



Escuela Técnica Superior de Ingenieros de
Caminos, Canales y Puertos



UNIVERSITAT
POLITÈCNICA
DE VALÈNCIA

Design project of the structure of a residential building in the city of Castellón street Paseo Ribalta nº1

ANNEX Nº2: STRUCTURAL CALCULATIONS

Autor: Monika Przygocka

**Tutor: Ignacio Javier Payá Zaforteza
Janusz Dębiński**

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1. Utility function of the building

The building is going to be a student residencial complex. It is situated 2,5km from Universitat Jaume I in Castellón. On the gound floor there are going to be an auditorium, 4 small conference rooms, 4 study rooms of different sizes and 3 offices. On the floors 1 to 4 there will be accommodations for the students that includes dormitory, kitchen, bathroom and living room. On the 5th floor will be a utility roof with a teerace and a swimming pool.

2. Description of the building

The bulding is in the shape of a trapezoid. The north-eastern and south-western sides aren't perpendicular. The bulding has 7 foors including undergroud garage and utility roof, on which will be located swimming pool with dimensions of 15,7mx4,6mx1,5m. The floors has variable dimensions that are shown on the plans below. The height of the buildings and its relative hights are shown in the following table:

Table 2.1 Height of the floors

Nº	Name	Height (m)	Relative height (m)
-1	Undergroud garage	3,15	-3,15
0	Ground Floor	4,04	0,00
1	First Floor	2,95	+4,04
2	Second Floor	2,95	+6,99
3	Third Floor	2,95	+9,94
4	Fourth floor	2,95	+12,89
5	Utility roof	2,95	+15,84
6	Roof of staircase	-	+20,48

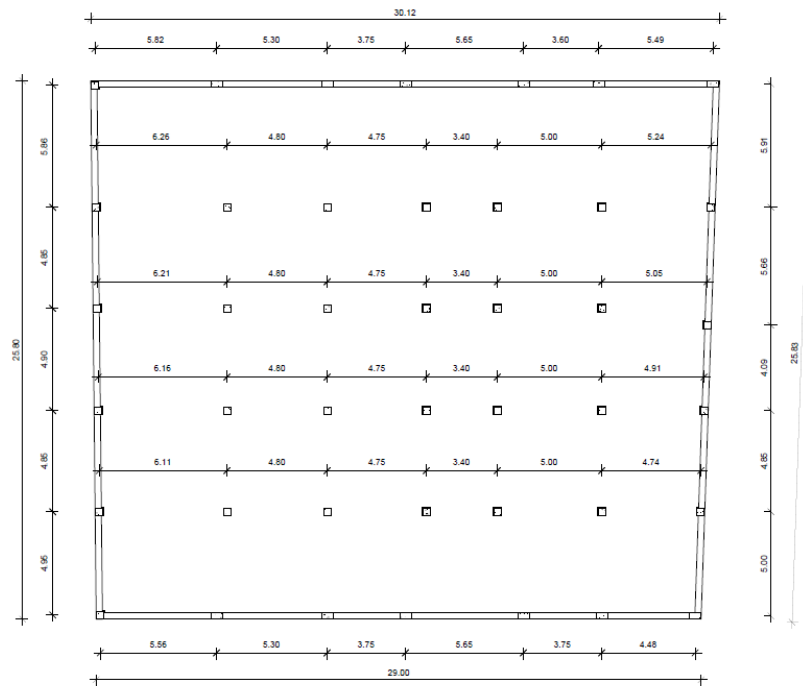


Figure 2.1 Undergroud garage plan

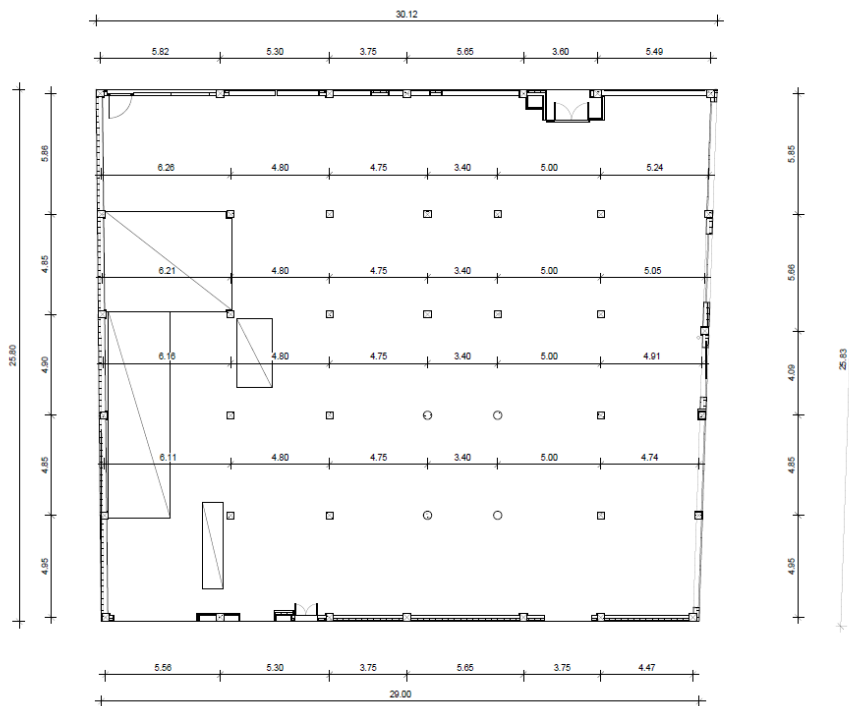


Figure 2.2 Ground Floor plan

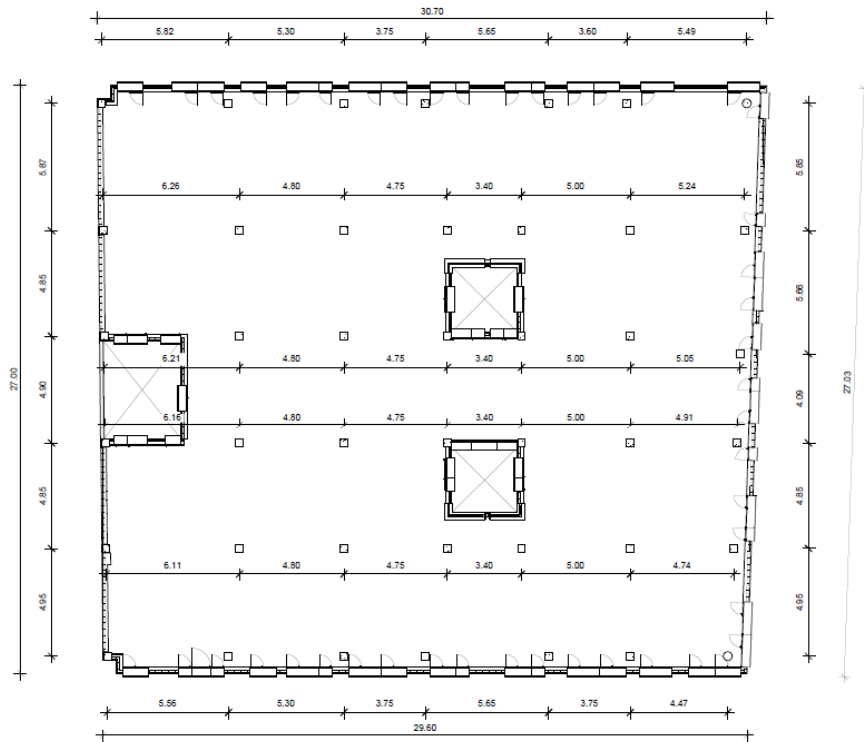


Figure 2.3 First Floor plan

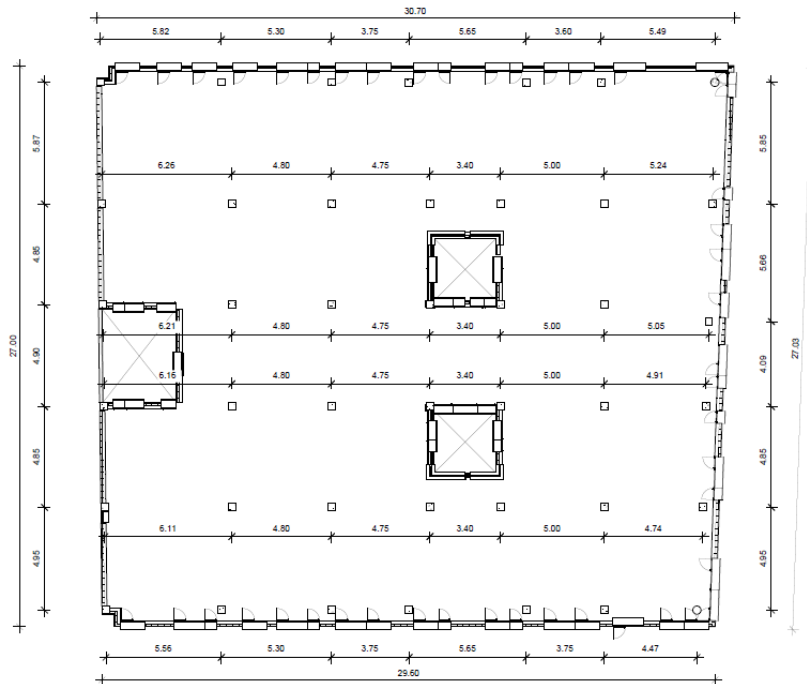


Figure 2.4 Second Floor plan

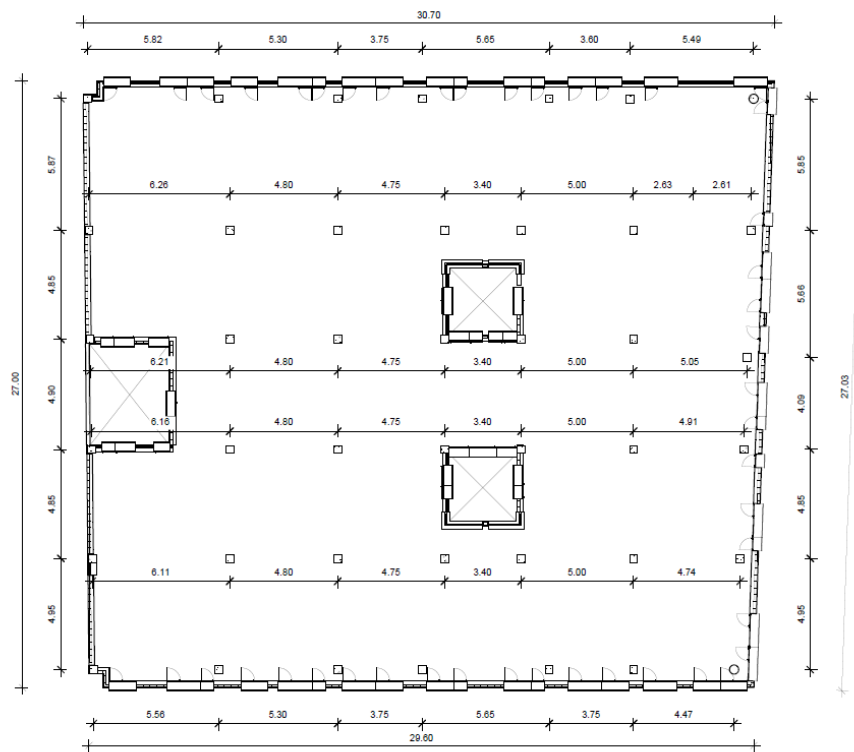


Figure 2.5 Third Floor plan

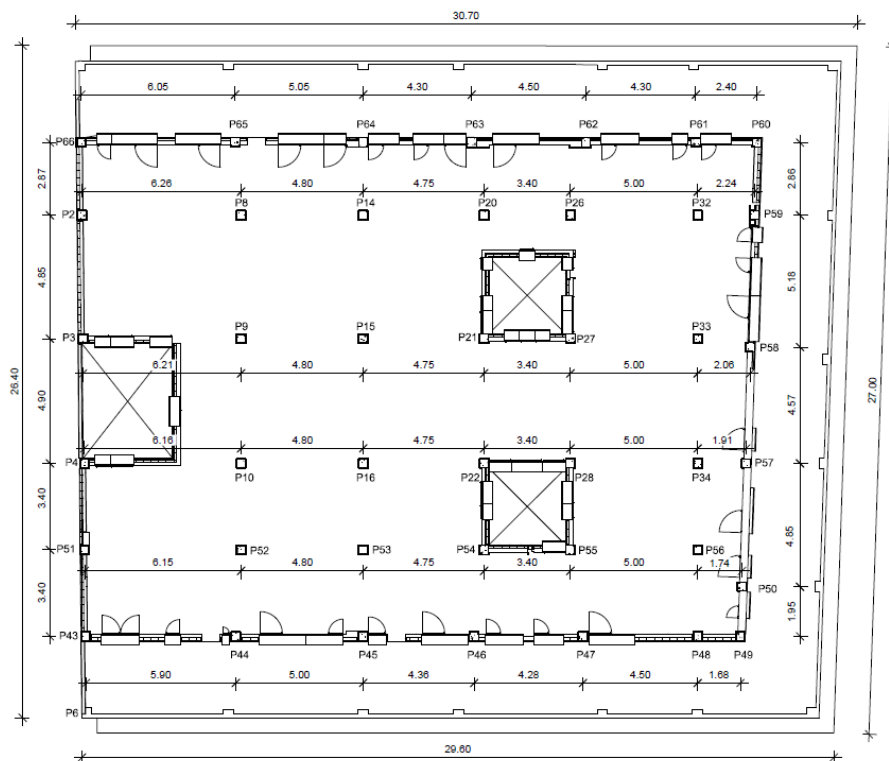


Figure 2.6 Fourth Floor plan

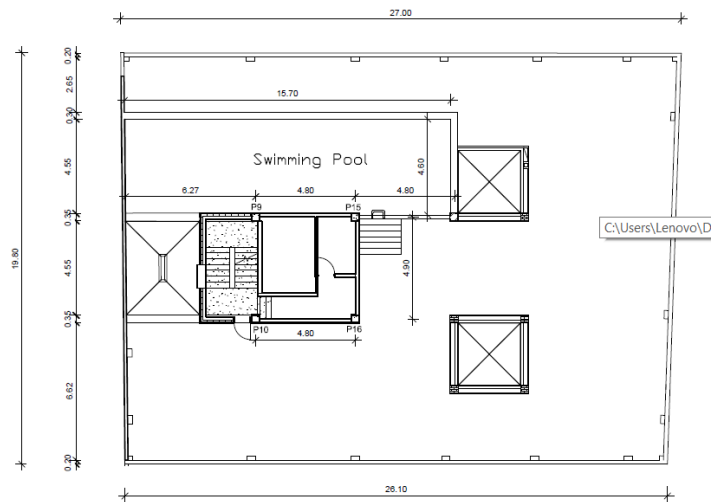


Figure 2.7 Utility Roof plan

3. Process of design

The building was design in 3D BIM technology in the program Autodesk Revit from the plans provided by Escuela Técnica Superior de Ingeniería de Edificación of Universitat Politècnica de València. From those plans 3D model of the building was designed and new plans where generated that are included in the documentation of this project. Afterwards the IFC file was created. It is a way of storing digital building descriptions that enables effortless exchange of information between various BIM software products. This IFC file from Revit was applied to Cypecad Software to calculate the structure of the building.

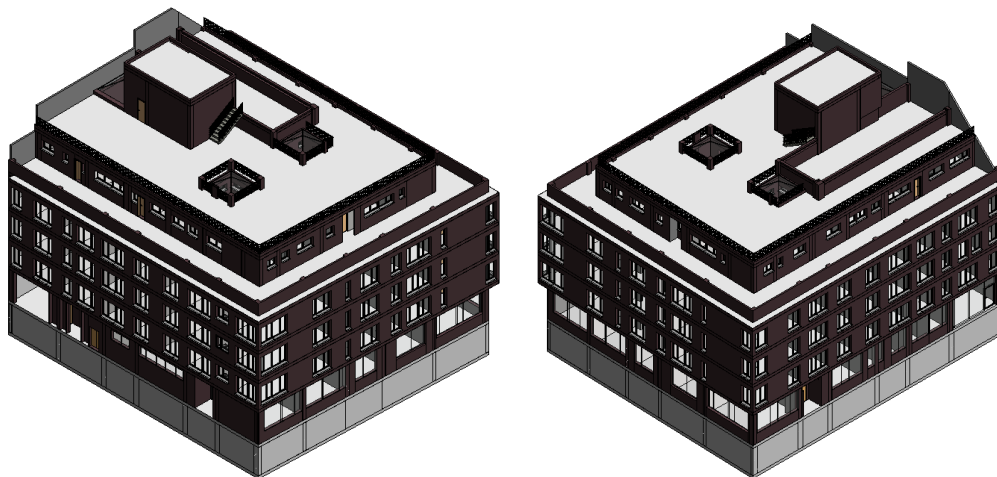


Figure 3.1 3D view of the building

4. Calculation Basis

4.1. Standards

standard [1] EN 1990:2002+A1 Eurocode 0 - Basis of structural design

standard [2] EN 1991-1-1 Eurocode 1: Actions on structures - Part 1-1: General actions -Densities, self-weight, imposed loads for buildings

standard [3] EN 1991-1-4:2005+A 1 Eurocode 1: Actions on structures - Part 1-4: General actions -Wind actions

standard [4] EN 1992-1-1: Eurocode 2: Design of concrete structures - Part 1-1 : General rules and rules for buildings

standard [5] EN 1997 -1 Eurocode 7: Geotechnical design - Part 1: General rules

standard [6] CTE, Código Técnico de la Edificación: DB_SE-AE (Documento Básico de Seguridad Estructural, Acciones en la Edificación).

4.2. Environmental conditions

Structure: In the case of the designed building, all concrete elements will be located inside building and protected from the outdoor.

Chosen exposure class: XC1 (according to Table 4.1 of standard [4])

XC1: Concrete inside buildings with low air humidity.

Fundations: In the case of the foundations, they will be located in the wet, rary dry enviroment.

Chosen exposure class: XC2 (according to Table 4.1 of standard [4])

4.3. Design working life

Chosen category: S4 (according to Table 2.1 of standard [1])

Design working life 50 years.

Housing or office buildings and civil engineering structures (except maritime works) having a low or average economic repercussion.

4.4. Structural materials

Chosen indicative strength class of concrete: C25/30 (according to Table E,1N of standard [4])

Chosen class of reinforcing steel: B500SP with C ductility class,

Strength parameters of concrete:

characteristic compressive cylinder strength of concrete at 28 days: $f_{ck} = 25,0 \text{ MPa}$

design value of concrete compressive strength: $f_{cd} = 16,67 \text{ MPa}$

$$f_{cd} = \alpha_{cc} \cdot \frac{f_{ck}}{\gamma_c} = 1,0 \cdot \frac{25,00}{1,5} = 16,67 \text{ MPa}$$

mean value of concrete cylinder compressive strength: $f_{cm} = 33,0 \text{ MPa}$

mean value of axial tensile strength of concrete: $f_{ctm} = 2,56 \text{ MPa}$

characteristic value of tensile strength of concrete: $f_{ctk,0,05} = 1,79 \text{ MPa}$

design value of tensile strength of concrete: $f_{ctd} = 1,2 \text{ MPa}$

$$f_{ctd} = \alpha_{cc} \cdot \frac{f_{ctk,0,05}}{\gamma_c} = 1,0 \cdot \frac{1,79}{1,5} = 1,2 \text{ MPa}$$

secant modulus of concrete elasticity: $E_{cm} = 30 \text{ GPa}$

Strength parameters of reinforcing steel:

characteristic yield strength of reinforcement: $f_{yk} = 500,0 \text{ MPa}$

design yield strength of reinforcement: $f_{yd} = 435,0 \text{ MPa}$

$$f_{yd} = \frac{f_{yk}}{\gamma_s} = \frac{500,0}{1,15} = 435,0 \text{ MPa}$$

design value of modulus of elasticity of reinforcing steel: $E_s = 200 \text{ GPa}$

4.5. Computation models of structural materials

Concrete: rigid-perfectly plastic model (a rectangular stress distribution was assumed)

Reinforcing steel: horizontal top branch was assumed

For assumed materials, basing on strain distribution, there were calculated: $\xi_{eff,lim}$, $\zeta_{eff,lim}$ and $A_{0,lim}$

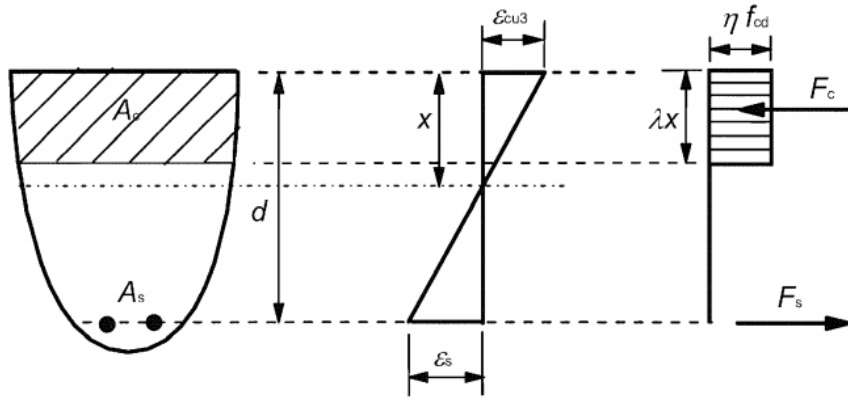


Figure 4.1. Rectangular stress distribution

$$\xi_{lim} = \lambda \cdot \frac{x}{d} = \lambda \cdot \frac{\varepsilon_{cu3}}{\varepsilon_{cu3} + \varepsilon_{yd}}$$

$$\varepsilon_{yd} = \frac{f_{yd}}{E_s} = \frac{435}{200\,000} = 0,002175$$

$$\xi_{lim} = 0,8 \cdot \frac{0,0035}{0,0035 + 0,002175} = 0,494$$

$$\zeta_{lim} = \frac{z}{d} = 1 - 0,5 \cdot \xi_{eff,lim} = 1 - 0,5 \cdot 0,494 = 0,753$$

$$A_{0,lim} = \xi_{lim} \cdot \zeta_{lim} = 0,494 \cdot 0,753 = 0,372$$

4.6. Concrete Cover

For the structure of exposure class XC1

Nominal cover: $c_{nom} = c_{min} + \Delta c_{dev}$

c_{min} – minimal cover

$$c_{min} = \max \begin{cases} c_{min,dur} + \Delta c_{dur,y} - \Delta c_{dur,st} - \Delta c_{dur,add} \\ c_{min,b} \\ 10\,mm \\ c_{min,f} \end{cases}$$

$c_{min,b}$ – minimal cover due to bond requirement

$$c_{min,b} = \phi = 20\,mm$$

$c_{min,dur}$ – minimal cover due to environmental conditions

$$c_{min,dur} = 15\,mm \text{ (according to Table 4.4N of standard [4])}$$

$\Delta c_{dur,y}$ – additive safety element

$$\Delta c_{dur,y} = 0$$

$\Delta c_{dur,st}$ – reduction of minimum cover for use of stainless steel

$$\Delta c_{dur,st} = 0$$

$\Delta c_{dur,add}$ – reduction of minimum cover for use of additional protection

$$\Delta c_{dur,add} = 0$$

$c_{min,f}$ – minimum cover due to fire resistance was omitted because of high value of $c_{min,dur}$

$$c_{min,dur} + \Delta c_{dur,y} - \Delta c_{dur,st} - \Delta c_{dur,add} = 15 + 0 - 0 - 0 = 15 \text{ mm}$$

$$c_{min} = \max \begin{cases} 20 \text{ mm} \\ 15 \text{ mm} \\ 10 \text{ mm} \end{cases} = 20 \text{ mm}$$

$$c_{nom} = c_{min} + \Delta c_{dev} = 20 + 10$$

$$c_{nom} = 30 \text{ mm}$$

For the foundations of exposure class XC2

Nominal cover: $c_{nom} = c_{min} + \Delta c_{dev}$

$$c_{min} = \max \begin{cases} c_{min,b} \\ c_{min,dur} + \Delta c_{dur,y} - \Delta c_{dur,st} - \Delta c_{dur,add} \\ 10 \text{ mm} \\ c_{min,f} \end{cases}$$

$$c_{min,b} = \phi = 20 \text{ mm}$$

$$c_{min,dur} = 25 \text{ mm (according to Table 4.4N of standard [4])}$$

$$\Delta c_{dur,y} = 0$$

$$\Delta c_{dur,st} = 0$$

$$\Delta c_{dur,add} = 0$$

$$c_{min,dur} + \Delta c_{dur,y} - \Delta c_{dur,st} - \Delta c_{dur,add} = 25 + 0 - 0 - 0 = 25 \text{ mm}$$

$$c_{min} = \max \begin{cases} 20 \text{ mm} \\ 25 \text{ mm} \\ 10 \text{ mm} \end{cases} = 25 \text{ mm}$$

$$c_{nom} = c_{min} + \Delta c_{dev} = 25 + 10$$

$$c_{nom} = 35 \text{ mm}$$

Table 4.1 Concrete nominal cover

	C_{nom} [mm]
Structure	35
Foundations	25

4.7. Actions taken for the calculation

In the following section the actions that will act on the structure will be defined.

4.7.1. Permanent actions

4.7.1.1. Self-weight load

The self-weight taken into account is that of the structural elements, such as pillars, beams, slabs.

4.7.1.2. Dead load

4.7.1.2.1. Slabs

Table 4.2 Dead load garage

Garage						
Lp.	Specification	layer thickness m	Weight kN/m ³	Load characteristic value kN/m ²	Load coefficient -	Design value of load kN/m ²
1	2	3	4	5	6	7
	Permanent loads					
1	Concrete screed	0.15	20.0	3.000	1.3	3.9
	Sum g, kN/m²			3.00		3.90

Table 4.3 Dead load Ground Floor

Floor 0						
Lp.	Specification	layer thickness m	Weight kN/m ³	Load characteristic value kN/m ²	Load coefficient -	Design value of load kN/m ²
1	2	3	4	5	6	7
	Permanent loads					
1	Laminate floor panels with HDF 8 mm	0.008	10.0	0.080	1.2	0.096
2	Spring mat made of PE 3 mm	0.003	0.30	0.001	1.2	0.001
3	Self-leveling undercoat 20 mm	0.020	16.0	0.320	1.3	0.416
4	Floor mesh			0.002	1.2	0.002
5	Geotextile			0.002	1.2	0.002
6	Mineral wool 20 mm	0.020	1.61	0.032	1.2	0.039
			Sum g, kN/m²	0.44		0.56

Table 4.4 Dead load Floor 1, 2, 3, 4

Floor 1,2,3,4						
Lp.	Specification	layer thickness m	Weight kN/m ³	Load characteristic value kN/m ²	Load coefficient -	Design value of load kN/m ²
1	2	3	4	5	6	7
	Permanent loads					
1	Laminate floor panels with HDF 8 mm	0.008	10.0	0.080	1.2	0.096
2	Spring mat made of PE 3 mm	0.003	0.30	0.001	1.2	0.001
3	Self-leveling undercoat 20 mm	0.020	16.0	0.320	1.3	0.416
4	Floor mesh			0.002	1.2	0.002
5	Geotextile			0.002	1.2	0.002
6	Mineral wool 20 mm	0.020	1.61	0.032	1.2	0.039
7	Slab					
8	Steel grate for suspended ceilings			0.02	1.2	0.024
9	Plasterboard 2 * 12,5mm	0.025	12.0	0.300	1.2	0.360
			Sum g, kN/m²	0.76		0.94

Table 4.5 Dead load terrace

Terrace						
Lp.	Specification	layer thickness m	Weight kN/m ³	Load characteristic value kN/m ²	Load coefficient -	Design value of load kN/m ²
1	2	3	4	5	6	7
	Permanent loads					
1	Gres tiles	0.02	21.0	0.420	1.2	0.504
2	Flexible mineral insulation	-	-	-	-	-
3	The reinforced inheritance layer	0.080	22.0	1.760	1.3	2.288
4	Polyethylene sheathing	-	-	-	-	-
5	Polystyrene EPS 100 50 mm	0.05	0.45	0.0225	1.2	0.027
6	Polyethylene sheathing	-	-	-	-	-
7	Cement screed	0.04	21	0.84	1.3	1.092
8	Slab					
8	Steel grate for suspended ceilings			0.02	1.2	0.024
9	Plasterboard 2 * 12,5mm	0.025	12.0	0.300	1.2	0.360
			Sum g, kN/m²	3.36		4.30

Table 4.6 Dead load Roof Staircase

Roof Staircase						
Lp.	Specification	layer thickness	Weight	Load characteristic value	Load coefficient	Design value of load
1	2	m	kN/m ³	kN/m ²	-	kN/m ²
1	2	3	4	5	6	7
	Permanent loads					
1	Gres tiles	0.02	21.0	0.420	1.2	0.504
2	Flexible mineral insulation	-	-	-	-	-
3	The reinforced inheritance layer	0.080	22.0	1.760	1.3	2.288
4	Polyethylene sheathing	-	-	-	-	-
5	Polystyrene EPS 100 50 mm	0.05	0.45	0.0225	1.2	0.027
6	Polyethylene sheathing	-	-	-	-	-
7	Cement screed	0.04	21	0.84	1.3	1.092
			Sum g, kN/m²	3.04		3.91

Swimming pool

The depth of the swimming pool situated on the utility roof is 1,5m . Its load is:

$$10kN/m^3 \cdot 1,5m = 15kN/m^2$$

4.7.1.2.2 Walls

The wall types with their layers were designed in the program Autodesk Revit. They are shown in the table below:

Table 4.7 Layers of the walls

		Composition							
Name of the wall		outer layer				inner layer			
width [m]	name	width [m]	material	width [m]	material	width [m]	material	width [m]	material
0.025	Outer pillars around	0.02	Decorative brick	0.005	Mortar				does not exist
0.05	Outer pillars around	0.02	Decorative brick	0.03	Mortar				does not exist
0.25	Dividing wall			0.02	Mortar	0.1	Thermal insulation	0.12	Concrete
0.3	Dividing wall garage			0.02	Mortar	0.1	Thermal insulation	0.2	Concrete
0.1	Outside wall	0.02	Decorative brick	0.02	Mortar			0.05	Concrete
0.15	Outside wall	0.02	Decorative brick	0.02	Mortar			0.1	Concrete
0.2	Outside wall	0.02	Decorative brick	0.02	Mortar			0.15	Concrete
0.25	Outside wall	0.02	Decorative brick	0.02	Mortar	0.1	Thermal insulation	0.1	Concrete
0.3	Outside wall	0.02	Decorative brick	0.02	Mortar	0.1	Thermal insulation	0.15	Concrete
0.4	Outside wall	0.02	Decorative brick	0.02	Mortar	0.1	Thermal insulation	0.25	Concrete
0.45	Outside wall	0.02	Decorative brick	0.02	Mortar	0.1	Thermal insulation	0.3	Concrete
0.05	outer pillars in garage							0.05	Concrete
0.05	Wall garage							0.05	Concrete
0.1	Wall garage							0.1	Concrete
0.15	Wall garage							0.15	Concrete
0.175	Wall garage							0.175	Concrete
0.2	Wall garage							0.2	Concrete
0.3	Wall garage							0.3	Concrete
0.025	Inner pillars around		does not exist					0.025	Gypsum wall board
0.03	Inner pillars around		does not exist					0.03	Gypsum wall board
0.05	Inner pillars around		does not exist					0.05	Gypsum wall board
0.05	Interior wall	0.01	Gypsum wall board					0.03	Hollow brick
0.1	Interior wall	0.01	Gypsum wall board					0.08	Hollow brick
0.15	Interior wall	0.01	Gypsum wall board					0.13	Hollow brick
0.2	Interior firewall	0.005	Gypsum wall board					0.19	Concrete
0.25	Interior firewall	0.005	Gypsum wall board					0.24	Concrete
0.3	Interior firewall	0.005	Gypsum wall board					0.29	Concrete
0.3225	Interior firewall	0.005	Gypsum wall board					0.3125	Concrete
0.4	Interior firewall	0.005	Gypsum wall board					0.39	Concrete
0.55	Interior firewall	0.005	Gypsum wall board					0.54	Concrete
0.05	Terrace wall							0.05	Concrete
0.1	Terrace wall							0.1	Concrete
0.14	Terrace wall	0.02	Decorative brick	0.02	Mortar	0.06	Concrete	0.02	Mortar
0.15	Terrace wall	0.02	Decorative brick	0.02	Mortar	0.07	Concrete	0.02	Mortar
0.2	Terrace wall	0.02	Decorative brick	0.02	Mortar	0.12	Concrete	0.02	Mortar
0.25	Terrace wall	0.02	Decorative brick	0.02	Mortar	0.17	Concrete	0.02	Mortar
0.3	Terrace wall	0.02	Decorative brick	0.02	Mortar	0.22	Concrete	0.02	Mortar
0.4	Terrace wall	0.02	Decorative brick	0.02	Mortar	0.32	Concrete	0.02	Mortar
0.65	Terrace wall							0.65	Concrete
0.05	Roof opening wall					0.05	Concrete		
0.1	Roof opening wall					0.1	Concrete		
0.3	Outer garage wall	0.02	Decorative brick	0.02	Mortar	0.1	Thermal insulation	0.14	Concrete
	Interior wall parking								
0.3	entrance	0.01	Gypsum wall board			0.1	Thermal insulation	0.18	Concrete
	Interior wall parking								
0.2	entrance	0.01	Gypsum wall board			0.1	Thermal insulation	0.08	Concrete

The weight of all type of used materials was established:

Table 4.8 Weight [kN/m³] of the wall layers

Name of material	Weight [kN/m ³]
Decorative brick	19
Hallow brick	14
Concrete	25
Mortar	21
Thermal insulation	0,45
Gypsum wall board	12

The

surface weight of each wall was calculated taking into account the weight and the layer thickness. Afterwards it was applied to program Cype as a line load in the corresponding position.

Table 4.9 Surface weight [kN/m²] of the walls

Width [m]	Name of wall	Surface weight [kN/m ²]
0.025	Outer pillars around	0.5
0.05	Outer pillars around	1.0
0.25	Dividing wall	3.6
0.3	Dividing wall garage	5.5
0.1	Outside wall	2.2
0.15	Outside wall	3.4
0.2	Outside wall	4.7
0.25	Outside wall	3.5
0.3	Outside wall	4.7
0.4	Outside wall	7.2
0.45	Outside wall	8.3

0.05	outer pillars in garage	1.25
0.05	Wall garage	1.25
0.1	Wall garage	2.5
0.15	Wall garage	3.75
0.175	Wall garage	4.4
0.2	Wall garage	5.0
0.3	Wall garage	7.5
0.025	Inner pillars around	0.3
0.03	Inner pillars around	0.36
0.05	Inner pillars around	0.6
0.05	Interior wall	0.7
0.1	Interior wall	1.4
0.15	Interior wall	2.1
0.2	Interior firewall	4.9
0.25	Interior firewall	6.1
0.3	Interior firewall	7.4
0.4	Interior firewall	9.9
0.55	Interior firewall	13.6
0.05	Terrace wall	1.25
0.1	Terrace wall	2.5
0.14	Terrace wall	3.1
0.15	Terrace wall	3.35
0.2	Terrace wall	4.6
0.25	Terrace wall	5.85

0.3	Terrace wall	7.1
0.4	Terrace wall	9.6
0.65	Terrace wall	16.25
0.05	Roof opening wall	1.25
0.1	Roof opening wall	2.5
0.3	Outer garage wall	4.6
0.3	Interior wall parking entrance	4.8
0.2	Interior wall parking entrance	2.3

4.7.2. Variable Load

4.7.2.1 Live load

The category and value of imposed loads are showed below:

Garage: Category F load 2kNn/m^2 (according to Table 6.7 and 6.8 of standard [2])

Ground floor Category C2 load 3kNn/m^2 (according to Table 6.1 and 6.2 of standard [2])

Floor 1,2,3,4 and utility roof Category A load 2kNn/m^2 (according to Table 6.1 and 6.2 of standard [2])

Stairs Category A load 3 kN/m^2 (according to Table 6.2 of standard [2])

Table 4.10 Live load of different zone of the building

Name	Category	Load q_k [kN/m^2]
Garage	F	2,00
Ground floor	C2	3,00
Floor 1,2,3,4 and utility roof	A	2,00
Stairs	A	3,00

4.7.2.2. Wind load

The wind action can be calculated with the Cype program, but a series of data is needed to enter the program.

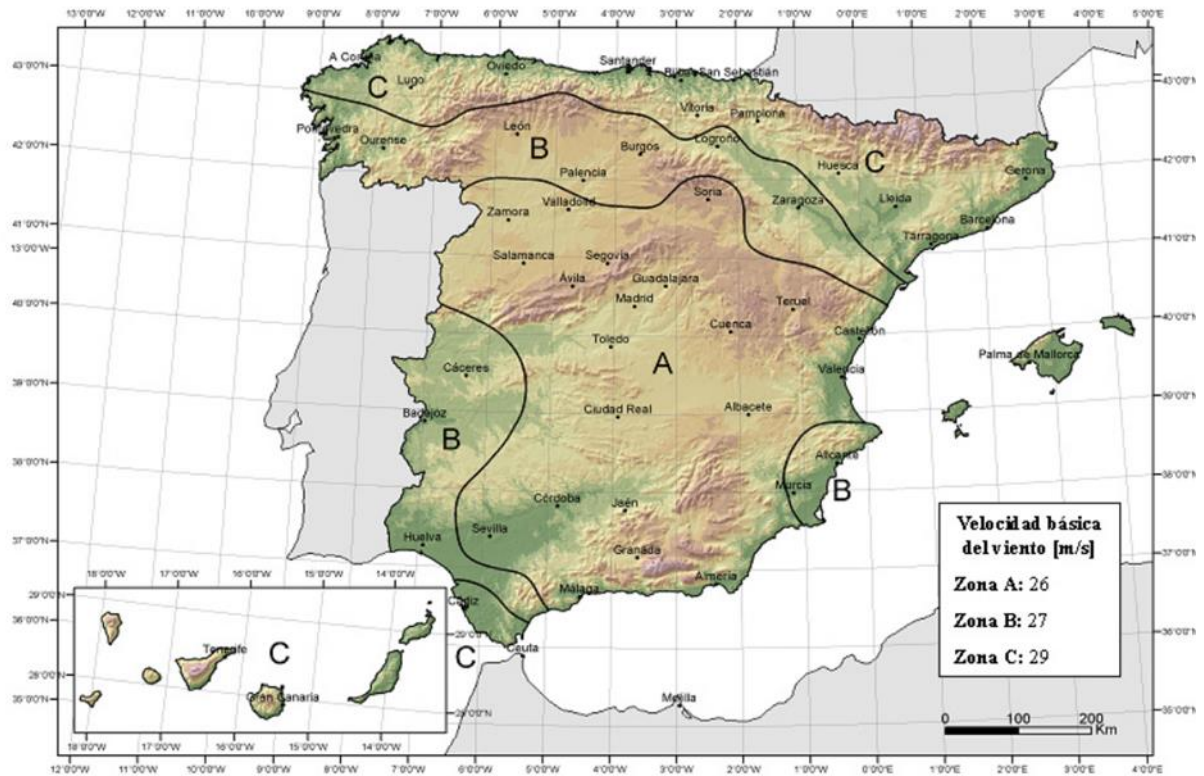


Figura D.1 Valor básico de la velocidad del viento, v_b

Figure 4.2 Basic wind velocity v_b (from standard [6])

Basic wind velocity: $v_b = 26 \frac{m}{s}$

Directional factor: $c_{dir} = 1,0$

Seasonal factor: $c_{season} = 1,0$

Terrain category: Category IV, Urban zones with buildings on, at least 15% of their surface area with a mean height greater than 15m.

Transverse direction (X)

Soil type: Flat

Longitudinal direction (Y)

Soil type: Flat

Service period (years): 50

Table 4.11 Tributary widths for each floor

Tributary widths		
Floors	Y Tributary width (m)	X Tributary width (m)
06. Roof of staircase +20.48m	5.30	7.70
05. Utility Roof +15.84m	19.80	27.00
04. Fourth floor+12.89m	26.40	30.70
03. Third Floor +9.94m	27.00	30.70
02. Second Floor +6.99m	27.00	30.70
01. First Floor +4.04m	27.00	30.70
00. Ground Floor+0.00m	25.80	30.12

Tributary widths are defined as the façade lengths exposed perpendicularly to wind action. The width in the direction of the wind is used to calculate the slenderness of the building and the width in the perpendicular direction to calculate the resultant pressure on the exposed surface.

Load Coefficients

+X: 1.00 -X:1.00

+Y: 1.00 -Y:1.00

8 cases of wind load were applied: pressure and suction from 4 directions. They are described in the calculations as:

Wind +X ecc.+

Wind +X ecc.-

Wind -X ecc.+

Wind -X ecc.-

Wind +Y ecc.+

Wind +Y ecc.-

Wind -Y ecc.+

Wind -Y ecc.-

ecc.+ - pressure

ecc.- - suction

In the following table the results of the wind loads on each floor are described:

Table 4.12 Wind load for each floor

Wind loads		
Floor	Wind X (kN)	Wind Y (kN)
06. Roof of staircase +20.48m	8.792	13.377
05. Utility Roof +15.84m	53.743	76.745
04. Fourth floor+12.89m	55.725	67.859
03. Third Floor +9.94m	56.991	67.859
02. Second Floor +6.99m	56.991	67.859
01. First Floor +4.04m	67.520	80.396
00. Ground Floor+0.00m	0.000	0.000

4.7.2.3. Snow load

In the section 3.5.1. of the DB-SE-AE of the CTE, is told that on flat roofs of apartment buildings located at less than 1,000 m altitude (above sea level), the snow load should be considered as 1.00 kN/m². But to adjust more this value the "Annex E. Climatic data" of the DB_SE-AE, will be taken into consideration, where it is shown:



Figure 4.3 Climatic zones in winter in Spain (from standard [6])

Table 4.13 Load of snow on a horizontal terrain, depending on the area of winter weather and altitude, relative to sea level

Tabla E.2 Sobrecarga de nieve en un terreno horizontal (kN/m²)

Altitud (m)	Zona de clima invernal, (según figura E.2)						
	1	2	3	4	5	6	7
0	0,3	0,4	0,2	0,2	0,2	0,2	0,2
200	0,5	0,5	0,2	0,2	0,3	0,2	0,2
400	0,6	0,6	0,2	0,3	0,4	0,2	0,2
500	0,7	0,7	0,3	0,4	0,4	0,3	0,2
600	0,9	0,9	0,3	0,5	0,5	0,4	0,2
700	1,0	1,0	0,4	0,6	0,6	0,5	0,2
800	1,2	1,1	0,5	0,8	0,7	0,7	0,2
900	1,4	1,3	0,6	1,0	0,8	0,9	0,2
1.000	1,7	1,5	0,7	1,2	0,9	1,2	0,2
1.200	2,3	2,0	1,1	1,9	1,3	2,0	0,2
1.400	3,2	2,6	1,7	3,0	1,8	3,3	0,2
1.600	4,3	3,5	2,6	4,6	2,5	5,5	0,2
1.800	-	4,6	4,0	-	-	9,3	0,2
2.200	-	8,0	-	-	-	-	-

The designed building is in "zone 5" and at sea level, the value that is applied is: 0.2 kN/m².

