 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1403 | 321 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1404 | 322 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1405 | 323 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1406 | 324 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1407 | 325 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1408 | 326 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1409 | 327 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1410 | 328 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1411 | 329 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1412 | 330 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1413 | 351 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1414 | 352 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1415 | 382 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1416 | 383 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1417 | 384 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1418 | 385 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1419 | 390 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1420 | 391 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1421 | 392 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1422 | 393 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1423 | 398 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1424 | 399 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1425 | 400 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1426 | 401 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1427 | 402 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1428 | 403 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1429 | 404 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1430 | 405 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1431 | 454 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1432 | 455 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1433 | 456 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1434 | 457 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1435 | 458 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1436 | 459 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1437 | 460 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1438 | 461 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1439 | 462 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1440 | 463 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1441 | 464 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1442 | 465 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1443 | 474 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | D1444 | 475 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1445 | 476 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1446 | 477 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1447 | 478 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1448 | 479 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1449 | 480 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1450 | 481 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1451 | 482 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1452 | 483 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1453 | 484 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1454 | 485 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1455 | 522 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1456 | 523 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1457 | 524 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1458 | 525 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1459 | 532 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1460 | 533 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1461 | 546 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1462 | 547 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1463 | 548 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1464 | 549 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1465 | 561 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1466 | 562 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1467 | 563 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1468 | 568 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1469 | 569 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1470 | 570 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1471 | 571 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1472 | 582 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1473 | 583 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1474 | 584 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1475 | 585 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1476 | 593 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1477 | 594 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1478 | 595 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1479 | 596 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1480 | 603 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1481 | 604 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1482 | 605 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1483 | 612 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1484 | 613 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1485 | 614 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1486 | 617 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1487 | 618 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | D1488 | 619 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1489 | 637 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1490 | 638 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1491 | 639 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1492 | 640 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1493 | 641 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1494 | 642 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1495 | 643 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1496 | 644 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1497 | 645 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1498 | 646 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1499 | 647 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1500 | 648 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1501 | 649 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1502 | 650 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1503 | 666 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1504 | 667 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1505 | 668 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1506 | 669 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1507 | 670 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1508 | 671 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1509 | 672 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1510 | 673 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1511 | 674 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1512 | 675 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1513 | 676 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1514 | 677 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1515 | 678 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1516 | 701 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1517 | 702 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1518 | 704 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1519 | 705 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1520 | 707 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1521 | 708 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1522 | 709 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1523 | 711 | Brace | 729.5 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1524 | 724 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1525 | 725 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1526 | 726 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1527 | 727 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1528 | 728 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1529 | 729 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1530 | 730 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1531 | 731 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |

**Table 3.2 - Frame Assignments - Summary (continued)**

| Story | Label | Unique Name | Design Type | Length mm | Analysis Section | Design Section | Axis Angle deg | Max Station Spacing mm | Min Number Stations |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | D1532 | 732 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |
| level 1 | D1533 | 733 | Brace | 1712.3 | 90LC150BTB | N/A | 90 | | 3 |

## 3.3 Shell Assignments

**Table 3.3 - Shell Assignments - Summary**

| Story | Label | Unique Name | Section | Diaphragm | Axis Angle deg | Added Mass kg/m² | Spring |
|---|---|---|---|---|---|---|---|
| level 6 | F2 | 34 | FLOOR$_{one}$ way | I-6 | 90 | 63 | |
| level 6 | F3 | 35 | FLOOR$_{one}$ way | I-6 | 90 | 63 | |
| level 6 | F4 | 36 | FLOOR$_{one}$ way | I-6 | 90 | 63 | |
| level 6 | F5 | 37 | FLOOR$_{one}$ way | I-6 | 90 | 63 | |
| level 6 | F6 | 38 | FLOOR$_{one}$ way | I-6 | 90 | 63 | |
| level 6 | F7 | 39 | FLOOR$_{one}$ way | I-6 | 90 | 63 | |
| level 5 | F2 | 28 | FLOOR$_{one}$ way | I-5 | 90 | 63 | |
| level 5 | F3 | 29 | FLOOR$_{one}$ way | I-5 | 90 | 63 | |
| level 5 | F4 | 30 | FLOOR$_{one}$ way | I-5 | 90 | 63 | |
| level 5 | F5 | 31 | FLOOR$_{one}$ way | I-5 | 90 | 63 | |
| level 5 | F6 | 32 | FLOOR$_{one}$ way | I-5 | 90 | 63 | |
| level 5 | F7 | 33 | FLOOR$_{one}$ way | I-5 | 90 | 63 | |
| level 4 | F2 | 21 | FLOOR$_{one}$ way | I-4 | 90 | 63 | |
| level 4 | F3 | 23 | FLOOR$_{one}$ way | I-4 | 90 | 63 | |
| level 4 | F4 | 24 | FLOOR$_{one}$ way | I-4 | 90 | 63 | |
| level 4 | F6 | 26 | FLOOR$_{one}$ way | I-4 | 90 | 63 | |
| level 4 | F7 | 27 | FLOOR$_{one}$ way | I-4 | 90 | 63 | |
| level 4 | F8 | 25 | FLOOR$_{one}$ way | | | | |
| level 4 | F9 | 40 | FLOOR$_{one}$ way | | | | |
| level 4 | F10 | 41 | FLOOR$_{one}$ way | | | | |
| level 3 | F2 | 15 | FLOOR$_{one}$ way | I-3 | 90 | 63 | |
| level 3 | F3 | 16 | FLOOR$_{one}$ way | I-3 | 90 | 63 | |
| level 3 | F4 | 17 | FLOOR$_{one}$ way | I-3 | 90 | 63 | |
| level 3 | F5 | 18 | FLOOR$_{one}$ way | I-3 | 90 | 63 | |
| level 3 | F6 | 19 | FLOOR$_{one}$ way | I-3 | 90 | 63 | |
| level 3 | F7 | 20 | FLOOR$_{one}$ way | I-3 | 90 | 63 | |
| level 2 | F2 | 9 | FLOOR$_{one}$ way | I-2 | 90 | 63 | |
| level 2 | F3 | 10 | FLOOR$_{one}$ way | I-2 | 90 | 63 | |
| level 2 | F4 | 11 | FLOOR$_{one}$ way | I-2 | 90 | 63 | |
| level 2 | F5 | 12 | FLOOR$_{one}$ way | I-2 | 90 | 63 | |
| level 2 | F6 | 13 | FLOOR$_{one}$ way | I-2 | 90 | 63 | |
| level 2 | F7 | 14 | FLOOR$_{one}$ way | I-2 | 90 | 63 | |
| level 1 | F2 | 2 | FLOOR$_{one}$ way | I-1 | 90 | 63 | |
| level 1 | F3 | 4 | FLOOR$_{one}$ way | I-1 | 90 | 63 | |
| level 1 | F4 | 5 | FLOOR$_{one}$ way | I-1 | 90 | 63 | |

**Table 3.3 - Shell Assignments - Summary (continued)**

| Story | Label | Unique Name | Section | Diaphragm | Axis Angle deg | Added Mass kg/m² | Spring |
|---|---|---|---|---|---|---|---|
| level 1 | F5 | 6 | FLOOR $_{one}$ way | I-1 | 90 | 63 | |
| level 1 | F6 | 7 | FLOOR $_{one}$ way | I-1 | 90 | 63 | |
| level 1 | F7 | 8 | FLOOR $_{one}$ way | I-1 | 90 | 63 | |
| Base | F1 | 3 | BASE SLAB | base | | | BASE SPRING |

## 3.4 Link Assignments

**Table 3.4 - Link Assignments - Summary**

| Story | Unique Name | Property |
|---|---|---|
| level 6 | K108 | HDx1 |
| level 6 | K109 | HDx1 |
| level 6 | K110 | HDx1 |
| level 6 | K111 | HDx1 |
| level 6 | K112 | HDx1 |
| level 6 | K113 | HDx1 |
| level 6 | K114 | HDx1 |
| level 6 | K115 | HDx1 |
| level 6 | K116 | HDx1 |
| level 6 | K117 | HDx1 |
| level 6 | K118 | HDx1 |
| level 6 | K119 | HDx1 |
| level 6 | K120 | HDx1 |
| level 6 | K121 | HDx1 |
| level 6 | K122 | HDx1 |
| level 6 | K123 | HDx1 |
| level 6 | K124 | HDx1 |
| level 6 | K125 | HDx1 |
| level 6 | K126 | HDx1 |
| level 6 | K127 | HDx1 |
| level 6 | K128 | HDx1 |
| level 6 | K129 | HDx1 |
| level 6 | K130 | HDx1 |
| level 6 | K131 | HDx1 |
| level 6 | K132 | HDx1 |
| level 6 | K133 | HDx1 |
| level 6 | K134 | HDx1 |
| level 6 | K183 | HDx1 |
| level 6 | K184 | HDx1 |
| level 6 | K185 | HDx1 |
| level 6 | K186 | HDx1 |
| level 6 | K187 | HDx1 |
| level 6 | K188 | HDx1 |
| level 6 | K189 | HDx1 |
| level 6 | K190 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 6 | K191 | HDx1 |
| level 6 | K192 | HDx1 |
| level 6 | K193 | HDx1 |
| level 6 | K194 | HDx1 |
| level 6 | K243 | HDx1 |
| level 6 | K244 | HDx1 |
| level 6 | K245 | HDx1 |
| level 6 | K246 | HDx1 |
| level 6 | K247 | HDx1 |
| level 6 | K248 | HDx1 |
| level 6 | K249 | HDx1 |
| level 6 | K250 | HDx1 |
| level 6 | K251 | HDx1 |
| level 6 | K252 | HDx1 |
| level 6 | K253 | HDx1 |
| level 6 | K254 | HDx1 |
| level 6 | K303 | HDx1 |
| level 6 | K304 | HDx1 |
| level 6 | K305 | HDx1 |
| level 6 | K306 | HDx1 |
| level 6 | K307 | HDx1 |
| level 6 | K308 | HDx1 |
| level 6 | K309 | HDx1 |
| level 6 | K310 | HDx1 |
| level 6 | K311 | HDx1 |
| level 6 | K312 | HDx1 |
| level 6 | K313 | HDx1 |
| level 6 | K314 | HDx1 |
| level 6 | K425 | HDx1 |
| level 6 | K426 | HDx1 |
| level 6 | K427 | HDx1 |
| level 6 | K428 | HDx1 |
| level 6 | K429 | HDx1 |
| level 6 | K430 | HDx1 |
| level 6 | K431 | HDx1 |
| level 6 | K432 | HDx1 |
| level 6 | K433 | HDx1 |
| level 6 | K434 | HDx1 |
| level 6 | K435 | HDx1 |
| level 6 | K436 | HDx1 |
| level 6 | K437 | HDx1 |
| level 6 | K438 | HDx1 |
| level 6 | K439 | HDx1 |
| level 6 | K440 | HDx1 |
| level 6 | K441 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 6 | K442 | HDx1 |
| level 6 | K443 | HDx1 |
| level 6 | K444 | HDx1 |
| level 6 | K445 | HDx1 |
| level 6 | K446 | HDx1 |
| level 6 | K447 | HDx1 |
| level 6 | K448 | HDx1 |
| level 6 | K449 | HDx1 |
| level 6 | K450 | HDx1 |
| level 6 | K451 | HDx1 |
| level 6 | K541 | HDx1 |
| level 6 | K542 | HDx1 |
| level 6 | K543 | HDx1 |
| level 6 | K544 | HDx1 |
| level 6 | K545 | HDx1 |
| level 6 | K546 | HDx1 |
| level 6 | K547 | HDx1 |
| level 6 | K548 | HDx1 |
| level 6 | K549 | HDx1 |
| level 6 | K550 | HDx1 |
| level 6 | K551 | HDx1 |
| level 6 | K552 | HDx1 |
| level 6 | K553 | HDx1 |
| level 6 | K554 | HDx1 |
| level 6 | K555 | HDx1 |
| level 6 | K556 | HDx1 |
| level 6 | K557 | HDx1 |
| level 6 | K558 | HDx1 |
| level 6 | K559 | HDx1 |
| level 6 | K560 | HDx1 |
| level 6 | K561 | HDx1 |
| level 6 | K562 | HDx1 |
| level 6 | K671 | HDx1 |
| level 6 | K672 | HDx1 |
| level 6 | K673 | HDx1 |
| level 6 | K674 | HDx1 |
| level 6 | K675 | HDx1 |
| level 6 | K676 | HDx1 |
| level 6 | K677 | HDx1 |
| level 6 | K678 | HDx1 |
| level 6 | K679 | HDx1 |
| level 6 | K680 | HDx1 |
| level 6 | K681 | HDx1 |
| level 6 | K682 | HDx1 |
| level 6 | K683 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 6 | K684 | HDx1 |
| level 6 | K685 | HDx1 |
| level 6 | K686 | HDx1 |
| level 6 | K687 | HDx1 |
| level 6 | K688 | HDx1 |
| level 6 | K689 | HDx1 |
| level 6 | K690 | HDx1 |
| level 6 | K691 | HDx1 |
| level 6 | K692 | HDx1 |
| level 6 | K695 | HDx1 |
| level 6 | K696 | HDx1 |
| level 6 | K697 | HDx1 |
| level 6 | K698 | HDx1 |
| level 6 | K800 | HDx1 |
| level 6 | K801 | HDx1 |
| level 6 | K802 | HDx1 |
| level 6 | K803 | HDx1 |
| level 6 | K804 | HDx1 |
| level 6 | K805 | HDx1 |
| level 6 | K806 | HDx1 |
| level 6 | K807 | HDx1 |
| level 6 | K808 | HDx1 |
| level 6 | K809 | HDx1 |
| level 6 | K810 | HDx1 |
| level 6 | K811 | HDx1 |
| level 6 | K812 | HDx1 |
| level 6 | K813 | HDx1 |
| level 6 | K814 | HDx1 |
| level 6 | K815 | HDx1 |
| level 6 | K816 | HDx1 |
| level 6 | K817 | HDx1 |
| level 6 | K818 | HDx1 |
| level 6 | K819 | HDx1 |
| level 6 | K820 | HDx1 |
| level 6 | K821 | HDx1 |
| level 6 | K822 | HDx1 |
| level 6 | K823 | HDx1 |
| level 6 | K900 | HDx1 |
| level 6 | K901 | HDx1 |
| level 6 | K902 | HDx1 |
| level 6 | K903 | HDx1 |
| level 6 | K904 | HDx1 |
| level 6 | K905 | HDx1 |
| level 6 | K906 | HDx1 |
| level 6 | K907 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 6 | K908 | HDx1 |
| level 6 | K909 | HDx1 |
| level 6 | K910 | HDx1 |
| level 6 | K911 | HDx1 |
| level 6 | K912 | HDx1 |
| level 6 | K913 | HDx1 |
| level 6 | K914 | HDx1 |
| level 6 | K915 | HDx1 |
| level 6 | K916 | HDx1 |
| level 6 | K917 | HDx1 |
| level 6 | K918 | HDx1 |
| level 6 | K919 | HDx1 |
| level 6 | K582 | HDx1 |
| level 6 | K583 | HDx1 |
| level 5 | K81 | HDx1 |
| level 5 | K82 | HDx1 |
| level 5 | K83 | HDx1 |
| level 5 | K84 | HDx1 |
| level 5 | K85 | HDx1 |
| level 5 | K86 | HDx1 |
| level 5 | K87 | HDx1 |
| level 5 | K88 | HDx1 |
| level 5 | K89 | HDx1 |
| level 5 | K90 | HDx1 |
| level 5 | K91 | HDx1 |
| level 5 | K92 | HDx1 |
| level 5 | K93 | HDx1 |
| level 5 | K94 | HDx1 |
| level 5 | K95 | HDx1 |
| level 5 | K96 | HDx1 |
| level 5 | K97 | HDx1 |
| level 5 | K98 | HDx1 |
| level 5 | K99 | HDx1 |
| level 5 | K100 | HDx1 |
| level 5 | K101 | HDx1 |
| level 5 | K102 | HDx1 |
| level 5 | K103 | HDx1 |
| level 5 | K104 | HDx1 |
| level 5 | K105 | HDx1 |
| level 5 | K106 | HDx1 |
| level 5 | K107 | HDx1 |
| level 5 | K171 | HDx1 |
| level 5 | K172 | HDx1 |
| level 5 | K173 | HDx1 |
| level 5 | K174 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 5 | K175 | HDx1 |
| level 5 | K176 | HDx1 |
| level 5 | K177 | HDx1 |
| level 5 | K178 | HDx1 |
| level 5 | K179 | HDx1 |
| level 5 | K180 | HDx1 |
| level 5 | K181 | HDx1 |
| level 5 | K182 | HDx1 |
| level 5 | K231 | HDx1 |
| level 5 | K232 | HDx1 |
| level 5 | K233 | HDx1 |
| level 5 | K234 | HDx1 |
| level 5 | K235 | HDx1 |
| level 5 | K236 | HDx1 |
| level 5 | K237 | HDx1 |
| level 5 | K238 | HDx1 |
| level 5 | K239 | HDx1 |
| level 5 | K240 | HDx1 |
| level 5 | K241 | HDx1 |
| level 5 | K242 | HDx1 |
| level 5 | K291 | HDx1 |
| level 5 | K292 | HDx1 |
| level 5 | K293 | HDx1 |
| level 5 | K294 | HDx1 |
| level 5 | K295 | HDx1 |
| level 5 | K296 | HDx1 |
| level 5 | K297 | HDx1 |
| level 5 | K298 | HDx1 |
| level 5 | K299 | HDx1 |
| level 5 | K300 | HDx1 |
| level 5 | K301 | HDx1 |
| level 5 | K302 | HDx1 |
| level 5 | K398 | HDx1 |
| level 5 | K399 | HDx1 |
| level 5 | K400 | HDx1 |
| level 5 | K401 | HDx1 |
| level 5 | K402 | HDx1 |
| level 5 | K403 | HDx1 |
| level 5 | K404 | HDx1 |
| level 5 | K405 | HDx1 |
| level 5 | K406 | HDx1 |
| level 5 | K407 | HDx1 |
| level 5 | K408 | HDx1 |
| level 5 | K409 | HDx1 |
| level 5 | K410 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 5 | K411 | HDx1 |
| level 5 | K412 | HDx1 |
| level 5 | K413 | HDx1 |
| level 5 | K414 | HDx1 |
| level 5 | K415 | HDx1 |
| level 5 | K416 | HDx1 |
| level 5 | K417 | HDx1 |
| level 5 | K418 | HDx1 |
| level 5 | K419 | HDx1 |
| level 5 | K420 | HDx1 |
| level 5 | K421 | HDx1 |
| level 5 | K422 | HDx1 |
| level 5 | K423 | HDx1 |
| level 5 | K424 | HDx1 |
| level 5 | K519 | HDx1 |
| level 5 | K520 | HDx1 |
| level 5 | K521 | HDx1 |
| level 5 | K522 | HDx1 |
| level 5 | K523 | HDx1 |
| level 5 | K524 | HDx1 |
| level 5 | K525 | HDx1 |
| level 5 | K526 | HDx1 |
| level 5 | K527 | HDx1 |
| level 5 | K528 | HDx1 |
| level 5 | K529 | HDx1 |
| level 5 | K530 | HDx1 |
| level 5 | K531 | HDx1 |
| level 5 | K532 | HDx1 |
| level 5 | K533 | HDx1 |
| level 5 | K534 | HDx1 |
| level 5 | K535 | HDx1 |
| level 5 | K536 | HDx1 |
| level 5 | K537 | HDx1 |
| level 5 | K538 | HDx1 |
| level 5 | K539 | HDx1 |
| level 5 | K540 | HDx1 |
| level 5 | K643 | HDx1 |
| level 5 | K644 | HDx1 |
| level 5 | K645 | HDx1 |
| level 5 | K646 | HDx1 |
| level 5 | K647 | HDx1 |
| level 5 | K648 | HDx1 |
| level 5 | K649 | HDx1 |
| level 5 | K650 | HDx1 |
| level 5 | K651 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 5 | K652 | HDx1 |
| level 5 | K653 | HDx1 |
| level 5 | K654 | HDx1 |
| level 5 | K655 | HDx1 |
| level 5 | K656 | HDx1 |
| level 5 | K657 | HDx1 |
| level 5 | K658 | HDx1 |
| level 5 | K659 | HDx1 |
| level 5 | K660 | HDx1 |
| level 5 | K661 | HDx1 |
| level 5 | K662 | HDx1 |
| level 5 | K663 | HDx1 |
| level 5 | K664 | HDx1 |
| level 5 | K667 | HDx1 |
| level 5 | K668 | HDx1 |
| level 5 | K669 | HDx1 |
| level 5 | K670 | HDx1 |
| level 5 | K773 | HDx1 |
| level 5 | K774 | HDx1 |
| level 5 | K775 | HDx1 |
| level 5 | K776 | HDx1 |
| level 5 | K777 | HDx1 |
| level 5 | K778 | HDx1 |
| level 5 | K779 | HDx1 |
| level 5 | K780 | HDx1 |
| level 5 | K781 | HDx1 |
| level 5 | K782 | HDx1 |
| level 5 | K783 | HDx1 |
| level 5 | K784 | HDx1 |
| level 5 | K785 | HDx1 |
| level 5 | K786 | HDx1 |
| level 5 | K787 | HDx1 |
| level 5 | K788 | HDx1 |
| level 5 | K789 | HDx1 |
| level 5 | K790 | HDx1 |
| level 5 | K791 | HDx1 |
| level 5 | K792 | HDx1 |
| level 5 | K793 | HDx1 |
| level 5 | K794 | HDx1 |
| level 5 | K795 | HDx1 |
| level 5 | K799 | HDx1 |
| level 5 | K885 | HDx1 |
| level 5 | K886 | HDx1 |
| level 5 | K887 | HDx1 |
| level 5 | K888 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 5 | K889 | HDx1 |
| level 5 | K890 | HDx1 |
| level 5 | K891 | HDx1 |
| level 5 | K892 | HDx1 |
| level 5 | K893 | HDx1 |
| level 5 | K894 | HDx1 |
| level 5 | K895 | HDx1 |
| level 5 | K896 | HDx1 |
| level 5 | K897 | HDx1 |
| level 5 | K721 | HDx1 |
| level 5 | K722 | HDx1 |
| level 5 | K796 | HDx1 |
| level 5 | K797 | HDx1 |
| level 5 | K798 | HDx1 |
| level 5 | K898 | HDx1 |
| level 5 | K899 | HDx1 |
| level 5 | K610 | HDx1 |
| level 5 | K611 | HDx1 |
| level 4 | K1 | HDx1 |
| level 4 | K2 | HDx1 |
| level 4 | K3 | HDx1 |
| level 4 | K4 | HDx1 |
| level 4 | K31 | HDx1 |
| level 4 | K56 | HDx1 |
| level 4 | K57 | HDx1 |
| level 4 | K58 | HDx1 |
| level 4 | K60 | HDx1 |
| level 4 | K63 | HDx1 |
| level 4 | K64 | HDx1 |
| level 4 | K65 | HDx1 |
| level 4 | K66 | HDx1 |
| level 4 | K67 | HDx1 |
| level 4 | K68 | HDx1 |
| level 4 | K69 | HDx1 |
| level 4 | K70 | HDx1 |
| level 4 | K71 | HDx1 |
| level 4 | K72 | HDx1 |
| level 4 | K73 | HDx1 |
| level 4 | K74 | HDx1 |
| level 4 | K75 | HDx1 |
| level 4 | K76 | HDx1 |
| level 4 | K77 | HDx1 |
| level 4 | K78 | HDx1 |
| level 4 | K79 | HDx1 |
| level 4 | K80 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 4 | K159 | HDx1 |
| level 4 | K160 | HDx1 |
| level 4 | K161 | HDx1 |
| level 4 | K162 | HDx1 |
| level 4 | K163 | HDx1 |
| level 4 | K164 | HDx1 |
| level 4 | K165 | HDx1 |
| level 4 | K166 | HDx1 |
| level 4 | K167 | HDx1 |
| level 4 | K168 | HDx1 |
| level 4 | K169 | HDx1 |
| level 4 | K170 | HDx1 |
| level 4 | K219 | HDx1 |
| level 4 | K220 | HDx1 |
| level 4 | K221 | HDx1 |
| level 4 | K222 | HDx1 |
| level 4 | K223 | HDx1 |
| level 4 | K224 | HDx1 |
| level 4 | K225 | HDx1 |
| level 4 | K226 | HDx1 |
| level 4 | K227 | HDx1 |
| level 4 | K228 | HDx1 |
| level 4 | K229 | HDx1 |
| level 4 | K230 | HDx1 |
| level 4 | K279 | HDx1 |
| level 4 | K280 | HDx1 |
| level 4 | K281 | HDx1 |
| level 4 | K282 | HDx1 |
| level 4 | K283 | HDx1 |
| level 4 | K284 | HDx1 |
| level 4 | K285 | HDx1 |
| level 4 | K286 | HDx1 |
| level 4 | K287 | HDx1 |
| level 4 | K288 | HDx1 |
| level 4 | K289 | HDx1 |
| level 4 | K290 | HDx1 |
| level 4 | K371 | HDx1 |
| level 4 | K372 | HDx1 |
| level 4 | K373 | HDx1 |
| level 4 | K374 | HDx1 |
| level 4 | K375 | HDx1 |
| level 4 | K376 | HDx1 |
| level 4 | K377 | HDx1 |
| level 4 | K378 | HDx1 |
| level 4 | K379 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 4 | K380 | HDx1 |
| level 4 | K381 | HDx1 |
| level 4 | K382 | HDx1 |
| level 4 | K383 | HDx1 |
| level 4 | K384 | HDx1 |
| level 4 | K385 | HDx1 |
| level 4 | K386 | HDx1 |
| level 4 | K387 | HDx1 |
| level 4 | K388 | HDx1 |
| level 4 | K389 | HDx1 |
| level 4 | K390 | HDx1 |
| level 4 | K391 | HDx1 |
| level 4 | K392 | HDx1 |
| level 4 | K393 | HDx1 |
| level 4 | K394 | HDx1 |
| level 4 | K395 | HDx1 |
| level 4 | K396 | HDx1 |
| level 4 | K397 | HDx1 |
| level 4 | K497 | HDx1 |
| level 4 | K498 | HDx1 |
| level 4 | K499 | HDx1 |
| level 4 | K500 | HDx1 |
| level 4 | K501 | HDx1 |
| level 4 | K502 | HDx1 |
| level 4 | K503 | HDx1 |
| level 4 | K504 | HDx1 |
| level 4 | K505 | HDx1 |
| level 4 | K506 | HDx1 |
| level 4 | K507 | HDx1 |
| level 4 | K509 | HDx1 |
| level 4 | K510 | HDx1 |
| level 4 | K511 | HDx1 |
| level 4 | K512 | HDx1 |
| level 4 | K513 | HDx1 |
| level 4 | K514 | HDx1 |
| level 4 | K515 | HDx1 |
| level 4 | K516 | HDx1 |
| level 4 | K517 | HDx1 |
| level 4 | K518 | HDx1 |
| level 4 | K616 | HDx1 |
| level 4 | K617 | HDx1 |
| level 4 | K618 | HDx1 |
| level 4 | K619 | HDx1 |
| level 4 | K620 | HDx1 |
| level 4 | K621 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 4 | K622 | HDx1 |
| level 4 | K623 | HDx1 |
| level 4 | K624 | HDx1 |
| level 4 | K625 | HDx1 |
| level 4 | K626 | HDx1 |
| level 4 | K627 | HDx1 |
| level 4 | K628 | HDx1 |
| level 4 | K629 | HDx1 |
| level 4 | K630 | HDx1 |
| level 4 | K631 | HDx1 |
| level 4 | K632 | HDx1 |
| level 4 | K633 | HDx1 |
| level 4 | K634 | HDx1 |
| level 4 | K635 | HDx1 |
| level 4 | K636 | HDx1 |
| level 4 | K639 | HDx1 |
| level 4 | K640 | HDx1 |
| level 4 | K641 | HDx1 |
| level 4 | K642 | HDx1 |
| level 4 | K749 | HDx1 |
| level 4 | K750 | HDx1 |
| level 4 | K751 | HDx1 |
| level 4 | K752 | HDx1 |
| level 4 | K753 | HDx1 |
| level 4 | K754 | HDx1 |
| level 4 | K755 | HDx1 |
| level 4 | K756 | HDx1 |
| level 4 | K757 | HDx1 |
| level 4 | K758 | HDx1 |
| level 4 | K759 | HDx1 |
| level 4 | K760 | HDx1 |
| level 4 | K761 | HDx1 |
| level 4 | K762 | HDx1 |
| level 4 | K763 | HDx1 |
| level 4 | K764 | HDx1 |
| level 4 | K765 | HDx1 |
| level 4 | K766 | HDx1 |
| level 4 | K767 | HDx1 |
| level 4 | K768 | HDx1 |
| level 4 | K769 | HDx1 |
| level 4 | K770 | HDx1 |
| level 4 | K771 | HDx1 |
| level 4 | K772 | HDx1 |
| level 4 | K865 | HDx1 |
| level 4 | K866 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 4 | K867 | HDx1 |
| level 4 | K868 | HDx1 |
| level 4 | K869 | HDx1 |
| level 4 | K870 | HDx1 |
| level 4 | K871 | HDx1 |
| level 4 | K872 | HDx1 |
| level 4 | K873 | HDx1 |
| level 4 | K874 | HDx1 |
| level 4 | K875 | HDx1 |
| level 4 | K876 | HDx1 |
| level 4 | K877 | HDx1 |
| level 4 | K878 | HDx1 |
| level 4 | K879 | HDx1 |
| level 4 | K880 | HDx1 |
| level 4 | K881 | HDx1 |
| level 4 | K882 | HDx1 |
| level 4 | K883 | HDx1 |
| level 4 | K884 | HDx1 |
| level 4 | K508 | HDx1 |
| level 4 | K637 | HDx1 |
| level 4 | K638 | HDx1 |
| level 3 | K32 | HDx1 |
| level 3 | K33 | HDx1 |
| level 3 | K34 | HDx1 |
| level 3 | K35 | HDx1 |
| level 3 | K36 | HDx1 |
| level 3 | K37 | HDx1 |
| level 3 | K38 | HDx1 |
| level 3 | K39 | HDx1 |
| level 3 | K40 | HDx1 |
| level 3 | K41 | HDx1 |
| level 3 | K42 | HDx1 |
| level 3 | K43 | HDx1 |
| level 3 | K44 | HDx1 |
| level 3 | K45 | HDx1 |
| level 3 | K46 | HDx1 |
| level 3 | K47 | HDx1 |
| level 3 | K48 | HDx1 |
| level 3 | K49 | HDx1 |
| level 3 | K50 | HDx1 |
| level 3 | K51 | HDx1 |
| level 3 | K52 | HDx1 |
| level 3 | K53 | HDx1 |
| level 3 | K54 | HDx1 |
| level 3 | K55 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 3 | K59 | HDx1 |
| level 3 | K61 | HDx1 |
| level 3 | K147 | HDx1 |
| level 3 | K148 | HDx1 |
| level 3 | K149 | HDx1 |
| level 3 | K150 | HDx1 |
| level 3 | K151 | HDx1 |
| level 3 | K152 | HDx1 |
| level 3 | K153 | HDx1 |
| level 3 | K154 | HDx1 |
| level 3 | K155 | HDx1 |
| level 3 | K156 | HDx1 |
| level 3 | K157 | HDx1 |
| level 3 | K158 | HDx1 |
| level 3 | K207 | HDx1 |
| level 3 | K208 | HDx1 |
| level 3 | K209 | HDx1 |
| level 3 | K210 | HDx1 |
| level 3 | K211 | HDx1 |
| level 3 | K212 | HDx1 |
| level 3 | K213 | HDx1 |
| level 3 | K214 | HDx1 |
| level 3 | K215 | HDx1 |
| level 3 | K216 | HDx1 |
| level 3 | K217 | HDx1 |
| level 3 | K218 | HDx1 |
| level 3 | K267 | HDx1 |
| level 3 | K268 | HDx1 |
| level 3 | K269 | HDx1 |
| level 3 | K270 | HDx1 |
| level 3 | K271 | HDx1 |
| level 3 | K272 | HDx1 |
| level 3 | K273 | HDx1 |
| level 3 | K274 | HDx1 |
| level 3 | K275 | HDx1 |
| level 3 | K276 | HDx1 |
| level 3 | K277 | HDx1 |
| level 3 | K278 | HDx1 |
| level 3 | K342 | HDx1 |
| level 3 | K343 | HDx1 |
| level 3 | K344 | HDx1 |
| level 3 | K345 | HDx1 |
| level 3 | K346 | HDx1 |
| level 3 | K347 | HDx1 |
| level 3 | K348 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 3 | K349 | HDx1 |
| level 3 | K352 | HDx1 |
| level 3 | K353 | HDx1 |
| level 3 | K354 | HDx1 |
| level 3 | K355 | HDx1 |
| level 3 | K356 | HDx1 |
| level 3 | K357 | HDx1 |
| level 3 | K358 | HDx1 |
| level 3 | K359 | HDx1 |
| level 3 | K360 | HDx1 |
| level 3 | K361 | HDx1 |
| level 3 | K362 | HDx1 |
| level 3 | K363 | HDx1 |
| level 3 | K364 | HDx1 |
| level 3 | K365 | HDx1 |
| level 3 | K366 | HDx1 |
| level 3 | K367 | HDx1 |
| level 3 | K368 | HDx1 |
| level 3 | K369 | HDx1 |
| level 3 | K370 | HDx1 |
| level 3 | K474 | HDx1 |
| level 3 | K475 | HDx1 |
| level 3 | K476 | HDx1 |
| level 3 | K477 | HDx1 |
| level 3 | K478 | HDx1 |
| level 3 | K479 | HDx1 |
| level 3 | K480 | HDx1 |
| level 3 | K481 | HDx1 |
| level 3 | K482 | HDx1 |
| level 3 | K483 | HDx1 |
| level 3 | K484 | HDx1 |
| level 3 | K485 | HDx1 |
| level 3 | K486 | HDx1 |
| level 3 | K487 | HDx1 |
| level 3 | K488 | HDx1 |
| level 3 | K489 | HDx1 |
| level 3 | K490 | HDx1 |
| level 3 | K492 | HDx1 |
| level 3 | K493 | HDx1 |
| level 3 | K494 | HDx1 |
| level 3 | K495 | HDx1 |
| level 3 | K496 | HDx1 |
| level 3 | K588 | HDx1 |
| level 3 | K589 | HDx1 |
| level 3 | K590 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 3 | K591 | HDx1 |
| level 3 | K592 | HDx1 |
| level 3 | K593 | HDx1 |
| level 3 | K594 | HDx1 |
| level 3 | K595 | HDx1 |
| level 3 | K596 | HDx1 |
| level 3 | K597 | HDx1 |
| level 3 | K598 | HDx1 |
| level 3 | K599 | HDx1 |
| level 3 | K600 | HDx1 |
| level 3 | K601 | HDx1 |
| level 3 | K602 | HDx1 |
| level 3 | K603 | HDx1 |
| level 3 | K604 | HDx1 |
| level 3 | K605 | HDx1 |
| level 3 | K606 | HDx1 |
| level 3 | K607 | HDx1 |
| level 3 | K608 | HDx1 |
| level 3 | K609 | HDx1 |
| level 3 | K612 | HDx1 |
| level 3 | K613 | HDx1 |
| level 3 | K614 | HDx1 |
| level 3 | K615 | HDx1 |
| level 3 | K725 | HDx1 |
| level 3 | K726 | HDx1 |
| level 3 | K727 | HDx1 |
| level 3 | K728 | HDx1 |
| level 3 | K729 | HDx1 |
| level 3 | K730 | HDx1 |
| level 3 | K731 | HDx1 |
| level 3 | K732 | HDx1 |
| level 3 | K733 | HDx1 |
| level 3 | K734 | HDx1 |
| level 3 | K735 | HDx1 |
| level 3 | K736 | HDx1 |
| level 3 | K737 | HDx1 |
| level 3 | K738 | HDx1 |
| level 3 | K739 | HDx1 |
| level 3 | K740 | HDx1 |
| level 3 | K741 | HDx1 |
| level 3 | K742 | HDx1 |
| level 3 | K743 | HDx1 |
| level 3 | K744 | HDx1 |
| level 3 | K745 | HDx1 |
| level 3 | K746 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 3 | K747 | HDx1 |
| level 3 | K748 | HDx1 |
| level 3 | K844 | HDx1 |
| level 3 | K845 | HDx1 |
| level 3 | K846 | HDx1 |
| level 3 | K847 | HDx1 |
| level 3 | K848 | HDx1 |
| level 3 | K849 | HDx1 |
| level 3 | K850 | HDx1 |
| level 3 | K851 | HDx1 |
| level 3 | K852 | HDx1 |
| level 3 | K853 | HDx1 |
| level 3 | K854 | HDx1 |
| level 3 | K855 | HDx1 |
| level 3 | K856 | HDx1 |
| level 3 | K857 | HDx1 |
| level 3 | K858 | HDx1 |
| level 3 | K859 | HDx1 |
| level 3 | K860 | HDx1 |
| level 3 | K861 | HDx1 |
| level 3 | K862 | HDx1 |
| level 3 | K863 | HDx1 |
| level 3 | K864 | HDx1 |
| level 3 | K665 | HDx1 |
| level 3 | K666 | HDx1 |
| level 2 | K5 | HDx1 |
| level 2 | K6 | HDx1 |
| level 2 | K7 | HDx1 |
| level 2 | K8 | HDx1 |
| level 2 | K9 | HDx1 |
| level 2 | K10 | HDx1 |
| level 2 | K11 | HDx1 |
| level 2 | K12 | HDx1 |
| level 2 | K13 | HDx1 |
| level 2 | K14 | HDx1 |
| level 2 | K15 | HDx1 |
| level 2 | K16 | HDx1 |
| level 2 | K17 | HDx1 |
| level 2 | K18 | HDx1 |
| level 2 | K19 | HDx1 |
| level 2 | K20 | HDx1 |
| level 2 | K21 | HDx1 |
| level 2 | K22 | HDx1 |
| level 2 | K23 | HDx1 |
| level 2 | K24 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 2 | K25 | HDx1 |
| level 2 | K26 | HDx1 |
| level 2 | K27 | HDx1 |
| level 2 | K28 | HDx1 |
| level 2 | K29 | HDx1 |
| level 2 | K30 | HDx1 |
| level 2 | K62 | HDx1 |
| level 2 | K135 | HDx1 |
| level 2 | K136 | HDx1 |
| level 2 | K137 | HDx1 |
| level 2 | K138 | HDx1 |
| level 2 | K139 | HDx1 |
| level 2 | K140 | HDx1 |
| level 2 | K141 | HDx1 |
| level 2 | K142 | HDx1 |
| level 2 | K143 | HDx1 |
| level 2 | K144 | HDx1 |
| level 2 | K145 | HDx1 |
| level 2 | K146 | HDx1 |
| level 2 | K195 | HDx1 |
| level 2 | K196 | HDx1 |
| level 2 | K197 | HDx1 |
| level 2 | K198 | HDx1 |
| level 2 | K199 | HDx1 |
| level 2 | K200 | HDx1 |
| level 2 | K201 | HDx1 |
| level 2 | K202 | HDx1 |
| level 2 | K203 | HDx1 |
| level 2 | K204 | HDx1 |
| level 2 | K205 | HDx1 |
| level 2 | K206 | HDx1 |
| level 2 | K255 | HDx1 |
| level 2 | K256 | HDx1 |
| level 2 | K257 | HDx1 |
| level 2 | K258 | HDx1 |
| level 2 | K259 | HDx1 |
| level 2 | K260 | HDx1 |
| level 2 | K261 | HDx1 |
| level 2 | K262 | HDx1 |
| level 2 | K263 | HDx1 |
| level 2 | K264 | HDx1 |
| level 2 | K265 | HDx1 |
| level 2 | K266 | HDx1 |
| level 2 | K315 | HDx1 |
| level 2 | K316 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 2 | K317 | HDx1 |
| level 2 | K318 | HDx1 |
| level 2 | K319 | HDx1 |
| level 2 | K320 | HDx1 |
| level 2 | K321 | HDx1 |
| level 2 | K322 | HDx1 |
| level 2 | K323 | HDx1 |
| level 2 | K324 | HDx1 |
| level 2 | K325 | HDx1 |
| level 2 | K326 | HDx1 |
| level 2 | K327 | HDx1 |
| level 2 | K328 | HDx1 |
| level 2 | K329 | HDx1 |
| level 2 | K330 | HDx1 |
| level 2 | K331 | HDx1 |
| level 2 | K332 | HDx1 |
| level 2 | K333 | HDx1 |
| level 2 | K334 | HDx1 |
| level 2 | K335 | HDx1 |
| level 2 | K336 | HDx1 |
| level 2 | K337 | HDx1 |
| level 2 | K338 | HDx1 |
| level 2 | K339 | HDx1 |
| level 2 | K340 | HDx1 |
| level 2 | K341 | HDx1 |
| level 2 | K452 | HDx1 |
| level 2 | K453 | HDx1 |
| level 2 | K454 | HDx1 |
| level 2 | K455 | HDx1 |
| level 2 | K456 | HDx1 |
| level 2 | K457 | HDx1 |
| level 2 | K458 | HDx1 |
| level 2 | K459 | HDx1 |
| level 2 | K460 | HDx1 |
| level 2 | K461 | HDx1 |
| level 2 | K462 | HDx1 |
| level 2 | K463 | HDx1 |
| level 2 | K464 | HDx1 |
| level 2 | K465 | HDx1 |
| level 2 | K466 | HDx1 |
| level 2 | K467 | HDx1 |
| level 2 | K468 | HDx1 |
| level 2 | K469 | HDx1 |
| level 2 | K470 | HDx1 |
| level 2 | K471 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 2 | K472 | HDx1 |
| level 2 | K473 | HDx1 |
| level 2 | K350 | HDx1 |
| level 2 | K351 | HDx1 |
| level 2 | K491 | HDx1 |
| level 2 | K563 | HDx1 |
| level 2 | K564 | HDx1 |
| level 2 | K565 | HDx1 |
| level 2 | K566 | HDx1 |
| level 2 | K567 | HDx1 |
| level 2 | K568 | HDx1 |
| level 2 | K569 | HDx1 |
| level 2 | K570 | HDx1 |
| level 2 | K571 | HDx1 |
| level 2 | K572 | HDx1 |
| level 2 | K573 | HDx1 |
| level 2 | K574 | HDx1 |
| level 2 | K575 | HDx1 |
| level 2 | K576 | HDx1 |
| level 2 | K577 | HDx1 |
| level 2 | K578 | HDx1 |
| level 2 | K579 | HDx1 |
| level 2 | K580 | HDx1 |
| level 2 | K581 | HDx1 |
| level 2 | K584 | HDx1 |
| level 2 | K585 | HDx1 |
| level 2 | K586 | HDx1 |
| level 2 | K587 | HDx1 |
| level 2 | K699 | HDx1 |
| level 2 | K700 | HDx1 |
| level 2 | K701 | HDx1 |
| level 2 | K702 | HDx1 |
| level 2 | K703 | HDx1 |
| level 2 | K704 | HDx1 |
| level 2 | K705 | HDx1 |
| level 2 | K706 | HDx1 |
| level 2 | K707 | HDx1 |
| level 2 | K708 | HDx1 |
| level 2 | K709 | HDx1 |
| level 2 | K710 | HDx1 |
| level 2 | K711 | HDx1 |
| level 2 | K712 | HDx1 |
| level 2 | K713 | HDx1 |
| level 2 | K714 | HDx1 |
| level 2 | K715 | HDx1 |