4.7.3. Load cases

Table 4.14 Load Cases

Automatic	Self weight	
	Dead load	
	Live load	
	Wind +X ecc.+	
	Wind +X ecc.-	
	Wind -X ecc.+	
	Wind -X ecc.-	
	Wind +Y ecc.+	
	Wind +Y ecc.-	
	Wind -Y ecc.+	
	Wind -Y ecc.-	
Additional	Reference	Nature
	LL 1	Live load
	LL 2	Live load
	S 1	Snow

4.8. Combinations of Actions Taken

For each project situation, critical load hypotheses will be identified and for each of them, the calculation value of the effect of the actions will be obtained by combining the actions that can act simultaneously, according to the following general criteria:

4.8.1. Ultimate Limit State (ULS)

Permanent or temporary situations (according to paragraph 6.4.3.2 of standard [1]):

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \gamma_P P_k + \gamma_{Q,1} Q_{k,1} + \sum_{i > 1} \gamma_{Q,i} \Psi_{0,i} Q_{k,i}$$

4.8.1. Serviceability limit state (SLS)

Characteristic combination (unlikely) (according to paragraph 6.5.3. of standard [1]):

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \gamma_P P_k + \gamma_{Q,1} Q_{k,1} + \sum_{i > 1} \gamma_{Q,i} \Psi_{0,i} Q_{k,i}$$

Quasi-permanent combination (according to paragraph 6.5.3. of standard [1]):

$$\sum_{j \geq 1} \gamma_{G,j} G_{k,j} + \sum_{j \geq 1} \gamma_{G^*,j} G_{k,j}^* + \gamma_P P_k + \sum_{i > 1} \gamma_{Q,i} \Psi_{2,i} Q_{k,i}$$

Where:

$G_{k,j}$ - Characteristic value of permanent action j

$G_{k,j}^*$ - Characteristic value of permanent action j of non-constant value

P_k - Characteristic value of a prestressing action

$Q_{k,1}$ - Characteristic value of the leading variable action 1

$\gamma_{Q,i}$ - Partial factor for variable action i

$\psi_{0,i}$ - Factor for combination value of a variable action i

$\psi_{1,i}$ - Factor for frequent value of a variable action i

$\psi_{2,i}$ - Factor for quasi-permanent value of a variable action i

4.8.3. Partial safety factors (γ) and combination factors (ψ)

For each project situation and limit state, the loading coefficients will be determined by] EN 1992-1-1:

Eurocode 2: Design of concrete structures - Part 1-1 : General rules and rules for buildings

Table 4.15 Load coefficients Ultimate limit state (ULS)

Persistent or transient				
	Partial safety factors (γ)		Combination coefficients (ψ)	
	Favourable	Unfavourable	Main (ψ_p)	Accompanying (ψ_a)
Dead load (G)	1.000	1.350	-	-

Persistent or transient				
	Partial safety factors (γ)		Combination coefficients (ψ)	
	Favourable	Unfavourable	Main (ψ_p)	Accompanying (ψ_a)
Live load (Q)	0.000	1.500	1.000	0.700
Wind (Q)	0.000	1.500	1.000	0.600
Snow (Q)	0.000	1.500	1.000	0.500

Displacements

Table 4.16 Load coefficient Service limit state (SLS)

Variable loads without seismic loading		
	Partial safety factors (γ)	
	Favourable	Unfavourable
Dead load (G)	1.000	1.000
Live load (Q)	0.000	1.000
Wind (Q)	0.000	1.000
Snow (Q)	0.000	1.000

4.8.4. List of combinations

Table 4.17 List of combination Ultimate limit state (ULS)

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
1	1.000	1.000												
2	1.350	1.350												
3	1.000	1.000	1.500											
4	1.350	1.350	1.500											
5	1.000	1.000		1.500										

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
6	1.350	1.350		1.500										
7	1.000	1.000			1.500									
8	1.350	1.350			1.500									
9	1.000	1.000		1.500	1.500									
10	1.350	1.350		1.500	1.500									
11	1.000	1.000				1.500								
12	1.350	1.350				1.500								
13	1.000	1.000	1.050			1.500								
14	1.350	1.350	1.050			1.500								
15	1.000	1.000		1.050		1.500								
16	1.350	1.350		1.050		1.500								
17	1.000	1.000			1.050	1.500								
18	1.350	1.350			1.050	1.500								
19	1.000	1.000		1.050	1.050	1.500								
20	1.350	1.350		1.050	1.050	1.500								
21	1.000	1.000	1.500			0.900								
22	1.350	1.350	1.500			0.900								
23	1.000	1.000		1.500		0.900								
24	1.350	1.350		1.500		0.900								
25	1.000	1.000			1.500	0.900								
26	1.350	1.350			1.500	0.900								
27	1.000	1.000		1.500	1.500	0.900								
28	1.350	1.350		1.500	1.500	0.900								
29	1.000	1.000					1.500							
30	1.350	1.350					1.500							
31	1.000	1.000	1.050				1.500							
32	1.350	1.350	1.050				1.500							
33	1.000	1.000		1.050			1.500							
34	1.350	1.350		1.050			1.500							
35	1.000	1.000			1.050		1.500							
36	1.350	1.350			1.050		1.500							

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
37	1.000	1.000		1.050	1.050		1.500							
38	1.350	1.350		1.050	1.050		1.500							
39	1.000	1.000	1.500				0.900							
40	1.350	1.350	1.500				0.900							
41	1.000	1.000		1.500			0.900							
42	1.350	1.350		1.500			0.900							
43	1.000	1.000			1.500		0.900							
44	1.350	1.350			1.500		0.900							
45	1.000	1.000		1.500	1.500		0.900							
46	1.350	1.350		1.500	1.500		0.900							
47	1.000	1.000						1.500						
48	1.350	1.350						1.500						
49	1.000	1.000	1.050					1.500						
50	1.350	1.350	1.050					1.500						
51	1.000	1.000		1.050				1.500						
52	1.350	1.350		1.050				1.500						
53	1.000	1.000			1.050			1.500						
54	1.350	1.350			1.050			1.500						
55	1.000	1.000		1.050	1.050			1.500						
56	1.350	1.350		1.050	1.050			1.500						
57	1.000	1.000	1.500					0.900						
58	1.350	1.350	1.500					0.900						
59	1.000	1.000		1.500				0.900						
60	1.350	1.350		1.500				0.900						
61	1.000	1.000			1.500			0.900						
62	1.350	1.350			1.500			0.900						
63	1.000	1.000		1.500	1.500			0.900						
64	1.350	1.350		1.500	1.500			0.900						
65	1.000	1.000							1.500					
66	1.350	1.350							1.500					
67	1.000	1.000	1.050						1.500					

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
68	1.350	1.350	1.050						1.500					
69	1.000	1.000		1.050					1.500					
70	1.350	1.350		1.050					1.500					
71	1.000	1.000			1.050				1.500					
72	1.350	1.350			1.050				1.500					
73	1.000	1.000		1.050	1.050				1.500					
74	1.350	1.350		1.050	1.050				1.500					
75	1.000	1.000	1.500						0.900					
76	1.350	1.350	1.500						0.900					
77	1.000	1.000		1.500					0.900					
78	1.350	1.350		1.500					0.900					
79	1.000	1.000			1.500				0.900					
80	1.350	1.350			1.500				0.900					
81	1.000	1.000		1.500	1.500				0.900					
82	1.350	1.350		1.500	1.500				0.900					
83	1.000	1.000								1.500				
84	1.350	1.350								1.500				
85	1.000	1.000	1.050							1.500				
86	1.350	1.350	1.050							1.500				
87	1.000	1.000		1.050						1.500				
88	1.350	1.350		1.050						1.500				
89	1.000	1.000			1.050					1.500				
90	1.350	1.350			1.050					1.500				
91	1.000	1.000		1.050	1.050					1.500				
92	1.350	1.350		1.050	1.050					1.500				
93	1.000	1.000	1.500							0.900				
94	1.350	1.350	1.500							0.900				
95	1.000	1.000		1.500						0.900				
96	1.350	1.350		1.500						0.900				
97	1.000	1.000			1.500					0.900				
98	1.350	1.350			1.500					0.900				

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
99	1.000	1.000		1.500	1.500					0.900				
100	1.350	1.350		1.500	1.500					0.900				
101	1.000	1.000									1.500			
102	1.350	1.350									1.500			
103	1.000	1.000	1.050								1.500			
104	1.350	1.350	1.050								1.500			
105	1.000	1.000		1.050							1.500			
106	1.350	1.350		1.050							1.500			
107	1.000	1.000			1.050						1.500			
108	1.350	1.350			1.050						1.500			
109	1.000	1.000		1.050	1.050						1.500			
110	1.350	1.350		1.050	1.050						1.500			
111	1.000	1.000	1.500								0.900			
112	1.350	1.350	1.500								0.900			
113	1.000	1.000		1.500							0.900			
114	1.350	1.350		1.500							0.900			
115	1.000	1.000			1.500						0.900			
116	1.350	1.350			1.500						0.900			
117	1.000	1.000		1.500	1.500						0.900			
118	1.350	1.350		1.500	1.500						0.900			
119	1.000	1.000										1.500		
120	1.350	1.350										1.500		
121	1.000	1.000	1.050									1.500		
122	1.350	1.350	1.050									1.500		
123	1.000	1.000		1.050								1.500		
124	1.350	1.350		1.050								1.500		
125	1.000	1.000			1.050							1.500		
126	1.350	1.350			1.050							1.500		
127	1.000	1.000		1.050	1.050							1.500		
128	1.350	1.350		1.050	1.050							1.500		
129	1.000	1.000	1.500									0.900		

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
130	1.350	1.350	1.500									0.900		
131	1.000	1.000		1.500								0.900		
132	1.350	1.350		1.500								0.900		
133	1.000	1.000			1.500							0.900		
134	1.350	1.350			1.500							0.900		
135	1.000	1.000		1.500	1.500							0.900		
136	1.350	1.350		1.500	1.500							0.900		
137	1.000	1.000											1.500	
138	1.350	1.350											1.500	
139	1.000	1.000	1.050										1.500	
140	1.350	1.350	1.050										1.500	
141	1.000	1.000		1.050									1.500	
142	1.350	1.350		1.050									1.500	
143	1.000	1.000			1.050								1.500	
144	1.350	1.350			1.050								1.500	
145	1.000	1.000		1.050	1.050								1.500	
146	1.350	1.350		1.050	1.050								1.500	
147	1.000	1.000	1.500										0.900	
148	1.350	1.350	1.500										0.900	
149	1.000	1.000		1.500									0.900	
150	1.350	1.350		1.500									0.900	
151	1.000	1.000			1.500								0.900	
152	1.350	1.350			1.500								0.900	
153	1.000	1.000		1.500	1.500								0.900	
154	1.350	1.350		1.500	1.500								0.900	
155	1.000	1.000												1.500
156	1.350	1.350												1.500
157	1.000	1.000	1.050											1.500
158	1.350	1.350	1.050											1.500
159	1.000	1.000		1.050										1.500
160	1.350	1.350		1.050										1.500

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
161	1.000	1.000			1.050									1.500
162	1.350	1.350			1.050									1.500
163	1.000	1.000		1.050	1.050									1.500
164	1.350	1.350		1.050	1.050									1.500
165	1.000	1.000				0.900								1.500
166	1.350	1.350				0.900								1.500
167	1.000	1.000	1.050			0.900								1.500
168	1.350	1.350	1.050			0.900								1.500
169	1.000	1.000		1.050		0.900								1.500
170	1.350	1.350		1.050		0.900								1.500
171	1.000	1.000			1.050	0.900								1.500
172	1.350	1.350			1.050	0.900								1.500
173	1.000	1.000		1.050	1.050	0.900								1.500
174	1.350	1.350		1.050	1.050	0.900								1.500
175	1.000	1.000					0.900							1.500
176	1.350	1.350					0.900							1.500
177	1.000	1.000	1.050				0.900							1.500
178	1.350	1.350	1.050				0.900							1.500
179	1.000	1.000		1.050			0.900							1.500
180	1.350	1.350		1.050			0.900							1.500
181	1.000	1.000			1.050		0.900							1.500
182	1.350	1.350			1.050		0.900							1.500
183	1.000	1.000		1.050	1.050		0.900							1.500
184	1.350	1.350		1.050	1.050		0.900							1.500
185	1.000	1.000						0.900						1.500
186	1.350	1.350						0.900						1.500
187	1.000	1.000	1.050					0.900						1.500
188	1.350	1.350	1.050					0.900						1.500
189	1.000	1.000		1.050				0.900						1.500
190	1.350	1.350		1.050				0.900						1.500
191	1.000	1.000			1.050			0.900						1.500

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
192	1.350	1.350			1.050			0.900						1.500
193	1.000	1.000		1.050	1.050			0.900						1.500
194	1.350	1.350		1.050	1.050			0.900						1.500
195	1.000	1.000							0.900					1.500
196	1.350	1.350							0.900					1.500
197	1.000	1.000	1.050						0.900					1.500
198	1.350	1.350	1.050						0.900					1.500
199	1.000	1.000		1.050					0.900					1.500
200	1.350	1.350		1.050					0.900					1.500
201	1.000	1.000			1.050				0.900					1.500
202	1.350	1.350			1.050				0.900					1.500
203	1.000	1.000		1.050	1.050				0.900					1.500
204	1.350	1.350		1.050	1.050				0.900					1.500
205	1.000	1.000								0.900				1.500
206	1.350	1.350								0.900				1.500
207	1.000	1.000	1.050							0.900				1.500
208	1.350	1.350	1.050							0.900				1.500
209	1.000	1.000		1.050						0.900				1.500
210	1.350	1.350		1.050						0.900				1.500
211	1.000	1.000			1.050					0.900				1.500
212	1.350	1.350			1.050					0.900				1.500
213	1.000	1.000		1.050	1.050					0.900				1.500
214	1.350	1.350		1.050	1.050					0.900				1.500
215	1.000	1.000									0.900			1.500
216	1.350	1.350									0.900			1.500
217	1.000	1.000	1.050								0.900			1.500
218	1.350	1.350	1.050								0.900			1.500
219	1.000	1.000		1.050							0.900			1.500
220	1.350	1.350		1.050							0.900			1.500
221	1.000	1.000			1.050						0.900			1.500
222	1.350	1.350			1.050						0.900			1.500

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
223	1.000	1.000		1.050	1.050						0.900			1.500
224	1.350	1.350		1.050	1.050						0.900			1.500
225	1.000	1.000										0.900		1.500
226	1.350	1.350										0.900		1.500
227	1.000	1.000	1.050									0.900		1.500
228	1.350	1.350	1.050									0.900		1.500
229	1.000	1.000		1.050								0.900		1.500
230	1.350	1.350		1.050								0.900		1.500
231	1.000	1.000			1.050							0.900		1.500
232	1.350	1.350			1.050							0.900		1.500
233	1.000	1.000		1.050	1.050							0.900		1.500
234	1.350	1.350		1.050	1.050							0.900		1.500
235	1.000	1.000											0.900	1.500
236	1.350	1.350											0.900	1.500
237	1.000	1.000	1.050										0.900	1.500
238	1.350	1.350	1.050										0.900	1.500
239	1.000	1.000		1.050									0.900	1.500
240	1.350	1.350		1.050									0.900	1.500
241	1.000	1.000			1.050								0.900	1.500
242	1.350	1.350			1.050								0.900	1.500
243	1.000	1.000		1.050	1.050								0.900	1.500
244	1.350	1.350		1.050	1.050								0.900	1.500
245	1.000	1.000	1.500											0.750
246	1.350	1.350	1.500											0.750
247	1.000	1.000		1.500										0.750
248	1.350	1.350		1.500										0.750
249	1.000	1.000			1.500									0.750
250	1.350	1.350			1.500									0.750
251	1.000	1.000		1.500	1.500									0.750
252	1.350	1.350		1.500	1.500									0.750
253	1.000	1.000				1.500								0.750

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
254	1.350	1.350				1.500								0.750
255	1.000	1.000	1.050			1.500								0.750
256	1.350	1.350	1.050			1.500								0.750
257	1.000	1.000		1.050		1.500								0.750
258	1.350	1.350		1.050		1.500								0.750
259	1.000	1.000			1.050	1.500								0.750
260	1.350	1.350			1.050	1.500								0.750
261	1.000	1.000		1.050	1.050	1.500								0.750
262	1.350	1.350		1.050	1.050	1.500								0.750
263	1.000	1.000	1.500			0.900								0.750
264	1.350	1.350	1.500			0.900								0.750
265	1.000	1.000		1.500		0.900								0.750
266	1.350	1.350		1.500		0.900								0.750
267	1.000	1.000			1.500	0.900								0.750
268	1.350	1.350			1.500	0.900								0.750
269	1.000	1.000		1.500	1.500	0.900								0.750
270	1.350	1.350		1.500	1.500	0.900								0.750
271	1.000	1.000					1.500							0.750
272	1.350	1.350					1.500							0.750
273	1.000	1.000	1.050				1.500							0.750
274	1.350	1.350	1.050				1.500							0.750
275	1.000	1.000		1.050			1.500							0.750
276	1.350	1.350		1.050			1.500							0.750
277	1.000	1.000			1.050		1.500							0.750
278	1.350	1.350			1.050		1.500							0.750
279	1.000	1.000		1.050	1.050		1.500							0.750
280	1.350	1.350		1.050	1.050		1.500							0.750
281	1.000	1.000	1.500				0.900							0.750
282	1.350	1.350	1.500				0.900							0.750
283	1.000	1.000		1.500			0.900							0.750
284	1.350	1.350		1.500			0.900							0.750

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
285	1.000	1.000			1.500		0.900							0.750
286	1.350	1.350			1.500		0.900							0.750
287	1.000	1.000		1.500	1.500		0.900							0.750
288	1.350	1.350		1.500	1.500		0.900							0.750
289	1.000	1.000						1.500						0.750
290	1.350	1.350						1.500						0.750
291	1.000	1.000	1.050					1.500						0.750
292	1.350	1.350	1.050					1.500						0.750
293	1.000	1.000		1.050				1.500						0.750
294	1.350	1.350		1.050				1.500						0.750
295	1.000	1.000			1.050			1.500						0.750
296	1.350	1.350			1.050			1.500						0.750
297	1.000	1.000		1.050	1.050			1.500						0.750
298	1.350	1.350		1.050	1.050			1.500						0.750
299	1.000	1.000	1.500					0.900						0.750
300	1.350	1.350	1.500					0.900						0.750
301	1.000	1.000		1.500				0.900						0.750
302	1.350	1.350		1.500				0.900						0.750
303	1.000	1.000			1.500			0.900						0.750
304	1.350	1.350			1.500			0.900						0.750
305	1.000	1.000		1.500	1.500			0.900						0.750
306	1.350	1.350		1.500	1.500			0.900						0.750
307	1.000	1.000							1.500					0.750
308	1.350	1.350							1.500					0.750
309	1.000	1.000	1.050						1.500					0.750
310	1.350	1.350	1.050						1.500					0.750
311	1.000	1.000		1.050					1.500					0.750
312	1.350	1.350		1.050					1.500					0.750
313	1.000	1.000			1.050				1.500					0.750
314	1.350	1.350			1.050				1.500					0.750
315	1.000	1.000		1.050	1.050				1.500					0.750

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
316	1.350	1.350		1.050	1.050				1.500					0.750
317	1.000	1.000	1.500						0.900					0.750
318	1.350	1.350	1.500						0.900					0.750
319	1.000	1.000		1.500					0.900					0.750
320	1.350	1.350		1.500					0.900					0.750
321	1.000	1.000			1.500				0.900					0.750
322	1.350	1.350			1.500				0.900					0.750
323	1.000	1.000		1.500	1.500				0.900					0.750
324	1.350	1.350		1.500	1.500				0.900					0.750
325	1.000	1.000								1.500				0.750
326	1.350	1.350								1.500				0.750
327	1.000	1.000	1.050							1.500				0.750
328	1.350	1.350	1.050							1.500				0.750
329	1.000	1.000		1.050						1.500				0.750
330	1.350	1.350		1.050						1.500				0.750
331	1.000	1.000			1.050					1.500				0.750
332	1.350	1.350			1.050					1.500				0.750
333	1.000	1.000		1.050	1.050					1.500				0.750
334	1.350	1.350		1.050	1.050					1.500				0.750
335	1.000	1.000	1.500							0.900				0.750
336	1.350	1.350	1.500							0.900				0.750
337	1.000	1.000		1.500						0.900				0.750
338	1.350	1.350		1.500						0.900				0.750
339	1.000	1.000			1.500					0.900				0.750
340	1.350	1.350			1.500					0.900				0.750
341	1.000	1.000		1.500	1.500					0.900				0.750
342	1.350	1.350		1.500	1.500					0.900				0.750
343	1.000	1.000									1.500			0.750
344	1.350	1.350									1.500			0.750
345	1.000	1.000	1.050								1.500			0.750
346	1.350	1.350	1.050								1.500			0.750

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
347	1.000	1.000		1.050							1.500			0.750
348	1.350	1.350		1.050							1.500			0.750
349	1.000	1.000			1.050						1.500			0.750
350	1.350	1.350			1.050						1.500			0.750
351	1.000	1.000		1.050	1.050						1.500			0.750
352	1.350	1.350		1.050	1.050						1.500			0.750
353	1.000	1.000	1.500								0.900			0.750
354	1.350	1.350	1.500								0.900			0.750
355	1.000	1.000		1.500							0.900			0.750
356	1.350	1.350		1.500							0.900			0.750
357	1.000	1.000			1.500						0.900			0.750
358	1.350	1.350			1.500						0.900			0.750
359	1.000	1.000		1.500	1.500						0.900			0.750
360	1.350	1.350		1.500	1.500						0.900			0.750
361	1.000	1.000										1.500		0.750
362	1.350	1.350										1.500		0.750
363	1.000	1.000	1.050									1.500		0.750
364	1.350	1.350	1.050									1.500		0.750
365	1.000	1.000		1.050								1.500		0.750
366	1.350	1.350		1.050								1.500		0.750
367	1.000	1.000			1.050							1.500		0.750
368	1.350	1.350			1.050							1.500		0.750
369	1.000	1.000		1.050	1.050							1.500		0.750
370	1.350	1.350		1.050	1.050							1.500		0.750
371	1.000	1.000	1.500									0.900		0.750
372	1.350	1.350	1.500									0.900		0.750
373	1.000	1.000		1.500								0.900		0.750
374	1.350	1.350		1.500								0.900		0.750
375	1.000	1.000			1.500							0.900		0.750
376	1.350	1.350			1.500							0.900		0.750
377	1.000	1.000		1.500	1.500							0.900		0.750

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
378	1.350	1.350		1.500	1.500							0.900		0.750
379	1.000	1.000											1.500	0.750
380	1.350	1.350											1.500	0.750
381	1.000	1.000	1.050										1.500	0.750
382	1.350	1.350	1.050										1.500	0.750
383	1.000	1.000		1.050									1.500	0.750
384	1.350	1.350		1.050									1.500	0.750
385	1.000	1.000			1.050								1.500	0.750
386	1.350	1.350			1.050								1.500	0.750
387	1.000	1.000		1.050	1.050								1.500	0.750
388	1.350	1.350		1.050	1.050								1.500	0.750
389	1.000	1.000	1.500										0.900	0.750
390	1.350	1.350	1.500										0.900	0.750
391	1.000	1.000		1.500									0.900	0.750
392	1.350	1.350		1.500									0.900	0.750
393	1.000	1.000			1.500								0.900	0.750
394	1.350	1.350			1.500								0.900	0.750
395	1.000	1.000		1.500	1.500								0.900	0.750
396	1.350	1.350		1.500	1.500								0.900	0.750

Displacements – Service limit state (SLS)

Table 4.18 List of combinations Service limit state (SLS)

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
1	1.000	1.000												
2	1.000	1.000	1.000											
3	1.000	1.000		1.000										
4	1.000	1.000			1.000									
5	1.000	1.000		1.000	1.000									
6	1.000	1.000				1.000								
7	1.000	1.000	1.000			1.000								

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
8	1.000	1.000		1.000		1.000								
9	1.000	1.000			1.000	1.000								
10	1.000	1.000		1.000	1.000	1.000								
11	1.000	1.000					1.000							
12	1.000	1.000	1.000				1.000							
13	1.000	1.000		1.000			1.000							
14	1.000	1.000			1.000		1.000							
15	1.000	1.000		1.000	1.000		1.000							
16	1.000	1.000						1.000						
17	1.000	1.000	1.000					1.000						
18	1.000	1.000		1.000				1.000						
19	1.000	1.000			1.000			1.000						
20	1.000	1.000		1.000	1.000			1.000						
21	1.000	1.000							1.000					
22	1.000	1.000	1.000						1.000					
23	1.000	1.000		1.000					1.000					
24	1.000	1.000			1.000				1.000					
25	1.000	1.000		1.000	1.000				1.000					
26	1.000	1.000								1.000				
27	1.000	1.000	1.000							1.000				
28	1.000	1.000		1.000						1.000				
29	1.000	1.000			1.000					1.000				
30	1.000	1.000		1.000	1.000					1.000				
31	1.000	1.000									1.000			
32	1.000	1.000	1.000								1.000			
33	1.000	1.000		1.000							1.000			
34	1.000	1.000			1.000						1.000			
35	1.000	1.000		1.000	1.000						1.000			
36	1.000	1.000										1.000		
37	1.000	1.000	1.000									1.000		
38	1.000	1.000		1.000								1.000		

Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
39	1.000	1.000			1.000							1.000		
40	1.000	1.000		1.000	1.000							1.000		
41	1.000	1.000											1.000	
42	1.000	1.000	1.000										1.000	
43	1.000	1.000		1.000									1.000	
44	1.000	1.000			1.000								1.000	
45	1.000	1.000		1.000	1.000								1.000	
46	1.000	1.000												1.000
47	1.000	1.000	1.000											1.000
48	1.000	1.000		1.000										1.000
49	1.000	1.000			1.000									1.000
50	1.000	1.000		1.000	1.000									1.000
51	1.000	1.000				1.000								1.000
52	1.000	1.000	1.000			1.000								1.000
53	1.000	1.000		1.000		1.000								1.000
54	1.000	1.000			1.000	1.000								1.000
55	1.000	1.000		1.000	1.000	1.000								1.000
56	1.000	1.000					1.000							1.000
57	1.000	1.000	1.000				1.000							1.000
58	1.000	1.000		1.000			1.000							1.000
59	1.000	1.000			1.000		1.000							1.000
60	1.000	1.000		1.000	1.000		1.000							1.000
61	1.000	1.000						1.000						1.000
62	1.000	1.000	1.000					1.000						1.000
63	1.000	1.000		1.000				1.000						1.000
64	1.000	1.000			1.000			1.000						1.000
65	1.000	1.000		1.000	1.000			1.000						1.000
66	1.000	1.000							1.000					1.000
67	1.000	1.000	1.000						1.000					1.000
68	1.000	1.000		1.000					1.000					1.000
69	1.000	1.000			1.000				1.000					1.000

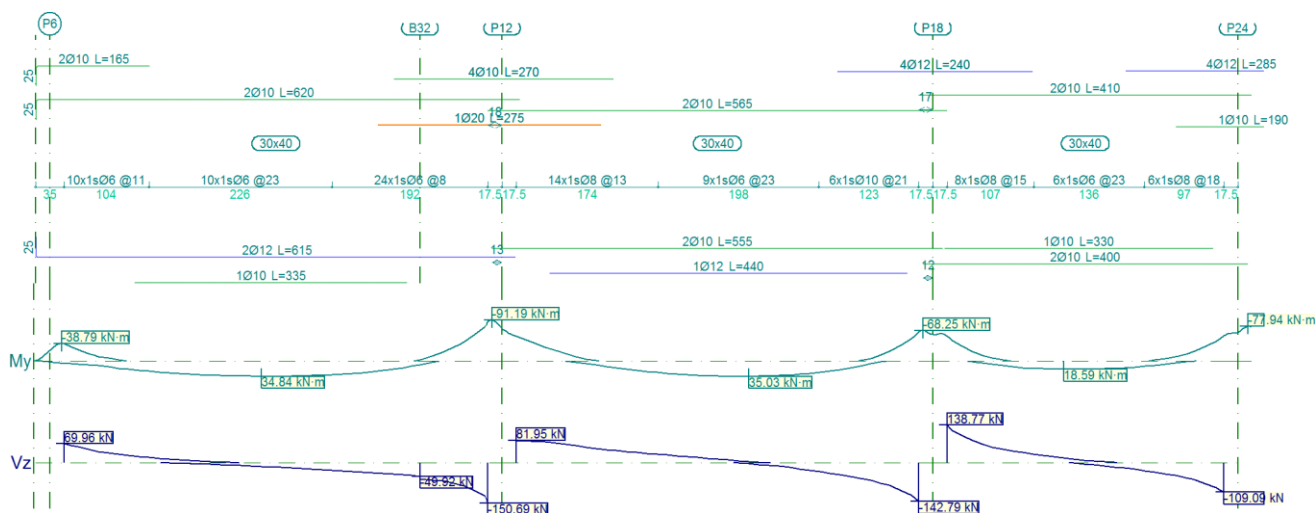
Comb.	SW	DL	Qa	LL 1	LL 2	W(+X ecc.+)	W(+X ecc.-)	W(-X ecc.+)	W(-X ecc.-)	W(+Y ecc.+)	W(+Y ecc.-)	W(-Y ecc.+)	W(-Y ecc.-)	S 1
70	1.000	1.000		1.000	1.000				1.000					1.000
71	1.000	1.000								1.000				1.000
72	1.000	1.000	1.000							1.000				1.000
73	1.000	1.000		1.000						1.000				1.000
74	1.000	1.000			1.000					1.000				1.000
75	1.000	1.000		1.000	1.000					1.000				1.000
76	1.000	1.000									1.000			1.000
77	1.000	1.000	1.000								1.000			1.000
78	1.000	1.000		1.000							1.000			1.000
79	1.000	1.000			1.000						1.000			1.000
80	1.000	1.000		1.000	1.000						1.000			1.000
81	1.000	1.000										1.000		1.000
82	1.000	1.000	1.000									1.000		1.000
83	1.000	1.000		1.000								1.000		1.000
84	1.000	1.000			1.000							1.000		1.000
85	1.000	1.000		1.000	1.000							1.000		1.000
86	1.000	1.000											1.000	1.000
87	1.000	1.000	1.000										1.000	1.000
88	1.000	1.000		1.000									1.000	1.000
89	1.000	1.000			1.000								1.000	1.000
90	1.000	1.000		1.000	1.000								1.000	1.000

5. Structural Analysis (Cype Calculations)

5.1. Frames

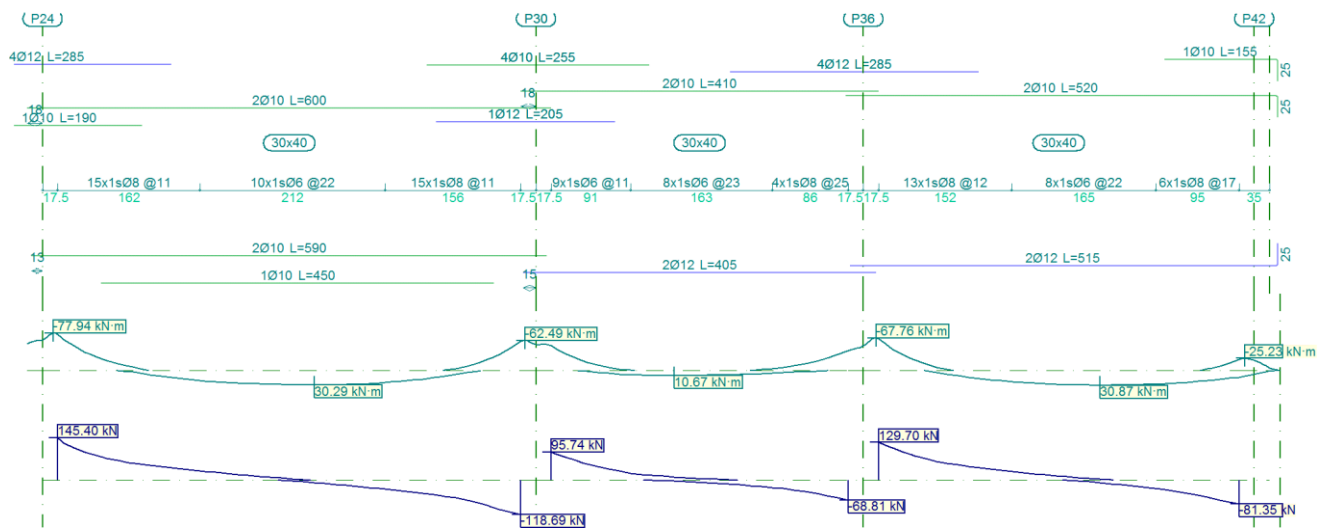
All the frames of the ground floor are shown below:

5.1.1. Frame 1



Frame 1			Span: P6-P12			Span: P12-P18			Span: P18-P24		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-37.84	--	-88.32	-55.02	--	-64.85	-55.36	--	-55.84
x	[m]		0.00	--	5.21	0.00	--	4.95	0.00	--	3.40
Max Moment	[kN·m]		30.95	34.84	28.33	23.87	35.03	31.96	16.58	18.59	14.04
x	[m]		1.67	2.42	3.55	1.61	2.86	3.36	1.06	1.44	2.31
Min Shear	[kN]		-4.14	-29.77	-150.69	--	-12.84	-142.79	--	-19.99	-109.09
x	[m]		1.67	3.42	5.21	--	3.23	4.95	--	2.19	3.40
Max Shear	[kN]		69.96	4.65	--	81.95	31.44	--	138.77	27.61	--
x	[m]		0.00	1.80	--	0.00	1.73	--	0.00	1.19	--
Min Torsion	[kN]		-5.07	-1.49	-1.43	--	--	-1.31	-14.00	--	-2.72
x	[m]		0.00	3.17	3.55	--	--	4.36	0.00	--	3.31
Max Torsion	[kN]		--	--	20.38	1.95	1.15	12.94	1.62	1.20	9.02
x	[m]		--	--	5.17	0.61	1.73	4.86	0.56	1.19	3.31
Top Reinf. Area	[cm ²]	Real	3.14	1.57	7.79	6.94	1.57	6.05	6.09	1.57	6.56
		Req.	2.66	0.00	6.40	5.03	0.00	4.74	4.17	0.00	4.38
Bot. Reinf. Area	[cm ²]	Real	3.05	3.05	3.05	2.70	2.70	2.70	2.36	2.36	2.36
		Req.	2.20	2.33	2.08	1.89	2.34	2.27	1.64	1.65	1.65
	[cm ² /m]	Real	5.14	7.07	7.07	7.73	7.73	7.48	6.70	2.46	5.59

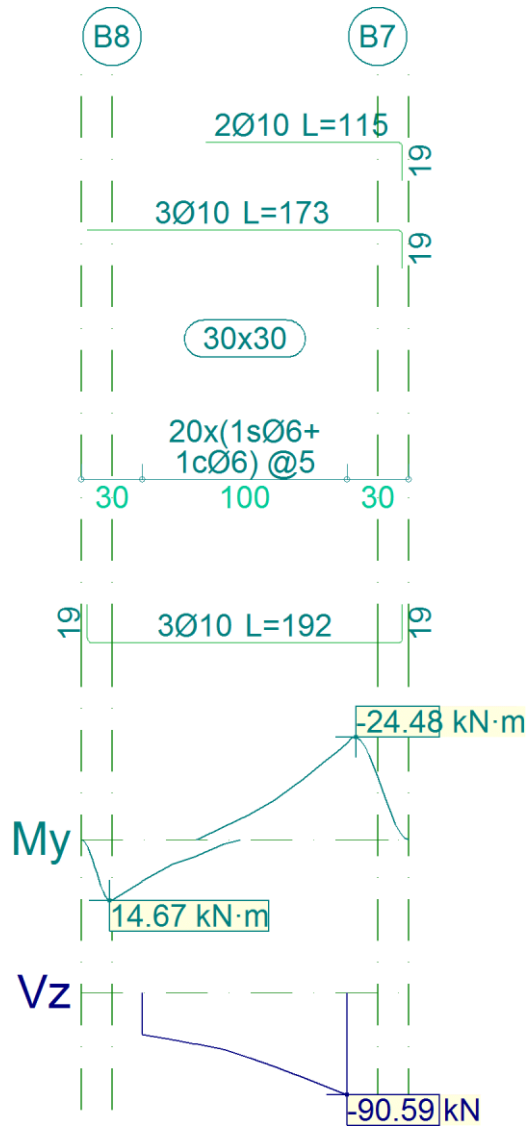
Frame 1			Span: P6-P12			Span: P12-P18			Span: P18-P24		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Transv. Reinf. Area		Req.	4.32	2.40	6.22	6.67	2.45	6.59	6.02	2.40	4.91
			1.21 mm, L/4298 (L: 5.21 m)			1.60 mm, L/3091 (L: 4.95 m)			0.23 mm, L/12206 (L: 2.85 m)		
Active Defl.		1.94 mm, L/2684 (L: 5.21 m)			1.86 mm, L/2655 (L: 4.95 m)			0.27 mm, L/10489 (L: 2.79 m)			
Long Term Defl.											



Frame 1			Span: P24-P30			Span: P30-P36			Span: P36-P42		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-75.48	--	-60.05	-51.35	--	-41.27	-65.68	--	-22.41
x	[m]		0.00	--	5.30	0.00	--	3.40	0.00	--	4.13
Max Moment	[kN·m]		21.74	30.29	27.25	9.86	10.67	7.74	19.57	30.87	30.40
x	[m]		1.68	2.93	3.56	1.03	1.41	2.28	1.29	2.54	2.79
Min Shear	[kN]		--	-22.09	-118.69	--	-16.84	-68.81	--	-13.11	-81.35
x	[m]		--	3.43	5.30	--	2.16	3.40	--	2.66	4.13
Max Shear	[kN]		145.40	26.15	--	95.74	16.18	--	129.70	32.84	--
x	[m]		0.00	1.81	--	0.00	1.16	--	0.00	1.41	--
Min Torsion	[kN]		-9.74	-1.13	-2.34	-5.87	--	-1.22	-5.09	--	-3.69
x	[m]		0.00	3.31	4.56	0.00	--	3.16	0.00	--	3.91
Max Torsion	[kN]		4.83	1.19	2.11	1.36	--	3.55	2.28	1.32	--
x	[m]		0.00	1.81	5.06	0.00	--	3.16	0.00	1.41	--
	[cm _c]	Real	6.88	1.57	5.84	5.45	2.31	6.09	6.09	1.57	2.36

Frame 1			Span: P24-P30			Span: P30-P36			Span: P36-P42		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Top Reinf. Area	[cm _c]	Req.	5.42	0.00	4.28	3.71	0.11	3.50	4.67	0.00	1.68
Bot. Reinf. Area		Real	2.36	2.36	2.36	2.26	2.26	2.26	2.26	2.26	2.26
		Req.	1.66	2.01	1.94	1.65	1.65	1.65	1.64	2.06	2.06
Transv. Reinf. Area		Real	9.14	2.57	9.14	5.14	2.46	4.02	8.38	8.38	5.91
	[cm _c /m]	Req.	7.85	2.40	7.79	4.63	2.40	3.56	7.51	2.56	5.38
Active Defl.			1.92 mm, L/2765 (L: 5.30 m)			0.07 mm, L/26601 (L: 1.74 m)			0.97 mm, L/4238 (L: 4.13 m)		
Long Term Defl.			2.37 mm, L/2234 (L: 5.30 m)			0.02 mm, L/7932 (L: 0.12 m)			1.25 mm, L/3294 (L: 4.13 m)		

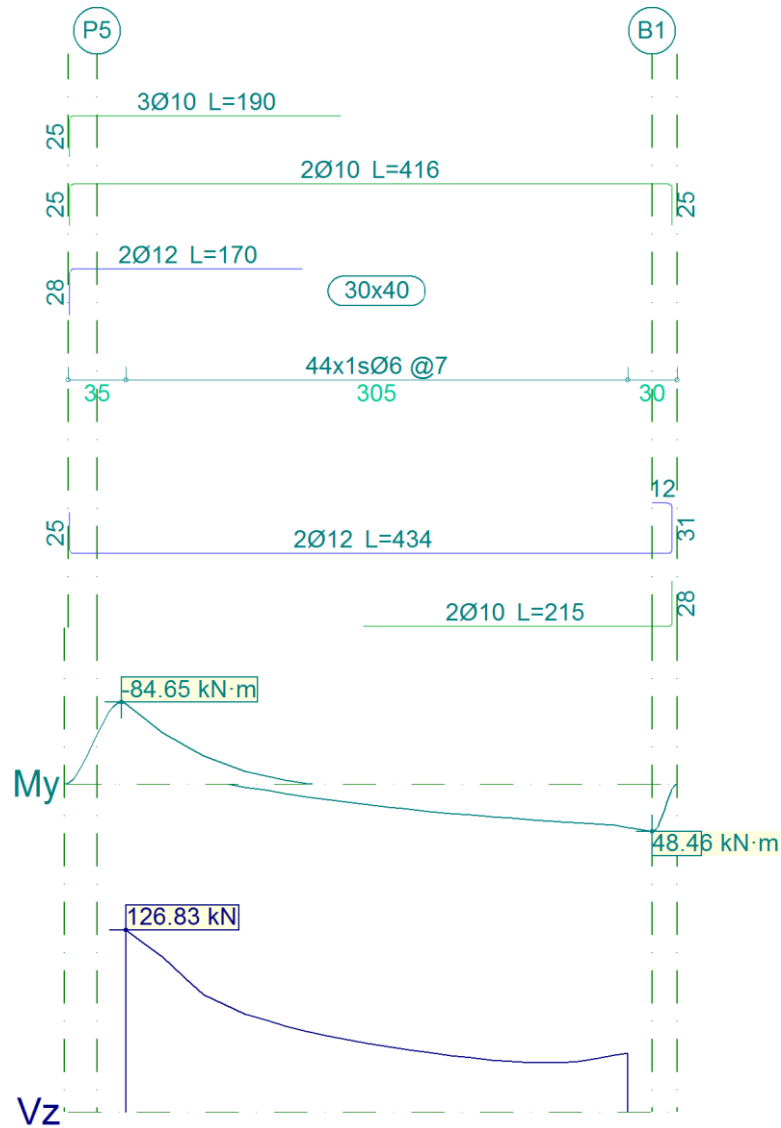
5.1.2. Frame 2



Frame 2		Span: B8-B7		
Section		30x30		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	--	-9.52	-23.15
x	[m]	--	0.65	1.00
Max Moment	[kN·m]	9.92	1.20	--
x	[m]	0.00	0.40	--
Min Shear	[kN]	-45.87	-65.43	-90.59
x	[m]	0.27	0.65	1.00
Max Shear	[kN]	--	--	--
x	[m]	--	--	--
Min Torsion	[kN]	--	--	--

Frame 2			Span: B8-B7		
Section			30x30		
Zone			1/3L	2/3L	3/3L
x	[m]		--	--	--
Max Torsion	[kN]		1.14	3.02	10.80
x	[m]		0.15	0.65	0.90
Top Reinf. Area	[cm _c]	Real	2.20	3.26	3.93
		Req.	0.53	1.97	3.04
Bot. Reinf. Area	[cm _c]	Real	2.36	2.36	2.36
		Req.	1.19	1.19	0.76
Transv. Reinf. Area	[cm _c /m]	Real	16.96	16.96	16.96
		Req.	4.92	8.48	14.94
Active Defl.			0.03 mm, L/29332 (L: 0.85 m)		
Long Term Defl.			0.05 mm, L/21870 (L: 1.00 m)		

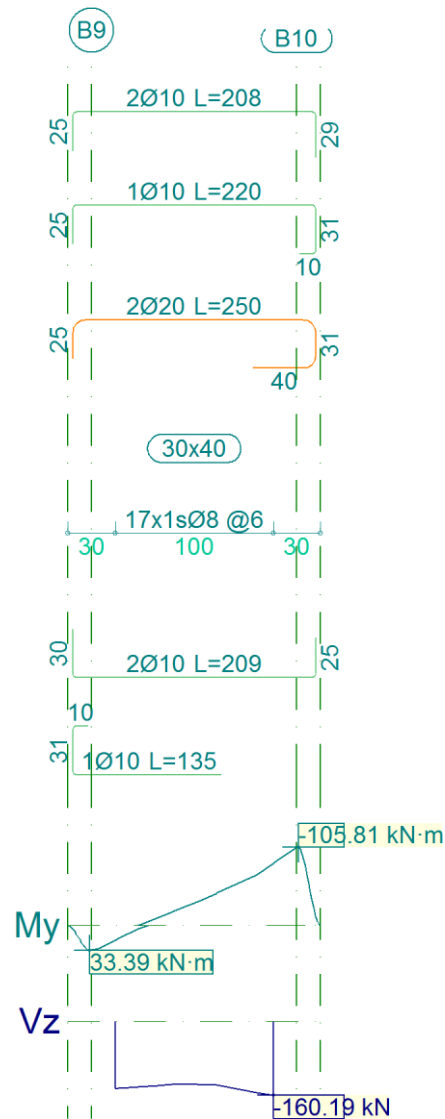
5.1.3. Frame 3



Frame 3		Span: P5-B1		
Section		30x40		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-82.94	--	--
x	[m]	0.00	--	--
Max Moment	[kN·m]	9.57	29.97	44.42
x	[m]	0.97	1.97	3.05
Min Shear	[kN]	--	--	--
x	[m]	--	--	--
Max Shear	[kN]	126.83	56.34	40.95
x	[m]	0.00	1.10	3.05
Min Torsion	[kN]	-2.36	-2.36	-3.47

Frame 3			Span: P5-B1		
Section			30x40		
Zone			1/3L	2/3L	3/3L
x	[m]		0.97	1.10	2.97
Max Torsion	[kN]		9.43	--	--
x	[m]		0.00	--	--
Top Reinf. Area	[cm _c]	Real	6.19	2.42	1.57
		Req.	5.88	0.70	0.21
Bot. Reinf. Area	[cm _c]	Real	2.26	3.83	3.83
		Req.	1.65	2.37	3.20
Transv. Reinf. Area	[cm _c /m]	Real	8.08	8.08	8.08
		Req.	7.23	5.18	4.36
Active Defl.			2.55 mm, L/2387 (L: 6.10 m)		
Long Term Defl.			2.86 mm, L/2130 (L: 6.10 m)		

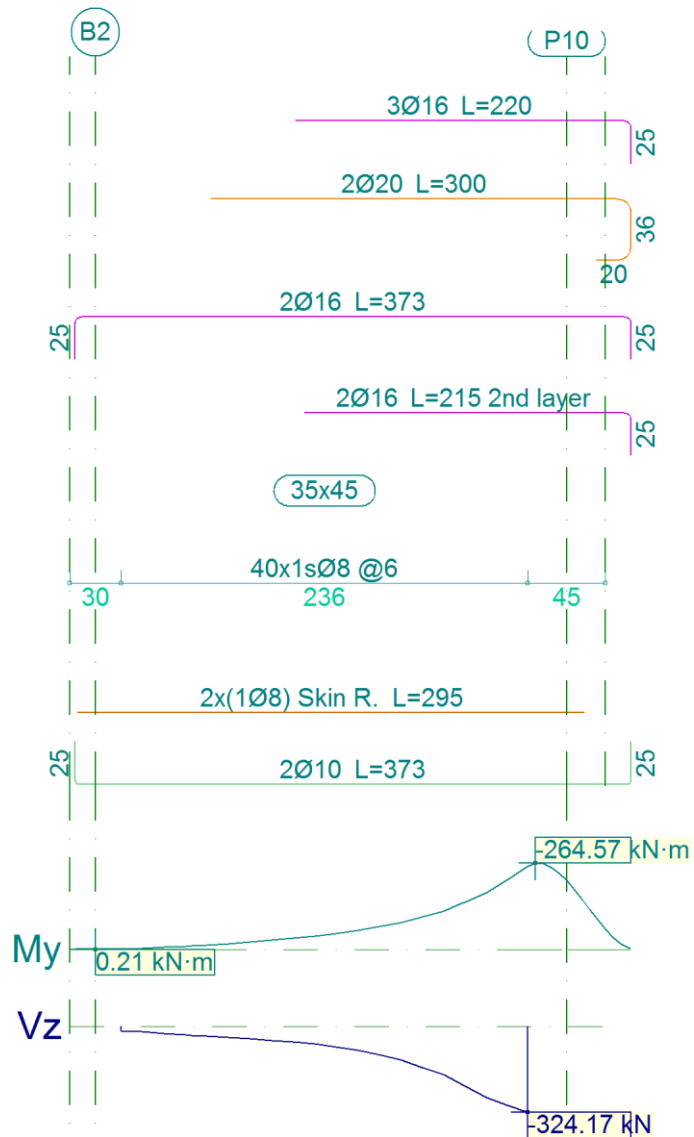
5.1.4. Frame 4



Frame 4		Span: B9-B10		
Section		30x40		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-10.51	-43.98	-83.68
x	[m]	0.27	0.65	1.00
Max Moment	[kN·m]	19.14	--	--
x	[m]	0.00	--	--
Min Shear	[kN]	-145.41	-137.83	-160.19
x	[m]	0.00	0.65	1.00
Max Shear	[kN]	--	--	--
x	[m]	--	--	--
Min Torsion	[kN]	-7.26	-5.01	-5.45

Frame 4			Span: B9-B10		
Section			30x40		
Zone			1/3L	2/3L	3/3L
x	[m]		0.00	0.36	0.90
Max Torsion	[kN]		--	--	--
x	[m]		--	--	--
Top Reinf. Area	[cm _c]	Real	7.25	8.64	8.64
		Req.	2.52	6.19	7.96
Bot. Reinf. Area	[cm _c]	Real	2.36	2.19	1.57
		Req.	1.71	1.57	0.33
Transv. Reinf. Area	[cm _c /m]	Real	16.76	16.76	16.76
		Req.	13.84	12.46	14.49
Active Defl.			0.13 mm, L/7755 (L: 1.00 m)		
Long Term Defl.			0.15 mm, L/6528 (L: 1.00 m)		

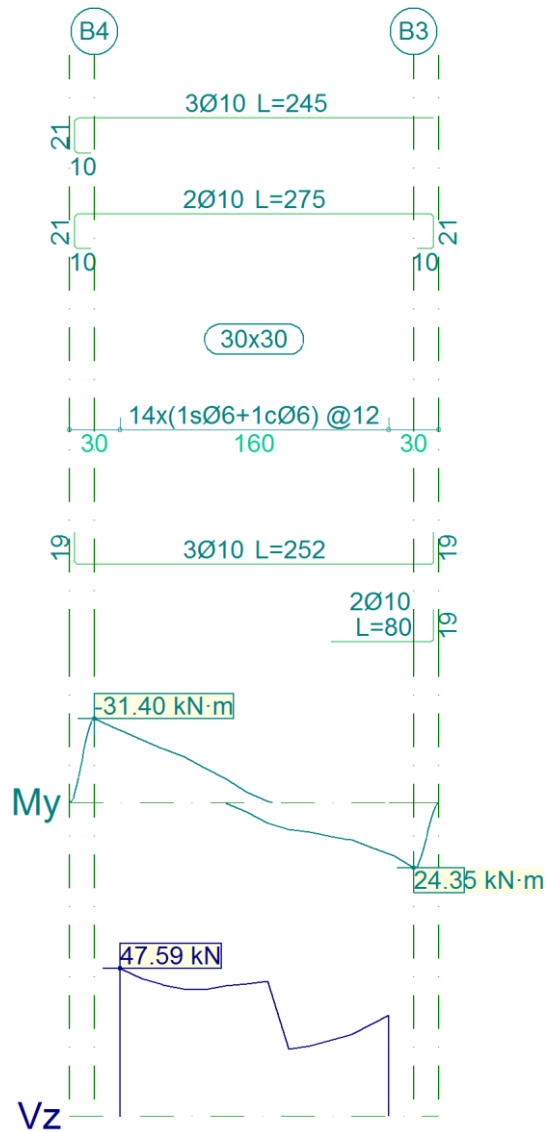
5.1.5. Frame 5



Frame 5		Span: B2-P10		
Section		35x45		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-22.91	-69.65	-255.75
x	[m]	0.75	1.50	2.36
Max Moment	[kN·m]	--	--	--
x	[m]	--	--	--
Min Shear	[kN]	-46.32	-106.44	-324.17
x	[m]	0.75	1.50	2.36
Max Shear	[kN]	--	--	--
x	[m]	--	--	--
Min Torsion	[kN]	--	--	-4.66

Frame 5			Span: B2-P10		
Section			35x45		
Zone			1/3L	2/3L	3/3L
x	[m]		--	--	2.12
Max Torsion	[kN]		2.19	--	4.42
x	[m]		0.00	--	2.12
Top Reinf. Area	[cm _c]	Real	5.26	14.44	20.36
		Req.	2.43	7.39	18.81
Bot. Reinf. Area	[cm _c]	Real	1.57	1.57	1.57
		Req.	0.00	0.00	0.00
Transv. Reinf. Area	[cm _c /m]	Real	16.76	16.76	16.76
		Req.	3.19	7.48	14.79
Active Defl.			0.58 mm, L/4098 (L: 2.36 m)		
Long Term Defl.			0.72 mm, L/3264 (L: 2.36 m)		

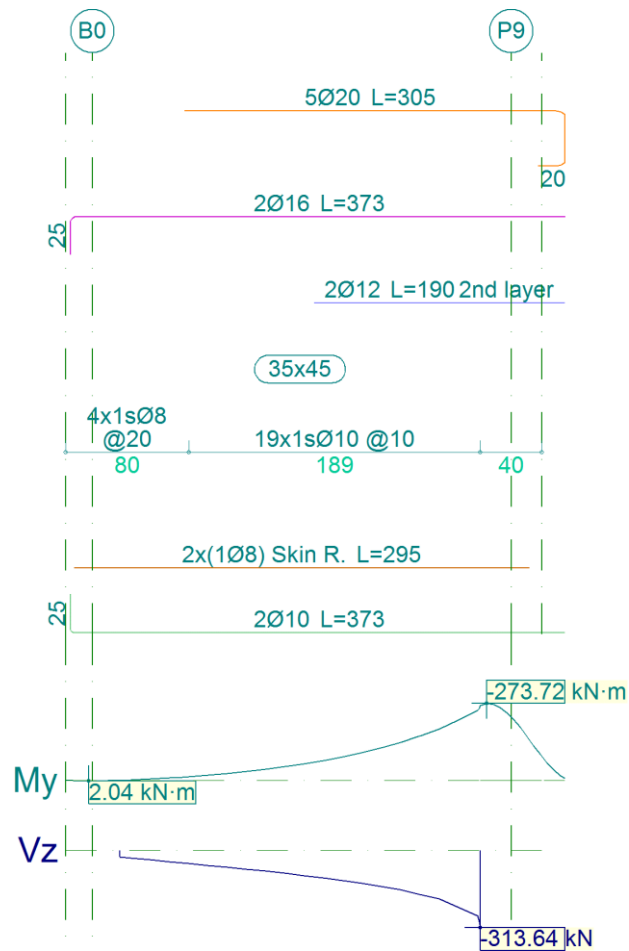
5.1.6. Frame 6



Frame 6		Span: B4-B3		
Section		30x30		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-27.08	-9.01	--
x	[m]	0.00	0.63	--
Max Moment	[kN·m]	--	9.95	18.97
x	[m]	--	1.00	1.60
Min Shear	[kN]	--	--	--
x	[m]	--	--	--
Max Shear	[kN]	47.59	43.47	32.58
x	[m]	0.00	0.88	1.60
Min Torsion	[kN]	-2.86	--	--

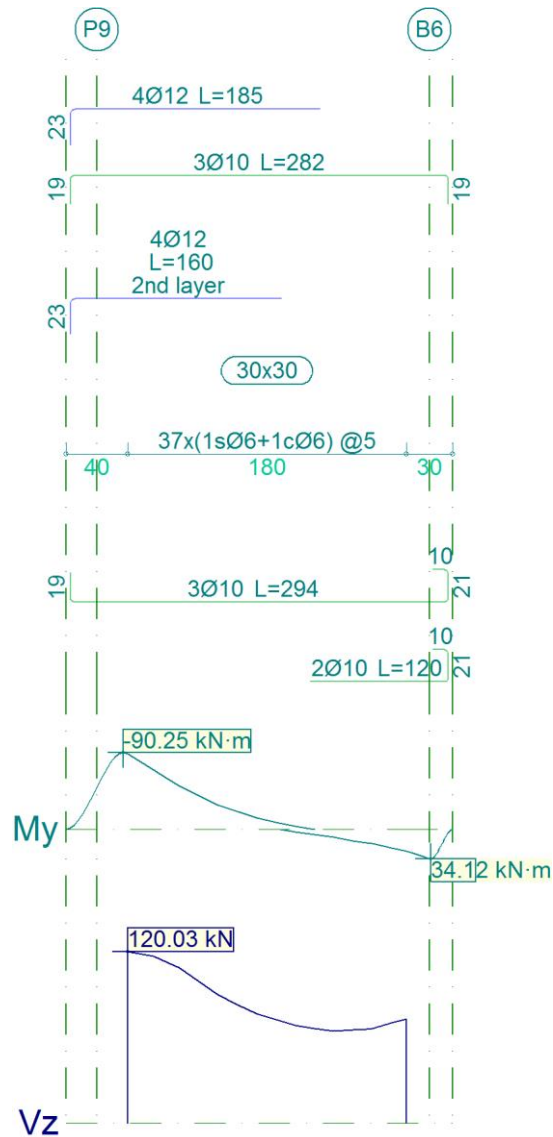
Frame 6			Span: B4-B3		
Section			30x30		
Zone			1/3L	2/3L	3/3L
x	[m]		0.00	--	--
Max Torsion	[kN]		--	--	--
x	[m]		--	--	--
Top Reinf. Area	[cm ²]	Real	3.93	3.93	3.93
		Req.	3.16	1.61	0.00
Bot. Reinf. Area	[cm ²]	Real	2.36	2.36	3.69
		Req.	0.31	1.19	1.76
Transv. Reinf. Area	[cm ² /m]	Real	7.07	7.07	7.07
		Req.	6.49	4.66	3.49
Active Defl.			1.19 mm, L/2679 (L: 3.20 m)		
Long Term Defl.			1.39 mm, L/2303 (L: 3.20 m)		

5.1.7. Frame 7



Frame 7			Span: B0-P9		
Section			35x45		
Zone			1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-25.14	-84.83	-265.94
x	[m]		0.70	1.45	2.34
Max Moment	[kN·m]		--	--	--
x	[m]		--	--	--
Min Shear	[kN]		-68.28	-122.26	-313.64
x	[m]		0.70	1.45	2.34
Max Shear	[kN]		--	--	--
x	[m]		--	--	--
Min Torsion	[kN]		--	--	-74.31
x	[m]		--	--	2.32
Max Torsion	[kN]		2.91	3.08	2.60
x	[m]		0.57	0.82	1.57
Top Reinf. Area	[cm _c]	Real	7.80	18.66	21.99
		Req.	3.10	8.56	19.57
Bot. Reinf. Area	[cm _c]	Real	1.57	1.57	1.57
		Req.	0.15	0.16	0.30
Transv. Reinf. Area	[cm _c /m]	Real	15.71	15.71	15.71
		Req.	5.49	8.59	13.86
Active Defl.			6.88 mm, L/450 (L: 4.68 m)		
Long Term Defl.			7.94 mm, L/392 (L: 4.68 m)		

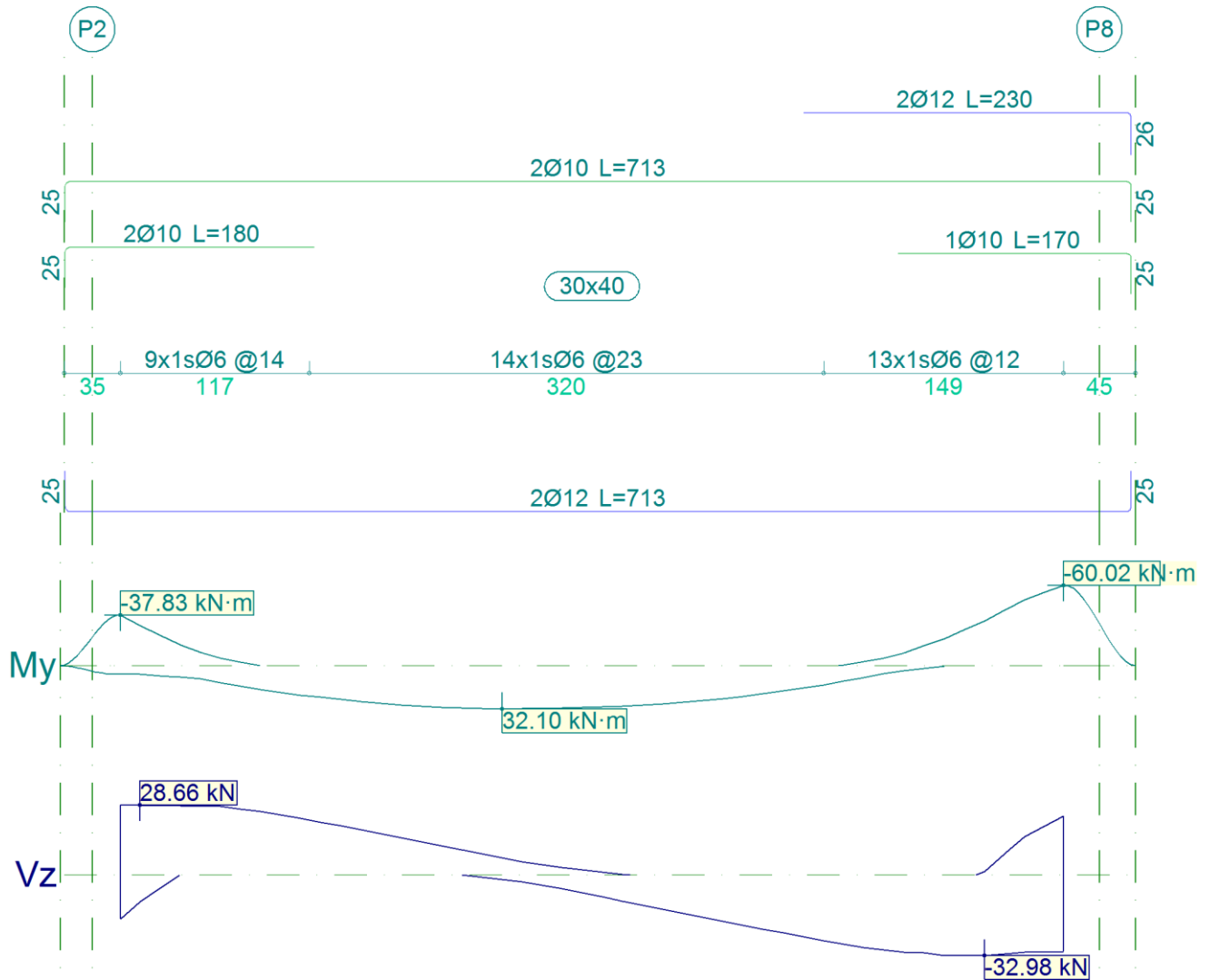
5.1.8. Frame 8



Frame 8		Span: P9-B6		
Section		30x30		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-88.80	-21.09	--
x	[m]	0.00	0.71	--
Max Moment	[kN·m]	--	2.27	25.26
x	[m]	--	1.08	1.80
Min Shear	[kN]	--	--	--
x	[m]	--	--	--
Max Shear	[kN]	120.03	82.74	72.87
x	[m]	0.00	0.71	1.80
Min Torsion	[kN]	-3.63	--	--

Frame 8			Span: P9-B6		
Section			30x30		
Zone			1/3L	2/3L	3/3L
x	[m]		0.00	--	--
Max Torsion	[kN]		1.65	1.91	1.91
x	[m]		0.58	1.08	1.21
Top Reinf. Area	[cm _c]	Real	11.40	7.78	2.61
		Req.	10.48	4.18	0.92
Bot. Reinf. Area	[cm _c]	Real	2.36	2.36	3.93
		Req.	0.26	1.19	2.49
Transv. Reinf. Area	[cm _c /m]	Real	16.96	16.96	16.96
		Req.	14.47	10.16	8.73
Active Defl.			0.59 mm, L/2894 (L: 1.71 m)		
Long Term Defl.			0.68 mm, L/2634 (L: 1.80 m)		

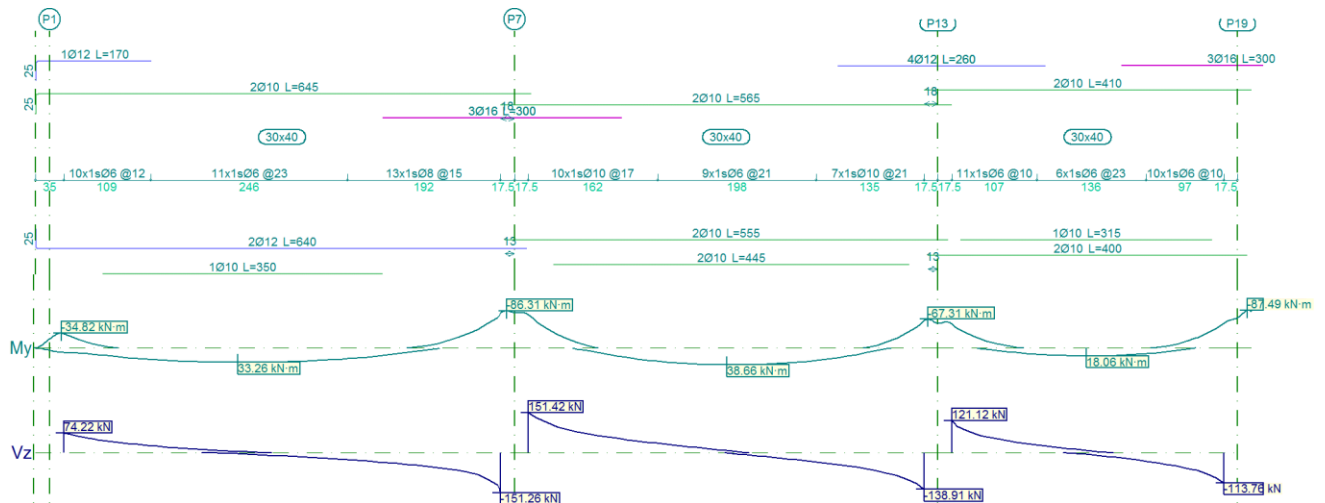
5.1.9. Frame 9



Frame 9		Span: P2-P8		
Section		30x40		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-37.83	--	-60.02
x	[m]	0.00	--	5.86
Max Moment	[kN·m]	30.24	32.10	20.84
x	[m]	1.87	2.37	4.00
Min Shear	[kN]	-18.02	-20.53	-32.98
x	[m]	0.00	3.87	5.37
Max Shear	[kN]	28.66	12.14	24.28
x	[m]	0.12	2.00	5.86
Min Torsion	[kN]	-11.30	--	--
x	[m]	0.00	--	--

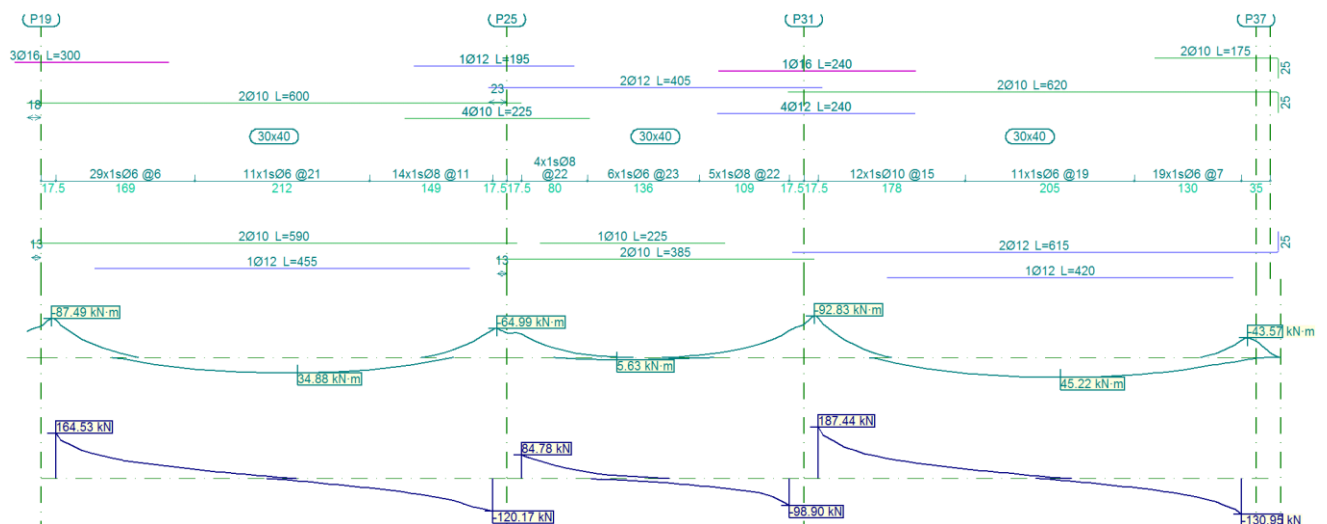
Frame 9			Span: P2-P8		
Section			30x40		
Zone			1/3L	2/3L	3/3L
Max Torsion	[kN]		--	--	9.62
x	[m]		--	--	5.62
Top Reinf. Area	[cm _c]	Real	3.14	1.57	4.62
		Req.	2.79	0.00	4.34
Bot. Reinf. Area	[cm _c]	Real	2.26	2.26	2.26
		Req.	2.11	2.14	1.65
Transv. Reinf. Area	[cm _c /m]	Real	4.04	2.46	4.71
		Req.	3.70	2.40	4.02
Active Defl.			1.13 mm, L/5088 (L: 5.74 m)		
Long Term Defl.			2.04 mm, L/2874 (L: 5.86 m)		

5.1.10. Frame 10



Frame 10			Span: P1-P7			Span: P7-P13			Span: P13-P19		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-33.78	--	-81.97	-77.60	--	-64.16	-56.03	--	-58.33
x	[m]		0.00	--	5.47	0.00	--	4.95	0.00	--	3.40
Max Moment	[kN·m]		32.22	33.26	22.84	30.10	38.66	32.63	14.23	18.06	14.60
x	[m]		1.80	2.18	3.68	1.61	2.48	3.36	1.06	1.68	2.31
Min Shear	[kN]		-0.58	-26.39	-151.26	--	-22.94	-138.91	--	-22.61	-113.76
x	[m]		1.80	3.55	5.47	--	3.23	4.95	--	2.18	3.40
Max Shear	[kN]		74.22	9.02	--	151.42	31.55	--	121.12	25.52	--
x	[m]		0.00	1.93	--	0.00	1.73	--	0.00	1.18	--
Min Torsion	[kN]		-1.11	--	-29.70	-2.11	-1.29	-13.95	--	--	-13.08

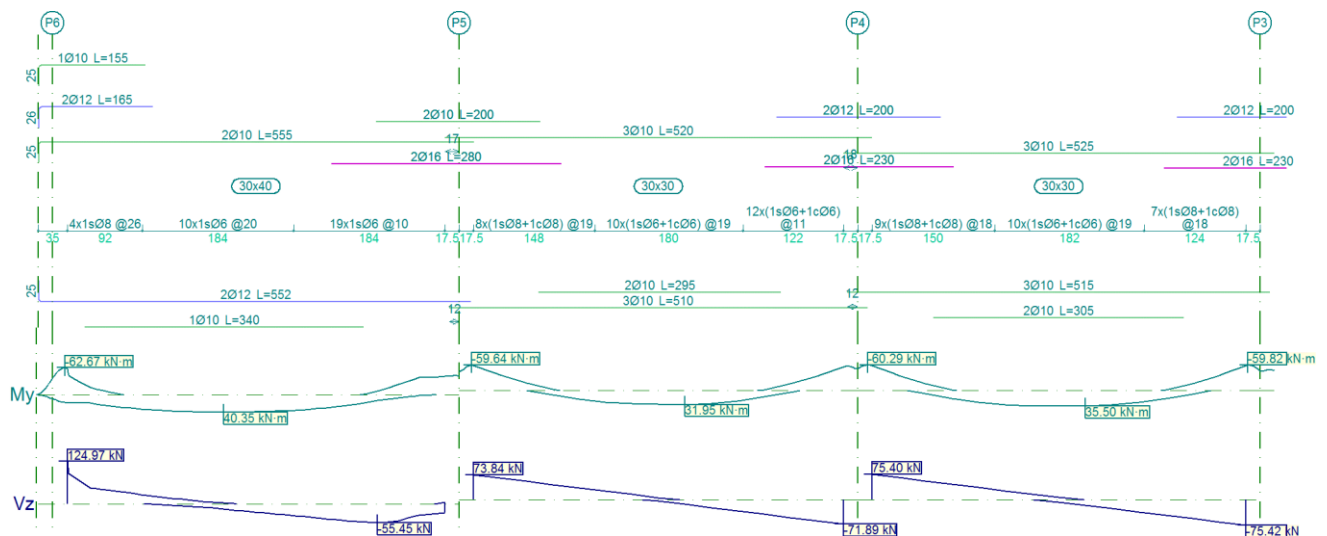
Frame 10			Span: P1-P7			Span: P7-P13			Span: P13-P19		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
x	[m]		0.43	--	5.43	0.61	1.73	4.86	--	--	3.31
Max Torsion	[kN]		4.51	--	1.25	13.40	--	1.58	17.09	--	--
x	[m]		0.00	--	4.18	0.00	--	4.11	0.00	--	--
Top Reinf. Area	[cm _c]	Real	2.70	1.57	7.60	7.60	1.57	6.09	6.09	1.98	7.60
		Req.	2.33	0.00	6.08	5.85	0.00	4.67	4.12	0.00	4.90
Bot. Reinf. Area	[cm _c]	Real	3.05	3.05	2.88	3.14	3.14	3.14	2.36	2.36	2.36
		Req.	2.21	2.22	1.75	2.30	2.59	2.39	1.65	1.65	1.65
Transv. Reinf. Area	[cm _c /m]	Real	4.71	6.70	6.70	9.24	2.69	7.48	5.65	2.46	5.65
		Req.	4.14	2.40	6.05	8.44	2.44	6.62	5.07	2.40	5.06
Active Defl.			1.04 mm, L/4851 (L: 5.05 m)			1.83 mm, L/2704 (L: 4.95 m)			0.17 mm, L/14587 (L: 2.44 m)		
Long Term Defl.			1.98 mm, L/2766 (L: 5.47 m)			2.14 mm, L/2316 (L: 4.95 m)			0.19 mm, L/12185 (L: 2.37 m)		



Frame 10			Span: P19-P25			Span: P25-P31			Span: P31-P37		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-84.72	--	-62.77	-51.95	-5.66	-60.68	-89.08	--	-39.19
x	[m]		0.00	--	5.30	0.00	2.16	3.25	0.00	--	5.14
Max Moment	[kN·m]		26.01	34.88	30.93	5.35	5.63	--	33.58	45.22	43.38
x	[m]		1.68	2.93	3.56	1.03	1.16	--	1.68	2.93	3.43
Min Shear	[kN]		--	-23.30	-120.17	-3.63	-26.44	-98.90	--	-16.86	-130.95
x	[m]		--	3.43	5.30	1.03	2.16	3.25	--	3.31	5.14

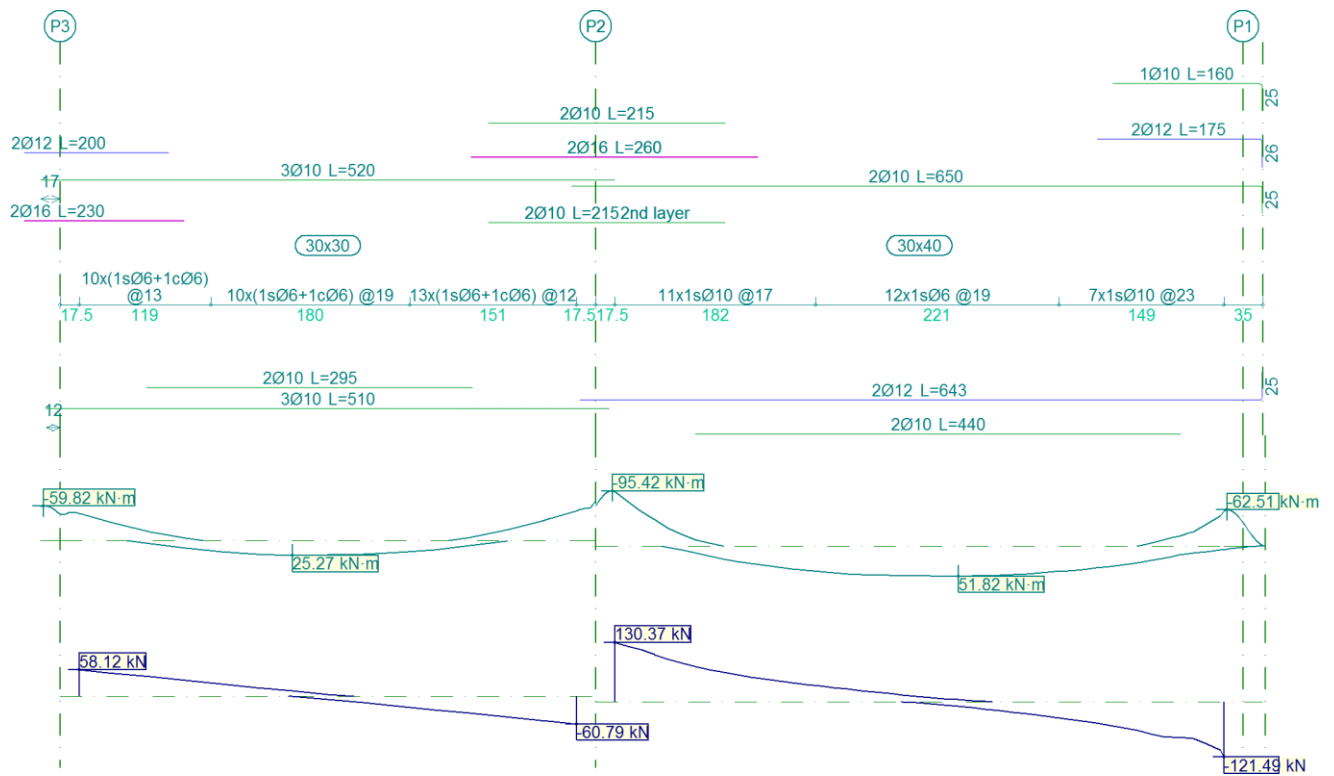
Frame 10			Span: P19-P25			Span: P25-P31			Span: P31-P37		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Max Shear	[kN]		164.53	29.39	--	84.78	11.04	--	187.44	34.02	--
x	[m]		0.00	1.81	--	0.00	1.16	--	0.00	1.81	--
Min Torsion	[kN]		-2.15	-1.37	-3.47	--	--	-13.97	-2.33	-1.60	-5.14
x	[m]		0.56	1.81	5.06	--	--	3.16	0.56	1.81	5.06
Max Torsion	[kN]		15.99	1.12	2.20	7.80	--	--	19.60	--	3.57
x	[m]		0.00	3.31	4.56	0.00	--	--	0.00	--	5.06
Top Reinf. Area	[cm _c]	Real	7.60	1.57	5.84	5.79	2.26	7.82	8.03	1.57	3.14
		Req.	6.13	0.00	4.46	3.76	1.65	5.23	6.60	0.00	2.93
Bot. Reinf. Area	[cm _c]	Real	2.70	2.70	2.70	2.36	2.36	1.94	3.39	3.39	3.39
		Req.	1.98	2.33	2.22	1.65	1.65	0.14	2.56	3.05	3.02
Transv. Reinf. Area	[cm _c /m]	Real	9.42	2.69	9.14	4.57	4.57	4.57	10.47	2.98	8.08
		Req.	8.46	2.40	7.84	4.01	2.40	4.15	9.37	2.64	7.13
Active Defl.			2.33 mm, L/2271 (L: 5.30 m)			0.21 mm, L/15206 (L: 3.25 m)			2.09 mm, L/2456 (L: 5.14 m)		
Long Term Defl.			2.87 mm, L/1844 (L: 5.30 m)			0.25 mm, L/12829 (L: 3.25 m)			2.76 mm, L/1859 (L: 5.14 m)		

5.1.11. Frame 11



Frame 11			Span: P6-P5			Span: P5-P4			Span: P4-P3		
Section			30x40			30x30			30x30		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-60.67	--	-43.21	-58.71	--	-55.91	-58.61	--	-58.66
x	[m]		0.00	--	4.60	0.00	--	4.50	0.00	--	4.55

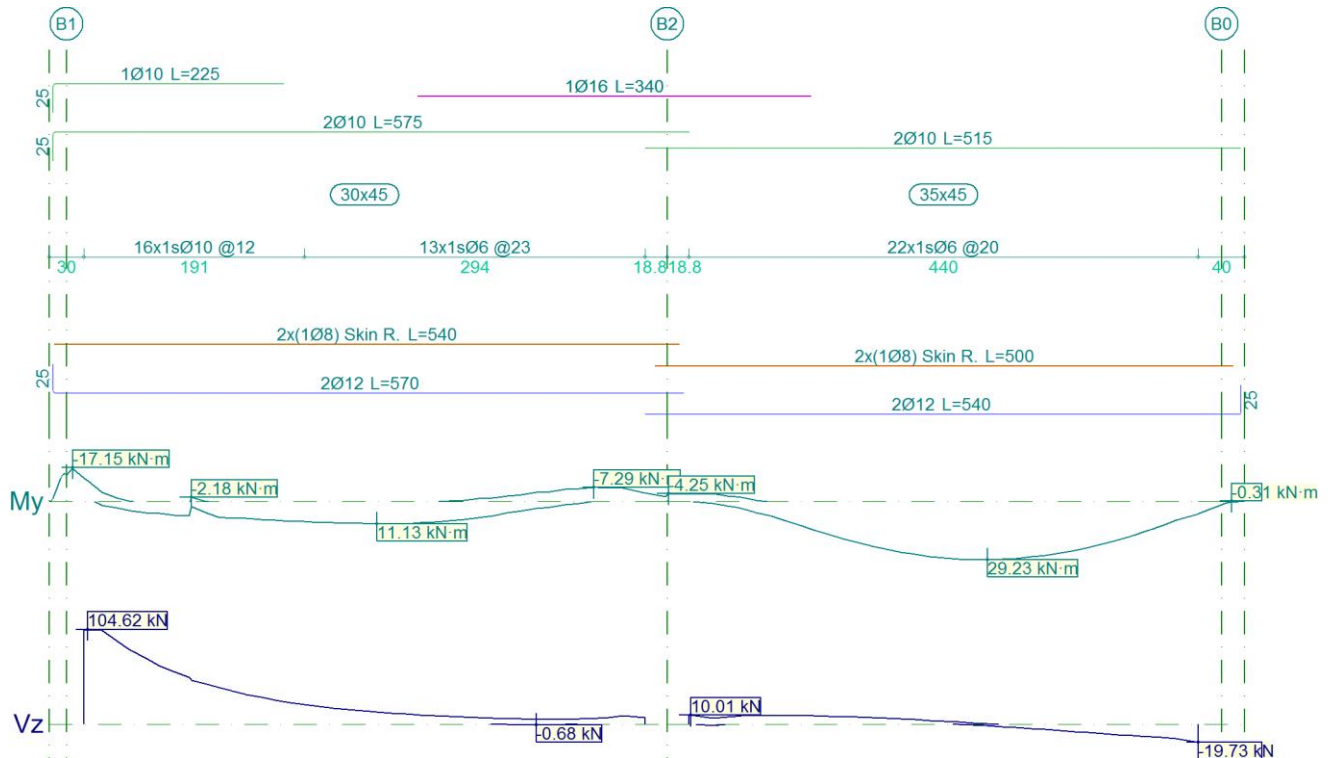
Frame 11			Span: P6-P5			Span: P5-P4			Span: P4-P3		
Section			30x40			30x30			30x30		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Max Moment	[kN·m]		38.85	40.35	29.96	19.78	31.95	23.29	27.17	35.50	27.17
x	[m]		1.53	1.91	3.16	1.29	2.57	3.21	1.30	2.60	3.25
Min Shear	[kN]		-7.70	-40.91	-55.45	--	-23.42	-71.89	--	-26.41	-75.42
x	[m]		1.53	3.03	3.78	--	2.89	4.50	--	2.93	4.55
Max Shear	[kN]		124.97	7.14	4.11	73.84	25.36	--	75.40	26.39	--
x	[m]		0.00	1.66	4.60	0.00	1.61	--	0.00	1.63	--
Min Torsion	[kN]		--	--	-2.25	-0.95	-0.95	-0.95	--	--	--
x	[m]		--	--	4.03	0.00	1.61	3.21	--	--	--
Max Torsion	[kN]		25.04	1.55	1.42	--	--	--	--	--	--
x	[m]		0.00	2.53	3.16	--	--	--	--	--	--
Top Reinf. Area	[cm _c]	Real	4.62	1.57	6.99	7.41	2.36	7.70	7.71	2.36	7.71
		Req.	4.30	0.00	3.05	6.00	0.00	5.70	6.08	0.00	6.02
Bot. Reinf. Area	[cm _c]	Real	3.05	3.05	3.05	3.93	3.93	3.93	3.93	3.93	3.93
		Req.	2.69	2.71	2.26	1.85	3.01	2.17	2.57	3.37	2.55
Transv. Reinf. Area	[cm _c /m]	Real	3.87	5.65	5.65	7.94	4.46	7.71	8.38	4.46	8.38
		Req.	3.49	3.17	4.74	7.18	2.72	6.92	7.36	2.83	7.36
Active Defl.			1.46 mm, L/3142 (L: 4.60 m)			3.57 mm, L/1172 (L: 4.18 m)			6.85 mm, L/664 (L: 4.55 m)		
Long Term Defl.			1.99 mm, L/2316 (L: 4.60 m)			3.51 mm, L/1182 (L: 4.16 m)			7.08 mm, L/643 (L: 4.55 m)		



Frame 11			Span: P3-P2			Span: P2-P1		
Section			30x30			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-47.33	--	-51.80	-93.43	--	-60.58
	x	[m]	0.00	--	4.50	0.00	--	5.51
Max Moment	[kN·m]		19.57	25.27	15.53	42.02	51.82	47.61
	x	[m]	1.29	1.93	3.21	1.73	3.11	3.73
Min Shear	[kN]		--	-22.09	-60.79	--	-22.77	-121.49
	x	[m]	--	2.89	4.50	--	3.61	5.51
Max Shear	[kN]		58.12	19.41	--	130.37	34.46	--
	x	[m]	0.00	1.61	--	0.00	1.86	--
Min Torsion	[kN]		--	--	--	-1.44	-1.22	-7.60
	x	[m]	--	--	--	0.98	1.86	5.48
Max Torsion	[kN]		--	--	--	6.05	--	1.43
	x	[m]	--	--	--	0.00	--	4.73
Top Reinf. Area	[cm _c]	Real	7.70	2.36	8.58	8.73	1.57	4.62
		Req.	4.76	0.00	7.29	6.95	0.00	4.32
Bot. Reinf. Area	[cm _c]	Real	3.93	3.93	3.72	3.83	3.83	3.83
		Req.	1.81	2.36	1.43	3.14	3.51	3.38
Transv. Reinf. Area	[cm _c /m]	Real	6.52	4.46	7.07	9.24	2.98	6.83
		Req.	5.60	2.40	6.02	8.28	2.67	6.21