**Table 3.4 - Link Assignments - Summary (continued)**

| Story | Unique Name | Property |
|---|---|---|
| level 2 | K716 | HDx1 |
| level 2 | K717 | HDx1 |
| level 2 | K718 | HDx1 |
| level 2 | K719 | HDx1 |
| level 2 | K720 | HDx1 |
| level 2 | K723 | HDx1 |
| level 2 | K724 | HDx1 |
| level 2 | K824 | HDx1 |
| level 2 | K825 | HDx1 |
| level 2 | K826 | HDx1 |
| level 2 | K827 | HDx1 |
| level 2 | K828 | HDx1 |
| level 2 | K829 | HDx1 |
| level 2 | K830 | HDx1 |
| level 2 | K831 | HDx1 |
| level 2 | K832 | HDx1 |
| level 2 | K833 | HDx1 |
| level 2 | K834 | HDx1 |
| level 2 | K835 | HDx1 |
| level 2 | K836 | HDx1 |
| level 2 | K837 | HDx1 |
| level 2 | K838 | HDx1 |
| level 2 | K839 | HDx1 |
| level 2 | K840 | HDx1 |
| level 2 | K841 | HDx1 |
| level 2 | K842 | HDx1 |
| level 2 | K843 | HDx1 |
| level 2 | K693 | HDx1 |
| level 2 | K694 | HDx1 |

# 4 Loads

This chapter provides loading information as applied to the model.

## 4.1 Load Patterns

**Table 4.1 - Load Patterns**

| Name | Type | Self Weight Multiplier | Auto Load |
|---|---|---|---|
| Q | Live | 0 | |
| G | Dead | 1 | |
| Eu | Seismic | 0 | NZS 1170 2004 |
| Wux | Wind | 0 | AS/NZS 1170.2:2011 |
| Wuy | Wind | 0 | AS/NZS 1170.2:2011 |
| $Eu_{ne}$ | Seismic | 0 | NZS 1170 2004 |
| $Eu_{PO}$ | Seismic | 0 | NZS 1170 2004 |
| $Eu_{PO}$ | Seismic | 0 | NZS 1170 2004 |

## 4.2 Auto Wind Loading

**Table 4.2 - Auto Wind - AS/NZS 1170.2:2011 (Part 1 of 2)**

| Load Pattern | Loading Method | Exposure Width Type | Angle deg | e | Cp,wind | Cp,lee | Ka | Kc | Kl | Kp | Top Story |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Wux | Diaphragms | From Diaphragms | 0 | 0 | 0.7 | 0.5 | 0.8 | 0.9 | 1 | 1 | level 6 |
| Wuy | Diaphragms | From Diaphragms | 90 | 0 | 0.7 | 0.5 | 0.8 | 0.9 | 1 | 1 | level 6 |

**Table 4.2 - Auto Wind - AS/NZS 1170.2:2011 (Part 2 of 2)**

| Bottom Story | Include Parapet | Vr meter/sec | Terrain Category | Md | Ms | Mt | Cdyn |
|---|---|---|---|---|---|---|---|
| Base | No | 45 | 3 | 1 | 1 | 1 | 1 |
| Base | No | 45 | 3 | 1 | 1 | 1 | 1 |

## 4.3 Auto Seismic Loading

**Table 4.3 - Auto Seismic - NZS 1170:2004 (Part 1 of 2)**

| Load Pattern | Type | Direction | Eccentricity % | Ecc. Overridden | Period Method | Top Story | Bottom Story | Site Class | Z |
|---|---|---|---|---|---|---|---|---|---|
| Eu | Seismic | X | | No | Program Calculated | level 6 | Base | C | 0.14 |
| Eu | Seismic | Y | | No | Program Calculated | level 6 | Base | C | 0.14 |
| Eu | Seismic | X + Ecc. Y | 10 | No | Program Calculated | level 6 | Base | C | 0.14 |
| Eu | Seismic | Y + Ecc. X | 10 | No | Program Calculated | level 6 | Base | C | 0.14 |
| Eu | Seismic | X - Ecc. Y | 10 | No | Program Calculated | level 6 | Base | C | 0.14 |
| Eu | Seismic | Y - Ecc. X | 10 | No | Program Calculated | level 6 | Base | C | 0.14 |
| $Eu_{ne}$ | Seismic | X | | No | Program Calculated | level 6 | Base | C | 0.14 |
| $Eu_{ne}$ | Seismic | Y | | No | Program Calculated | level 6 | Base | C | 0.14 |
| $Eu_{ne}$ | Seismic | X + Ecc. Y | 10 | No | Program Calculated | level 6 | Base | C | 0.14 |
| $Eu_{ne}$ | Seismic | Y + Ecc. X | 10 | No | Program Calculated | level 6 | Base | C | 0.14 |
| $Eu_{ne}$ | Seismic | X - Ecc. Y | 10 | No | Program Calculated | level 6 | Base | C | 0.14 |
| $Eu_{ne}$ | Seismic | Y - Ecc. X | 10 | No | Program Calculated | level 6 | Base | C | 0.14 |

**Table 4.3 - Auto Seismic - NZS 1170:2004 (Part 1 of 2, continued)**

| Load Pattern | Type | Direction | Eccentricity % | Ecc. Overridden | Period Method | Top Story | Bottom Story | Site Class | Z |
|---|---|---|---|---|---|---|---|---|---|
| $Eu_{PO}$ | Seismic | X | | No | Program Calculated | level 6 | Base | C | 0.14 |
| $Eu_{PO}$ | Seismic | Y | | No | Program Calculated | level 6 | Base | C | 0.14 |

**Table 4.3 - Auto Seismic - NZS 1170:2004 (Part 2 of 2)**

| R | D km | Sp | μ | Period Used sec | Coeff Used | Weight Used kN | Base Shear kN | Ft Used kN |
|---|---|---|---|---|---|---|---|---|
| 1 | 20 | 0.7 | 2 | 1.694 | 0.038192 | 3009.0275 | 114.9197 | 9.1936 |
| 1 | 20 | 0.7 | 2 | 1.83 | 0.035337 | 3009.0275 | 106.3287 | 8.5063 |
| 1 | 20 | 0.7 | 2 | 1.694 | 0.038192 | 3009.0275 | 114.9197 | 9.1936 |
| 1 | 20 | 0.7 | 2 | 1.83 | 0.035337 | 3009.0275 | 106.3287 | 8.5063 |
| 1 | 20 | 0.7 | 2 | 1.694 | 0.038192 | 3009.0275 | 114.9197 | 9.1936 |
| 1 | 20 | 0.7 | 2 | 1.83 | 0.035337 | 3009.0275 | 106.3287 | 8.5063 |
| 1 | 20 | 0.7 | 1.25 | 1.694 | 0.061107 | 3009.0275 | 183.8715 | 14.7097 |
| 1 | 20 | 0.7 | 1.25 | 1.83 | 0.056538 | 3009.0275 | 170.1259 | 13.6101 |
| 1 | 20 | 0.7 | 1.25 | 1.694 | 0.061107 | 3009.0275 | 183.8715 | 14.7097 |
| 1 | 20 | 0.7 | 1.25 | 1.83 | 0.056538 | 3009.0275 | 170.1259 | 13.6101 |
| 1 | 20 | 0.7 | 1.25 | 1.694 | 0.061107 | 3009.0275 | 183.8715 | 14.7097 |
| 1 | 20 | 0.7 | 1.25 | 1.83 | 0.056538 | 3009.0275 | 170.1259 | 13.6101 |
| 1 | 20 | 0.7 | 2 | 1.694 | 0.038192 | 3009.0275 | 114.9197 | 9.1936 |
| 1 | 20 | 0.7 | 2 | 1.83 | 0.035337 | 3009.0275 | 106.3287 | 8.5063 |

# 5 Analysis Results

This chapter provides analysis results.

## 5.1 Structure Results

**Table 5.1 - Centers of Mass and Rigidity**

| Story | Diaphragm | Mass X kg | Mass Y kg | XCM m | YCM m | Cumulative X kg | Cumulative Y kg | XCCM m | YCCM m | XCR m | YCR m |
|---|---|---|---|---|---|---|---|---|---|---|---|
| level 1 | I-1 | 0 | 0 | 1.9543 | 7.8976 | 0 | 0 | 0 | 0 | | |
| level 2 | I-2 | 0 | 0 | 1.9544 | 7.8929 | 0 | 0 | 0 | 0 | | |
| level 3 | I-3 | 0 | 0 | 1.9544 | 7.8908 | 0 | 0 | 0 | 0 | | |
| level 4 | I-4 | 0 | 0 | 1.955 | 7.8833 | 0 | 0 | 0 | 0 | | |
| level 5 | I-5 | 0 | 0 | 1.9546 | 7.8858 | 0 | 0 | 0 | 0 | | |
| level 6 | I-6 | 0 | 0 | 1.9549 | 7.8795 | 0 | 0 | 0 | 0 | | |

**Table 5.2 - Diaphragm Center of Mass Displacements**

| Story | Diaphragm | Load Case/Combo | UX mm | UY mm | RZ rad | Point | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|---|---|
| level 6 | I-6 | $LS_G$ | -0.104 | -0.045 | -3E-06 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_Q$ | -0.104 | -1.494 | -7E-06 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{Eu}$ 1 | 51.9 | 0.219 | -0.000118 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{Eu}$ 2 | 0.208 | 55.613 | 1E-06 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{Eu}$ 3 | 52.08 | 0.217 | -0.000699 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{Eu}$ 4 | 0.009 | 55.615 | 0.000641 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{Eu}$ 5 | 51.72 | 0.221 | 0.000462 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{Eu}$ 6 | 0.406 | 55.611 | -0.000639 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{Wux}$ | 72.12 | 0.288 | -0.000335 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{Wuy}$ | 0.413 | 100.837 | -0.000175 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $NL_{Eu}$ Max | 51.128 | 56.602 | 0.00065 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $NL_{Eu}$ Min | -0.03 | -0.389 | -0.000674 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $NL_{Eu}$ Max | 83.035 | 92.477 | 0.001066 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $NL_{Eu}$ Min | 0.04 | -0.233 | -0.001123 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | -0.098 | -0.571 | -5E-06 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | -0.098 | -0.571 | -5E-06 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | -0.232 | -2.283 | -1.4E-05 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | -0.232 | -2.283 | -1.4E-05 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $PO_{Eux}$ Max | 117.702 | 0.013 | -5E-06 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $PO_{Eux}$ Min | -0.098 | -0.571 | -0.00028 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $PO_{Euy}$ Max | 0.392 | 119.481 | -2E-06 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $PO_{Euy}$ Min | -0.098 | -0.571 | -6E-06 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | $LS_{1.2G+1.5Q}$ | -0.281 | -2.296 | -1.5E-05 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | ULS Max | 71.994 | 100.783 | 0.00065 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | ULS Min | -0.281 | -2.296 | -0.000674 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | 1.2G+Wx | 71.994 | 0.234 | -0.00034 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 6 | I-6 | 1.2G+Wy | 0.288 | 100.783 | -0.000179 | 7 | 1.9549 | 7.8795 | 19.225 |
| level 5 | I-5 | $LS_G$ | -0.081 | -0.047 | -2E-06 | 8 | 1.9546 | 7.8858 | 16.02 |

**Table 5.2 - Diaphragm Center of Mass Displacements (continued)**

| Story | Diaphragm | Load Case/Combo | UX mm | UY mm | RZ rad | Point | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|---|---|
| level 5 | I-5 | $LS_{Q}$ | -0.086 | -1.286 | -5E-06 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{Eu}$ 1 | 41.629 | 0.171 | -9E-05 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{Eu}$ 2 | 0.157 | 44.908 | 1E-06 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{Eu}$ 3 | 41.772 | 0.17 | -0.000547 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{Eu}$ 4 | -0.001 | 44.909 | 0.000505 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{Eu}$ 5 | 41.486 | 0.172 | 0.000367 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{Eu}$ 6 | 0.315 | 44.907 | -0.000503 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{Wux}$ | 59.418 | 0.23 | -0.000281 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{Wuy}$ | 0.32 | 83.441 | -0.000143 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $NL_{Eu}$ Max | 41.149 | 45.81 | 0.000513 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $NL_{Eu}$ Min | -0.038 | -0.347 | -0.000528 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $NL_{Eu}$ Max | 66.847 | 74.804 | 0.00084 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $NL_{Eu}$ Min | 0.01 | -0.225 | -0.000882 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | -0.082 | -0.49 | -4E-06 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | -0.082 | -0.49 | -4E-06 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | -0.197 | -1.942 | -1E-05 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | -0.197 | -1.942 | -1E-05 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $PO_{Eux}$ Max | 94.754 | -0.037 | -4E-06 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $PO_{Eux}$ Min | -0.082 | -0.49 | -0.000213 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $PO_{Euy}$ Max | 0.29 | 96.619 | -1E-06 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $PO_{Euy}$ Min | -0.082 | -0.49 | -4E-06 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | $LS_{1.2G+1.5Q}$ | -0.227 | -1.986 | -1.1E-05 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | ULS Max | 59.321 | 83.385 | 0.000513 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | ULS Min | -0.227 | -1.986 | -0.000528 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | 1.2G+Wx | 59.321 | 0.174 | -0.000284 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 5 | I-5 | 1.2G+Wy | 0.223 | 83.385 | -0.000146 | 8 | 1.9546 | 7.8858 | 16.02 |
| level 4 | I-4 | $LS_{G}$ | -0.054 | -0.043 | -2E-06 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Q}$ | -0.057 | -1.083 | -3E-06 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Eu}$ 1 | 31.293 | 0.122 | -6.2E-05 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Eu}$ 2 | 0.11 | 34.102 | 3.665E-07 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Eu}$ 3 | 31.394 | 0.122 | -0.000394 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Eu}$ 4 | -0.003 | 34.103 | 0.000367 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Eu}$ 5 | 31.191 | 0.123 | 0.00027 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Eu}$ 6 | 0.222 | 34.101 | -0.000366 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Wux}$ | 45.983 | 0.155 | -0.000197 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{Wuy}$ | 0.228 | 64.949 | -0.000109 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $NL_{Eu}$ Max | 31.105 | 34.897 | 0.000374 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $NL_{Eu}$ Min | -0.031 | -0.303 | -0.000382 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $NL_{Eu}$ Max | 50.538 | 56.924 | 0.000611 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $NL_{Eu}$ Min | 0.001 | -0.217 | -0.000639 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | -0.058 | -0.405 | -3E-06 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | -0.058 | -0.405 | -3E-06 | 9 | 1.955 | 7.8833 | 12.815 |

**Table 5.2 - Diaphragm Center of Mass Displacements (continued)**

| Story | Diaphragm | Load Case/Combo | UX mm | UY mm | RZ rad | Point | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|---|---|
| level 4 | I-4 | $NL_{GRAVITY}$(1.2G+1.5Q) Max | -0.14 | -1.599 | -6E-06 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $NL_{GRAVITY}$(1.2G+1.5Q) Min | -0.14 | -1.599 | -6E-06 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $PO_{Eux}$ Max | 71.619 | -0.082 | -3E-06 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $PO_{Eux}$ Min | -0.058 | -0.405 | -0.000147 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $PO_{Euy}$ Max | 0.203 | 73.484 | -4.865E-07 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $PO_{Euy}$ Min | -0.058 | -0.405 | -3E-06 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | $LS_{1.2G+1.5Q}$ | -0.15 | -1.677 | -7E-06 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | ULS Max | 45.919 | 64.896 | 0.000374 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | ULS Min | -0.15 | -1.677 | -0.000382 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | 1.2G+Wx | 45.919 | 0.103 | -0.000199 | 9 | 1.955 | 7.8833 | 12.815 |
| level 4 | I-4 | 1.2G+Wy | 0.163 | 64.896 | -0.00011 | 9 | 1.955 | 7.8833 | 12.815 |
| level 3 | I-3 | $LS_G$ | -0.029 | -0.027 | -1E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_Q$ | -0.027 | -0.883 | -2E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{Eu}$ 1 | 21.411 | 0.078 | -3.7E-05 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{Eu}$ 2 | 0.067 | 23.695 | 4.165E-08 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{Eu}$ 3 | 21.474 | 0.078 | -0.00025 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{Eu}$ 4 | -0.003 | 23.695 | 0.000235 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{Eu}$ 5 | 21.347 | 0.078 | 0.000176 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{Eu}$ 6 | 0.137 | 23.695 | -0.000235 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{Wux}$ | 32.445 | 0.109 | -0.000144 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{Wuy}$ | 0.143 | 46.421 | -7.4E-05 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $NL_{Eu}$ Max | 21.483 | 24.351 | 0.00024 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $NL_{Eu}$ Min | -0.022 | -0.249 | -0.000244 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $NL_{Eu}$ Max | 34.886 | 39.637 | 0.000391 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $NL_{Eu}$ Min | -0.004 | -0.196 | -0.000408 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | -0.034 | -0.316 | -1E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | -0.034 | -0.316 | -1E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $NL_{GRAVITY}$(1.2G+1.5Q) Max | -0.083 | -1.254 | -3E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $NL_{GRAVITY}$(1.2G+1.5Q) Min | -0.083 | -1.254 | -3E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $PO_{Eux}$ Max | 49.369 | -0.112 | -1E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $PO_{Eux}$ Min | -0.034 | -0.316 | -8.8E-05 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $PO_{Euy}$ Max | 0.127 | 51.113 | -3.858E-07 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $PO_{Euy}$ Min | -0.034 | -0.316 | -1E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | $LS_{1.2G+1.5Q}$ | -0.075 | -1.357 | -3E-06 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | ULS Max | 32.411 | 46.388 | 0.00024 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | ULS Min | -0.075 | -1.357 | -0.000244 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | 1.2G+Wx | 32.411 | 0.077 | -0.000144 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 3 | I-3 | 1.2G+Wy | 0.108 | 46.388 | -7.5E-05 | 11 | 1.9544 | 7.8908 | 9.61 |
| level 2 | I-2 | $LS_G$ | -0.016 | -0.024 | -2.26E-07 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_Q$ | -0.017 | -0.652 | -4.417E-07 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_{Eu}$ 1 | 12.271 | 0.038 | -1.6E-05 | 13 | 1.9544 | 7.8929 | 6.405 |

**Table 5.2 - Diaphragm Center of Mass Displacements (continued)**

| Story | Diaphragm | Load Case/Combo | UX mm | UY mm | RZ rad | Point | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|---|---|
| level 2 | I-2 | $LS_{Eu}$ 2 | 0.031 | 13.938 | -1.707E-07 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_{Eu}$ 3 | 12.301 | 0.038 | -0.000124 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_{Eu}$ 4 | -0.002 | 13.938 | 0.000118 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_{Eu}$ 5 | 12.242 | 0.038 | 9.1E-05 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_{Eu}$ 6 | 0.063 | 13.938 | -0.000119 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_{Wux}$ | 19.2 | 0.057 | -8.1E-05 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_{Wuy}$ | 0.067 | 28.094 | -4E-05 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $NL_{Eu}$ Max | 12.513 | 14.358 | 0.000121 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $NL_{Eu}$ Min | -0.022 | -0.199 | -0.000123 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $NL_{Eu}$ Max | 20.249 | 23.28 | 0.000195 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $NL_{Eu}$ Min | -0.015 | -0.178 | -0.000203 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | -0.022 | -0.233 | -3.689E-07 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | -0.022 | -0.233 | -3.689E-07 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | -0.053 | -0.906 | -1E-06 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | -0.053 | -0.906 | -1E-06 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $PO_{Eux}$ Max | 28.52 | -0.131 | -3.689E-07 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $PO_{Eux}$ Min | -0.022 | -0.233 | -3.9E-05 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $PO_{Euy}$ Max | 0.054 | 29.967 | -3.689E-07 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $PO_{Euy}$ Min | -0.022 | -0.233 | -1E-06 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | $LS_{1.2G+1.5Q}$ | -0.045 | -1.007 | -1E-06 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | ULS Max | 19.18 | 28.065 | 0.000121 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | ULS Min | -0.045 | -1.007 | -0.000123 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | 1.2G+Wx | 19.18 | 0.029 | -8.1E-05 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 2 | I-2 | 1.2G+Wy | 0.048 | 28.065 | -4E-05 | 13 | 1.9544 | 7.8929 | 6.405 |
| level 1 | I-1 | $LS_G$ | -0.009 | -0.047 | 5.253E-08 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_Q$ | -0.011 | -0.423 | 1.542E-07 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{Eu}$ 1 | 4.809 | 0.012 | -4E-06 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{Eu}$ 2 | 0.007 | 5.729 | -2.541E-07 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{Eu}$ 3 | 4.815 | 0.012 | -3.4E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{Eu}$ 4 | 4.457E-05 | 5.729 | 3.3E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{Eu}$ 5 | 4.803 | 0.012 | 2.7E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{Eu}$ 6 | 0.014 | 5.729 | -3.4E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{Wux}$ | 7.748 | 0.021 | -3.5E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{Wuy}$ | 0.016 | 11.859 | -1.2E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $NL_{Eu}$ Max | 5.061 | 5.834 | 3.3E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $NL_{Eu}$ Min | -0.017 | -0.166 | -3.5E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $NL_{Eu}$ Max | 8.071 | 9.422 | 5.3E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $NL_{Eu}$ Min | -0.022 | -0.164 | -5.5E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | -0.013 | -0.178 | 7.261E-08 | 15 | 1.9543 | 7.8976 | 3.2 |

**Table 5.2 - Diaphragm Center of Mass Displacements (continued)**

| Story | Diaphragm | Load Case/Combo | UX mm | UY mm | RZ rad | Point | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|---|---|
| level 1 | I-1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | -0.013 | -0.178 | 7.261E-08 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | -0.031 | -0.608 | 2.085E-07 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | -0.031 | -0.608 | 2.085E-07 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $PO_{Eux}$ Max | 11.232 | -0.14 | 7.261E-08 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $PO_{Eux}$ Min | -0.013 | -0.178 | -8E-06 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $PO_{Euy}$ Max | 0.007 | 12.091 | 7.261E-08 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $PO_{Euy}$ Min | -0.013 | -0.178 | -4.684E-07 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | $LS_{1.2G+1.5Q}$ | -0.028 | -0.691 | 2.944E-07 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | ULS Max | 7.738 | 11.802 | 3.3E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | ULS Min | -0.028 | -0.691 | -3.5E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | 1.2G+Wx | 7.738 | -0.036 | -3.5E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| level 1 | I-1 | 1.2G+Wy | 0.006 | 11.802 | -1.2E-05 | 15 | 1.9543 | 7.8976 | 3.2 |
| Base | base | $LS_G$ | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_Q$ | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{Eu}$ 1 | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{Eu}$ 2 | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{Eu}$ 3 | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{Eu}$ 4 | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{Eu}$ 5 | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{Eu}$ 6 | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{Wux}$ | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{Wuy}$ | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $NL_{Eu}$ Max | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $NL_{Eu}$ Min | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $NL_{Eu}$ Max | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $NL_{Eu}$ Min | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $PO_{Eux}$ Max | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $PO_{Eux}$ Min | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $PO_{Euy}$ Max | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $PO_{Euy}$ Min | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | $LS_{1.2G+1.5Q}$ | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | ULS Max | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | ULS Min | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | 1.2G+Wx | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |
| Base | base | 1.2G+Wy | 0 | 0 | 0 | 17 | 1.9549 | 7.9315 | 0 |