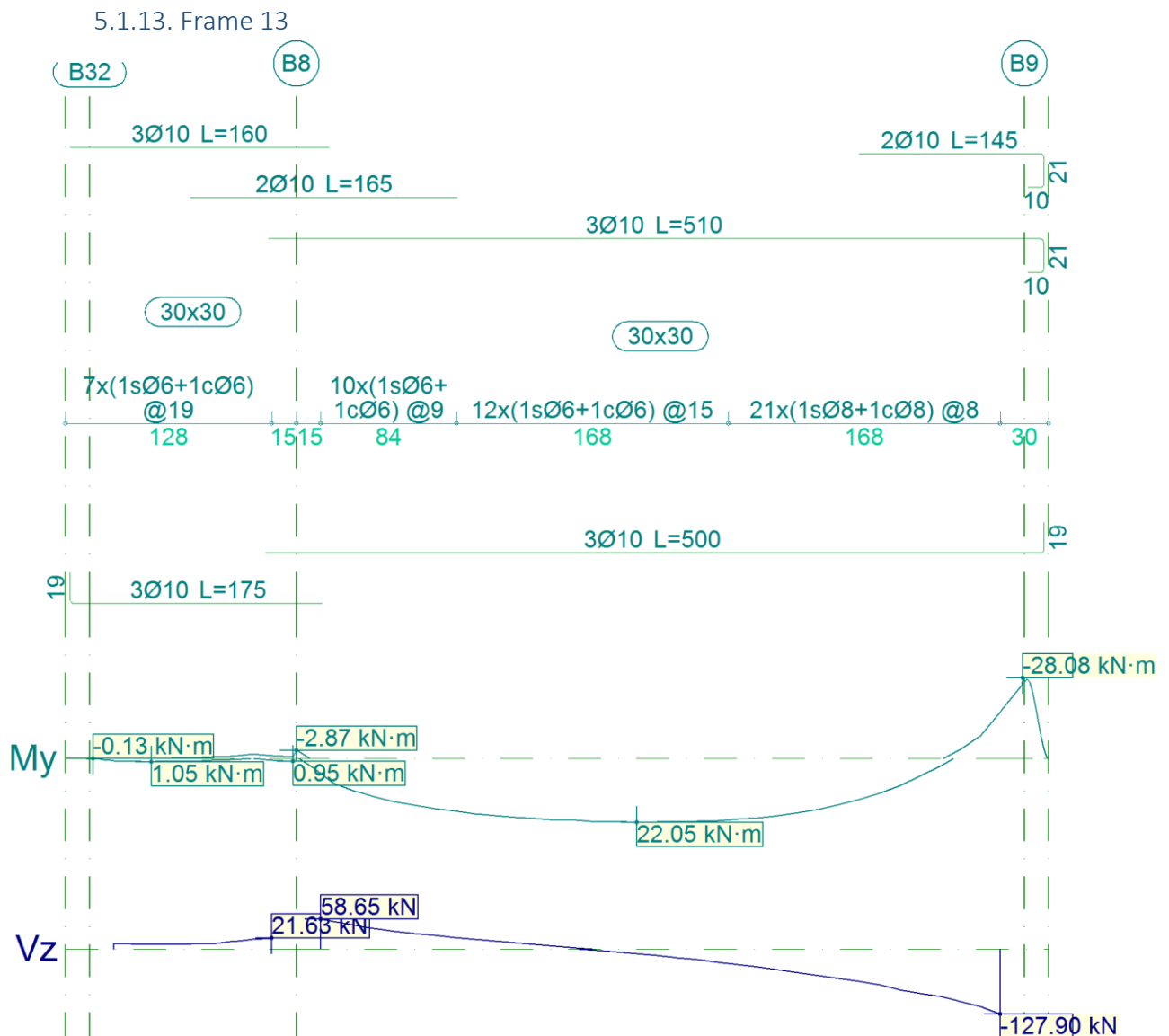
Frame 11	Span: P3-P2			Span: P2-P1		
Section	30x30			30x40		
Zone	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Active Defl.	1.86 mm, L/2238 (L: 4.16 m)			6.21 mm, L/888 (L: 5.51 m)		
Long Term Defl.	1.78 mm, L/2281 (L: 4.07 m)			7.24 mm, L/761 (L: 5.51 m)		

5.1.12. Frame 12



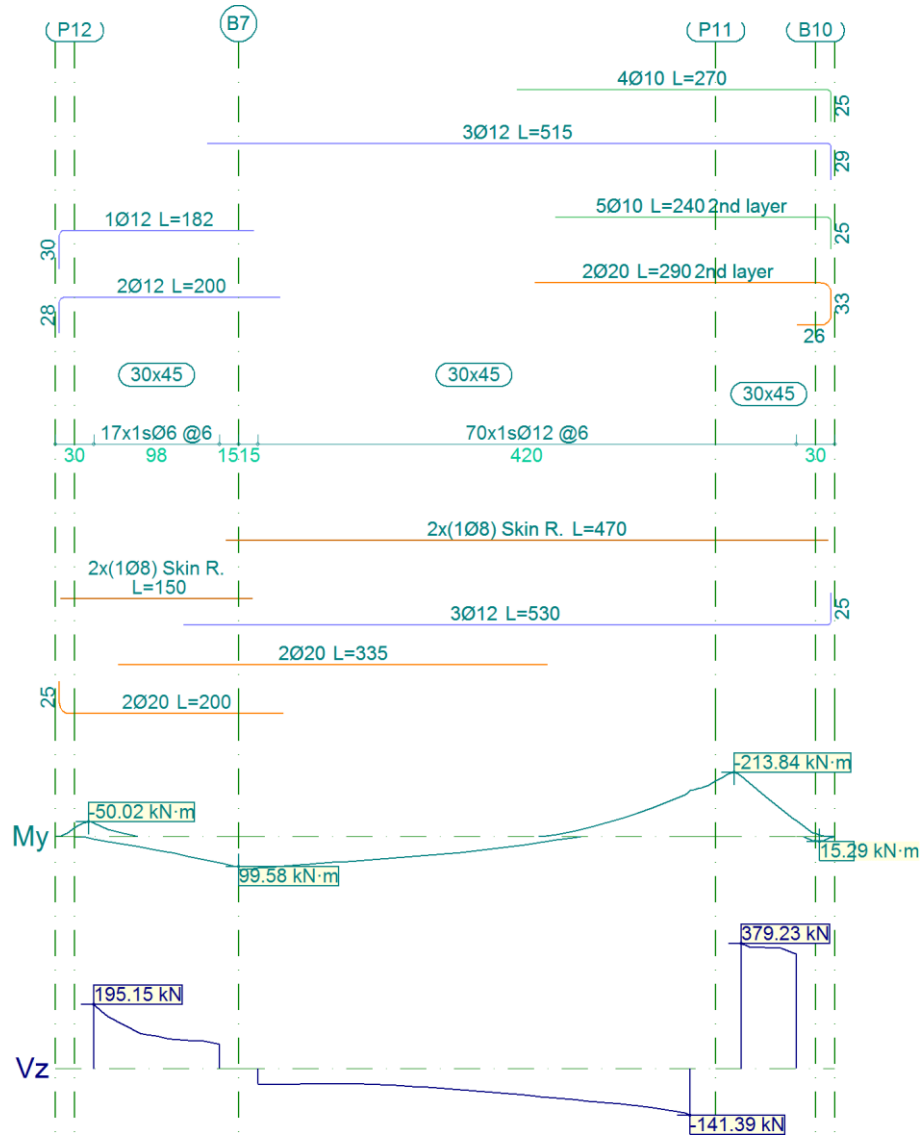
Frame 12		Span: B1-B2			Span: B2-B0		
Section		30x45			35x45		
Zone		1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-12.12	--	-7.29	-4.08	--	--
x	[m]	0.00	--	4.41	0.21	--	--
Max Moment	[kN·m]	9.06	11.13	8.90	20.41	29.23	27.70
x	[m]	1.53	2.53	3.28	1.46	2.58	2.96
Min Shear	[kN]	--	--	-0.68	-1.31	-3.74	-19.73
x	[m]	--	--	3.91	0.21	2.83	4.40
Max Shear	[kN]	104.62	26.47	9.47	10.01	7.31	--
x	[m]	0.03	1.66	4.66	0.02	1.58	--
Min Torsion	[kN]	-14.17	-2.93	-1.54	--	--	--
x	[m]	0.00	1.66	3.41	--	--	--
Max Torsion	[kN]	--	--	--	1.72	1.51	--

Frame 12			Span: B1-B2			Span: B2-B0		
Section			30x45			35x45		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
x	[m]		--	--	--	0.96	1.58	--
Top Reinf. Area	[cm _c]	Real	2.36	2.17	3.58	3.43	1.57	1.57
		Req.	1.86	0.17	1.87	2.19	0.00	0.00
Bot. Reinf. Area	[cm _c]	Real	2.26	2.26	2.26	2.26	2.26	2.26
		Req.	1.86	1.88	1.88	2.19	2.19	2.19
Transv. Reinf. Area	[cm _c /m]	Real	13.09	13.09	2.46	2.83	2.83	2.83
		Req.	11.52	2.72	2.40	2.80	2.80	2.80
Active Defl.			0.28 mm, L/17051 (L: 4.85 m)			0.72 mm, L/6111 (L: 4.40 m)		
Long Term Defl.			0.31 mm, L/15397 (L: 4.85 m)			0.96 mm, L/4572 (L: 4.40 m)		



Frame 13			Span: B32-B8			Span: B8-B9		
Section			30x30			30x30		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment. x	[kN·m]		--	--	-1.60	--	--	-16.32
	[m]		--	--	0.86	--	--	4.20
Max Moment x	[kN·m]		1.05	0.98	--	20.72	22.05	19.68
	[m]		0.23	0.48	--	1.33	1.96	2.83
Min Shear x	[kN]		--	--	--	--	-35.50	-127.90
	[m]		--	--	--	--	2.71	4.20
Max Shear x	[kN]		10.88	10.47	21.63	58.65	5.83	--
	[m]		0.00	0.61	0.98	0.00	1.46	--
Min Torsion x	[kN]		--	--	--	--	-1.81	-5.35
	[m]		--	--	--	--	2.58	4.08
Max Torsion x	[kN]		--	--	0.84	3.98	--	--
	[m]		--	--	0.86	0.00	--	--
Top Reinf. Area	[cm _c]	Real	2.14	2.71	3.05	3.93	2.36	3.93
		Req.	0.59	0.59	1.19	0.56	0.13	3.04
Bot. Reinf. Area	[cm _c]	Real	2.36	2.36	2.36	2.36	2.36	2.36
		Req.	1.19	1.19	0.09	1.99	2.16	2.12
Transv. Reinf. Area	[cm _c /m]	Real	4.46	4.46	4.46	9.42	18.85	18.85
		Req.	2.40	2.40	2.40	8.22	4.75	16.51
Active Defl.			0.00 mm, <L/1000 (L: 0.98 m)			1.68 mm, L/2501 (L: 4.20 m)		
Long Term Defl.			0.00 mm, <L/1000 (L: 0.98 m)			2.32 mm, L/1813 (L: 4.20 m)		

5.1.14. Frame 14



Frame 14		Span: P12-B7			Span: B7-P11			Span: P11-B10		
Section		30x45			30x45			30x45		
Zone		1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-46.53	--	--	--	--	-154.21	-202.63	-135.92	-92.58
x	[m]	0.00	--	--	--	--	3.37	0.00	0.18	0.31
Max Moment	[kN·m]	24.41	53.51	87.30	104.68	65.98	10.20	--	--	--
x	[m]	0.23	0.61	0.98	0.00	1.21	2.33	--	--	--
Min Shear	[kN]	--	--	--	-50.96	-84.58	-141.39	--	--	--
x	[m]	--	--	--	1.08	2.21	3.37	--	--	--
Max Shear	[kN]	195.15	107.77	86.18	--	--	--	379.23	368.01	365.58
x	[m]	0.00	0.36	0.73	--	--	--	0.00	0.18	0.31
Min Torsion	[kN]	-2.26	-2.92	-3.78	--	--	-20.55	-8.59	-8.59	-19.22

Frame 14			Span: P12-B7			Span: B7-P11			Span: P11-B10		
Section			30x45			30x45			30x45		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
x	[m]		0.11	0.61	0.86	--	--	3.33	0.06	0.18	0.31
Max Torsion	[kN]		6.41	--	--	8.33	1.79	1.35	1.96	--	--
x	[m]		0.00	--	--	0.00	1.21	2.33	0.00	--	--
Top Reinf. Area	[cm _c]	Real	3.39	3.39	3.11	3.39	4.62	16.74	16.74	16.74	16.74
		Req.	2.95	2.95	0.22	0.50	1.94	13.34	15.83	15.83	15.92
Bot. Reinf. Area	[cm _c]	Real	6.16	9.52	10.01	9.68	9.68	3.39	3.39	3.39	3.39
		Req.	3.19	5.51	6.32	7.44	4.78	1.99	0.00	0.00	1.14
Transv. Reinf. Area	[cm _c /m]	Real	9.42	9.42	9.42	37.70	37.70	37.70	37.70	37.70	37.70
		Req.	0.00	7.97	6.87	6.00	6.11	9.24	0.00	0.00	31.65
Active Defl.			2.58 mm, L/1739 (L: 4.48 m)			3.39 mm, L/1322 (L: 4.48 m)			0.64 mm, L/1336 (L: 0.85 m)		
Long Term Defl.			3.03 mm, L/1474 (L: 4.47 m)			3.96 mm, L/1130 (L: 4.47 m)			0.74 mm, L/1152 (L: 0.85 m)		

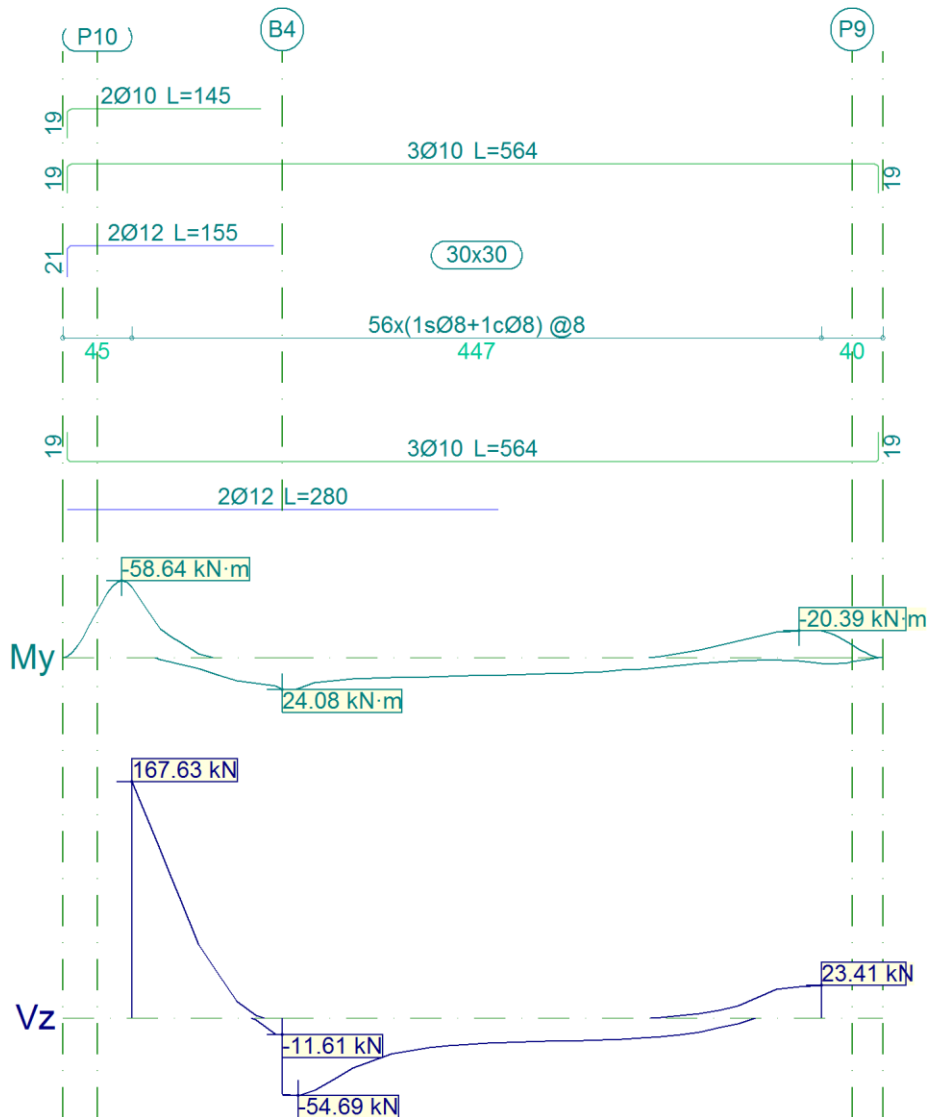
5.1.15. Frame 15



Frame 15		Span: P9-P8		
Section		30x40		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-33.22	-3.89	-74.44
x	[m]	0.00	2.93	4.42
Max Moment	[kN·m]	24.06	12.71	7.80
x	[m]	0.00	1.56	3.06
Min Shear	[kN]	-130.00	-26.70	-56.44
x	[m]	0.00	2.93	4.42
Max Shear	[kN]	14.43	12.31	20.35
x	[m]	1.06	1.56	4.42
Min Torsion	[kN]	--	--	-10.89

Frame 15			Span: P9-P8		
Section			30x40		
Zone			1/3L	2/3L	3/3L
x	[m]		--	--	4.31
Max Torsion	[kN]		15.60	--	--
x	[m]		0.00	--	--
Top Reinf. Area	[cm _c]	Real	3.05	2.26	5.66
		Req.	2.53	1.65	5.34
Bot. Reinf. Area	[cm _c]	Real	2.26	2.26	2.26
		Req.	1.90	1.65	1.65
Transv. Reinf. Area	[cm _c /m]	Real	6.28	5.65	5.65
		Req.	5.77	2.40	4.90
Active Defl.			0.25 mm, L/17679 (L: 4.42 m)		
Long Term Defl.			0.30 mm, L/14570 (L: 4.42 m)		

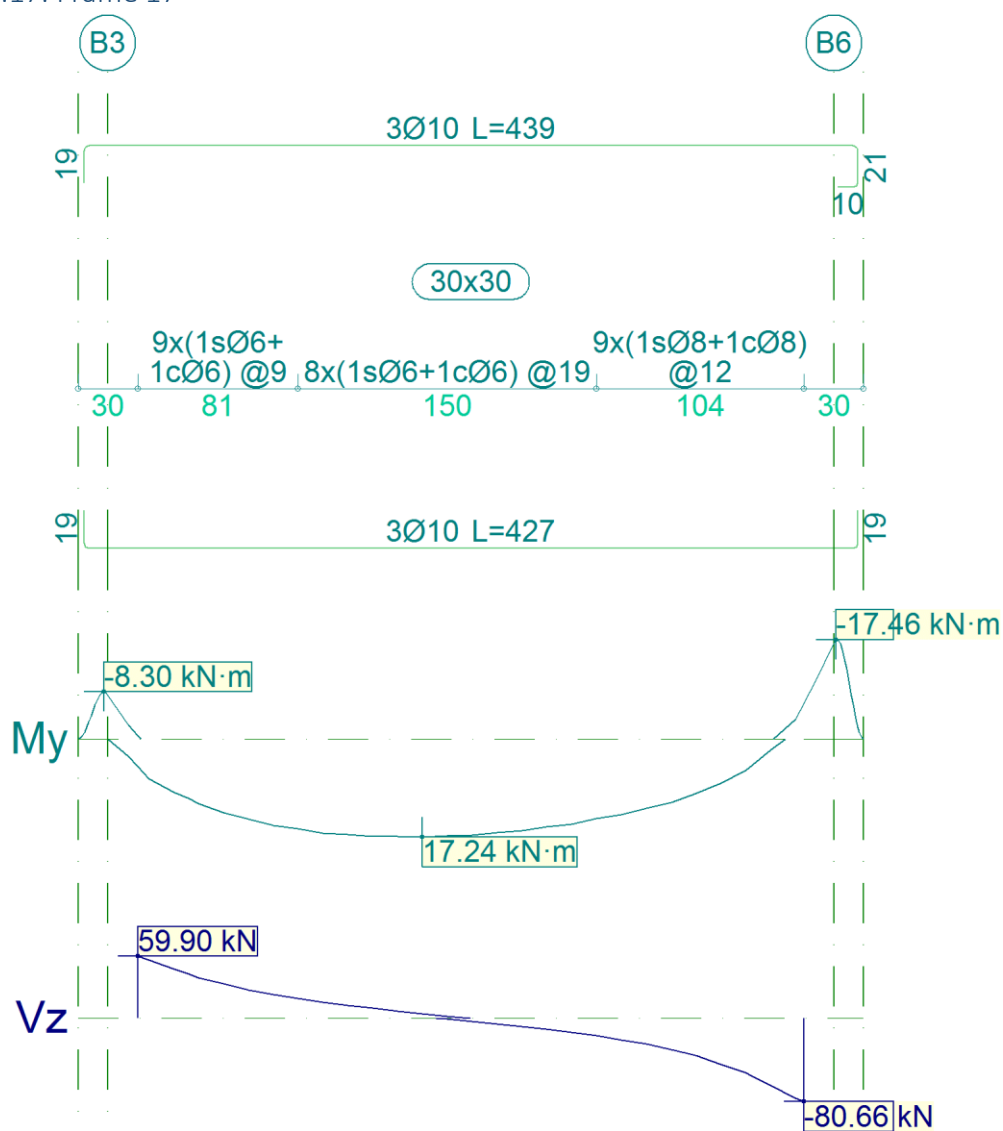
5.1.16. Frame 16



Frame 16		Span: P10-P9		
Section		30x30		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	-53.70	--	-20.39
x	[m]	0.00	--	4.33
Max Moment	[kN·m]	26.92	15.65	10.51
x	[m]	0.98	1.56	3.06
Min Shear	[kN]	-54.69	-30.44	-15.33
x	[m]	1.08	1.56	3.06
Max Shear	[kN]	167.63	--	23.41
x	[m]	0.00	--	4.47
Min Torsion	[kN]	-9.57	-1.58	--

Frame 16			Span: P10-P9		
Section			30x30		
Zone			1/3L	2/3L	3/3L
x	[m]		0.98	1.56	--
Max Torsion	[kN]		23.46	--	2.37
x	[m]		0.93	--	4.18
Top Reinf. Area	[cm _c]	Real	6.19	2.36	2.36
		Req.	5.85	0.11	2.08
Bot. Reinf. Area	[cm _c]	Real	4.62	4.62	2.36
		Req.	4.23	1.75	1.18
Transv. Reinf. Area	[cm _c /m]	Real	18.85	18.85	18.85
		Req.	13.08	4.09	3.45
Active Defl.			1.15 mm, L/3880 (L: 4.47 m)		
Long Term Defl.			1.40 mm, L/3197 (L: 4.47 m)		

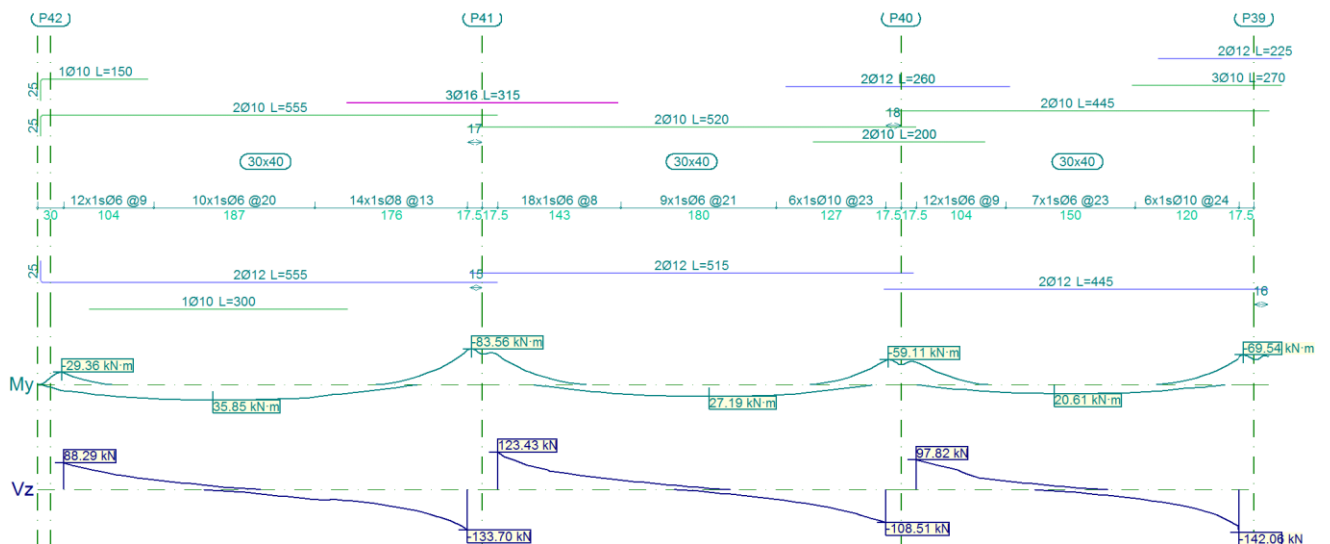
5.1.17. Frame 17



Frame 17		Span: B3-B6		
Section		30x30		
Zone		1/3L	2/3L	3/3L
Min Moment.	[kN·m]	--	--	-6.33
x	[m]	--	--	3.35
Max Moment	[kN·m]	16.73	17.24	14.01
x	[m]	1.06	1.43	2.31
Min Shear	[kN]	--	-13.67	-80.66
x	[m]	--	2.18	3.35
Max Shear	[kN]	59.90	9.86	--
x	[m]	0.00	1.18	--
Min Torsion	[kN]	-3.82	--	--

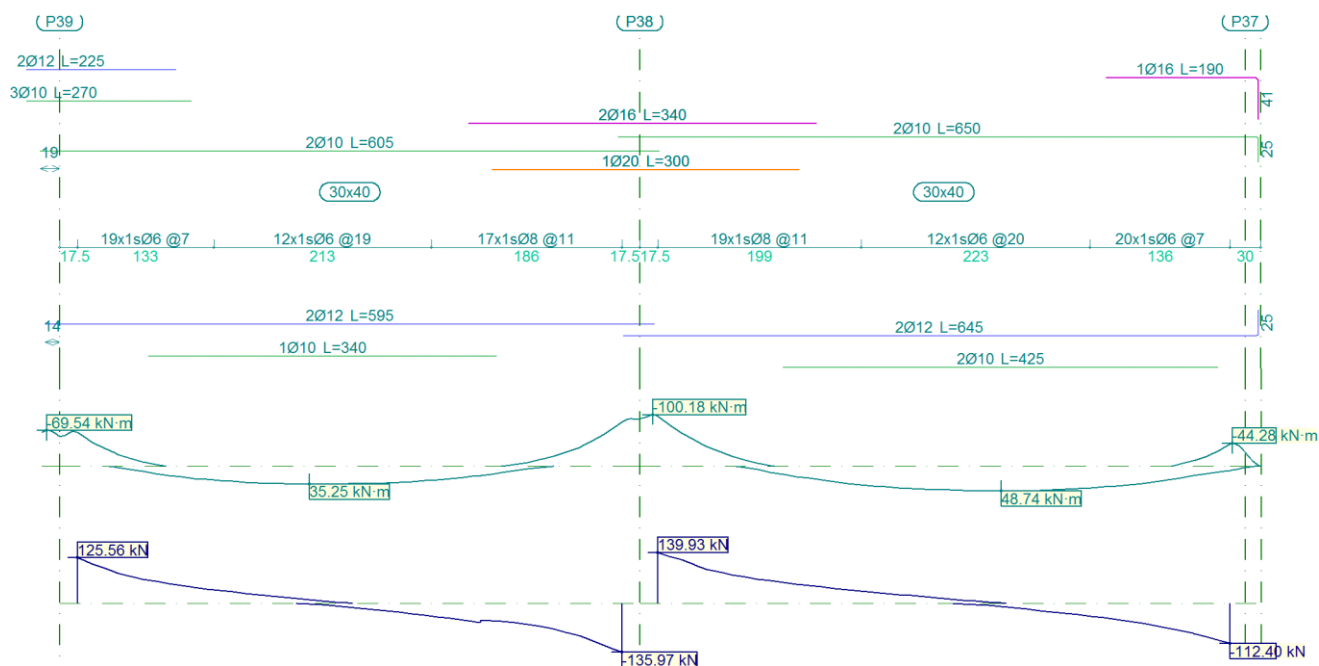
Frame 17			Span: B3-B6		
Section			30x30		
Zone			1/3L	2/3L	3/3L
x	[m]		0.00	--	--
Max Torsion	[kN]		--	--	5.23
x	[m]		--	--	3.31
Top Reinf. Area	[cm _c]	Real	2.36	2.36	2.36
		Req.	0.97	0.00	1.94
Bot. Reinf. Area	[cm _c]	Real	2.36	2.36	2.36
		Req.	1.58	1.59	1.43
Transv. Reinf. Area	[cm _c /m]	Real	9.42	4.46	12.57
		Req.	8.28	2.40	11.34
Active Defl.			1.04 mm, L/3229 (L: 3.35 m)		
Long Term Defl.			1.19 mm, L/2812 (L: 3.35 m)		

5.1.18. Frame 18



Frame 18			Span: P42-P41			Span: P41-P40			Span: P40-P39		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-28.16	--	-81.22	-69.96	--	-57.36	-52.87	--	-65.99
x	[m]		0.00	--	4.68	0.00	--	4.50	0.00	--	3.74
Max Moment	[kN·m]		34.98	35.85	20.27	20.99	27.19	24.69	19.03	20.61	16.98
x	[m]		1.48	1.73	3.23	1.45	2.45	3.08	1.23	1.60	2.60
Min Shear	[kN]		--	-34.56	-133.70	--	-22.77	-108.51	--	-27.31	-142.06
x	[m]		--	3.06	4.68	--	2.95	4.50	--	2.48	3.74
Max Shear	[kN]		88.29	15.67	--	123.43	26.80	--	97.82	19.24	--

Frame 18			Span: P42-P41			Span: P41-P40			Span: P40-P39		
Section			30x40			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
x	[m]		0.00	1.60	--	0.00	1.58	--	0.00	1.35	--
Min Torsion	[kN]		--	-1.39	-1.69	-4.14	--	-1.85	-2.74	--	-3.26
x	[m]		--	2.85	4.10	0.00	--	4.33	0.00	--	3.73
Max Torsion	[kN]		2.37	--	5.27	1.64	--	3.43	1.49	--	17.51
x	[m]		0.00	--	4.60	0.33	--	4.33	0.48	--	3.73
Top Reinf. Area	[cm _c]	Real	2.36	1.57	7.60	7.60	1.57	5.32	5.40	1.57	6.14
		Req.	1.99	0.00	5.87	5.13	0.00	4.07	3.72	0.00	4.83
Bot. Reinf. Area	[cm _c]	Real	3.05	3.05	2.39	2.26	2.26	2.26	2.26	2.26	2.26
		Req.	2.40	2.40	1.78	1.65	1.81	1.76	1.65	1.65	1.63
Transv. Reinf. Area	[cm _c /m]	Real	6.28	7.73	7.73	7.07	2.69	6.83	6.28	2.46	6.55
		Req.	5.49	2.69	6.85	6.27	2.40	6.19	5.67	2.40	5.80
Active Defl.			1.36 mm, L/3441 (L: 4.68 m)			0.86 mm, L/5114 (L: 4.39 m)			0.38 mm, L/9392 (L: 3.59 m)		
Long Term Defl.			1.75 mm, L/2678 (L: 4.68 m)			1.05 mm, L/4199 (L: 4.39 m)			0.47 mm, L/7663 (L: 3.57 m)		



Frame 18			Span: P39-P38			Span: P38-P37		
Section			30x40			30x40		
Zone			1/3L	2/3L	3/3L	1/3L	2/3L	3/3L
Min Moment.	[kN·m]		-65.44	--	-86.65	-97.29	--	-42.78
x	[m]		0.00	--	5.31	0.00	--	5.58
Max Moment	[kN·m]		32.80	35.25	24.43	33.58	48.74	47.58
x	[m]		1.76	2.26	3.64	1.85	3.35	3.73
Min Shear	[kN]		--	-38.01	-135.97	--	-16.89	-112.40
x	[m]		--	3.51	5.31	--	3.60	5.58
Max Shear	[kN]		125.56	19.79	--	139.93	33.86	--
x	[m]		0.00	1.89	--	0.00	1.98	--
Min Torsion	[kN]		-5.08	-1.51	-2.30	-3.74	--	-2.19
x	[m]		0.00	3.39	3.89	0.00	--	4.98
Max Torsion	[kN]		1.79	--	2.84	1.83	1.31	1.90
x	[m]		0.00	--	5.14	0.73	1.98	5.48
Top Reinf. Area	[cm _c]	Real	6.19	1.57	8.48	8.73	1.57	3.58
		Req.	4.64	0.00	6.59	7.17	0.00	3.02
Bot. Reinf. Area	[cm _c]	Real	3.05	3.05	3.05	3.83	3.83	3.83
		Req.	2.31	2.36	2.02	2.59	3.29	3.28
Transv. Reinf. Area	[cm _c /m]	Real	8.08	9.14	9.14	9.14	9.14	8.08
		Req.	7.08	2.96	7.72	8.30	2.64	7.25
Active Defl.			1.61 mm, L/3165 (L: 5.09 m)			3.27 mm, L/1709 (L: 5.58 m)		
Long Term Defl.			1.94 mm, L/2621 (L: 5.08 m)			4.08 mm, L/1368 (L: 5.58 m)		