## 5.2 Story Results

**Table 5.3 - Story Max/Avg Displacements**

| Story | Load Case/Combo | Direction | Maximum mm | Average mm | Ratio |
|---|---|---|---|---|---|
| level 6 | $LS_G$ | X | 0.139 | 0.105 | 1.32 |
| level 6 | $LS_G$ | Y | 0.082 | 0.043 | 1.908 |
| level 5 | $LS_G$ | X | 0.102 | 0.081 | 1.265 |
| level 5 | $LS_G$ | Y | 0.071 | 0.044 | 1.589 |
| level 4 | $LS_G$ | X | 0.068 | 0.053 | 1.278 |
| level 4 | $LS_G$ | Y | 0.06 | 0.043 | 1.406 |
| level 3 | $LS_G$ | X | 0.037 | 0.028 | 1.313 |
| level 3 | $LS_G$ | Y | 0.032 | 0.02 | 1.6 |
| level 2 | $LS_G$ | X | 0.021 | 0.015 | 1.422 |
| level 2 | $LS_G$ | Y | 0.024 | 0.011 | 2.227 |
| level 1 | $LS_G$ | X | 0.036 | 0.009 | 4.252 |
| level 1 | $LS_G$ | Y | 0.047 | 0.01 | 4.849 |
| level 6 | $LS_Q$ | Y | 1.572 | 1.484 | 1.06 |
| level 5 | $LS_Q$ | Y | 1.335 | 1.277 | 1.045 |
| level 4 | $LS_Q$ | Y | 1.121 | 1.084 | 1.035 |
| level 3 | $LS_Q$ | Y | 0.9 | 0.878 | 1.024 |
| level 2 | $LS_Q$ | Y | 0.653 | 0.624 | 1.046 |
| level 1 | $LS_Q$ | Y | 0.423 | 0.338 | 1.251 |
| level 6 | $LS_{Eu}$ 1 | X | 52.848 | 51.907 | 1.018 |
| level 5 | $LS_{Eu}$ 1 | X | 42.346 | 41.633 | 1.017 |
| level 4 | $LS_{Eu}$ 1 | X | 31.792 | 31.297 | 1.016 |
| level 3 | $LS_{Eu}$ 1 | X | 21.706 | 21.411 | 1.014 |
| level 2 | $LS_{Eu}$ 1 | X | 12.401 | 12.271 | 1.011 |
| level 1 | $LS_{Eu}$ 1 | X | 4.824 | 4.799 | 1.005 |
| level 6 | $LS_{Eu}$ 2 | Y | 55.615 | 55.604 | 1 |
| level 5 | $LS_{Eu}$ 2 | Y | 44.909 | 44.901 | 1 |
| level 4 | $LS_{Eu}$ 2 | Y | 34.103 | 34.098 | 1 |
| level 3 | $LS_{Eu}$ 2 | Y | 23.696 | 23.69 | 1 |
| level 2 | $LS_{Eu}$ 2 | Y | 13.938 | 13.935 | 1 |
| level 1 | $LS_{Eu}$ 2 | Y | 5.743 | 5.73 | 1.002 |
| level 6 | $LS_{Eu}$ 3 | X | 57.669 | 52.118 | 1.107 |
| level 5 | $LS_{Eu}$ 3 | X | 46.14 | 41.798 | 1.104 |
| level 4 | $LS_{Eu}$ 3 | X | 34.542 | 31.415 | 1.1 |
| level 3 | $LS_{Eu}$ 3 | X | 23.473 | 21.484 | 1.093 |
| level 2 | $LS_{Eu}$ 3 | X | 13.288 | 12.305 | 1.08 |
| level 1 | $LS_{Eu}$ 3 | X | 5.068 | 4.805 | 1.055 |
| level 6 | $LS_{Eu}$ 4 | Y | 61.68 | 55.606 | 1.109 |
| level 5 | $LS_{Eu}$ 4 | Y | 49.682 | 44.901 | 1.106 |
| level 4 | $LS_{Eu}$ 4 | Y | 37.565 | 34.098 | 1.102 |
| level 3 | $LS_{Eu}$ 4 | Y | 25.917 | 23.688 | 1.094 |
| level 2 | $LS_{Eu}$ 4 | Y | 15.057 | 13.933 | 1.081 |
| level 1 | $LS_{Eu}$ 4 | Y | 6.048 | 5.726 | 1.056 |
| level 6 | $LS_{Eu}$ 5 | X | 55.368 | 51.697 | 1.071 |
| level 5 | $LS_{Eu}$ 5 | X | 44.387 | 41.469 | 1.07 |

**Table 5.3 - Story Max/Avg Displacements (continued)**

| Story | Load Case/Combo | Direction | Maximum mm | Average mm | Ratio |
|---|---|---|---|---|---|
| level 4 | $LS_{Eu}$ 5 | X | 33.321 | 31.18 | 1.069 |
| level 3 | $LS_{Eu}$ 5 | X | 22.741 | 21.339 | 1.066 |
| level 2 | $LS_{Eu}$ 5 | X | 12.964 | 12.238 | 1.059 |
| level 1 | $LS_{Eu}$ 5 | X | 5.013 | 4.793 | 1.046 |
| level 6 | $LS_{Eu}$ 6 | Y | 61.659 | 55.603 | 1.109 |
| level 5 | $LS_{Eu}$ 6 | Y | 49.668 | 44.899 | 1.106 |
| level 4 | $LS_{Eu}$ 6 | Y | 37.557 | 34.096 | 1.101 |
| level 3 | $LS_{Eu}$ 6 | Y | 25.916 | 23.687 | 1.094 |
| level 2 | $LS_{Eu}$ 6 | Y | 15.059 | 13.934 | 1.081 |
| level 1 | $LS_{Eu}$ 6 | Y | 6.052 | 5.726 | 1.057 |
| level 6 | $LS_{Wux}$ | X | 74.717 | 72.13 | 1.036 |
| level 5 | $LS_{Wux}$ | X | 61.496 | 59.413 | 1.035 |
| level 4 | $LS_{Wux}$ | X | 47.544 | 46.002 | 1.034 |
| level 3 | $LS_{Wux}$ | X | 33.439 | 32.432 | 1.031 |
| level 2 | $LS_{Wux}$ | X | 19.695 | 19.184 | 1.027 |
| level 1 | $LS_{Wux}$ | X | 7.881 | 7.726 | 1.02 |
| level 6 | $LS_{Wuy}$ | Y | 102.446 | 100.778 | 1.017 |
| level 5 | $LS_{Wuy}$ | Y | 84.704 | 83.319 | 1.017 |
| level 4 | $LS_{Wuy}$ | Y | 65.964 | 64.926 | 1.016 |
| level 3 | $LS_{Wuy}$ | Y | 47.028 | 46.304 | 1.016 |
| level 2 | $LS_{Wuy}$ | Y | 28.375 | 27.973 | 1.014 |
| level 1 | $LS_{Wuy}$ | Y | 11.921 | 11.768 | 1.013 |
| level 6 | $NL_{Eu}$ Max | X | 56.527 | 53.781 | 1.051 |
| level 6 | $NL_{Eu}$ Max | Y | 62.852 | 59.727 | 1.052 |
| level 5 | $NL_{Eu}$ Max | X | 45.372 | 43.227 | 1.05 |
| level 5 | $NL_{Eu}$ Max | Y | 50.729 | 48.269 | 1.051 |
| level 4 | $NL_{Eu}$ Max | X | 34.16 | 32.692 | 1.045 |
| level 4 | $NL_{Eu}$ Max | Y | 38.468 | 36.682 | 1.049 |
| level 3 | $NL_{Eu}$ Max | X | 23.436 | 22.45 | 1.044 |
| level 3 | $NL_{Eu}$ Max | Y | 26.65 | 25.5 | 1.045 |
| level 2 | $NL_{Eu}$ Max | X | 13.497 | 13.001 | 1.038 |
| level 2 | $NL_{Eu}$ Max | Y | 15.533 | 14.946 | 1.039 |
| level 1 | $NL_{Eu}$ Max | X | 5.359 | 5.207 | 1.029 |
| level 1 | $NL_{Eu}$ Max | Y | 6.24 | 6.037 | 1.034 |
| level 6 | $NL_{Eu}$ Min | X | 5.231 | 2.643 | 1.979 |
| level 6 | $NL_{Eu}$ Min | Y | 6.778 | 3.577 | 1.895 |
| level 5 | $NL_{Eu}$ Min | X | 4.14 | 2.1 | 1.971 |
| level 5 | $NL_{Eu}$ Min | Y | 5.349 | 2.844 | 1.881 |
| level 4 | $NL_{Eu}$ Min | X | 3.016 | 1.66 | 1.817 |
| level 4 | $NL_{Eu}$ Min | Y | 3.921 | 2.112 | 1.857 |
| level 3 | $NL_{Eu}$ Min | X | 1.947 | 0.989 | 1.968 |
| level 3 | $NL_{Eu}$ Min | Y | 2.562 | 1.401 | 1.829 |
| level 2 | $NL_{Eu}$ Min | X | 0.996 | 0.51 | 1.954 |
| level 2 | $NL_{Eu}$ Min | Y | 1.353 | 0.76 | 1.78 |
| level 1 | $NL_{Eu}$ Min | X | 0.346 | 0.173 | 1.997 |

**Table 5.3 - Story Max/Avg Displacements (continued)**

| Story | Load Case/Combo | Direction | Maximum mm | Average mm | Ratio |
|---|---|---|---|---|---|
| level 1 | $NL_{Eu}$ Min | Y | 0.464 | 0.258 | 1.798 |
| level 6 | $NL_{Eu}$ Max | X | 92.03 | 87.448 | 1.052 |
| level 6 | $NL_{Eu}$ Max | Y | 102.608 | 97.542 | 1.052 |
| level 5 | $NL_{Eu}$ Max | X | 73.892 | 70.306 | 1.051 |
| level 5 | $NL_{Eu}$ Max | Y | 82.777 | 78.79 | 1.051 |
| level 4 | $NL_{Eu}$ Max | X | 55.639 | 53.18 | 1.046 |
| level 4 | $NL_{Eu}$ Max | Y | 62.704 | 59.813 | 1.048 |
| level 3 | $NL_{Eu}$ Max | X | 38.148 | 36.496 | 1.045 |
| level 3 | $NL_{Eu}$ Max | Y | 43.347 | 41.492 | 1.045 |
| level 2 | $NL_{Eu}$ Max | X | 21.878 | 21.058 | 1.039 |
| level 2 | $NL_{Eu}$ Max | Y | 25.159 | 24.22 | 1.039 |
| level 1 | $NL_{Eu}$ Max | X | 8.511 | 8.288 | 1.027 |
| level 1 | $NL_{Eu}$ Max | Y | 10.023 | 9.722 | 1.031 |
| level 6 | $NL_{Eu}$ Min | X | 8.488 | 4.248 | 1.998 |
| level 6 | $NL_{Eu}$ Min | Y | 10.88 | 5.556 | 1.958 |
| level 5 | $NL_{Eu}$ Min | X | 6.703 | 3.365 | 1.992 |
| level 5 | $NL_{Eu}$ Min | Y | 8.573 | 4.4 | 1.949 |
| level 4 | $NL_{Eu}$ Min | X | 4.874 | 2.659 | 1.833 |
| level 4 | $NL_{Eu}$ Min | Y | 6.259 | 3.238 | 1.933 |
| level 3 | $NL_{Eu}$ Min | X | 3.134 | 1.576 | 1.988 |
| level 3 | $NL_{Eu}$ Min | Y | 4.06 | 2.128 | 1.908 |
| level 2 | $NL_{Eu}$ Min | X | 1.587 | 0.805 | 1.972 |
| level 2 | $NL_{Eu}$ Min | Y | 2.097 | 1.125 | 1.864 |
| level 1 | $NL_{Eu}$ Min | X | 0.519 | 0.257 | 2.02 |
| level 1 | $NL_{Eu}$ Min | Y | 0.654 | 0.349 | 1.875 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 0.153 | 0.1 | 1.531 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 0.628 | 0.566 | 1.109 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 0.114 | 0.081 | 1.41 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 0.526 | 0.484 | 1.085 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 0.081 | 0.058 | 1.411 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 0.433 | 0.405 | 1.068 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 0.046 | 0.033 | 1.406 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 0.326 | 0.308 | 1.059 |
| level 2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 0.233 | 0.211 | 1.105 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 0.055 | 0.013 | 4.351 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 0.178 | 0.117 | 1.52 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 0.153 | 0.1 | 1.531 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 0.628 | 0.566 | 1.109 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 0.114 | 0.081 | 1.41 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 0.526 | 0.484 | 1.085 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 0.081 | 0.058 | 1.411 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 0.433 | 0.405 | 1.068 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 0.046 | 0.033 | 1.406 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 0.326 | 0.308 | 1.059 |
| level 2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 0.233 | 0.211 | 1.105 |

**Table 5.3 - Story Max/Avg Displacements (continued)**

| Story | Load Case/Combo | Direction | Maximum mm | Average mm | Ratio |
|---|---|---|---|---|---|
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 0.055 | 0.013 | 4.351 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 0.178 | 0.117 | 1.52 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | X | 0.37 | 0.236 | 1.572 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 2.426 | 2.268 | 1.07 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | X | 0.279 | 0.195 | 1.436 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 2.031 | 1.926 | 1.055 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 1.668 | 1.598 | 1.044 |
| level 3 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 1.282 | 1.238 | 1.036 |
| level 2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 0.906 | 0.851 | 1.065 |
| level 1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 0.608 | 0.457 | 1.332 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | X | 0.37 | 0.236 | 1.572 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 2.426 | 2.268 | 1.07 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | X | 0.279 | 0.195 | 1.436 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 2.031 | 1.926 | 1.055 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 1.668 | 1.598 | 1.044 |
| level 3 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 1.282 | 1.238 | 1.036 |
| level 2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 0.906 | 0.851 | 1.065 |
| level 1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 0.608 | 0.457 | 1.332 |
| level 6 | $PO_{Eux}$ Max | X | 119.953 | 117.719 | 1.019 |
| level 5 | $PO_{Eux}$ Max | X | 96.454 | 94.765 | 1.018 |
| level 4 | $PO_{Eux}$ Max | X | 72.803 | 71.629 | 1.016 |
| level 3 | $PO_{Eux}$ Max | X | 50.074 | 49.37 | 1.014 |
| level 2 | $PO_{Eux}$ Max | X | 28.831 | 28.521 | 1.011 |
| level 1 | $PO_{Eux}$ Max | X | 11.295 | 11.22 | 1.007 |
| level 6 | $PO_{Eux}$ Min | Y | 2.645 | 1.575 | 1.679 |
| level 5 | $PO_{Eux}$ Min | Y | 2.048 | 1.245 | 1.644 |
| level 4 | $PO_{Eux}$ Min | Y | 1.48 | 0.929 | 1.594 |
| level 3 | $PO_{Eux}$ Min | Y | 0.942 | 0.616 | 1.53 |
| level 2 | $PO_{Eux}$ Min | Y | 0.487 | 0.338 | 1.441 |
| level 1 | $PO_{Eux}$ Min | X | 0.055 | 0.013 | 4.351 |
| level 1 | $PO_{Eux}$ Min | Y | 0.182 | 0.119 | 1.528 |
| level 6 | $PO_{Euy}$ Max | Y | 119.494 | 119.468 | 1 |
| level 5 | $PO_{Euy}$ Max | Y | 96.624 | 96.609 | 1 |
| level 4 | $PO_{Euy}$ Max | Y | 73.487 | 73.476 | 1 |
| level 3 | $PO_{Euy}$ Max | Y | 51.115 | 51.104 | 1 |
| level 2 | $PO_{Euy}$ Max | Y | 29.997 | 29.977 | 1.001 |
| level 1 | $PO_{Euy}$ Max | Y | 12.256 | 12.174 | 1.007 |
| level 6 | $PO_{Euy}$ Min | X | 0.153 | 0.1 | 1.531 |
| level 6 | $PO_{Euy}$ Min | Y | 0.628 | 0.566 | 1.109 |
| level 5 | $PO_{Euy}$ Min | X | 0.114 | 0.081 | 1.41 |
| level 5 | $PO_{Euy}$ Min | Y | 0.526 | 0.484 | 1.085 |
| level 4 | $PO_{Euy}$ Min | X | 0.081 | 0.058 | 1.411 |
| level 4 | $PO_{Euy}$ Min | Y | 0.433 | 0.405 | 1.068 |
| level 3 | $PO_{Euy}$ Min | X | 0.046 | 0.033 | 1.406 |
| level 3 | $PO_{Euy}$ Min | Y | 0.326 | 0.308 | 1.059 |

**Table 5.3 - Story Max/Avg Displacements (continued)**

| Story | Load Case/Combo | Direction | Maximum mm | Average mm | Ratio |
|---|---|---|---|---|---|
| level 2 | $PO_{Euy}$ Min | Y | 0.233 | 0.211 | 1.105 |
| level 1 | $PO_{Euy}$ Min | X | 0.073 | 0.022 | 3.369 |
| level 1 | $PO_{Euy}$ Min | Y | 0.178 | 0.117 | 1.52 |
| level 6 | $LS_{1.2G+1.5Q}$ | X | 0.438 | 0.286 | 1.529 |
| level 6 | $LS_{1.2G+1.5Q}$ | Y | 2.458 | 2.278 | 1.079 |
| level 5 | $LS_{1.2G+1.5Q}$ | X | 0.32 | 0.225 | 1.424 |
| level 5 | $LS_{1.2G+1.5Q}$ | Y | 2.087 | 1.969 | 1.06 |
| level 4 | $LS_{1.2G+1.5Q}$ | Y | 1.754 | 1.677 | 1.046 |
| level 3 | $LS_{1.2G+1.5Q}$ | Y | 1.389 | 1.342 | 1.035 |
| level 2 | $LS_{1.2G+1.5Q}$ | Y | 1.008 | 0.949 | 1.062 |
| level 1 | $LS_{1.2G+1.5Q}$ | Y | 0.691 | 0.518 | 1.332 |
| level 6 | ULS Max | X | 74.631 | 72.004 | 1.036 |
| level 6 | ULS Max | Y | 102.428 | 100.726 | 1.017 |
| level 5 | ULS Max | X | 61.424 | 59.316 | 1.036 |
| level 5 | ULS Max | Y | 84.677 | 83.266 | 1.017 |
| level 4 | ULS Max | X | 47.497 | 45.938 | 1.034 |
| level 4 | ULS Max | Y | 65.928 | 64.875 | 1.016 |
| level 3 | ULS Max | X | 33.41 | 32.397 | 1.031 |
| level 3 | ULS Max | Y | 47.008 | 46.277 | 1.016 |
| level 2 | ULS Max | X | 19.674 | 19.163 | 1.027 |
| level 2 | ULS Max | Y | 28.355 | 27.956 | 1.014 |
| level 1 | ULS Max | X | 7.847 | 7.704 | 1.019 |
| level 1 | ULS Max | Y | 11.882 | 11.741 | 1.012 |
| level 6 | ULS Min | X | 5.231 | 2.74 | 1.91 |
| level 6 | ULS Min | Y | 6.778 | 4.479 | 1.513 |
| level 5 | ULS Min | X | 4.14 | 2.177 | 1.902 |
| level 5 | ULS Min | Y | 5.349 | 3.623 | 1.476 |
| level 4 | ULS Min | X | 3.016 | 1.66 | 1.817 |
| level 4 | ULS Min | Y | 3.921 | 2.779 | 1.411 |
| level 3 | ULS Min | X | 1.947 | 1.01 | 1.927 |
| level 3 | ULS Min | Y | 2.562 | 1.929 | 1.328 |
| level 2 | ULS Min | X | 0.996 | 0.517 | 1.925 |
| level 2 | ULS Min | Y | 1.353 | 1.122 | 1.206 |
| level 1 | ULS Min | X | 0.346 | 0.187 | 1.849 |
| level 1 | ULS Min | Y | 0.691 | 0.518 | 1.332 |
| level 6 | 1.2G+Wx | X | 74.631 | 72.004 | 1.036 |
| level 5 | 1.2G+Wx | X | 61.424 | 59.316 | 1.036 |
| level 4 | 1.2G+Wx | X | 47.497 | 45.938 | 1.034 |
| level 3 | 1.2G+Wx | X | 33.41 | 32.397 | 1.031 |
| level 2 | 1.2G+Wx | X | 19.674 | 19.163 | 1.027 |
| level 1 | 1.2G+Wx | X | 7.847 | 7.704 | 1.019 |
| level 6 | 1.2G+Wy | Y | 102.428 | 100.726 | 1.017 |
| level 5 | 1.2G+Wy | Y | 84.677 | 83.266 | 1.017 |
| level 4 | 1.2G+Wy | Y | 65.928 | 64.875 | 1.016 |
| level 3 | 1.2G+Wy | Y | 47.008 | 46.277 | 1.016 |

**Table 5.3 - Story Max/Avg Displacements (continued)**

| Story | Load Case/Combo | Direction | Maximum mm | Average mm | Ratio |
|---|---|---|---|---|---|
| level 2 | 1.2G+Wy | Y | 28.355 | 27.956 | 1.014 |
| level 1 | 1.2G+Wy | Y | 11.882 | 11.741 | 1.012 |

**Table 5.4 - Story Drifts**

| Story | Load Case/Combo | Direction | Drift | Label | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|
| level 6 | $LS_G$ | X | 1.2E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $LS_Q$ | Y | 7.4E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $LS_{Eu}$ 1 | X | 0.003277 | | 11.41 | 15.86 | 19.225 |
| level 6 | $LS_{Eu}$ 2 | Y | 0.003342 | | 2.87 | 15.86 | 19.225 |
| level 6 | $LS_{Eu}$ 3 | X | 0.003597 | | 11.41 | 15.86 | 19.225 |
| level 6 | $LS_{Eu}$ 4 | Y | 0.003744 | | 11.41 | 2.44 | 19.225 |
| level 6 | $LS_{Eu}$ 5 | X | 0.003427 | | 11.41 | 0 | 19.225 |
| level 6 | $LS_{Eu}$ 6 | Y | 0.003742 | | -7.5 | 2.44 | 19.225 |
| level 6 | $LS_{Wux}$ | X | 0.004131 | | 11.41 | 15.86 | 19.225 |
| level 6 | $LS_{Wuy}$ | Y | 0.005545 | | -7.5 | 15.86 | 19.225 |
| level 6 | $NL_{Eu}$ Max | X | 0.003481 | | -7.5 | 15.86 | 19.225 |
| level 6 | $NL_{Eu}$ Max | Y | 0.003782 | | -7.5 | 15.86 | 19.225 |
| level 6 | $NL_{Eu}$ Min | X | 0.000341 | | 11.41 | 15.86 | 19.225 |
| level 6 | $NL_{Eu}$ Min | Y | 0.000446 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{Eu}$ Max | X | 0.00566 | | -7.5 | 15.86 | 19.225 |
| level 6 | $NL_{Eu}$ Max | Y | 0.006188 | | -7.5 | 15.86 | 19.225 |
| level 6 | $NL_{Eu}$ Min | X | 0.000557 | | -0.18 | 15.86 | 19.225 |
| level 6 | $NL_{Eu}$ Min | Y | 0.00072 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 1.2E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 3.2E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 1.2E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 3.2E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | X | 2.9E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 0.000123 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | X | 2.9E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 0.000123 | | 11.41 | 0 | 19.225 |
| level 6 | $PO_{Eux}$ Max | X | 0.007333 | | -7.5 | 15.86 | 19.225 |
| level 6 | $PO_{Eux}$ Min | Y | 0.000186 | | 11.41 | 0 | 19.225 |
| level 6 | $PO_{Euy}$ Max | Y | 0.007138 | | 1.04 | 15.86 | 19.225 |
| level 6 | $PO_{Euy}$ Min | X | 1.2E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $PO_{Euy}$ Min | Y | 3.2E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $LS_{1.2G+1.5Q}$ | X | 3.8E-05 | | 11.41 | 0 | 19.225 |
| level 6 | $LS_{1.2G+1.5Q}$ | Y | 0.000116 | | 11.41 | 0 | 19.225 |
| level 6 | ULS Max | X | 0.004125 | | 4.09 | 15.86 | 19.225 |
| level 6 | ULS Max | Y | 0.00555 | | -7.5 | 15.86 | 19.225 |
| level 6 | ULS Min | X | 0.000341 | | 11.41 | 15.86 | 19.225 |
| level 6 | ULS Min | Y | 0.000446 | | 11.41 | 0 | 19.225 |
| level 6 | 1.2G+Wx | X | 0.004125 | | 4.09 | 15.86 | 19.225 |
| level 6 | 1.2G+Wy | Y | 0.00555 | | -7.5 | 15.86 | 19.225 |

**Table 5.4 - Story Drifts (continued)**

| Story | Load Case/Combo | Direction | Drift | Label | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|
| level 5 | $LS_G$ | X | 1.1E-05 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $LS_Q$ | X | 1.6E-05 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $LS_Q$ | Y | 6.7E-05 | | 11.41 | 0 | 16.02 |
| level 5 | $LS_{Eu}$ 1 | X | 0.003293 | | -0.79 | 15.86 | 16.02 |
| level 5 | $LS_{Eu}$ 2 | Y | 0.003372 | | 8.36 | 6.71 | 16.02 |
| level 5 | $LS_{Eu}$ 3 | X | 0.003619 | | -5.06 | 15.86 | 16.02 |
| level 5 | $LS_{Eu}$ 4 | Y | 0.003781 | | 11.41 | 9.15 | 16.02 |
| level 5 | $LS_{Eu}$ 5 | X | 0.003453 | | 1.955 | 0 | 16.02 |
| level 5 | $LS_{Eu}$ 6 | Y | 0.003779 | | -7.5 | 9.15 | 16.02 |
| level 5 | $LS_{Wux}$ | X | 0.004356 | | 11.41 | 15.86 | 16.02 |
| level 5 | $LS_{Wuy}$ | Y | 0.005847 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $NL_{Eu}$ Max | X | 0.003499 | | 11.41 | 15.86 | 16.02 |
| level 5 | $NL_{Eu}$ Max | Y | 0.003827 | | -7.5 | 9.15 | 16.02 |
| level 5 | $NL_{Eu}$ Min | X | 0.000351 | | 4.09 | 15.86 | 16.02 |
| level 5 | $NL_{Eu}$ Min | Y | 0.000446 | | 11.41 | 0 | 16.02 |
| level 5 | $NL_{Eu}$ Max | X | 0.005696 | | 11.41 | 15.86 | 16.02 |
| level 5 | $NL_{Eu}$ Max | Y | 0.006264 | | -7.5 | 9.15 | 16.02 |
| level 5 | $NL_{Eu}$ Min | X | 0.000572 | | 11.41 | 15.86 | 16.02 |
| level 5 | $NL_{Eu}$ Min | Y | 0.000722 | | 11.41 | 0 | 16.02 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 1.2E-05 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 2.9E-05 | | 11.41 | 0 | 16.02 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 1.2E-05 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 2.9E-05 | | 11.41 | 0 | 16.02 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | X | 2.9E-05 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 0.000113 | | 11.41 | 0 | 16.02 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | X | 2.9E-05 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 0.000113 | | 11.41 | 0 | 16.02 |
| level 5 | $PO_{Eux}$ Max | X | 0.00738 | | 11.41 | 15.86 | 16.02 |
| level 5 | $PO_{Eux}$ Min | Y | 0.000177 | | 11.41 | 0 | 16.02 |
| level 5 | $PO_{Euy}$ Max | Y | 0.00722 | | 0.43 | 9.15 | 16.02 |
| level 5 | $PO_{Euy}$ Min | X | 1.2E-05 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $PO_{Euy}$ Min | Y | 2.9E-05 | | 11.41 | 0 | 16.02 |
| level 5 | $LS_{1.2G+1.5Q}$ | X | 3.7E-05 | 1 | -7.5 | 0 | 16.02 |
| level 5 | $LS_{1.2G+1.5Q}$ | Y | 0.000104 | | 11.41 | 0 | 16.02 |
| level 5 | ULS Max | X | 0.004349 | | 11.41 | 15.86 | 16.02 |
| level 5 | ULS Max | Y | 0.00585 | 1 | -7.5 | 0 | 16.02 |
| level 5 | ULS Min | X | 0.000351 | | 4.09 | 15.86 | 16.02 |
| level 5 | ULS Min | Y | 0.000446 | | 11.41 | 0 | 16.02 |
| level 5 | 1.2G+Wx | X | 0.004349 | | 11.41 | 15.86 | 16.02 |
| level 5 | 1.2G+Wy | Y | 0.00585 | 1 | -7.5 | 0 | 16.02 |
| level 4 | $LS_G$ | X | 1.1E-05 | | 11.41 | 0 | 12.815 |
| level 4 | $LS_G$ | Y | 1E-05 | | 0.43 | 9.15 | 12.815 |
| level 4 | $LS_Q$ | X | 1.5E-05 | | 11.41 | 0 | 12.815 |
| level 4 | $LS_Q$ | Y | 6.9E-05 | | 11.41 | 1.22 | 12.815 |
| level 4 | $LS_{Eu}$ 1 | X | 0.003147 | | 11.41 | 15.86 | 12.815 |

**Table 5.4 - Story Drifts (continued)**

| Story | Load Case/Combo | Direction | Drift | Label | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|
| level 4 | $LS_{Eu}$ 2 | Y | 0.00325 | | 0.43 | 9.15 | 12.815 |
| level 4 | $LS_{Eu}$ 3 | X | 0.003454 | | 11.41 | 15.86 | 12.815 |
| level 4 | $LS_{Eu}$ 4 | Y | 0.003634 | | 11.41 | 3.66 | 12.815 |
| level 4 | $LS_{Eu}$ 5 | X | 0.003302 | | 11.41 | 0 | 12.815 |
| level 4 | $LS_{Eu}$ 6 | Y | 0.003632 | | -7.5 | 3.66 | 12.815 |
| level 4 | $LS_{Wux}$ | X | 0.004403 | | -0.18 | 15.86 | 12.815 |
| level 4 | $LS_{Wuy}$ | Y | 0.00592 | | -7.5 | 15.86 | 12.815 |
| level 4 | $NL_{Eu}$ Max | X | 0.003348 | | -7.5 | 15.86 | 12.815 |
| level 4 | $NL_{Eu}$ Max | Y | 0.003687 | | -7.5 | 15.86 | 12.815 |
| level 4 | $NL_{Eu}$ Min | X | 0.000334 | | 8.36 | 15.86 | 12.815 |
| level 4 | $NL_{Eu}$ Min | Y | 0.000425 | | 11.41 | 15.86 | 12.815 |
| level 4 | $NL_{Eu}$ Max | X | 0.00546 | | -7.5 | 15.86 | 12.815 |
| level 4 | $NL_{Eu}$ Max | Y | 0.00604 | | -7.5 | 15.86 | 12.815 |
| level 4 | $NL_{Eu}$ Min | X | 0.000543 | | -6.28 | 15.86 | 12.815 |
| level 4 | $NL_{Eu}$ Min | Y | 0.000687 | | 11.41 | 15.86 | 12.815 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 1.2E-05 | | 11.41 | 0 | 12.815 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 3.5E-05 | | 0.43 | 9.15 | 12.815 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 1.2E-05 | | 11.41 | 0 | 12.815 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 3.5E-05 | | 0.43 | 9.15 | 12.815 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | X | 2.8E-05 | | 11.41 | 0 | 12.815 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 0.000124 | | 0.43 | 9.15 | 12.815 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | X | 2.8E-05 | | 11.41 | 0 | 12.815 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 0.000124 | | 0.43 | 9.15 | 12.815 |
| level 4 | $PO_{Eux}$ Max | X | 0.007095 | | -7.5 | 15.86 | 12.815 |
| level 4 | $PO_{Eux}$ Min | Y | 0.00017 | | 11.41 | 15.86 | 12.815 |
| level 4 | $PO_{Euy}$ Max | Y | 0.006982 | | 1.65 | 15.86 | 12.815 |
| level 4 | $PO_{Euy}$ Min | X | 1.2E-05 | | 11.41 | 0 | 12.815 |
| level 4 | $PO_{Euy}$ Min | Y | 3.5E-05 | | 0.43 | 9.15 | 12.815 |
| level 4 | $LS_{1.2G+1.5Q}$ | X | 3.5E-05 | | 11.41 | 0 | 12.815 |
| level 4 | $LS_{1.2G+1.5Q}$ | Y | 0.000116 | | 0.43 | 9.15 | 12.815 |
| level 4 | ULS Max | X | 0.004396 | | -0.18 | 15.86 | 12.815 |
| level 4 | ULS Max | Y | 0.005914 | | -7.5 | 15.86 | 12.815 |
| level 4 | ULS Min | X | 0.000334 | | 8.36 | 15.86 | 12.815 |
| level 4 | ULS Min | Y | 0.000425 | | 11.41 | 15.86 | 12.815 |
| level 4 | 1.2G+Wx | X | 0.004396 | | -0.18 | 15.86 | 12.815 |
| level 4 | 1.2G+Wy | Y | 0.005914 | | -7.5 | 15.86 | 12.815 |
| level 3 | $LS_G$ | X | 6E-06 | | 11.41 | 0 | 9.61 |
| level 3 | $LS_G$ | Y | 5E-06 | | 11.41 | 15.86 | 9.61 |
| level 3 | $LS_Q$ | Y | 8.4E-05 | | 5.31 | 9.15 | 9.61 |
| level 3 | $LS_{Eu}$ 1 | X | 0.002903 | | 8.36 | 15.86 | 9.61 |
| level 3 | $LS_{Eu}$ 2 | Y | 0.003045 | | 6.53 | 6.71 | 9.61 |
| level 3 | $LS_{Eu}$ 3 | X | 0.003178 | | 8.36 | 15.86 | 9.61 |
| level 3 | $LS_{Eu}$ 4 | Y | 0.003389 | | 11.41 | 6.71 | 9.61 |
| level 3 | $LS_{Eu}$ 5 | X | 0.003051 | | -2.01 | 0 | 9.61 |
| level 3 | $LS_{Eu}$ 6 | Y | 0.003388 | | -7.5 | 6.71 | 9.61 |

**Table 5.4 - Story Drifts (continued)**

| Story | Load Case/Combo | Direction | Drift | Label | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|
| level 3 | $LS_{Wux}$ | X | 0.004288 | | -4.45 | 15.86 | 9.61 |
| level 3 | $LS_{Wuy}$ | Y | 0.005821 | | -7.5 | 9.15 | 9.61 |
| level 3 | $NL_{Eu}$ Max | X | 0.003104 | | -7.5 | 15.86 | 9.61 |
| level 3 | $NL_{Eu}$ Max | Y | 0.003473 | 1 | -7.5 | 0 | 9.61 |
| level 3 | $NL_{Eu}$ Min | X | 0.000301 | | 11.41 | 15.86 | 9.61 |
| level 3 | $NL_{Eu}$ Min | Y | 0.00038 | | 11.41 | 15.86 | 9.61 |
| level 3 | $NL_{Eu}$ Max | X | 0.00508 | | -7.5 | 15.86 | 9.61 |
| level 3 | $NL_{Eu}$ Max | Y | 0.00568 | 1 | -7.5 | 0 | 9.61 |
| level 3 | $NL_{Eu}$ Min | X | 0.000487 | | 11.41 | 15.86 | 9.61 |
| level 3 | $NL_{Eu}$ Min | Y | 0.000616 | | 11.41 | 15.86 | 9.61 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 7E-06 | | 11.41 | 0 | 9.61 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 3.3E-05 | | 5.92 | 9.15 | 9.61 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 7E-06 | | 11.41 | 0 | 9.61 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 3.3E-05 | | 5.92 | 9.15 | 9.61 |
| level 3 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 0.000128 | | 5.31 | 9.15 | 9.61 |
| level 3 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 0.000128 | | 5.31 | 9.15 | 9.61 |
| level 3 | $PO_{Eux}$ Max | X | 0.00663 | | -4.45 | 15.86 | 9.61 |
| level 3 | $PO_{Eux}$ Min | Y | 0.000146 | | 11.41 | 15.86 | 9.61 |
| level 3 | $PO_{Euy}$ Max | Y | 0.006598 | | 2.26 | 6.71 | 9.61 |
| level 3 | $PO_{Euy}$ Min | X | 7E-06 | | 11.41 | 0 | 9.61 |
| level 3 | $PO_{Euy}$ Min | Y | 3.3E-05 | | 5.92 | 9.15 | 9.61 |
| level 3 | $LS_{1.2G+1.5Q}$ | Y | 0.000131 | | 5.31 | 9.15 | 9.61 |
| level 3 | ULS Max | X | 0.004286 | | -7.5 | 15.86 | 9.61 |
| level 3 | ULS Max | Y | 0.00582 | 1 | -7.5 | 0 | 9.61 |
| level 3 | ULS Min | X | 0.000301 | | 11.41 | 15.86 | 9.61 |
| level 3 | ULS Min | Y | 0.00038 | | 11.41 | 15.86 | 9.61 |
| level 3 | 1.2G+Wx | X | 0.004286 | | -7.5 | 15.86 | 9.61 |
| level 3 | 1.2G+Wy | Y | 0.00582 | 1 | -7.5 | 0 | 9.61 |
| level 2 | $LS_G$ | X | 9E-06 | | 11.41 | 0 | 6.405 |
| level 2 | $LS_G$ | Y | 9E-06 | | 2.26 | 15.86 | 6.405 |
| level 2 | $LS_Q$ | Y | 0.000111 | | 2.26 | 15.86 | 6.405 |
| level 2 | $LS_{Eu}$ 1 | X | 0.002366 | | 2.26 | 15.86 | 6.405 |
| level 2 | $LS_{Eu}$ 2 | Y | 0.002563 | | 11.41 | 6.71 | 6.405 |
| level 2 | $LS_{Eu}$ 3 | X | 0.002566 | | 2.26 | 15.86 | 6.405 |
| level 2 | $LS_{Eu}$ 4 | Y | 0.002814 | | 11.41 | 7.32 | 6.405 |
| level 2 | $LS_{Eu}$ 5 | X | 0.002483 | | 1.955 | 0 | 6.405 |
| level 2 | $LS_{Eu}$ 6 | Y | 0.002814 | | -7.5 | 6.71 | 6.405 |
| level 2 | $LS_{Wux}$ | X | 0.003696 | | 1.65 | 15.86 | 6.405 |
| level 2 | $LS_{Wuy}$ | Y | 0.005146 | | -7.5 | 6.71 | 6.405 |
| level 2 | $NL_{Eu}$ Max | X | 0.002557 | | -7.5 | 15.86 | 6.405 |
| level 2 | $NL_{Eu}$ Max | Y | 0.002911 | 1 | -7.5 | 0 | 6.405 |
| level 2 | $NL_{Eu}$ Min | X | 0.000236 | | 11.41 | 15.86 | 6.405 |
| level 2 | $NL_{Eu}$ Min | Y | 0.000284 | | 11.41 | 15.86 | 6.405 |
| level 2 | $NL_{Eu}$ Max | X | 0.004184 | | -7.5 | 15.86 | 6.405 |
| level 2 | $NL_{Eu}$ Max | Y | 0.004736 | 1 | -7.5 | 0 | 6.405 |

**Table 5.4 - Story Drifts (continued)**

| Story | Load Case/Combo | Direction | Drift | Label | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|
| level 2 | $NL_{Eu}$ Min | X | 0.000372 | | 11.41 | 15.86 | 6.405 |
| level 2 | $NL_{Eu}$ Min | Y | 0.000457 | | 11.41 | 15.86 | 6.405 |
| level 2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 4.4E-05 | | 2.26 | 15.86 | 6.405 |
| level 2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 4.4E-05 | | 2.26 | 15.86 | 6.405 |
| level 2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 0.000159 | | 2.26 | 15.86 | 6.405 |
| level 2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 0.000159 | | 2.26 | 15.86 | 6.405 |
| level 2 | $PO_{Eux}$ Max | X | 0.005486 | | -4.45 | 15.86 | 6.405 |
| level 2 | $PO_{Eux}$ Min | Y | 0.000104 | | 11.41 | 15.86 | 6.405 |
| level 2 | $PO_{Euy}$ Max | Y | 0.005578 | | 1.955 | 6.71 | 6.405 |
| level 2 | $PO_{Euy}$ Min | Y | 4.4E-05 | | 2.26 | 15.86 | 6.405 |
| level 2 | $LS_{1.2G+1.5Q}$ | Y | 0.000177 | | 2.26 | 15.86 | 6.405 |
| level 2 | ULS Max | X | 0.0037 | | -7.5 | 15.86 | 6.405 |
| level 2 | ULS Max | Y | 0.005147 | | -7.5 | 3.66 | 6.405 |
| level 2 | ULS Min | X | 0.000236 | | 11.41 | 15.86 | 6.405 |
| level 2 | ULS Min | Y | 0.000284 | | 11.41 | 15.86 | 6.405 |
| level 2 | 1.2G+Wx | X | 0.0037 | | -7.5 | 15.86 | 6.405 |
| level 2 | 1.2G+Wy | Y | 0.005147 | | -7.5 | 3.66 | 6.405 |
| level 1 | $LS_G$ | X | 1.1E-05 | | -7.5 | 15.25 | 3.2 |
| level 1 | $LS_G$ | Y | 1.5E-05 | | 1.955 | 6.71 | 3.2 |
| level 1 | $LS_Q$ | Y | 0.000132 | | 1.955 | 6.71 | 3.2 |
| level 1 | $LS_{Eu}$ 1 | X | 0.001508 | | -7.5 | 15.86 | 3.2 |
| level 1 | $LS_{Eu}$ 2 | Y | 0.001795 | | -0.18 | 10.37 | 3.2 |
| level 1 | $LS_{Eu}$ 3 | X | 0.001584 | | -7.5 | 15.86 | 3.2 |
| level 1 | $LS_{Eu}$ 4 | Y | 0.00189 | | 11.41 | 15.86 | 3.2 |
| level 1 | $LS_{Eu}$ 5 | X | 0.001567 | 1 | -7.5 | 0 | 3.2 |
| level 1 | $LS_{Eu}$ 6 | Y | 0.001891 | | -7.5 | 15.86 | 3.2 |
| level 1 | $LS_{Wux}$ | X | 0.002463 | | -7.5 | 14.03 | 3.2 |
| level 1 | $LS_{Wuy}$ | Y | 0.003725 | | -3.84 | 0 | 3.2 |
| level 1 | $NL_{Eu}$ Max | X | 0.001675 | | 11.41 | 15.86 | 3.2 |
| level 1 | $NL_{Eu}$ Max | Y | 0.00195 | | -7.5 | 15.86 | 3.2 |
| level 1 | $NL_{Eu}$ Min | X | 0.000108 | | -7.5 | 15.86 | 3.2 |
| level 1 | $NL_{Eu}$ Min | Y | 0.000145 | | 11.41 | 0 | 3.2 |
| level 1 | $NL_{Eu}$ Max | X | 0.00266 | | 11.41 | 15.86 | 3.2 |
| level 1 | $NL_{Eu}$ Max | Y | 0.003132 | | -7.5 | 15.86 | 3.2 |
| level 1 | $NL_{Eu}$ Min | X | 0.000162 | | -7.5 | 15.86 | 3.2 |
| level 1 | $NL_{Eu}$ Min | Y | 0.000204 | | 11.41 | 0 | 3.2 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | X | 1.7E-05 | | -7.5 | 15.25 | 3.2 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Y | 5.6E-05 | | 1.955 | 6.71 | 3.2 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | X | 1.7E-05 | | -7.5 | 15.25 | 3.2 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Y | 5.6E-05 | | 1.955 | 6.71 | 3.2 |
| level 1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Y | 0.00019 | | 1.955 | 6.71 | 3.2 |
| level 1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Y | 0.00019 | | 1.955 | 6.71 | 3.2 |
| level 1 | $PO_{Eux}$ Max | X | 0.00353 | | 11.41 | 15.25 | 3.2 |
| level 1 | $PO_{Eux}$ Min | X | 1.7E-05 | | -7.5 | 15.25 | 3.2 |
| level 1 | $PO_{Eux}$ Min | Y | 5.7E-05 | | 11.41 | 0 | 3.2 |

**Table 5.4 - Story Drifts (continued)**

| Story | Load Case/Combo | Direction | Drift | Label | X m | Y m | Z m |
|---|---|---|---|---|---|---|---|
| level 1 | $PO_{Euy}$ Max | Y | 0.00383 | | 1.65 | 15.86 | 3.2 |
| level 1 | $PO_{Euy}$ Min | X | 2.3E-05 | | -7.5 | 15.25 | 3.2 |
| level 1 | $PO_{Euy}$ Min | Y | 5.6E-05 | | 1.955 | 6.71 | 3.2 |
| level 1 | $LS_{1.2G+1.5Q}$ | Y | 0.000216 | | 1.955 | 6.71 | 3.2 |
| level 1 | ULS Max | X | 0.002452 | | 11.41 | 15.25 | 3.2 |
| level 1 | ULS Max | Y | 0.003713 | | -4.45 | 0 | 3.2 |
| level 1 | ULS Min | X | 0.000108 | | -7.5 | 15.86 | 3.2 |
| level 1 | ULS Min | Y | 0.000216 | | 1.955 | 6.71 | 3.2 |
| level 1 | 1.2G+Wx | X | 0.002452 | | 11.41 | 15.25 | 3.2 |
| level 1 | 1.2G+Wy | Y | 0.003713 | | -4.45 | 0 | 3.2 |

**Table 5.5 - Story Forces**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 6 | $LS_G$ | Top | 212.4919 | 0 | 0 | 0 | 1673.7685 | -415.4216 |
| level 6 | $LS_G$ | Bottom | 230.2447 | 0 | 0 | 0 | 1818.2615 | -449.9557 |
| level 6 | $LS_Q$ | Top | 584.197 | 0 | 0 | 0 | 4599.316 | -1142.1051 |
| level 6 | $LS_Q$ | Bottom | 584.197 | 0 | 0 | 0 | 4599.316 | -1142.1051 |
| level 6 | $LS_{Eu}$ 1 | Top | 0 | -39.0706 | 0 | 307.8575 | 0 | 0 |
| level 6 | $LS_{Eu}$ 1 | Bottom | 0 | 0 | 0 | 0 | 0 | -125.0265 |
| level 6 | $LS_{Eu}$ 2 | Top | 0 | 0 | -36.1498 | -70.6693 | 0 | 0 |
| level 6 | $LS_{Eu}$ 2 | Bottom | 0 | 0 | 0 | 0 | 115.6799 | 0 |
| level 6 | $LS_{Eu}$ 3 | Top | 0 | -39.0706 | 0 | 369.8235 | 0 | 0 |
| level 6 | $LS_{Eu}$ 3 | Bottom | 0 | 0 | 0 | 0 | 0 | -125.0265 |
| level 6 | $LS_{Eu}$ 4 | Top | 0 | 0 | -36.1498 | -139.0285 | 0 | 0 |
| level 6 | $LS_{Eu}$ 4 | Bottom | 0 | 0 | 0 | 0 | 115.6799 | 0 |
| level 6 | $LS_{Eu}$ 5 | Top | 0 | -39.0706 | 0 | 245.8916 | 0 | 0 |
| level 6 | $LS_{Eu}$ 5 | Bottom | 0 | 0 | 0 | 0 | 0 | -125.0265 |
| level 6 | $LS_{Eu}$ 6 | Top | 0 | 0 | -36.1498 | -2.31 | 0 | 0 |
| level 6 | $LS_{Eu}$ 6 | Bottom | 0 | 0 | 0 | 0 | 115.6799 | 0 |
| level 6 | $LS_{Wux}$ | Top | 0 | -22.8799 | 0 | 188.4159 | 0 | 0 |
| level 6 | $LS_{Wux}$ | Bottom | 0 | 0 | 0 | 0 | 0 | -73.2156 |
| level 6 | $LS_{Wuy}$ | Top | 0 | 0 | -27.2799 | -45.0118 | 0 | 0 |
| level 6 | $LS_{Wuy}$ | Bottom | 0 | 0 | 0 | 0 | 87.2955 | 0 |
| level 6 | $NL_{Eu}$ Max | Top | 387.751 | 1.15E-05 | 4.339E-05 | 369.8834 | 3053.5801 | -758.0553 |
| level 6 | $NL_{Eu}$ Max | Bottom | 405.5038 | 0.6888 | 1.2472 | 3.2165 | 3317.8875 | -792.5485 |
| level 6 | $NL_{Eu}$ Min | Top | 387.751 | -39.0706 | -36.1498 | -139.1023 | 3053.408 | -758.1575 |
| level 6 | $NL_{Eu}$ Min | Bottom | 405.4997 | -0.0189 | -0.0342 | -6.3405 | 3197.9016 | -921.7408 |
| level 6 | $NL_{Eu}$ Max | Top | 387.751 | 3.176E-06 | 0.0001 | 591.8167 | 3053.5903 | -758.039 |
| level 6 | $NL_{Eu}$ Max | Bottom | 405.5433 | 1.1258 | 2.0376 | 5.0193 | 3389.957 | -792.4673 |
| level 6 | $NL_{Eu}$ Min | Top | 387.7509 | -62.5129 | -57.8397 | -222.5825 | 3053.3251 | -758.205 |
| level 6 | $NL_{Eu}$ Min | Bottom | 405.5038 | -0.0139 | -0.0342 | -10.3598 | 3197.9843 | -999.3171 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Top | 387.751 | 0 | -4.562E-06 | 0.0005 | 3053.5741 | -758.063 |

**Table 5.5 - Story Forces (continued)**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Bottom | 405.5038 | -0.0236 | -0.0361 | 0.1815 | 3198.0346 | -792.5808 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Top | 387.751 | 0 | -4.562E-06 | 0.0005 | 3053.5741 | -758.063 |
| level 6 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Bottom | 405.5038 | -0.0236 | -0.0361 | 0.1815 | 3198.0346 | -792.5808 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Top | 1019.7742 | 3.807E-06 | 1.002E-05 | 0.0035 | 8029.9158 | -1993.7247 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Bottom | 1046.4035 | -0.1651 | -0.2866 | 1.2441 | 8246.2975 | -2045.4249 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Top | 1019.7742 | 3.807E-06 | 1.002E-05 | 0.0035 | 8029.9158 | -1993.7247 |
| level 6 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Bottom | 1046.4035 | -0.1651 | -0.2866 | 1.2441 | 8246.2975 | -2045.4249 |
| level 6 | $PO_{Eux}$ Max | Top | 387.751 | 0 | -4.55E-06 | 688.8636 | 3053.6057 | -758.063 |
| level 6 | $PO_{Eux}$ Max | Bottom | 405.5038 | 1.5859 | -0.0243 | 0.1815 | 3198.167 | -792.5808 |
| level 6 | $PO_{Eux}$ Min | Top | 387.751 | -87.4214 | -4.568E-06 | 0.0005 | 3053.5741 | -758.2366 |
| level 6 | $PO_{Eux}$ Min | Bottom | 405.5038 | -0.0236 | -0.0361 | -13.3047 | 3198.0346 | -1081.8426 |
| level 6 | $PO_{Euy}$ Max | Top | 387.751 | 0 | -4.562E-06 | 0.0005 | 3053.5741 | -758.0604 |
| level 6 | $PO_{Euy}$ Max | Bottom | 405.5038 | 0.0081 | 2.6256 | 5.0537 | 3443.6746 | -792.5808 |
| level 6 | $PO_{Euy}$ Min | Top | 387.751 | 0 | -73.9956 | -144.6538 | 3053.2742 | -758.063 |
| level 6 | $PO_{Euy}$ Min | Bottom | 405.5038 | -0.0236 | -0.0361 | 0.1815 | 3198.0346 | -792.6288 |
| level 6 | $LS_{1.2G+1.5Q}$ | Top | 1131.2858 | 0 | 0 | 0 | 8907.4962 | -2211.6637 |
| level 6 | $LS_{1.2G+1.5Q}$ | Bottom | 1152.5892 | 0 | 0 | 0 | 9080.8878 | -2253.1045 |
| level 6 | ULS Max | Top | 1131.2858 | 1.15E-05 | 4.339E-05 | 369.8834 | 8907.4962 | -498.506 |
| level 6 | ULS Max | Bottom | 1152.5892 | 0.6888 | 1.2472 | 3.2165 | 9080.8878 | -539.9468 |
| level 6 | ULS Min | Top | 254.9903 | -39.0706 | -36.1498 | -139.1023 | 2008.5222 | -2211.6637 |
| level 6 | ULS Min | Bottom | 276.2937 | -0.0189 | -0.0342 | -6.3405 | 2181.9138 | -2253.1045 |
| level 6 | 1.2G+Wx | Top | 254.9903 | -22.8799 | 0 | 188.4159 | 2008.5222 | -498.506 |
| level 6 | 1.2G+Wx | Bottom | 276.2937 | 0 | 0 | 0 | 2181.9138 | -613.1624 |
| level 6 | 1.2G+Wy | Top | 254.9903 | 0 | -27.2799 | -45.0118 | 2008.5222 | -498.506 |
| level 6 | 1.2G+Wy | Bottom | 276.2937 | 0 | 0 | 0 | 2269.2093 | -539.9468 |
| level 5 | $LS_G$ | Top | 443.3745 | 0 | 0 | 0 | 3497.2992 | -866.6244 |
| level 5 | $LS_G$ | Bottom | 466.3199 | 0 | 0 | 0 | 3684.0556 | -911.2595 |
| level 5 | $LS_Q$ | Top | 1168.394 | 0 | 0 | 0 | 9198.632 | -2284.2103 |
| level 5 | $LS_Q$ | Bottom | 1168.394 | 0 | 0 | 0 | 9198.632 | -2284.2103 |
| level 5 | $LS_{Eu}$ 1 | Top | 0 | -64.5702 | 0 | 508.9458 | 0 | -125.2219 |
| level 5 | $LS_{Eu}$ 1 | Bottom | 0 | 0 | 0 | 0 | 0 | -331.847 |
| level 5 | $LS_{Eu}$ 2 | Top | 0 | 0 | -59.7431 | -116.7855 | 115.8607 | 0 |
| level 5 | $LS_{Eu}$ 2 | Bottom | 0 | 0 | 0 | 0 | 307.0392 | 0 |
| level 5 | $LS_{Eu}$ 3 | Top | 0 | -64.5702 | 0 | 611.3535 | 0 | -125.2219 |
| level 5 | $LS_{Eu}$ 3 | Bottom | 0 | 0 | 0 | 0 | 0 | -331.847 |
| level 5 | $LS_{Eu}$ 4 | Top | 0 | 0 | -59.7431 | -229.759 | 115.8607 | 0 |
| level 5 | $LS_{Eu}$ 4 | Bottom | 0 | 0 | 0 | 0 | 307.0392 | 0 |
| level 5 | $LS_{Eu}$ 5 | Top | 0 | -64.5702 | 0 | 406.5381 | 0 | -125.2219 |
| level 5 | $LS_{Eu}$ 5 | Bottom | 0 | 0 | 0 | 0 | 0 | -331.847 |
| level 5 | $LS_{Eu}$ 6 | Top | 0 | 0 | -59.7431 | -3.8119 | 115.8607 | 0 |
| level 5 | $LS_{Eu}$ 6 | Bottom | 0 | 0 | 0 | 0 | 307.0392 | 0 |
| level 5 | $LS_{Wux}$ | Top | 0 | -67.4138 | 0 | 555.153 | 0 | -73.33 |

**Table 5.5 - Story Forces (continued)**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 5 | $LS_{Wux}$ | Bottom | 0 | 0 | 0 | 0 | 0 | -289.0544 |
| level 5 | $LS_{Wuy}$ | Top | 0 | 0 | -80.378 | -132.6238 | 87.4319 | 0 |
| level 5 | $LS_{Wuy}$ | Bottom | 0 | 0 | 0 | 0 | 344.6417 | 0 |
| level 5 | $NL_{Eu}$ Max | Top | 793.8927 | 1.438E-05 | 4.185E-05 | 611.3743 | 6376.8249 | -1551.847 |
| level 5 | $NL_{Eu}$ Max | Bottom | 816.91 | 1.3973 | 2.4176 | 6.1008 | 6763.5889 | -1596.4665 |
| level 5 | $NL_{Eu}$ Min | Top | 793.8927 | -64.5702 | -59.7431 | -229.8025 | 6256.8692 | -1681.1602 |
| level 5 | $NL_{Eu}$ Min | Bottom | 816.8381 | -0.0292 | -0.0659 | -12.6937 | 6443.5736 | -1940.5743 |
| level 5 | $NL_{Eu}$ Max | Top | 793.8927 | 4.701E-06 | 0.0001 | 978.1997 | 6448.9616 | -1551.7491 |
| level 5 | $NL_{Eu}$ Max | Bottom | 817.0783 | 2.2829 | 3.9278 | 9.5339 | 6956.0686 | -1596.3354 |
| level 5 | $NL_{Eu}$ Min | Top | 793.8926 | -103.3123 | -95.589 | -367.7057 | 6256.8336 | -1758.7934 |
| level 5 | $NL_{Eu}$ Min | Bottom | 816.8381 | -0.0232 | -0.0686 | -20.7056 | 6443.5016 | -2147.276 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Top | 793.8927 | 5.846E-07 | -1.038E-05 | 0.0008 | 6256.8738 | -1551.8886 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Bottom | 816.8381 | -0.0392 | -0.0682 | 0.2774 | 6443.5642 | -1596.4959 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Top | 793.8927 | 5.846E-07 | -1.038E-05 | 0.0008 | 6256.8738 | -1551.8886 |
| level 5 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Bottom | 816.8381 | -0.0392 | -0.0682 | 0.2774 | 6443.5642 | -1596.4959 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Top | 2067.1346 | 4.411E-06 | 1.018E-05 | 0.0057 | 16284.086 | -4041.0036 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Bottom | 2101.5527 | -0.2806 | -0.5378 | 1.9459 | 16563.5142 | -4107.7854 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Top | 2067.1346 | 4.411E-06 | 1.018E-05 | 0.0057 | 16284.086 | -4041.0036 |
| level 5 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Bottom | 2101.5527 | -0.2806 | -0.5378 | 1.9459 | 16563.5142 | -4107.7854 |
| level 5 | $PO_{Eux}$ Max | Top | 793.8927 | 5.846E-07 | -1.038E-05 | 1138.7918 | 6257.0206 | -1551.8886 |
| level 5 | $PO_{Eux}$ Max | Bottom | 816.8381 | 3.21 | -0.0452 | 0.2774 | 6443.8467 | -1596.4959 |
| level 5 | $PO_{Eux}$ Min | Top | 793.8927 | -144.4774 | -1.039E-05 | 0.0008 | 6256.8738 | -1841.3153 |
| level 5 | $PO_{Eux}$ Min | Bottom | 816.8381 | -0.0392 | -0.0682 | -26.6634 | 6443.5642 | -2367.214 |
| level 5 | $PO_{Euy}$ Max | Top | 793.8927 | 6.258E-07 | -1.038E-05 | 0.0008 | 6502.7327 | -1551.8886 |
| level 5 | $PO_{Euy}$ Max | Bottom | 816.8381 | 0.0191 | 5.0455 | 9.6726 | 7099.5311 | -1596.4959 |
| level 5 | $PO_{Euy}$ Min | Top | 793.8927 | 0 | -122.2892 | -239.0551 | 6256.8738 | -1551.9329 |
| level 5 | $PO_{Euy}$ Min | Bottom | 816.8381 | -0.0392 | -0.0682 | 0.2774 | 6443.5642 | -1596.6339 |
| level 5 | $LS_{1.2G+1.5Q}$ | Top | 2284.6404 | 0 | 0 | 0 | 17994.707 | -4466.2647 |
| level 5 | $LS_{1.2G+1.5Q}$ | Bottom | 2312.1749 | 0 | 0 | 0 | 18218.8148 | -4519.8268 |
| level 5 | ULS Max | Top | 2284.6404 | 1.438E-05 | 4.185E-05 | 611.3743 | 17994.707 | -1039.9493 |
| level 5 | ULS Max | Bottom | 2312.1749 | 1.3973 | 2.4176 | 6.1008 | 18218.8148 | -1093.5114 |
| level 5 | ULS Min | Top | 532.0494 | -67.4138 | -80.378 | -229.8025 | 4196.759 | -4466.2647 |
| level 5 | ULS Min | Bottom | 559.5839 | -0.0292 | -0.0659 | -12.6937 | 4420.8668 | -4519.8268 |
| level 5 | 1.2G+Wx | Top | 532.0494 | -67.4138 | 0 | 555.153 | 4196.759 | -1113.2793 |
| level 5 | 1.2G+Wx | Bottom | 559.5839 | 0 | 0 | 0 | 4420.8668 | -1382.5657 |
| level 5 | 1.2G+Wy | Top | 532.0494 | 0 | -80.378 | -132.6238 | 4284.191 | -1039.9493 |
| level 5 | 1.2G+Wy | Bottom | 559.5839 | 0 | 0 | 0 | 4765.5084 | -1093.5114 |
| level 4 | $LS_G$ | Top | 680.2529 | 0 | 0 | 0 | 5369.7274 | -1329.4984 |
| level 4 | $LS_G$ | Bottom | 709.736 | 0 | 0 | 0 | 5609.6947 | -1386.8509 |
| level 4 | $LS_Q$ | Top | 1660.3102 | 0 | 0 | 0 | 13066.1613 | -3245.9064 |

**Table 5.5 - Story Forces (continued)**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 4 | $LS_{Q}$ | Bottom | 1660.3102 | 0 | 0 | 0 | 13066.1613 | -3245.9064 |
| level 4 | $LS_{Eu}$ 1 | Top | 0 | -83.5184 | 0 | 658.3662 | 0 | -332.1699 |
| level 4 | $LS_{Eu}$ 1 | Bottom | 0 | 0 | 0 | 0 | 0 | -599.4292 |
| level 4 | $LS_{Eu}$ 2 | Top | 0 | 0 | -77.2748 | -151.0508 | 307.3379 | 0 |
| level 4 | $LS_{Eu}$ 2 | Bottom | 0 | 0 | 0 | 0 | 554.6177 | 0 |
| level 4 | $LS_{Eu}$ 3 | Top | 0 | -83.5184 | 0 | 790.7084 | 0 | -332.1699 |
| level 4 | $LS_{Eu}$ 3 | Bottom | 0 | 0 | 0 | 0 | 0 | -599.4292 |
| level 4 | $LS_{Eu}$ 4 | Top | 0 | 0 | -77.2748 | -297.0474 | 307.3379 | 0 |
| level 4 | $LS_{Eu}$ 4 | Bottom | 0 | 0 | 0 | 0 | 554.6177 | 0 |
| level 4 | $LS_{Eu}$ 5 | Top | 0 | -83.5184 | 0 | 526.0239 | 0 | -332.1699 |
| level 4 | $LS_{Eu}$ 5 | Bottom | 0 | 0 | 0 | 0 | 0 | -599.4292 |
| level 4 | $LS_{Eu}$ 6 | Top | 0 | 0 | -77.2748 | -5.0542 | 307.3379 | 0 |
| level 4 | $LS_{Eu}$ 6 | Bottom | 0 | 0 | 0 | 0 | 554.6177 | 0 |
| level 4 | $LS_{Wux}$ | Top | 0 | -109.9676 | 0 | 905.5831 | 0 | -289.3914 |
| level 4 | $LS_{Wux}$ | Bottom | 0 | 0 | 0 | 0 | 0 | -641.2877 |
| level 4 | $LS_{Wuy}$ | Top | 0 | 0 | -131.1152 | -216.3401 | 345.0436 | 0 |
| level 4 | $LS_{Wuy}$ | Bottom | 0 | 0 | 0 | 0 | 764.6122 | 0 |
| level 4 | $NL_{Eu}$ Max | Top | 1178.346 | 3.404E-05 | 1.428E-05 | 790.7075 | 9609.7353 | -2303.211 |
| level 4 | $NL_{Eu}$ Max | Bottom | 1207.896 | 1.9585 | 3.3559 | 8.3814 | 10109.6151 | -2360.6028 |
| level 4 | $NL_{Eu}$ Min | Top | 1178.3459 | -83.5185 | -77.2748 | -297.0691 | 9289.5187 | -2647.5992 |
| level 4 | $NL_{Eu}$ Min | Bottom | 1207.829 | -0.0462 | -0.0843 | -17.6085 | 9529.4279 | -2983.9957 |
| level 4 | $NL_{Eu}$ Max | Top | 1178.346 | 1.759E-05 | 0.0001 | 1265.134 | 9802.3397 | -2303.0661 |
| level 4 | $NL_{Eu}$ Max | Bottom | 1207.829 | 3.2208 | 5.423 | 12.8737 | 10458.6719 | -2360.503 |
| level 4 | $NL_{Eu}$ Min | Top | 1178.3459 | -133.6294 | -123.6397 | -475.3295 | 9289.4544 | -2854.4547 |
| level 4 | $NL_{Eu}$ Min | Bottom | 1207.7802 | -0.0254 | -0.0918 | -28.8715 | 9529.3683 | -3358.1099 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Top | 1178.346 | 8.807E-07 | -1.854E-05 | 0.0011 | 9289.5041 | -2303.2479 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Bottom | 1207.829 | -0.0728 | -0.0853 | 0.5353 | 9529.3532 | -2360.5677 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Top | 1178.346 | 8.807E-07 | -1.854E-05 | 0.0011 | 9289.5041 | -2303.2479 |
| level 4 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Bottom | 1207.829 | -0.0728 | -0.0853 | 0.5353 | 9529.3532 | -2360.5677 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Top | 3012.7516 | 4.891E-06 | 1.054E-05 | 0.0073 | 23733.1306 | -5889.2063 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Bottom | 3056.9762 | -0.5114 | -0.6664 | 3.8057 | 24091.9633 | -5975.0352 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Top | 3012.7516 | 4.891E-06 | 1.054E-05 | 0.0073 | 23733.1306 | -5889.2063 |
| level 4 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Bottom | 3056.9762 | -0.5114 | -0.6664 | 3.8057 | 24091.9633 | -5975.0352 |
| level 4 | $PO_{Eux}$ Max | Top | 1178.346 | 8.807E-07 | -1.851E-05 | 1473.1235 | 9289.8048 | -2303.2479 |
| level 4 | $PO_{Eux}$ Max | Bottom | 1207.829 | 4.5131 | -0.0597 | 0.5353 | 9529.7743 | -2360.5677 |
| level 4 | $PO_{Eux}$ Min | Top | 1178.346 | -186.8744 | -1.856E-05 | 0.0011 | 9289.5041 | -3074.4113 |
| level 4 | $PO_{Eux}$ Min | Bottom | 1207.829 | -0.0728 | -0.0853 | -37.2332 | 9529.3532 | -3756.5782 |
| level 4 | $PO_{Euy}$ Max | Top | 1178.346 | 9.512E-07 | -1.854E-05 | 0.0011 | 9945.9002 | -2303.2479 |
| level 4 | $PO_{Euy}$ Max | Bottom | 1207.829 | 0.0431 | 6.9383 | 13.1061 | 10718.8457 | -2360.5677 |
| level 4 | $PO_{Euy}$ Min | Top | 1178.346 | 5.763E-07 | -158.175 | -309.2006 | 9289.5041 | -2303.3872 |