5.2. Worst cases of forces of columns

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
P1	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	254.6	-42.4	32.5	-41.6	-47.8	Q	70.5	Verified
			Base	DL, LL, W	263.7	65.2	-61.1	-41.6	-47.8	N,M	82.0	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	9.94 m	DL, LL, W	263.7	65.2	-61.1	-41.6	-47.8	N,M	82.0	Verified
			Head	DL, LL, W	523.6	-51.9	59.7	-45.3	-40.9	N,M	63.2	Verified
			Base	DL, LL, W	534.0	52.4	-55.9	-45.3	-40.9	N,M	76.4	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	791.8	-56.9	54.7	-44.5	-44.2	N,M	83.9	Verified
			Base	DL, LL, W	802.1	55.8	-58.7	-44.5	-44.2	N,M	85.6	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1025.5	-62.6	37.9	-18.9	-36.0	N,M	93.5	Verified
			Base	DL, LL, W	1040.3	68.3	-30.8	-18.9	-36.0	N,M	93.8	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	0 m	DL, LL, W	1032.6	57.6	-39.7	-23.6	-30.0	Q	7.5	Verified
				DL, LL, W	1040.3	68.3	-30.8	-18.9	-36.0	N,M	93.8	Verified
			Head	DL, LL, W	1250.9	-63.0	25.4	-14.0	-42.1	Q	40.1	Verified
				DL, LL, W	1280.7	-60.4	29.3	-16.8	-38.4	N,M	85.9	Verified
			Base	DL, LL, W	1262.1	52.8	-13.2	-14.0	-42.1	N,M	77.3	Verified
			Column start	DL, LL, W	1262.1	52.8	-13.2	-14.0	-42.1	N,M	77.3	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1262.1	52.8	-13.2	-14.0	-42.1	N,M	77.3	Verified
P2	05. Utility Roof +15.84m (12.89 - 17.44 m)	35x35	Head	DL, LL, W	470.3	5.9	17.3	-22.8	9.1	N,M	36.9	Verified
			Base	DL, LL, W	481.1	-18.3	-43.1	-22.8	9.1	N,M	65.3	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	929.8	26.3	71.7	-63.4	19.4	Q	64.6	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
				DL, LL, W	926.1	35.4	67.5	-60.1	27.0	N,M	90.6	Verified
			Base	DL, LL, W	938.9	-17.3	-70.9	-63.4	19.4	Q	64.6	Verified
				DL, LL, W	935.2	-25.4	-67.7	-60.1	27.0	N,M	85.9	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1281. 6	5.7	61.5	-47.7	5.1	Q	46.7	Verified
				DL, LL, W	1275. 3	14.5	58.2	-45.3	11.9	N,M	90.4	Verified
			Base	DL, LL, W	1292. 0	-7.3	-60.1	-47.7	5.1	Q	46.7	Verified
				DL, LL, W	1285. 6	-15.7	-57.2	-45.3	11.9	N,M	90.8	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1539. 7	11.1	67.3	-53.4	8.2	Q	49.1	Verified
				DL, LL, W	1625. 3	21.6	61.1	-49.3	16.2	N,M	98.0	Verified
			Base	DL, LL, W	1550. 1	-9.7	-68.9	-53.4	8.2	Q	49.1	Verified
				DL, LL, W	1635. 7	-19.6	-64.6	-49.3	16.2	N,M	99.1	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1831. 3	43.5	44.8	-22.5	25.5	Q	28.1	Verified
				DL, LL, W	1978. 2	30.7	47.4	-23.9	19.1	N,M	99.4	Verified
			Base	DL, LL, W	1846. 1	-49.4	-37.3	-22.5	25.5	Q	28.1	Verified
				DL, LL, W	1993. 0	-38.8	-39.5	-23.9	19.1	N,M	99.8	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	2109. 0	45.8	28.7	-17.8	31.4	Q	29.9	Verified
				DL, LL, W	2262. 7	42.0	30.7	-18.7	26.9	N,M	96.9	Verified
			Base	DL, LL, W	2120. 1	-40.4	-20.4	-17.8	31.4	Q	29.9	Verified
				DL, LL, W	2290. 5	-19.3	-28.7	-23.4	19.2	N,M	92.5	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	2120. 1	-40.4	-20.4	-17.8	31.4	Q	6.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
				DL, LL, W	2290.5	-19.3	-28.7	-23.4	19.2	N,M	92.5	Verified
P3	05. Utility Roof +15.84m (12.89 - 17.44 m)	35x35	Head	DL, LL, W	255.6	3.2	18.1	-24.4	4.4	Q	31.2	Verified
				DL, LL, W	417.9	8.0	20.5	-27.1	9.1	N,M	37.3	Verified
			Base	DL, LL, W	266.4	-8.4	-46.6	-24.4	4.4	Q	30.6	Verified
				DL, LL, W	428.7	-16.0	-51.2	-27.1	9.1	N,M	73.6	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	675.7	17.2	67.2	-53.1	13.9	Q	55.1	Verified
				DL, LL, W	506.0	14.2	67.6	-53.0	11.4	N,M	90.8	Verified
			Base	DL, LL, W	685.8	-17.6	-65.6	-53.1	13.9	Q	55.1	Verified
				DL, LL, W	686.4	-22.6	-62.4	-50.2	18.3	N,M	89.1	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	876.0	18.3	65.8	-50.1	13.6	Q	52.1	Verified
				DL, LL, W	934.1	26.3	61.4	-47.0	19.6	N,M	95.9	Verified
			Base	DL, LL, W	886.4	-16.4	-61.9	-50.1	13.6	Q	52.1	Verified
				DL, LL, W	944.4	-23.8	-58.5	-47.0	19.6	N,M	92.7	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1127.7	18.6	70.8	-58.3	15.5	Q	54.9	Verified
				DL, LL, W	1190.0	28.2	63.1	-52.5	22.9	N,M	87.4	Verified
			Base	DL, LL, W	1138.1	-21.0	-77.8	-58.3	15.5	Q	54.9	Verified
				DL, LL, W	1200.3	-30.1	-70.9	-52.5	22.9	N,M	92.0	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1377.3	31.5	36.6	-13.2	13.8	N,M	96.7	Verified
			Base	DL, LL, W	1392.1	-18.7	-11.4	-13.2	13.8	Q	17.4	Verified
				DL, LL, W	1453.3	-10.9	-11.9	-13.7	9.2	N,M	88.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	0 m	DL, LL, W	1392.1	-18.7	-11.4	-13.2	13.8	Q	3.2	Verified
				DL, LL, W	1453.3	-10.9	-11.9	-13.7	9.2	N,M	88.9	Verified
			Head	DL, LL, W	1463.4	-16.2	-15.3	7.8	-14.5	Q	15.0	Verified
				DL, LL, W	1576.0	-11.7	-19.4	8.0	-7.3	N,M	86.0	Verified
			Base	DL, LL, W	1475.0	25.3	6.9	7.8	-14.5	Q	15.0	Verified
				DL, LL, W	1559.6	18.3	6.9	8.0	-11.5	N,M	87.1	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1475.0	25.3	6.9	7.8	-14.5	Q	2.8	Verified
				DL, LL, W	1559.6	18.3	6.9	8.0	-11.5	N,M	87.1	Verified
P4	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	143.2	-16.4	38.3	-36.8	-20.3	Q	62.0	Verified
				DL, LL, W	142.9	-14.2	39.2	-37.4	-17.7	N,M	46.7	Verified
			Base	DL, LL, W	153.3	34.3	-53.7	-36.8	-20.3	N,M	80.0	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	475.0	-52.0	67.5	-61.4	-41.9	N,M	83.6	Verified
			Base	DL, LL, W	484.2	42.3	-70.8	-61.4	-41.9	N,M	78.2	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	736.9	-15.6	69.1	-52.7	-12.7	Q	52.8	Verified
				DL, LL, W	742.8	-27.5	62.9	-48.2	-21.6	N,M	81.6	Verified
			Base	DL, LL, W	747.2	16.8	-65.3	-52.7	-12.7	Q	52.8	Verified
				DL, LL, W	753.1	27.7	-60.0	-48.2	-21.6	N,M	80.4	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	999.5	-21.1	75.6	-62.7	-17.4	Q	59.1	Verified
				DL, LL, W	1006.6	-37.1	66.0	-55.3	-29.3	N,M	86.5	Verified
			Base	DL, LL, W	1009.8	23.2	-84.2	-62.7	-17.4	Q	59.1	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	1016. 9	37.7	-75.0	-55.3	-29.3	N,M	91.6	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1268. 1	-34.9	40.7	-14.8	-16.1	N,M	96.7	Verified
			Base	DL, LL, W	1282. 9	23.8	-13.2	-14.8	-16.1	N,M	86.3	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	0 m	DL, LL, W	1282. 9	23.8	-13.2	-14.8	-16.1	N,M	86.3	Verified
			Head	DL, LL, W	1360. 7	10.1	-16.8	8.6	10.3	Q	12.2	Verified
				DL, LL, W	1442. 2	4.8	-20.9	8.7	1.7	N,M	78.3	Verified
			Base	DL, LL, W	1372. 3	-19.3	7.8	8.6	10.3	Q	12.2	Verified
				DL, LL, W	1438. 6	16.4	6.4	8.2	-5.8	N,M	81.3	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1372. 3	-19.3	7.8	8.6	10.3	Q	2.3	Verified
				DL, LL, W	1438. 6	16.4	6.4	8.2	-5.8	N,M	81.3	Verified
	P5	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	598.3	-0.6	34.4	-40.6	-1.1	N,M	48.5
Base				DL, LL, W	607.5	2.0	-57.0	-40.6	-1.1	Q	40.8	Verified
				DL, LL, W	576.6	13.4	-52.3	-37.2	-9.2	N,M	67.5	Verified
03. Floor 3 +9.94m (6.99 - 9.94 m)		35x35	Head	DL, LL, W	888.2	-2.8	55.0	-42.6	-2.3	Q	42.8	Verified
				DL, LL, W	875.0	-19.8	49.9	-38.8	-15.3	N,M	82.4	Verified
			Base	DL, LL, W	898.5	3.2	-53.5	-42.6	-2.3	Q	42.8	Verified
				DL, LL, W	885.4	19.1	-49.2	-38.8	-15.3	N,M	81.7	Verified
02. Floor 2 +6.99m (4.04 - 6.99 m)		35x35	Head	DL, LL, W	1205. 5	-3.0	57.9	-44.6	-1.7	Q	44.8	Verified
				DL, LL, W	1187. 7	-24.4	50.2	-39.3	-18.2	N,M	94.7	Verified
			Base	DL, LL, W	1215. 9	1.4	-56.0	-44.6	-1.7	Q	44.8	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	1198.1	22.1	-50.1	-39.3	-18.2	N,M	93.9	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1506.5	-40.6	51.3	-30.7	-24.8	N,M	91.4	Verified
			Base	DL, LL, W	1521.3	49.6	-60.4	-30.7	-24.8	N,M	97.9	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	1857.2	-48.9	71.2	-42.3	-34.0	Q	45.0	Verified
				DL, LL, W	1921.5	-43.8	73.0	-43.1	-28.9	N,M	96.3	Verified
			Base	DL, LL, W	1868.4	44.7	-45.2	-42.3	-34.0	N,M	87.1	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1826.6	44.5	-44.5	-41.6	-33.8	Q	10.6	Verified
				DL, LL, W	1868.4	44.7	-45.2	-42.3	-34.0	N,M	87.1	Verified
P6	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	178.4	25.8	26.1	-32.7	29.6	Q	60.8	Verified
				DL, LL, W	180.0	25.8	26.2	-32.8	29.5	N,M	38.0	Verified
			Base	DL, LL, W	192.9	-39.0	-49.8	-34.5	28.1	Q	59.8	Verified
				DL, LL, W	194.5	-36.7	-51.8	-35.9	26.4	N,M	74.8	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	9.94 m	DL, LL, W	195.3	-38.9	-50.2	-34.7	28.1	Q	9.1	Verified
				DL, LL, W	194.5	-36.7	-51.8	-35.9	26.4	N,M	74.8	Verified
			Head	DL, LL, W	397.3	26.9	55.8	-42.7	21.1	Q	47.1	Verified
				DL, LL, W	406.0	41.2	46.7	-36.2	31.8	N,M	59.0	Verified
			Base	DL, LL, W	426.0	-36.6	-48.3	-38.4	29.1	Q	47.0	Verified
				DL, LL, W	416.4	-39.8	-45.5	-36.2	31.8	N,M	56.8	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	634.9	44.3	46.1	-37.3	33.5	N,M	78.3	Verified
			Base	DL, LL, W	645.2	-41.1	-48.9	-37.3	33.5	N,M	78.1	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	850.7	50.4	33.9	-17.2	29.5	Q	33.3	Verified
				DL, LL, W	854.8	50.4	33.8	-17.2	29.5	N,M	97.6	Verified
			Base	DL, LL, W	865.4	-57.1	-28.8	-17.2	29.5	Q	33.3	Verified
				DL, LL, W	869.5	-57.0	-28.8	-17.2	29.5	N,M	99.4	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	0 m	DL, LL, W	865.4	-57.1	-28.8	-17.2	29.5	Q	5.6	Verified
				DL, LL, W	869.5	-57.0	-28.8	-17.2	29.5	N,M	99.4	Verified
			Head	DL, LL, W	1033.9	54.0	25.7	-14.4	36.0	Q	37.8	Verified
				DL, LL, W	1038.3	53.9	25.6	-14.3	36.0	N,M	87.6	Verified
			Base	DL, LL, W	1045.0	-45.0	-13.9	-14.4	36.0	Q	37.8	Verified
				DL, LL, W	1049.4	-45.0	-13.8	-14.3	36.0	N,M	78.1	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1045.0	-45.0	-13.9	-14.4	36.0	Q	6.4	Verified
				DL, LL, W	1049.4	-45.0	-13.8	-14.3	36.0	N,M	78.1	Verified
P35	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	870.4	6.7	-0.5	2.0	8.1	Q	8.3	Verified
				DL, LL, W	974.4	2.8	-1.0	2.6	3.7	N,M	61.4	Verified
			Base	DL, LL, W	880.5	-13.5	4.3	2.0	8.1	Q	8.3	Verified
				DL, LL, W	983.2	-0.1	10.4	5.6	-0.2	N,M	64.6	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1361.2	22.9	-4.3	3.2	16.5	Q	16.9	Verified
				DL, LL, W	1527.6	13.1	-5.3	3.9	9.3	N,M	93.9	Verified
			Base	DL, LL, W	1371.9	-20.9	4.1	3.2	16.5	Q	16.9	Verified
				DL, LL, W	1536.6	-2.5	12.4	9.6	2.2	N,M	94.1	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1859. 2	24.3	-1.8	1.4	17.1	Q	15.5	Verified
				DL, LL, W	2089. 9	13.4	-3.0	2.3	9.3	N,M	99.2	Verified
			Base	DL, LL, W	1870. 0	-21.0	2.1	1.4	17.1	Q	15.5	Verified
				DL, LL, W	2098. 5	-0.6	11.7	9.3	0.6	N,M	99.1	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	40x40	Head	DL, LL, W	2483. 2	-48.5	-2.7	2.2	-26.7	Q	18.2	Verified
				DL, LL, W	2556. 5	41.5	7.3	-3.1	21.2	N,M	97.9	Verified
			Base	DL, LL, W	2503. 0	51.2	5.4	2.2	-26.7	Q	18.2	Verified
				DL, LL, W	2571. 4	47.5	5.5	2.2	-24.8	N,M	99.4	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	Head	DL, LL, W	2964. 9	-35.4	-1.1	0.0	-27.3	Q	17.5	Verified
				DL, LL, W	3218. 4	-6.6	12.1	-11.5	-3.7	N,M	97.0	Verified
			Base	DL, LL, W	2980. 0	42.6	-1.1	0.0	-27.3	Q	17.5	Verified
				DL, LL, W	3226. 5	27.0	-2.3	-0.7	-17.3	N,M	98.5	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	3076. 8	40.5	-1.0	0.1	-25.3	Q	4.1	Verified
				DL, LL, W	3226. 5	27.0	-2.3	-0.7	-17.3	N,M	98.5	Verified
P41	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	289.5	-3.7	-27.6	24.9	-3.4	Q	29.9	Verified
				DL, LL, W	302.0	-3.5	-27.5	24.8	-3.2	N,M	26.8	Verified
			Base	DL, LL, W	300.2	5.3	38.4	24.9	-3.4	Q	29.4	Verified
				DL, LL, W	296.4	12.4	34.6	22.5	-7.6	N,M	37.1	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	671.2	-3.2	-39.5	29.1	-2.5	Q	29.3	Verified
				DL, LL, W	662.1	-16.3	-31.4	23.4	-11.9	N,M	60.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	682.0	3.4	37.5	29.1	-2.5	Q	29.3	Verified
				DL, LL, W	672.9	15.3	30.5	23.4	-11.9	N,M	59.7	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1050. 3	-4.4	-39.5	29.4	-3.2	Q	29.6	Verified
				DL, LL, W	1033. 9	-21.5	-29.4	22.1	-15.5	N,M	77.6	Verified
			Base	DL, LL, W	1061. 1	4.0	38.3	29.4	-3.2	Q	29.6	Verified
				DL, LL, W	1044. 6	19.7	29.1	22.1	-15.5	N,M	77.0	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1369. 6	-33.7	-19.4	11.3	-18.6	Q	19.8	Verified
				DL, LL, W	1396. 2	27.4	-14.4	8.7	14.5	N,M	93.7	Verified
			Base	DL, LL, W	1384. 8	35.7	22.7	11.3	-18.6	Q	19.8	Verified
				DL, LL, W	1471. 2	-6.5	24.6	12.1	3.7	N,M	95.7	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	1688. 3	-27.5	-22.7	12.6	-21.1	Q	22.3	Verified
				DL, LL, W	1797. 3	-17.4	-25.9	14.2	-13.3	N,M	95.7	Verified
			Base	DL, LL, W	1699. 5	30.4	12.0	12.6	-21.1	Q	22.3	Verified
				DL, LL, W	1831. 5	6.1	21.7	19.2	-4.8	N,M	97.9	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1741. 0	29.3	13.0	13.6	-19.9	Q	4.9	Verified
				DL, LL, W	1831. 5	6.1	21.7	19.2	-4.8	N,M	97.9	Verified
P34	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	220.1	-4.2	-2.8	2.3	-5.1	Q	7.4	Verified
				DL, LL, W	356.1	-2.7	-4.3	3.3	-3.8	N,M	18.6	Verified
			Base	DL, LL, W	228.1	9.2	3.3	2.3	-5.1	Q	7.3	Verified
				DL, LL, W	366.8	4.5	6.6	4.5	-2.2	N,M	19.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	969.3	18.3	-3.5	4.0	14.1	N,M	68.3	Verified
			Base	DL, LL, W	979.8	-18.2	7.0	4.0	14.1	Q	14.7	Verified
				DL, LL, W	1033.2	-1.6	13.3	9.0	0.5	N,M	69.4	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1588.8	24.2	-7.0	5.2	17.8	Q	18.1	Verified
				DL, LL, W	1650.1	18.9	-7.5	5.5	14.0	N,M	95.6	Verified
			Base	DL, LL, W	1599.6	-23.1	6.8	5.2	17.8	Q	18.1	Verified
				DL, LL, W	1676.7	-6.3	14.0	10.8	4.9	N,M	95.4	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	2214.8	28.6	-4.7	3.3	20.8	Q	18.3	Verified
				DL, LL, W	2314.4	19.1	-5.1	3.6	14.0	N,M	99.5	Verified
			Base	DL, LL, W	2225.6	-26.5	4.2	3.3	20.8	Q	18.3	Verified
				DL, LL, W	2326.0	-6.8	12.6	10.2	4.9	N,M	98.7	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	40x40	Head	DL, LL, W	2861.8	52.1	4.7	-2.0	26.7	Q	17.1	Verified
				DL, LL, W	2875.8	51.0	4.9	-2.1	26.2	N,M	99.7	Verified
			Base	DL, LL, W	2881.6	-47.8	-2.9	-2.0	26.7	Q	17.1	Verified
				DL, LL, W	2898.3	40.5	0.6	-0.2	-21.0	N,M	98.5	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	Head	DL, LL, W	3008.1	-25.6	2.8	-2.6	-22.0	Q	13.8	Verified
				DL, LL, W	3465.3	1.7	14.7	-12.5	0.9	N,M	96.9	Verified
			Base	DL, LL, W	3023.2	37.2	-4.5	-2.6	-22.0	Q	13.8	Verified
				DL, LL, W	3494.7	23.0	-5.1	-3.0	-13.4	N,M	97.9	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	2242.9	36.8	-3.1	-1.7	-21.9	Q	3.5	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	3494.7	23.0	-5.1	-3.0	-13.4	N,M	97.9	Verified
P40	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	265.9	-1.3	-31.6	29.6	-2.2	Q	36.7	Verified
				DL, LL, W	276.1	-1.1	-31.6	29.7	-2.0	N,M	28.9	Verified
			Base	DL, LL, W	276.6	4.6	46.8	29.6	-2.2	N,M	50.4	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	620.3	-5.3	-51.1	37.5	-3.9	Q	37.9	Verified
				DL, LL, W	612.5	-18.6	-43.1	31.9	-13.6	N,M	68.1	Verified
			Base	DL, LL, W	631.1	5.2	48.4	37.5	-3.9	Q	37.9	Verified
				DL, LL, W	623.3	17.4	41.5	31.9	-13.6	N,M	66.5	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	974.8	-5.9	-49.8	37.6	-4.4	Q	37.9	Verified
				DL, LL, W	958.1	-23.3	-39.5	30.2	-17.0	N,M	81.6	Verified
			Base	DL, LL, W	985.5	5.8	49.7	37.6	-4.4	Q	37.9	Verified
				DL, LL, W	968.9	21.8	40.4	30.2	-17.0	N,M	81.8	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1294.0	-33.3	-24.3	13.0	-18.0	N,M	98.7	Verified
			Base	DL, LL, W	1309.1	34.2	24.2	13.0	-18.0	N,M	99.6	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	0 m	DL, LL, W	1309.1	34.2	24.2	13.0	-18.0	N,M	99.6	Verified
			Head	DL, LL, W	1569.7	-24.8	-20.9	11.4	-19.5	Q	22.0	Verified
				DL, LL, W	1632.2	-16.8	-22.7	12.3	-13.0	N,M	95.1	Verified
			Base	DL, LL, W	1580.9	28.9	10.3	11.4	-19.5	Q	22.0	Verified
				DL, LL, W	1669.6	5.8	19.3	17.0	-4.5	N,M	97.2	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1580.9	28.9	10.3	11.4	-19.5	Q	4.7	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
				DL, LL, W	1669.6	5.8	19.3	17.0	-4.5	N,M	97.2	Verified
P39	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	279.5	3.7	-31.2	28.9	3.9	Q	35.3	Verified
				DL, LL, W	290.9	3.6	-31.3	29.1	3.8	N,M	29.5	Verified
			Base	DL, LL, W	290.3	-6.7	45.5	28.9	3.9	N,M	48.2	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	688.2	12.8	-49.5	36.4	9.3	Q	37.7	Verified
				DL, LL, W	679.9	25.4	-41.1	30.5	18.4	N,M	73.5	Verified
			Base	DL, LL, W	699.0	-11.8	46.9	36.4	9.3	Q	37.7	Verified
				DL, LL, W	690.6	-23.4	39.6	30.5	18.4	N,M	71.7	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1094.8	12.3	-48.7	36.8	9.2	Q	38.0	Verified
				DL, LL, W	1077.1	28.9	-37.9	29.0	21.1	N,M	87.7	Verified
			Base	DL, LL, W	1105.6	-12.0	48.8	36.8	9.2	Q	38.0	Verified
				DL, LL, W	1087.9	-27.1	38.9	29.0	21.1	N,M	87.7	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1466.5	36.9	-23.4	12.6	20.1	N,M	97.8	Verified
			Base	DL, LL, W	1481.7	-38.5	23.9	12.6	20.1	Q	21.6	Verified
				DL, LL, W	1483.9	-38.5	23.8	12.6	20.1	N,M	99.1	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	1772.3	30.2	-21.5	11.6	22.1	Q	22.7	Verified
				DL, LL, W	1844.2	22.5	-23.8	12.9	15.6	N,M	98.6	Verified
			Base	DL, LL, W	1783.5	-30.5	10.4	11.6	22.1	Q	22.7	Verified
				DL, LL, W	1883.7	-7.5	20.2	17.9	7.1	N,M	99.5	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1783.5	-30.5	10.4	11.6	22.1	Q	5.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
				DL, LL, W	1883.7	-7.5	20.2	17.9	7.1	N,M	99.5	Verified
P33	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	379.5	-8.0	-1.0	-0.7	-9.8	Q	10.2	Verified
				DL, LL, W	401.8	-4.4	-2.4	0.7	-5.9	N,M	27.0	Verified
			Base	DL, LL, W	390.3	17.9	-2.8	-0.7	-9.8	Q	10.1	Verified
				DL, LL, W	409.0	16.8	-2.9	-0.7	-9.1	N,M	32.2	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	948.5	-28.1	5.3	-2.0	-20.9	Q	21.0	Verified
				DL, LL, W	996.7	-12.8	10.6	-5.8	-9.7	N,M	66.5	Verified
			Base	DL, LL, W	959.0	26.2	0.1	-2.0	-20.9	Q	21.0	Verified
				DL, LL, W	1008.5	19.3	0.2	-2.1	-15.3	N,M	70.8	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1518.4	-25.0	-2.6	1.9	-18.7	Q	18.9	Verified
				DL, LL, W	1595.4	-9.3	-9.1	6.7	-7.2	N,M	95.9	Verified
			Base	DL, LL, W	1529.1	24.6	2.4	1.9	-18.7	Q	18.9	Verified
				DL, LL, W	1590.9	19.7	2.7	2.1	-14.9	N,M	98.7	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	2090.2	-30.3	-0.5	0.4	-22.1	Q	19.5	Verified
				DL, LL, W	2191.4	-10.7	-9.0	6.3	-8.3	N,M	96.7	Verified
			Base	DL, LL, W	2100.9	28.2	0.5	0.4	-22.1	Q	19.5	Verified
				DL, LL, W	2201.8	20.3	0.5	0.4	-15.7	N,M	99.4	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	40x40	Head	DL, LL, W	2671.4	-54.8	7.2	-3.1	-28.1	Q	18.9	Verified
				DL, LL, W	2796.6	-13.4	23.9	-12.0	-6.2	N,M	96.6	Verified
			Base	DL, LL, W	2691.2	50.3	-4.3	-3.1	-28.1	Q	18.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	Head	DL, LL, W	2704.3	49.7	-4.6	-3.2	-27.7	N,M	98.0	Verified
				DL, LL, W	3147.2	-26.5	5.0	-4.2	-22.5	Q	15.1	Verified
				DL, LL, W	3308.1	-1.0	14.2	-12.1	-0.6	N,M	96.9	Verified
				DL, LL, W	3162.3	37.8	-6.9	-4.2	-22.5	Q	15.1	Verified
			Base	DL, LL, W	3321.9	24.0	-6.9	-4.2	-14.3	N,M	97.8	Verified
				DL, LL, W	3174.7	37.8	-7.1	-4.4	-22.5	Q	3.7	Verified
				DL, LL, W	3321.9	24.0	-6.9	-4.2	-14.3	N,M	97.8	Verified
				DL, LL, W	3321.9	24.0	-6.9	-4.2	-14.3	N,M	97.8	Verified
P38	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	372.1	7.2	-33.6	30.5	6.5	Q	32.8	Verified
				DL, LL, W	388.3	7.2	-33.7	30.7	6.5	N,M	46.3	Verified
			Base	DL, LL, W	382.9	-10.1	47.1	30.5	6.5	Q	32.3	Verified
				DL, LL, W	382.8	-18.1	42.9	27.7	11.2	N,M	65.3	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	838.2	14.7	-50.6	37.3	10.8	Q	39.0	Verified
				DL, LL, W	809.5	30.2	-39.9	29.7	22.1	N,M	81.2	Verified
			Base	DL, LL, W	849.0	-13.9	48.3	37.3	10.8	Q	39.0	Verified
				DL, LL, W	820.2	-28.3	38.8	29.7	22.1	N,M	79.6	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1301.4	15.3	-50.2	37.6	11.6	Q	39.4	Verified
				DL, LL, W	1284.9	31.6	-39.0	29.4	23.4	N,M	96.2	Verified
			Base	DL, LL, W	1312.2	-15.5	49.3	37.6	11.6	Q	39.4	Verified
				DL, LL, W	1347.8	-23.6	40.8	30.8	18.1	N,M	95.9	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1696.2	40.6	-27.1	15.8	21.8	Q	23.2	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	1803.1	26.9	-29.4	17.2	14.5	N,M	97.0	Verified
				DL, LL, W	1711.3	-41.0	31.9	15.8	21.8	Q	23.2	Verified
				DL, LL, W	1820.8	0.7	35.2	17.4	-0.4	N,M	99.9	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	2186.7	11.9	-44.8	28.6	7.3	Q	24.5	Verified
				DL, LL, W	2236.8	21.2	-37.8	21.2	14.9	N,M	95.3	Verified
			Base	DL, LL, W	2197.9	-8.2	33.7	28.6	7.3	Q	24.5	Verified
				DL, LL, W	2270.5	-7.0	29.0	26.4	6.6	N,M	97.8	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	2197.9	-8.2	33.7	28.6	7.3	Q	5.5	Verified
				DL, LL, W	2270.5	-7.0	29.0	26.4	6.6	N,M	97.8	Verified
P32	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	395.1	10.4	-0.6	-0.8	13.2	Q	13.5	Verified
				DL, LL, W	427.7	7.7	-0.6	-0.9	10.3	N,M	30.9	Verified
			Base	DL, LL, W	419.4	-24.9	-2.5	-0.7	13.3	N,M	37.6	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	1140.5	46.3	3.8	-1.3	32.2	Q	32.3	Verified
				DL, LL, W	1225.5	24.1	4.9	-2.0	15.8	N,M	83.6	Verified
			Base	DL, LL, W	1151.1	-37.5	0.6	-1.3	32.2	Q	32.3	Verified
				DL, LL, W	1190.6	-35.2	-0.2	-1.9	30.4	N,M	78.3	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1692.7	32.9	-2.2	1.5	24.8	Q	22.6	Verified
				DL, LL, W	1817.1	24.0	-1.3	0.8	18.3	N,M	97.1	Verified
			Base	DL, LL, W	1703.4	-32.9	1.8	1.5	24.8	Q	22.6	Verified
				DL, LL, W	1831.6	-16.9	7.2	5.7	12.5	N,M	93.5	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	2264.1	39.5	-1.3	0.9	28.9	Q	24.0	Verified
				DL, LL, W	2431.2	29.2	0.1	0.0	21.5	N,M	97.8	Verified
			Base	DL, LL, W	2274.8	-37.0	1.2	0.9	28.9	Q	24.0	Verified
				DL, LL, W	2443.8	-16.5	-9.5	-7.7	12.3	N,M	94.5	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	40x40	Head	DL, LL, W	2848.6	67.7	4.0	-1.8	36.0	Q	22.4	Verified
				DL, LL, W	3059.8	47.4	6.7	-3.3	25.3	N,M	97.2	Verified
			Base	DL, LL, W	2868.4	-66.8	-2.8	-1.8	36.0	Q	22.4	Verified
				DL, LL, W	3083.6	-23.8	-23.9	-13.2	12.7	N,M	94.6	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	Head	DL, LL, W	3411.0	46.4	8.3	-5.0	32.3	Q	20.6	Verified
				DL, LL, W	3689.1	34.5	10.1	-6.3	22.7	N,M	94.4	Verified
			Base	DL, LL, W	3426.1	-45.8	-6.1	-5.0	32.3	Q	20.6	Verified
				DL, LL, W	3718.1	11.8	-11.7	-8.6	-2.3	N,M	92.9	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	2618.8	-44.1	-3.8	-3.4	30.4	Q	5.3	Verified
				DL, LL, W	3718.1	11.8	-11.7	-8.6	-2.3	N,M	92.9	Verified
P26	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	301.0	14.2	4.5	-4.2	17.0	Q	20.5	Verified
				DL, LL, W	325.9	12.4	5.3	-5.0	15.3	N,M	19.8	Verified
			Base	DL, LL, W	311.7	-31.0	-6.7	-4.2	17.0	Q	20.2	Verified
				DL, LL, W	324.3	-30.5	-8.0	-5.0	16.7	N,M	31.0	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	899.3	51.1	7.1	-4.7	35.1	Q	35.5	Verified
				DL, LL, W	930.3	48.6	8.7	-5.9	33.3	N,M	78.6	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	909.8	-40.1	-5.2	-4.7	35.1	Q	35.5	Verified
				DL, LL, W	940.8	-38.0	-6.7	-5.9	33.3	N,M	71.6	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1351.9	32.2	5.8	-4.2	24.2	Q	24.7	Verified
				DL, LL, W	1439.8	26.9	7.5	-5.5	20.4	N,M	95.0	Verified
			Base	DL, LL, W	1362.6	-32.0	-5.4	-4.2	24.2	Q	24.7	Verified
				DL, LL, W	1452.7	-19.4	-14.6	-11.4	14.3	N,M	90.8	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1808.4	38.9	3.4	-2.0	29.0	Q	27.5	Verified
				DL, LL, W	1924.3	31.5	5.2	-3.3	23.3	N,M	99.5	Verified
			Base	DL, LL, W	1819.1	-38.0	-1.9	-2.0	29.0	Q	27.5	Verified
				DL, LL, W	1935.6	-19.5	-14.3	-11.6	14.9	N,M	95.9	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	2273.9	40.5	4.6	-2.6	21.5	Q	16.9	Verified
				DL, LL, W	2425.1	29.2	6.4	-3.6	15.6	N,M	97.3	Verified
			Base	DL, LL, W	2289.0	-39.8	-5.2	-2.6	21.5	Q	16.9	Verified
				DL, LL, W	2440.9	-14.6	-19.3	-10.2	7.8	N,M	94.9	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	0 m	DL, LL, W	1741.2	-37.1	-3.4	-1.7	20.0	Q	4.8	Verified
				DL, LL, W	2440.9	-14.6	-19.3	-10.2	7.8	N,M	94.9	Verified
			Head	DL, LL, W	2705.0	48.1	16.5	-9.5	32.7	Q	21.1	Verified
				DL, LL, W	2904.7	37.3	18.9	-11.1	23.9	N,M	85.5	Verified
			Base	DL, LL, W	2720.1	-45.1	-10.6	-9.5	32.7	Q	21.1	Verified
				DL, LL, W	2918.7	-27.8	-18.0	-14.4	22.0	N,M	83.6	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	2076. 6	-43.2	-7.3	-6.8	30.6	Q	5.3	Verified
				DL, LL, W	2918. 7	-27.8	-18.0	-14.4	22.0	N,M	83.6	Verified
P20	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	286.1	12.5	-9.8	10.1	14.9	Q	21.6	Verified
				DL, LL, W	319.3	12.3	-9.9	10.3	14.9	N,M	20.9	Verified
			Base	DL, LL, W	296.8	-27.0	17.0	10.1	14.9	Q	21.2	Verified
				DL, LL, W	330.0	-27.3	17.3	10.3	14.9	N,M	33.6	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	859.5	47.0	-19.9	14.6	32.2	N,M	80.7	Verified
			Base	DL, LL, W	870.0	-36.7	18.0	14.6	32.2	Q	35.5	Verified
				DL, LL, W	909.1	-34.3	18.7	15.1	30.2	N,M	73.8	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1312. 6	30.0	-11.4	8.7	22.6	Q	24.3	Verified
				DL, LL, W	1372. 2	26.3	-11.9	9.1	20.0	N,M	91.8	Verified
			Base	DL, LL, W	1323. 3	-30.0	11.7	8.7	22.6	Q	24.3	Verified
				DL, LL, W	1385. 0	-19.8	18.2	13.8	14.6	N,M	88.9	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1765. 8	36.1	-11.6	8.5	26.7	Q	26.5	Verified
				DL, LL, W	1845. 9	30.6	-11.5	8.5	22.6	N,M	96.9	Verified
			Base	DL, LL, W	1776. 6	-34.6	11.0	8.5	26.7	Q	26.5	Verified
				DL, LL, W	1857. 5	-19.8	19.0	14.7	15.3	N,M	94.1	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	2235. 4	37.1	-5.4	3.5	19.8	Q	17.2	Verified
				DL, LL, W	2338. 3	28.1	-4.7	3.1	15.1	N,M	99.6	Verified
			Base	DL, LL, W	2250. 6	-36.9	7.5	3.5	19.8	Q	17.2	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	2354. 4	-14.3	17.8	9.0	7.5	N,M	97.5	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	0 m	DL, LL, W	1725. 3	-34.1	6.7	3.2	18.3	Q	4.5	Verified
				DL, LL, W	2354. 4	-14.3	17.8	9.0	7.5	N,M	97.5	Verified
			Head	DL, LL, W	2675. 3	45.5	-8.8	4.3	30.9	Q	20.5	Verified
				DL, LL, W	2814. 8	37.4	-4.7	0.7	23.6	N,M	87.4	Verified
			Base	DL, LL, W	2690. 4	-42.5	3.4	4.3	30.9	Q	20.5	Verified
				DL, LL, W	2827. 1	-11.2	17.9	13.5	12.2	N,M	85.2	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, W	1761. 0	-38.3	2.5	2.8	26.4	Q	4.7	Verified
				DL, LL, W	2827. 1	-11.2	17.9	13.5	12.2	N,M	85.2	Verified
P21	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	267.4	-14.2	-14.0	14.8	-15.1	Q	26.1	Verified
				DL, LL, W	287.7	-14.7	-13.8	14.6	-15.5	N,M	22.8	Verified
			Base	DL, LL, W	277.8	24.4	23.6	14.8	-15.1	Q	25.6	Verified
				DL, LL, W	285.2	26.0	22.4	14.0	-16.2	N,M	36.6	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	659.5	-30.2	-23.4	18.0	-22.8	N,M	62.6	Verified
			Base	DL, LL, W	669.8	27.9	22.5	18.0	-22.8	Q	29.1	Verified
				DL, LL, W	697.0	24.6	23.9	19.1	-19.9	N,M	61.0	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1037. 4	-27.4	-18.1	14.3	-21.5	Q	25.9	Verified
				DL, LL, W	1078. 0	-23.4	-18.8	14.8	-18.5	N,M	74.3	Verified
			Base	DL, LL, W	1047. 8	27.5	18.2	14.3	-21.5	Q	25.9	Verified
				DL, LL, W	1088. 4	23.8	18.9	14.8	-18.5	N,M	75.0	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myx (kN-m)	Qx (kN)	Qy (kN)			
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1365.7	-29.3	-16.9	12.5	-21.5	Q	24.9	Verified
				DL, LL, W	1464.0	-24.2	-16.0	11.7	-17.3	N,M	90.9	Verified
			Base	DL, LL, W	1376.0	25.5	15.0	12.5	-21.5	Q	24.9	Verified
				DL, LL, W	1421.6	26.5	11.9	10.1	-22.5	N,M	92.9	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1763.4	-28.0	-2.6	1.8	-15.0	Q	13.3	Verified
				DL, LL, W	1820.3	21.2	-3.3	2.2	11.4	N,M	96.8	Verified
			Base	DL, LL, W	1778.6	27.9	4.2	1.8	-15.0	Q	13.3	Verified
				DL, LL, W	1843.3	28.0	3.0	1.2	-15.0	N,M	99.6	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	2153.8	-18.6	-2.0	0.2	-14.5	Q	12.6	Verified
				DL, LL, W	2247.2	6.6	-3.4	1.2	5.6	N,M	96.4	Verified
			Base	DL, LL, W	2165.4	22.7	-1.4	0.2	-14.5	Q	12.6	Verified
				DL, LL, W	2261.6	14.8	-0.8	0.7	-9.6	N,M	98.5	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	2165.4	22.7	-1.4	0.2	-14.5	Q	2.9	Verified
				DL, LL, W	2261.6	14.8	-0.8	0.7	-9.6	N,M	98.5	Verified
P27	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	253.6	-13.9	7.2	-7.3	-15.7	Q	21.8	Verified
				DL, LL, W	267.3	-13.4	7.9	-8.1	-15.1	N,M	18.8	Verified
			Base	DL, LL, W	264.0	26.1	-11.4	-7.3	-15.7	Q	21.5	Verified
				DL, LL, W	277.7	25.2	-12.7	-8.1	-15.1	N,M	28.8	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	659.4	-32.9	15.2	-11.8	-24.5	N,M	59.5	Verified
			Base	DL, LL, W	669.7	29.6	-15.0	-11.8	-24.5	N,M	57.8	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1056. 0	-27.8	18.4	-14.1	-21.7	Q	26.0	Verified
				DL, LL, W	1092. 4	-23.5	19.7	-15.1	-18.5	N,M	75.4	Verified
			Base	DL, LL, W	1066. 3	27.6	-17.5	-14.1	-21.7	Q	26.0	Verified
				DL, LL, W	1118. 3	21.5	-16.9	-13.6	-16.8	N,M	76.7	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1447. 2	-32.1	14.9	-10.4	-23.9	Q	26.1	Verified
				DL, LL, W	1509. 9	-14.2	23.6	-17.0	-10.1	N,M	95.5	Verified
			Base	DL, LL, W	1457. 5	28.8	-11.5	-10.4	-23.9	Q	26.1	Verified
				DL, LL, W	1471. 2	28.0	-10.8	-9.8	-23.3	N,M	95.8	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1874. 9	-30.9	10.4	-5.5	-16.3	Q	15.0	Verified
				DL, LL, W	1955. 8	-5.2	21.7	-11.6	-2.6	N,M	98.7	Verified
			Base	DL, LL, W	1890. 1	30.2	-10.1	-5.5	-16.3	Q	15.0	Verified
				DL, LL, W	1905. 6	30.0	-9.9	-5.3	-16.2	N,M	99.6	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	2230. 9	-3.1	24.4	-17.3	-2.3	Q	14.5	Verified
				DL, LL, W	2332. 6	-3.0	19.6	-13.3	-2.2	N,M	98.6	Verified
			Base	DL, LL, W	2242. 5	3.3	-24.8	-17.3	-2.3	Q	14.5	Verified
				DL, LL, W	2351. 3	15.3	-8.9	-7.3	-9.8	N,M	98.3	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	2242. 5	3.3	-24.8	-17.3	-2.3	Q	3.3	Verified
				DL, LL, W	2351. 3	15.3	-8.9	-7.3	-9.8	N,M	98.3	Verified
P22	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	242.0	3.7	-15.5	17.3	2.1	Q	22.4	Verified
				DL, LL, W	250.5	3.8	-15.7	17.5	2.1	N,M	18.0	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	252.3	-1.6	28.7	17.3	2.1	Q	22.1	Verified
				DL, LL, W	260.9	-1.5	29.0	17.5	2.1	N,M	27.8	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	715.2	4.2	-41.2	32.3	4.3	Q	32.6	Verified
				DL, LL, W	737.8	5.0	-39.3	30.8	5.0	N,M	62.0	Verified
			Base	DL, LL, W	725.3	-6.4	39.4	32.3	4.3	Q	32.6	Verified
				DL, LL, W	776.3	-7.8	35.3	28.7	5.2	N,M	62.5	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1126.9	12.1	-35.9	28.0	9.6	Q	29.7	Verified
				DL, LL, W	1205.1	21.6	-23.5	18.6	16.8	N,M	81.0	Verified
			Base	DL, LL, W	1137.2	-12.3	35.6	28.0	9.6	Q	29.7	Verified
				DL, LL, W	1215.5	-21.3	23.9	18.6	16.8	N,M	82.5	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1535.9	9.7	-38.5	29.2	6.2	Q	29.1	Verified
				DL, LL, W	1644.2	21.7	-21.6	16.3	15.2	N,M	95.4	Verified
			Base	DL, LL, W	1546.3	-6.1	36.1	29.2	6.2	Q	29.1	Verified
				DL, LL, W	1648.4	-6.8	29.2	23.7	7.0	N,M	97.7	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1984.7	0.7	-27.4	14.7	0.4	Q	12.2	Verified
				DL, LL, W	2060.3	25.9	-4.6	2.5	13.9	N,M	99.4	Verified
			Base	DL, LL, W	1999.8	-0.9	27.7	14.7	0.4	Q	12.2	Verified
				DL, LL, W	2139.3	-0.9	18.7	9.9	0.4	N,M	99.9	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	0 m	DL, W	1411.2	-25.8	2.1	1.2	13.8	Q	3.0	Verified
				DL, LL, W	2139.3	-0.9	18.7	9.9	0.4	N,M	99.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Head	DL, LL, W	2219.4	17.6	-3.3	0.8	13.2	Q	11.0	Verified
				DL, LL, W	2401.3	11.3	-3.0	0.7	8.1	N,M	98.4	Verified
			Base	DL, LL, W	2230.9	-20.1	-0.9	0.8	13.2	Q	11.0	Verified
				DL, LL, W	2407.1	12.4	0.2	1.4	-7.2	N,M	98.8	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, W	1545.3	-20.1	-2.0	-0.6	13.0	Q	2.7	Verified
				DL, LL, W	2407.1	12.4	0.2	1.4	-7.2	N,M	98.8	Verified
P28	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	254.9	3.7	9.2	-10.2	2.4	Q	13.2	Verified
				DL, LL, W	268.1	4.1	9.1	-10.1	2.7	N,M	15.8	Verified
			Base	DL, LL, W	265.2	-2.4	-16.8	-10.2	2.4	Q	13.0	Verified
				DL, LL, W	278.5	-2.9	-16.6	-10.1	2.7	N,M	19.3	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	776.7	8.5	30.1	-23.8	7.5	Q	25.0	Verified
				DL, LL, W	774.6	20.9	20.4	-16.4	16.8	N,M	60.4	Verified
			Base	DL, LL, W	786.9	-10.3	-29.3	-23.8	7.5	Q	25.0	Verified
				DL, LL, W	784.7	-21.1	-20.6	-16.4	16.8	N,M	61.1	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1236.2	15.1	34.9	-26.8	11.9	Q	29.4	Verified
				DL, LL, W	1298.9	7.1	23.9	-18.4	5.8	N,M	86.3	Verified
			Base	DL, LL, W	1246.5	-15.2	-33.5	-26.8	11.9	Q	29.4	Verified
				DL, LL, W	1310.4	-21.7	-23.0	-18.3	17.2	N,M	85.9	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1688.0	13.3	36.0	-26.8	9.2	Q	25.8	Verified
				DL, LL, W	1770.4	12.2	29.7	-21.9	8.2	N,M	96.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	1698.3	-10.1	-32.4	-26.8	9.2	Q	25.8	Verified
				DL, LL, W	1786.2	-19.2	-17.4	-14.9	16.6	N,M	93.6	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	2197.1	3.7	33.1	-17.3	1.7	Q	13.7	Verified
				DL, LL, W	2302.9	2.4	25.1	-13.1	1.2	N,M	99.8	Verified
			Base	DL, LL, W	2212.3	-2.8	-31.4	-17.3	1.7	Q	13.7	Verified
				DL, LL, W	2240.8	24.6	-9.9	-5.7	-13.2	N,M	97.9	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	0 m	DL, W	1526.1	-26.6	-8.5	-4.8	14.5	Q	3.6	Verified
				DL, LL, W	2240.8	24.6	-9.9	-5.7	-13.2	N,M	97.9	Verified
			Head	DL, LL, W	2562.8	2.3	41.4	-29.3	1.0	Q	18.7	Verified
				DL, LL, W	2675.4	1.9	33.7	-22.9	0.6	N,M	85.7	Verified
			Base	DL, LL, W	2577.9	-0.6	-42.2	-29.3	1.0	Q	18.7	Verified
				DL, LL, W	2696.6	21.9	-14.3	-12.1	-12.8	N,M	84.6	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, W	1720.1	-0.9	-37.5	-25.3	1.0	Q	4.2	Verified
				DL, LL, W	2696.6	21.9	-14.3	-12.1	-12.8	N,M	84.6	Verified
P23	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	676.8	-4.5	-11.7	12.0	-4.6	Q	12.9	Verified
				DL, LL, W	743.8	-7.3	-8.1	8.2	-7.8	N,M	49.8	Verified
			Base	DL, LL, W	686.9	7.0	18.4	12.0	-4.6	Q	12.9	Verified
				DL, LL, W	757.0	7.5	14.7	9.7	-4.8	N,M	53.8	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1083.5	-17.3	-8.8	6.7	-12.9	Q	14.5	Verified
				DL, LL, W	1195.8	-13.4	-7.5	5.8	-10.1	N,M	75.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	1094. 2	16.7	8.9	6.7	-12.9	Q	14.5	Verified
				DL, LL, W	1209. 1	6.4	13.1	9.9	-4.7	N,M	78.7	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1496. 6	-21.8	-9.1	6.8	-16.1	Q	17.0	Verified
				DL, LL, W	1648. 6	-16.2	-7.7	5.7	-12.0	N,M	92.4	Verified
			Base	DL, LL, W	1507. 4	20.8	8.9	6.8	-16.1	Q	17.0	Verified
				DL, LL, W	1659. 4	15.6	7.5	5.7	-12.0	N,M	95.1	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	2031. 3	-30.4	-3.5	2.3	-16.7	Q	14.0	Verified
				DL, LL, W	2126. 2	-6.1	11.6	-5.7	-3.7	N,M	95.1	Verified
			Base	DL, LL, W	2046. 4	32.1	5.2	2.3	-16.7	Q	14.0	Verified
				DL, LL, W	2133. 5	22.8	4.4	1.8	-11.7	N,M	97.6	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	2321. 1	-24.3	-2.7	1.1	-17.6	Q	14.6	Verified
				DL, LL, W	2435. 8	-9.5	-9.2	6.3	-5.6	N,M	95.6	Verified
			Base	DL, LL, W	2332. 7	25.8	0.5	1.1	-17.6	Q	14.6	Verified
				DL, LL, W	2451. 4	17.9	-3.5	-1.2	-12.7	N,M	97.7	Verified
P29	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1530. 3	23.7	0.6	0.8	-15.7	Q	3.5	Verified
				DL, LL, W	2451. 4	17.9	-3.5	-1.2	-12.7	N,M	97.7	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	704.7	-9.6	2.1	-1.7	-10.5	Q	10.7	Verified
				DL, LL, W	759.9	-4.1	5.3	-5.3	-4.5	N,M	50.1	Verified
			Base	DL, LL, W	714.8	16.6	-2.1	-1.7	-10.5	Q	10.7	Verified
				DL, LL, W	765.9	12.4	-2.9	-2.2	-7.8	N,M	53.3	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1142.6	-20.4	4.6	-3.3	-15.1	Q	15.5	Verified
				DL, LL, W	1223.6	-5.9	13.8	-10.0	-4.6	N,M	79.7	Verified
			Base	DL, LL, W	1153.3	19.7	-4.2	-3.3	-15.1	Q	15.5	Verified
				DL, LL, W	1231.1	14.0	-5.6	-4.5	-10.6	N,M	80.1	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1578.4	-25.5	2.1	-1.1	-19.0	Q	18.6	Verified
				DL, LL, W	1683.0	-6.5	14.1	-9.8	-5.0	N,M	95.7	Verified
			Base	DL, LL, W	1589.1	24.9	-0.7	-1.1	-19.0	Q	18.6	Verified
				DL, LL, W	1692.5	17.0	-2.1	-2.2	-13.0	N,M	96.9	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	2020.0	-34.2	3.9	-2.4	-18.8	Q	15.7	Verified
				DL, LL, W	2153.9	-6.1	20.6	-11.4	-3.7	N,M	97.6	Verified
			Base	DL, LL, W	2035.2	36.0	-5.1	-2.4	-18.8	Q	15.7	Verified
				DL, LL, W	2081.0	34.2	-5.3	-2.5	-17.9	N,M	99.1	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	Head	DL, LL, W	2358.3	-27.5	10.2	-5.9	-19.5	Q	16.0	Verified
				DL, LL, W	2543.2	-9.0	21.3	-14.5	-5.1	N,M	97.6	Verified
			Base	DL, LL, W	2369.8	28.0	-6.6	-5.9	-19.5	Q	16.0	Verified
				DL, LL, W	2554.9	19.0	-7.9	-6.9	-13.5	N,M	97.5	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1806.3	26.8	-4.5	-4.1	-18.4	Q	4.0	Verified
				DL, LL, W	2554.9	19.0	-7.9	-6.9	-13.5	N,M	97.5	Verified
P17	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	894.9	-2.3	-8.4	8.8	-1.9	Q	9.0	Verified
				DL, LL, W	959.8	-3.7	-4.0	4.1	-3.3	N,M	60.8	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	905.1	2.4	13.6	8.8	-1.9	Q	9.0	Verified
				DL, LL, W	972.7	0.1	11.0	7.1	-0.4	N,M	64.3	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1323.7	19.2	-4.8	3.6	13.7	Q	14.2	Verified
				DL, LL, W	1476.5	10.5	-4.1	3.1	7.3	N,M	90.8	Verified
			Base	DL, LL, W	1334.5	-17.0	4.8	3.6	13.7	Q	14.2	Verified
				DL, LL, W	1483.5	-1.9	8.7	6.7	1.8	N,M	90.5	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	1773.4	20.5	-4.5	3.3	14.9	Q	14.5	Verified
				DL, LL, W	1984.6	10.6	-3.6	2.6	7.7	N,M	96.9	Verified
			Base	DL, LL, W	1784.1	-19.1	4.3	3.3	14.9	Q	14.5	Verified
				DL, LL, W	1991.9	-0.8	9.5	7.5	0.7	N,M	96.9	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	2303.4	-30.2	3.6	-0.7	-17.2	Q	13.5	Verified
				DL, LL, W	2479.8	-5.0	12.1	-5.2	-3.8	N,M	95.5	Verified
			Base	DL, LL, W	2318.6	34.2	1.0	-0.7	-17.2	Q	13.5	Verified
				DL, LL, W	2491.5	22.9	2.2	-0.1	-11.2	N,M	97.7	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	0 m	DL, LL, W	1759.7	32.2	-0.1	-1.0	-16.4	Q	4.0	Verified
				DL, LL, W	2491.5	22.9	2.2	-0.1	-11.2	N,M	97.7	Verified
			Head	DL, LL, W	2875.0	-48.7	-6.8	1.2	-34.4	Q	21.3	Verified
				DL, LL, W	3121.7	-20.7	-22.6	14.5	-11.8	N,M	88.9	Verified
			Base	DL, LL, W	2890.1	49.3	-3.4	1.2	-34.4	Q	21.3	Verified
				DL, LL, W	3124.6	34.2	-1.4	2.4	-24.6	N,M	90.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	2197. 0	46.1	-3.9	0.0	-31.5	Q	5.1	Verified
				DL, LL, W	3124. 6	34.2	-1.4	2.4	-24.6	N,M	90.4	Verified
P11	04. Floor 4 +12.89m (9.94 - 12.89 m)	40x40	Head	DL, LL, W	1128. 8	1.5	-19.1	21.5	1.0	Q	18.2	Verified
				DL, LL, W	1180. 3	5.5	-14.2	16.6	5.0	N,M	52.2	Verified
			Base	DL, LL, W	1142. 1	-1.1	34.6	21.5	1.0	Q	18.2	Verified
				DL, LL, W	1189. 6	-0.4	22.1	13.1	0.6	N,M	55.9	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	40x40	Head	DL, LL, W	1783. 3	2.3	-38.5	28.5	1.1	Q	24.1	Verified
				DL, LL, W	1862. 4	13.4	-26.3	19.9	9.0	N,M	80.4	Verified
			Base	DL, LL, W	1797. 3	-0.5	36.9	28.5	1.1	Q	24.1	Verified
				DL, LL, W	1872. 7	0.6	32.6	25.0	0.2	N,M	84.6	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	40x40	Head	DL, LL, W	2420. 6	-0.9	-45.9	35.4	-1.3	Q	27.2	Verified
				DL, LL, W	2517. 4	-19.9	-25.2	20.9	-14.9	N,M	95.6	Verified
			Base	DL, LL, W	2434. 6	2.5	47.9	35.4	-1.3	Q	27.2	Verified
				DL, LL, W	2537. 4	3.8	42.3	30.8	-2.3	N,M	99.8	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	40x40	Head	DL, LL, W	2842. 3	46.3	-15.6	7.3	25.9	Q	16.8	Verified
				DL, LL, W	3192. 4	25.6	-15.1	6.6	15.0	N,M	97.0	Verified
			Base	DL, LL, W	2862. 1	-50.6	11.7	7.3	25.9	Q	16.8	Verified
				DL, LL, W	3204. 0	-7.0	22.6	13.9	2.4	N,M	96.9	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	Head	DL, LL, W	3518. 3	43.2	-0.7	0.2	33.3	Q	21.0	Verified
				DL, LL, W	3941. 5	29.6	2.5	-2.2	21.7	N,M	97.8	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	3532.6	-46.7	-0.2	0.2	33.3	Q	21.0	Verified
				DL, LL, W	3953.3	-22.1	-8.4	-5.1	17.2	N,M	97.0	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	2649.8	-46.1	1.3	1.0	32.4	Q	5.6	Verified
				DL, LL, W	3953.3	-22.1	-8.4	-5.1	17.2	N,M	97.0	Verified
P16	06. Roof of Staircase+20.48m (15.84 - 20.48 m)	35x35	Head	DL, LL, W	84.6	14.5	-5.2	2.0	8.7	N,M	17.9	Verified
			Base	DL, LL, W	101.8	-22.3	3.4	2.0	8.7	Q	15.1	Verified
				DL, LL, W	96.7	-22.5	3.3	1.9	8.6	N,M	33.0	Verified
	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	551.5	6.0	-22.8	17.3	2.8	Q	17.6	Verified
				DL, LL, W	552.0	13.2	-18.4	14.1	8.3	N,M	45.4	Verified
			Base	DL, LL, W	562.2	-1.5	23.0	17.3	2.8	Q	17.6	Verified
				DL, LL, W	562.8	-8.7	18.8	14.1	8.3	N,M	44.0	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	1100.4	1.1	-25.0	18.3	1.0	Q	18.4	Verified
				DL, LL, W	1231.9	7.4	-15.7	11.5	5.6	N,M	77.3	Verified
			Base	DL, LL, W	1110.9	-1.4	22.5	18.3	1.0	Q	18.4	Verified
				DL, LL, W	1241.8	-1.2	18.9	15.4	0.7	N,M	82.1	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1738.8	18.5	-7.5	5.5	13.6	Q	13.3	Verified
				DL, LL, W	1816.5	12.2	-6.8	4.9	9.0	N,M	94.2	Verified
			Base	DL, LL, W	1749.6	-17.5	6.9	5.5	13.6	Q	13.3	Verified
				DL, LL, W	1826.7	-3.8	12.0	9.4	3.0	N,M	94.5	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	2305.0	20.7	-5.2	3.9	14.3	Q	12.3	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
				DL, LL, W	2408. 0	13.1	-4.5	3.3	8.9	N,M	98.2	Verified
			Base	DL, LL, W	2315. 7	-17.2	5.1	3.9	14.3	Q	12.3	Verified
				DL, LL, W	2419. 4	-2.0	11.5	9.1	2.0	N,M	98.3	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	40x40	Head	DL, LL, W	2872. 4	45.2	-4.0	3.9	25.4	Q	16.4	Verified
				DL, LL, W	2895. 8	44.4	-3.9	3.8	25.1	N,M	99.1	Verified
			Base	DL, LL, W	2892. 2	-49.8	10.6	3.9	25.4	Q	16.4	Verified
				DL, LL, W	3020. 5	-12.5	26.8	12.6	5.1	N,M	99.2	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	Head	DL, LL, W	3120. 6	39.6	-13.6	6.5	28.2	Q	17.9	Verified
				DL, LL, W	3556. 0	30.9	-11.1	5.0	20.5	N,M	99.7	Verified
			Base	DL, LL, W	3135. 7	-40.9	5.0	6.5	28.2	Q	17.9	Verified
				DL, LL, W	3579. 1	-8.5	17.6	13.8	9.4	N,M	98.8	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	3438. 4	-40.7	4.0	5.6	28.2	Q	4.6	Verified
				DL, LL, W	3579. 1	-8.5	17.6	13.8	9.4	N,M	98.8	Verified
P10	06. Roof of Staircase+20.48m (15.84 - 20.48 m)	35x35	Head	DL, LL, W	235.3	18.3	-5.9	3.8	11.0	N,M	38.0	Verified
			Base	DL, LL, W	252.5	-28.4	10.4	3.8	11.0	N,M	56.9	Verified
	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	774.0	10.4	-37.9	28.5	7.2	Q	29.5	Verified
				DL, LL, W	778.9	19.6	-32.9	24.6	14.5	N,M	66.8	Verified
			Base	DL, LL, W	784.1	-7.4	33.3	28.5	7.2	Q	29.5	Verified
				DL, LL, W	789.0	-16.6	28.5	24.6	14.5	N,M	63.3	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	1521. 2	10.7	-32.4	26.6	9.1	Q	27.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	1637.5	12.6	-20.4	17.6	10.4	N,M	92.0	Verified
			Base	DL, LL, W	1531.4	-12.0	34.1	26.6	9.1	Q	27.4	Verified
				DL, LL, W	1646.2	-6.3	29.1	22.2	4.4	N,M	97.1	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	2234.6	30.6	-23.0	17.7	22.8	Q	23.8	Verified
				DL, LL, W	2409.6	18.9	-21.6	16.7	14.0	N,M	98.0	Verified
			Base	DL, LL, W	2245.0	-27.6	22.1	17.7	22.8	Q	23.8	Verified
				DL, LL, W	2419.6	-8.0	27.0	21.7	6.8	N,M	99.9	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	40x40	Head	DL, LL, W	2962.0	20.7	-59.7	47.3	16.1	Q	31.9	Verified
				DL, LL, W	3195.0	29.1	-36.4	30.6	21.5	N,M	96.8	Verified
			Base	DL, LL, W	2975.5	-20.5	60.9	47.3	16.1	Q	31.9	Verified
				DL, LL, W	3210.0	-12.4	52.3	39.9	9.7	N,M	99.8	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	45x45	Head	DL, LL, W	3744.2	82.8	-51.2	30.9	44.9	Q	27.7	Verified
				DL, LL, W	3919.8	75.7	-50.2	30.9	41.3	N,M	95.8	Verified
			Base	DL, LL, W	3768.6	-80.8	61.2	30.9	44.9	Q	27.7	Verified
				DL, LL, W	4016.8	-9.3	80.0	41.4	5.5	N,M	97.8	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	45x45	Head	DL, LL, W	4519.8	52.8	-69.5	39.0	43.6	Q	29.7	Verified
				DL, LL, W	4936.9	32.7	-67.4	37.5	26.2	N,M	91.2	Verified
			Base	DL, LL, W	4537.9	-64.9	35.9	39.0	43.6	Q	29.7	Verified
				DL, LL, W	4948.4	-6.5	53.2	47.9	7.5	N,M	92.6	Verified
	-01. Undergroud garage -3.15m	45x45	Column start	DL, LL, W	3366.2	-62.8	27.6	29.6	41.0	Q	7.2	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
				DL, LL, W	4948.4	-6.5	53.2	47.9	7.5	N,M	92.6	Verified
P15	06. Roof of Staircase+20.48m (17.44 - 20.48 m)	35x35	Head	DL, LL, W	70.0	-14.4	-3.7	1.6	-11.1	Q	20.4	Verified
				DL, LL, W	70.5	-14.5	-3.8	1.7	-10.9	N,M	19.9	Verified
			Base	DL, LL, W	80.7	14.9	0.6	1.6	-11.1	Q	19.9	Verified
				DL, LL, W	60.8	14.9	1.1	1.5	-10.3	N,M	22.7	Verified
	05. Utility Roof +15.84m (12.89 - 17.44 m)	35x35	Head	DL, LL, W	625.3	-32.3	-17.4	13.7	-24.0	Q	27.7	Verified
				DL, LL, W	783.0	-18.4	-26.5	19.8	-14.5	N,M	64.4	Verified
			Base	DL, LL, W	636.1	31.2	18.9	13.7	-24.0	Q	27.7	Verified
				DL, LL, W	793.7	19.9	26.0	19.8	-14.5	N,M	65.5	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	1249.1	-10.7	-26.3	19.6	-7.1	Q	20.9	Verified
				DL, LL, W	1314.7	-16.6	-18.5	14.0	-11.3	N,M	84.5	Verified
			Base	DL, LL, W	1259.6	7.8	24.7	19.6	-7.1	Q	20.9	Verified
				DL, LL, W	1329.5	7.3	22.1	17.5	-6.8	N,M	87.5	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1685.3	-1.7	-22.2	16.4	-1.6	Q	15.0	Verified
				DL, LL, W	1881.3	-9.8	-12.4	9.1	-7.6	N,M	96.1	Verified
			Base	DL, LL, W	1696.0	2.6	21.1	16.4	-1.6	Q	15.0	Verified
				DL, LL, W	1895.6	3.4	16.9	13.1	-2.2	N,M	98.3	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	2191.2	-3.0	-23.6	17.3	-2.0	Q	14.4	Verified
				DL, LL, W	2451.6	-12.7	-10.8	8.4	-8.7	N,M	95.0	Verified
			Base	DL, LL, W	2201.9	2.2	22.2	17.3	-2.0	Q	14.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	2465. 2	2.7	17.2	13.2	-2.3	N,M	96.5	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	40x40	Head	DL, LL, W	2793. 5	-46.0	-8.1	5.1	-25.9	Q	17.4	Verified
				DL, LL, W	3020. 9	14.5	-5.3	3.6	5.9	N,M	95.6	Verified
			Base	DL, LL, W	2813. 4	51.0	10.8	5.1	-25.9	Q	17.4	Verified
				DL, LL, W	3043. 1	35.9	10.4	4.8	-17.6	N,M	98.8	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	Head	DL, LL, W	3485. 6	-40.2	-8.0	3.4	-29.8	Q	18.9	Verified
				DL, LL, W	3649. 6	-20.2	-16.2	10.8	-11.9	N,M	91.9	Verified
			Base	DL, LL, W	3500. 7	44.7	1.7	3.4	-29.8	Q	18.9	Verified
				DL, LL, W	3659. 3	32.0	1.1	3.0	-22.5	N,M	93.5	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	2326. 7	41.4	1.9	3.0	-26.9	Q	4.9	Verified
				DL, LL, W	3659. 3	32.0	1.1	3.0	-22.5	N,M	93.5	Verified
P9	06. Roof of Staircase+20.48m (17.44 - 20.48 m)	35x35	Head	DL, LL, W	247.2	-27.7	-2.0	-2.2	-23.1	Q	29.6	Verified
			Base	DL, LL, W	257.9	33.3	-8.0	-2.2	-23.1	N,M	33.8	Verified
	05. Utility Roof +15.84m (12.89 - 17.44 m)	35x35	Head	DL, LL, W	621.9	-28.8	3.1	-0.1	-20.1	Q	20.2	Verified
				DL, LL, W	924.5	9.9	0.3	1.9	6.6	N,M	61.8	Verified
			Base	DL, LL, W	632.3	22.5	2.9	-0.1	-20.1	Q	20.2	Verified
				DL, LL, W	943.0	-5.0	9.5	5.6	4.4	N,M	62.6	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	1354. 0	6.7	-25.4	19.6	6.5	Q	20.7	Verified
				DL, LL, W	1468. 5	14.1	-17.7	13.8	12.3	N,M	90.1	Verified
			Base	DL, LL, W	1364. 1	-9.6	23.5	19.6	6.5	Q	20.7	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	1475.5	-9.8	21.5	17.7	6.3	N,M	92.8	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1907.8	28.8	-10.6	8.7	21.9	Q	21.3	Verified
				DL, LL, W	2028.6	25.0	-11.3	9.2	19.0	N,M	98.9	Verified
			Base	DL, LL, W	1918.1	-27.1	11.7	8.7	21.9	Q	21.3	Verified
				DL, LL, W	2034.2	-13.8	18.4	14.2	11.3	N,M	97.5	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	2446.9	31.7	-12.4	10.0	24.0	Q	20.5	Verified
				DL, LL, W	2578.5	26.3	-13.1	10.6	20.4	N,M	97.4	Verified
			Base	DL, LL, W	2457.3	-29.6	13.2	10.0	24.0	Q	20.5	Verified
				DL, LL, W	2581.9	-16.2	20.3	16.3	11.9	N,M	96.4	Verified
	01. Floor 1 +4.04m (0.25 - 4.04 m)	40x40	Head	DL, LL, W	2850.4	-0.6	-59.5	41.7	-5.0	Q	26.1	Verified
				DL, LL, W	3150.9	37.8	-28.6	23.6	17.6	N,M	95.5	Verified
			Base	DL, LL, W	2868.3	16.1	81.9	41.7	-5.0	Q	26.1	Verified
				DL, LL, W	3166.0	-13.9	53.2	24.7	12.9	N,M	97.8	Verified
	00. Ground Floor +0.00m (-3.15 - 0.25 m)	40x40	Head	DL, LL, W	3414.4	-51.3	-82.1	47.2	-38.3	Q	38.3	Verified
				DL, LL, W	3727.0	-39.7	-76.0	43.6	-28.6	N,M	95.4	Verified
			Base	DL, LL, W	3429.0	54.2	47.9	47.2	-38.3	Q	38.3	Verified
				DL, LL, W	3737.4	20.1	52.9	47.5	-17.4	N,M	96.8	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	3429.0	54.2	47.9	47.2	-38.3	Q	8.9	Verified
				DL, LL, W	3737.4	20.1	52.9	47.5	-17.4	N,M	96.8	Verified
P14	05. Utility Roof +15.84m (12.89 - 17.44 m)	35x35	Head	DL, LL, W	621.3	-0.1	-10.0	11.1	4.9	Q	12.1	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
				DL, LL, W	639.8	-4.2	-9.1	10.1	0.4	N,M	43.2	Verified
			Base	DL, LL, W	632.0	-13.1	19.3	11.1	4.9	Q	12.1	Verified
				DL, LL, W	626.6	-16.1	17.0	9.7	6.7	N,M	50.0	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	1202.4	36.8	-15.6	11.4	24.1	Q	26.8	Verified
				DL, LL, W	1321.1	24.6	-19.0	13.9	15.1	N,M	88.2	Verified
			Base	DL, LL, W	1213.0	-25.9	14.1	11.4	24.1	Q	26.8	Verified
				DL, LL, W	1331.8	-14.2	18.1	14.7	14.8	N,M	85.9	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	1726.6	21.0	-3.9	2.8	16.0	Q	14.7	Verified
				DL, LL, W	1877.3	13.1	-4.7	3.3	10.1	N,M	96.8	Verified
			Base	DL, LL, W	1737.4	-21.3	3.5	2.8	16.0	Q	14.7	Verified
				DL, LL, W	1894.1	-5.5	12.3	9.7	3.7	N,M	97.0	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	35x35	Head	DL, LL, W	2251.7	26.6	-1.4	1.2	18.9	Q	15.7	Verified
				DL, LL, W	2439.3	17.7	-2.2	1.8	12.7	N,M	99.4	Verified
			Base	DL, LL, W	2262.4	-23.6	1.9	1.2	18.9	Q	15.7	Verified
				DL, LL, W	2456.7	-6.4	12.2	9.6	5.0	N,M	99.0	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	40x40	Head	DL, LL, W	2777.1	53.4	7.7	-3.6	29.8	Q	19.5	Verified
				DL, LL, W	3001.9	36.0	5.9	-2.5	20.7	N,M	99.5	Verified
			Base	DL, LL, W	2796.9	-58.1	-5.7	-3.6	29.8	Q	19.5	Verified
				DL, LL, W	3032.1	-17.4	19.3	9.8	7.7	N,M	97.8	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	40x40	Head	DL, LL, W	3235.9	47.4	6.9	-6.0	32.4	Q	20.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	3519.7	37.1	5.0	-4.6	23.8	N,M	99.6	Verified
				DL, LL, W	3251.0	-45.0	-10.2	-6.0	32.4	Q	20.4	Verified
				DL, LL, W	3550.7	-10.0	11.6	7.2	11.6	N,M	97.5	Verified
	-01. Undergroud garage -3.15m	40x40	Column start	DL, LL, W	3251.0	-45.0	-10.2	-6.0	32.4	Q	4.7	Verified
				DL, LL, W	3550.7	-10.0	11.6	7.2	11.6	N,M	97.5	Verified
P8	05. Utility Roof +15.84m (12.89 - 17.44 m)	35x35	Head	DL, W	430.4	12.5	-2.2	4.6	14.8	Q	15.6	Verified
				DL, LL, W	817.5	-2.6	-5.0	7.7	0.7	N,M	54.1	Verified
			Base	DL, W	441.1	-26.8	9.8	4.6	14.8	Q	15.6	Verified
				DL, LL, W	829.6	-10.8	16.0	8.2	4.1	N,M	60.3	Verified
	04. Floor 4 +12.89m (9.94 - 12.89 m)	35x35	Head	DL, LL, W	1456.9	36.0	-21.5	16.5	24.9	Q	29.1	Verified
				DL, LL, W	1612.6	28.3	-23.6	18.2	19.0	N,M	96.5	Verified
			Base	DL, LL, W	1467.4	-28.6	21.5	16.5	24.9	Q	29.1	Verified
				DL, LL, W	1625.6	-13.7	30.0	23.4	12.9	N,M	97.5	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	35x35	Head	DL, LL, W	2156.8	9.3	-29.5	21.8	7.2	Q	19.1	Verified
				DL, LL, W	2353.8	17.7	-18.3	13.8	13.2	N,M	97.3	Verified
			Base	DL, LL, W	2167.5	-9.9	28.3	21.8	7.2	Q	19.1	Verified
				DL, LL, W	2368.5	-8.0	25.7	19.7	5.8	N,M	99.5	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	40x40	Head	DL, LL, W	2918.5	10.9	-53.6	39.8	7.6	Q	25.9	Verified
				DL, LL, W	3113.0	31.9	-31.0	24.7	21.8	N,M	95.5	Verified
			Base	DL, LL, W	2932.6	-9.3	51.8	39.8	7.6	Q	25.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	3132.3	-11.0	46.6	35.1	9.1	N,M	97.7	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	45x45	Head	DL, LL, W	3571.2	85.1	-11.4	4.0	48.3	Q	25.2	Verified
				DL, LL, W	3876.8	59.7	-16.2	6.1	35.6	N,M	98.8	Verified
			Base	DL, LL, W	3596.3	-95.6	3.4	4.0	48.3	Q	25.2	Verified
				DL, LL, W	3909.5	-36.4	36.2	22.1	15.4	N,M	97.0	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	45x45	Head	DL, LL, W	4042.8	85.6	12.0	-10.7	61.1	Q	31.5	Verified
				DL, LL, W	4392.4	76.1	11.4	-9.7	50.2	N,M	99.6	Verified
			Base	DL, LL, W	4061.2	-82.5	-17.3	-10.7	61.1	Q	31.5	Verified
				DL, LL, W	4427.0	-33.3	-34.2	-20.2	34.3	N,M	96.7	Verified
	-01. Undergroud garage -3.15m	45x45	Column start	DL, LL, W	4410.9	-61.9	-15.1	-9.7	50.2	Q	7.8	Verified
				DL, LL, W	4427.0	-33.3	-34.2	-20.2	34.3	N,M	96.7	Verified
P13	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	334.7	-25.5	-5.9	6.3	-23.6	N,M	57.9	Verified
			Base	DL, LL, W	342.6	37.0	10.8	6.3	-23.6	N,M	83.1	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	693.3	-42.1	-13.9	10.4	-31.3	N,M	90.7	Verified
			Base	DL, LL, W	701.1	40.8	13.6	10.4	-31.3	Q	41.6	Verified
				DL, LL, W	725.3	40.3	12.9	9.9	-30.8	N,M	89.7	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	1062.7	-40.7	-13.0	9.7	-29.9	Q	36.8	Verified
				DL, LL, W	1105.0	-38.8	-12.4	9.3	-28.6	N,M	94.8	Verified
			Base	DL, LL, W	1070.6	38.4	12.8	9.7	-29.9	Q	36.8	Verified
				DL, LL, W	1112.9	36.9	12.2	9.3	-28.6	N,M	94.0	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
	01. Floor 1 +4.04m (0 - 4.04 m)	35x35	Head	DL, LL, W	1429. 7	-59.5	-15.2	8.6	-31.4	Q	29.5	Verified
				DL, LL, W	1436. 6	-59.4	-15.3	8.6	-31.4	N,M	97.6	Verified
			Base	DL, LL, W	1444. 9	58.1	16.9	8.6	-31.4	Q	29.5	Verified
				DL, LL, W	1451. 7	58.1	16.9	8.6	-31.4	N,M	98.1	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x35	0 m	DL, LL, W	1444. 9	58.1	16.9	8.6	-31.4	Q	5.9	Verified
				DL, LL, W	1451. 7	58.1	16.9	8.6	-31.4	N,M	98.1	Verified
			Head	DL, LL, W	1783. 0	-48.8	-14.6	8.8	-32.9	Q	30.8	Verified
				DL, LL, W	1843. 5	-48.0	-13.0	7.5	-30.6	N,M	94.4	Verified
			Base	DL, LL, W	1794. 2	41.6	9.8	8.8	-32.9	Q	30.8	Verified
				DL, LL, W	1854. 6	36.2	7.5	7.5	-30.6	N,M	97.2	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	1794. 2	41.6	9.8	8.8	-32.9	Q	6.3	Verified
				DL, LL, W	1854. 6	36.2	7.5	7.5	-30.6	N,M	97.2	Verified
P7	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	366.1	-23.4	-2.7	3.2	-22.7	N,M	53.2	Verified
			Base	DL, LL, W	374.0	36.9	5.7	3.2	-22.7	N,M	75.9	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	809.6	-45.4	-8.0	6.0	-33.5	Q	42.9	Verified
				DL, LL, W	838.4	-44.6	-7.1	5.3	-33.0	N,M	94.7	Verified
			Base	DL, LL, W	817.5	43.5	7.9	6.0	-33.5	Q	42.9	Verified
				DL, LL, W	846.3	42.9	7.1	5.3	-33.0	N,M	93.6	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	1270. 0	-45.7	-10.2	8.7	-34.7	Q	41.2	Verified
				DL, LL, W	1318. 6	-43.7	-9.1	7.9	-33.3	N,M	97.7	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	1277.9	46.4	12.7	8.7	-34.7	Q	41.2	Verified
				DL, LL, W	1326.5	44.5	11.7	7.9	-33.3	N,M	99.5	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1744.1	-49.7	-10.8	4.5	-26.8	N,M	99.4	Verified
			Base	DL, LL, W	1757.1	50.5	6.1	4.5	-26.8	N,M	98.6	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1350.8	43.3	6.3	4.3	-23.0	Q	6.5	Verified
				DL, LL, W	1757.1	50.5	6.1	4.5	-26.8	N,M	98.6	Verified
			Head	DL, LL, W	2105.7	-46.3	3.4	-1.5	-30.0	Q	26.1	Verified
				DL, LL, W	2147.3	-38.4	16.3	-12.0	-22.1	N,M	98.1	Verified
			Base	DL, LL, W	2115.3	36.2	-0.8	-1.5	-30.0	Q	26.1	Verified
				DL, LL, W	2156.9	22.4	-16.7	-12.0	-22.1	N,M	98.6	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	2115.3	36.2	-0.8	-1.5	-30.0	Q	7.1	Verified
				DL, LL, W	2156.9	22.4	-16.7	-12.0	-22.1	N,M	99.8	Verified
P19	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	312.8	-23.2	5.4	-6.1	-21.4	N,M	52.9	Verified
			Base	DL, LL, W	320.7	33.3	-10.7	-6.1	-21.4	N,M	76.2	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	687.7	-37.5	17.0	-12.6	-27.9	Q	38.6	Verified
				DL, LL, W	711.6	-36.7	16.9	-12.5	-27.4	N,M	89.0	Verified
			Base	DL, LL, W	695.6	36.6	-16.3	-12.6	-27.9	Q	38.6	Verified
				DL, LL, W	719.5	36.0	-16.3	-12.5	-27.4	N,M	88.2	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	1076.2	-38.1	16.9	-12.6	-28.5	Q	36.4	Verified
				DL, LL, W	1111.2	-36.5	16.5	-12.3	-27.4	N,M	95.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	1084. 1	37.4	-16.3	-12.6	-28.5	Q	36.4	Verified
				DL, LL, W	1119. 1	36.0	-16.0	-12.3	-27.4	N,M	95.7	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1437. 3	-25.6	38.8	-20.4	-14.0	Q	23.7	Verified
				DL, LL, W	1463. 9	-39.5	23.6	-12.2	-21.3	N,M	98.9	Verified
			Base	DL, LL, W	1450. 3	26.9	-37.6	-20.4	-14.0	Q	23.7	Verified
				DL, LL, W	1476. 9	40.3	-22.1	-12.2	-21.3	N,M	99.1	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1105. 2	21.1	-33.6	-18.2	-11.0	Q	5.8	Verified
				DL, LL, W	1476. 9	40.3	-22.1	-12.2	-21.3	N,M	99.1	Verified
			Head	DL, LL, W	1756. 1	-28.6	32.6	-22.8	-16.7	Q	26.9	Verified
				DL, LL, W	1830. 6	-31.0	27.4	-18.4	-18.1	N,M	97.6	Verified
			Base	DL, LL, W	1765. 6	17.2	-29.9	-22.8	-16.7	Q	26.9	Verified
				DL, LL, W	1840. 1	18.6	-23.1	-18.4	-18.1	N,M	96.7	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1765. 6	17.2	-29.9	-22.8	-16.7	Q	6.4	Verified
				DL, LL, W	1840. 1	18.6	-23.1	-18.4	-18.1	N,M	97.5	Verified
P25	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	335.2	-25.1	-7.6	8.5	-23.4	Q	33.8	Verified
				DL, LL, W	334.9	-24.8	-8.3	9.2	-23.1	N,M	59.2	Verified
			Base	DL, LL, W	343.1	37.0	14.8	8.5	-23.4	Q	33.8	Verified
				DL, LL, W	342.8	36.3	16.1	9.2	-23.1	N,M	89.1	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	711.1	-40.9	-21.9	16.4	-30.5	Q	43.7	Verified
				DL, LL, W	735.9	-40.6	-21.3	15.9	-30.3	N,M	97.0	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	719.0	39.9	21.6	16.4	-30.5	Q	43.7	Verified
				DL, LL, W	743.8	39.7	21.0	15.9	-30.3	N,M	96.2	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	1100. 0	-41.1	-21.4	16.2	-30.8	Q	41.7	Verified
				DL, LL, W	1136. 5	-39.9	-20.6	15.6	-30.0	N,M	98.0	Verified
			Base	DL, LL, W	1107. 9	40.5	21.6	16.2	-30.8	Q	41.7	Verified
				DL, LL, W	1144. 4	39.5	20.8	15.6	-30.0	N,M	98.2	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1461. 0	-27.4	-36.7	19.6	-15.0	Q	23.8	Verified
				DL, LL, W	1487. 2	-41.5	-21.8	11.6	-22.4	N,M	98.9	Verified
			Base	DL, LL, W	1474. 0	28.9	36.7	19.6	-15.0	Q	23.8	Verified
				DL, LL, W	1500. 2	42.4	21.6	11.6	-22.4	N,M	99.6	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1122. 3	22.4	33.0	17.6	-11.6	Q	6.0	Verified
				DL, LL, W	1500. 2	42.4	21.6	11.6	-22.4	N,M	99.6	Verified
			Head	DL, LL, W	1810. 7	-39.6	-17.8	10.6	-25.2	Q	25.2	Verified
				DL, LL, W	1850. 3	-34.3	-22.4	14.2	-19.8	N,M	96.1	Verified
			Base	DL, LL, W	1820. 3	29.8	11.4	10.6	-25.2	Q	25.2	Verified
				DL, LL, W	1859. 9	20.1	16.7	14.2	-19.8	N,M	95.1	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1820. 3	29.8	11.4	10.6	-25.2	Q	6.0	Verified
				DL, LL, W	1859. 9	20.1	16.7	14.2	-19.8	N,M	95.1	Verified
P31	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	313.3	-25.0	5.2	-5.4	-23.5	Q	32.8	Verified
				DL, LL, W	328.6	-24.9	5.3	-5.5	-23.5	N,M	56.0	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	321.2	37.4	-9.2	-5.4	-23.5	N,M	82.1	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	699.9	-43.3	13.8	-10.3	-32.1	Q	42.5	Verified
				DL, LL, W	729.2	-42.3	13.8	-10.3	-31.5	N,M	92.4	Verified
			Base	DL, LL, W	707.8	41.9	-13.4	-10.3	-32.1	Q	42.5	Verified
				DL, LL, W	737.1	41.2	-13.4	-10.3	-31.5	N,M	91.3	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	1090.5	-43.9	14.2	-10.5	-32.8	Q	40.4	Verified
				DL, LL, W	1129.0	-41.9	13.9	-10.3	-31.5	N,M	98.3	Verified
			Base	DL, LL, W	1098.4	43.2	-13.7	-10.5	-32.8	Q	40.4	Verified
				DL, LL, W	1136.9	41.5	-13.4	-10.3	-31.5	N,M	98.2	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1451.7	-31.5	38.5	-20.9	-17.2	Q	25.2	Verified
				DL, LL, W	1475.8	-45.9	23.0	-12.5	-24.7	N,M	98.2	Verified
			Base	DL, LL, W	1464.7	32.8	-39.7	-20.9	-17.2	Q	25.2	Verified
				DL, LL, W	1488.8	46.6	-23.8	-12.5	-24.7	N,M	99.2	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1459.2	32.7	-39.7	-20.9	-17.1	Q	6.6	Verified
				DL, LL, W	1488.8	46.6	-23.8	-12.5	-24.7	N,M	99.2	Verified
			Head	DL, LL, W	1770.3	-34.0	37.8	-25.7	-20.1	Q	30.4	Verified
				DL, LL, W	1847.7	-36.3	32.6	-21.4	-21.2	N,M	96.9	Verified
			Base	DL, LL, W	1779.8	21.1	-33.0	-25.7	-20.1	Q	30.4	Verified
				DL, LL, W	1857.2	22.1	-26.2	-21.4	-21.2	N,M	95.4	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1779.8	21.1	-33.0	-25.7	-20.1	Q	7.3	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	1857.2	22.1	-26.2	-21.4	-21.2	N,M	95.8	Verified
P37	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	177.2	-19.7	-15.1	14.6	-19.5	Q	42.2	Verified
				DL, LL, W	185.2	-19.4	-16.0	15.5	-19.2	N,M	42.6	Verified
			Base	DL, LL, W	185.1	32.0	23.6	14.6	-19.5	Q	41.4	Verified
				DL, LL, W	193.1	31.6	25.1	15.5	-19.2	N,M	81.3	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	481.6	-39.8	-26.3	19.7	-29.5	Q	44.7	Verified
				DL, LL, W	498.3	-38.4	-28.1	21.0	-28.5	N,M	90.9	Verified
			Base	DL, LL, W	489.5	38.4	25.8	19.7	-29.5	Q	44.7	Verified
				DL, LL, W	506.2	37.2	27.6	21.0	-28.5	N,M	89.4	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	785.9	-40.8	-23.7	18.0	-30.5	Q	41.5	Verified
				DL, LL, W	810.2	-38.4	-25.6	19.4	-28.9	N,M	89.6	Verified
			Base	DL, LL, W	793.8	40.0	24.1	18.0	-30.5	Q	41.5	Verified
				DL, LL, W	818.1	38.1	25.8	19.4	-28.9	N,M	89.9	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1084.8	-25.8	-42.4	23.6	-14.4	Q	28.2	Verified
				DL, LL, W	1090.5	-45.8	-22.6	13.0	-25.1	N,M	96.5	Verified
			Base	DL, LL, W	1097.8	28.1	46.1	23.6	-14.4	Q	28.2	Verified
				DL, LL, W	1103.5	48.0	26.2	13.0	-25.1	N,M	99.4	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1103.5	48.0	26.2	13.0	-25.1	N,M	99.4	Verified
			Head	DL, LL, W	1343.1	-44.5	-30.3	16.0	-28.9	Q	33.0	Verified
				DL, LL, W	1380.1	-42.5	-33.1	17.9	-26.5	N,M	94.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	1352.7	35.0	13.7	16.0	-28.9	Q	33.0	Verified
				DL, LL, W	1385.7	20.0	26.9	24.4	-20.1	N,M	85.9	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1352.7	35.0	13.7	16.0	-28.9	Q	7.2	Verified
				DL, LL, W	1385.7	20.0	26.9	24.4	-20.1	N,M	85.9	Verified
P12	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	303.2	15.2	-2.0	2.4	14.4	Q	19.8	Verified
				DL, LL, W	320.1	14.8	-1.7	2.1	14.0	N,M	39.6	Verified
			Base	DL, LL, W	311.1	-23.0	4.3	2.4	14.4	N,M	51.3	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	715.3	31.0	-4.9	3.6	22.9	N,M	84.4	Verified
			Base	DL, LL, W	723.2	-29.7	4.7	3.6	22.9	N,M	83.5	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	1132.9	32.1	-6.8	5.9	24.0	Q	28.9	Verified
				DL, LL, W	1164.1	23.1	-0.3	1.2	17.4	N,M	94.0	Verified
			Base	DL, LL, W	1140.8	-31.5	8.9	5.9	24.0	Q	28.9	Verified
				DL, LL, W	1145.4	-31.3	8.8	5.9	23.9	N,M	90.3	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1567.6	45.4	-7.2	2.8	27.0	N,M	95.9	Verified
			Base	DL, LL, W	1580.6	-55.7	3.3	2.8	27.0	N,M	99.2	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	Head	DL, LL, W	1980.0	66.5	5.2	-2.8	42.1	Q	36.7	Verified
				DL, LL, W	2037.9	63.0	6.5	-3.9	38.7	N,M	98.8	Verified
			Base	DL, LL, W	1989.4	-47.3	-2.2	-2.8	42.1	Q	36.7	Verified
				DL, LL, W	2011.5	-30.5	-17.8	-13.1	31.3	N,M	93.8	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1989.4	-47.3	-2.2	-2.8	42.1	Q	9.9	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	2011.5	-30.5	-17.8	-13.1	31.3	N,M	94.8	Verified
P18	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	272.8	16.0	-5.4	5.9	14.5	Q	22.4	Verified
				DL, LL, W	287.4	15.6	-5.5	6.0	14.1	N,M	41.4	Verified
			Base	DL, LL, W	280.7	-22.5	10.3	5.9	14.5	N,M	55.7	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	604.3	28.0	-12.7	9.5	20.7	Q	30.9	Verified
				DL, LL, W	608.6	27.7	-13.0	9.7	20.5	N,M	83.2	Verified
			Base	DL, LL, W	612.2	-26.8	12.5	9.5	20.7	Q	30.9	Verified
				DL, LL, W	616.5	-26.6	12.7	9.7	20.5	N,M	82.1	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	936.6	28.2	-12.3	9.3	20.8	Q	30.9	Verified
				DL, LL, W	942.6	28.0	-12.5	9.4	20.6	N,M	97.4	Verified
			Base	DL, LL, W	944.5	-26.9	12.3	9.3	20.8	Q	30.9	Verified
				DL, LL, W	950.5	-26.7	12.4	9.4	20.6	N,M	96.8	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1271.2	33.3	-12.6	6.9	18.7	Q	20.0	Verified
				DL, LL, W	1295.9	19.8	-19.2	10.5	11.8	N,M	97.2	Verified
			Base	DL, LL, W	1284.2	-36.8	13.4	6.9	18.7	N,M	99.9	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1257.9	-23.1	27.9	14.6	11.2	Q	4.2	Verified
				DL, LL, W	1284.2	-36.8	13.4	6.9	18.7	N,M	99.9	Verified
			Head	DL, LL, W	1614.9	36.7	-10.9	6.5	23.7	Q	24.4	Verified
				DL, LL, W	1642.4	30.1	-15.4	10.1	17.1	N,M	97.7	Verified
			Base	DL, LL, W	1624.5	-28.4	7.1	6.5	23.7	Q	24.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1651. 9	-16.9	12.4	10.1	17.1	N,M	97.1	Verified
				DL, LL, W	1624. 5	-28.4	7.1	6.5	23.7	Q	5.9	Verified
				DL, LL, W	1651. 9	-16.9	12.4	10.1	17.1	N,M	98.4	Verified
P24	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	249.2	14.2	3.7	-4.6	12.8	Q	20.3	Verified
				DL, LL, W	260.3	13.9	3.6	-4.4	12.5	N,M	36.1	Verified
			Base	DL, LL, W	257.1	-19.8	-8.4	-4.6	12.8	N,M	48.8	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	606.0	24.5	14.8	-10.9	18.1	N,M	81.2	Verified
			Base	DL, LL, W	613.9	-23.5	-14.2	-10.9	18.1	N,M	79.9	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	964.8	25.4	14.7	-10.9	18.9	N,M	97.8	Verified
			Base	DL, LL, W	972.7	-24.6	-14.2	-10.9	18.9	N,M	97.1	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1230. 5	13.0	36.5	-19.1	7.2	Q	21.5	Verified
				DL, LL, W	1346. 8	15.8	23.9	-12.3	8.8	N,M	98.5	Verified
			Base	DL, LL, W	1243. 5	-14.0	-34.9	-19.1	7.2	Q	21.5	Verified
				DL, LL, W	1359. 0	-17.3	-26.4	-14.6	8.9	N,M	100. 0	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1243. 5	-14.0	-34.9	-19.1	7.2	Q	4.4	Verified
				DL, LL, W	1359. 0	-17.3	-26.4	-14.6	8.9	N,M	100. 0	Verified
			Head	DL, LL, W	1475. 1	15.5	29.6	-21.1	8.7	Q	24.0	Verified
				DL, LL, W	1624. 2	19.5	23.3	-16.1	10.9	N,M	97.5	Verified
			Base	DL, LL, W	1484. 6	-8.3	-28.3	-21.1	8.7	Q	24.0	Verified
				DL, LL, W	1633. 7	-10.5	-21.0	-16.1	10.9	N,M	97.2	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1568. 8	-9.7	-27.7	-20.5	10.1	Q	4.8	Verified
				DL, LL, W	1633. 7	-10.5	-21.0	-16.1	10.9	N,M	97.6	Verified
P30	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	249.6	14.2	-6.4	7.5	13.2	Q	22.6	Verified
				DL, LL, W	261.2	14.1	-6.3	7.5	13.1	N,M	38.8	Verified
			Base	DL, LL, W	257.5	-20.7	13.6	7.5	13.2	N,M	57.3	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	610.5	26.5	-18.7	14.0	19.6	N,M	87.1	Verified
			Base	DL, LL, W	618.4	-25.4	18.3	14.0	19.6	N,M	86.0	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	972.9	26.8	-18.2	13.8	19.9	N,M	93.3	Verified
			Base	DL, LL, W	980.8	-26.0	18.3	13.8	19.9	N,M	93.1	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1308. 3	15.8	-32.4	17.2	9.1	Q	20.4	Verified
				DL, LL, W	1364. 0	17.6	-24.6	13.0	10.1	N,M	99.5	Verified
			Base	DL, LL, W	1321. 3	-18.1	31.9	17.2	9.1	Q	20.4	Verified
				DL, LL, W	1377. 0	-20.2	24.1	13.0	10.1	N,M	99.9	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1321. 3	-18.1	31.9	17.2	9.1	Q	4.2	Verified
				DL, LL, W	1377. 0	-20.2	24.1	13.0	10.1	N,M	99.9	Verified
			Head	DL, LL, W	1640. 1	30.1	-13.2	7.8	19.3	Q	20.6	Verified
				DL, LL, W	1667. 9	24.1	-17.6	11.3	13.5	N,M	97.5	Verified
			Base	DL, LL, W	1649. 6	-23.1	8.3	7.8	19.3	Q	20.6	Verified
				DL, LL, W	1670. 9	-12.7	13.7	11.4	13.2	N,M	96.8	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1663. 1	-25.6	-0.6	2.0	20.9	Q	4.8	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
				DL, LL, W	1677.5	-13.1	13.6	11.3	13.5	N,M	97.3	Verified
P36	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	236.4	15.8	0.8	-0.7	15.0	Q	22.9	Verified
				DL, LL, W	248.5	15.4	0.7	-0.6	14.6	N,M	34.7	Verified
			Base	DL, LL, W	244.3	-23.9	-1.0	-0.7	15.0	Q	22.6	Verified
				DL, LL, W	246.1	-23.9	-1.2	-0.8	15.0	N,M	47.0	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	552.6	30.9	3.4	-2.5	22.8	Q	31.1	Verified
				DL, LL, W	555.6	30.8	3.5	-2.6	22.7	N,M	75.0	Verified
			Base	DL, LL, W	560.5	-29.5	-3.3	-2.5	22.8	Q	31.1	Verified
				DL, LL, W	563.5	-29.4	-3.4	-2.6	22.7	N,M	73.9	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	870.2	31.4	4.6	-3.3	23.3	Q	32.0	Verified
				DL, LL, W	874.4	31.4	4.7	-3.4	23.3	N,M	92.3	Verified
			Base	DL, LL, W	878.1	-30.3	-4.3	-3.3	23.3	Q	32.0	Verified
				DL, LL, W	882.3	-30.3	-4.4	-3.4	23.3	N,M	91.4	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	1191.2	35.0	12.7	-7.0	19.0	N,M	96.1	Verified
			Base	DL, LL, W	1204.2	-36.0	-13.5	-7.0	19.0	N,M	97.3	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	1204.2	-36.0	-13.5	-7.0	19.0	N,M	97.3	Verified
			Head	DL, LL, W	1418.4	23.0	27.3	-19.8	13.3	Q	24.8	Verified
				DL, LL, W	1475.4	24.4	21.5	-15.1	14.0	N,M	93.4	Verified
			Base	DL, LL, W	1428.0	-13.6	-27.1	-19.8	13.3	N,M	93.4	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1428.0	-13.6	-27.1	-19.8	13.3	N,M	93.4	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
P42	04. Floor 4 +12.89m (9.94 - 12.89 m)	30x30	Head	DL, LL, W	128.6	12.2	-8.9	8.7	11.8	Q	28.4	Verified
			Base	DL, LL, W	136.5	-19.0	14.1	8.7	11.8	N,M	43.6	Verified
	03. Floor 3 +9.94m (6.99 - 9.94 m)	30x30	Head	DL, LL, W	373.2	26.1	-14.5	10.9	19.2	N,M	69.9	Verified
			Base	DL, LL, W	381.1	-24.8	14.4	10.9	19.2	N,M	68.2	Verified
	02. Floor 2 +6.99m (4.04 - 6.99 m)	30x30	Head	DL, LL, W	618.8	27.8	-12.4	9.3	20.7	N,M	83.0	Verified
			Base	DL, LL, W	626.7	-27.2	12.2	9.3	20.7	N,M	82.7	Verified
	01. Floor 1 +4.04m (0 - 4.04 m)	35x30	Head	DL, LL, W	864.9	35.1	-8.5	5.3	19.4	N,M	94.7	Verified
			Base	DL, LL, W	877.9	-37.4	11.5	5.3	19.4	N,M	98.6	Verified
	00. Ground Floor +0.00m (-3.15 - 0 m)	35x30	0 m	DL, LL, W	877.9	-37.4	11.5	5.3	19.4	N,M	98.6	Verified
			Head	DL, LL, W	1070.5	34.0	-14.9	7.1	22.5	N,M	89.0	Verified
			Base	DL, LL, W	1080.1	-27.9	4.6	7.1	22.5	Q	26.2	Verified
				DL, LL, W	1098.8	-12.2	17.6	15.3	12.9	N,M	84.1	Verified
	-01. Undergroud garage -3.15m	35x30	Column start	DL, LL, W	1080.1	-27.9	4.6	7.1	22.5	Q	4.7	Verified
				DL, LL, W	1098.8	-12.2	17.6	15.3	12.9	N,M	84.1	Verified
P43	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	80.0	4.1	29.3	-32.6	0.3	Q	54.8	Verified
			Base	DL, LL, W	90.7	3.2	-57.1	-32.6	0.3	N,M	89.0	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	90.7	3.2	-57.1	-32.6	0.3	N,M	89.0	Verified
P44	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	147.8	-2.5	-6.1	7.1	-11.9	Q	21.2	Verified
				DL, LL, W	152.8	4.9	-8.6	10.0	-3.0	N,M	11.3	Verified
			Base	DL, LL, W	158.5	29.1	12.6	7.1	-11.9	N,M	40.5	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	158.5	29.1	12.6	7.1	-11.9	N,M	40.5	Verified
P45	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	113.0	-3.5	-5.0	6.6	-10.9	Q	21.0	Verified
				DL, LL, W	114.4	-1.0	-7.1	9.3	-7.7	N,M	8.1	Verified
			Base	DL, LL, W	123.7	25.4	12.5	6.6	-10.9	N,M	39.8	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	123.7	25.4	12.5	6.6	-10.9	N,M	39.8	Verified
P46	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	105.6	-4.4	-6.8	8.3	-11.9	Q	24.3	Verified
				DL, LL, W	110.2	-2.1	-8.7	10.7	-9.1	N,M	9.2	Verified
			Base	DL, LL, W	116.4	27.2	15.2	8.3	-11.9	N,M	47.0	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	116.4	27.2	15.2	8.3	-11.9	N,M	47.0	Verified
P47	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	115.6	-3.6	-0.2	0.6	-11.2	Q	18.4	Verified
				DL, LL, W	125.8	0.7	-0.4	1.0	-6.4	N,M	6.5	Verified
			Base	DL, LL, W	126.3	26.2	1.5	0.6	-11.2	N,M	33.6	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	126.3	26.2	1.5	0.6	-11.2	N,M	33.6	Verified
P48	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	100.3	-3.5	-6.6	6.0	-9.6	Q	19.2	Verified
				DL, LL, W	100.3	-1.4	-8.5	8.3	-6.9	N,M	8.6	Verified
			Base	DL, LL, W	111.1	22.1	9.3	6.0	-9.6	N,M	32.4	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	111.1	22.1	9.3	6.0	-9.6	N,M	32.4	Verified
P49	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	-19.4	-7.3	-2.9	3.9	-9.6	N,M	35.2	Verified
			Base	DL, LL, W	-8.6	18.1	7.5	3.9	-9.6	N,M	67.2	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Wors t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	-8.6	18.1	7.5	3.9	-9.6	N,M	67.2	Verified
P50	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	53.6	-8.5	-4.3	0.4	-9.7	Q	18.4	Verified
			Base	DL, LL, W	64.4	17.2	-3.3	0.4	-9.7	Q	17.9	Verified
				DL, LL, W	49.2	15.3	-2.4	0.4	-8.6	N,M	29.2	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	64.4	17.2	-3.3	0.4	-9.7	Q	1.9	Verified
				DL, LL, W	49.2	15.3	-2.4	0.4	-8.6	N,M	29.2	Verified
P56	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	201.2	2.5	-6.3	4.5	8.0	Q	12.7	Verified
				DL, LL, W	226.9	-2.6	-8.5	6.7	2.3	N,M	13.5	Verified
			Base	DL, LL, W	212.0	-18.6	5.6	4.5	8.0	N,M	19.5	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	212.0	-18.6	5.6	4.5	8.0	N,M	19.5	Verified
P55	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	184.1	-11.9	4.2	-2.8	-7.9	Q	12.0	Verified
				DL, LL, W	201.2	-10.3	5.8	-4.5	-5.4	N,M	14.2	Verified
			Base	DL, LL, W	194.9	9.1	-3.3	-2.8	-7.9	Q	11.7	Verified
				DL, LL, W	185.4	-9.2	-5.4	-3.9	2.1	N,M	12.9	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	194.9	9.1	-3.3	-2.8	-7.9	Q	1.7	Verified
				DL, LL, W	185.4	-9.2	-5.4	-3.9	2.1	N,M	12.9	Verified
P54	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	184.2	-9.0	-12.2	12.9	-3.2	Q	19.0	Verified
				DL, LL, W	192.8	-11.2	-10.5	10.8	-5.6	N,M	16.7	Verified
			Base	DL, LL, W	194.9	-0.5	22.0	12.9	-3.2	N,M	21.0	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	194.9	-0.5	22.0	12.9	-3.2	N,M	21.0	Verified
P53	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	246.5	2.0	-5.2	6.7	8.0	Q	13.3	Verified
				DL, LL, W	276.0	-5.5	-4.7	6.1	-0.4	N,M	14.9	Verified
			Base	DL, LL, W	257.2	-19.2	12.7	6.7	8.0	N,M	24.3	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	257.2	-19.2	12.7	6.7	8.0	N,M	24.3	Verified
P52	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	326.7	4.3	-10.1	11.1	12.0	Q	18.4	Verified
				DL, LL, W	366.8	-2.0	-11.5	12.6	5.1	N,M	20.6	Verified
			Base	DL, LL, W	337.4	-27.5	19.2	11.1	12.0	N,M	35.0	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	337.4	-27.5	19.2	11.1	12.0	N,M	35.0	Verified
P51	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	172.2	-5.5	35.5	-36.9	-3.5	Q	51.8	Verified
			Base	DL, LL, W	182.5	3.3	-58.7	-36.9	-3.5	Q	50.9	Verified
				DL, LL, W	174.5	3.3	-57.8	-36.3	-3.3	N,M	69.9	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	182.5	3.3	-58.7	-36.9	-3.5	Q	7.6	Verified
				DL, LL, W	174.5	3.3	-57.8	-36.3	-3.3	N,M	69.9	Verified
P57	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	-5.1	-3.8	2.2	-0.6	-5.6	Q	12.5	Verified
				DL, LL, W	-4.2	0.9	4.2	-3.3	0.0	N,M	16.7	Verified
			Base	DL, LL, W	5.6	11.1	0.5	-0.6	-5.6	N,M	35.0	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	5.6	11.1	0.5	-0.6	-5.6	N,M	35.0	Verified
P58	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	10.6	-7.9	4.6	-3.7	-9.4	N,M	22.8	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst t case	Use (%)	Status
				Nature	N (kN)	Mxx (kN-m)	Myy (kN-m)	Qx (kN)	Qy (kN)			
			Base	DL, LL, W	21.3	17.2	-5.1	-3.7	-9.4	N,M	48.6	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	21.3	17.2	-5.1	-3.7	-9.4	N,M	48.6	Verified
P59	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	7.1	9.1	6.4	-4.9	12.7	Q	29.1	Verified
			Base	DL, LL, W	17.8	-24.5	-6.6	-4.9	12.7	N,M	75.0	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	17.8	-24.5	-6.6	-4.9	12.7	N,M	75.0	Verified
P60	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	11.2	9.8	-0.8	3.1	9.3	N,M	27.8	Verified
			Base	DL, LL, W	21.9	-14.7	7.3	3.1	9.3	N,M	41.2	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	21.9	-14.7	7.3	3.1	9.3	N,M	41.2	Verified
P61	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	34.8	13.2	-2.8	1.4	11.3	N,M	29.0	Verified
			Base	DL, LL, W	45.5	-16.8	0.9	1.4	11.3	N,M	35.6	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	45.5	-16.8	0.9	1.4	11.3	N,M	35.6	Verified
P62	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	35.4	15.0	0.1	1.9	14.4	N,M	34.4	Verified
			Base	DL, LL, W	46.2	-23.0	5.2	1.9	14.4	N,M	57.0	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	46.2	-23.0	5.2	1.9	14.4	N,M	57.0	Verified
P63	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	40.1	14.0	-6.6	6.6	13.3	Q	29.1	Verified
				DL, LL, W	35.6	14.3	-2.5	1.7	13.7	N,M	32.1	Verified
			Base	DL, LL, W	50.8	-21.3	10.9	6.6	13.3	Q	28.3	Verified
				DL, LL, W	46.3	-22.1	1.9	1.7	13.7	N,M	52.9	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	50.8	-21.3	10.9	6.6	13.3	Q	3.0	Verified