**Table 5.5 - Story Forces (continued)**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 4 | $PO_{Euy}$ Min | Bottom | 1207.829 | -0.0728 | -0.0853 | 0.5353 | 9529.3532 | -2360.8242 |
| level 4 | $LS_{1.2G+1.5Q}$ | Top | 3306.7688 | 0 | 0 | 0 | 26042.9148 | -6464.2577 |
| level 4 | $LS_{1.2G+1.5Q}$ | Bottom | 3342.1485 | 0 | 0 | 0 | 26330.8755 | -6533.0808 |
| level 4 | ULS Max | Top | 3306.7688 | 3.404E-05 | 1.428E-05 | 905.5831 | 26042.9148 | -1595.3981 |
| level 4 | ULS Max | Bottom | 3342.1485 | 1.9585 | 3.3559 | 8.3814 | 26330.8755 | -1664.2211 |
| level 4 | ULS Min | Top | 816.3035 | -109.9676 | -131.1152 | -297.0691 | 6443.6729 | -6464.2577 |
| level 4 | ULS Min | Bottom | 851.6832 | -0.0462 | -0.0843 | -17.6085 | 6731.6336 | -6533.0808 |
| level 4 | 1.2G+Wx | Top | 816.3035 | -109.9676 | 0 | 905.5831 | 6443.6729 | -1884.7895 |
| level 4 | 1.2G+Wx | Bottom | 851.6832 | 0 | 0 | 0 | 6731.6336 | -2305.5088 |
| level 4 | 1.2G+Wy | Top | 816.3035 | 0 | -131.1152 | -216.3401 | 6788.7164 | -1595.3981 |
| level 4 | 1.2G+Wy | Bottom | 851.6832 | 0 | 0 | 0 | 7496.2458 | -1664.2211 |
| level 3 | $LS_G$ | Top | 923.6689 | 0 | 0 | 0 | 7295.3664 | -1805.0898 |
| level 3 | $LS_G$ | Bottom | 953.152 | 0 | 0 | 0 | 7535.3337 | -1862.4424 |
| level 3 | $LS_Q$ | Top | 2244.5072 | 0 | 0 | 0 | 17665.4773 | -4388.0116 |
| level 3 | $LS_Q$ | Bottom | 2244.5072 | 0 | 0 | 0 | 17665.4773 | -4388.0116 |
| level 3 | $LS_{Eu}$ 1 | Top | 0 | -99.1149 | 0 | 781.4387 | 0 | -599.8468 |
| level 3 | $LS_{Eu}$ 1 | Bottom | 0 | 0 | 0 | 0 | 0 | -917.0148 |
| level 3 | $LS_{Eu}$ 2 | Top | 0 | 0 | -91.7054 | -179.2545 | 555.0041 | 0 |
| level 3 | $LS_{Eu}$ 2 | Bottom | 0 | 0 | 0 | 0 | 848.4617 | 0 |
| level 3 | $LS_{Eu}$ 3 | Top | 0 | -99.1149 | 0 | 938.5164 | 0 | -599.8468 |
| level 3 | $LS_{Eu}$ 3 | Bottom | 0 | 0 | 0 | 0 | 0 | -917.0148 |
| level 3 | $LS_{Eu}$ 4 | Top | 0 | 0 | -91.7054 | -352.5387 | 555.0041 | 0 |
| level 3 | $LS_{Eu}$ 4 | Bottom | 0 | 0 | 0 | 0 | 848.4617 | -5.295E-07 |
| level 3 | $LS_{Eu}$ 5 | Top | 0 | -99.1149 | 0 | 624.3609 | 0 | -599.8468 |
| level 3 | $LS_{Eu}$ 5 | Bottom | 0 | 0 | 0 | 0 | 0 | -917.0148 |
| level 3 | $LS_{Eu}$ 6 | Top | 0 | 0 | -91.7054 | -5.9703 | 555.0041 | 0 |
| level 3 | $LS_{Eu}$ 6 | Bottom | 0 | 0 | 0 | 0 | 848.4617 | 0 |
| level 3 | $LS_{Wux}$ | Top | 0 | -150.9607 | 0 | 1243.1613 | 0 | -641.8376 |
| level 3 | $LS_{Wux}$ | Bottom | 0 | 0 | 0 | 0 | 0 | -1124.9118 |
| level 3 | $LS_{Wuy}$ | Top | 0 | 0 | -179.9916 | -296.9861 | 765.2678 | 0 |
| level 3 | $LS_{Wuy}$ | Bottom | 0 | 0 | 0 | 0 | 1341.2408 | -6.823E-07 |
| level 3 | $NL_{Eu}$ Max | Top | 1597.0211 | 0.0002 | -3.305E-05 | 938.5013 | 13175.3917 | -3121.4737 |
| level 3 | $NL_{Eu}$ Max | Bottom | 1626.817 | 2.3875 | 3.9118 | 9.36 | 13724.956 | -3178.9365 |
| level 3 | $NL_{Eu}$ Min | Top | 1597.0211 | -99.1152 | -91.7054 | -352.5414 | 12594.9057 | -3744.8922 |
| level 3 | $NL_{Eu}$ Min | Bottom | 1626.5042 | -0.0409 | -0.0845 | -20.8709 | 12834.8291 | -4135.1025 |
| level 3 | $NL_{Eu}$ Max | Top | 1597.0211 | 2.571E-05 | -3.305E-05 | 1501.6126 | 13524.6367 | -3121.365 |
| level 3 | $NL_{Eu}$ Max | Bottom | 1627.551 | 3.8656 | 6.268 | 14.2821 | 14260.5758 | -3178.969 |
| level 3 | $NL_{Eu}$ Min | Top | 1597.0211 | -158.5846 | -146.7286 | -564.0818 | 12594.8577 | -4119.5028 |
| level 3 | $NL_{Eu}$ Min | Bottom | 1626.5042 | -0.0162 | -0.1003 | -33.8104 | 12834.848 | -4707.888 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Top | 1597.0211 | 1.208E-06 | -3.305E-05 | 0.0014 | 12594.8262 | -3121.4442 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Bottom | 1626.5042 | -0.0642 | -0.0806 | 0.514 | 12834.6402 | -3178.7719 |

**Table 5.5 - Story Forces (continued)**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Top | 1597.0211 | 1.208E-06 | -3.305E-05 | 0.0014 | 12594.8262 | -3121.4442 |
| level 3 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Bottom | 1626.5042 | -0.0642 | -0.0806 | 0.514 | 12834.6402 | -3178.7719 |
| level 3 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Top | 4078.912 | 4.031E-06 | 9.53E-06 | 0.0085 | 32139.6966 | -7972.9586 |
| level 3 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Bottom | 4123.1367 | -0.4704 | -0.6844 | 3.759 | 32498.0741 | -8058.8286 |
| level 3 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Top | 4078.912 | 4.031E-06 | 9.53E-06 | 0.0085 | 32139.6966 | -7972.9586 |
| level 3 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Bottom | 4123.1367 | -0.4704 | -0.6844 | 3.759 | 32498.0741 | -8058.8286 |
| level 3 | $PO_{Eux}$ Max | Top | 1597.0211 | 1.208E-06 | -3.302E-05 | 1748.5035 | 12595.2655 | -3121.4442 |
| level 3 | $PO_{Eux}$ Max | Bottom | 1626.5042 | 5.2835 | -0.0654 | 0.514 | 12835.1697 | -3178.7719 |
| level 3 | $PO_{Eux}$ Min | Top | 1597.0211 | -221.772 | -3.306E-05 | 0.0014 | 12594.8262 | -4517.9577 |
| level 3 | $PO_{Eux}$ Min | Bottom | 1626.5042 | -0.0642 | -0.0806 | -43.101 | 12834.6402 | -5318.8955 |
| level 3 | $PO_{Euy}$ Max | Top | 1597.0211 | 1.284E-06 | -3.305E-05 | 0.0014 | 13784.9519 | -3121.4442 |
| level 3 | $PO_{Euy}$ Max | Bottom | 1626.5042 | 0.0482 | 7.9921 | 15.0722 | 14659.7924 | -3178.7719 |
| level 3 | $PO_{Euy}$ Min | Top | 1597.0211 | 8.891E-07 | -187.7132 | -366.9391 | 12594.8262 | -3121.6971 |
| level 3 | $PO_{Euy}$ Min | Bottom | 1626.5042 | -0.0642 | -0.0806 | 0.514 | 12834.6402 | -3179.1658 |
| level 3 | $LS_{1.2G+1.5Q}$ | Top | 4475.1635 | 0 | 0 | 0 | 35252.6556 | -8748.1252 |
| level 3 | $LS_{1.2G+1.5Q}$ | Bottom | 4510.5432 | 0 | 0 | 0 | 35540.6163 | -8816.9482 |
| level 3 | ULS Max | Top | 4475.1635 | 0.0002 | 0 | 1243.1613 | 35252.6556 | -2166.1078 |
| level 3 | ULS Max | Bottom | 4510.5432 | 2.3875 | 3.9118 | 9.36 | 35540.6163 | -2234.9308 |
| level 3 | ULS Min | Top | 1108.4027 | -150.9607 | -179.9916 | -352.5414 | 8754.4397 | -8748.1252 |
| level 3 | ULS Min | Bottom | 1143.7824 | -0.0409 | -0.0845 | -20.8709 | 9042.4004 | -8816.9482 |
| level 3 | 1.2G+Wx | Top | 1108.4027 | -150.9607 | 0 | 1243.1613 | 8754.4397 | -2807.9454 |
| level 3 | 1.2G+Wx | Bottom | 1143.7824 | 0 | 0 | 0 | 9042.4004 | -3359.8426 |
| level 3 | 1.2G+Wy | Top | 1108.4027 | 0 | -179.9916 | -296.9861 | 9519.7075 | -2166.1078 |
| level 3 | 1.2G+Wy | Bottom | 1143.7824 | 0 | 0 | 0 | 10383.6413 | -2234.9308 |
| level 2 | $LS_G$ | Top | 1167.8248 | 0 | 0 | 0 | 9227.1169 | -2282.1278 |
| level 2 | $LS_G$ | Bottom | 1203.3305 | 0 | 0 | 0 | 9516.1029 | -2351.1958 |
| level 2 | $LS_Q$ | Top | 2828.7042 | 0 | 0 | 0 | 22264.7933 | -5530.1167 |
| level 2 | $LS_Q$ | Bottom | 2828.7042 | 0 | 0 | 0 | 22264.7933 | -5530.1167 |
| level 2 | $LS_{Eu}$ 1 | Top | 0 | -109.5885 | 0 | 864.1076 | 0 | -917.5104 |
| level 2 | $LS_{Eu}$ 1 | Bottom | 0 | 0 | 0 | 0 | 0 | -1268.1939 |
| level 2 | $LS_{Eu}$ 2 | Top | 0 | 0 | -101.396 | -198.194 | 848.9202 | 0 |
| level 2 | $LS_{Eu}$ 2 | Bottom | 0 | 0 | 0 | 0 | 1173.3878 | -5.396E-07 |
| level 2 | $LS_{Eu}$ 3 | Top | 0 | -109.5885 | 0 | 1037.7961 | 0 | -917.5104 |
| level 2 | $LS_{Eu}$ 3 | Bottom | 0 | 0 | 0 | 0 | 0 | -1268.1939 |
| level 2 | $LS_{Eu}$ 4 | Top | 0 | 0 | -101.396 | -389.8028 | 848.9202 | -5.298E-07 |
| level 2 | $LS_{Eu}$ 4 | Bottom | 0 | 0 | 0 | 0 | 1173.3878 | -6.959E-07 |
| level 2 | $LS_{Eu}$ 5 | Top | 0 | -109.5885 | 0 | 690.419 | 0 | -917.5104 |
| level 2 | $LS_{Eu}$ 5 | Bottom | 0 | 0 | 0 | 0 | 0 | -1268.1939 |
| level 2 | $LS_{Eu}$ 6 | Top | 0 | 0 | -101.396 | -6.5852 | 848.9202 | 0 |
| level 2 | $LS_{Eu}$ 6 | Bottom | 0 | 0 | 0 | 0 | 1173.3878 | 0 |
| level 2 | $LS_{Wux}$ | Top | 0 | -191.7271 | 0 | 1578.8729 | 0 | -1125.6666 |
| level 2 | $LS_{Wux}$ | Bottom | 0 | 0 | 0 | 0 | 0 | -1739.1934 |

**Table 5.5 - Story Forces (continued)**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 2 | $LS_{Wuy}$ | Top | 0 | 0 | -228.5977 | -377.1863 | 1342.1408 | -6.826E-07 |
| level 2 | $LS_{Wuy}$ | Bottom | 0 | 0 | 0 | 0 | 2073.6535 | -8.706E-07 |
| level 2 | $NL_{Eu}$ Max | Top | 2016.4362 | 0.0001 | -0.0001 | 1037.7681 | 16796.8229 | -3941.2538 |
| level 2 | $NL_{Eu}$ Max | Bottom | 2054.377 | 2.5552 | 4.0185 | 9.0396 | 17427.7447 | -4010.8497 |
| level 2 | $NL_{Eu}$ Min | Top | 2016.4361 | -109.5891 | -101.3962 | -389.7871 | 15906.4138 | -4896.5869 |
| level 2 | $NL_{Eu}$ Min | Bottom | 2051.9955 | -0.0362 | -0.0554 | -21.4421 | 16195.4247 | -5342.7583 |
| level 2 | $NL_{Eu}$ Max | Top | 2016.4363 | 2.219E-05 | -0.0001 | 1660.4674 | 17332.597 | -3941.2812 |
| level 2 | $NL_{Eu}$ Max | Bottom | 2060.7523 | 4.0647 | 6.3928 | 13.9076 | 18169.0901 | -4010.9914 |
| level 2 | $NL_{Eu}$ Min | Top | 2016.4361 | -175.3447 | -162.2337 | -623.6651 | 15906.4332 | -5470.8988 |
| level 2 | $NL_{Eu}$ Min | Bottom | 2051.9955 | -0.0188 | -0.0785 | -33.9339 | 16195.576 | -6126.5088 |
| level 2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Top | 2016.4361 | 9.793E-07 | -0.0001 | 0.0015 | 15906.2276 | -3941.0925 |
| level 2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Bottom | 2051.9955 | -0.0542 | -0.0449 | 0.4617 | 16195.1833 | -4010.7516 |
| level 2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Top | 2016.4361 | 9.793E-07 | -0.0001 | 0.0015 | 15906.2276 | -3941.0925 |
| level 2 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Bottom | 2051.9955 | -0.0542 | -0.0449 | 0.4617 | 16195.1833 | -4010.7516 |
| level 2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Top | 5146.1823 | 4.797E-06 | 1.035E-05 | 0.0088 | 40555.0025 | -10058.9068 |
| level 2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Bottom | 5199.4408 | -0.3863 | -0.5001 | 3.0282 | 40986.4176 | -10162.3669 |
| level 2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Top | 5146.1823 | 4.797E-06 | 1.035E-05 | 0.0088 | 40555.0025 | -10058.9068 |
| level 2 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Bottom | 5199.4408 | -0.3863 | -0.5001 | 3.0282 | 40986.4176 | -10162.3669 |
| level 2 | $PO_{Eux}$ Max | Top | 2016.4361 | 9.793E-07 | -0.0001 | 1933.4784 | 15906.777 | -3941.0925 |
| level 2 | $PO_{Eux}$ Max | Bottom | 2051.9955 | 5.5516 | -0.0253 | 0.4617 | 16195.7876 | -4010.7516 |
| level 2 | $PO_{Eux}$ Min | Top | 2016.4361 | -245.207 | -0.0001 | 0.0015 | 15906.2276 | -6081.8273 |
| level 2 | $PO_{Eux}$ Min | Bottom | 2051.9955 | -0.0542 | -0.0449 | -44.4136 | 16195.1833 | -6971.6297 |
| level 2 | $PO_{Euy}$ Max | Top | 2016.4361 | 1.215E-06 | -0.0001 | 0.0015 | 17731.9318 | -3941.0925 |
| level 2 | $PO_{Euy}$ Max | Bottom | 2051.9955 | 0.0304 | 8.137 | 15.6212 | 18721.6413 | -4010.7516 |
| level 2 | $PO_{Euy}$ Min | Top | 2016.4361 | 7.132E-07 | -207.5492 | -405.7109 | 15906.2276 | -3941.4835 |
| level 2 | $PO_{Euy}$ Min | Bottom | 2051.9955 | -0.0542 | -0.0449 | 0.4617 | 16195.1833 | -4011.261 |
| level 2 | $LS_{1.2G+1.5Q}$ | Top | 5644.4461 | 0 | 0 | 0 | 44469.7302 | -11033.7284 |
| level 2 | $LS_{1.2G+1.5Q}$ | Bottom | 5687.0529 | 0 | 0 | 0 | 44816.5134 | -11116.6101 |
| level 2 | ULS Max | Top | 5644.4461 | 0.0001 | 0 | 1578.8729 | 44469.7302 | -2738.5533 |
| level 2 | ULS Max | Bottom | 5687.0529 | 2.5552 | 4.0185 | 9.0396 | 44816.5134 | -2821.435 |
| level 2 | ULS Min | Top | 1401.3898 | -191.7271 | -228.5977 | -389.7871 | 11072.5403 | -11033.7284 |
| level 2 | ULS Min | Bottom | 1443.9966 | -0.0362 | -0.0554 | -21.4421 | 11419.3235 | -11116.6101 |
| level 2 | 1.2G+Wx | Top | 1401.3898 | -191.7271 | 0 | 1578.8729 | 11072.5403 | -3864.2199 |
| level 2 | 1.2G+Wx | Bottom | 1443.9966 | 0 | 0 | 0 | 11419.3235 | -4560.6284 |
| level 2 | 1.2G+Wy | Top | 1401.3898 | 0 | -228.5977 | -377.1863 | 12414.681 | -2738.5533 |
| level 2 | 1.2G+Wy | Bottom | 1443.9966 | 0 | 0 | 0 | 13492.977 | -2821.435 |
| level 1 | $LS_G$ | Top | 1419.2792 | 0 | 0 | 0 | 11218.4245 | -2773.3755 |
| level 1 | $LS_G$ | Bottom | 1465.1701 | 0 | 0 | 0 | 11591.9375 | -2862.6456 |
| level 1 | $LS_Q$ | Top | 3412.9012 | 0 | 0 | 0 | 26864.1093 | -6672.2218 |
| level 1 | $LS_Q$ | Bottom | 3412.9012 | 0 | 0 | 0 | 26864.1093 | -6672.2218 |
| level 1 | $LS_{Eu}$ 1 | Top | 0 | -114.9196 | 0 | 906.2118 | 0 | -1268.7419 |
| level 1 | $LS_{Eu}$ 1 | Bottom | 0 | -114.9197 | 0 | 906.2139 | 0 | -1636.4847 |
| level 1 | $LS_{Eu}$ 2 | Top | 0 | 0 | -106.3286 | -207.8336 | 1173.8948 | -5.398E-07 |

**Table 5.5 - Story Forces (continued)**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 1 | $LS_{Eu}$ 2 | Bottom | 0 | 0 | -106.3287 | -207.8339 | 1514.1464 | -6.58E-07 |
| level 1 | $LS_{Eu}$ 3 | Top | 0 | -114.9196 | 0 | 1088.3551 | 0 | -1268.7419 |
| level 1 | $LS_{Eu}$ 3 | Bottom | 0 | -114.9197 | 0 | 1088.3572 | -6.065E-07 | -1636.4847 |
| level 1 | $LS_{Eu}$ 4 | Top | 0 | 0 | -106.3286 | -408.7695 | 1173.8948 | -6.962E-07 |
| level 1 | $LS_{Eu}$ 4 | Bottom | 0 | 0 | -106.3287 | -408.7697 | 1514.1464 | -8.586E-07 |
| level 1 | $LS_{Eu}$ 5 | Top | 0 | -114.9196 | 0 | 724.0685 | 0 | -1268.7419 |
| level 1 | $LS_{Eu}$ 5 | Bottom | 0 | -114.9197 | 0 | 724.0706 | 6.159E-07 | -1636.4847 |
| level 1 | $LS_{Eu}$ 6 | Top | 0 | 0 | -106.3286 | -6.8978 | 1173.8948 | 0 |
| level 1 | $LS_{Eu}$ 6 | Bottom | 0 | 0 | -106.3287 | -6.898 | 1514.1464 | 0 |
| level 1 | $LS_{Wux}$ | Top | 0 | -232.4618 | 0 | 1914.3227 | 0 | -1740.152 |
| level 1 | $LS_{Wux}$ | Bottom | 0 | -232.4618 | 0 | 1914.3227 | 0 | -2484.0297 |
| level 1 | $LS_{Wuy}$ | Top | 0 | 0 | -277.1659 | -457.3238 | 2074.7965 | -8.709E-07 |
| level 1 | $LS_{Wuy}$ | Bottom | 0 | 0 | -277.1659 | -457.3238 | 2961.7275 | -1.066E-06 |
| level 1 | $NL_{Eu}$ Max | Top | 2443.1496 | 4.62E-06 | 4.1E-05 | 1088.3115 | 20509.7361 | -4775.0138 |
| level 1 | $NL_{Eu}$ Max | Bottom | 2489.0404 | 0 | 2.585E-05 | 1088.3324 | 21238.1129 | -4864.2002 |
| level 1 | $NL_{Eu}$ Min | Top | 2443.1495 | -114.9196 | -106.3286 | -408.7394 | 19277.3964 | -6096.4891 |
| level 1 | $NL_{Eu}$ Min | Bottom | 2489.0404 | -114.9197 | -106.3287 | -408.766 | 19650.5886 | -6566.1049 |
| level 1 | $NL_{Eu}$ Max | Top | 2443.1495 | 7.293E-07 | 4.027E-05 | 1741.3212 | 21251.0012 | -4775.0868 |
| level 1 | $NL_{Eu}$ Max | Bottom | 2489.0405 | 7.021E-06 | 1.129E-05 | 1741.3514 | 22192.4572 | -4864.2013 |
| level 1 | $NL_{Eu}$ Min | Top | 2443.1494 | -183.8717 | -170.1257 | -653.9834 | 19277.4676 | -6890.903 |
| level 1 | $NL_{Eu}$ Min | Bottom | 2489.0404 | -183.8716 | -170.1259 | -654.025 | 19650.7958 | -7588.6983 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Top | 2443.1495 | -1.06E-06 | 4.709E-06 | 0.0021 | 19277.1531 | -4774.951 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Max | Bottom | 2489.0404 | 0 | 0 | 0.0022 | 19650.358 | -4864.1863 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Top | 2443.1495 | -1.06E-06 | 4.709E-06 | 0.0021 | 19277.1531 | -4774.951 |
| level 1 | $NL_{GRAVITY}$ STARTING (G+0.3Q) Min | Bottom | 2489.0404 | 0 | 0 | 0.0022 | 19650.358 | -4864.1863 |
| level 1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Top | 6224.4002 | -1.939E-06 | 4.445E-06 | 0.0093 | 49059.2234 | -12166.17 |
| level 1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Max | Bottom | 6293.2366 | -2.065E-06 | -3.202E-06 | 0.01 | 49616.4978 | -12299.8615 |
| level 1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Top | 6224.4002 | -1.939E-06 | 4.445E-06 | 0.0093 | 49059.2234 | -12166.17 |
| level 1 | $NL_{GRAVITY}$ (1.2G+1.5Q) Min | Bottom | 6293.2366 | -2.065E-06 | -3.202E-06 | 0.01 | 49616.4978 | -12299.8615 |
| level 1 | $PO_{Eux}$ Max | Top | 2443.1495 | -1.06E-06 | 4.753E-06 | 2027.6851 | 19277.7886 | -4774.951 |
| level 1 | $PO_{Eux}$ Max | Bottom | 2489.0404 | 0 | 0 | 2027.6781 | 19651.0365 | -4864.1863 |
| level 1 | $PO_{Eux}$ Min | Top | 2443.1495 | -257.1354 | 4.529E-06 | 0.0021 | 19277.1531 | -7735.8808 |
| level 1 | $PO_{Eux}$ Min | Bottom | 2489.0404 | -257.1357 | 0 | 0.0022 | 19650.358 | -8676.0902 |
| level 1 | $PO_{Euy}$ Max | Top | 2443.1495 | -1.009E-06 | 4.709E-06 | 0.0021 | 21803.4168 | -4774.951 |
| level 1 | $PO_{Euy}$ Max | Bottom | 2489.0404 | 0 | 0 | 0.0022 | 22903.6029 | -4864.1863 |
| level 1 | $PO_{Euy}$ Min | Top | 2443.1495 | -1.167E-06 | -217.6456 | -425.4449 | 19277.1531 | -4775.4661 |
| level 1 | $PO_{Euy}$ Min | Bottom | 2489.0404 | 0 | -217.6458 | -425.4445 | 19650.358 | -4864.7528 |
| level 1 | $LS_{1.2G+1.5Q}$ | Top | 6822.4868 | 0 | 0 | 0 | 53758.2733 | -13336.3834 |

**Table 5.5 - Story Forces (continued)**

| Story | Load Case/Combo | Location | P kN | VX kN | VY kN | T kN-m | MX kN-m | MY kN-m |
|---|---|---|---|---|---|---|---|---|
| level 1 | $LS_{1.2G+1.5Q}$ | Bottom | 6877.5559 | 0 | 0 | 0 | 54206.4889 | -13443.5075 |
| level 1 | ULS Max | Top | 6822.4868 | 4.62E-06 | 4.1E-05 | 1914.3227 | 53758.2733 | -3328.0506 |
| level 1 | ULS Max | Bottom | 6877.5559 | 0 | 2.585E-05 | 1914.3227 | 54206.4889 | -3435.1747 |
| level 1 | ULS Min | Top | 1703.135 | -232.4618 | -277.1659 | -457.3238 | 13462.1094 | -13336.3834 |
| level 1 | ULS Min | Bottom | 1758.2041 | -232.4618 | -277.1659 | -457.3238 | 13910.325 | -13443.5075 |
| level 1 | 1.2G+Wx | Top | 1703.135 | -232.4618 | 0 | 1914.3227 | 13462.1094 | -5068.2026 |
| level 1 | 1.2G+Wx | Bottom | 1758.2041 | -232.4618 | 0 | 1914.3227 | 13910.325 | -5919.2044 |
| level 1 | 1.2G+Wy | Top | 1703.135 | 0 | -277.1659 | -457.3238 | 15536.9059 | -3328.0506 |
| level 1 | 1.2G+Wy | Bottom | 1758.2041 | 0 | -277.1659 | -457.3238 | 16872.0525 | -3435.1747 |

## 5.3 Modal Results

**Table 5.6 - Modal Periods and Frequencies**

| Case | Mode | Period sec | Frequency cyc/sec | Circular Frequency rad/sec | Eigenvalue rad²/sec² |
|---|---|---|---|---|---|
| Modal | 1 | 1.83 | 0.546 | 3.4327 | 11.7833 |
| Modal | 2 | 1.694 | 0.59 | 3.71 | 13.7644 |
| Modal | 3 | 1.226 | 0.816 | 5.1262 | 26.2782 |
| Modal | 4 | 0.377 | 2.655 | 16.6846 | 278.3756 |
| Modal | 5 | 0.368 | 2.716 | 17.0642 | 291.1859 |
| Modal | 6 | 0.317 | 3.159 | 19.8498 | 394.014 |
| Modal | 7 | 0.185 | 5.415 | 34.0264 | 1157.7939 |
| Modal | 8 | 0.178 | 5.618 | 35.2982 | 1245.9659 |
| Modal | 9 | 0.157 | 6.385 | 40.1171 | 1609.385 |
| Modal | 10 | 0.125 | 8.022 | 50.4062 | 2540.7852 |
| Modal | 11 | 0.119 | 8.41 | 52.8431 | 2792.3886 |
| Modal | 12 | 0.108 | 9.275 | 58.277 | 3396.207 |
| Modal | 13 | 0.096 | 10.468 | 65.7736 | 4326.1692 |
| Modal | 14 | 0.09 | 11.069 | 69.5461 | 4836.6651 |
| Modal | 15 | 0.082 | 12.142 | 76.2934 | 5820.6776 |
| Modal | 16 | 0.082 | 12.219 | 76.7713 | 5893.8378 |
| Modal | 17 | 0.078 | 12.901 | 81.0607 | 6570.8357 |
| Modal | 18 | 0.071 | 14.001 | 87.9725 | 7739.1545 |
| Modal | 19 | 0.058 | 17.212 | 108.1468 | 11695.7283 |
| Modal | 20 | 0.057 | 17.42 | 109.4529 | 11979.9388 |
| Modal | 21 | 0.055 | 18.277 | 114.8383 | 13187.8422 |
| Modal | 22 | 0.054 | 18.6 | 116.869 | 13658.3631 |
| Modal | 23 | 0.05 | 19.919 | 125.1552 | 15663.8154 |
| Modal | 24 | 0.03 | 33.174 | 208.4373 | 43446.0901 |
| Modal | 25 | 0.03 | 33.461 | 210.2447 | 44202.8401 |
| Modal | 26 | 0.03 | 33.716 | 211.8434 | 44877.6423 |
| Modal | 27 | 0.029 | 34.268 | 215.3143 | 46360.2383 |
| Modal | 28 | 0.029 | 34.821 | 218.7874 | 47867.9137 |
| Modal | 29 | 0.028 | 35.442 | 222.6874 | 49589.6703 |
| Modal | 30 | 0.025 | 39.586 | 248.727 | 61865.1199 |

**Table 5.7 - Modal Participating Mass Ratios (Part 1 of 2)**

| Case | Mode | Period sec | UX | UY | UZ | Sum UX | Sum UY | Sum UZ |
|---|---|---|---|---|---|---|---|---|
| Modal | 1 | 1.83 | 0.0004 | 0.7407 | 0 | 0.0004 | 0.7407 | 0 |
| Modal | 2 | 1.694 | 0.7273 | 0.0004 | 0 | 0.7277 | 0.7411 | 0 |
| Modal | 3 | 1.226 | 0.0012 | 0 | 0 | 0.7289 | 0.7411 | 0 |
| Modal | 4 | 0.377 | 0.0005 | 0.1628 | 0 | 0.7294 | 0.9039 | 0 |
| Modal | 5 | 0.368 | 0.1685 | 0.0005 | 0 | 0.8979 | 0.9043 | 0 |
| Modal | 6 | 0.317 | 0.001 | 0 | 0 | 0.8989 | 0.9043 | 0 |
| Modal | 7 | 0.185 | 1.353E-05 | 0.053 | 0 | 0.8989 | 0.9574 | 0 |
| Modal | 8 | 0.178 | 0.0555 | 1.109E-05 | 0 | 0.9544 | 0.9574 | 0 |
| Modal | 9 | 0.157 | 0.0002 | 0 | 0 | 0.9546 | 0.9574 | 0 |
| Modal | 10 | 0.125 | 7.069E-07 | 0.0233 | 0 | 0.9546 | 0.9807 | 0 |
| Modal | 11 | 0.119 | 0.0248 | 6.126E-07 | 0 | 0.9794 | 0.9807 | 0 |
| Modal | 12 | 0.108 | 4.97E-05 | 0 | 0 | 0.9794 | 0.9807 | 0 |
| Modal | 13 | 0.096 | 0 | 0.0123 | 0 | 0.9794 | 0.993 | 0 |
| Modal | 14 | 0.09 | 0.0133 | 0 | 0 | 0.9928 | 0.993 | 0 |
| Modal | 15 | 0.082 | 0 | 0.0069 | 0 | 0.9928 | 0.9999 | 0 |
| Modal | 16 | 0.082 | 5.236E-06 | 0 | 0 | 0.9928 | 0.9999 | 0 |
| Modal | 17 | 0.078 | 0.0072 | 0 | 0 | 1 | 0.9999 | 0 |
| Modal | 18 | 0.071 | 1.156E-05 | 0 | 0 | 1 | 0.9999 | 0 |
| Modal | 19 | 0.058 | 0 | 0 | 0 | 1 | 0.9999 | 0 |
| Modal | 20 | 0.057 | 0 | 2.567E-06 | 0 | 1 | 0.9999 | 0 |
| Modal | 21 | 0.055 | 0 | 0 | 0 | 1 | 0.9999 | 0 |
| Modal | 22 | 0.054 | 0 | 2.708E-05 | 0 | 1 | 0.9999 | 0 |
| Modal | 23 | 0.05 | 0 | 4.915E-05 | 0 | 1 | 1 | 0 |
| Modal | 24 | 0.03 | 0 | 0 | 0 | 1 | 1 | 0 |
| Modal | 25 | 0.03 | 0 | 1.251E-06 | 0 | 1 | 1 | 0 |
| Modal | 26 | 0.03 | 0 | 2.533E-06 | 0 | 1 | 1 | 0 |
| Modal | 27 | 0.029 | 0 | 5.292E-06 | 0 | 1 | 1 | 0 |
| Modal | 28 | 0.029 | 0 | 6.771E-06 | 0 | 1 | 1 | 0 |
| Modal | 29 | 0.028 | 0 | 9.071E-06 | 0 | 1 | 1 | 0 |
| Modal | 30 | 0.025 | 0 | 0 | 0 | 1 | 1 | 0 |

**Table 5.7 - Modal Participating Mass Ratios (Part 2 of 2)**

| Case | Mode | RX | RY | RZ | Sum RX | Sum RY | Sum RZ |
|---|---|---|---|---|---|---|---|
| Modal | 1 | 0.9375 | 0.0005 | 0 | 0.9375 | 0.0005 | 0 |
| Modal | 2 | 0.0005 | 0.9422 | 0.0009 | 0.9381 | 0.9428 | 0.0009 |
| Modal | 3 | 0 | 0.0014 | 0.6764 | 0.9381 | 0.9442 | 0.6773 |
| Modal | 4 | 0.0318 | 0.0001 | 2.381E-06 | 0.9699 | 0.9443 | 0.6773 |
| Modal | 5 | 0.0001 | 0.0265 | 0.0012 | 0.97 | 0.9707 | 0.6785 |
| Modal | 6 | 0 | 0.0002 | 0.1912 | 0.97 | 0.9709 | 0.8697 |
| Modal | 7 | 0.0146 | 2.849E-06 | 0 | 0.9846 | 0.9709 | 0.8697 |
| Modal | 8 | 3.409E-06 | 0.0137 | 0.0003 | 0.9846 | 0.9846 | 0.87 |
| Modal | 9 | 0 | 0.0001 | 0.0653 | 0.9846 | 0.9847 | 0.9353 |
| Modal | 10 | 0.0081 | 0 | 0 | 0.9926 | 0.9847 | 0.9353 |
| Modal | 11 | 0 | 0.0079 | 0.0001 | 0.9926 | 0.9926 | 0.9354 |

**Table 5.7 - Modal Participating Mass Ratios (Part 2 of 2, continued)**

| Case | Mode | RX | RY | RZ | Sum RX | Sum RY | Sum RZ |
|---|---|---|---|---|---|---|---|
| Modal | 12 | 0 | 1.793E-05 | 0.0342 | 0.9926 | 0.9926 | 0.9696 |
| Modal | 13 | 0.0046 | 0 | 0 | 0.9972 | 0.9926 | 0.9696 |
| Modal | 14 | 0 | 0.0047 | 2.379E-05 | 0.9972 | 0.9973 | 0.9696 |
| Modal | 15 | 0.0027 | 0 | 7.059E-07 | 1 | 0.9973 | 0.9696 |
| Modal | 16 | 0 | 2.072E-06 | 0.0191 | 1 | 0.9973 | 0.9887 |
| Modal | 17 | 0 | 0.0027 | 5.362E-06 | 1 | 1 | 0.9887 |
| Modal | 18 | 0 | 4.88E-06 | 0.0113 | 1 | 1 | 1 |
| Modal | 19 | 0 | 0 | 0 | 1 | 1 | 1 |
| Modal | 20 | 5.66E-07 | 0 | 0 | 1 | 1 | 1 |
| Modal | 21 | 0 | 0 | 0 | 1 | 1 | 1 |
| Modal | 22 | 9.873E-06 | 0 | 0 | 1 | 1 | 1 |
| Modal | 23 | 1.989E-05 | 0 | 0 | 1 | 1 | 1 |
| Modal | 24 | 0 | 0 | 0 | 1 | 1 | 1 |
| Modal | 25 | 0 | 0 | 0 | 1 | 1 | 1 |
| Modal | 26 | 5.839E-07 | 0 | 0 | 1 | 1 | 1 |
| Modal | 27 | 1.652E-06 | 0 | 0 | 1 | 1 | 1 |
| Modal | 28 | 2.192E-06 | 0 | 0 | 1 | 1 | 1 |
| Modal | 29 | 3.254E-06 | 0 | 0 | 1 | 1 | 1 |
| Modal | 30 | 0 | 0 | 0 | 1 | 1 | 1 |