Summary of code checks												
Columns	Span	Dimension (cm)	Position	Worst case forces						Worst case	Use (%)	Status
				Nature	N (kN)	Mxx (kN·m)	Myy (kN·m)	Qx (kN)	Qy (kN)			
				DL, LL, W	46.3	-22.1	1.9	1.7	13.7	N,M	52.9	Verified
P64	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	26.3	13.4	-4.2	6.9	11.0	Q	26.3	Verified
				DL, LL, W	26.2	13.7	-3.1	5.5	11.4	N,M	34.5	Verified
			Base	DL, LL, W	37.1	-15.6	14.0	6.9	11.0	Q	25.5	Verified
				DL, LL, W	38.0	-9.6	19.0	9.6	7.8	N,M	49.3	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	37.1	-15.6	14.0	6.9	11.0	Q	2.6	Verified
				DL, LL, W	38.0	-9.6	19.0	9.6	7.8	N,M	49.3	Verified
P65	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	4.2	15.2	-1.5	3.3	13.3	Q	29.5	Verified
				DL, LL, W	-3.0	14.4	-1.8	3.8	11.6	N,M	50.5	Verified
			Base	DL, LL, W	15.0	-19.9	7.3	3.3	13.3	N,M	61.2	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, W	33.4	-21.0	7.2	3.4	13.3	Q	2.8	Verified
				DL, LL, W	15.0	-19.9	7.3	3.3	13.3	N,M	61.2	Verified
P66	05. Utility Roof +15.84m (12.89 - 15.84 m)	35x35	Head	DL, LL, W	45.4	1.0	16.7	-24.9	-3.3	Q	45.6	Verified
				DL, LL, W	45.1	1.5	16.9	-24.7	-2.5	N,M	21.8	Verified
			Base	DL, LL, W	56.2	9.6	-49.2	-24.9	-3.3	N,M	83.6	Verified
	-01. Undergroud garage -3.15m	35x35	Column start	DL, LL, W	56.2	9.6	-49.2	-24.9	-3.3	N,M	83.6	Verified
Notes: Q: Ultimate shear resistance N,M: Limit state at failure under normal stresses												

5.3. Reinforcement of the column

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
P1	04. Floor 4 +12.89m	35x35	9.94/12.19	4Ø20	-	-	1.03	1sØ6	30	82.0	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø20	-	-	1.03	1sØ6	30	82.0	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø20	-	-	1.03	1sØ6	30	85.6	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.64	4Ø20	2Ø12	2Ø12	1.40	1sØ6	15	93.8	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø20	2Ø12	2Ø12	1.40	1sØ6	15	93.8	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	2Ø12	2Ø12	1.40	1sØ6	-	77.3	Verified
P2	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	65.3	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.19	4Ø16	-	-	0.66	1sØ6	20	90.6	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø16	-	-	0.66	1sØ6	20	90.8	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø20	-	-	1.03	1sØ6	30	99.1	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.64	4Ø20	4Ø16	4Ø16	2.34	1sØ6+X2ctØ6+Y2ctØ6	20	99.8	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø25	2Ø20	2Ø20	2.63	1sØ8	30	96.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø20	2Ø20	2.63	1sØ8	-	92.5	Verified
P3	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	73.6	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø12	-	-	0.37	1sØ6	15	90.8	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø12	-	-	0.37	1sØ6	15	95.9	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø20	-	-	1.03	1sØ6	30	92.0	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.64	4Ø20	-	-	1.03	1sØ6	30	96.7	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.30	4Ø20	-	-	1.03	1sØ6	30	88.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	-	-	1.03	1sØ6	-	87.1	Verified
P4	05. Utility Roof +15.84m	35x35	12.89/15.39	4Ø16	-	-	0.66	1sØ6	20	80.0	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.19	4Ø16	-	-	0.66	1sØ6	20	83.6	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø16	-	-	0.66	1sØ6	20	81.6	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø20	-	-	1.03	1sØ6	30	91.6	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.64	4Ø20	-	-	1.03	1sØ6	30	96.7	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.30	4Ø20	-	-	1.03	1sØ6	30	86.3	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
	-01. Undergroud garage -3.15m	-	-	4Ø20	-	-	1.03	1sØ6	-	81.3	Verified
P5	04. Floor 4 +12.89m	35x35	9.94/12.19	4Ø12	-	-	0.37	1sØ6	15	67.5	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø12	-	-	0.37	1sØ6	15	82.4	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø12	-	-	0.37	1sØ6	15	94.7	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.64	4Ø25	2Ø16	2Ø16	2.26	1sØ8	20	97.9	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø25	2Ø20	2Ø20	2.63	1sØ8	30	96.3	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø20	2Ø20	2.63	1sØ8	-	87.1	Verified
P6	04. Floor 4 +12.89m	35x35	9.94/12.19	4Ø16	-	-	0.66	1sØ6	20	74.8	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø16	-	-	0.66	1sØ6	20	74.8	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø16	-	-	0.66	1sØ6	20	78.3	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.64	4Ø16	-	-	0.66	1sØ6	20	99.4	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø16	-	-	0.66	1sØ6	20	99.4	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø16	-	-	0.66	1sØ6	-	78.1	Verified
P7	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	75.9	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø16	-	-	0.89	1sØ6	20	94.7	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø20	2Ø12	2Ø12	1.90	1sØ6	15	99.5	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø25	4Ø20	-	3.07	1sØ8+Y2ctØ8	30	99.4	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø25	4Ø20	-	3.07	1sØ8+Y2ctØ8	30	98.6	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø20	2Ø20	3.07	1sØ8	-	99.8	Verified
P8	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	60.3	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø16	-	-	0.66	1sØ6	20	97.5	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø25	2Ø16	2Ø16	2.26	1sØ8	20	99.5	Verified
	02. Floor 2 +6.99m	40x40	4.04/6.69	4Ø25	4Ø16	4Ø16	2.23	1sØ8+X2ctØ8+Y2ctØ8	20	97.7	Verified
	01. Floor 1 +4.04m	45x45	0.00/3.74	4Ø25	6Ø16	6Ø16	2.16	1sØ8+X1ctØ8+Y1ctØ8	20	98.8	Verified
	00. Ground Floor +0.00m	45x45	-3.15/-0.40	4Ø25	8Ø16	8Ø16	2.56	1sØ8+X2ctØ8+Y2ctØ8	20	99.6	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	8Ø16	8Ø16	2.56	1sØ8+X2ctØ8+Y2ctØ8	-	96.7	Verified
P9	06. Roof of Staircase+20.48m	35x35	17.44/20.08	4Ø12	-	-	0.37	1sØ6	15	33.8	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
	05. Utility Roof +15.84m	35x35	12.89/15.44	4Ø12	-	-	0.37	1sØ6	15	62.6	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø12	-	-	0.37	1sØ6	15	92.8	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø20	2Ø12	2Ø12	1.40	1sØ6	15	98.9	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø25	4Ø16	4Ø16	2.92	1sØ8+X2ctØ8+Y2ctØ8	20	97.4	Verified
	01. Floor 1 +4.04m	40x40	0.25/3.64	4Ø25	6Ø16	6Ø16	2.74	1sØ8+X1ctØ8+Y1ctØ8	20	97.8	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.40	4Ø25	6Ø20	6Ø20	3.58	1sØ8+X1ctØ8+Y1ctØ8	30	96.8	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	6Ø20	6Ø20	3.58	1sØ8+X1ctØ8+Y1ctØ8	-	96.8	Verified
P10	06. Roof of Staircase+20.48m	35x35	15.84/20.08	4Ø12	-	-	0.37	1sØ6	15	56.9	Verified
	05. Utility Roof +15.84m	35x35	12.89/15.39	4Ø12	-	-	0.37	1sØ6	15	66.8	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø16	-	-	0.66	1sØ6	20	97.1	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø20	4Ø16	4Ø16	2.34	1sØ6+X2ctØ6+Y2ctØ6	20	99.9	Verified
	02. Floor 2 +6.99m	40x40	4.04/6.59	4Ø25	4Ø16	4Ø16	2.23	1sØ8+X2ctØ8+Y2ctØ8	20	99.8	Verified
	01. Floor 1 +4.04m	45x45	0.00/3.64	4Ø25	8Ø16	8Ø16	2.56	1sØ8+X2ctØ8+Y2ctØ8	20	97.8	Verified
	00. Ground Floor +0.00m	45x45	-3.15/-0.45	4Ø25	6Ø25	6Ø25	3.88	1sØ8+X1ctØ8+Y1ctØ8	30	92.6	Verified
-01. Undergroud garage -3.15m	-	-	4Ø25	6Ø25	6Ø25	3.88	1sØ8+X1ctØ8+Y1ctØ8	-	92.6	Verified	
P11	04. Floor 4 +12.89m	40x40	9.94/12.44	4Ø12	2Ø12	2Ø12	0.57	1sØ6+X1ctØ6+Y1ctØ6	15	55.9	Verified
	03. Floor 3 +9.94m	40x40	6.99/9.64	4Ø12	2Ø12	2Ø12	0.57	1sØ6+X1ctØ6+Y1ctØ6	15	84.6	Verified
	02. Floor 2 +6.99m	40x40	4.04/6.69	4Ø16	2Ø16	2Ø16	1.01	1sØ6+X1ctØ6+Y1ctØ6	20	99.8	Verified
	01. Floor 1 +4.04m	40x40	0.00/3.74	4Ø25	6Ø16	6Ø16	2.74	1sØ8+X1ctØ8+Y1ctØ8	20	97.0	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.45	4Ø25	6Ø20	6Ø20	3.58	1sØ8+X1ctØ8+Y1ctØ8	30	97.8	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	6Ø20	6Ø20	3.58	1sØ8+X1ctØ8+Y1ctØ8	-	97.0	Verified
P12	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	51.3	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø12	-	-	0.50	1sØ6	15	84.4	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø20	-	-	1.40	1sØ6	30	94.0	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø25	4Ø16	-	2.64	1sØ8+Y2ctØ8	20	99.2	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.45	4Ø25	4Ø20	-	3.07	1sØ8+Y2ctØ8	30	98.8	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø20	2Ø20	3.07	1sØ8	-	94.8	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
P13	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	83.1	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø16	-	-	0.89	1sØ6	20	90.7	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø20	-	-	1.40	1sØ6	30	94.8	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø20	2Ø12	2Ø12	1.40	1sØ6	15	98.1	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø20	2Ø12	2Ø12	1.40	1sØ6	15	98.1	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	2Ø12	2Ø12	1.40	1sØ6	-	97.2	Verified
P14	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	50.0	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø12	-	-	0.37	1sØ6	15	88.2	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø20	-	-	1.03	1sØ6	30	97.0	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø20	4Ø16	4Ø16	2.34	1sØ6+X2ctØ6+Y2ctØ6	20	99.4	Verified
	01. Floor 1 +4.04m	40x40	0.00/3.74	4Ø20	6Ø16	6Ø16	2.29	1sØ6+X1ctØ6+Y1ctØ6	20	99.5	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	4Ø20	4Ø20	2.80	1sØ8+X2ctØ8+Y2ctØ8	30	99.6	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	4Ø20	4Ø20	2.80	1sØ8+X2ctØ8+Y2ctØ8	-	97.5	Verified
P15	06. Roof of Staircase+20.48m	35x35	17.44/20.08	4Ø12	-	-	0.37	1sØ6	15	22.7	Verified
	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	65.5	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø12	-	-	0.37	1sØ6	15	87.5	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø20	-	-	1.03	1sØ6	30	98.3	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø25	2Ø20	2Ø20	2.63	1sØ8	30	96.5	Verified
	01. Floor 1 +4.04m	40x40	0.00/3.74	4Ø25	2Ø25	2Ø25	2.45	1sØ8+X1ctØ8+Y1ctØ8	30	98.8	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	6Ø20	6Ø20	3.58	1sØ8+X1ctØ8+Y1ctØ8	30	93.5	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	6Ø20	6Ø20	3.58	1sØ8+X1ctØ8+Y1ctØ8	-	93.5	Verified
P16	06. Roof of Staircase+20.48m	35x35	15.84/20.08	4Ø12	-	-	0.37	1sØ6	15	33.0	Verified
	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	45.4	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø12	-	-	0.37	1sØ6	15	82.1	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø20	-	-	1.03	1sØ6	30	94.5	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø25	2Ø16	2Ø16	2.26	1sØ8	20	98.3	Verified
	01. Floor 1 +4.04m	40x40	0.00/3.74	4Ø25	4Ø16	4Ø16	2.23	1sØ8+X2ctØ8+Y2ctØ8	20	99.2	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	4Ø20	4Ø20	2.80	1sØ8+X2ctØ8+Y2ctØ8	30	99.7	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	4Ø20	4Ø20	2.80	1sØ8+X2ctØ8+Y2ctØ8	-	98.8	Verified
P17	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø12	-	-	0.37	1sØ6	15	64.3	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	90.8	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø16	2Ø16	2Ø16	1.31	1sØ6	20	96.9	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø25	4Ø20	4Ø20	3.65	1sØ8+X2ctØ8+Y2ctØ8	30	97.7	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	4Ø20	4Ø20	2.80	1sØ8+X2ctØ8+Y2ctØ8	30	97.7	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	4Ø20	4Ø20	2.80	1sØ8+X2ctØ8+Y2ctØ8	-	90.4	Verified
P18	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	55.7	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø12	-	-	0.50	1sØ6	15	83.2	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø12	-	-	0.50	1sØ6	15	97.4	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø16	4Ø16	-	1.53	1sØ6+Y2ctØ6	20	99.9	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø16	4Ø16	-	1.53	1sØ6+Y2ctØ6	20	99.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø16	2Ø16	2Ø16	1.53	1sØ6	-	98.4	Verified
P19	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	76.2	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø16	-	-	0.89	1sØ6	20	89.0	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø20	-	-	1.40	1sØ6	30	95.9	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø20	4Ø16	4Ø12	2.39	1sØ6+X2ctØ6+Y2ctØ6	15	99.1	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø20	4Ø16	4Ø12	2.39	1sØ6+X2ctØ6+Y2ctØ6	15	99.1	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	2Ø20	2Ø20	2.39	1sØ6	-	97.5	Verified
P20	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	33.6	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø12	-	-	0.37	1sØ6	15	80.7	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	91.8	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø16	2Ø16	2Ø16	1.31	1sØ6	20	96.9	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø25	2Ø25	2Ø25	3.21	1sØ8	30	99.6	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	2Ø25	2Ø25	2.45	1sØ8+X1ctØ8+Y1ctØ8	30	97.5	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø25	2Ø25	2.45	1sØ8	-	85.2	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
P21	05. Utility Roof +15.84m	35x35	12.89/15.44	4Ø12	-	-	0.37	1sØ6	15	36.6	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.49	4Ø12	-	-	0.37	1sØ6	15	62.6	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø12	-	-	0.37	1sØ6	15	75.0	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø12	-	-	0.37	1sØ6	15	92.9	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø20	4Ø12	4Ø12	1.76	1sØ6+X2ctØ6+Y2ctØ6	15	99.6	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.30	4Ø20	2Ø20	2Ø20	2.05	1sØ6	30	98.5	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	2Ø20	2Ø20	2.05	1sØ6	-	98.5	Verified
P22	05. Utility Roof +15.84m	35x35	12.89/15.44	4Ø12	-	-	0.37	1sØ6	15	27.8	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø12	-	-	0.37	1sØ6	15	62.5	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø12	-	-	0.37	1sØ6	15	82.5	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø16	-	-	0.66	1sØ6	20	97.7	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø20	4Ø16	4Ø16	2.34	1sØ6+X2ctØ6+Y2ctØ6	20	99.9	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.30	4Ø20	4Ø16	4Ø16	2.34	1sØ6+X2ctØ6+Y2ctØ6	20	99.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	4Ø16	4Ø16	2.34	1sØ6+X2ctØ6+Y2ctØ6	-	98.8	Verified
P23	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø12	-	-	0.37	1sØ6	15	53.8	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	78.7	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø16	-	-	0.66	1sØ6	20	95.1	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø25	2Ø20	2Ø20	2.63	1sØ8	30	97.6	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.30	4Ø25	2Ø20	2Ø20	2.63	1sØ8	30	97.7	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø20	2Ø20	2.63	1sØ8	-	97.7	Verified
P24	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	48.8	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø12	-	-	0.50	1sØ6	15	81.2	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø12	-	-	0.50	1sØ6	15	97.8	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø20	4Ø12	-	1.63	1sØ6+Y2ctØ6	15	100.0	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø20	4Ø12	-	1.63	1sØ6+Y2ctØ6	15	100.0	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	2Ø12	2Ø12	1.63	1sØ6	-	97.6	Verified
P25	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	89.1	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø16	-	-	0.89	1sØ6	20	97.0	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø16	2Ø16	2Ø16	1.79	1sØ6	20	98.2	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø25	2Ø20	-	2.47	1sØ8	30	99.6	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø25	2Ø20	-	2.47	1sØ8	30	99.6	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø20	-	2.47	1sØ8	-	95.1	Verified
P26	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	31.0	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø12	-	-	0.37	1sØ6	15	78.6	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	95.0	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø16	2Ø16	2Ø16	1.31	1sØ6	20	99.5	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø25	4Ø20	4Ø20	3.65	1sØ8+X2ctØ8+Y2ctØ8	30	97.3	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	4Ø20	4Ø20	2.80	1sØ8+X2ctØ8+Y2ctØ8	30	94.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	4Ø20	4Ø20	2.80	1sØ8+X2ctØ8+Y2ctØ8	-	83.6	Verified
P27	05. Utility Roof +15.84m	35x35	12.89/15.44	4Ø12	-	-	0.37	1sØ6	15	28.8	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.49	4Ø12	-	-	0.37	1sØ6	15	59.5	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø12	-	-	0.37	1sØ6	15	76.7	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø12	-	-	0.37	1sØ6	15	95.8	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø20	2Ø20	2Ø20	2.05	1sØ6	30	99.6	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.30	4Ø25	2Ø16	2Ø16	2.26	1sØ8	20	98.6	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø16	2Ø16	2.26	1sØ8	-	98.3	Verified
P28	05. Utility Roof +15.84m	35x35	12.89/15.44	4Ø12	-	-	0.37	1sØ6	15	19.3	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø12	-	-	0.37	1sØ6	15	61.1	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.54	4Ø12	-	-	0.37	1sØ6	15	86.3	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.59	4Ø20	-	-	1.03	1sØ6	30	96.4	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø25	4Ø16	4Ø16	2.92	1sØ8+X2ctØ8+Y2ctØ8	20	99.8	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	4Ø16	4Ø16	2.23	1sØ8+X2ctØ8+Y2ctØ8	20	97.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	4Ø16	4Ø16	2.23	1sØ8+X2ctØ8+Y2ctØ8	-	84.6	Verified
P29	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø12	-	-	0.37	1sØ6	15	53.3	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	80.1	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø16	-	-	0.66	1sØ6	20	96.9	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø25	2Ø20	2Ø20	2.63	1sØ8	30	99.1	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.30	4Ø25	4Ø16	4Ø16	2.92	1sØ8+X2ctØ8+Y2ctØ8	20	97.6	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	4Ø16	4Ø16	2.92	1sØ8+X2ctØ8+Y2ctØ8	-	97.5	Verified
P30	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	57.3	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø12	-	-	0.50	1sØ6	15	87.1	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø16	-	-	0.89	1sØ6	20	93.3	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø20	4Ø12	-	1.63	1sØ6+Y2ctØ6	15	99.9	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø20	4Ø12	-	1.63	1sØ6+Y2ctØ6	15	99.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	2Ø12	2Ø12	1.63	1sØ6	-	97.3	Verified
P31	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	82.1	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø16	-	-	0.89	1sØ6	20	92.4	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø20	-	-	1.40	1sØ6	30	98.3	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø25	4Ø16	-	2.64	1sØ8+Y2ctØ8	20	99.2	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø25	4Ø16	-	2.64	1sØ8+Y2ctØ8	20	99.2	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø16	2Ø16	2.64	1sØ8	-	95.8	Verified
P32	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	37.6	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø12	-	-	0.37	1sØ6	15	83.6	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø20	-	-	1.03	1sØ6	30	97.1	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø25	2Ø20	2Ø20	2.63	1sØ8	30	97.8	Verified
	01. Floor 1 +4.04m	40x40	0.00/3.74	4Ø25	6Ø16	6Ø16	2.74	1sØ8+X1ctØ8+Y1ctØ8	20	97.2	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	6Ø20	6Ø20	3.58	1sØ8+X1ctØ8+Y1ctØ8	30	94.4	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	6Ø20	6Ø20	3.58	1sØ8+X1ctØ8+Y1ctØ8	-	92.9	Verified
P33	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	32.2	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø12	-	-	0.37	1sØ6	15	70.8	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	98.7	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø20	4Ø12	4Ø12	1.76	1sØ6+X2ctØ6+Y2ctØ6	15	99.4	Verified
	01. Floor 1 +4.04m	40x40	0.00/3.74	4Ø25	2Ø20	2Ø20	2.01	1sØ8+X1ctØ8+Y1ctØ8	30	98.0	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	2Ø25	2Ø25	2.45	1sØ8+X1ctØ8+Y1ctØ8	30	97.8	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø25	2Ø25	2.45	1sØ8	-	97.8	Verified
P34	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	19.9	Verified
	04. Floor 4 +12.89m	35x35	9.94/12.54	4Ø12	-	-	0.37	1sØ6	15	69.4	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø16	-	-	0.66	1sØ6	20	95.6	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø20	2Ø20	2Ø20	2.05	1sØ6	30	99.5	Verified
	01. Floor 1 +4.04m	40x40	0.00/3.74	4Ø25	4Ø16	4Ø16	2.23	1sØ8+X2ctØ8+Y2ctØ8	20	99.7	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	6Ø16	6Ø16	2.74	1sØ8+X1ctØ8+Y1ctØ8	20	97.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	6Ø16	6Ø16	2.74	1sØ8+X1ctØ8+Y1ctØ8	-	97.9	Verified
P35	04. Floor 4 +12.89m	35x35	9.94/12.44	4Ø12	-	-	0.37	1sØ6	15	64.6	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	94.1	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø20	2Ø12	2Ø12	1.40	1sØ6	15	99.2	Verified
	01. Floor 1 +4.04m	40x40	0.00/3.74	4Ø20	6Ø12	6Ø12	1.63	1sØ6+X1ctØ6+Y1ctØ6	15	99.4	Verified
	00. Ground Floor +0.00m	40x40	-3.15/-0.30	4Ø25	4Ø16	4Ø16	2.23	1sØ8+X2ctØ8+Y2ctØ8	20	98.5	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	4Ø16	4Ø16	2.23	1sØ8+X2ctØ8+Y2ctØ8	-	98.5	Verified
P36	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	47.0	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø12	-	-	0.50	1sØ6	15	75.0	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø12	-	-	0.50	1sØ6	15	92.3	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø20	2Ø12	-	1.41	1sØ6	15	97.3	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø20	2Ø12	-	1.41	1sØ6	15	97.3	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	2Ø12	-	1.41	1sØ6	-	93.4	Verified
P37	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	81.3	Verified
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø16	-	-	0.89	1sØ6	20	90.9	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø20	-	-	1.40	1sØ6	30	89.9	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø20	4Ø12	2Ø12	1.84	1sØ6+Y2ctØ6	15	99.4	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø20	4Ø12	2Ø12	1.84	1sØ6+Y2ctØ6	15	99.4	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	4Ø12	2Ø12	1.84	1sØ6+Y2ctØ6	-	85.9	Verified
P38	04. Floor 4 +12.89m	35x35	9.94/12.59	4Ø12	-	-	0.37	1sØ6	15	65.3	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	81.2	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø12	-	-	0.37	1sØ6	15	96.2	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø16	4Ø16	4Ø16	1.97	1sØ6+X2ctØ6+Y2ctØ6	20	99.9	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø25	2Ø16	2Ø16	2.26	1sØ8	20	97.8	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø25	2Ø16	2Ø16	2.26	1sØ8	-	97.8	Verified
P39	04. Floor 4 +12.89m	35x35	9.94/12.59	4Ø12	-	-	0.37	1sØ6	15	48.2	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	73.5	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø12	-	-	0.37	1sØ6	15	87.7	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø20	-	-	1.03	1sØ6	30	99.1	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø20	-	-	1.03	1sØ6	30	99.5	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	-	-	1.03	1sØ6	-	99.5	Verified
P40	04. Floor 4 +12.89m	35x35	9.94/12.59	4Ø12	-	-	0.37	1sØ6	15	50.4	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	68.1	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø12	-	-	0.37	1sØ6	15	81.8	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø16	-	-	0.66	1sØ6	20	99.6	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø16	-	-	0.66	1sØ6	20	99.6	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø16	-	-	0.66	1sØ6	-	97.2	Verified
P41	04. Floor 4 +12.89m	35x35	9.94/12.59	4Ø12	-	-	0.37	1sØ6	15	37.1	Verified
	03. Floor 3 +9.94m	35x35	6.99/9.64	4Ø12	-	-	0.37	1sØ6	15	60.4	Verified
	02. Floor 2 +6.99m	35x35	4.04/6.69	4Ø12	-	-	0.37	1sØ6	15	77.6	Verified
	01. Floor 1 +4.04m	35x35	0.00/3.74	4Ø20	-	-	1.03	1sØ6	30	95.7	Verified
	00. Ground Floor +0.00m	35x35	-3.15/-0.40	4Ø20	-	-	1.03	1sØ6	30	97.9	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø20	-	-	1.03	1sØ6	-	97.9	Verified
P42	04. Floor 4 +12.89m	30x30	9.94/12.59	4Ø12	-	-	0.50	1sØ6	15	43.6	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
	03. Floor 3 +9.94m	30x30	6.99/9.64	4Ø12	-	-	0.50	1sØ6	15	69.9	Verified
	02. Floor 2 +6.99m	30x30	4.04/6.69	4Ø12	-	-	0.50	1sØ6	15	83.0	Verified
	01. Floor 1 +4.04m	35x30	0.00/3.74	4Ø16	-	-	0.77	1sØ6	20	98.6	Verified
	00. Ground Floor +0.00m	35x30	-3.15/-0.40	4Ø16	-	-	0.77	1sØ6	20	98.6	Verified
	-01. Undergroud garage -3.15m	-	-	4Ø16	-	-	0.77	1sØ6	-	84.1	Verified
P43	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø16	-	-	0.66	1sØ6	20	89.0	Verified
	04. Floor 4 +12.89m	-	-	4Ø16	-	-	0.66	1sØ6	-	89.0	Verified
P44	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	40.5	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	40.5	Verified
P45	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	39.8	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	39.8	Verified
P46	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	47.0	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	47.0	Verified
P47	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	33.6	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	33.6	Verified
P48	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	32.4	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	32.4	Verified
P49	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	67.2	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	67.2	Verified
P50	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	29.2	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	29.2	Verified
P51	05. Utility Roof +15.84m	35x35	12.89/15.44	4Ø16	-	-	0.66	1sØ6	20	69.9	Verified
	04. Floor 4 +12.89m	-	-	4Ø16	-	-	0.66	1sØ6	-	69.9	Verified
P52	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	35.0	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	35.0	Verified
P53	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	24.3	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	24.3	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars				Stirrups			
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
P54	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	21.0	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	21.0	Verified
P55	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	14.2	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	12.9	Verified
P56	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	19.5	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	19.5	Verified
P57	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	35.0	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	35.0	Verified
P58	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	48.6	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	48.6	Verified
P59	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	75.0	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	75.0	Verified
P60	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	41.2	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	41.2	Verified
P61	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	35.6	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	35.6	Verified
P62	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	57.0	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	57.0	Verified
P63	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	52.9	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	52.9	Verified
P64	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	49.3	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	49.3	Verified
P65	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø12	-	-	0.37	1sØ6	15	61.2	Verified
	04. Floor 4 +12.89m	-	-	4Ø12	-	-	0.37	1sØ6	-	61.2	Verified
P66	05. Utility Roof +15.84m	35x35	12.89/15.54	4Ø16	-	-	0.66	1sØ6	20	83.6	Verified
	04. Floor 4 +12.89m	-	-	4Ø16	-	-	0.66	1sØ6	-	83.6	Verified

Column reinforcement											
Concrete: C25/30											
Column	Geometry			Reinforcement						Use (%)	Status
	Floor	Dimensions (cm)	Span (m)	Bars			Stirrups				
				Corner	X Face	Y Face	Steel area (%)	Description ⁽¹⁾	Spacing (cm)		
Notes:											
⁽¹⁾ s = stirrup, c = cross tie											

5.4. Stairs

5.4.1. General Data

- Concrete: C25/30
- Steel: S-500
- Geometric cover: 2,5 cm

5.4.2. Stairs garage

Geometry

- Width: 1.000 m
- Tread: 0.280 m
- Riser: 0.175 m

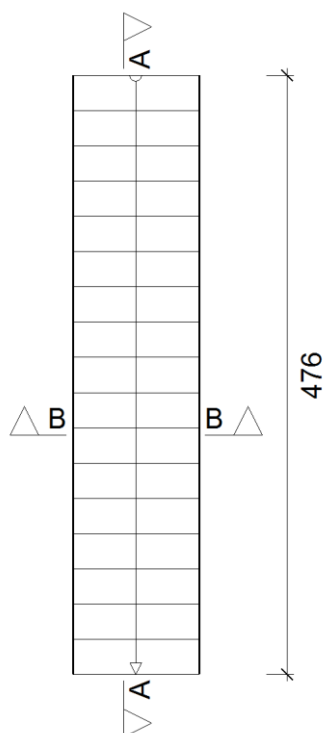
Loads

- Self weight: 4.66 kN/m_c
- Steps: 1.16 kN/m_c
- Handrails: 3.00 kN/m
- Floor: 1.00 kN/m_c
- Live load: 3.00 kN/m_c

Spans Geometry

- Final floor: 00. Ground Floor +0.00m
- Initial floor: -01. Undergroud garage -3.15m
- Thickness: 0.19 m

- Tread: 0.280 m
- Riser: 0.175 m
- No. of steps: 18
- Change in level: 3.15 m
- Intermediate landing supports: Masonry wall (Width: 0.20 m)



Results

Reinforcement			
Section	Type	Top	Bottom
A-A	Longitudinal	Ø8@20	Ø12@10
B-B	Transverse	Ø8@20	Ø8@20

Reactions (kN/m)			
Position	Self weight	Dead load	Live load
Column start	13.1	15.1	7.1

Reactions (kN/m)			
Position	Self weight	Dead load	Live load
Landing	13.1	15.1	7.1

Takeoff

Takeoff						
Section	Face	Diameter	Number	Length (m)	Total (m)	Weight (kg)
A-A	Top	Ø8	6	6.96	41.76	16.5
A-A	Bottom	Ø12	11	7.19	79.09	70.2
B-B	Top	Ø8	29	1.18	34.22	13.5
B-B	Bottom	Ø8	29	1.13	32.77	12.9
					Total + 10 %	124.4

- Concrete volume: 1.07 m³
- Surface: 5.6 m²
- Steel volume: 116.7 kg/m³
- Steel surface area: 22.2 kg/m²