**Table 5.8 - Modal Load Participation Ratios**

| Case | Item Type | Item | Static % | Dynamic % |
|---|---|---|---|---|
| Modal | Acceleration | UX | 100 | 100 |
| Modal | Acceleration | UY | 100 | 100 |
| Modal | Acceleration | UZ | 0 | 0 |

**Table 5.9 - Modal Direction Factors**

| Case | Mode | Period sec | UX | UY | UZ | RZ |
|---|---|---|---|---|---|---|
| Modal | 1 | 1.83 | 0.001 | 0.999 | 0 | 0 |
| Modal | 2 | 1.694 | 0.998 | 0.001 | 0 | 0.002 |
| Modal | 3 | 1.226 | 0.002 | 0 | 0 | 0.998 |
| Modal | 4 | 0.377 | 0.003 | 0.997 | 0 | 0 |
| Modal | 5 | 0.368 | 0.991 | 0.003 | 0 | 0.006 |
| Modal | 6 | 0.317 | 0.006 | 0 | 0 | 0.994 |
| Modal | 7 | 0.185 | 0 | 1 | 0 | 0 |
| Modal | 8 | 0.178 | 0.996 | 0 | 0 | 0.004 |
| Modal | 9 | 0.157 | 0.004 | 0 | 0 | 0.996 |
| Modal | 10 | 0.125 | 0 | 1 | 0 | 0 |
| Modal | 11 | 0.119 | 0.997 | 0 | 0 | 0.003 |
| Modal | 12 | 0.108 | 0.003 | 0 | 0 | 0.997 |
| Modal | 13 | 0.096 | 0 | 1 | 0 | 0 |
| Modal | 14 | 0.09 | 0.998 | 0 | 0 | 0.002 |
| Modal | 15 | 0.082 | 0 | 1 | 0 | 0 |

**Table 5.9 - Modal Direction Factors (continued)**

| Case | Mode | Period sec | UX | UY | UZ | RZ |
|---|---|---|---|---|---|---|
| Modal | 16 | 0.082 | 0.002 | 0 | 0 | 0.998 |
| Modal | 17 | 0.078 | 0.998 | 0 | 0 | 0.002 |
| Modal | 18 | 0.071 | 0.002 | 0 | 0 | 0.998 |
| Modal | 19 | 0.058 | 0.001 | 0.999 | 0 | 0 |
| Modal | 20 | 0.057 | 0 | 1 | 0 | 0 |
| Modal | 21 | 0.055 | 0 | 1 | 0 | 0 |
| Modal | 22 | 0.054 | 0 | 1 | 0 | 0 |
| Modal | 23 | 0.05 | 0 | 1 | 0 | 0 |
| Modal | 24 | 0.03 | 0 | 1 | 0 | 0 |
| Modal | 25 | 0.03 | 0 | 1 | 0 | 0 |
| Modal | 26 | 0.03 | 0 | 1 | 0 | 0 |
| Modal | 27 | 0.029 | 0 | 1 | 0 | 0 |
| Modal | 28 | 0.029 | 0 | 1 | 0 | 0 |
| Modal | 29 | 0.028 | 0 | 1 | 0 | 0 |
| Modal | 30 | 0.025 | 0.002 | 0.998 | 0 | 0 |

Appendix B:

Manual Calculations

EXTRAMILE
consulting structural engineers

PROJECT NO.:

**18021**

PROJECT TITLE:

**BRANZ /NASH Research on Specific Design of Multi-Storey Light Steel Framed Buildings**

CLIENT:

**Heavy Engineerign Research Association**

SITE ADDRESS:

**typical site in Auckland Region**

**Auckland**

DATE:

**10-Aug-18**

elaborated by:
Paul Milewski
*MEng (Hons)*
*CPEng, CMEngNZ, IntPE (NZ/AU)*
*CEng MICE (UK)*

# LOADS

***GRAVITY LOADS***

| | | G [kPa] | Q [kPa] |
|---|---|---|---|
| **Roof:** | | | |
| - roof covering | | 0.05 | |
| -timber trusses/rafters | | 0.15 | |
| -ceiling and services | | 0.10 | |
| - imposed roof load | | | 0.25 |
| | Σ | **0.30** | **0.25** |
| **Typical Wall - Timber** | | | |
| -framing | | 0.10 | |
| -services/insulation, finishes | | 0.20 | |
| | Σ | **0.30** | |
| **Floor:** | | | |
| - floor covering | | 0.10 | |
| -floor framing | | 0.17 | |
| -ceiling and services | | 0.15 | |
| - imposed roof load | | | 2.00 |
| | Σ | **0.42** | **2.00** |

***WIND LOADS***

Building importance level 2, therefore annual probabilities of exceedance
for service and ultimate wind speeds are 1/25 and 1/500 respectively, therefore:

| | | |
|---|---|---|
| Basic ultimate wind speed for wind zone A7, Vb: | [m/s] | 45 |
| Terrain category 3, therefore Mz,cat: | [-] | 0.94 |
| Shielding Ms: | [-] | 1.00 |
| Topographic Coefficient Mt: | [-] | 1 |
| Site wind speed Vs: | [m/s] | 42.30 |
| Basic velocity pressure qb: Vs^2 x 0.6 | [kPa] | 1.07 |

external pressure coefficients - roof:

| | | |
|---|---|---|
| wind suction along ridge governs by inspection: | [-] | -0.9 |
| corresponding internal pressure coefficient: | [-] | 0 |
| therefore max. wind load on roof: | [kPa] | -0.87 |

pressure coefficients - walls:

| | | |
|---|---|---|
| windward wall: | [-] | 0.7 |
| leeward wall: | [-] | -0.5 |
| side wall: | [-] | -0.5 |
| internal max.: | [-] | 0 |
| internal min.: | [-] | -0.3 |
| therefore max. wall face load: | [kPa] | 1.07 |
| and, taking combination factor kc=0.9, overall wind load for bracing calculation: | [kPa] | 1.16 |
| net pressure coefficient to the canopy | [-] | -1.2 |
| therefore loading onto the canopy | [kPa] | -1.3 |
| ratio of serviceability wind loading to ultimate wind loading: | [-] | 0.676 |

## *EARTHQUAKE LOADS*

| | | |
|---|---|---|
| assume fundamental frequency (conservative) | 2 | |
| | T= | 0.5 |
| conservatively assume soil type: | C | |
| spectral shape factor, Ch(T): | 0.85 | |
| hazard factor, Z: | 0.14 | |
| return period factor for normal importance building (IL-2, p=1/500): | 1.0 | |
| near fault factor, N(T,D): | 1.0 | |
| elastic site spectrum, C(T1) = | 0.1 | |
| ductility: | 2 | |
| structural performance factor: | 0.7 | |
| km= | 1.71 | |
| horizontal design action coefficient, Cd(T1) | 0.049 | |
| serviceability horizontal design action coefficient: | 0.024 | |

| level | height [m] | tot. height [m] | G [kN] | Q [kN] | W [kN] | wi x hi [kNm] | W [kN] | V1 [kN] | V2 [kN] |
|---|---|---|---|---|---|---|---|---|---|
| 1 | 3.2 | 3.2 | 380.00 | 91.2 | 471.20 | 1507.84 | 123.85829 | 6.02 | 6.49 |
| 2 | 3.2 | 6.4 | 380.00 | 91.2 | 471.20 | 3015.68 | 247.71657 | 12.04 | 12.94 |
| 3 | 3.2 | 9.6 | 380.00 | 91.2 | 471.20 | 4523.52 | 371.57486 | 18.06 | 19.25 |
| 4 | 3.2 | 12.8 | 380.00 | 91.2 | 471.20 | 6031.36 | 495.43314 | 24.07 | 23.27 |
| 5 | 3.2 | 16 | 380.00 | 91.2 | 471.20 | 7539.2 | 619.29143 | 30.09 | 31.42 |
| 6 | 3.2 | 19.2 | 380.00 | 91.2 | 471.20 | 9047.04 | 969.32571 | 47.10 | 48.43 |
| | | | | | 2827.2 | 31664.64 | | 137.37836 | |

V1 - manually calculated lateral loading
V2 - lateral loading from auto lateral cases in ETABS

# STUD SIZING

***PRELIMINARY STUD SIZING***

EXTERNAL WALL

| LEVEL | LW[m] | C/C[m] | TA UR[m2] | TA R[m2] | G[kPa] | Q[kPa] |
|---|---|---|---|---|---|---|
| 6 | 2.5 | 0.6 | 1.5 | 1.50 | 1.25 | 2 |
| 5 | 2.5 | 0.6 | 3 | 3.00 | 1.25 | 2 |
| 4 | 2.5 | 0.6 | 4.5 | 4.50 | 1.25 | 2 |
| 3 | 2.5 | 0.6 | 6 | 6.00 | 1.25 | 2 |
| 2 | 2.5 | 0.6 | 7.5 | 7.50 | 1.25 | 2 |
| 1 | 2.5 | 0.6 | 9 | 9.00 | 1.25 | 2 |

LW-loaded width; C/C-stud centers; TA UR/TA R - unreduced and reduced tributary areas

1.2G+1.5Q (M@50mm eccentricity or 0.3kPa)

| LEVEL | N[kN] | M[kNm] |
|---|---|---|
| 6 | 6.75 | 0.34 |
| 5 | 13.5 | 0.34 |
| 4 | 20.25 | 0.34 |
| 3 | 27 | 0.34 |
| 2 | 33.75 | 0.34 |
| 1 | 40.5 | 0.34 |

1.2G+0.4Q+Wu (M@50mm eccentricity or 1.07kPa)

| LEVEL | N[kN] | M[kNm] |
|---|---|---|
| 6 | 3.45 | 0.67 |
| 5 | 6.9 | 0.67 |
| 4 | 10.35 | 0.67 |
| 3 | 13.8 | 0.67 |
| 2 | 17.25 | 0.67 |
| 1 | 20.7 | 0.67 |

| LEVEL | D[mm] | BMT[mm] | config. | mat. |
|---|---|---|---|---|
| 6 | 90 | 0.75 | S | G550 |
| 5 | 90 | 0.95 | S | G550 |
| 4 | 90 | 1.15 | S | G550 |
| 3 | 90 | 1.5 | S | G350 |
| 2 | 90 | 0.95 | BTB | G550 |
| 1 | 90 | 0.95 | BTB | G550 |

D - depth of C channel; BMT - base metal thickness o the C channel

***PRELIMINARY STUD SIZING***

INTERNAL WALL

| LEVEL | LW[m] | C/C[m] | TA UR[m2] | TA R[m2] | G[kPa] | Q[kPa] |
|---|---|---|---|---|---|---|
| 6 | 5 | 0.6 | 3 | 3.00 | 1.25 | 2 |
| 5 | 5 | **0.6** | 6 | 6.00 | 1.25 | 2 |
| 4 | 5 | **0.6** | 9 | 9.00 | 1.25 | 2 |
| 3 | 5 | 0.6 | 12 | 10.39 | 1.25 | 2 |
| 2 | 5 | 0.6 | 15 | 11.62 | 1.25 | 2 |
| 1 | 5 | 0.6 | 18 | 12.73 | 1.25 | 2 |

LW-loaded width; C/C-stud centers; TA UR/TA R - unreduced and reduced tributary areas

1.2G+1.5Q (M@50mm eccentricity or 0.3kPa)

| LEVEL | N[kN] | M[kNm] |
|---|---|---|
| 6 | 13.5 | 0.68 |
| 5 | 27 | 0.68 |
| 4 | 40.5 | 0.68 |
| 3 | 46.765372 | 0.68 |
| 2 | 52.285275 | 0.68 |
| 1 | 57.275649 | 0.68 |

1.2G+0.4Q+Wu (M@50mm eccentricity or 1.07kPa)

| LEVEL | N[kN] | M[kNm] |
|---|---|---|
| 6 | 6.9 | 0.68 |
| 5 | 13.8 | 0.68 |
| 4 | 20.7 | 0.68 |
| 3 | 23.902301 | 0.68 |
| 2 | 26.723585 | 0.68 |
| 1 | 29.274221 | 0.68 |

| LEVEL | D[mm] | BMT[mm] | config. | mat. |
|---|---|---|---|---|
| 6 | 90 | 0.75 | S | G550 |
| 5 | 90 | 1.15 | S | G550 |
| 4 | 90 | 0.95 | BTB | G550 |
| 3 | 90 | 0.95 | BTB | G550 |
| 2 | 90 | 0.95 | BTB | G550 |
| 1 | 90 | 0.95 | BTB | G550 |

***FINAL STUD SIZING (BASED ON MODEL)***

M - BASED ON WIND FACE LOADING
N - MAX. COMPRESSION FROM MODEL
T - MAX. TENSION FROM MODEL

| LEVEL | N[kN] | M[kNm] | T[kN] |
|---|---|---|---|
| 6 | 19 | 0.68 | 1 |
| 5 | 27 | 0.68 | 1.4 |
| 4 | 39 | 0.68 | 5 |
| 3 | 46 | 0.68 | 12 |
| 2 | 57 | 0.68 | 26 |
| 1 | 75 | 0.68 | 42 |

finally in model and for QS

| LEVEL | D[mm] | BMT[mm] | config. | mat. |
|---|---|---|---|---|
| 6 | 90 | 1.15 | S | G550 |
| 5 | 90 | 1.5 | S | G350 |
| 4 | 90 | 0.95 | BTB | G550 |
| 3 | 90 | 0.95 | BTB | G550 |
| 2 | 90 | 1.15 | BTB | G550 |
| 1 | 90 | 1.5 | BTB | G350 |

D - depth of C channel; BMT - base metal thickness of the C channel
S - single sections
BTB - back to back sections

# CONNECTION CALCULATIONS

## *SCREW CAPACITY - LEVELS 3 AND 4 (0.95BMT)*

| | | |
|---|---|---|
| screw diameter | [mm] | 4.8 |
| t1 (thickness of the material on the side of the screw head) | [mm] | 1.50 |
| t2 (thickness of the material on the side of the screw point) | [mm] | 0.95 |
| fu1 | [MPa] | 420.0 |
| fu2 | [MPa] | 550.00 |
| C | [-] | 2.70 |
| | | |
| tilting | [kN] | 4.69 |
| | | |
| bearing 1 | [kN] | 8.16 |
| bearing 2 | [kN] | 6.77 |
| | | |
| tilting possible | [-] | N |
| t2/t1 | [-] | 0.63 |
| strength reduction factor | [-] | 0.5 |
| characteristic strength of the screw | [kN] | **3.39** |

## *SCREW CAPACITY - LEVELS 2 AND 6 (1.15BMT)*

| | | |
|---|---|---|
| screw diameter | [mm] | 4.8 |
| t1 (thickness of the material on the side of the screw head) | [mm] | 1.50 |
| t2 (thickness of the material on the side of the screw point) | [mm] | 1.15 |
| fu1 | [MPa] | 420.0 |
| fu2 | [MPa] | 550.00 |
| C | [-] | 2.70 |
| | | |
| tilting | [kN] | 6.24 |
| | | |
| bearing 1 | [kN] | 8.16 |
| bearing 2 | [kN] | 8.20 |
| | | |
| tilting possible | [-] | N |
| t2/t1 | [-] | 1 |
| strength reduction factor | [-] | 0.5 |
| characteristic strength of the screw | [kN] | 4.08 |

## *SCREW CAPACITY - LEVELS 1 AND 5 (1.5BMT)*

| | | |
|---|---|---|
| screw diameter | [mm] | 4.8 |
| t1 (thickness of the material on the side of the screw head) | [mm] | 1.50 |
| t2 (thickness of the material on the side of the screw point) | [mm] | 1.50 |
| fu1 | [MPa] | 420.0 |
| fu2 | [MPa] | 420.00 |
| C | [-] | 2.70 |
| | | |
| tilting | [kN] | 7.10 |
| | | |
| bearing 1 | [kN] | 8.16 |
| bearing 2 | [kN] | 8.16 |
| | | |
| tilting possible | [-] | N |
| t2/t1 | [-] | 1 |
| strength reduction factor | [-] | 0.5 |
| characteristic strength of the screw | [kN] | 4.08 |

***REQUIRED NUMBER OF SCREWS PER HOLD-DOWN***

| LEVEL | BMT[mm] | MAT. | SC[kN] | T[kN] | SC NO[-] |
|---|---|---|---|---|---|
| 6 | 1.15 | G550 | 4.08 | 1 | 1 |
| 5 | 1.5 | G350 | 4.08 | 1.4 | 1 |
| 4 | 0.95 | G550 | 3.39 | 5 | 2 |
| 3 | 0.95 | G550 | 3.39 | 12 | 4 |
| 2 | 1.15 | G550 | 4.08 | 26 | 7 |
| 1 | 1.5 | G350 | 4.08 | 42 | 11 |

SC- screw capacity; T- max. tension for a given level from model;
SC NO- required no of screws per hold-down

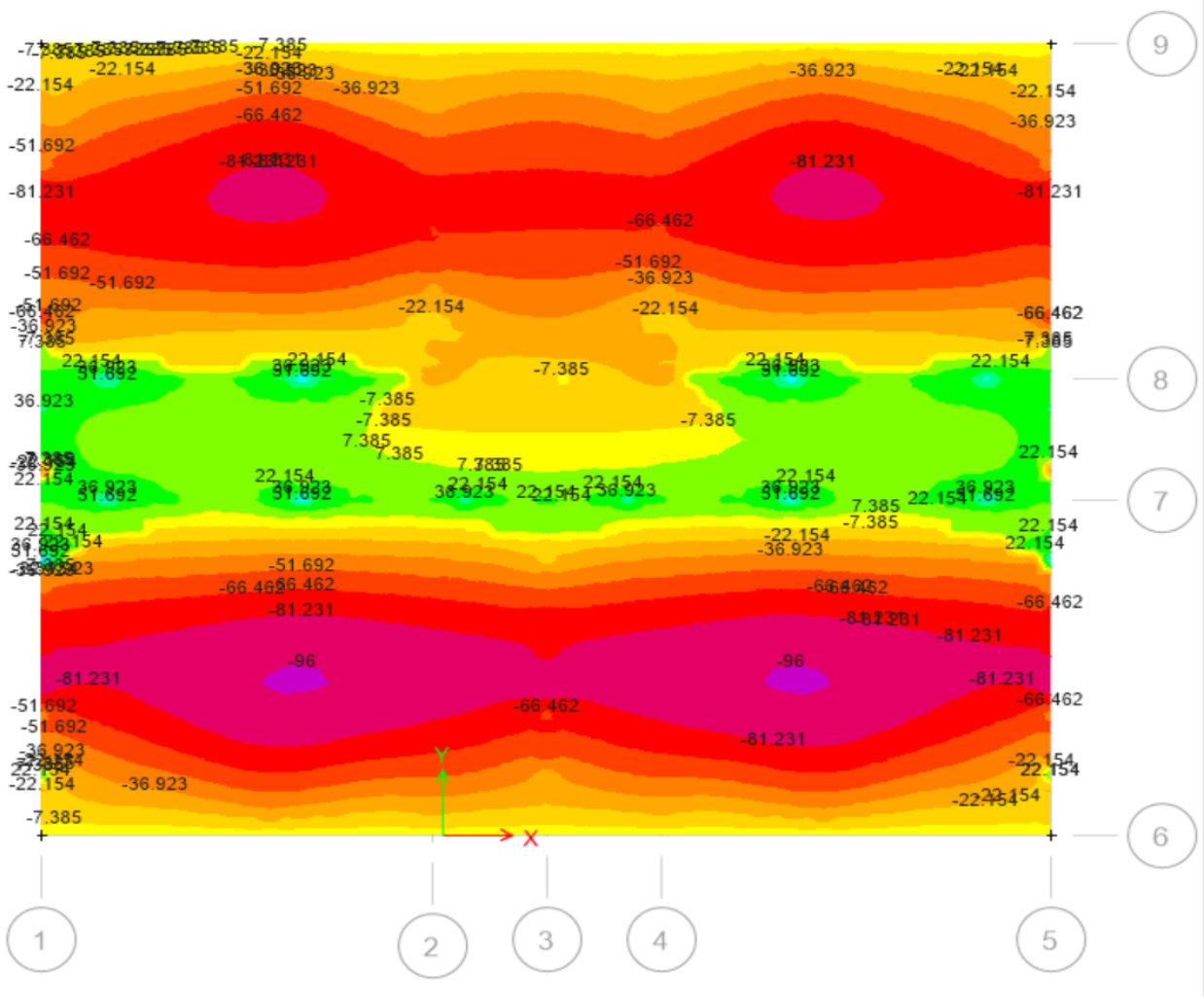
# LINTELS

***LINTEL SCHEDULE***

| mark | fasteners (in total) | type | no of jambs e/s |
|---|---|---|---|
| type A | 4 | A | 1 |
| type B | 4 | B (single plate) | 1 |

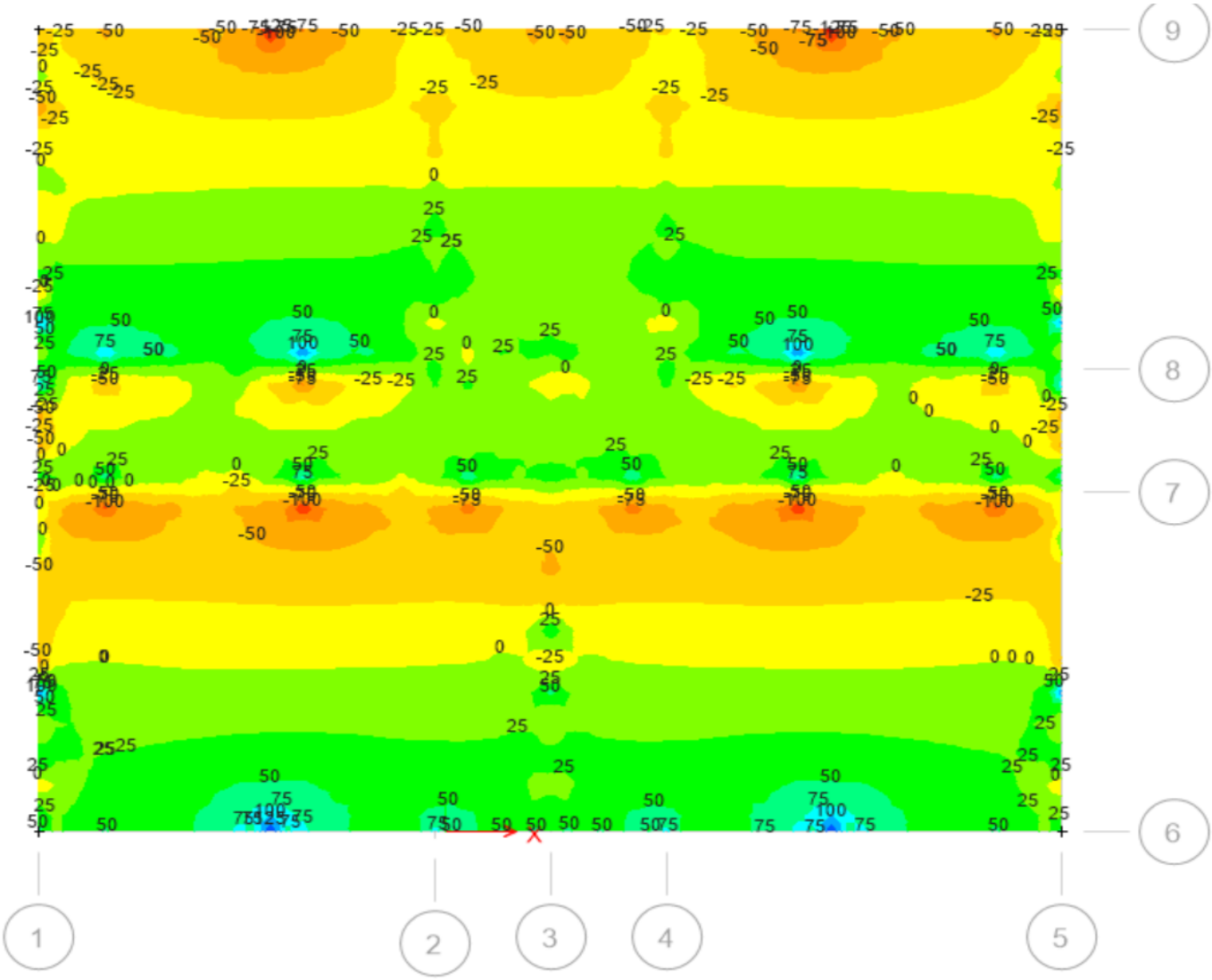
# FOUNDATIONS

***BASE SLAB FORCES***



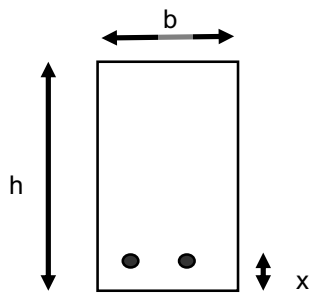

Mu [kNm]

***BASE SLAB FORCES***




Vu [kNm]

## BASE SLAM CHECK




| | | |
|---|---|---|
| ultimate M | [kNm] | 96.0 |
| ultimate V | [kN] | 100.0 |
| depth of beam: | [mm] | 400 |
| width of beam: | [mm] | 1000 |
| steel, fy: | [Mpa] | 500 |
| concrete, fc: | [Mpa] | 35 |

tension reinforcement:

| dia. | no. | 'x' | As |
|---|---|---|---|
| 8 | 0 | 0 | 0 |
| 10 | 0 | 0 | 0 |
| 12 | 0 | 0 | 0 |
| 16 | 5 | 50 | 1005 |
| 24 | 0 | 0 | 0 |
| 32 | 0 | 0 | 0 |
| | | 50 | 1005 |

| | | | |
|---|---|---|---|
| T | [kN] | 503 | |
| a | [mm] | 16.9 | |
| a balanced | [mm] | 121.7 | |
| % reinf. | [%] | 0.29% | |
| tension failure: | [-] | OK | |
| lever: | [mm] | 341.6 | |
| Mc | [kNm] | 145.93 | OK |

flexural reinforcement for shear:

| dia. | no. | As | | | |
|---|---|---|---|---|---|
| 8 | 0 | 0 | V* | [kN] | 100.00 |
| 10 | 0 | 0 | bw= | [mm] | 1000 |
| 12 | 0 | 0 | d= | [mm] | 325 |
| 16 | 10 | 2011 | fyt | [Mpa] | 500 |
| | | 2011 | seismic? | [y/n] | n |

| | | | |
|---|---|---|---|
| average shear stress in concrete: | [Mpa] | 0.41 | |
| allowable shear stress in concrete: | [Mpa] | 0.78 | |
| max. concrete shear stress: | [Mpa] | 1.18 | |
| min. concrete stress: | [Mpa] | 0.47 | |
| final allowable stress: | [Mpa] | 0.78 | OK |

Appendix C:

Bill of Quantities

EXTRAMILE
consulting structural engineers

| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | HERA Multistory | | | PROJECT NO: | 18021 |
| TITLE: | BILL OF QUANTITIES | | | PAGE: 1 | OF: 2 |
| DATE: 10 August 2018 | BY/CHKD: PM | REV: 0 | | STATUS: | information |

# BILL OF QUANTITIES

EXTRAMILE
consulting structural engineers

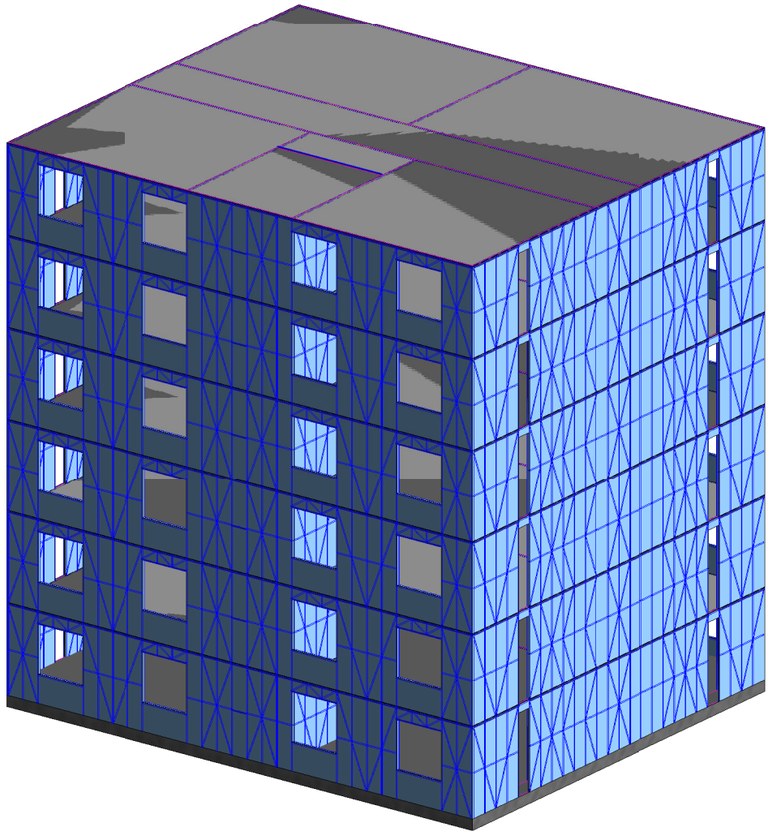
| | | | | | |
|---|---|---|---|---|---|
| PROJECT: | HERA Multistory | | | PROJECT NO: | 18021 |
| TITLE: | BILL OF QUANTITIES | | | PAGE: 2 | OF: 2 |
| DATE: 10 August 2018 | BY/CHKD: PM | REV: 0 | | STATUS: | information |

| | | |
|---|---|---|
| 90LC95 | lm | 2407 |
| 90LC115 | lm | 3611 |
| 90LC150 | lm | 3611 |
| RFS FJ290 | lm | 6000 |
| | | |
| concrete 35MPa | m3 | 120 |
| HD16 rebar | lm | 3450 |

Appendix D:

Structural Drawings

| Sheet Number | Sheet Name | Current Revision | Current Revision Date | Current Revision Description |
|---|---|---|---|---|
| 01 | DRAWING ISSUE SHEET | R.1 | 180810 | FOR INFORMATION |
| 02 | ROOF PLAN | R.1 | 180810 | FOR INFORMATION |
| 03 | TYP. UPPER LEVEL FLOOR PLAN | R.1 | 180810 | FOR INFORMATION |
| 04 | TYP. UPPER LEVEL WALL AND LINTEL PLAN | R.1 | 180810 | FOR INFORMATION |
| 05 | GROUND LEVEL WALL AND LINTEL PLAN | R.1 | 180810 | FOR INFORMATION |
| 06 | LINTEL DETAILS | R.1 | 180810 | FOR INFORMATION |
| 07 | GROUND LEVEL SLAB PLAN | R.1 | 180810 | FOR INFORMATION |
| 08 | ELEVATION NORTH | R.1 | 180810 | FOR INFORMATION |
| 09 | ELEVATION SOUTH | R.1 | 180810 | FOR INFORMATION |
| 10 | ELEVATION WEST AND EAST | R.1 | 180810 | FOR INFORMATION |
| 11 | SECTIONS | R.1 | 180810 | FOR INFORMATION |
| 12 | SECTIONS | R.1 | 180810 | FOR INFORMATION |
| 13 | SECTIONS | R.1 | 180810 | FOR INFORMATION |
| 14 | HOLDDOWN DETAILS | R.1 | 180810 | FOR INFORMATION |
| 15 | FOUNDATION DETAILS | R.1 | 180810 | FOR INFORMATION |



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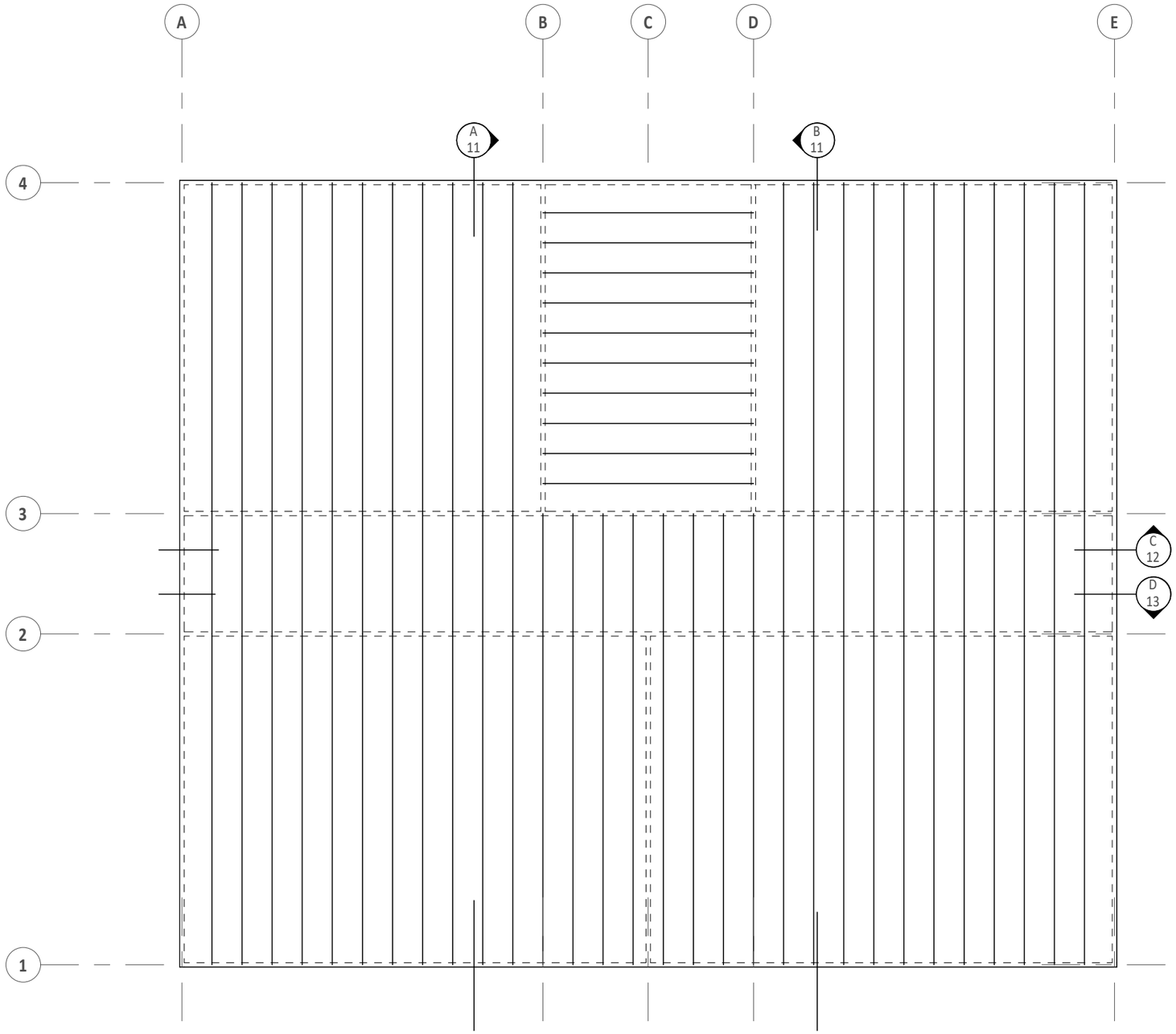
HERA

**Client:**
HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:**
Research on Multi-Storey Light Steel Framed Buildings

**Drawing:**
DRAWING ISSUE SHEET

| | | | | | | |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| Ref. | Description | | | | | Date |
| scale: @A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 01 | rev: R.1 |




**ROOF PLAN**

1 : 100

= = = = DENOTES WALLS UNDER

——— RFS 290 FJ BY ROLLFORING SERVICES (OR EQUIVALENT) FLOOR JOIST @600 MAX. c/c IN LINE WITH STUDS

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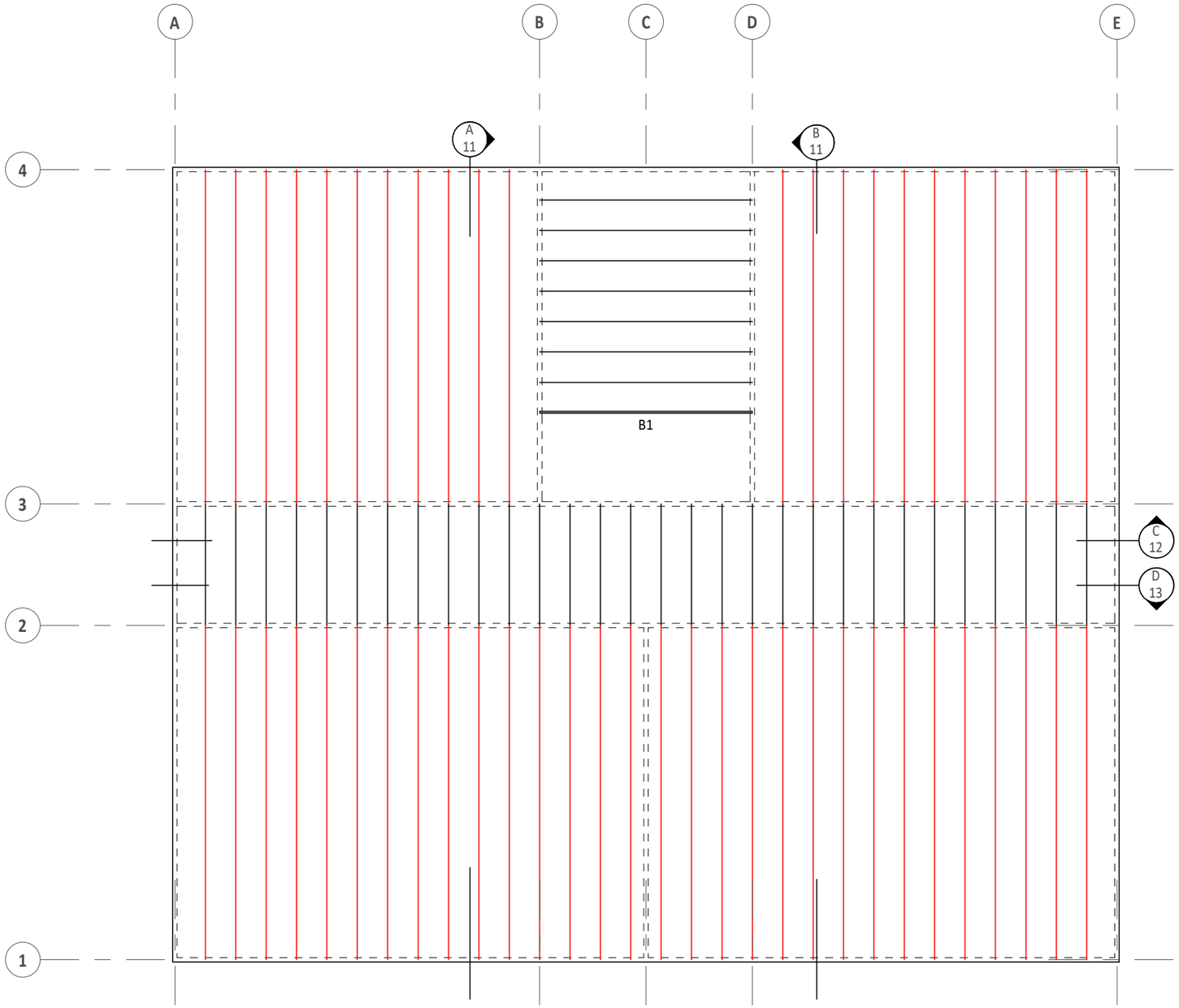
HERA

**Client:**
HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:**
Research on Multi-Storey Light Steel Framed Buildings

**Drawing:**
ROOF PLAN

| Ref. | Description | | | | Date |
|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | 180810 |
| scale: 1:100@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 02 | rev: R.1 |




**TYP. UPPER LEVEL FLOOR PLAN**

1 : 100

B1 - 250 PFC

DENOTES WALLS UNDER

RFS 290 FJ BY ROLLFORING SERVICES (OR EQUIVALENT) FLOOR JOIST @600 MAX. c/c IN LINE WITH STUDS

RFS 290 FJ BY ROLLFORING SERVICES (OR EQUIVALENT) FLOOR JOIST @300 MAX. c/c IN LINE WITH STUDS

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211 Karamu Road North
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www.extra-mile.co.nz, info@extra-mile.co.nz

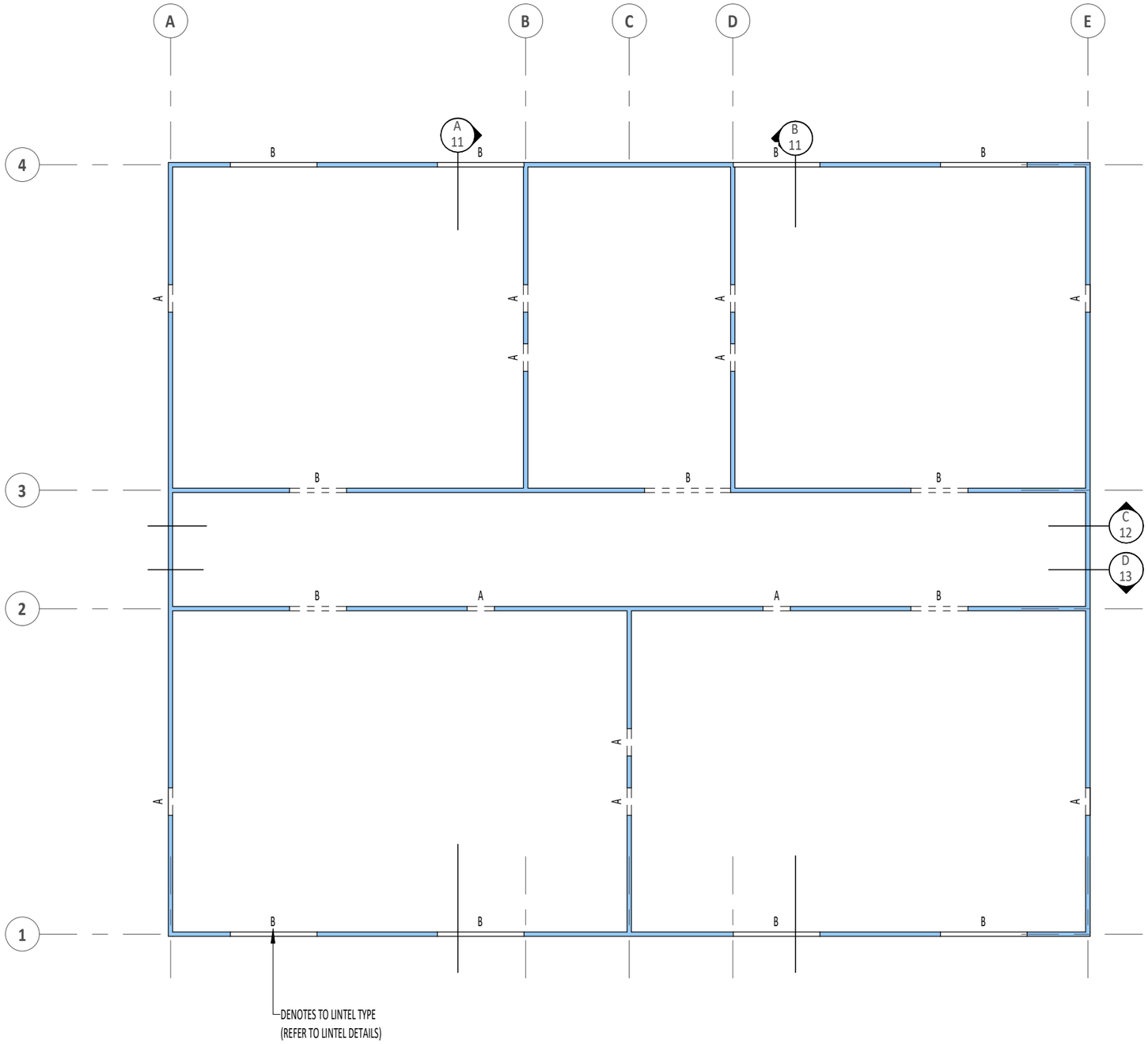
HERA

**Client:** HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:** Research on Multi-Storey Light Steel Framed Buildings

**Drawing:** TYP. UPPER LEVEL FLOOR PLAN

| | | | | | | |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| Ref. | Description | | | | | Date |
| scale: 1:100@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 03 | rev: R.1 |




DENOTES WALLS (FRAMING AS SHOWN ON ELEVATIONS)

SECTIONS:
LEVEL 6 -- 90 LC 115 G550
LEVEL 5 -- 90 LC 150 G550
LEVEL 4 -- 90 LC 95 BTB G550
LEVEL 3 -- 90 LC 95 BTB G550
LEVEL 2 -- 90 LC 115 BTB G550
LEVEL 1 -- 90 LC 150 BTB G550

BTB DENOTES BACK TO BACK

**TYP. UPPER LEVEL FLOOR PLAN**

1 : 100

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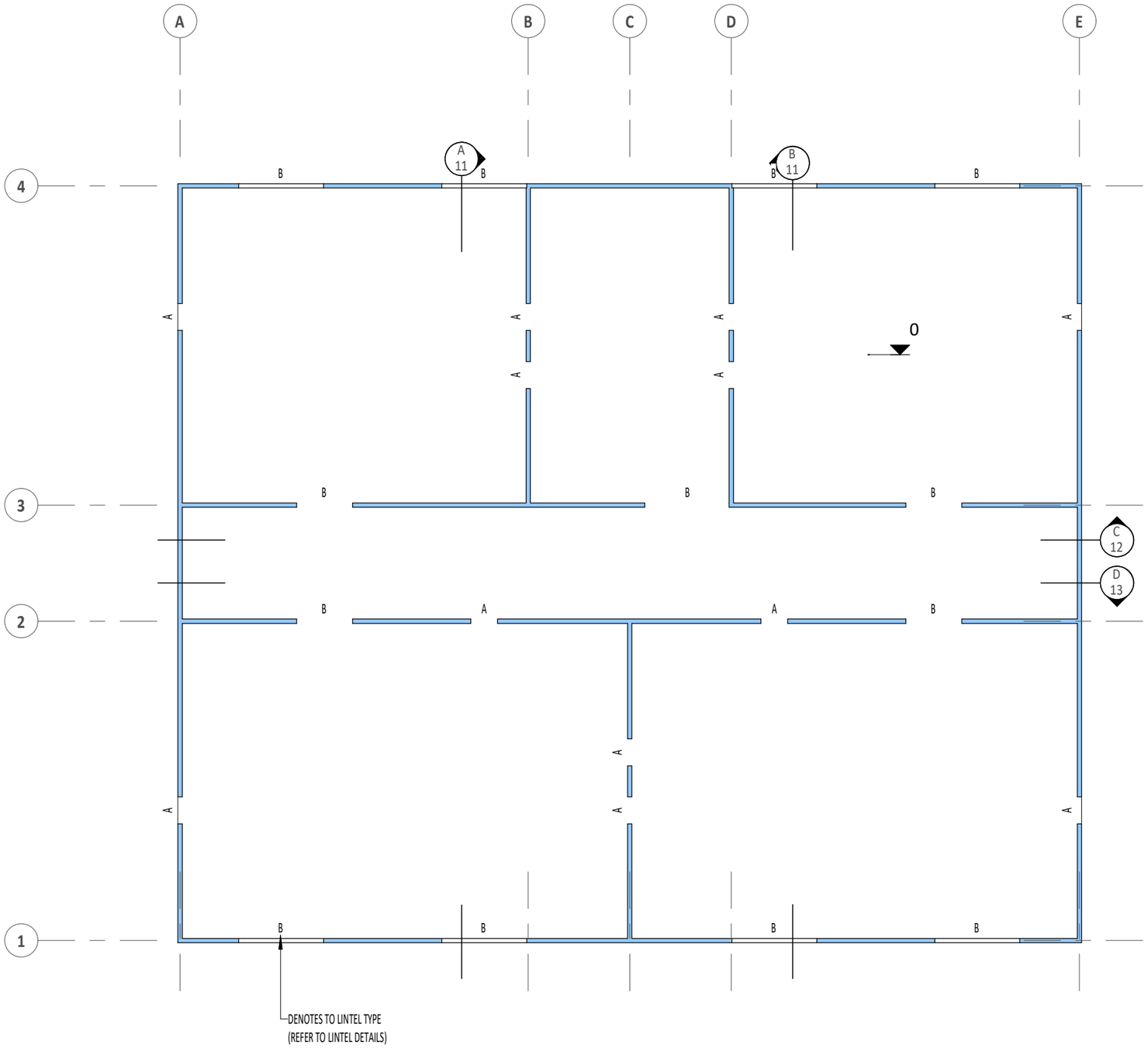
**Client:**
HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:**
Research on Multi-Storey Light Steel Framed Buildings

**Drawing:**
TYP. UPPER LEVEL WALL AND LINTEL PLAN

| | | | | | | |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| Ref. | Description | | | | | Date |
| scale: 1:100@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 04 | rev: R.1 |




**GROUND LEVEL WALL AND LINTEL PLAN**

1 : 100

DENOTES WALLS (FRAMING AS SHOWN ON ELEVATIONS)

SECTIONS:

LEVEL 6 -- 90 LC 115 G550
LEVEL 5 -- 90 LC 150 G550
LEVEL 4 -- 90 LC 95 BTB G550
LEVEL 3 -- 90 LC 95 BTB G550
LEVEL 2 -- 90 LC 115 BTB G550
LEVEL 1 -- 90 LC 150 BTB G550

BTB DENOTES BACK TO BACK

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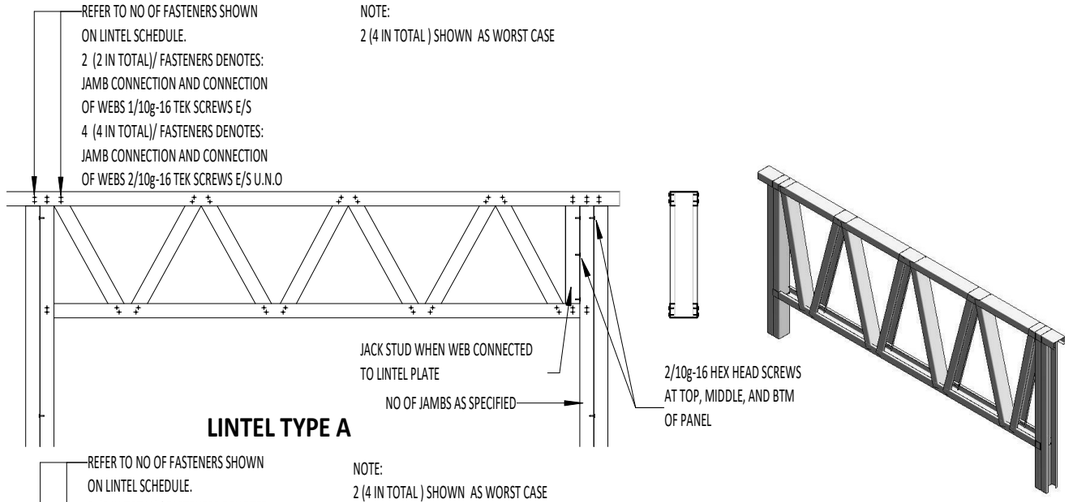
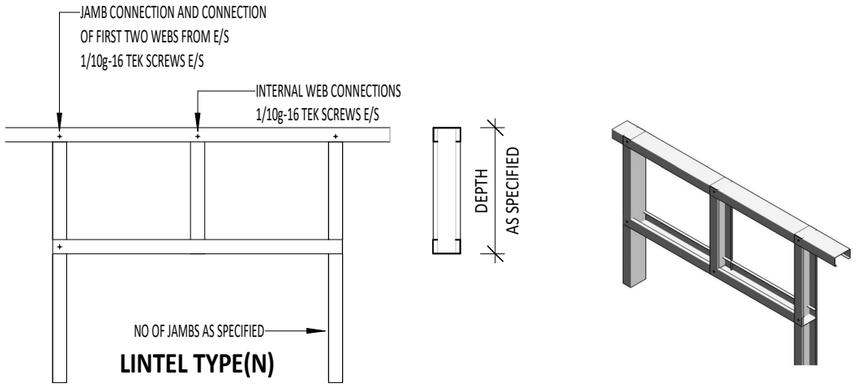
**Project:** Research on Multi-Storey Light Steel Framed Buildings

**Drawing:** GROUND LEVEL WALL AND LINTEL PLAN

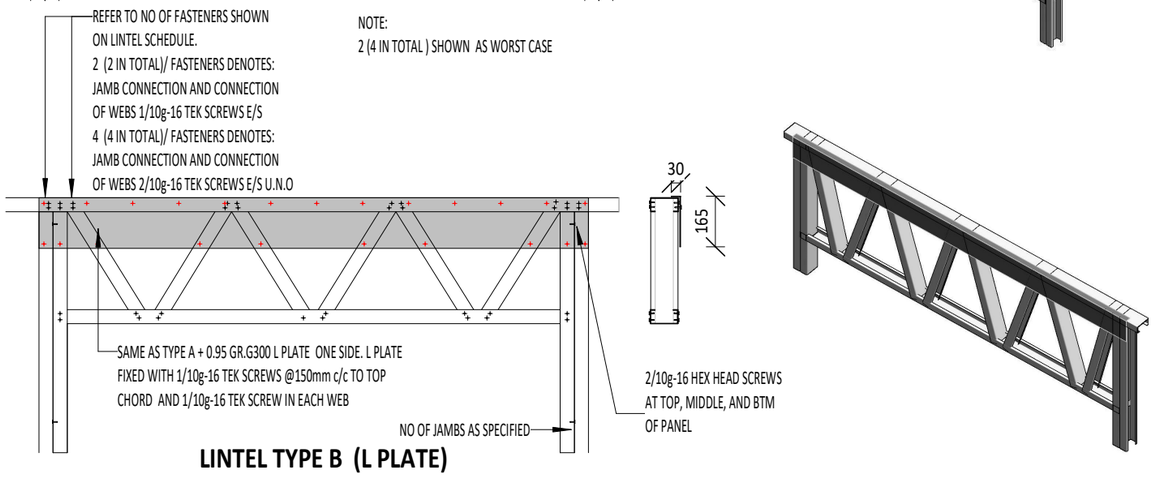
| Ref. | Description | | | | | Date |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| scale: 1:100@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 05 | rev: R.1 |



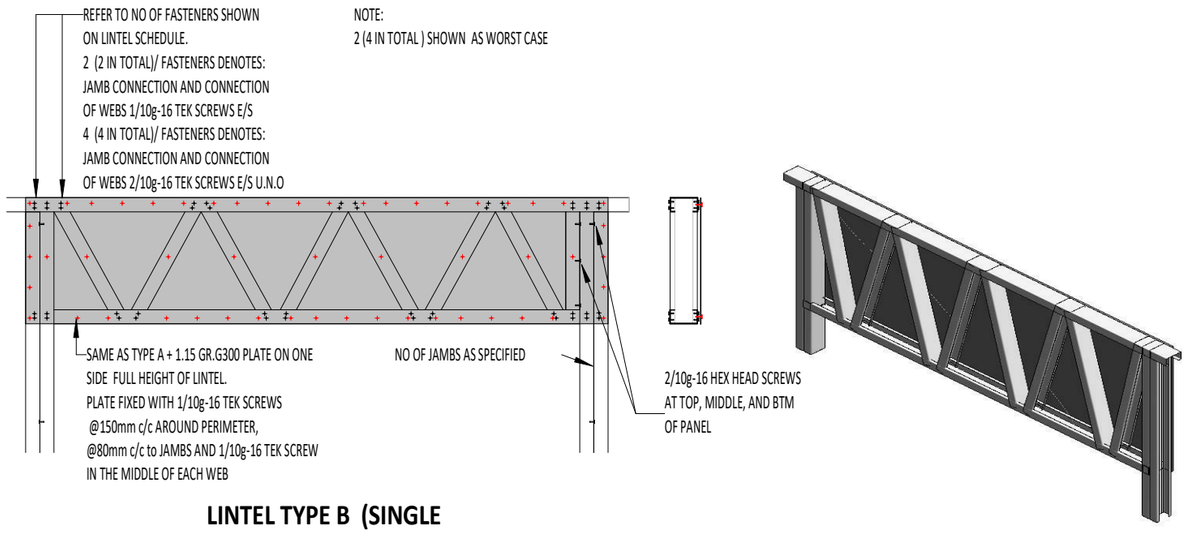

**LINTEL TYPE A**



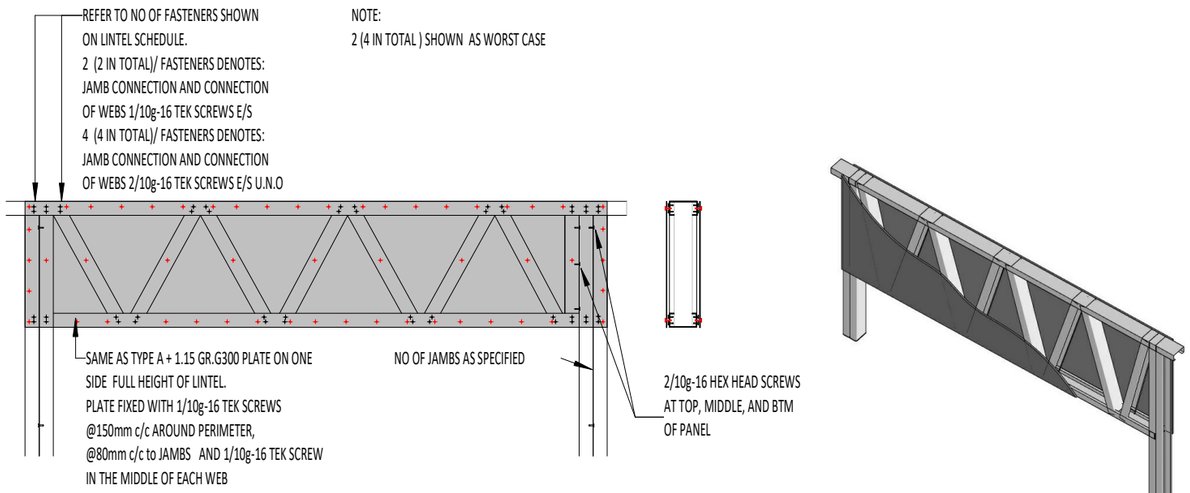

**LINTEL TYPE(N)**




**LINTEL TYPE B (L PLATE)**




**LINTEL TYPE B (SINGLE PLATE)**




**LINTEL TYPE C (DOUBLE PLATE)**

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HERA

**Client:** HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:** Research on Multi-Storey Light Steel Framed Buildings

**Drawing:** LINTEL DETAILS

| Ref. | Description | | | | Date |
|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | 180810 |

| scale: | drawn: | checked: | status: | job no: | drg no: | rev: |
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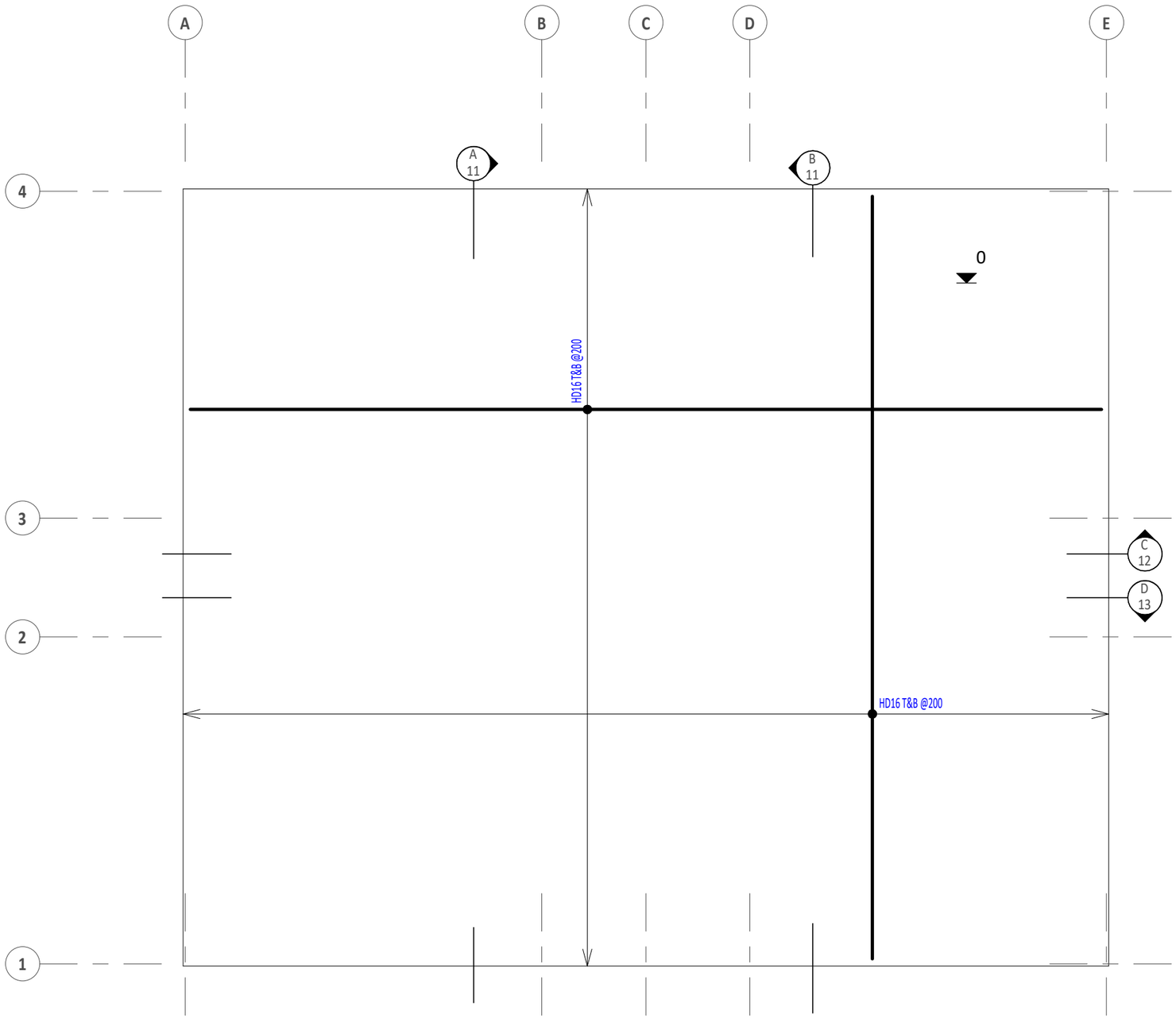
| 1:20@A3 | AM | PM | S | 18021 | 06 | R.1 |




**GROUND LEVEL SLAB PLAN**

1 : 100

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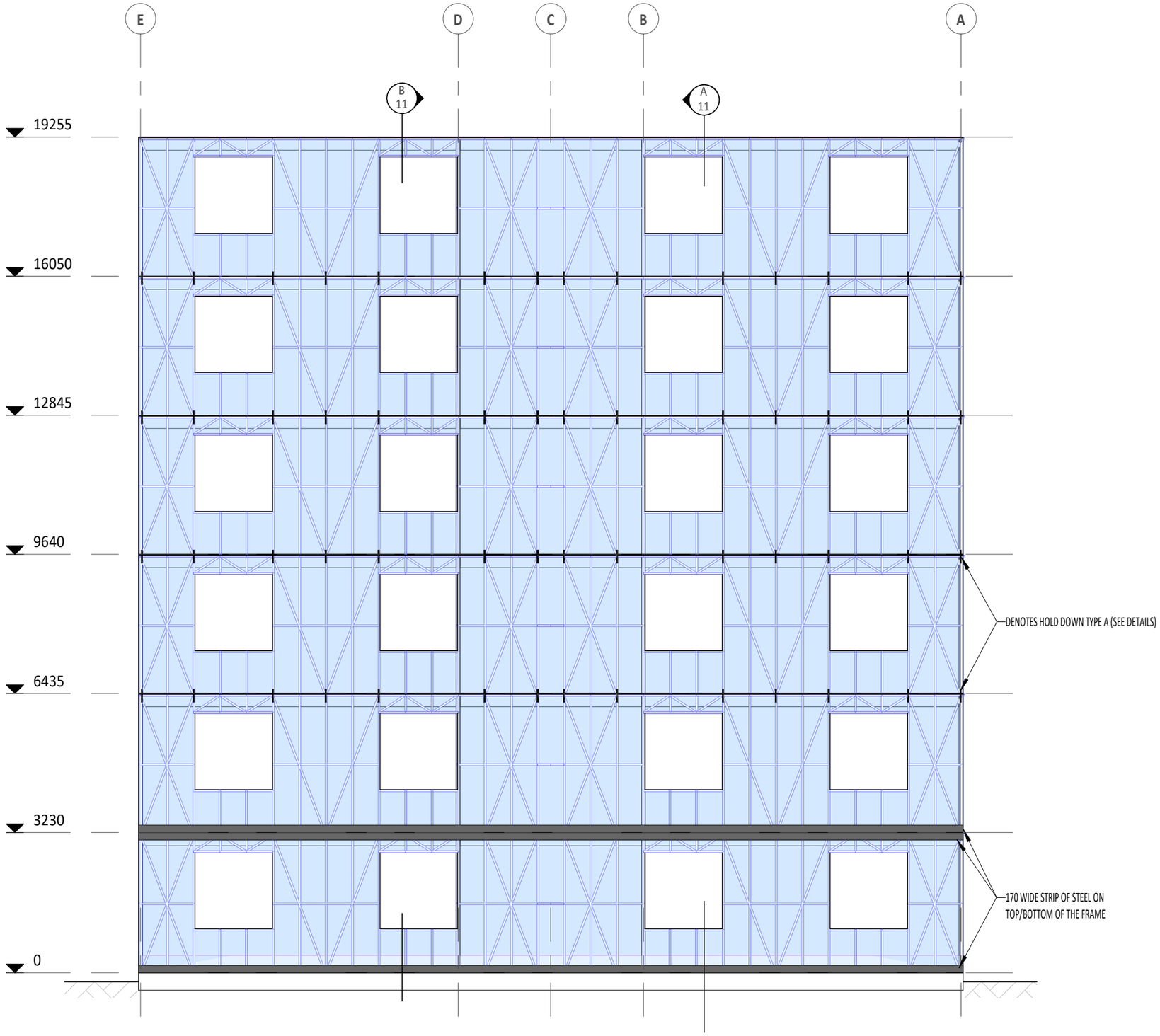
**Client:**
HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:**
Research on Multi-Storey Light Steel Framed Buildings

**Drawing:**
GROUND LEVEL SLAB PLAN

| | | | | | | |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| Ref. | Description | | | | | Date |
| scale: 1:100@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 07 | rev: R.1 |