5.4.3. Stairs from Ground Floor to First Floor

Geometry

- Width: 1.100 m
- Tread: 0.280 m
- Riser: 0.184 m

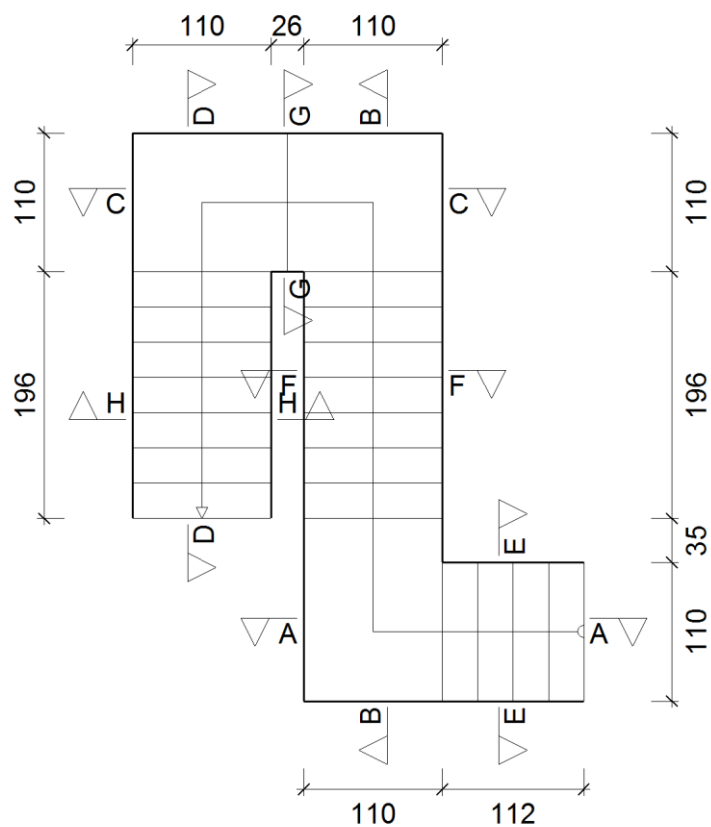
Loads

- Self weight: 8.34 kN/m_c
- Steps: 1.21 kN/m_c

- Handrails: 3.00 kN/m
- Floor: 1.00 kN/m_e
- Live load: 3.00 kN/m_e

Spans Geometry

- Final floor: 01. Floor 1 +4.04m
- Initial floor: 00. Ground Floor +0.00m
- Thickness: 0.34 m
- Tread: 0.280 m
- Riser: 0.184 m
- No. of steps: 22
- Change in level: 4.05 m



Results

Reinforcement			
Section	Type	Top	Bottom
A-A	Longitudinal	Ø12@15	Ø12@15
B-B	Longitudinal	Ø12@15	Ø12@15
C-C	Longitudinal	Ø12@15	Ø12@15
D-D	Longitudinal	Ø12@15	Ø12@15
E-E	Transverse	Ø8@10	Ø8@10
F-F	Transverse	Ø8@10	Ø8@10
G-G	Transverse	Ø12@15	Ø12@15
H-H	Transverse	Ø8@10	Ø8@10

Reactions (kN/m)			
Position	Self weight	Dead load	Live load
Column start	45.5	23.6	13.9
Landing	43.3	22.3	13.0

Takeoff

Takeoff						
Section	Face	Diameter	Number	Length (m)	Total (m)	Weight (kg)
A-A	Top	Ø12	8	3.40	27.20	24.1
A-A	Bottom	Ø12	8	2.83	22.64	20.1
A-A	Bottom	Ø12	8	1.60	12.80	11.4

Takeoff						
Section	Face	Diameter	Number	Length (m)	Total (m)	Weight (kg)
B-B	Top	Ø12	8	2.41	19.28	17.1
B-B	Top	Ø12	8	4.43	35.44	31.5
B-B	Bottom	Ø12	8	5.08	40.64	36.1
B-B	Bottom	Ø12	8	1.60	12.80	11.4
C-C	Top	Ø12	8	2.81	22.48	20.0
C-C	Bottom	Ø12	8	2.68	21.44	19.0
D-D	Top	Ø12	8	2.04	16.32	14.5
D-D	Top	Ø12	8	3.90	31.20	27.7
D-D	Bottom	Ø12	8	2.42	19.36	17.2
D-D	Bottom	Ø12	8	3.80	30.40	27.0
E-E	Top	Ø8	13	1.31	17.03	6.7
E-E	Bottom	Ø8	16	1.23	19.68	7.8
F-F	Top	Ø8	27	1.31	35.37	14.0
F-F	Bottom	Ø8	31	1.23	38.13	15.0
G-G	Top	Ø12	1	1.45	1.45	1.3
G-G	Bottom	Ø12	1	1.32	1.32	1.2
H-H	Top	Ø8	25	1.23	30.75	12.1
H-H	Bottom	Ø8	28	1.23	34.44	13.6
					Total + 10 %	383.5

- Concrete volume: 3.79 m³
- Surface: 11.3 m²
- Steel volume: 101.3 kg/m³
- Steel surface area: 33.8 kg/m²

5.4.4. Stairs from First Floor to Utility Roof

Geometry

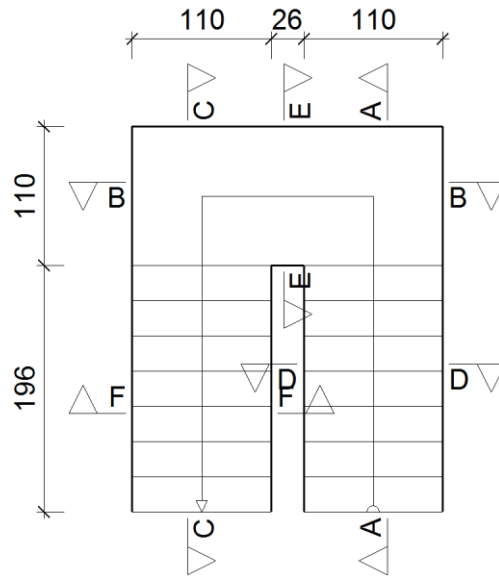
- Width: 1.100 m
- Tread: 0.280 m
- Riser: 0.184 m

Loads

- Self weight: 5.89 kN/m_c
- Steps: 1.21 kN/m_c
- Handrails: 3.00 kN/m
- Floor: 1.00 kN/m_c
- Live load: 3.00 kN/m_c

Spans Geometry

- Final floor: 05. Utility Roof +15.84m
- Initial floor: 01. Floor 1 +4.04m
- Equal consecutive flights: 4
- Thickness: 0.24 m
- Tread: 0.280 m
- Riser: 0.184 m
- No. of steps: 16
- Change in level: 2.95 m



Results

Reinforcement			
Section	Type	Top	Bottom
A-A	Longitudinal	Ø10@20	Ø10@20
B-B	Longitudinal	Ø10@20	Ø10@20
C-C	Longitudinal	Ø10@20	Ø10@20
D-D	Transverse	Ø8@15	Ø8@15
E-E	Transverse	Ø10@20	Ø10@20
F-F	Transverse	Ø8@15	Ø8@15

Reactions (kN/m)			
Position	Self weight	Dead load	Live load
Column start	21.4	17.0	9.7
Landing	21.2	16.8	9.6

Takeoff

Takeoff						
Section	Face	Diameter	Number	Length (m)	Total (m)	Weight (kg)
A-A	Top	Ø10	7	4.10	28.70	17.7
A-A	Bottom	Ø10	7	3.72	26.04	16.1
A-A	Bottom	Ø10	7	1.43	10.01	6.2
B-B	Top	Ø10	7	2.74	19.18	11.8
B-B	Bottom	Ø10	7	2.64	18.48	11.4
C-C	Top	Ø10	7	1.81	12.67	7.8
C-C	Top	Ø10	7	3.58	25.06	15.5
C-C	Bottom	Ø10	7	4.51	31.57	19.5
D-D	Top	Ø8	16	1.31	20.96	8.3
D-D	Bottom	Ø8	19	1.23	23.37	9.2
E-E	Top	Ø10	1	1.33	1.33	0.8
E-E	Bottom	Ø10	1	1.28	1.28	0.8
F-F	Top	Ø8	17	1.31	22.27	8.8
F-F	Bottom	Ø8	18	1.23	22.14	8.7
					Total + 10 %	156.7

- Concrete volume: 1.89 m³
- Surface: 7.9 m²
- Steel volume: 83.0 kg/m³
- Steel surface area: 19.9 kg/m²

6. Calculation by hand (with verification with Cype)

6.1. Beam

The calculations were done for a frame 10 of the 1st floor.

6.1.1. Static diagram

As a static system, a continuous, five-span system was adopted. Due to the use of the method of plastic leveling in static calculations as the effective length of the span, the light span was assumed.

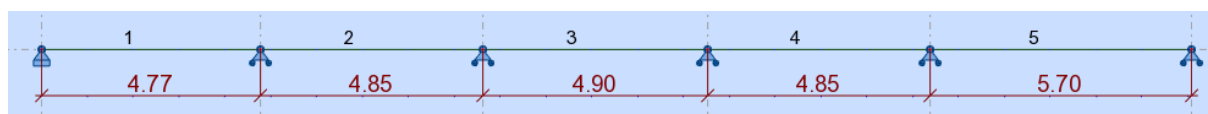


Figure 6.1 Dimensions of the beam

$$l_{\text{eff},0-1} = 4,77\text{m}$$

$$l_{\text{eff},1-2} = l_{\text{eff},3-4} = 4,85\text{m}$$

$$l_{\text{eff},2-3} = 4,90\text{m}$$

$$l_{\text{eff},4-5} = 5,70\text{m}$$

6.1.2. Loads

Table 6.1 Loads

Lp.	Type of load	Load characteristic value [kN/m ²]	Load coefficient γ_f	Design value of load [kN/m ²]
Permanent loads				
1.	External permanent loads 9,0 [kN/m ²]	9,0	1,35	12,15
2.	Beam of 40cm thick 25,0 [kN/m ³] · 0,40 m	10	1,35	13,5
TOTAL permanent loads		19,0	1,35	25,65
Variable loads				

3.	Live load 2,00 [kN/m ²]	2,0	1,50	3,0
TOTAL Variable loads		2,0	1,50	3,0
TOTAL		21,0		28,65

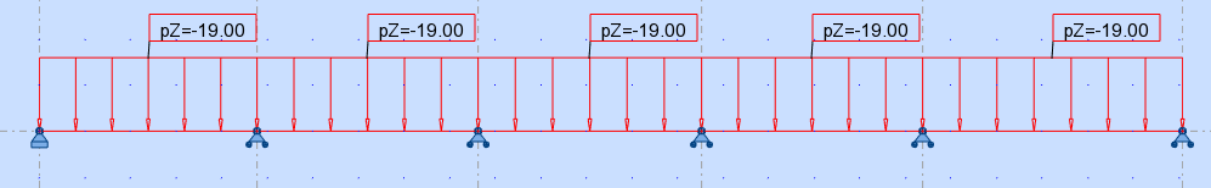


Figure 6.2 Permanent loads

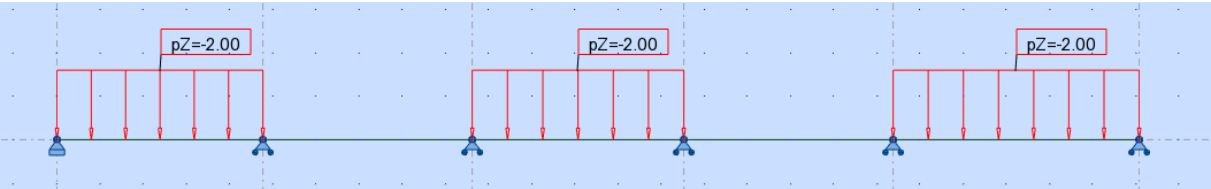


Figure 6.3 Live load case 1

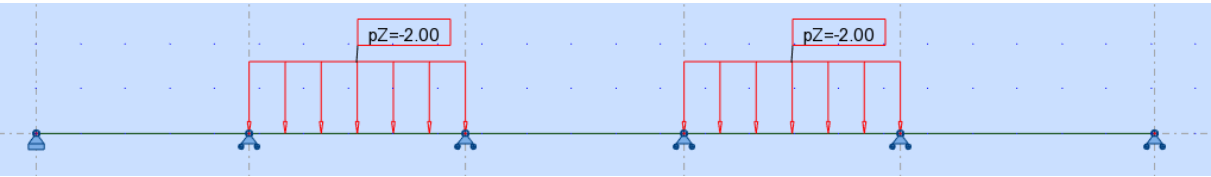


Figure 6.4 Live loads case 2

6.1.3. Dimensioning due to limit state of bearing capacity - ULS

6.1.3.1. Dimensioning due to bending

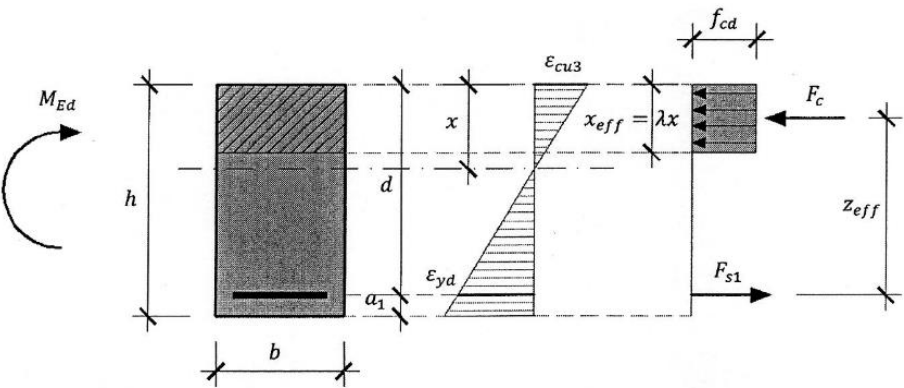


Figure 6.5 Distribution of strains and stresses in the bent section for adopted concrete and steel material models

- Effective depth of a cross-section

Distance of the center of gravity of the reinforcement from the extreme fiber of the stretched cross-section of the plate:

$$a_1 = c_{nom} + \varphi_{str} + \frac{1}{2} \cdot \varphi = 30 + 6 + \frac{1}{2} \cdot 12 = 42 \text{ mm}$$

Effective depth of a cross-section:

$$d = h - a_1 = 0,40 - 0,042 = 0,358 \text{ m}$$

- Minimum and maximum cross-sectional area of the main reinforcement

a) Determination of the minimum cross-section area of the main reinforcement

$$A_{s,min} = \max \left\{ \begin{array}{l} 0,26 \cdot \frac{f_{ctm}}{f_{yk}} \cdot b_t \cdot d \\ 0,0013 \cdot b_t \cdot d \end{array} \right.$$

$$= \max \left\{ \begin{array}{l} 0,26 \cdot \frac{2,56}{500} \cdot 30 \cdot 35,8 \\ 0,0013 \cdot 30 \cdot 35,8 \end{array} \right. = \max \left\{ \begin{array}{l} 1,43 \\ 1,39 \end{array} \right. = 1,43 \text{ cm}^2$$

b) Determination of the maximum cross-section area of the main reinforcement

$$A_{s,max} = 0,04 \cdot A_c = 0,04 \cdot 30 \cdot 40 = 48 \text{ cm}^2$$

The calculations were done for the span number 5 which is span P2-P1 in cype.

Table 6.2 Values of the moment

Name	Moment (kNm)
Span	38.07
Right support	-75.14
Left support	-67.46

$$\xi_{eff,lim} = \frac{\lambda \cdot x}{d} = \lambda \cdot \frac{\varepsilon_{cu3}}{\varepsilon_{cu3} + \varepsilon_{yd}}$$

For concrete $f_{ck} \leq 50 \text{ MPa}$ $\varepsilon_{cu3} = 0,0035$

$$\varepsilon_{yd} = \frac{f_{yd}}{E_s} = \frac{435}{200\,000} = 0,002175$$

$$\xi_{eff,lim} = 0,8 \cdot \frac{0,0035}{0,0035 + 0,002175} = 0,494$$

$$\xi_{eff,lim} = \frac{z}{d} = 1 - 0,5 \cdot \xi_{eff,lim} = 1 - 0,5 \cdot 0,494 = 0,753$$

$$A_{0,lim} = \xi_{eff,lim} \cdot \zeta_{eff,lim} = 0,494 \cdot 0,753 = 0,372$$

- Span

$$M_{Ed} = M_1 = 38,07 \text{ kNm}$$

$$A_0 = \frac{M_{Ed}}{\eta \cdot f_{cd} \cdot b_w \cdot d^2} = \frac{38,07 \cdot 10^{-3}}{1,0 \cdot 16,67 \cdot 0,30 \cdot 0,358^2} = 0,0594 \leq A_{0,lim} = 0,372$$

- singly reinforced section

$$\zeta = 0,5 \cdot (1 + \sqrt{1 - 2 \cdot A_0}) = 0,5 \cdot (1 + \sqrt{1 - 2 \cdot 0,0594}) = 0,969$$

$$A_{s1,req} = \frac{M_{Ed}}{f_{yd} \cdot \zeta \cdot d} = \frac{38,07 \cdot 10^{-3}}{435 \cdot 0,984 \cdot 0,358} = 2,48 \cdot 10^{-4} \text{ m}^2 = 2,48 \text{ cm}^2$$

Adopted: **2Φ12 and 1Φ10 ($A_{s1,prov} = 3,05 \text{ cm}^2$)**

$$A_{s,min} = 1,43 \text{ cm}^2 < A_{s1,prov} = 3,05 \text{ cm}^2 < A_{s,max} = 48 \text{ cm}^2$$

- ✓ Condition is met

- Right support

$$M_{Ed} = -75,14 \text{ kNm}$$

$$A_0 = \frac{M_{Ed}}{\eta \cdot f_{cd} \cdot b_w \cdot d^2} = \frac{75,14 \cdot 10^{-3}}{1,0 \cdot 16,67 \cdot 0,30 \cdot 0,358^2} = 0,117 \leq A_{0,lim} = 0,372$$

- singly reinforced section

$$\zeta = 0,5 \cdot (1 + \sqrt{1 - 2 \cdot A_0}) = 0,5 \cdot (1 + \sqrt{1 - 2 \cdot 0,117}) = 0,937$$

$$A_{s1,req} = \frac{M_{Ed}}{f_{yd} \cdot \zeta \cdot d} = \frac{75,14 \cdot 10^{-3}}{435 \cdot 0,937 \cdot 0,358} = 5,15 \cdot 10^{-4} \text{ m}^2 = 5,15 \text{ cm}^2$$

Adopted: **6Φ10 and 1Φ12 ($A_{s1,prov} = 5,84 \text{ cm}^2$)**

$$A_{s,min} = 1,43 \text{ cm}^2 < A_{s1,prov} = 5,84 \text{ cm}^2 < A_{s,max} = 48 \text{ cm}^2$$

- ✓ Condition is met

- Left support

$$M_{Ed} = -67,46 \text{ kNm}$$

$$A_0 = \frac{M_{Ed}}{\eta \cdot f_{cd} \cdot b_w \cdot d^2} = \frac{67,46 \cdot 10^{-3}}{1,0 \cdot 16,67 \cdot 0,30 \cdot 0,358^2} = 0,105 \leq A_{0,lim} = 0,372$$

- singly reinforced section

$$\zeta = 0,5 \cdot (1 + \sqrt{1 - 2 \cdot A_0}) = 0,5 \cdot (1 + \sqrt{1 - 2 \cdot 0,105}) = 0,944$$

$$A_{s1,req} = \frac{M_{Ed}}{f_{yd} \cdot \zeta \cdot d} = \frac{67,46 \cdot 10^{-3}}{435 \cdot 0,944 \cdot 0,358} = 4,59 \cdot 10^{-4} m^2 = 4,49 cm^2$$

Adopted: **4Φ12 (A_{s1,prov} = 4,52 cm²)**

$$A_{s,min} = 1,43 cm^2 < A_{s1,prov} = 4,52 cm^2 < A_{s,max} = 48 cm^2$$

✓ Condition is met

6.1.3.2. Checking the load capacity – bending

- Span

The load capacity was checked without consideration of assembly reinforcement.

$$x_{lim} = \frac{\varepsilon_{cu3}}{\varepsilon_{cu3} + \frac{f_{yd}}{E_s}} \cdot d = \frac{3,5 \cdot 10^{-3}}{3,5 \cdot 10^{-3} + \frac{435}{200000}} \cdot 0,358 = 0,221 m$$

Calculation of the compression zone x assuming that $\sigma_{s1} = f_{yd}$:

$$\sum X = 0$$

$$x = \frac{1}{\lambda} \cdot \frac{f_{yd} \cdot A_{s1}}{\eta \cdot f_{cd} \cdot b_w} = \frac{1}{0,8} \cdot \frac{435 \cdot 3,05 \cdot 10^{-4}}{1,0 \cdot 16,67 \cdot 0,30} = 0,0332 m$$

$$x = 0,0332 m < x_{lim} = 0,221 m$$

$$\sigma_{s1} = f_{yd} = 435 MPa$$

After determining the unknown values: x, σ_{s1} it's possible to write the balance condition from which the section load capacity is calculated:

$$\sum M_{F,s1} = 0$$

$$\begin{aligned} M_{Rd} &= \eta \cdot f_{cd} \cdot b_w \cdot \lambda \cdot x \cdot (d - 0,5 \cdot \lambda \cdot x) \\ &= 1,0 \cdot 16,67 \cdot 0,30 \cdot 0,8 \cdot 0,0332 \cdot (0,358 - 0,5 \cdot 0,8 \cdot 0,0332) \\ &= 0,04579 MNm = 45,79 kNm \end{aligned}$$

$$M_{Ed} = 38,07 kNm < M_{Rd} = 45,79 kNm$$

✓ Condition is met.

- Right support

The load capacity was checked without consideration of assembly reinforcement.

$$x_{lim} = 0,221m$$

Calculation of the compression zone x assuming that $\sigma_{s1} = f_{yd}$:

$$\sum X = 0$$

$$x = \frac{1}{\lambda} \cdot \frac{f_{yd} \cdot A_{s1}}{\eta \cdot f_{cd} \cdot b_w} = \frac{1}{0,8} \cdot \frac{435 \cdot 5,84 \cdot 10^{-4}}{1,0 \cdot 16,67 \cdot 0,30} = 0,0635m$$

$$x = 0,0635m < x_{lim} = 0,221m$$

$$\sigma_{s1} = f_{yd} = 435MPa$$

After determining the unknown values: x, σ_{s1} it's possible to write the balance condition from which the section load capacity is calculated:

$$\sum M_{F,s1} = 0$$

$$\begin{aligned} M_{Rd} &= \eta \cdot f_{cd} \cdot b_w \cdot \lambda \cdot x \cdot (d - 0,5 \cdot \lambda \cdot x) \\ &= 1,0 \cdot 16,67 \cdot 0,30 \cdot 0,8 \cdot 0,0635 \cdot (0,358 - 0,5 \cdot 0,8 \cdot 0,0635) \\ &= 0,08450MNm = 84,50kNm \end{aligned}$$

$$M_{Ed} = 75,14 kNm < M_{Rd} = 84,50kNm$$

✓ Condition is met.

- Left support

The load capacity was checked without consideration of assembly reinforcement.

$$x_{lim} = 0,221m$$

Calculation of the compression zone x assuming that $\sigma_{s1} = f_{yd}$:

$$\sum X = 0$$

$$x = \frac{1}{\lambda} \cdot \frac{f_{yd} \cdot A_{s1}}{\eta \cdot f_{cd} \cdot b_w} = \frac{1}{0,8} \cdot \frac{435 \cdot 4,58 \cdot 10^{-4}}{1,0 \cdot 16,67 \cdot 0,30} = 0,0398m$$

$$x = 0,0398m < x_{lim} = 0,221m$$

$$\sigma_{s1} = f_{yd} = 435MPa$$

After determining the unknown values: x, σ_{s1} it's possible to write the balance condition from which the section load capacity is calculated:

$$\sum M_{F,s1} = 0$$

$$\begin{aligned} M_{Rd} &= \eta \cdot f_{cd} \cdot b_w \cdot \lambda \cdot x \cdot (d - 0,5 \cdot \lambda \cdot x) \\ &= 1,0 \cdot 16,67 \cdot 0,30 \cdot 0,8 \cdot 0,0398 \cdot (0,358 - 0,5 \cdot 0,8 \cdot 0,0398) \\ &= 0,05447 MNm = 54,47 kNm \end{aligned}$$

$$M_{Ed} = 67,46 kNm < M_{Rd} = 74,47 kNm$$

✓ Condition is met.

Table 6.3 Summary Span

Span				
	$A_{s,min}$	$A_{s,req}$	Max ($A_{s,min}; A_{s,req}$)	$A_{s,prov}$
Top (A'_s)	1,43	0,00	1,43	2 ϕ 10 (1,57cm ²)
Bottom (A_s)	1,43	2,48	2,48	2 ϕ 12 and 1 ϕ 10 (3,05cm ²)

Table 6.4 Summary Side of right column

Side of right column				
	$A_{s,min}$	$A_{s,req}$	Max ($A_{s,min}; A_{s,req}$)	$A_{s,prov}$
Top (A'_s)	1,43	5,15	5,15	6 ϕ 10 and 1 ϕ 12 (5,84cm ²)
Bottom (A_s)	1,43	2,19	2,19	2 ϕ 12 (2,26cm ²)

Table 6.5 Summary Side of left column

Side of left column				
	$A_{s,min}$	$A_{s,req}$	Max ($A_{s,min}; A_{s,req}$)	$A_{s,prov}$
Top (A'_s)	1,43	4,59	4,59	4 ϕ 12 (4,52cm ²)
Bottom (A_s)	1,43	1,99	1,99	2 ϕ 12 (2,26cm ²)

6.1.3.3. Dimensioning due to shearing

The minimum degree of shear reinforcement:

$$\rho_{w,min} = 0,08 \frac{f_{ck}^{0,5}}{f_{yk}} = 0,08 \frac{25^{0,5}}{500} = 0,0008m$$

Maximum stirrup spacing:

$$s_{l,max} = 0,75 \cdot d = 0,75 \cdot 0,358 = 0,26m$$

V_{Ed} - calculated transverse force in the support axis,

V_{Ed}^* - calculated lateral force at a distance d from the face of the support,

$V_{Rd,c}$ - design shear resistance due to concrete stretching occurring during shearing of a non-shear element,

$V_{Rd,s}$ computational shear resistance due to stretching of the reinforcement calculated on the shear,

$V_{Rd,max}$ - computational shear resistance due to compression of concrete struts.

- Right support

$$V_{Ed} = V_A = -79.52 \text{ kN}$$

$$V_{Ed}^* = V_A + (g + q) \cdot d = -79,52 + (19 + 2) \cdot 0,358 = -72,00 \text{ kN}$$

$$V_{Ed}^* = -72,00 \text{ kN}$$

Design shear resistance $V_{Rd,c}$ due to concrete stretching occurring during shearing of a non-shear element:

$$V_{Rd,c} = \max \left\{ \left[C_{Rd,c} \cdot k \cdot (100 \cdot \rho_1 \cdot f_{ck})^{\frac{1}{3}} + k_1 \cdot \sigma_{cp} \right] \cdot b_w \cdot d \right. \\ \left. (v_{min} + k_1 \cdot \sigma_{cp}) \cdot b_w \cdot d \right.$$

$$C_{Rd,c} = \frac{0,18}{\gamma_c} = \frac{0,18}{1,4} = 0,129$$

$$k = \min \left\{ 1 + \sqrt{\frac{200}{d}} \right. \\ \left. \frac{200}{2,0} = \min \left\{ 1 + \sqrt{\frac{200}{358}} = \min \left\{ \frac{1,747}{2,0} = 1,747 \right. \right. \right.$$

$$\rho_1 = \min \left\{ \frac{A_{sl}}{b_w \cdot d} \right. \\ \left. 0,02 \right.$$

A_{sl} - field of tension reinforcement, which extends to a distance not less than $l_{bd} + d$ beyond the considered cross-section

Assumed: $6\phi 10$ and $1\phi 12 \rightarrow A_{sl} = 5,84 \text{ cm}^2$

$$\rho_1 = \min \left\{ \frac{5,84}{30 \cdot 35,8} = \min \left\{ \frac{0,00544}{0,02} = 0,00544 \right. \right.$$

$$k_1 = 0,15$$

σ_{cp} – compressive stress in concrete at the center of gravity center, caused by longitudinal force and / or compression

$$\sigma_{cp} = \frac{N_{Ed}}{A_c}$$

$$\sigma_{cp} = \frac{0}{30 \cdot 40} = 0,00 \text{ MPa}$$

$$v_{min} = 0,035 \cdot k^{\frac{3}{2}} \cdot \sqrt{f_{ck}} = 0,035 \cdot 1,747^{\frac{3}{2}} \cdot \sqrt{25} = 0,404$$

$$V_{Rd,c} = \max \left\{ \left[0,129 \cdot 1,747 \cdot (100 \cdot 0,00544 \cdot 25)^{\frac{1}{3}} + 0,15 \cdot 0,00 \right] \cdot 300 \cdot 358 \right. \\ \left. (0,404 + 0,15 \cdot 0,00) \cdot 300 \cdot 358 \right. \\ = \max \left\{ \begin{array}{l} 5,78 \cdot 10^4 \text{ N} \\ 4,34 \cdot 10^4 \text{ N} \end{array} \right.$$

$$V_{Rd,c} = 5,78 \cdot 10^4 \text{ N} = 57,8 \text{ kN}$$

$$V_{Ed} = 79,52 \text{ kN} > V_{Rd,c} = 57,8 \text{ kN}$$

Necessary design of shear reinforcement.

Design shear resistance $V_{Rd,max}$ due to compression of concrete struts:

$$V_{Rd,max} = \frac{\alpha_{cw} \cdot b_w \cdot z \cdot v_1 \cdot f_{cd}}{\cot \theta + \tan \theta}$$

α_{cw} - coefficient depending on the state of stress in the compression belt for unstressed structures

$$\alpha_{cw} = 1,0$$

b_w - the smallest width of the part of the cross-section between the compression and tension belts

z - arm of internal forces

If the longitudinal force is equal to zero, then in the shear calculation can be taken:

$$z = 0,9 \cdot d = 0,9 \cdot 358 = 322,2mm$$

v_1 - the coefficient of reduction of the shear strength of the concrete, the recommended value is:

$$v = 0,6 \cdot \left(1 - \frac{f_{ck}}{250}\right) = 0,6 \cdot \left(1 - \frac{25}{250}\right) = 0,54$$

θ - the angle between the concrete compressed cross-brace and the beam axis perpendicular to the transverse force, in accordance with the National Annex:

$1,0 \leq \cot \theta \leq 2,0$, it was assumed:

$$\cot \theta = 2,0 (\Rightarrow \tan \theta = 0,5)$$

$$V_{Rd,max} = \frac{1,0 \cdot 300 \cdot 322,2 \cdot 0,54 \cdot 16,67}{2 + 0,5} = 348,05 \cdot 10^3 N = 348,05 kN$$

$$V_{Ed} = 79,52 kN \leq V_{Rd,max} = 348,05 kN$$

✓ Condition met - the load capacity of the pressed concrete struts is met

Designing shear reinforcement:

The length of the shear section l_w (counted from the axis of the beam) read from the computer program:

$$V_{Ed}(x = l_w) = V_{Rd,c}$$

$$l_w = 1,69m$$

Stirrup bearing capacity:

$$V_{Rd,s} = \frac{A_{sw}}{s} \cdot z \cdot f_{ywd} \cdot \cot \theta$$

After the transformation, the dependence on the required spacing of stirrups was obtained:

$$s \leq \frac{A_{sw}}{V_{Rd,s}} \cdot z \cdot f_{ywd} \cdot \cot \theta$$

A_{sw} - cross-sectional area of shear reinforcement

Double-cutted stirrups were adopted with diameter $\phi_{st} = 8mm$.

$$A_{sw} = 2 \cdot \frac{\pi \cdot \phi_{st}^2}{4} = 2 \cdot \frac{\pi \cdot 0,8^2}{4} = 1,01 cm^2 = 1,01 \cdot 10^{-4} m^2$$

$V_{Rd,s}$ - load capacity of stirrups, adopted:

$$V_{Rd,s} = V_{Ed}^* = 72,00 kN$$

f_{ywd} – calculation yield point of shear reinforcement

$$f_{ywd} = 435 \text{ MPa}$$

$$s \leq \frac{1,01 \cdot 10^{-4}}{72,00} \cdot 0,322 \cdot 435 \cdot 10^3 \cdot 2,0 \leq 0,39 \text{ m}$$

The spacing of stirrups has been adopted:

$$s = 0,20 \text{ m} \leq s_{l,max} = 0,26 \text{ m}$$

✓ Condition is met

Adopted: **Doble-cutted stirrups $\phi 8$ every 20cm**

Degree of shear reinforcement:

$$\rho_w = \frac{A_{sw}}{s \cdot b_w} = \frac{1,01}{20 \cdot 30} = 0,0017 \geq \rho_{w,min} = 0,00088 \text{ m}$$

✓ Condition is met

• Left support

$$V_{Ed} = V_A = 82,02 \text{ kN}$$

$$V_{Ed}^* = V_A - (g + q) \cdot d = 82,02 - (19 + 2) \cdot 0,358 = 74,50 \text{ kN}$$

$$V_{Ed}^* = 74,50 \text{ kN}$$

Design shear resistance $V_{Rd,c}$ due to concrete stretching occurring during shearing of a non-shear element:

$$V_{Rd,c} = \max \left\{ \begin{array}{l} \left[C_{Rd,c} \cdot k \cdot (100 \cdot \rho_1 \cdot f_{ck})^{\frac{1}{3}} + k_1 \cdot \sigma_{cp} \right] \cdot b_w \cdot d \\ (v_{min} + k_1 \cdot \sigma_{cp}) \cdot b_w \cdot d \end{array} \right.$$

$$C_{Rd,c} = \frac{0,18}{\gamma_c} = \frac{0,18}{1,4} = 0,129$$

$$k = \min \left\{ 1 + \sqrt{\frac{200}{d}} = \min \left\{ 1 + \sqrt{\frac{200}{358}} = \min \left\{ \frac{1,747}{2,0} = 1,747 \right. \right. \right.$$

$$\rho_1 = \min \left\{ \frac{A_{sl}}{b_w \cdot d} \right. \\ \left. 0,02 \right.$$

A_{sl} - field of tension reinforcement, which extends to a distance not less than $l_{bd} + d$ beyond the considered cross-section

Assumed: $4\phi 12 \rightarrow A_{sl} = 4,52 \text{ cm}^2$

$$\rho_1 = \min \left\{ \frac{4,52}{30 \cdot 35,8} = \min \left\{ \frac{0,00421}{0,02} = 0,00421 \right. \right.$$

$$k_1 = 0,15$$

σ_{cp} – compressive stress in concrete at the center of gravity center, caused by longitudinal force and / or compression

$$\sigma_{cp} = \frac{N_{Ed}}{A_c}$$

$$\sigma_{cp} = \frac{0}{30 \cdot 40} = 0,00 \text{ MPa}$$

$$v_{min} = 0,035 \cdot k^{\frac{3}{2}} \cdot \sqrt{f_{ck}} = 0,035 \cdot 1,747^{\frac{3}{2}} \cdot \sqrt{25} = 0,404$$

$$V_{Rd,c} = \max \left\{ \left[0,129 \cdot 1,747 \cdot (100 \cdot 0,00421 \cdot 25)^{\frac{1}{3}} + 0,15 \cdot 0,00 \right] \cdot 300 \cdot 358 \right. \\ \left. (0,404 + 0,15 \cdot 0,00) \cdot 300 \cdot 358 \right. \\ = \max \left\{ \begin{array}{l} 5,30 \cdot 10^4 \text{ N} \\ 4,34 \cdot 10^4 \text{ N} \end{array} \right.$$

$$V_{Rd,c} = 5,30 \cdot 10^4 \text{ N} = 53,0 \text{ kN}$$

$$V_{Ed} = 82,02 \text{ kN} > V_{Rd,c} = 53,0 \text{ kN}$$

Necessary design of shear reinforcement.

Design shear resistance $V_{Rd,max}$ due to compression of concrete struts:

$$V_{Rd,max} = \frac{\alpha_{cw} \cdot b_w \cdot z \cdot v_1 \cdot f_{cd}}{\cot \theta + \tan \theta}$$

α_{cw} - coefficient depending on the state of stress in the compression belt for unstressed structures

$$\alpha_{cw} = 1,0$$

b_w - the smallest width of the part of the cross-section between the compression and tension belts

z - arm of internal forces

If the longitudinal force is equal to zero, then in the shear calculation can be taken:

$$z = 0,9 \cdot d = 0,9 \cdot 358 = 322,2 \text{ mm}$$

v_1 - the coefficient of reduction of the shear strength of the concrete, the recommended value is:

$$v = 0,6 \cdot \left(1 - \frac{f_{ck}}{250}\right) = 0,6 \cdot \left(1 - \frac{25}{250}\right) = 0,54$$

θ - the angle between the concrete compressed cross-brace and the beam axis perpendicular to the transverse force, in accordance with the National Annex:

$1,0 \leq \cot \theta \leq 2,0$, it was assumed:

$$\cot \theta = 2,0 (\Rightarrow \tan \theta = 0,5)$$

$$V_{Rd,max} = \frac{1,0 \cdot 300 \cdot 322,2 \cdot 0,54 \cdot 16,67}{2 + 0,5} = 348,05 \cdot 10^3 N = 348,05 kN$$

$$V_{Ed} = 82,02 kN \leq V_{Rd,max} = 348,05 kN$$

✓ Condition met - the load capacity of the pressed concrete struts is met

Designing shear reinforcement:

The length of the shear section l_w (counted from the axis of the beam) read from the computer program:

$$V_{Ed}(x = l_w) = V_{Rd,c}$$

$$l_w = 1,62 m$$

Stirrup bearing capacity:

$$V_{Rd,s} = \frac{A_{sw}}{s} \cdot z \cdot f_{ywd} \cdot \cot \theta$$

After the transformation, the dependence on the required spacing of stirrups was obtained:

$$s \leq \frac{A_{sw}}{V_{Rd,s}} \cdot z \cdot f_{ywd} \cdot \cot \theta$$

A_{sw} - cross-sectional area of shear reinforcement

Double-cuttend stirrups were adopted with diameter $\phi_{st} = 8 mm$.

$$A_{sw} = 2 \cdot \frac{\pi \cdot \phi_{st}^2}{4} = 2 \cdot \frac{\pi \cdot 0,8^2}{4} = 1,01 cm^2 = 1,01 \cdot 10^{-4} m^2$$

$V_{Rd,s}$ - load capacity of stirrups, adopted:

$$V_{Rd,s} = V_{Ed}^* = 74,50 kN$$

f_{ywd} – calculation yield point of shear reinforcement

$$f_{ywd} = 435 \text{ MPa}$$

$$s \leq \frac{1,01 \cdot 10^{-4}}{74,50} \cdot 0,322 \cdot 435 \cdot 10^3 \cdot 2,0 \leq 0,38 \text{ m}$$

The spacing of stirrups has been adopted:

$$s = 0,20 \text{ m} \leq s_{l,max} = 0,26 \text{ m}$$

✓ Conditio is met

Adopted: **Doble-cuttet stirrups $\phi 8$ every 20cm**

Degree of shear reinforcement:

$$\rho_w = \frac{A_{sw}}{s \cdot b_w} = \frac{1,01}{20 \cdot 30} = 0,0017 \geq \rho_{w,min} = 0,00088 \text{ m}$$

✓ Conditio is met

Load capacity – shearing

Right support

Computational shear capacity for the assumed transverse reinforcement:

$$V_{Rd,s} = \frac{A_{sw}}{s} \cdot z \cdot f_{ywd} \cdot \cot \theta = \frac{1,01 \cdot 10^{-4}}{0,20} \cdot 0,322 \cdot 435 \cdot 10^3 \cdot 2,0 = 141,47 \text{ kN}$$

$$V_{Ed}^* = 72,00 \text{ kN} \leq V_{Rd,s} = 141,47 \text{ kN}$$

✓ Condition is met

Left support

Computational shear capacity for the assumed transverse reinforcement:

$$V_{Rd,s} = \frac{A_{sw}}{s} \cdot z \cdot f_{ywd} \cdot \cot \theta = \frac{1,01 \cdot 10^{-4}}{0,20} \cdot 0,322 \cdot 435 \cdot 10^3 \cdot 2,0 = 141,47 \text{ kN}$$

$$V_{Ed}^* = 74,50 \text{ kN} \leq V_{Rd,s} = 141,47 \text{ kN}$$

✓ Condition is met

6.1.4. Construction solution adopted

a) Materials

- concrete: C25/30
- reinforcing steel: grade B500SP, class of ductility C

b) Geometry:

- width of the cross-section: 0,30m

- height of cross-section: 0,40m

c) Reinforcement:

-Span:

Bottom reinforcement: $2\phi 12$ and $1\phi 10$

Top reinforcement: $2\phi 10$

- Right support:

Bottom reinforcement: $2\phi 12$

Top reinforcement: $6\phi 10$ and $1\phi 12$

Doble-cuttet stirrups: $2\phi 8$ every 20cm (on a distance of 1,68 m from the edge of the support)

- Left support:

Bottom reinforcement: $2\phi 12$

Top reinforcement: $4\phi 12$

Doble-cuttet stirrups: $2\phi 8$ every 20cm (on a distance of 1,62 m from the edge of the support)

d) Cover of the bars: $c_{nom} = 30mm$

6.1.5. Verification with Cype

Table 6.6 Verification with Cype

Nr of frame	Span	Moment (kNm)		Calculated Area (cm ²)		Reinforcement
				By hand	By cype	
10 Floor 2	1 (P6-P5)	Min. left side	-57.95	3.90	4.06	Top
		Min. right side	-64.60	4.38	4.55	Top
		Max.	27.58	1.18	1.84	Bottom
	2 (P5-P4)	Min. left side	-57.73	3.89	4.02	Top
		Min. right side	-64.35	4.46	4.58	Top
		Max.	28.98	1.91	1.93	Bottom

	3 (P4-P3)	Min. left side	-28.99	1.91	4.17	Top
		Min. right side	-29.74	1.96	4.10	Top
		Max.	13.36	0.87	1.43	Bottom
	4 (P3-P2)	Min. left side	-62.61	4.24	4.40	Top
		Min. right side	-62.29	4.21	4.44	Top
		Max.	28.82	1.89	1.92	Bottom
	5 (P2-P1)	Min. left side	-67.46	4.59	4.76	Top
		Min. right side	-75.14	5.15	5.33	Top
		Max.	38.07	2.52	2.55	Bottom

6.2. Column

In this section the axial forces that have some columns at the base will be calculated.

These data will be compared with those obtained in section " Structural Analysis (Cype Calculations)" through the Cype program.

A column centered on the floor of the building (P17), and a lateral column (P4) will be considered.

- **Column 17 (central):** It has an axil force (N) in its base 2197,0 kN (cype data).

Live load:

Table 6.7 Life Load on the floors

Name	Load q_k [kN/m ²]
Garage	2,0
Ground floor	3,0
Floor 1,2,3,4 and utility roof	2,0
Roof of staircase	1,0

Dead load:

Table 6.8 Dead Load on the floors

Name	Load g [kN/m ²]
Garage	3,0
Ground floor	0,44
Floor 1,2,3,4	0,76
Utility roof	3,36
Roof of staircase	3,04

$$q = [1,35 \cdot (3 + 0,44 + 4 \cdot 0,76 + 3,36) + 1,5 \cdot (2 + 3 + 5 \cdot 2)] \cdot \frac{4,80m + 4,75m}{2} \cdot \frac{5,00m + 4,85m}{2} = 2030,3 \text{ kN}$$

- **Column 4 (lateral)**: It has an axil force (N) in its base 1372,3 kN (cype data).

$$q = [1,35 \cdot (3 + 0,44 + 4 \cdot 0,76 + 3,36) + 1,5 \cdot (2 + 3 + 5 \cdot 2)] \cdot \frac{6,16m}{2} \cdot \frac{4,90m + 4,85m}{2} =$$

$$q = 1309,6 \text{ kN}$$

This check made by hand can be considered valid, since we are within the order of magnitude admitted.