**ELEVATION NORTH**

1 : 100

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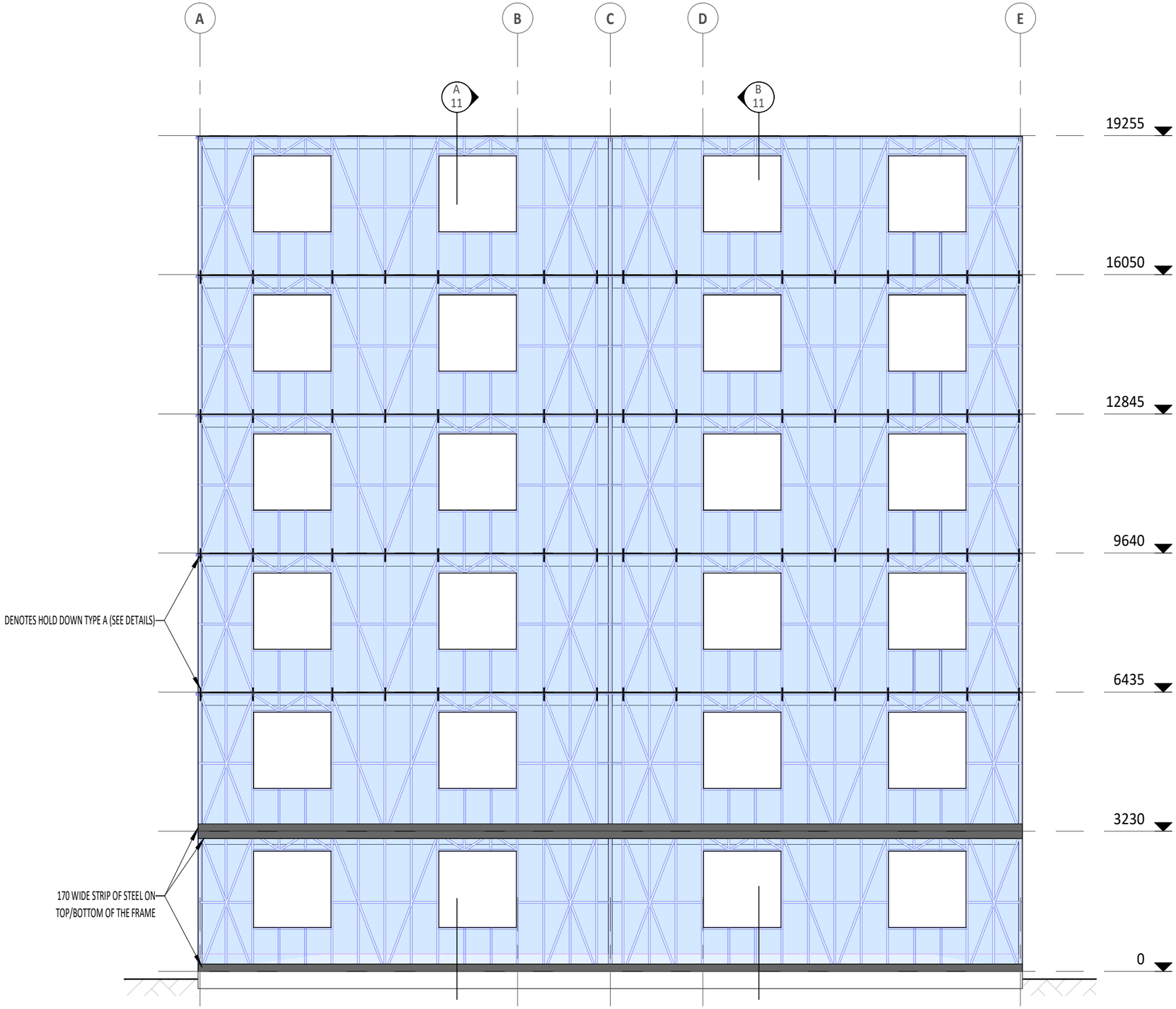
**Client:**
HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:**
Research on Multi-Storey Light Steel Framed Buildings

**Drawing:**
ELEVATION NORTH

| | | | | | | |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| Ref. | Description | | | | | Date |
| scale: 1:100@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 08 | rev: R.1 |




## ELEVATION SOUTH

1 : 100

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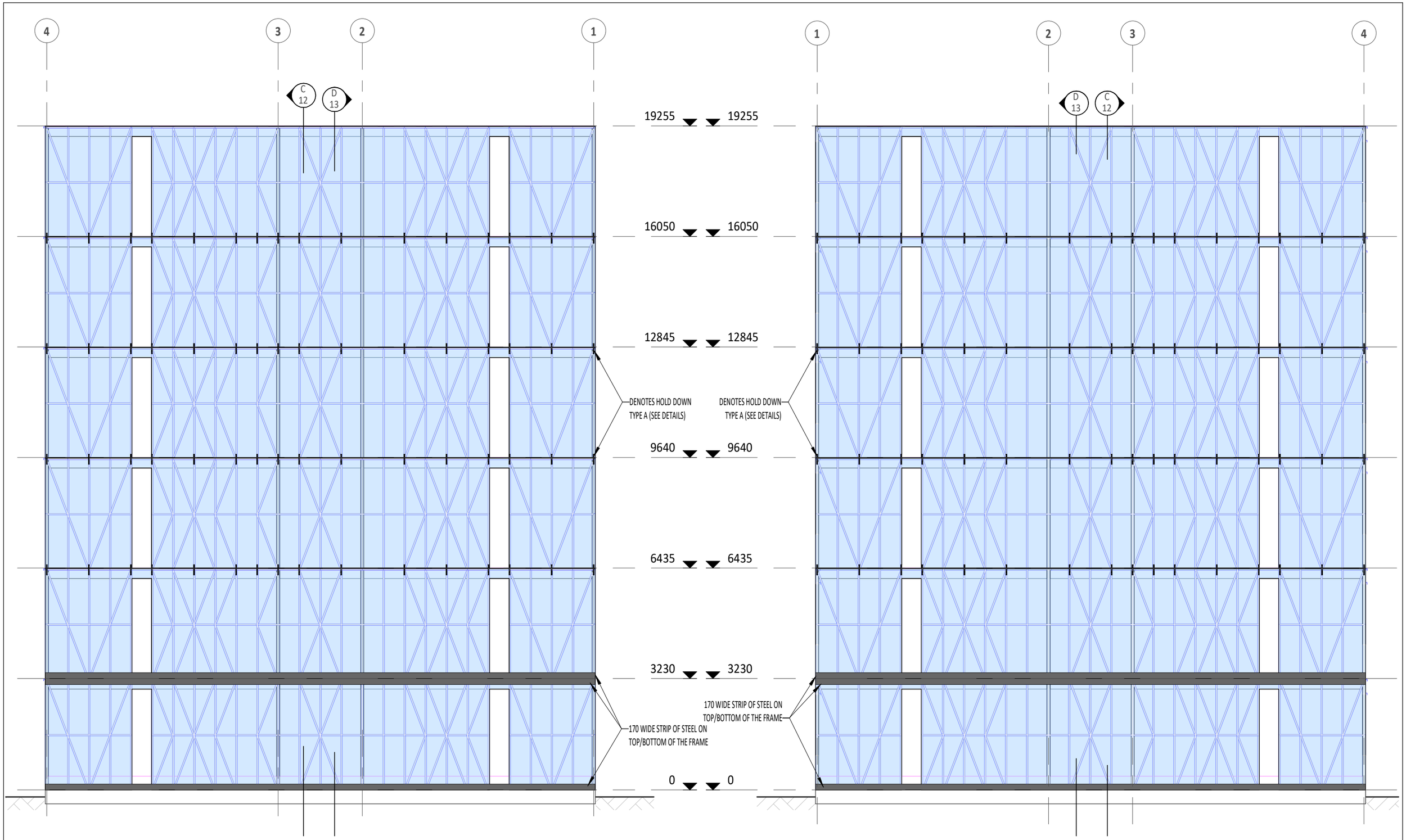
**Client:**
HEAVY ENGINEERING
RESEARCH ASSOCIATION

**Project:**
Research on
Multi-Storey Light Steel
Framed Buildings

**Drawing:**
ELEVATION SOUTH

| Ref. | Description | | | | Date |
|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | 180810 |

| scale: | drawn: | checked: | status: | job no: | drg no: | rev: |
|---|---|---|---|---|---|---|
| 1:100@A3 | DD | PM | S | 18021 | 09 | R.1 |

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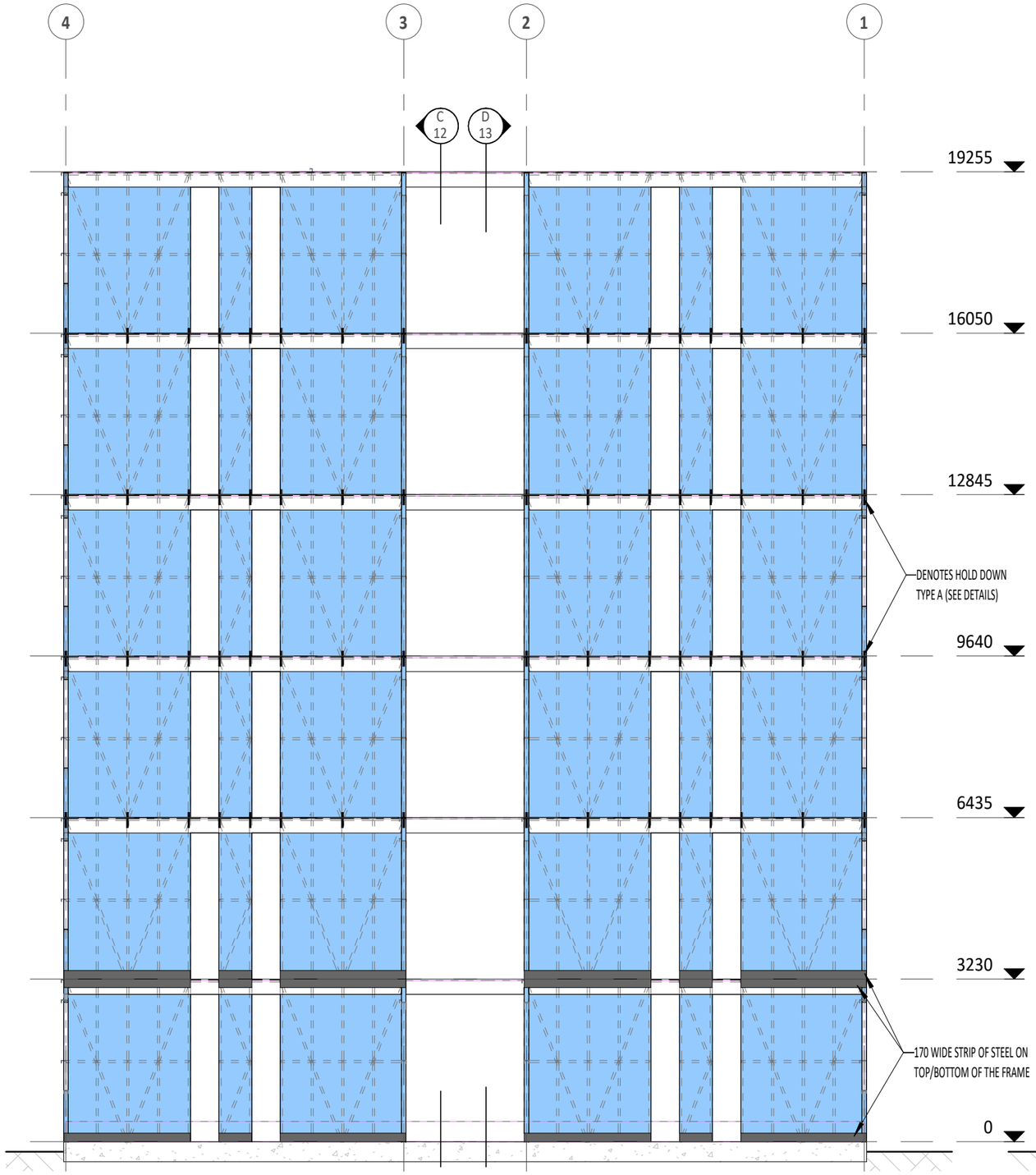
**Client:** HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:** Research on Multi-Storey Light Steel Framed Buildings

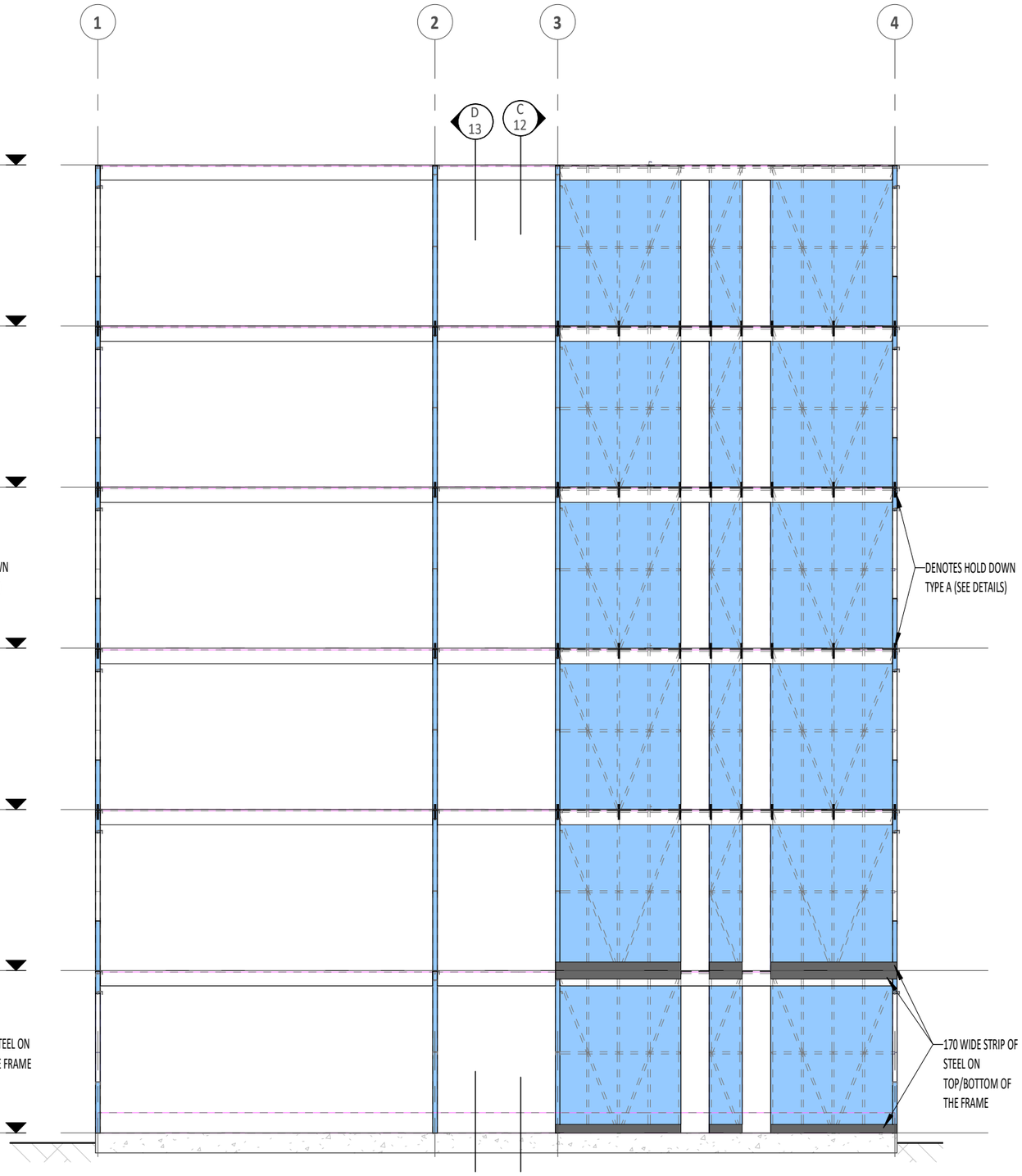
**Drawing:** ELEVATION WEST AND EAST

| Ref. | Description | Date |
|---|---|---|
| R.1 | FOR INFORMATION | 180810 |

| scale: | drawn: | checked: | status: | job no: | drg no: | rev: |
|---|---|---|---|---|---|---|
| 1:100@A3 | DD | PM | S | 18021 | 10 | R.1 |




**A-A**
1 : 100




**B-B**
1 : 100

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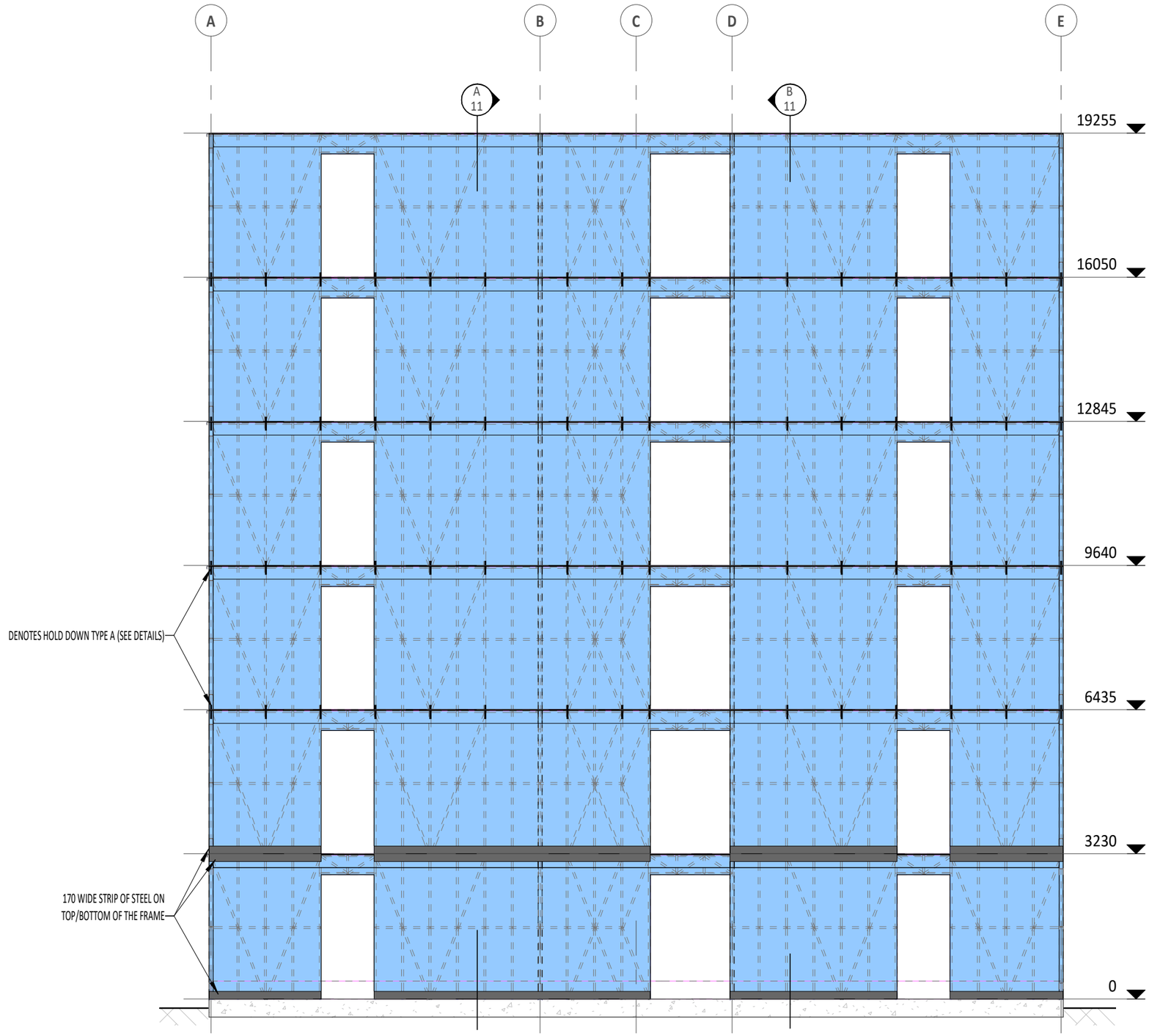
HERA

**Client:**
HEAVY ENGINEERING
RESEARCH ASSOCIATION

**Project:**
Research on
Multi-Storey Light Steel
Framed Buildings

**Drawing:**
SECTIONS

| Ref. | Description | | | | | Date |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| scale: 1:100@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 11 | rev: R.1 |




**C-C**

1 : 100

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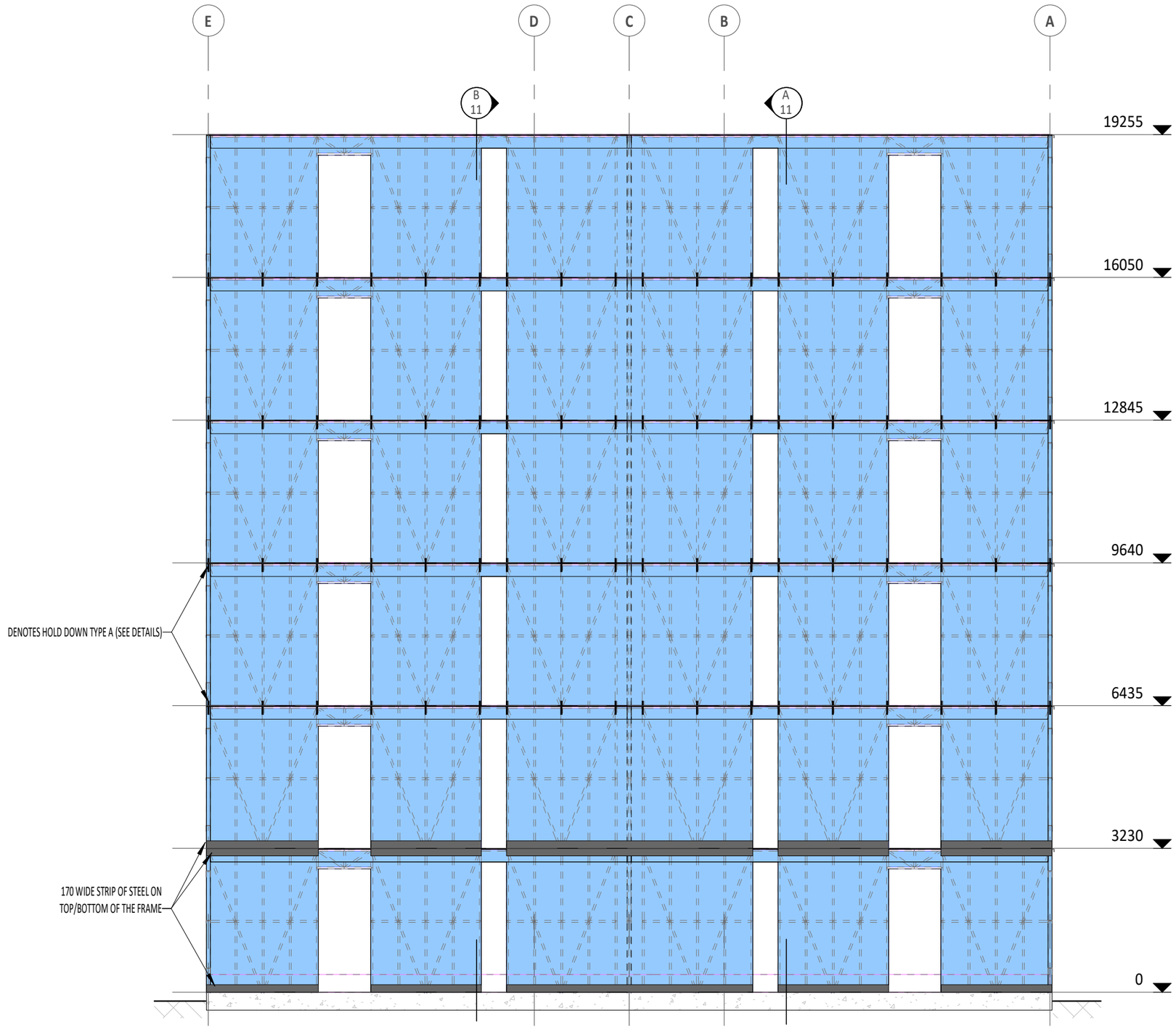
HERA

**Client:**
HEAVY ENGINEERING RESEARCH ASSOCIATION

**Project:**
Research on Multi-Storey Light Steel Framed Buildings

**Drawing:**
SECTIONS

| | | | | | | |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| Ref. | Description | | | | | Date |
| scale: 1:100@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 12 | rev: R.1 |




**D-D**

1 : 100

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**Client:**
HEAVY ENGINEERING
RESEARCH ASSOCIATION

**Project:**
Research on
Multi-Storey Light Steel
Framed Buildings

**Drawing:**
SECTIONS

| | | | | | | |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| Ref. | Description | | | | | Date |
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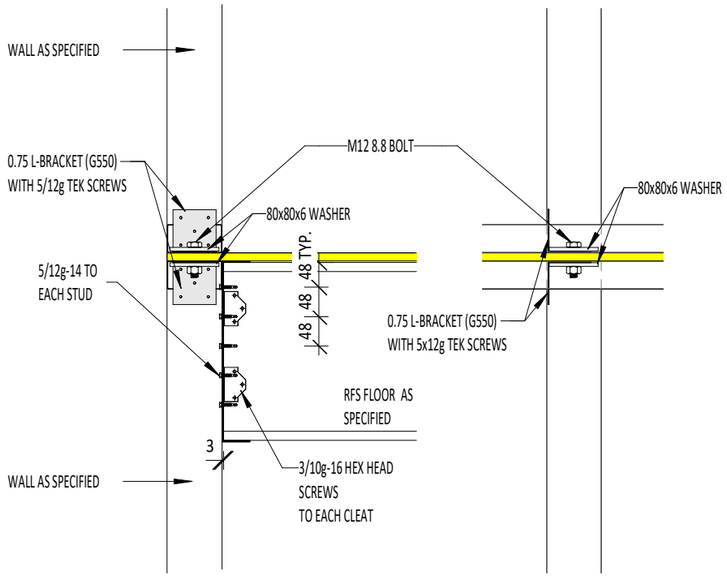
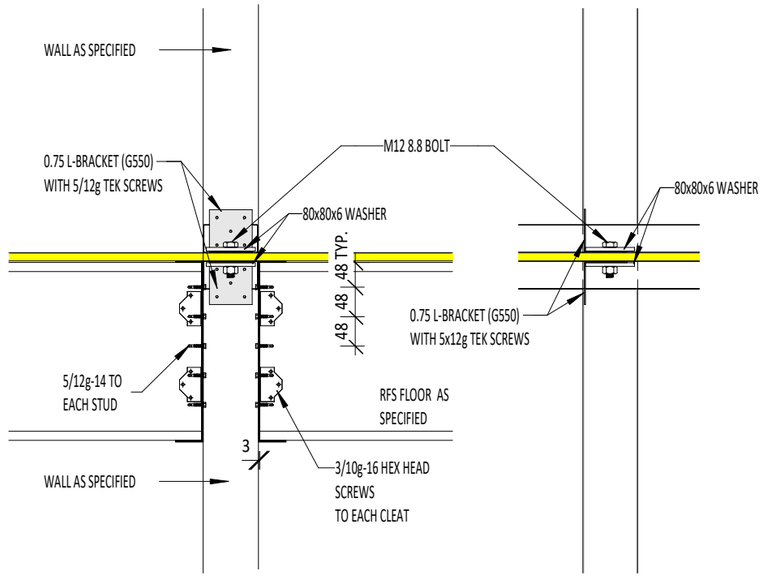


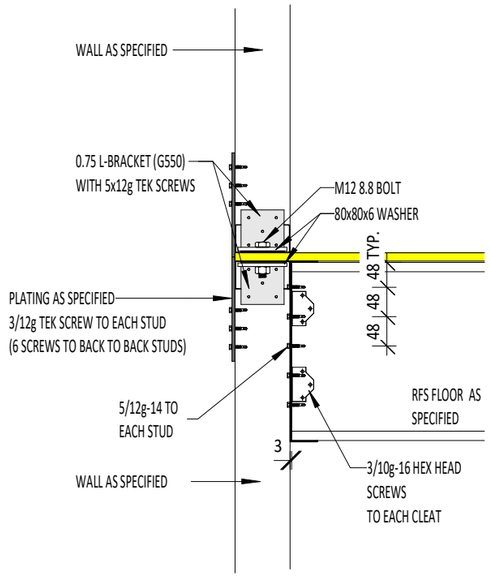

**TYPICAL HOLDDOWN FOR LEVELS 6-3 (WITHOUT PLATING) - EXTERNAL WALL**

1 : 10



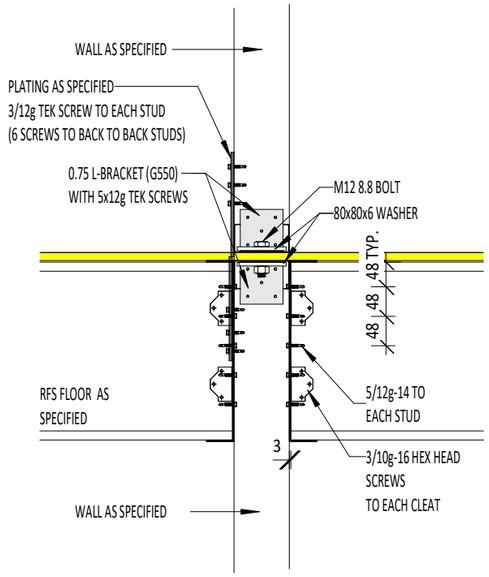

**TYPICAL HOLDDOWN FOR LEVELS 6-3 (WITHOUT PLATING) - INTERNAL WALL**

1 : 10




**TYPICAL HOLDDOWN FOR LEVELS 1 AND 2 (HOLDDOWN TO BE APPLIED TO EACH STUD) - EXTERNAL WALL**

1 : 10




**TYPICAL HOLDDOWN FOR LEVELS 1 AND 2 (HOLDDOWN TO BE APPLIED TO EACH STUD) - INTERNAL WALL**

1 : 10

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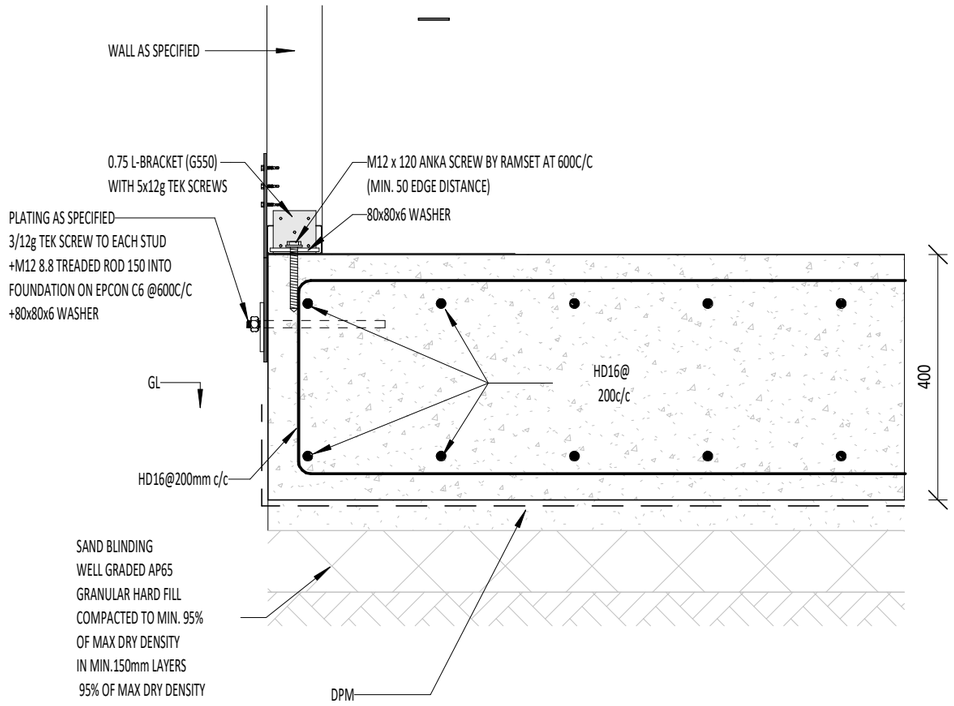
**Client:** HEAVY ENGINEERING RESEARCH ASSOCIATION

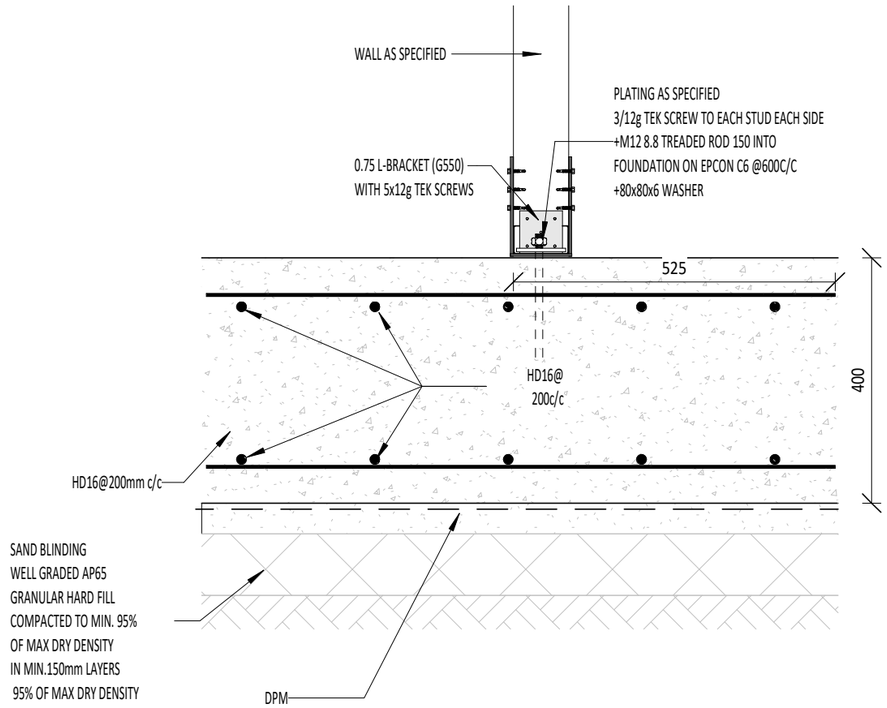
**Project:** Research on Multi-Storey Light Steel Framed Buildings

**Drawing:** HOLDDOWN DETAILS

| Ref. | Description | | | | | Date |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| scale: 1:10@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 14 | rev: R.1 |




**TYPICAL HOLDDOWN FOR**
**LEVEL 1 EXTERNAL WALL**
**TO FOUNDATION**
1 : 10




**TYPICAL HOLDDOWN FOR**
**LEVEL 1 INTERNAL WALL**
**TO FOUNDATION**
1 : 10

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Framed Buildings

**Drawing:**
FOUNDATION DETAILS

| | | | | | | |
|---|---|---|---|---|---|---|
| R.1 | FOR INFORMATION | | | | | 180810 |
| Ref. | Description | | | | | Date |
| scale: 1:10@A3 | drawn: DD | checked: PM | status: S | job no: 18021 | drg no: 15 | rev: R.1 |